INFORMATION TECHNOLOGY & FINANCIAL REPORTING

(A THEORETICAL & AN EMPIRICAL STUDY)

BY:

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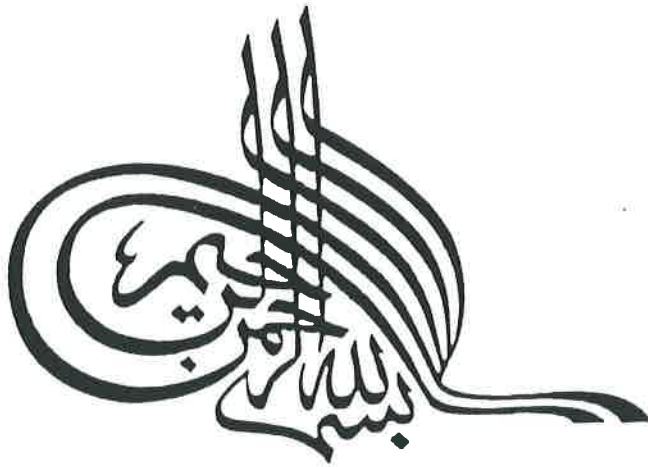
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Table of Contents

CHAPTER FIVE :THE AGGREGATION CRITERIA

CHAPTER SIX :FINANCIAL DATABASE STANDARDS

CHAPTER SEVEN: SUMMARY AND CONCLUSIONS

LIST OF TABLES

CHAPTER ONE
INTRODUCTION

1.1 Foreword

The world is witnessing what amounts to be called an "information revolution". This revolution is made possible and supported by the development and widespread use of modern and powerful communication and computing devices.

The main support to this revolution comes from the increasing capabilities of these new devices. Recently, IBM reported that it developed a floppy diskette with a storage capacity of 11.6 billion bytes. Moreover, it is estimated that the storage capacity of floppy diskette is increasing at an approximate rate of 60 % yearly and the computing power is doubling each year.

On the other hand, it is expected that about 75 % of the world population will be connected by the end of this century. The subscribers to the Internet at the end of 1997 was estimated at 60 million, and expected to reach 700 millions by the year 2000. The demand for the Internet services by individuals and companies, alike, quadruples each year. The increased computing power coupled with the increased communication links, paved the way for worldwide web, where every individual and company can reserve sites. These sites are then used to broadcast and spread news and announcements to every interested subscriber. These sites have the potential of being connected to corporate databases.

In summary, this information revolution has a startling feature that information can now be made available to almost everyone and at relatively low cost. In other words, this information revolution has passed the efficiency and effectiveness measures.

These established advancements in information technology bring us to the main concern of this study. That is, how information technology can affect the function of financial reporting. The orientation towards use of computer-based reports is vividly expressed by Hopewood et al (1990):

> The implication (of growth in information technology) extends not only to Internal management of organizations but also to the external world, as users of published accounting information begin to rely on databases of company information held on computers rather than full hard copy reports.

This trend is recently supported by results of a survey conducted by The Business Week (January 1998). It was found that 10% of the polled companies have centralized databases, 41% have databases under construction and 35% plan to have one, and only 14% do not plan to have this facility.

However, this trend is not prevalent all over the world. Many studies have shown that full utilization of information technology in the developing world faces some problems. For example, Malek and Al-Shoaibi (1998) listed the following as main barriers to gain from information technology in the developing countries:

1. Lack of information technology infrastructure, mainly telecommunications.
2. Lack of expertise.
3. Lack of government support.
4. Lack of conceiving information as an important asset.
5. Lack of national policies

However, it is suggested that these problems could be overcame by balanced investment in telecommunications infrastructure, education, training, and local research efforts. Nevertheless, even in countries, which have already taken serious steps towards information technology utilization, such as Saudi Arabia, there is no homogeneity in information technology utilization and adoption. Al–Turki and Tang (1998) found that the adoption is more observable in public and large and medium size private organizations. And even in these the use of information technology is confined to conventional uses such as accounting, human resources management, inventory control and word processing. However, it is widely believed that encouragement by low prices and the atmosphere of globalization will eliminate barriers and help and speed the process of technology adoption in the developing world in the very near future.

How all these developments affect and contribute to the development of financial accounting reporting, is the subject of this study.

