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The Intertwined Functions of Advanced Information Systems and Management Control Practice in a Municipal Context

Krister Bredmar, Ulrika Melin
School of Business and Economics, Linnaeus University, Sweden

Abstract

Background: Advanced, integrated information systems such as an enterprise resource planning (ERP) system have nowadays come to play such a crucial role for organizations and functions such as management accounting and control that in many cases, they would not function without the support of these systems. Public sector operations in general and municipal operations, in particular, are complex and require a lot of resources. Because of this, the managers working within this context need the support of advanced information systems to a large extent. **Objectives:** This paper aims at understanding how these new systems and their users, accountants, and controllers, perceive the opportunities they bring in a municipal setting. **Methods/Approach:** Out of 290 Swedish municipalities, 97 participated in the survey. **Results:** The results show that these systems have come to play an important part in working with management accounting and control issues. **Conclusions:** One conclusion that could be drawn from this study is that information supported by advanced information systems has become such an important necessity that management accounting as a function or phenomenon would not work without it. Therefore, the interdependency between information systems and management accounting and control practice could be described as intertwined.

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Introduction

Advanced information systems such as enterprise resource planning (ERP) have changed how work is done and how operations are run in a modern company. They have become so crucial for an organization that it is hard for a business process to run smoothly without digital support. These systems also change the way managers in general work with information and how functions such as management control can plan for and monitor performance differently. The advanced integrated systems also lower the cost of operations, reduce cycle time, and increase customer satisfaction, including its effects on competitive advantage (Spathis et al., 2004). This makes it even more important to understand how these systems affect control functions in general but shapes and reshapes how the accounting function supports and transforms how integrated accounting information is used within the organization (Chapman, 2005).

Presenting and analyzing accounting and management control information most often comes from a predetermined structure, for example, the structure of a financial statement that frames and puts restrictions on what kind of information is possible to present and analyze. By implementing and using ERP systems and advanced information systems and integrated use of data and information sources, new ways of understanding the information not previously thought of opens up (Quattrone et al., 2001). The ways an accounting and management control function works with, for example, financial figures and calculations change when ERP systems are implemented (Bredmar, 2017a), and new forms of non-financial performance measurement and profitability analysis are possible (Spatis et al., 2004). Implementing and working with modern, integrated, advanced information systems brings new possibilities and options to managers through new dynamic reports presented, for example, through dashboards and digital interfaces. Still, it also brings new opportunities to the accounting and management control function (Bredmar, 2017b).

This paper aims at understanding how its users, the accountant, and the controller perceive these new systems and the opportunities they bring. The intertwined functions of advanced information systems and management control are presented and discussed. Issues like how ERP systems support management accounting tasks and decision making, along with how well new systems are customized to the organization and its needs, constitute the basis for this kind of understanding. The value of the system and its ability to contribute to the company's competitive advantage in many ways builds on the ability to tailor information systems function, not to the technical advances but the needs of different functions in an organization, such as accounting and management control. For these systems to become what they were meant to be, an even deeper understanding of how users perceive the systems needs to be developed, which is the aim of this paper.

Theoretical outline

There are several purposes that, in one way or another, need to be met when investing in advanced information systems from a management control perspective. One that increases efficiency is that these systems, such as SAP, eliminate routine work (Scapens et al., 2003). This is especially true in an accounting context where cost clerks and accounting personnel previously did manual work such as cost calculation, which is now done automatically within the systems. More advanced calculations and advanced analysis reported information and performance measures to have the opportunity to become forward-looking, which could improve the information value for the management control function. The more advanced analysis and the added value the reports bring make it even more important for management accountants to assist and support other managers in understanding and supporting actions taken

based on the reports. This is something that Scapens et al. (2003) noticed. "*… the experience in BM (Europe) indicates that managers needed the support of management accountants, initially in understanding the information provided by the SAP system and then in utilizing the information for management purposes. … Within BM (Europe), we observed a widening of the role of the management accountants, and at the same time a reduction in the size of the accounting function.*"

For an IT project of this kind to become successful, the right stakeholders within the organization must decide upon what features and functions need to be supported. The easiest and most simple way of dividing the stakeholders in this kind of project is to group stakeholders with a background within the financial department and those with other experiences and preferences, working in other departments (Hyvönen, 2003). When buying and implementing an ERP system, the financial department is more interested in getting a "best of bread" system where other departments are looking for a more common solution. This could be explained by the previous experience that traditionally has come with CFOs being responsible for buying software and early digital solutions. The purpose behind buying and implementing a specific system is to reflect previous experience and understandings that come with working within a certain department.

