Towards a taxonomy of accounting

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Abstract

The homological transfer research method was used to derive a tentative taxonomy of the discipline of Accounting from the Nolan and Wetherbe taxonomy of the related discipline Management Information Systems. First the Nolan and Wetherbe taxonomy was updated to reflect recent developments in MIS. Then its concepts were replaced by equivalent accounting concepts to yield a homologous taxonomy of Accounting. Finally the proposed taxonomy was validated empirically by classifying 151 articles from three Accounting Journals and by evaluating the resulting classification in terms of five success criteria.

Key Words

Framework
Taxonomy
Paradigm
Systems Theory
Homological Transfer Research Approach
Management Information Systems
Accounting

1. INTRODUCTION

There are great opportunities for research in Accounting, many of which we apparently do not even recognise (Mautz 1963). Why do we fail to recognise and exploit these opportunities for research? Perhaps the reason is that research in Accounting has often been performed on an ad hoc basis. Accounting research appears to have been influenced by fashionable trends (such as the positive approach), fashionable research methods (such as empirical research) and practical problems (such as accounting for inflation).

Ideally we need a regular review of the current scientific status of Accounting as well as planning for future research and the general development of the discipline. To evaluate the current status, a method of classifying all existing Accounting research documents should be devised. Such a classification model may also stimulate research in areas that are under-researched, or identify new areas which require research.

A taxonomy is a powerful tool that can be used to classify existing research. The Concise Oxford Dictionary defines a taxonomy as a set of principles behind a classification scheme. Vogel and Wetherbe (1984) refined the definition further by identifying three distinct types of frameworks or taxonomies:

- ☐ **domain coverage** frameworks which focus on the set of all propositions in a discipline
- ☐ **problem specific** frameworks which focus on specific problem areas and
- ☐ **methodology driven** frameworks which focus on research methodology differentiation.

The purpose of this research study is to propose a tentative domain coverage taxonomy which will serve as a means of classifying all Accounting research and which will contribute to the subsequent development of a universally acceptable taxonomy of Accounting. *Throughout this article the word Accounting refers to Financial Accounting and specifically excludes related disciplines such as Management Accounting, Taxation and Auditing.*

A taxonomy of Accounting can have several uses. First it can provide a logical organisation of the discipline which may assist educationists in explaining the complexities of Accounting to students and to people from other disciplines. Secondly it may serve as a classification scheme for past, present and future research, thus assisting Accounting researchers to generate hypotheses. Thirdly the potential for categorising research may be utilised by librarians and editors of journals to facilitate access to literature in Accounting. Fourthly theorists may use the taxonomy to assess the current status of Accounting. Finally a taxonomy can be used to analyze research preferences of research institutions, journals, standard setting bodies and even countries (Vogel and Wetherbe 1984).

A dynamic field of knowledge such as Accounting is however constantly subject to change. A successful taxonomy of Accounting should therefore be flexible so as not to inhibit the eclectic, pervasive and dynamic nature of the discipline.

2. EXISTING TAXONOMIES IN ACCOUNTING

A review of the literature indicates that only a few taxonomies have been developed in Accounting. In 1972 Johnson proposed a two-dimensional matrix as a tentative taxonomy for Accounting research. However, the two-dimensions were not mutually exclusive, and the matrix proved to be so complex that a consistent classification of research seemed remote. Pratt (1988) developed a classification scheme for Financial Accounting research which emphasised the policy making process. Although the schematic format of the Pratt model made it easy to use, the model concentrated on the narrow perspective of policy making and was constructed mainly to trace the development of research over time rather than to identify the whole study field of Accounting. In his article "Revolution in Accounting thought" Wells (1976) applied the disciplinary matrix of Kuhn (1970) to an Accounting environment. The main criticism levelled against the disciplinary matrix is that it was inflexible and adopted a monistic rather than a holistic view of science. The matrix may therefore cause the field to break up into hermetic factions and erode the creativity generated by exchanges about research topics and research methods (Banville and Landry 1989).

The Financial Accounting Standards Board embarked on a massive project in the late seventies to develop a conceptual framework for Accounting. This framework is a problem specific framework which focuses on the codification of current accounting principles and establishes a comprehensive theory of Accounting. No single governing theory of Accounting is rich enough to encompass the full range of user-environment specifications effectively, hence there exists in Accounting literature not a theory of Accounting but a collection of theories (American Accounting Association 1977). Indeed Belkaoui (1985:141) identifies Accounting as a multi-paradigmatic science with several different theories vying for acceptance. A domain coverage taxonomy of Accounting should accommodate all the theories of the discipline.