1.2   Purpose of the Study

The primary purpose of this study is to analyze the possible impact of information technology on the theoretical and practical bases of financial reporting. Although many people are well aware of the influence of technological advancements on accounting practice, few are equally aware of the unlimited ways in which information technology can affect the theoretical and operational aspects of financial reporting. Thus, this study attempts first to contribute to the existing knowledge in this area by analyzing the theoretical issues in accounting and information technology that form the basis for the possible impact. Second, the study discusses the ability of information technology to contribute to the solution of current theoretical accounting reporting problems. This centers mainly on the data base structures and query systems as replacement or supplement to current accounting reports. Third, the study attempts to develop some forms of aggregation which may be permitted or required by all interested parties in accounting information and that makes the use of databases feasible.

(5)

1.3 Background and Context of the Study

External financial reporting was originally developed in the context of stewardship which required accountability for funds provided by equity investors and lenders. More recently, the uses which accounting reports are expected to serve have expanded to include, for example, measurement of managerial performance and prediction of the economic prospects of the firm. Yet companies continue to produce a single set of published reports to meet all of these uses. Recently, acknowledging that different uses can not be served by a single set of reports, attempts have been made to produce reports based, for example, on valuations other than historical cost. Published annual reports, prepared in accordance with the legal requirements and other regulations, are highly aggregated and condensed in a manner which deny users much of the details of the events that constitute the aggregate published figures.

However, the other extreme alternative is to provide details of every single transaction that takes place and made available to users through a data base system. Nevertheless, such reporting system may be meaningful but not practical (in that it may require knowledge and sophisticated users).

Thus, some form of aggregation may be in order, so as to avoid these possible problems. Furthermore, for such information in such a database to serve the users in an efficient manner, it would be necessary for the companies to store the data in a similar form and under similar classifications. In other words, these databases need to be standardized.

1.4 Significance of the Study

Aggregation, as followed by accountants, results in a loss of information to the users of financial statements. A possible alternative is to leave the information in disaggregated form to be aggregated by the eventual users. The difficulty of accommodating the new information in annual published reports in their current form, may necessitate a move towards data-base systems in which companies manage data as a centrally-controlled resource to be shared among a wide range of users. This is made possible by the significant developments in information technology. However, storing and reporting detailed information about every transaction, event, or activity may result in confusion and information overload to the users. Thus, there appears to be a need for compromise, which will reduce the information loss on the one hand but avoid information overload on the other. It seems that no studies have addressed this problem. Thus, this study is an attempt to analyze some forms of aggregation that may meet these criteria.

1.5 The Scope of the Study

The operational issues that arise in the context of this study are so many that could not be tracked in one study, if any meaningful results are to be reached. Thus, this study will be confined to explore the following issues:

1. How is an admissible transaction to be defined, so that all companies find it easy to identify without confusion
2. What attributes of a transaction (e.g. cost, price, time, quality, and location) are to be included in the database and which are not.
3. What levels and kinds of aggregation are to be allowed in the data- base?
4. What chances of success are there to define standards specifying the transactions, the admissible characteristics and levels of aggregation?

These issues seem to form an integrated accounting system or framework of reporting. However, many issues remain to be addressed such as technical specifications of database, the retrieval systems, and the security of databases.

1.6 Methodology and Implementation

An outline of the steps taken in this study to examine these selected issues is as follows:

Step1: **The Literature Review,** The literature is reviewed for the following specific purposes:
  i. To establish what work has been done so far in defining the basic concepts underlying this, such as transactions, their attributes and kinds and levels of aggregations.
  ii. To determine what effort has been made to integrate information theories with accounting approaches.

Step 2: **Financial statement analysis:** a sample of published annual reports selected from different industries from the United Kingdom and Saudi Arabia is analyzed to examine the nature of aggregation process which is likely to have taken place in producing the information contained in those reports.

Step 3: **Industry Patterns:** Analysis of financial reports is undertaken to establish the differences in the types and characteristics of transactions and in the process of aggregation among different industries.

Step 4: **Defined Criteria:** Criteria are used in deciding what kind and levels of aggregation may be permitted or required in the database.

Step 5: **Financial data base standards:** Implications of industry differences, for attempts to define standards for an accounting database, which could be applied to all companies and industries, are outlined and discussed.

1.7 Organization of the Study

The first chapter has explained the purpose of this study, the background to the problem and the significance of the study.

