

The Extent of Management Support Systems Use in Accounting: Their Contribution to Performance

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Abstract

It has long been argued that management support systems, such as executive information systems, decision support systems and expert systems, have a significant contribution to make to organisations. Such use can also be seen to be conflicting with traditional roles of the accounting profession in providing information to senior management. This paper reports on an investigation into the use of such systems within organisations, as reported by the group most likely impacted – accountants.

In the last two decades, the impact of information technology (IT) development on the accounting profession has been very significant. Accountants have increasingly used various computer and telecommunication technologies in performing their duties with a view to enhancing their productivity and effectiveness. As a result, the major role of accounting professionals in business organisations has profoundly changed from being a traditional bean counter to a value-added internal adviser to the management team.

Management support systems include a range of applications and technologies that are not designed to process transactions, rather to enable the investigation of structured and semi-structured problem situations. For this study we restricted ourselves to the major categories: executive information systems, decision support systems, expert systems and data mining. These can all have some impact and involvement from the organisation's accounting function.

Impacts that have been suggested in the literature include reducing of the number of accounting staff, and hence the staff cost. Other benefits to the organisation include more relevant, accurate, and timely information available to the management. While reducing staff levels may increase the workload on the remaining staff, the overall performance of the accounting department should be improved with the enhanced information technologies. Thus we need to examine whether individuals perceived an enhancement to their job as well as an enhancement to their department's performance.

A survey was conducted to explore the nature, impact and benefits of management support systems in organisations in Hong Kong. The results demonstrate that the extent of MSS use in accounting is generally low with great potential for further improvement. The respondents perceived that the use of IT in general can help to improve their own job and, improving their department's performance. While the impact of IT applications in accounting is significant, management support systems were less widely used and contributed less to the organisational performance.

1. Introduction

The relationship and linkage between information systems (IS) and accounting have been addressed in prior research studies a few decades ago [4] [6] [8]. Since the 1960s, applications of information technology (IT) in the accounting function increased significantly. Accounting practitioners are among the pioneers in applying IT to process large volume of data and the impact of IT on accounting has been dramatic over the last several decades.

As today's executives require relevant, accurate, and real-time information to manage and control businesses effectively and efficiently, the role of management support systems (MSS) in organisations is critical to their success in the marketplace. While the generic applications of IT, such as word processing systems, spreadsheets, database systems, and packaged accounting software, in accounting operations are very common, especially in small-to-medium sized enterprises (SMEs), extensive applications of MSS are yet to be seen.

MSS creates value to management in providing strategic and summarised business information, both external and internal, for the purpose of decision making. MSS include a range of applications and technologies that are not designed to process

transactions, but to facilitate the problem solving process by investigating the structured and semi-structured problem situations. For the purpose of this study, we define MSS as those computerised information systems restricted to the major categories, including executive information systems (EIS), decision support systems (DSS), expert systems (ES), and data mining (DM).

The major benefit of increasing the use of MSS in accounting is the availability of more accurate, relevant, and timely information to the management. Other benefits include enhanced efficiency and productivity of the individual accounting staff and of the department as a whole. This will lead to a reduction of the number of accounting staff and hence the staff cost.

In view of the significant impact and benefits of MSS within organisations, in particular to the accounting function, this paper aims to explore the nature, impact and benefits of MSS in accounting in Hong Kong organisations.

2. Literature Review

2.1 Nature of management support systems

Management support systems (MSS) generally refer to those information systems that help managers at all levels to make decisions. Some systems cater for highly structured and regular decisions at tactical and operational levels while others address non-routine situations requiring subjective evaluation at strategic level. These systems are designed to incorporate both internal and external data and are presented in user-friendly ways, like graphs, charts, tables, etc. In this study, the different categories of MSS defined and included are: executive information systems (EIS), decision support systems (DSS), expert systems (ES), and online analytical processing systems (OLAP).

Executives started to use personal computers to manage their organisations in the 1970s. Rockart and Treacy [16] were the pioneers who identified the phenomenon of computer use by executives. They coined the concept of Executive Information Systems (EIS), regarding it as a system with intense data, designed to provide information for executive use in discharging their managerial duties. There are a variety of definitions for EIS [14] [15]. In summary, it is a computerised system that provides executives with easy access to internal and external information that is relevant to their critical success factors [20]. Previous researchers have addressed the benefits of implementing an EIS [10] [13]. Because of the significant impact of EIS on the role of accountants, the professional accounting bodies in Australia and USA have issued reports to their members explaining the nature of EIS and setting out their roles associated with the EIS development and use [2] [9].

Decision support systems (DSS) are structured models initially created by management scientists and operations researchers to solve business problems using a quantitative approach. It originally caters for highly structured computation and decision making processes. However, its nature changed over the years that it simply means a system providing support to managers in making decisions. Sprague [18] defines DSS as computer-based systems that help decision-makers confront ill-structured problems through direct interaction with data and analysis models. The financial models in different scenarios (what-if analysis) developed by accountants are examples of DSS.