In conclusion the literature review confirms that few taxonomies have been developed in Accounting and that the majority have tended to focus on some

narrow aspect of the domain of study. Therefore a research opportunity exists to develop a taxonomy that encompasses the whole field of study of Accounting.

3. RESEARCH METHOD

A taxonomy of Accounting can be developed through a continual process of observation, validation and feedback, until concise and non-overlapping elements evolve and clear relationships are identified. Alternatively a suitable taxonomic model in a related discipline can be selected and transferred to Accounting. The latter research method - the Homological Transfer approach - was originally proposed by von Bertalanffy (1972) and was subsequently amplified by Mende (1986 and 1990).

The Homological Transfer approach recognises similarities between manufacturing, financial, educational, informational and other productive processes. These similarities imply that the corresponding disciplines should contain similar laws and techniques. Therefore an existing model in one discipline should be capable of being adapted and transferred to another discipline where the model is not yet being used.

The Homological Transfer approach consists of five steps:

a. Recognise the similarity between two productive processes.
b. Replace the concepts of the donor process with the concepts of the recipient process.
c. Validate the relationships of the transferred model in the recipient process.
d. Reuse the reasoning given in the donor process to derive new relationships in the recipient process.
e. Extend the reasoning by incorporating into the model relationships which are unique to the recipient process (Mende 1990).

In carrying out the Homological Transfer procedure the steps d and e, of theorem proving and model extension, were specifically excluded from the scope of the study. The proposed taxonomic model will probably be subject to further modifications and the application of the last two steps of the Homological Transfer approach will be premature.

Management Information Systems was selected as a donor discipline for two reasons. First, it contains several domain coverage taxonomies. Second, accounting and management information systems are both informational productive processes with several areas of similarity:

- ☐ both processes receive inputs from sources and deliver outputs to users
- ☐ both processes carry out transformations that convert inputs to outputs
- ☐ both processes receive data inputs and produce informational outputs
- ☐ both are service - orientated productive systems whose continued existence depends on the usefulness of the outputs
- ☐ the transformational processes of a manual accounting system can easily be computerised and
- ☐ many of the processes in the typical management information system are actually accounting processes.

Consequently the Homological Transfer approach was used to select, adapt and transfer a suitable MIS model to Accounting. An extensive literature survey in Management Information Systems (Koornhof 1992) identified two potential donor models, the Ives, Hamilton and Davis model (1980) and the Nolan and Wetherbe model (1980).

The Ives model was developed as a comprehensive domain coverage framework to facilitate the categorisation of all MIS research. As the model was flexible, easy to use and extensive validation had resulted in a consistent classification of research, it was identified as a potential candidate for transfer.

The comprehensive framework proposed by Nolan and Wetherbe was based on Systems Theory. As a result the model was also flexible and its schematic designs coped with the complex relationships of MIS. The model was also validated by classifying a wide spectrum of MIS articles into the taxonomy.

The latter model was ultimately selected as the most appropriate for transfer because it is based on System Theory. Systems Theory provides a simple means of categorising, understanding and synthesising knowledge, and is particularly suitable to the accounting process which is, in fact, an open system. A taxonomy based on System Theory would be adaptable and flexible and should therefore suit the eclectic, pervasive and dynamic nature of Accounting.