Chapter Two is devoted to discussion of the premises of the existing theoretical approaches to financial accounting that underline the two extremes of reporting alternatives.

Chapter Three provides a comprehensive review of the literature relevant to this study. Firstly, the theoretical contributions toward defining accounting transactions, their attributes and aggregation are reviewed. Secondly, the information system studies, which operationalize accounting attempts based on data base approaches, are examined. Thirdly, previous empirical research, which addressed the problem of aggregation in accounting reports, is reviewed and evaluated.

Chapter Four, contained the analysis of selected company financial reports, undertaken as part of this study to examine the nature of the aggregation process which takes place in current published accounts.

Chapter five develops a set of criteria to be used in deciding upon some forms and levels of aggregation.

Chapter Six examines the feasibility of achieving standards for financial databases that could be applied to all companies and industries.

Chapter Seven presents a short summary of the findings and conclusions of this study.

CHAPTER TWO
THE CURRENT FINANCIAL REPORTING FRAMEWORK

2.1 Introduction

The current published annual reports are based on the "value approach" to accounting. The value approach rests on a major assumption that the role of accounting is to provide information about the basic financial conditions and operations of the reporting entity. As such the role of accountant is to assign and select weights (values) to underlying transactions in order to convey summary of the underlying business activities.

On the other extreme stands the "value approach" to accounting, which shifts the role of accounting from indulging in valuation to reporting financial information in as a raw form as possible.

In this chapter, the premises of the two approaches are defined and analyzed and the differences between them are highlighted. Moreover, the problems of the current accounting reports based on the "value approach" are analyzed together with the solutions offered by the "events approach".

2.2 The Framework of Financial Reporting

Production of accounting reports is influenced by the accountants' perception of the objectives of these reports, the users and uses that these reports are expected to serve, the statutory requirements and other regulations that guide both measurement and communication of accounting information. In the following subsections these features are reviewed with reference to United Kingdom and Kingdom of Saudi Arabia, the two countries from which the samples used in the empirical part of this study are derived.

2.2.1. Objectives of Current Published Reports

In the UK, the Corporate Report (1975) states that:

> **The fundamental objective of corporate reports is to communicate economic measurements of and information about the resources and performance of the reporting entity useful to those having reasonable rights to such information.**
> **(Section 3.2)**

In the US, a similar study group known as " Trueblood Committee" issued a statement including a basic objective of financial statements and other subsidiary objectives. According to the statement:

The basic objective of financial statements is to provide information on which to base economic decisions.
(AICPA, October 1973)

The two reports are similar in that:
(i) The stewardship was no longer the basic objective of accounting reports.
(ii) Usefulness of economic decisions has been expressed as a criterion for accounting information.
(iii) New users, other than existing shareholders, have been identified and their information needs explicitly defined.

2.2.2. Users of Financial Statements

The Corporate Report (1975) defined users as those "having a reasonable right to information concerning the reporting entity". The following groups are identified in the report:

    i.   The equity investor group - including existing and potential shareholders
    ii.   The loan creditor group
    iii.   The employee group
    iv.   The analyst advisor group
    v.   The business contact group
    vi.   The government
    vii.   The public
    (Section 1 (9))

In the USA, the Trueblood Report identified the main recipients to whom financial reports are directed as:

Those who have limited authority, ability or resources to obtain information and who rely on financial statements as their principal source of information about an enterprise's economic activities.
(AICPA, October 1973)

The Corporate Report takes a wider view of uses of accounting than the Trueblood Report does since it includes almost all members of the society. Both reports, however, claim that while users may differ, their economic decisions are similar and so are their information needs. This view is clearly expressed in the Trueblood Report as follows:

Though users who rely on financial statements are of different types, they have certain similar information needs.
(AICPA, October 1973)

The report claims that users' needs could be identified through studying the economic decision-making.

In Saudi Arabia the statement of objectives and concepts of accounting stated the following as the main users of "general purpose" financial reports:
1-The current and potential investors and creditors
2- Suppliers and customers with current or potential dealings

Although the statement did not discarded government agencies as potential users (even partly), it argued that those agencies have the authority and resources to get the information deemed necessary (Paragraph 53).