At its simplest level, the ERP system needs to support and be able to handle an increased volume of transactions. This is especially true when dealing with large volumes of financial and management control data and information (Booth et al., 2000). "*These benefits can be seen as arising from the greater process standardization, efficiency and automation of ERP systems, which are the state-of-the-art in terms of high-volume transaction engines*" (Booth et al., 2000).

On a more general level, an ERP user benefits more from compiling better reports, for example, for decision making, especially when the reports are within the area of management accounting. Even though these new systems bring an opportunity to do even more advanced data analysis, methods and techniques that management accounting functions build on have not changed to the same extent as these systems have evolved. Even though digital support has brought new opportunities (Booth et al., 2000), the value an advanced information system such as an ERP system brings is mainly based on how the user perceives the system's benefits and opportunities. In a management process, this could be based on what kind of accounting information the system provides the manager with, which could provide the manager with more flexible information and reporting generation (Spathis et al., 2003). This could also bring improved quality when it comes to financial statement reports. These systems have become a necessary tool for companies to become and remain competitive, and they are not merely a strategic move or decision anymore. Due to their function in a modern organization, they have become a strategic necessity. And from one point of view, a management accountant needs to develop increased skills within IT and systems to be able to benefit from these new systems fully.

Since the systems have become more and more important for an organization and its strategic, competitive position, whether the systems should be customized for the organization or if the organization should adapt to the system arises. From one perspective, these systems make it possible to change the ways an organization is managed and re-engineer activities to increase efficiency. "*It is plausible that ERP system implementations require a re-organization of business processes and organizational structure but most importantly a change of management style and culture*" (Wood et al., 2001).

There is a recognition that ERP systems contribute to a companies performance (Botta-Genoulaz et al., 2005). In many ways, the implementation of an advanced

information system, such as the integrated information system, changes and transforms the organization as such and, in particular, the ability to monitor and control the operations. Labor productivity is, for example, becoming more and more dependent on these systems and the changed business practices. Real-time information increases the organization's transparency and, by doing so, also increases the ability to plan for and analyze deviations. Hunton et al. (2003) conclude that adopters of ERP systems outperformance non-adopters when it, for example, comes to return on assets and asset turnover. The cost of customizing an ERP system should then be compared to the calculated benefits, for example, in increased performance that comes with the new opportunities that the system brings.

In working with the management control function with the support of an advanced information system, management accounting and control issues are no longer dealt with within the accounting and finance function domain, 'if it ever was' as Dechow et al. (2005) state. Traditional informational hierarchies become obsolete, and the focus on interaction and distribution enhances management control across many organizational places and management functions. One could then argue that these systems have a little or moderate impact on management accounting and control since it is now done in other parts of the organization, decoupled from the accounting and financial department (Dechow et al., 2005). The intertwined function of advanced information systems and management control becomes embedded within the management function, bringing it closer to the operation and contributing to a deeper understanding of planning and control and performance management.

One challenge that organizations who start an ERP project aiming to invest in a larger integrated digital information system meet are that in many cases, the traditional solutions previously bought are based on a stand-alone solution where different business functions have their digital support and software (Bredmar, 2017a). In transforming from this way of looking at digital support and digital information systems, it has been noted that accountants tend to favor the stand-alone systems to the ERP systems, which in a way becomes a contradiction since many of the benefits that come with integrated systems lays per see in the ability to integrate different data sources. For the information system to have a new and improved impact on management accounting and control, it needs to be integrated; if not, it will have little or no impact on transformed management accounting techniques (Granlund et al., 2002).

There is a call for more in-depth research on the intertwined relation between integrated information systems and management accounting functions (Rom et al., 2007). This is especially true when specialized software supports specific management accounting functions and techniques. In many ways, these advanced techniques depend on digital support so that they would not function if digital support were absent. This also brings a new role to the accountant where new methods and insights need to be dispersed throughout the organization. But in the end, more research is needed to show how these new systems and a changed management accounting function are improving organizational performance. When done right, the fit between integrated information systems and management accounting practice could improve the understanding of how good performance is generated.