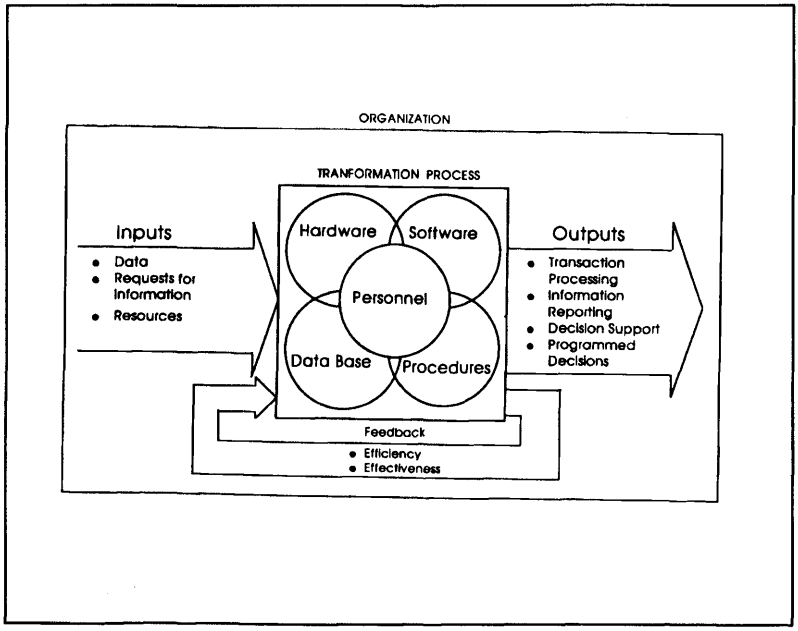
4. THE NOLAN AND WETHERBE MODEL

Nolan and Wetherbe (1980) believed that a comprehensive framework for MIS should accommodate both the eclectic and the pervasive characteristics of MIS. To that end they drew on a discipline specifically designed to cope with complexity, namely Systems Theory.

The Nolan-Wetherbe framework has two dimensions. The MIS transformation process in figure 1 transforms data to meet the information needs of the organisation. This is the practical systems dimension of MIS.

Figure 1

Model of the MIS transformation process

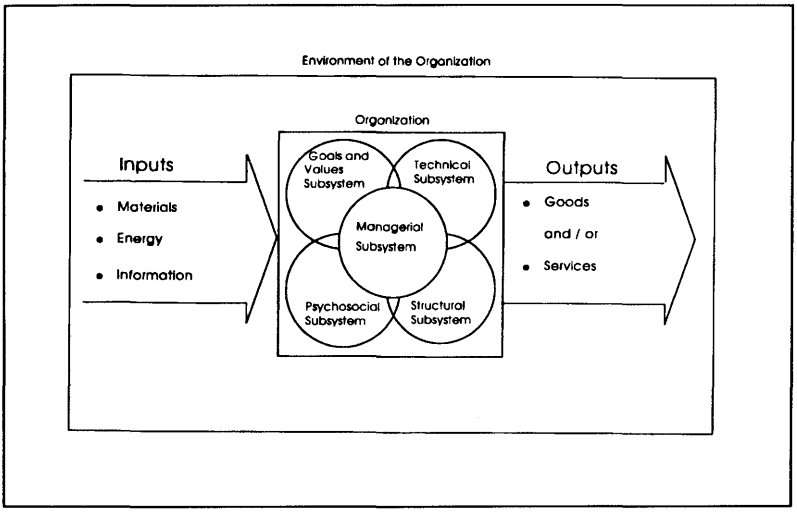


The second dimension of the model in figure 2 deals with the interaction between the MIS and its organisational environment. The practical systems

dimension of MIS in figure 1 is itself a subset of the technical subsystem in the organisational model.

Figure 2

The organisational system



5. THE TRANSFER OF THE NOLAN AND WETHERBE MODEL

The Nolan-Wetherbe model was published in 1980, but since then several changes have occurred in the field of Management Information Systems. So the model had to be updated prior to its transfer to Accounting. In the main the changes resulted in the extension of the transformation process to include management; the refinement of the environment in figure 2 into three subheadings (host organisation, task environment and general environment), and the introduction of a separate category for meta research to accommodate research about research in the discipline.

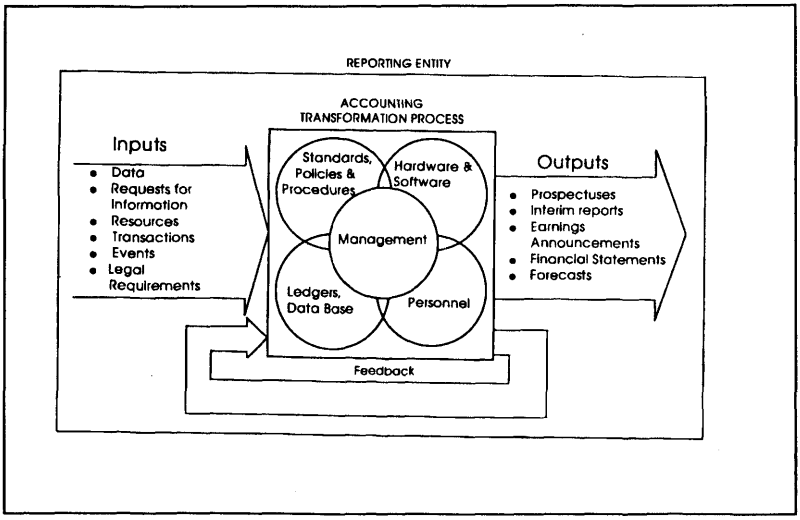
In following the required steps for a successful homological transfer, many similarities existing between management information systems and accounting systems were identified. So it was concluded that a transfer would be feasible. The concepts applicable in management information systems were then replaced

with concepts applicable in accounting. Accordingly the transformation process in figure 1 was amended as follows:

- ☐ the environment was changed from host organisation to reporting entity,
- ☐ the inputs were changed to include inputs such as transactions, events and legal requirements,
- ☐ the outputs were changed to reflect outputs such as financial statements, interim reports, earnings announcements, prospectuses,
- ☐ the computer hardware subsystem and the software subsystem were deemphasised and combined into one subsystem in the accounting system,
- ☐ the procedures subsystem of the management transformation process was renamed the standards, policies and procedures subsystem,
- ☐ the database subsystem was renamed the ledgers and database system,
- ☐ the new subsystem "Management" which was introduced in the update of the Nolan - Wetherbe model, was retained as a new branch of research in accounting.

The recommended replacement of concepts in the MIS transformation process are reflected in figure 3.

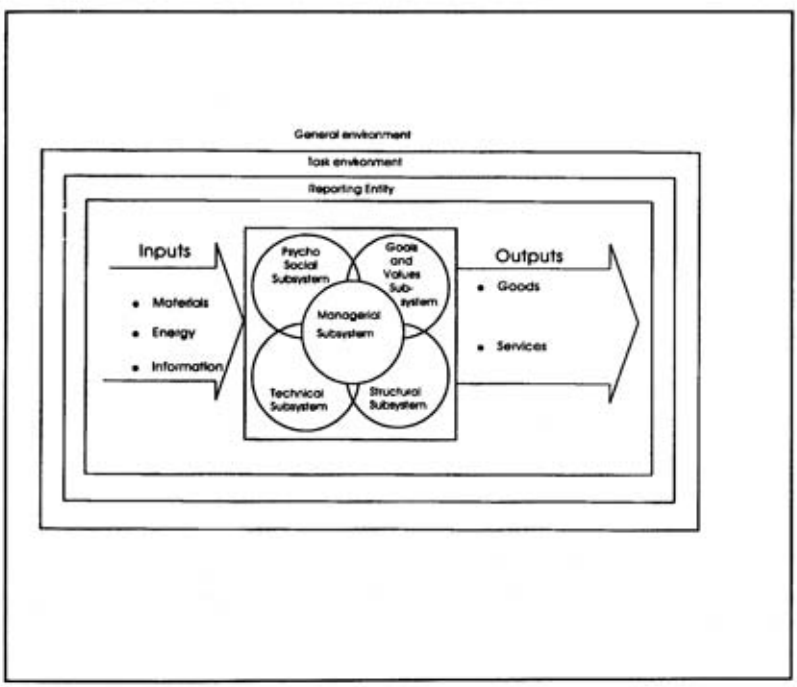
Figure 3
Model of an accounting system



The Nolan-Wetherbe organisational model in figure 2 was transferred to the accounting system with only minor changes (figure 4). As mentioned previously, the Accounting model refers to the reporting entity rather than the host organisation.

