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Gary Spraakman, Winnie O'Grady, Davood Askarany, Chris Akroyd,

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ERP systems and management accounting: new understandings through "nudging" in qualitative research

Gary Spraakman*
School of Administrative Studies
York University
Toronto, ON Canada M3J 1P3
garys@yorku.ca

Winifred O'Grady
Davood Askarany
Business School
University of Auckland
and

Chris Akroyd
College of Business
Oregon State University

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Abstract

Purpose - This paper seeks to show how our understanding of the effects of ERP systems on management accounting is influenced through "nudging" by researchers in their preamble to interviews. In particular, we examine how a preamble influences participants and affects their responses to subsequent open-ended questions.

Design/methodology/approach - To carry out this study, we develop a conceptual framework and compare the findings about ERP systems use from Sanchez-Rodriguez and Spraakman (2012) with the findings about ERP system use from Spraakman et al. (2015). Both studies asked the same four questions, on the impact of IT and ERP systems on management accounting, but was administered to similar groups of respondents, using different nudges.

Findings - When the impact of ERP implementation on the physical, transactional, and information flows within the firm were nudged, the responses focused on how the chart of accounts had to be expanded to account for the additional data introduced by transaction processing. When the IT and ERP system knowledge and skills were nudged, the responses tended to emphasize analyses or the use of new information through the use of drill down functionality. The research herein provides new insights and contributions to understanding how nudging affects or directs respondent assessments of the impact of ERP systems on management accounting.

Originality/value - This paper makes explicit that nudging occurs in research whether intentional or unintentional.

Keywords - Management accounting, Qualitative Research Methodology, Information Technology and Accounting, Nudging

ERP Systems and Management Accounting: New Understandings through “Nudging” in Qualitative Research

1. Introduction

The research question driving this paper is how does nudging affect respondent assessments of the impact of enterprise resource planning (ERP) systems on management accounting? Thaler and Sunstein (2009, p. 6) define nudging as “any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives.” In particular, we are interested in how nudging by qualitative researchers in their interview preamble influences participants and affects their responses to subsequent open-ended questions. There are different ways to nudge or influence how respondents make sense of the questions they are asked. Our particular interest is whether responses to questions about the impact of ERP systems are contingent on nudging or remain the same regardless of nudging. If nudging has explanatory power, it has substantial research benefits, particularly for establishing research purposes, designing survey questions, gathering evidence, and interpreting findings. Accordingly, studies on how an ERP system impacts management accounting could be approached from a range of nudges or perspectives which could reveal different attributes. We conjecture that by varying the nudging, i.e., interpreting the impact of ERP systems from different perspectives, we can broaden our understanding of the ways in which ERP systems impact management accounting.

This paper considers the nudging approaches used unintentionally in two independent qualitative research studies that address the impact of ERP systems on management accounting. In a multiple case study by Sanchez-Rodriguez and Spraakman (2012), controllers were asked

four questions about the impact of ERP systems on management accounting. Those questions were nudged or introduced with a discussion of three flows (Magal and Word, 2009) associated with ERP systems – the process of the physical activities, the processing of transactions, and the provision of information. The other study – Spraakman et al. (2015) – asked the same four questions of similar participants but changed the nudging to the IT and ERP skills required of newly graduated management accountants. The responses differed according to the nudge. More specifically, the two sets of respondents identified how ERP systems had different impacts on management accounting. In this paper we want to examine why and how nudging during an interview preamble alters responses to the same questions.

The next section gives a brief summary of the literature on nudging related to management accounting and IT and ERP systems, and develop a conceptual framework. The third section discusses the similarities in samples and methodologies of the two studies we examine – Sanchez-Rodriguez and Spraakman (2012) and Spraakman et al. (2015) – and the differences in nudging during the interview preamble. Section four describes the findings for each study, while Section five discusses the impact of nudging on the two sets of findings. The final section offers concluding comments, limitations, and suggestions for future research.

2. Conceptual Framework

The academic literature reports that ERP systems are not well understood (Chapman, 2005, 2009). According to Chapman (2005, p.688), “ERP holds out fascinating possibilities for future studies that might significantly further enhance our understanding of the nature of

management control”. The need for further research is due to the nature of ERP systems, which are multi-faceted in how they electronically connect all aspects of firms. The complexity and resulting amorphousness of ERP systems mean that they can be viewed and thereby understood from many perspectives. For example, the previously noted research of Sanchez-Rodriguez and Spraakman (2012) nudged respondents’ understanding of ERP systems towards the interplay among three flows – physical, transactional, and informational. Alternately, Scapens and Jazayeri (2003), in their seminal study, employed the information perspective to understand the role of ERP systems in changing and standardizing internal information processes. Their perspective does not explicitly address the transaction processing role of ERP systems and therefore failed to recognize the increased information generated in ERP systems as a result of this transaction processing. Furthermore, the information processing perspective adopted in their study did not focus attention on the changes made to charts of accounts as part of ERP system implementation. Sanchez-Rodriguez and Spraakman (2012) identified the increased information and expanded chart of accounts as impacts of ERP system implementation by approaching the issue from a different perspective through a nudge. We argue that the important differences in the findings of Scapans and Jazayeri (2003) and Sanchez-Rodriguez and Spraakman (2012) are due to differences in nudging.