2.2.3 The Statutory Requirements

In the United Kingdom companies are required under the Companies Acts to submit financial statements that give a "true and fair view" of the companies' affairs and operations. The statutory rules provide that:

> **The balance sheet shall give a true and fair view of the state of affairs of the company as at the end of the financial year, and of its profit or loss for the financial year.**
> **(CA1989: S 226(2), S 227(3))**

This requirement overrides all other requirements of the Act as to the matters to be included in a company's account or in notes to those accounts.
The phrase "true and fair view" is not clearly defined. Chastney commented that:

> **The Companies Act requires the presentation of a true and fair view not the true and fair view.**

Hence:

> **There is probably no one truly correct method of accounting, which would yield a single view, which is true and fair.[1]**

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[1] Chastney, J.G. True and Fair View: History, Meaning, and the Impact of the fourth directive. p. 91

It is thus possible for more than one set of financial statements to show simultaneously a true and fair view of a company's state of affairs and operations. Whether the statements give "a true and fair view" is subject to the external auditors' opinion that should accompany the published financial statements, and which is required by the Companies Act (CA 1985; Sec 236).

In Saudi Arabia the framework of disclosure consists of:

i. Company regulations
ii. Banks supervision regulations
iii. Accounting standards issued by the Saudi Organization of Certified Public Accountants (SOCPA) under the auspices of the ministry of commerce
iv. Generally accepted international accounting principles, in areas where no Saudi standards are issued
v. Disclosure standards for commercial banks issued by Saudi Arabian Monetary Agency (SAMA)

The Saudi "company regulations" of 1402 H amended 1405 H require that at the end of every financial year the board of directors shall make an inventory of the value of the company assets and liabilities as of that date. And shall prepare a balance sheet of the company, or profit and loss statement, and a report on its operations and financial position for the expired financial year (Section 5, Paragraph 123).

2.2.4. Accounting Standards

The separation of ownership and management characterized the recent development of business environment. Management has full control over the accounting and reporting system of the reporting entity. Thus, accounting standards protect the users of accounting reports from possible management bias. Furthermore, standards can help in resolving the potential conflicts of interests between user groups.

In the UK, the Accounting Standard Committee (ASC) issues statements of standard accounting practice (SSAPs). The Committee has stated that:

The standards describe the methods of accounting approved by the councils of the five accounting bodies in UK and Ireland for application to all financial accounts intended to give a true and fair view of position and profit and loss. [2]

It is required that significant departures from applicable accounting standards should be disclosed and the financial effects should be estimated and disclosed unless this would be impracticable or misleading in the context of giving a true and fair view.

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[2] Certified Accountants Members Handbook, p.401

Further, conformity with SSAPs is an indication that the financial statements are true and fair, while departure from SSAP without adequate explanation may therefore result in the financial statements not showing a true and fair view.

The Saudi Organization of Certified Public Accountants (SOCPA) requires that in preparing and auditing financial reports, there should be firm adherence to the concepts, standards that were approved by the minister of commerce, if not amended by the organization. For areas of reporting, for which no such standards or guidelines were issued by the Saudi organization, the American standards should be used after careful adaptation to the local environment and circumstances (memo 102/2 dated 1/2/1994).

Accounting standards can change over time due to the environmental changes. APB Statement No 4 stated that:

> **Generally Accepted Accounting Principles change in response to change in the economic and social conditions, to new knowledge and technology, and to demand of users for more serviceable financial information.**

This suggests that the concept of "true and fair view" is dynamic: its content changes but its meaning remains the same.

2.2.5. Aggregation in Published Financial Reports

In order to achieve the objectives of reporting accountants identify, record, and classify economic events or transactions according to pre-determined criteria. Once recorded, events of a similar nature are summarized for communication to users in financial statements. Thus, each figure on the financial statements represents many events condensed and summarized for reporting purposes.

However, the Companies Acts and Stock Exchange Regulations require certain information to be disclosed in more detail.

The Companies Act (1985) as amended in 1989 requires disclosure of an analysis of turnover between:
(a) Substantially different business activities
(b) Substantially different geographical markets

Analysis is also required of profit before tax over substantially different business activities, but the determination of different activities and markets is left to management opinion (Sch 4 (55)).