Figure 4

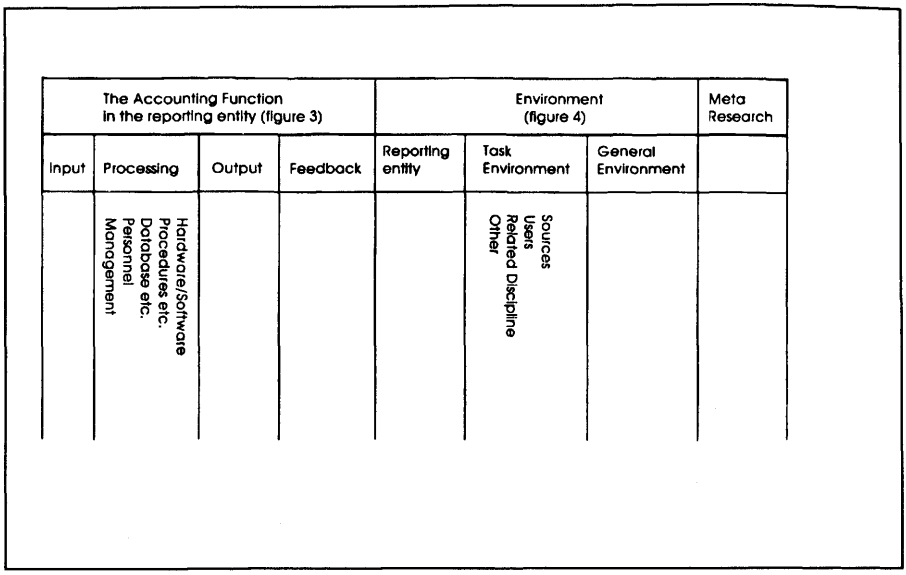
The Reporting Entity



To facilitate the immediate use and the future modification of the proposed taxonomy of Accounting, the systems in figure 3 and 4 have been represented as a matrix of categories in figure 5.

Figure 5

A tentative taxonomy of Accounting



6. VALIDATION OF THE MODEL

Step c of the Homological Transfer approach requires the validation of the transferred model in the recipient discipline. The purpose of this step is to ensure that the model's categories are appropriate to the recipient discipline, that they are unambiguous and that relationships are clearly and correctly identified. The tentative model was validated both empirically and qualitatively.

For the empirical validation a sample of research was selected from journals of three different countries:

- ☐ Accounting Review; United States of America
- ☐ Accounting & Business Review; United Kingdom
- ☐ De Ratione; South Africa.

The Accounting research articles in the 1989-1991 issues of the three journals were examined. Articles in related disciplines such as Auditing, Taxation, Management Accounting and Finance were ignored unless those articles represented inter-disciplinary research which addressed research topics in Accounting as well. The abstract of each article was scanned to identify the key issues for classification purposes.

The 151 selected research articles were successfully classified by the author within the tentative taxonomy. An extract from the classification is shown in Appendix A. The majority of articles in the sample focused on the processing and output activities of the Accounting function, the reporting entity and task environment. There was a paucity of articles in the categories of input, feedback, general environment and meta research.

Only two difficulties were encountered in the classification of the articles. The first was that research related to Accounting was not easy to distinguish from research related to Management Accounting, Finance, Auditing and Taxation. This was largely attributable to the inherent limitations of current definitions of Accounting. A major criticism of these definitions is that the boundaries of the discipline are blurred. So the problem is likely to persist until a clearer demarcation of the realm of Accounting is obtained. The second difficulty arose in identifying the key issues of research. Some abstracts mentioned several key issues others failed to give a fair reflection of the main thrust of the research. A partial solution may be to classify research on the basis of "major" emphasis and "minor" emphasis with both issues being classified, but distinguished by means of different symbols (Du Plessis and Lay 1989). Furthermore, classification should not be based purely on the abstract or key words. The body of the article should also be scanned to ensure that the abstract gives a fair reflection of the research conducted.

The qualitative validation was based on five success criteria which were selected from the literature:

- ☐ Usefulness: The taxonomy should be useful to a wide spectrum of users.
- ☐ Understandability: The taxonomy will only succeed if it is easily understood and simple to use.

- ☐ Consistent Classification: The taxonomy should allow different users to classify accounting research consistently.

- ☐ Comprehensiveness: The taxonomy should accommodate the full spectrum of research in Accounting.

- ☐ Parsimony: The taxonomy should contain only necessary distinct and non-overlapping categories.

In relation to the first criterion, the taxonomy was found to be useful in classifying the sample of research. In relation to the second, the taxonomy was easy to understand due to the schematic design, and the use of the matrix format allowed for easy classification. Thirdly, as the scope of the validation process was limited, it would be premature to assume that the qualitative characteristic of consistent classification can be met. Fourthly the taxonomy was generally found to be comprehensive as the full spectrum of research in the limited sample could be classified. Finally there was no indication that any of the categories overlapped in the classification of selected articles and therefore the parsimony criterion was met.

7. FURTHER RESEARCH

The outcome of the validation of the proposed taxonomy is not conclusive, as the sample of classified research was far too limited to allow generalised conclusions to be drawn. Furthermore the research articles were classified by one person - the author - who may be biased. So the proposed taxonomy can only become "generally accepted" if it is subjected to extensive further validation, modification and refinement. Several additional research projects are necessary to test the robustness of the taxonomy, to analyze and refine the subsystems and minor categories, and to validate the taxonomy using larger samples and more assessors. Samples should include not only articles but also textbooks, dissertations, research projects, theses and hypotheses. The sample should be classified by groups consisting of Accountants and Non-Accountants. Research should establish whether geographical area influences the consistency of classification. Each assessor should also rate the taxonomy against the pre-determined qualitative characteristics to assess its usefulness and feasibility. Further research could establish whether the taxonomy can be validated using theorem proving and whether the proposed model can be extended to include relationships peculiar only to Accounting.