University of Chicago behavioural economist Richard Thaler introduced the term nudge as a challenge to economic thinking in two books, *Misbehaving: The Making of Behavioral Economics* (2015) and *Nudge: Improving Decisions about Health, Wealth, and Happiness* (2009 with Cass R. Sunstein). Thaler and Sunstein (2009, p. 6) noted that, “[t]o count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates.”

Choice architecture is a term they used to describe the design of nudges to elicit certain behaviours. Thaler and Sunstein (2009) provide examples of successful nudges:

- Placing the fruit and salads before the desserts at an elementary school cafeteria to encourage [nudge] children to eat more apples and fewer Twinkies. (Thaler and Sunstein, 2009, pp. 1-11)
- Adding a confederate into an experiment to influence [nudge] a group's assessment. (Thaler and Sunstein, 2009, p. 58)
- Explicitly, stating that "more than 90 percent of Minnesotans complied, in full, with their obligations under the tax law" to nudge taxpayers in Minnesota towards greater tax compliance, Thaler and Sunstein (2009, p. 67) concluded that "[w]hen informed that the actual compliance level is high, they become less likely to cheat."

There are three basic assumptions underlying the theory of nudging: (1) people do not always make decisions that are best for themselves, (2) it is not possible to avoid other influences on choice, (3) nudges which are paternalistic do not always involve coercion. The theory behind nudging starts by dividing human responses into two cognitive camps, (1) automatic, and (2) reflective (Thaler and Sunstein, 2009, 19-39). Kahneman (2011, p. 13) has since shown that the automatic and reflective modes are not mutually exclusive. When in automatic mode, responses of people can be described as uncontrolled, effortless, associative, fast, unconscious, and skilled. In contrast, responses in the reflective mode are controlled, effortful, deductive, slow, self-aware, and rule following. The authors go on to say that using nudging with the reflective mode to effect behavior is most successful "for choices that have delayed effects; those that are difficult, infrequent, and offer poor feedback; and those for which the relation between choice and experience is ambiguous." Nudging could thus be useful when respondents are asked to focus on specific aspects of the many effects of ERP implementations.

Thaler and Sunstein (2009, pp 36-37) also equate but do not limit nudging to generic framing, e.g.,

The idea is that choice, depends, in part, on the way in which problems are stated. ... Framing works because people tend to be somewhat mindless, passive decision makers. Their Reflective System does not do the work that would be required to check and see whether reframing the questions would produce a different answer. One reason they don't do this is that they wouldn't know what to make of the contradiction. This implies that frames are powerful nudges, and must be selected with caution.

The picture that emerges is one of busy people trying to cope in a complex world in which they cannot afford to think deeply about every choice they have to make. ... Because they are busy and have limited attention they accept questions as posed rather than trying to determine whether their answers would vary under alternative formulations. The bottom line, from our point of view, is that people are, shall we say, nudge-able.

The respondents interviewed by both Sanchez-Rodriguez and Spraakman (2012) and Spraakman et al. (2015) are sophisticated senior accounting managers who are likely to have busy schedules. The multi-faceted and amorphous nature of ERP systems could assume possible multiple perspectives in responses. Moreover, Thaler and Sunstein (2009, p. 78) state that decisions involving ambiguity, infrequency, difficulty and minimal feedback are ideal candidates for nudging. These are the conditions facing respondents in both Sanchez-Rodriguez and Spraakman (2012) and Spraakman et al. (2015). Thus, nudging during the interview preamble could provide a default perspective and influence responses.

Similarly, differences in findings can be observed between Sanchez-Rodriguez and Spraakman (2012) and studies that adopt different "nudges". For example, Scapans and Jazayeri (2003, p. 201) found that ERP system implementations do not drive changes in management accounting information. They found changes, such as a reduction in routine management accounting activities, greater access for line managers to management accounting information, more future-oriented management accounting information, and broader mandates for management accountants. They acknowledged that ERP systems were associated with these

changes through “integration, standardization, routinization and centralization”. However, the authors argued that the ERP systems were not the “driver” of the information changes and that they would have occurred anyway. With different nudging, in contrast, Sanchez-Rodriguez and Spraakman (2012, p. 398) found that ERP implementations leveraged the computational power and relational databases of their systems to undertake transaction processing, forced the standardization of physical processes, extended the charts of accounts, and expanded the scope of management accounting information to include non-financial information captured during transaction processing.