Methodological considerations

Based on the theoretical outline, 20 survey questions were formulated that evaluate and describe the respondent's understanding and experience of the intertwined function of advanced information systems and management control in different ways and dimensions. The questions are presented in appendix 1. A web-based survey tool

was used, and an email with a short introduction to the study and a link to the survey was sent out to the 290 Swedish municipalities. The subject line said that the mail should be forwarded to the CFO. Out of the 290 tentative respondents, 97 answered the survey. The survey questions began with some questions about the municipal background, trying to establish the size and character of the municipal. The following 20 questions were stated as propositions that the respondent answered with a number based on the Likert scale 1-7. For this paper, the answers have been analyzed using nine cross-tables, whereby relations between questions have been established and viewed.

Results

From a more general perspective, the respondents consider their information systems important for running smooth business operations (see Figure 1). However, the answers indicate that the organizations do not have entirely customized systems even though their ambition was that they should be entirely customized to their needs. The majority of the respondents that if their information systems are important, they have been customized to a certain degree.

Figure 1
The importance of IS and its customization

		IS importance for an efficient operation (Q19)							
		1	2	3	4	5	6	7	**Tot**
An IS customized for the operation (Q 20)	1			1					**1**
	2				2			1	**3**
	3				2				**2**
	4		1	1	5	6	3	3	**19**
	5		1	1	4	8	9	5	**28**
	6					5	9	13	**27**
	7					2	2	6	**10**
	Tot		**2**	**3**	**13**	**21**	**23**	**28**	**90**

Source: Authors' work

Similarly, there is what could be understood as a form of correlation between if the information systems are important and how employees use or approach the systems, see Figure 2. The statement (Q12) that it is hard for employees to use the systems is not approved, and the answers are somewhat lower. An interesting observation is that the main numbers of answers are in the middle, so the respondents are a bit hesitant when it comes to employees' ability to use and take advantage of the systems.

Figure 2
The importance of IS and employees' ability to use it

IS usage resistance among personal (Q12)	IS importance for an efficient operation (Q19)							
	1	2	3	4	5	6	7	**Tot**
1							1	**1**
2			1	2	4	2	4	**13**
3		1		3	1	9	5	**19**
4			1	6	6	4	6	**23**
5				2	9	6	10	**27**
6		2	1		2	1		**6**
7					1	1		**2**
Tot		**3**	**3**	**13**	**22**	**23**	**27**	**91**

Source: Authors' work

From a management accounting perspective, the answers show that it is highly important to have integrated information systems, with most answers centered on numbers 5 and 6, as shown in Figure 3. This could be contrasted and compared with the statement (Q6) that their integrated information system supports their management accounting function to a large extent. These answers show a slightly lower focus where answers 4 and 5 are at the center.

Figure 3
Integrated IS and its importance and support of MA

Integrated IS supports MA (Q6)	Integrated IS importance from an MA perspective (Q16)							
	1	2	3	4	5	6	7	**Tot**
1				1	1		2	**4**
2			1	2	3	2	1	**9**
3			2	3	3	3	1	**12**
4		2		4	8	6	3	**23**
5		1		2	7	6	3	**19**
6				2	6	6	3	**17**
7						1	2	**3**
Tot		**3**	**3**	**14**	**28**	**24**	**15**	**87**

Source: Authors' work

Similarly, the answers show that the respondents largely use the information systems to produce decision-support information and reports, see Figure 4. The answers focus on the focus that integrated information systems are important for management

accounting and that the systems are used to deliver decision support. Almost none of the respondents' answers are on the lower left side of the pivot table, which should have indicated the opposite.

Figure 4
Integrated IS, decision support, and MA

Questionable support from IS for decision making (Q13)	Integrated IS importance from an MA perspective (Q16)							
	1	2	3	4	5	6	7	**Tot**
1				1	2	1	4	**8**
2		1	2	3	9	10	4	**29**
3				5	7	7	1	**20**
4		1	2	6	3	2	3	**17**
5			1	1	7	2	1	**12**
6		1			1	2	1	**5**
7							1	**1**
Tot		**3**	**5**	**16**	**29**	**24**	**15**	**92**

Source: Authors' work

Suppose a more personal perspective is applied and compared to if the IS supports decision making the answers are a bit more dispersed, as shown in Figure 5. Here, the respondents state that the integrated IS is important for individual management control work, focusing on answers 5 and 6. But there is a tendency, not that strong, though, that there are outliners in all corners, both in the high left and right corners and in the lower left and right corners. At the same time, there is a quite strong focus in the center around 5 and 6 in the columns and on 2 and 3 in the rows, which shows the same strength since the statement for the rows is reversed with a negative notion.