Expert systems (ES) are those information systems that solve problems by capturing knowledge for a very specific and limited domain of human expertise in the form of a set of rules [12]. Expert systems work with a knowledge base which is the model of human knowledge represented in a way that a computer can process. A wide range of applications of ES in accounting-related areas have been addressed in the literature [1] [17].

In the 1990s, the increasing complexity and innovation in the business environment further complicate the decision process. Most of the traditional technologies can only perform two-dimensional analysis with limited insight in the information stored in the database. Coping with the expanding role of computers in everyday operations, a new type of system, On-line Analytical Processing (OLAP) has evolved to satisfy the changing and complicated information needs. The most notable feature of an OLAP system is its multidimensional and drill-through capabilities. An OLAP system gives end users easy access to large volumes of numerical data on-line through the use of a multidimensional database that reads and aggregates large groups of diverse data to analyse relationships and look for patterns, trends, and exceptions [19]. The advantage of OLAP technology is to further improve the quality and timeliness of information with deeper insight available to management.

2.2 Impact and contribution of management support systems

With the use of MSS, the major role of accountants in organisations has changed from a traditional bean counter to a

value-added internal advisor to top management [3]. An EIS could generate tremendous benefits to the organization. A survey of IS managers in the US on the grouping of EIS benefits conducted by Iyer and Aronson [10] indicates that those benefits are very broad, from the availability of data to the improvement of executive performance. Based on that study, it can be seen that the tangible and intangible costs of not using an EIS are significant. In addition, an EIS could create positive effects on the entire image of the organization, such as retaining and attracting high quality staff as well as providing a better image to the customers, suppliers, competitors and investors in the marketplace [13].

Another case study [11] demonstrates that the traditional two-dimensional view of the accounting information system has been replaced by a sophisticated, real-time multi-dimensional environment. Accountants can now manipulate the various multi-dimensional cubes to produce top-quality information to management. In summary, the benefits of the OLAP include the following [11]:

- Reduce the time and streamline the processes/systems associated with distributing, analysing, forecasting and consolidating financial management reports periodically.
- Provide better tools to analyse data underlying the line items in the monthly financial management reports more effectively and efficiently.
- Reduce the risk associated with undocumented and complex processes and reliance on one person to maintain the systems that support financial management reporting.
- Streamline and simplify the maintenance of reporting templates and supporting systems.
- Provide the potential to realise productivity gains in areas currently using inefficient reporting tools and areas responsible for coordinating, staging, distributing and consolidating financial management information.
- Provide opportunities to implement improvements in other areas such as budgeting and project reporting.

While prior studies have introduced the various benefits of using MSS in organisations, the extent of MSS use varies with industry sectors – different levels of complexity and competition in the task environment, company size – different amount of resources available, and IT management strategy – different management styles in deploying IT.

3. Research Question

Historically executives rely on the accountants to gather information for making business decisions. While significant contribution can be accrued to organisations, the increasing use of MSS will further impact and transform the nature of the tasks of accountants – from being pure system users to being a member or leader of the system development team [5].

In this study, we seek to investigate the nature, impact and benefits of MSS in organisations in Hong Kong with a focus on accounting individuals and departments. In particular, we address the following question:

- Do organisations use MSS to enhance productivity and efficiency in accounting?
- How does the use of IT help to improve both individual and departmental performance in accounting?

In order to provide an answer to the above questions, we have gathered information on whether different kinds of MSS are being used in the organisations of the respondents and on the respondents' perception of how much does the use of IT help their own performance as well as their accounting department's performance.

4. Research Methodology

In addressing the objectives of this study, we conducted a survey to the members of a professional accounting body in Hong Kong by using email. Data was collected through an instrument in the form of a questionnaire which was made available on a web site for the members to complete and submit their replies. The questionnaire aims at exploring whether the respondent's organizations use the four categories of MSS and how much does the use of MSS help to improve their individual and departmental performance.

5. Data Collection and Results

Email messages were sent to approximately 4,500 valid email addresses, 319 responses were received representing about 7% response rate. The results indicated that the distribution by industry is well-balanced. Table 1 shows the detailed distribution by industry among the respondents' organisations. The industry sectors were well-distributed. Table 2 presents the distribution by company size in terms of the number of staff. A wide range of companies was covered. Table 3 shows that a majority of the organisations have an accounting department of less than 10, with nearly one-quarter of the organisations have

3 or less accounting staff. The applications of the different categories of MSS is shown in Table 4. The respondents' perception on whether IT can help to improve their own and department's performance is listed in Table 5. The measurement is from a scale of 0 to 100 representing the magnitude of the IT impact on the performance.