The insight of this brief review, that nudging influences responses, is useful for interpreting the findings of ERP system impacts on management accounting. The multi-faceted and amorphous nature of ERP systems means individual case studies could be approached from different perspectives that reflect a “bounded system”. The view adopted means the research can be in-depth but not comprehensive (Stake, 1995; McCaslin and Scott, 2003). The bounded system reflected in individual case studies enables what Fiss and Zajac (2006, p. 1174) describe as “sensemaking” through nudging. Fiss and Zajac (2006), citing Snow et al. (1986), observe that nudges can be basically “schema of interpretation” while Hunt, Benfort and Snow (1994) view nudges as a way for respondents to “simplify and condense” their wide variety of possible responses. In effect, it may be impossible to understand a multi-faceted and amorphous phenomenon such as ERP systems comprehensively. All that is possible is to develop a partial understanding that reflects one particular schema of interpretation, theory, or perspective at a time. For this reason, Scapens and Jazayeri (2003) and Sanchez-Rodriguez and Spraakman (2012) make sense of the impact of ERP systems on management accounting in different ways.

Parker (2012, p. 59) says that qualitative studies enable researchers to “unpack” the complexity of firms and to focus on what is of interest. He adds that this level of detail is not available to quantitative researchers. Lillis and Mundy (2005, p.121) also recognize that case studies are “conducted in complex environments” in order to capture complex real-world events and interactions. Ahrens and Dent (1998), note that qualitative researchers must “engage with the field” to get rich explanations.

Thus, nudging reflects a perspective (or schema of interpretation or theory) which allows a particular “story” to emerge. This condition should not be alarming. Ahrens and Dent (1998) explain that “stories” from case studies are not the same as fiction. They differentiate sharply between the two, namely:

Social scientists discover things: novelists make them up. Social science attempts to be faithful to the observation of the real world, moving systematically from field material, through interpretation, to explanation. In contrast, fiction relies on an imaginary world. To denigrate case studies because they are stories, as Geertz (1988, p. 140) points out, is to confuse ‘making things out’ with ‘making things up’ (Ahrens and Dent, 1998, p. 9).

Ahrens and Dent (1998, p. 11) further argue that a perspective “focuses theoretical constructs onto data, rather than allowing constructs to emerge from the data.” They accept the conclusion made by Eisenhardt (1989, p. 536) that “preordained theoretical perspectives or propositions may bias and limit the findings” and that perspectives take “advantage of serendipitous findings.” In other words, nudging influences.

We argue that nudging allows the “capturing of complexity in a coherent way” (Ahrens and Dent, 1998, p. 24). There is substantial complexity with an ERP system and its impact on management accounting. A “story” is the result of a particular nudge that connects the attributes through skillful ordering in a way that makes a certain sense. Multiple perspectives can be

adopted to produce understandings about the impacts of ERP systems on management accounting, each one of which reflects a different way of making sense of the phenomenon.

The concept of nudging has practical relevance. Malina and Selto (2015) examined the use of nudges with the performance measurement model over a 15-year period at an international *Fortune 500* firm. They studied the firm's distribution channel to find support for nudging, i.e., "managers can benefit from management control systems that provide nudges to limit search activities, provide guidance, and sometimes impose restraints" (pp. 41-42). Malina and Selto (2015, p.35) measured the extent of nudging by focusing on frequencies.

To summarize, our underlying premise is that nudging occurs as a natural part of the qualitative research process. We believe that it enables researchers to influence respondents' choices about the perspective to adopt when responding to interview questions. Researchers cannot prevent themselves from nudging; researchers need to direct or control that tendency in their research designs. Lipe (1993) provides evidence that respondents are influenced by self-generated perspectives which could conflict with the research perspective. Accordingly, there is a valid need for researchers to control or influence the nudging that inevitably arises. More specifically, Lipe (1993) asked respondents to identify which of four options best represented how they had interpreted a described scenario. Respondents were asked to specify whether they thought the expenditure on budget variance investigation was a benefit (or not) to the firm and if they thought the expenditure for the investigation was a loss or a cost.¹ Thus, Lipe (1993) found how respondents placed questions into perspectives, which was essential for understanding their

¹ Lipe (1993, p. 756) found with a chi-square test that the differences were significantly significant at $p < 0.01$.

responses. We go one step further in advocating that nudging by interviewers in their preamble should be made explicit and controlled for as it will occur nevertheless.

A conceptual framework for nudging with qualitative research is shown in Exhibit 1. The nudge takes place in the preamble by establishing the choice architecture (Thaler and Sunstein, 2009; Kahneman, 2011; Thaler, 2015). Exhibit 1 shows two preambles A and B, e.g., Sanchez-Rodriguez and Sprakman (2012) and Sprakman et al. (2015), but there could be more for considering an ERP system from different perspectives. As the ERP system is amorphous, it appears to be different based on the particular preamble or nudge (Thaler and Sunstein, 2009; Kahneman, 2011; Thaler, 2015). Respondents view their ERP systems through the same questions but differently because of different preambles. Thus, we expect respondents to answer the same question differently based on the preamble provided. Consequently, the Exhibit 1 responses for question 1² from persons receiving preamble A will not correspond with responses for question 1 when they receive preamble B. Similarly, responses for question 2 from persons receiving preamble A will differ from when the same persons receive preamble B.