Figure 5
Individual MC work, decision making, and IS importance

Questionable support from IS for decision making (Q13)	Integrated IS importance for individual MC work (Q3)							
	1	2	3	4	5	6	7	**Tot**
1	1				5		2	**8**
2		2	1	4	9	10	3	**29**
3			3	1	10	5	1	**20**
4		2	5	2	4	4		**17**
5	1			3	3	4	1	**12**
6	1			1		2	1	**5**
7				1				**1**
Tot	**3**	**4**	**9**	**12**	**31**	**25**	**8**	**92**

Source: Authors' work

In Figure 6, where two different statements that in a way build on each other, the respondents show a bit of hesitation, and the answers are focused in the middle on both axels. The answers for the statement (Q1) proposing that their information systems are up to date and suitable for the operations the focus is on numbers 5 and 4. In the same way, respondents answered in the middle, numbers 4 and 5, when it comes to the idea that the information systems have great potential but are not user friendly. The single most answered combination is 5 and 5, both in the middle of the Likert scale.

Figure 6
IS potential and suitability

Great potential in IS but not user-friendly (Q17)	Up to date IS suitable for the purpose (Q1)							
	1	2	3	4	5	6	7	Tot
1				1		1		**2**
2		1	1	2	1		1	**6**
3		1	3	5	4	2	1	**16**
4		3	5	3	12	10	2	**35**
5	2			2	16		1	**21**
6			1	5	2	3		**11**
7					1			**1**
Tot	**2**	**5**	**10**	**18**	**36**	**16**	**5**	**92**

Source: Authors' work

When asked if the integrated systems contribute to the development of the management accounting function, the answers are focused around 5 and 6, which might reflect the respondents, support for that statement (Q2), shown in Figure 7. These systems do not seem to be standard, but rather they are customized to specific needs in the organization (as stated in Q8). There is a somewhat causal relation between lower answers and higher answers relating to the two statements in the pivot table.

Figure 7
Customization IS and its ability to contribute to MA development

New IS is standard system with little customization (Q8)	Integrated IS contributes to developing MA (Q2)							
	1	2	3	4	5	6	7	Tot
1			1			1		**2**
2		1	1	2	1	2		**7**
3		1	1	2	6	5	2	**17**
4		4	3	5	8	5	1	**27**
5			2	2	6	9	2	**21**
6	1	1		3	4	4		**13**
7		1			1	2	1	**5**
Tot	**1**	**8**	**8**	**14**	**26**	**28**	**6**	**92**

Source: Authors' work

Once again, the answers show a somewhat hesitating pattern when it comes to the need to search for the right information (Q15) and the ability of the information system to produce novel information (Q11); see Figure 8. The focus in the pivot table is in the middle of numbers 4 and 5 on both axels.

Figure 8
Information overload and the ability to produce new information

New IS brings with it access to information we didn't know of (Q11)	Information-overload makes it important to select the right information (Q15)							
	1	2	3	4	5	6	7	Tot
1								
2	2				1		1	4
3	1		2	4	4	1		12
4	1	1	3	12	4	3		24
5	1	5	5	3	10	6		30
6		3	1	3	7		1	15
7				1	1	3		5
Tot	5	9	11	23	27	13	2	90

Source: Authors' work

As shown in earlier tables, the respondents state that their information systems are suitable for their needs, but the answers on the statement (Q4) saying that the information systems could deliver more value and be of more use is more diverse, see Figure 9. More than one-third of the answer agrees with the statement and thinks that the system could be of more use for them.