In addition to the Companies Act, listed companies are subject to stock exchange requirements. There is no legal backing to these requirements but listed company's

sign an agreement to observe the requirements and, if they do not follow them, would be in danger of having the quotation suspended. The detailed requirements include:
(a) The proportion in which turnover and profits are divided among substantially different classes of business on a group basis
(b) Geographical analysis of turnover and of the contribution to trading results of those trading operations carried on by the company (or group) outside the United Kingdom. (Stock Exchange Chapter 2, 9(b))

The Corporate Report (1975) recommended that, for each main activity there should be disclosed: Turnover, profit before tax, employment information, value added, and capital employed. It requires that the basis used for division into classes or activities should be stated, together with any significant change during the year and the principal products, services or markets as classified in the Corporate Report (Section 6.53).

2.3 "Value Approach"

The traditional approach used by accountants, according to Sorter, is the "value approach" in which they assumed that:

> Users needs are known and sufficiently well specified so that accounting theory can deductively arrive at and produce optimal input values for used and useful decision models. [3]

Hence, the role of accounting has been seen as providing information ready to incorporate in users' decision models. More specifically, Sorter stated that:

> Most value theorists assume the role of accounting to be producing optimum income and capital value or values. [4]

To carry out this role, accountants have followed various accounting conventions to produce a single set of condensed and summarized statements, which reduce the results of transactions and various business activities into a relatively small number of figures. They employ the matching of expenses and revenues in order to produce "a true and fair" income figure or figures.

This indicates that accountants have been concerned with the production of optimal input values rather than specifying the information needs of external users.

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[3] Sorter, G. (1969). An Events Approach To Accounting Theory, p.40.
[4] . Sorter, op cit. p.41

2.3.1. Problems of Aggregated Annual Published Reports

Current published annual reports prepared using the "value approach" suffers from many problems including:

i. The problem of measurement and classification
ii. The problem of aggregation and information loss
iii. The problem of information bias
iv. The problem of standards setting and
v. The problem of complexity[5]

Recognizing these problems, Sorter (1969) proposed an "events approach" to replace or supplement the "value approach" upon which current reports are based. In the following sections we review the underlying assumptions of the "events approach" and the solutions which it offers for current reporting problems.

2.4 The Events Approach

The main premise upon which the events approach rests, is the definition of the role of accounting, which is stated as being:

> **To provide information about relevant economic events that might be useful in a variety of decision models.[6]**

Sorter's view of the role of accounting is compatible with Ijiri's earlier definition of accounting as a system of communicating the economic events of an entity[7]. But, Sorter's approach assigns an active role to the user, as he or she selects and makes use of the information, which is more appropriate to the decision at hand. The events approach asserts that users needs are unknown and perhaps unknowable, and for that reason:

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[5] Claire, M. Winlow, An Analysis of the practicability of replacing governmental annual reports with a computerized database

[6] Sorter, G. op cit. p. 41

[7] Ijiri, Y.Foundation Of Accounting Measurement, p.3

Less rather than more aggregation is appropriate and the user, rather than accountant, must aggregate, and assign weights and values to the data consistent with his forecasts and utility function. [8]

The call for less aggregation by proponents of the "events" approach is because aggregation involves summarization or condensation of data, to the extent that identification of the various details comprising the aggregate is difficult or impossible. This results in information loss to those who use the data.

2.4.1. Disaggregation as a Solution to Current Reporting Problems

Recently, the need arises for more information that may be relevant to serve purposes other than the stewardship function. Alternative accounting models such as current purchasing power and current cost accounting (SSAP 16) have been proposed as alternatives or supplements to historical cost model. The logic behind the proposals is that different valuation statements are different for different users. AAA (ASOBAT)[9] recommended a multi-column report in which historical cost and current cost information appear in adjacent columns. Sorter commented that:

Multi-column reporting seems eminently compatible with an "events" view of accounting.[10]

Because not all events lie within the boundaries of historical cost and current cost, however, Sorter said that: The two columns advocated do not go far enough, but they represent a start.[11]

How does an "events approach" solve the problems of current reports, which were identified above? To answer this question we examine these problems together with the solutions offered by a reporting system based upon an "events" approach.

2.4.2. The Problem of Measurement and Classification

Most accounting measurements are expressed in monetary terms. Therefore, the day-to-day transactions of business undertaken in many different units of measurement have all to be converted to money values. Other characteristics of transactions are ignored either because accountants consider them difficult to quantify or because they

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[8] 7. Ijiri, Y.Foundation Of Accounting Measurement, p.3

[9] AAA. A Statement of Basic Accounting Theory
[10] Sorter, G.op cit. p.46
[11] Sorter, G. op cit p.46

(16)

are considered irrelevant to the users of accounting reports. Belkaoui stressed that this is one of the major flaws of accounting measurement since it precludes maintenance and use of productivity, performance, reliability, and other multi-dimensional data [12].