(Exhibit 1 – about here)

Of course there are some assumptions built into the theoretical model in Exhibit 1. The first is that the preambles are significantly different perspectives on ERP systems. Second, the questions being asked are the same, e. g., respondents subject to preamble (nudge) A will be administered the same questions as respondents subject to preamble (nudge) B. Third, although respondents will be envisaging different aspects of the same phenomena, our understanding of

² We assumed 10 for the framework but there could be more than 10 or fewer.

the impact of ERP systems on management accounting will be cumulative across case studies (Richardson, 2017).³

3. Research Methods

Both Sanchez-Rodriguez and Spraakman (2012) and Spraakman et al. (2015) use a qualitative multi-case approach to obtain a rich understanding (McCaslin and Scott, 2003) of the impact of ERP systems on management accounting. Each of these studies attempts to orient the respondents' conceptualization of these impacts by providing contextualized details and clarifying constructs and propositions (Keating, 1995). In effect, both studies attempt to create a perspective from which to "describe and explain, as well as potentially predict existing reality" (Lukka, 2005).

To address our research question – does nudging affect respondent assessments of the impact of ERP systems on management accounting? – we consider the responses of two sets of financial managers to the same four questions about the impact of ERP implementation on (1) performance measures, (2) management accounting techniques, (3) activities of management accountants and (4) the use of non-financial information.

In comparing the two multi-case studies, we are concerned with building cumulative knowledge, which Richardson (2017, p. 3) says requires an etic perspective. Etic studies "attempt to extract concepts and findings from the field in order to identify patterns across research sites." In contrast, Richardson (2017) says the opposite studies are emic, which "attempt to capture behaviours, beliefs and institutions in community members' own terms." Accordingly, our etic inquiry enables us to obtain a wider view of the impact of ERP systems. Thus, with our

³ This will be discussed in the next section.

etic perspective we are seeking to understand how nudging impacts responses to open-ended questions. A paper from an emic perspective would examine the subjects (i.e., the insiders) in regard to the nudge; instead, this paper takes an etic perspective and thus examines the impact of nudging on the responses to the questions (outsiders).

The similarity of samples and methodologies: The samples in the two studies have similarities. The Sanchez-Rodriguez and Spraakman (2012) research included controllers from 13 firms listed in Canada's Top 500 companies representing different industries and sectors. The selected firms were those identified by three consultants specializing in ERP system implementations. Telephone interviews lasting about 45 minutes were conducted after which the interview notes were typed and subsequently verified with the respective respondent.

Spraakman et al. (2015) drew a sample from the non-bank firms listed in the New Zealand's NZX Company Research database with annual sales of more than \$NZ 200 million. The CFOs at the resulting 35 firms were invited to participate in this research and to nominate two accountants employed in the firm (preferably, the CFO and a management accountant). Of the 35 CFOs contacted, 20 committed themselves (57.1% response rate) and/or their subordinates to participate in 60-minute face to face interviews. There were 39 respondents; eight CFOs, 20 controllers/managers, and 11 management accountants. All 20 firms had ERP systems, although only a few were fully integrated. The interviews were audio recorded and transcribed, and the transcriptions verified by returning them to the appropriate respondents with requests to address inaccuracies.

The firms in both Sanchez-Rodriguez and Spraakman (2012) and Spraakman et al. (2015) had ERP systems. The firms in the first study were purposely selected for the presence of an ERP

systems. Although not determined a priori, all firms in the second paper were found to have ERP systems. There is no periodization concern as firms in both papers had ERP systems, a very important factor for the present study. There are no reasons to believe that periodization is problematic.

Differences in nudging: The two studies were nudged differently. The Sanchez-Rodriguez and Spraakman (2012) study focused on the impact of ERP implementation on the physical, transactional, and information flows within the firm. While Spraakman et al. (2015) considered the IT and ERP knowledge and skills required of newly hired management accounting graduates. However, interviewees were each nudged in specific ways.

The Sanchez-Rodriguez and Spraakman (2012) interviews commenced with a discussion of the three flows. Then the four questions were asked:

1. To what extent do changes to IT lead to changes to performance measures used by your firm? What? Explain?
2. To what extent do changes to IT lead to changes to accounting techniques at your firm? What? Explain?
3. To what extent do changes to IT lead to changes to activities of accountants at your firm? What? Explain?
4. To what extent do changes to IT lead to changes to the use of non-financial information at your firm? What? Explain?

The Spraakman et al. (2015) interviews began with questions to ascertain the IT knowledge and skills required by newly hired management accounting graduates. More specifically, the following six questions were asked:

1. What is your job title?
2. What do you do?
3. Does your position description require you to have IT knowledge and skills?
4. What IT systems do you use and how do you use those systems?
5. What IT knowledge and skills do you need for using those systems to do your work?
6. What would a new university graduate need in the way of IT knowledge and skills to effectively work in your unit?

These six questions identified the context within which particular IT and ERP system knowledge and skills were applied. These question on the context were used to nudge the subsequent four questions which were the same ones posed by Sanchez-Rodriguez and Spraakman (2012, p. 406), as listed above. The same questions were thus asked accompanied by different nudging with the expectation of getting different answers (Thaler and Sunstein (2009), Kahneman, 2011), Thaler (2015), Richardson (2017).