Figure 9
IS suitability and its ability to deliver more value

Our IS does not deliver maximal benefits (Q4)	Up to date IS suitable for the purpose (Q1)							
	1	2	3	4	5	6	7	Tot
1							3	3
2	2			1	1	2		6
3				2	4	2	1	9
4			4	5	9	3		21
5			2	3	7	4	1	17
6		3	2	5	9	3		22
7		2	2	2	5	2		13
Tot	2	5	10	18	35	16	5	91

Source: Authors' work

Discussion

Several different functions phenomena like advanced information systems and management control practice could be discussed based on the results presented in this paper. Firstly there is the issue of the value of information. In Figure 5, the results show that integrated information systems are an important part of management control work. At the same time, the respondents do not question its ability to support decision-making. In the same way, table 6 shows that the respondents think their systems are more or less up-to-date and fulfill their purpose. This aligns with Quattrone et al. (2001) reasoning about the value and understanding of the information to the organization and its users. The respondents think that their information systems are a suitable means for their work with management control.

Similarly, the answers show that if the respondent thinks it's important to have an integrated information system that supports management accounting, it also confirms that their systems support management accounting and control functions. However, the focus shown in Figure 3 is in the middle around numbers 4, 5, and 6 on both axels, which could also be interpreted as if the respondent did not fully use the advanced systems for management accounting purposes, or that other sources were more important when it came to the use of the integrated systems. Nevertheless, none of the respondents indicated low numbers, but there was a tilt over to the higher numbers. In a way, this supports Scapens and Jazayeri (2003) and their idea that advanced systems increase efficiency within the accounting function and bring new ways of understanding information value.

Booth et al. (2000) also state that these advanced systems have contributed to the ability to compile more interesting and useful reports. And from a decision-making perspective table, 4 shows that the respondents agree that information systems are important for management accounting, and it is not questionable when it comes to supporting decision making. On the other hand, Figure 8 could be interpreted as if the respondents know what they get from the systems, they are not overloaded with information, and the information is not new to them. The focus among the answers is at the center, around numbers 4 and 5. None of the respondents have answers at the far end of the scale, and they might have hesitated when answering the statements and then settled with a number in the middle.

From one important perspective, these advanced systems need to be aligned with and customized to the organizational needs and their purpose with the systems, all the way from a management accounting function out into the organization (Wood et al., 2001, Botta-Genoulaz et al., 2005, Dechow et al., 2005). This idea is supported among the respondents. For example, the answers presented in Figure 1 indicate that the respondents think the information systems are important for an efficient operation and that the information systems are customized to the operation. Even though it seems like several of the respondents are working with standard systems, not fully customized, they say that the systems contribute to developing management control as a function, as shown in Figure 7. But then again, from another perspective, as shown in Figure 9, the answers show the respondents think that the systems could deliver more, and at the same time, the systems are up to date and suit their purpose.

Conclusion

Public sector operations in general and municipal operations, in particular, are complex business that needs a lot of resources. In that sense, it becomes interesting to reflect on and study how users in this complex setting understand and experience the intertwined functions of advanced information systems and management control.

This paper has in many ways confirmed that. As discussed earlier, information has become such an important commodity that management accounting as a function or phenomenon would not work without it. It brings an even more efficient organization, and even if standard systems are used, they could contribute to new evolving management accounting functions. And from an individual management control perspective, the systems are considered important, and they bring support to decision making.

Even though this study has not been asked, one could argue that the advanced, integrated systems have come to fill such an important function for management accounting and control, so these functions probably would not have worked as efficiently without the support of these systems. From another perspective, one could also argue that the systems have found their true value within management accounting, bringing with it the ability for individual managers outside the management accounting realm to participate in traditional management control activities such as performance measurement and management, planning, and control. These systems, and the intertwined function with management accounting as they have come to play, could be compared to a backbone and a nervous system in the organization (Macintosh, 1994), making management accounting more accessible to individuals within the organization and by doing so empowering them.

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About the authors

Krister Bredmar, Professor of Business administration with a specialization in Management control at School of Business and Economics, Linnaeus University, Sweden. His research interests are divided between middle management's work, especially how it is framed within management control research, and digitalization, especially within small and medium-sized businesses. The author can be contacted at **krister.bredmar@lnu.se**

Ulrika Melin, Senior lecturer in Business administration, specializing in accounting, management accounting, and business informatics at School of Business and Economics, Linnaeus University, Sweden. She has extensive experience teaching applied management knowledge both within the accounting and informatics fields.