The other aspect of the measurement problem is clear in periods of high inflation where the monetary units of different periods are added together as if they are identical. AAA (SOATATA) expressed the problem as follows:

Accountants at present treat all assets, liabilities, expenses and revenues as being mutually additive, but this involves aggregating dollars of unlike purchasing power as though their purchasing power was identical.[13]

Revsine [14] argues that the motivation to the data expansion school has come mainly from the inability to reach an agreement on a specifically defined income measurement model. The controversy continues over the relative merits of the alternative methods of measurement. This, however, does not cause a problem to "events theorists". Sorter expressed the view that:

The concern of "events" theorists is not primarily with the final figure but rather with describing critical operating activities of a firm.[15]

Classification, on the other hand, is much easier and more flexible under an "events approach" than under a "value approach". The detailed and disaggregated information gives more flexibility by reporting events in less aggregated form, which users can then manipulate, aggregate, and summarize as they wish. The lower the level of aggregation the greater will be the flexibility of the user in manipulating the information.

2.4.3. The Aggregation Problem and Information Loss

Although current published accounts are now required by statute or stock exchange to contain information, which was not previously available and may also contain some detailed information voluntarily, submitted by management, they are still highly aggregated and condensed. Since relatively small number of items rather than detailed information is communicated, there is considerable loss of information to the users. The aggregated balances conceal the various events that compose them, and the loss occurs because of the inability of the users to disaggregate the already aggregated

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[12] Belkaoui, A. Accounting Theory, p.81

[13] AAA. A Statement of Basic Accounting Theory. Op. cit.

[14] Revsine, L. (1970). Data Expansion and Conceptual Structure, p.710

[15] 15. Sorter, op. cit. p.44

reports. However, the effects of this information loss may differ from one user to another, depending on the utility each user places on the information. By its very nature, the "events" approach calls for an expansion of data to be communicated to users of accounting information in a less aggregated form. Sorter said that:

> While they (events' proponents) agree that the accountants' suggested weights and values deserve to be communicated, they would insist that these weights to be communicated in disaggregated form.[16]

2.4.4. The Problem of Information Bias

This problem arises out of the conflicting nature of the users needs, and the wide range of valuation practices available to and acceptable by accountants. Specifically, this information bias exists when one accounting treatment is seen to be favoring one user group at the expense of another user group. For accounting information to serve the users and be accepted by them, it should be free from bias to any group (including management). However, this is a difficult requirement for accounting to achieve under the existing reporting practices. AAA (ASOBAT) advocated freedom from bias as a desirable quality for accounting information. It states that:

> The standard of freedom from bias is advocated because of the many users accounting serves and the many uses to which it may be put. The presence of bias, which may serve the needs of one set of users cannot be assumed to aid or even leave unharmed the interests of others.[17]

The eventual result of information bias, may be a loss of faith in the credibility of accounting as a neutral and independent measurement and communication system. In Solomon's words:

> If it ever becomes accepted that accounting might be used to achieve other than purely measurement and communication ends, faith in it would be destroyed.[18]

Under a "value approach", it is likely to be impossible to treat all users equally and so there will be bias in favor of some at the expense of others. However, the problem will not exist if users are supplied with detailed unweighted information, which does not favor the interests of one party over another. In that sense, accounting retains its

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[16] 16. Sorter, op. cit. p.41

[17] 17. AAA. Op. cit

[18] 18. Solomons, D. the Politicization of Accounting. p. 147

credibility as a neutral measurement and communication system. Again, in Solomon's words:

> **It is the quality of neutrality, which makes a map reliable, and the essential nature of accounting, I believe, is cartographic.[19]**

The communication of unweighted and detailed information makes it possible for accounting to be neutral and to retain its credibility and reliability.