4. Findings

a. Nudging the Impact of ERP Systems with the Three Flows

Sanchez-Rodriguez and Spraakman (2012) consider the impact of ERPs on management accounting from the perspective of physical, transactional, and information flows in firms. A summary of their research findings is presented in the next few paragraphs.

Changes to performance measures. Sanchez-Rodriguez and Spraakman (2012) argued, based on the literature, that ERP systems improve transaction processing and subsequently the quality of information utilized for measuring performance (Granlund and Malmi, 2002; Quattrone and Hooper, 2005; Hakkinen and Hilmola, 2008; Granlund, 2011). Consistent with the literature, they found that the impact of ERP systems has been to standardize performance measures, to expand their use to more organizational units and products, and to increase their accuracy and timeliness. Although the number of measures may not necessarily increase, when additional measures are introduced, they are derived from more detailed transaction processing which can support the production of additional, especially non-financial, measures.

Changes to management accounting techniques. Sanchez-Rodriguez and Spraakman (2012) proposed, based on the literature, that ERP systems do not change the techniques of management accounting (Granlund and Malmi, 2002; Scapens and Jazayeri, 2003; Spathis and Constantinides, 2004; Quattrone and Hooper, 2005; Rom and Rhode, 2006). They found that the techniques did not change, but they did become more accurate and timely and, as a result, analysis and decision making were enhanced. However, an unanticipated finding of the study was that the proliferation of data in the ERP system was driven by more detailed transaction processes reflecting an expanded and standardized chart of accounts.

This expansion of the chart of accounts was a significant change to and a major means of improving management accounting techniques (Sanchez-Rodriguez and Spraakman, 2012). The

importance of the chart of accounts in changing management accounting had not been noted in the extant literature prior to their study

Changes to management accountant activities. Based on the literature, Sanchez-Rodriguez and Spraakman (2012) expected that ERP system implementations would change the activities of management accountants by reducing the number of routine tasks undertaken and increasing their time for analyses (Granlund and Malmi, 2002; Lodh and Gaffikin, 2003; Scapens and Jazayeri, 2003; Rikhardsson and Kraemmergaard, 2005). Their findings support the literature and provide an alternative explanation for the observed changes. The authors argue that it is the extended chart of accounts applied at the transaction processing level that reduces the involvement of management accountants with data entry, while at the same time allowing them to become more involved in analyses.

Changes to the use of non-financial information. Sanchez-Rodriguez and Spraakman's (2012) hypothesized that the implementation of ERP systems would lead management accountants to use more non-financial information, despite the lack of comment in the literature suggesting such a relationship might exist (Norreklit, 2003; Spathis and Constantinides, 2004). Sanchez-Rodrigues and Spraakman (2012) argued that as ERP systems take over the recording of transaction processing data, there is an increasing amount of non-financial data for subsequent analyses. A significant contribution of the Sanchez-Rodrigues and Spraakman's (2012) study was the finding that ERP systems lead to increased use of this non-financial information by management accountants. This change has been facilitated, as expected, by transaction processing.

The results of Sanchez-Rodriguez and Spraakman's (2012) noted above will now be compared to findings from the same four questions but nudged differently.

b. Nudging the Impact of ERP Systems with IT Knowledge and Skills

Spraakman et al. (2015) considered the impact of ERPs on management accounting from the perspective of IT skills and knowledge. A summary of their research findings is presented in the next few paragraphs.

Changes to performance measures. Respondents identified that pre-ERP performance measures tended to be financial and heavily reliant on financial budget comparisons. After implementation, these financial performance measures were maintained but augmented by physical activity and transactional performance measures. For example, the capture of purchase order data in ERP systems meant that firms could now extract performance measures based on transaction histories. One respondent (3)⁴ identified two purchasing performance measures, namely "whether the order was sent on time" and "were vendors being paid on time".

Respondents noted that the proliferation of ERP-based performance measures was enabled by the system's drill down functionality which allowed users to connect financial numbers to physical activity and transactional data. The drill down functionality, very rare prior to ERP system implementations, increased the insightfulness of performance measures. It is the ability to drill down that actually improves managers' understanding of drivers of financial performance and enables them to make appropriate decisions. Respondents noted, for example, that ERP systems enhance integration among the performance measures (8) and takes the clutter away to create more value through analyses of performance measures (9). This drill down

⁴ This number refers to one of the 20 firms interviewed for this research. The firms are in random order.

facility also enhanced the ability and opportunity of management accountants to work with sales, marketing, production, and other non-accounting colleagues to develop greater insights into accounting numbers.

The usefulness of the new (physical activity and transactional) performance measures was evident in respondents' comments. For example, one respondent discovered that parking lot revenue was driven not by the hourly charge but by the turnover of spot occupancy (19) while another observed that compared to financial performance measures, physical activity and transactional performance measures provide a clearer understanding of the real revenue drivers (14). Other respondents noted that performance measures become more granular with ERP systems (6) and that scanning documents such as invoices allow management accountants to drill down to information on those documents (e.g. 5). More generally, respondent (15) said,

the worse your ERP system, the further back you are probably from the reality of what is going on. The better it can be, the closer you can get to the real root causes or root information.