8. CONCLUSION

The purpose of this style, as indicated in the title, is to *contribute towards* rather than to *establish* a generally accepted taxonomy of Accounting. Although the proposed taxonomy will requite further validation, modification and refinement it has a number of strengths which may serve as a useful starting point for further research:

- ☐ The use of System Theory resulted in a flexible model which can easily be adapted to changes in the dynamic field of Accounting.
- ☐ The schematic diagrams and tables facilitate understanding and application.
- ☐ The holistic approach of the model ensures that the full spectrum of research in Accounting can be classified .
- ☐ Success criteria for the assessment of taxonomies in Accounting are established.
- ☐ By identifying the parallelism of ideas between accounting and other productive processes, interdisciplinary research may be encouraged.
- ☐ The Nolan-Wetherbe model whose robustness has already been tested in Management Information Systems forms a sound starting point for development of a taxonomy of Accounting.

The study also identified two problem areas in Accounting. The one is the ad hoc nature of Accounting research, which results in many research opportunities being overlooked. The other problem is the paucity of meta research aimed at developing a generally accepted taxonomy of Accounting. The Accounting literature survey found only limited attempts in this research area. In addition, these taxonomies tended to be problem-specific, focused, inflexible or unyielding.

Finally, the development of an internationally accepted taxonomy of Accounting is no easy task. It will require the cumulative efforts and the pooled perspectives of many different researchers as well as adequate resources.

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Appendix A
THE ACCOUNTING REVIEW

		The Accounting Function				Environment			
	Literature	Input	Processing	Output	Feedback	Reporting Entity	Task Environment	General Environment	Meta Research
1	McNichols, M. January 1989			*			*		
2	Bothke, Jr.A.W., Lorek, K.S. & Willinger,G.L.			*		*			
3	January 1989 Ronen, J.,		*				*		
4	Aharoni,A. January 1989 Bulbitz, Z. &			*			*		
5	Etteredge, M. January 1989 Ismail, B.E. &			*			*		
6	Kim, M.K. January 1989 Deakin, E.B. January 1989		* *				*		

		The Accounting Function				Environment			
	Literature	Input	Processing	Output	Feedback	Reporting Entity	Task Environment	General Environment	Meta Research
7	Bowen, R.M. & Pfeiffer, G.M. January 1989	*	* *			*	*		
8	Defeo, V.J., Lambert, R.A.& Larcker, D.F. April 1989					*			
9	Ingram, R.W., Raman, R.K. & Wilson, E.R. April 1989			*		*	*		
10	Niehaus,G.R.April 1989		*			*			
11	Hopwood, W.& Schaefer,T April1989			*			*		*
12	Lobo G.T. & Song, I. April 1989		*	*			*		*
13	Powers, M. & Revsine,L. April 1989		*						

		The Accounting Function				Environment			
	Literature	Input	Processing	Output	Feedback	Reporting Entity	Task Environment	General Envrionment	Meta Research
14	Asquith, P., Healy, P. &	*	*	*			*		
15	Palepu, K. July 1989			*			*		
16	Moser, D.V. July 1989		* *			*			
17	Trombley, M.A.	*	* * *						
18	July 1989 Hand, J.R.M. October 1989		*	*			*		
19	Bernard,V.L. & Stober,T.L. October 1989		*	*		*	*		
20	Hill, J.W. & Ingram,R.W. October 1989			*			*		
21	Cornell, B. & Landsman, W.R. October 1989 Dempsey, S.J. October 1989			*		*	*		

		The Accounting Function				Environment			
	Literature	Input	Processing	Output	Feedback	Reporting Entity	Task Environment	General Envrionment	Meta Research
22	Newman, H.A. October 1989		*			*			
23	Thomas, J.K. October 1989		* * *	*					
24	Frost, C.A. & Bernard, V.L. October 1989		*			*	*		
25	Dye, R.A. January 1990			*			*		
26	Robinson, J.R. & Shane, P.B.	*	*						
27	January 1990 Lipe, R.			*			* *	*	
28	January 1990 DeAngelo, L.E. January 1990					*	* *		

APPENDIX A (CONTINUED)

ACCOUNTING REVIEW

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