Table 1: Distribution by industry

Industry	% of companies
Manufacturing	15
Financial/banking/insurance/investment services	16
Public/government services	5
Education/training/consulting services	4
Wholesale/retail/import/export trades	20
Hotels/restaurants	2
Telecommunications services	11
Transport/warehousing & supporting services	7
Real estate/construction/land development	4
Business/professional services	10
Others	6
	100

Table 2: Distribution of size of companies

No. of staff	% of companies
3 or less	7
4 to 29	23
30 to 49	8
50 to 99	13
100 to 199	11
200 to 499	15
500 to 999	5
1000 or more	17

Table 3: Distribution of size of accounting departments

No. of staff	% of companies
3 or less	24
4 to 9	29
10 to 15	17
16 to 29	11
30 to 49	8
50 to 99	5
100 to 199	3
200 or more	3

Table 4: MSS applications in accounting used by companies surveyed

MSS applications	% of companies using the application
Decision support systems (DSS)	7
Executive information systems (EIS)	12
Online analytical processing (OLAP)	7
Expert systems (ES)	5

Table 5: Perceived scores on how IT will help to improve job performance

Impact	Score (0 to 100)
improve own performance	72
improve accounting department performance	74

An indicator variable, MSS_apps, was created to count the number of MSS applications. This was then assessed as a contributor to the output, or performance variables: number of days to complete month end; improve own performance; improve accounting department performance and relative rank (top 10%, etc). In all cases no correlation was found with the raw data. That is, there was no direct relationship between the count of MSS applications and the various performance criteria.

Closer examination revealed that MSS applications are much more a phenomenon of larger organizations. Classifying large organizations as those with 100+ employees, we obtained the counts shown in Table 6.

Table 6 Number of management support applications by company size

MSS applications	Small company	Large company
0	136	108
1	15	25
2	5	10
3		7
4	6	3

Tested for independence using chi-squared shown that the number of MSS applications differed significantly with company size ($p=0.004$). The data shows that small companies have fewer MSS applications.

Two of the MSS applications accounted for these differences: 25 of the 37 organisations with EIS are large organizations and 32 of the 51 organisations with data warehouse applications are also large. These results gave significant chi-squared values ($p=0.014$ and $p=0.027$ respectively). Expert systems and decision support systems were not significantly different in their occurrence. The number of cases reporting these MSS applications is insufficient for more penetrating analysis. Case study methods are needed to explore their contributions to the organizations.

6. Analyses and Implications

The survey aims to find out what MSS applications are currently used by companies in Hong Kong. Around 90% of the companies do not have the sophisticated MSS applications in place, such as executive information systems (EIS), decision support systems (DSS), expert systems (ES), or on-line analytical processing systems (OLAP). The extent of MSS use in accounting is found to be generally low. It indicates that the potential for more MSS application in accounting is significant.

The respondents perceived that the use of IT can help to improve their own job performance with an average score of 72 for the “perceived contribution” in a scale from 0 to 100. In addition, the average score for improving their department’s performance is 74. The magnitudes of these scores indicate that the impact of IT applications in accounting is significant and tangible and intangible benefits can be accrued to individuals and organisations.

An important benefit of the application of IT in accounting is to reduce the time required to complete the regular and ad hoc financial reports to assist management in making sound business decisions. Management used to complain that the accounting information arrive too late and that it leads to untimely managerial decisions which would affect the competitive advantage of the organisation.

In recent years, intensive application of IT has reduced the time required for month-end closing process significantly and some companies have even adopted one-day reporting (ODR) as their targets. Although the extent of IT application in accounting may vary depending on industry nature, company size, and its IT management strategy, this survey provides a preliminary insight for accounting practitioners to further improve the efficiency of their accounting operations through better use of IT.

7. Limitations and Further Research

There are several limitations inherent in this research. First, the sample organisations are restricted to those having a member of the selected professional accounting body working in it. Further research is required to reach a larger sample of organisations in Hong Kong.

Second, the score that IT will help to improve performance is based on personal perception which might be affected by other others. Further research is required to develop an instrument to measure the impact of IT on the individual and team performance in accounting.

Third, only 41% of those respondents are the most senior staff in their department. The perception on how IT help their performance might be different from those who are not the most senior. Further research is required to collect data from those who are the most senior in the accounting department of their organisations.

Finally, there are other factors affecting the performance in accounting in organisations, apart from the application of IT. Further research is required to examine the relative magnitude of the IT impact on accounting performance, both individual and departmental.

8. Conclusion

The application of MSS has evolved as a strategic weapon for forward-looking organisations to achieve a competitive advantage in the marketplace. Executives can now have access to instant information from the various MSS to enhance the quality of their decisions. However, they need the assistance from the accounting professionals who now become internal advisors to reap the maximum benefits from deploying MSS. This survey demonstrates that the use of IT in general can help to improve the accountants' own job performance and their department's performance as well. While the impact of IT applications in accounting is significant, management support systems were less widely used and contributed less to the organisational performance.

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