Finally, the research showed that performance measures are not limited to division or business unit levels, but can be produced for a branch, store, product set, product, etc. In this way, analysis can be extended to support multiple perspectives.

Changes to management accounting techniques. The respondents all agreed that the major change to management accounting techniques was the addition of the drill down functionality. There was little in the way of drill down activity before ERP system implementations. This capacity, inherent in ERP systems, allows financial numbers to be understood in terms of physical activity and transactional details. Drill down capability is enhanced by another

technique, namely document scanning. More specifically, source documents such as invoices and purchase orders become part of the electronically retrievable database, making them quickly and easily accessible to management accountants working with these systems. Prior to ERP system implementations, source documents were stored in paper form, which made their retrieval difficult.

Capturing and electronically integrating multiple sources of data means that management accounting techniques become faster and more detailed. The automated capture of physical activity and transactional data means the information is more accurate and reliable. The electronic format also makes the techniques more flexible by allowing them to be used in conjunction with one another. For example, ERP systems can easily produce rolling forecasts (4), and can thus support more frequent reporting, including daily and even hourly updates on sales and gross margins.

Automation also supports faster periodic reporting. For example, automation allows: the general ledger accounts to be closed in fewer days after the month end; financial statements to be prepared more quickly, and the board of directors to meet sooner after the end of the reporting period. With less time devoted to month-end adjustments, management accountants can undertake more analyses.

The responsibility for capturing physical activity and transactional data used in analyses has moved from management accountants to others such as operational employees. Thus operational employees are now involved with scanning invoices and entering data regarding contracts, purchase orders, and sales. Management accounting techniques for data capture have become generalized business tools with management accountants acting more like the “caretakers” of the data repository (13). The techniques are often operationalized using templates

that ensure that users other than management accountants capture the required data (14). No matter who captures it, all data are stored in relational databases for ease of retrieval. In this way, management accounting techniques are subsumed by the system and no longer independent of it. Often the techniques are compiled into dashboards for ease and effectiveness of use (19). An example provided by one respondent (17) was that the handling of purchase orders is no longer a management accounting activity; it is the responsibility of non-management accounting personnel.

Changes to management accountant activities. According to Spraakman et al. (2015), with the implementation of ERP systems, management accountants spend less time entering data and more time on analysis. For example, they no longer prepare accounts receivable, accounts payable, or purchase orders. These activities are delegated to other users (17). One respondent (1) commented that management accountants had switched from preparing journal entries to analyses. Given that data entry is now largely done electronically or by non-accounting staff, management accountants have more time to analyze that information and direct it to decision makers to whom it is most useful.

Selected subsets of the massive amounts of data provided by ERP systems are exported to Excel, for one-off exploratory analysis, or to pre-formatted templates that automatically and regularly update certain information. More sophisticated ERP system users may rely on analytic systems such as Hyperion and Cognos to regularly extract and process data from their ERP database.

Notwithstanding the availability of supplementary analysis tools, all respondents from Spraakman et al. (2015) agreed that Excel continues to be the crucial analysis tool used by

management accountants to add value (18) – it is their “bread and butter”. One respondent (3) reflected on the ad hoc analyses opportunities presented by ERPs, observing that there is more readily available data for export into Excel, where the data can be manipulated, before being sent on with a note stating, for example, “Hey I just noticed the sale you made yesterday has no margin. What is going on?”

Management accountants now have quick and actionable access to unprecedented amounts of detailed data from which to produce useful information. This situation enables them to respond more quickly to management issues and to work with non-accounting units to add value.

Changes to use of non-financial information. The respondents to Spraakman et al. (2015) readily admitted that the focus of management accountants had shifted from financial information toward non-financial information. Typical comments include the following: “financial numbers are just saying what whereas the non-financial numbers actually tell you the why behind those numbers” (2), “non-financial information leads to more questions and understanding” (20), “all key drivers are non-financial” (6), and “non-financial information is necessary for understanding the changing nature of the business and market” (16). Spraakman et al. (2015) found, contrary to the reported literature but in agreement with Sanchez-Rodriguez and Spraakman (2012), that the availability of non-financial information increases after ERP implementations. However, where Sanchez-Rodriguez and Spraakman (2012, p. 409) found that ERP systems “generated more non-financial transactional data”. Spraakman et al. (2015) found that management accountants actually used more non-financial information.

5. Discussion

This paper considers how nudging influences the responses given to identical questions about the impact of ERP systems on management accounting. Spraakman et al. (2015) asked a comparable group of participants in comparable firms the same four questions found in Sanchez-Rodriguez and Spraakman (2012) and generated different responses. We argue the differences in response arise because the questions are nudged differently, with each study adding further insight regarding the impact that ERP systems have on management accounting. Sanchez-Rodriguez and Spraakman (2012) nudged the questions with a discussion of three flows found in ERP systems (Magal and Word, 2009), namely physical activities, transactions, and information. They discussed the role of ERP systems for transaction processing and for standardizing business activities in line with efficient and effective best practices. The four questions about the impact of ERPs on management accounting were introduced after participants considered the ERP systems as three flows. Consequently, respondents viewed the changes to management accounting more from the perspective of physical systems, transaction processing and information provision. Nudging the research from this perspective revealed that expanded chart of accounts is found in ERPs but overlooked how the details captured at the physical activity and transactional levels are being used to generate additional, particularly non-financial, information.

The Spraakman et al. (2015) study was based on a different nudge, namely the IT and ERP knowledge and skills needed by newly hired management accounting graduates. Consequently, responses provided by interviewees to the same four questions reflected their understanding of what management accountants do differently after implementing ERP systems.

Without considering nudging, one might expect similar responses from comparable groups asked the same questions. Our research reveals that nudging leads to responses which reflect different aspects of the phenomenon under investigation. Sanchez-Rodriguez and Spraakman (2012) structured their research to emphasize contributions garnered from a systems perspective while Spraakman et al. (2015) reflected a business analyses informed perspective. The differences in findings caused by different nudges are addressed below in more detail.⁵

Performance measures. Sanchez-Rodriguez and Spraakman (2012) perceived the impacts in terms of financial transaction processing. They found ERP systems are associated with more extensive and standardized charts of accounts which allow financial “performance measures to become more extensive, more detailed, and standardized” and more parts of the firm to be subjected to detailed measurement. The nudging revealed that more information was produced. In contrast, Spraakman et al. (2015) found that financial performance measures are augmented by non-financial measures covering both the processing of physical activities and transactions. To access the non-financial measures, management accountants could drill down from financial numbers to physical activity and transactional data. This type of analysis revealed the drivers of financial performance thus facilitating decision making. This focus on the knowledge and skills of newly graduated management accountants nudged participants to think about types of information that was being used to do their jobs.

Management accounting techniques. Sanchez-Rodriguez and Spraakman (2012) found the only new technique was the expansion of the chart of accounts, which was highly significant for the context examined. Spraakman et al. (2015) revealed that the major change to management

⁵ See the Appendix for the differences in more detail.

accounting techniques was the addition of drill down functionality to link financial figures to physical activity and transactional information and the scanning of source documents such as invoices and purchase orders into the database to extend the data available for drill down analysis.

Management accountant activities. Sanchez-Rodriguez and Spraakman (2012) discovered that the extended chart of accounts in ERP systems enabled more detailed analyses by management accountants, allowing them to generate more nuanced financial information. Spraakman et al. (2015) identified the IT skills management accountants require to analyze the data in ERP systems. Excel is the basic analysis tool utilized by management accountants to conduct ad-hoc and one-off exploratory analyses, and to create templates that can be automatically populated with routine data extracted from the ERP database. Sophisticated analytic systems such as Hyperion and Cognos may also be used to generate routinely reported information.

Use of non-financial information. Sanchez-Rodriguez and Spraakman (2012) found ERP systems produce more non-financial information because of the expanded chart of accounts. Spraakman et al. (2015) reached the same conclusion but also found that the drill down functionality of ERP systems led management accountants to use more non-financial information to understand the changing nature of the business.

6. Concluding Comments

Our research considered the impact of alternative nudging on the findings developed from two independent qualitative research studies and makes two contributions. The first

contribution is demonstrating how nudging is important in qualitative research and should not be neglected. This is because nudging affects how respondents interpret the questions asked of them and produces a bounded understanding of the phenomenon under investigation. The use of different nudges helps to build a more multi-dimensional understanding of complex and amorphous phenomena such as the impact of ERP systems on management accounting. This paper reveals how nudging influences respondent perceptions about the impact of ERP systems on management accounting. We showed in Exhibit 1, the conceptual framework for using the preamble for nudging with qualitative research.

This research considers the different responses produced by two studies involving similar respondents asked the same set of questions about the effects of ERP systems on management accounting. The initial study, Sanchez-Rodriguez and Spraakman's (2012), adopted a systems perspective focused on the physical activity, transactional, and information impacts of ERP systems. Spraakman et al. (2015) adopt a business analysis perspective oriented to the IT and ERP knowledge and skills required of newly hired management accounting graduates. More specifically, the systems perspective considered what the ERP systems can do for management accountants while the business analysis perspective considered how ERP systems are used by management accountants. The perspective notwithstanding, the two sets of respondents were asked to consider the impact of ERP systems on management accounting. The different nudges provide alternate but reconcilable views of these impacts. For example, Sanchez-Rodriguez and Spraakman (2012) detected the extended chart of accounts while Spraakman et al. (2015) revealed management accountants' use of the drill down facility to link financial information to activity and transactional information. Taken together, the two studies, informed by two nudges,

provide a richer and fuller understanding of the use of ERP systems in practice than would be possible using only one perspective.

The second contribution this research makes to the literature is through an augmented understanding of the impact of ERP systems on management accounting. More specifically, the business analysis perspective reveals that ERP systems: increase the timeliness of information by allowing quicker period end adjustments or closings; provide the capacity to drill-down from financial numbers to non-financial information and support more granular and non-financial explanations of performance including insights into the drivers of the financial figures. Thus, this research helps us understand how ERP systems enhance performance measures and management accounting techniques which can improve the information used for decision making. As the information provided by management accountants improves decision making there will be increased demand for management accounting analyses.

Future research could develop our understanding of the impact of ERP systems on management accounting by classifying the existing research according to the nudge or perspective adopted. The result would be an etic perspective that would allow reconciliation of existing, and perhaps identification of missing, perspectives. Another research topic could be the assessment of the self-fulfilling prophecy inherent with perspectives. This could be achieved by combining -Thaler and Sunstein's (2009) nudging with the literature on framing (Dewulf et al. 2009) to better understand how different perspectives can influence qualitative research design.

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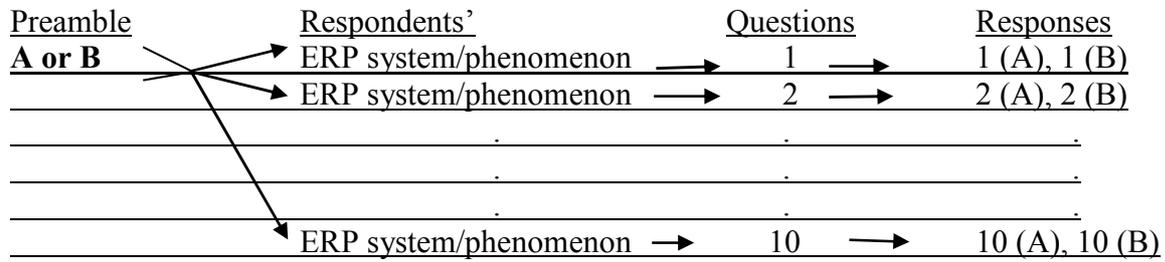
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Exhibit 1 – Conceptual Framework for using Preambles to Nudge Qualitative Research



Note, A and B must be significantly different, and thus responses: 1 (A) and 1 (B) are significantly different, 2 (A) and 2 (B) are significantly different, and 10 (A) and 10 (B) are significantly different.

Appendix Sanchez-Rodriguez and Spraakman (2012)	Spraakman et al. (2015)
<p>Changes to performance measures. “In this ERP environment, one important attribute of ERP systems identified by respondents was the extensive and standardized chart of accounts. This change in chart of accounts enabled performance measures to become more extensive, more detailed, and standardized. With the expanded physical activity and transactional information, more units and products of a firm were subject to measurement and that which had always been measured was now revealed in greater detail. The ERP transactions were standardized throughout the firm thereby forcing the performance measures to be standardized and comparable across the firm.”</p> <p>Changes to management accounting techniques. “Other than the chart of accounts, our research revealed the same results; the techniques did not change with the implementation of an ERP system. Respondent D was recorded suggesting, “The techniques did not change, but they worked faster, with better detail, and with more accuracy.”</p> <p>Changes to management accountant activities. “As expected the responses indicate that management accountants are now less involved with entering and gathering data, but more involved with analyzing information.”</p>	<p>Changes to performance measures. The respondents in discussing performance measures often started with the pre-ERP condition where performance measures tended to be financial and significantly restricted to financial budget comparisons. Although these financial performance measures were not eliminated, they have been augmented by physical activity and transactional performance measures. Respondents noted that access to these ERP-based performance measures came from drilling down from financial numbers to physical activities and transactional data. The drill down functionality, very rare prior to ERP systems, increased the insightfulness of performance measures. It was actually the drill down to drivers of financial performance that improved understanding and enabled appropriate decisions.</p> <p>Changes to management accounting techniques. The respondents all agreed that the major change to management accounting techniques was the addition of the drill down functionality. This capacity inherent with ERP systems allowed financial numbers to be understood in terms of physical activities and transactional information. This drill down technique also allowed the analysis to go to scanned source documents such as invoices and purchase orders.</p> <p>Changes to management accountant activities. Drawing upon the massive data provided by ERP systems, Excel can be used for one-off exploratory analysis as well as for creating templates to automatically extract regularly used information. With sophisticated ERP systems, analytic systems such as Hyperion and Cognos are used by management accountants to extract regularly required information from the ERP data. Nevertheless, all respondents agreed that Excel continued to be a crucial analysis tool for management accountants to add value.</p>

Changes to use of non-financial information.

“The most revealing of finding from this empirical study has been that ERP systems led to increased use of non-financial information by management accountants. ERP systems provided additional financial and non-financial information, which can be converted into performance indicators or even into key performance indicators. This information tended to be produced automatically.”

Changes to use of non-financial information.

Sanchez-Rodriguez and Spraakman (2012) found contrary to the literature that the availability non-financial information was increased after ERP implementations. Spraakman et al. (2015) reached the same conclusion, with a significant difference. Where Sanchez-Rodriguez and Spraakman (2012, p. 409) found that ERP systems “generated more non-financial transactional data”, this research found that management accountants actually used more non-financial information.