2.4.5. The Problem of Standard Setting

The Accounting Standards Committee (ASC) and similar bodies in other countries issue standards to regulate the accounting profession. The process of issuing a standard commonly starts by circulating an exposure draft of the recommended standard and soliciting feedback from addressees. The process seems to be highly democratic in nature but this is not always the case especially when an influential group considers that it is likely to suffer as a result of the new standard. Lobbying by such a group may lead to modification of the standard to reduce its unfavorable effects. Solomon's expressed the view that:

> **Because standards need to be set mainly in areas where there is controversy, it is highly probable that in every case someone will find the new treatment less favorable than the status quo and there is constantly a temptation for such people to rush off to their legislative representatives to get the government to interfere.[20]**

Moreover, some writers[21], expressed their concern over possible government intervention in the process if standard-setters do not take into consideration the possible economic and social consequences of proposed accounting standards, especially if the consequences are expected to be adverse to government policies and plans. Nevertheless, it appears that under a value approach the presence of these conflicts seems inevitable and there are always likely to be conflicts in setting standards which cannot be resolved.

Tweedie and Whittington (1990) point out some of the problems that confront standard setters such as off-balance sheet financing, complex capital issues and accounting for brand names. The main concern in this case is not with the these

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[19] Solomons, ibid, p. 148

[20] 20. Solomons, op. cit. P.146

[21] 21. Zeff, A. The Rise of Economic Consequences. p. 152 and Solomons, op. Cit

specific items but rather goes to the basic changing nature of the standard setting process.

Sorter questioned the validity of standards under the "value approach". Since users' needs are assumed to be identifiable. That means the data requirements of the users are always known and if so, then accounting should provide exactly these requirements and no more nor less.

However, under an "events "approach standards are required to:
Limit the range and define the description of relevant events.[22]

Further, accountants are not required, under an events approach to justify one valuation or another. Their main job will be the accurate reporting of the characteristics of relevant events.

2.4.6. The Problem of Complexity

If accounting as a profession is expected to serve its clients, the accounting statements should be useful to those clients (users). Usefulness implies that the reports have to be understandable. Unfortunately, this does not seem to be the case. This view is expressed by AAA (ASOBAT)[23] which indicated that accounting reports in their traditional form are technical and complex, so require a high degree of understanding of the measurement process underlying the reports, as well as familiarity with the real meaning of accounting terminology. Lee and Tweedie[24]have shown that only a minority of shareholders understands the annual published reports. They attribute this mainly to the shareholders' lack of knowledge of the measurement methods (asset valuation and income determination), and also the shareholders' inability to understand the technical terms in the annual published reports.

However, under an "events" approach, developments in computer and technology and data-bases make it possible for users of financial reports to specify their needs and the level of detail or aggregation required.

However, the "events" approach suffers from some shortcomings. Belkoui (1992) summarized the main limitations to this approach as follows:

    i. The usefulness of the events approach may depend on the psychological type of the decision-maker. Information overload may result from the

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[22] 22. Sorter, op. cit. p.45

[23] AAA (ASOBAT) op. Cit.

[24] T.A. Lee and Tweedie, D.P. (1976). The Private Shareholder - his sources of financial information and his understanding of reporting practice

attempt to measure the relevant characteristics of all crucial events affecting the firm.

ii. An adequate criterion for the choice of the crucial events has not been developed.

iii. Measuring all the characteristics of an "events" approach may prove to be difficult given the state of the art in accounting. More research is needed to examine the impact of different design approaches to the events approach theory, such as the hierarchical, network, relational, entity-relationship, and REA models.

Conclusion

This chapter has reviewed the environment, constituents, and regulatory framework relevant to the production and presentation of current annual published reports, which are based on a "value approach". The "events approach" was discussed as a possible replacement of the value approach.

The next chapter examines the existing literature on the "events" approach, the extent to which it defines events, characteristics of events, forms of aggregation, and the assumption of the approach.

CHAPTER THREE

The Features of Computer-Based Financial Reporting

3.1 Introduction

The purpose of this chapter is to highlight the theoretical and practical aspects of a computer-based reporting system. This includes the delineation of the basic events and characteristics of events and forms of aggregation. So far in the accounting literature these may be classified into three categories, as follows:

i. The basic terms, the concepts, and the framework for the approach
ii. The operating features of the computer-based reporting system, and
iii. The empirical validation of the approach

3.2 The Basic Unit of Events Reporting:

There is no generally accepted definition of the term "event" as the main constituent of events accounting. Nevertheless, Johnson (1970) offered the following definition for the term "event":

> The term event refers in a general way to an action, occurrence, or happening that could be described by one or more of an infinite number of properties, attributes or characteristics. [25]

To be more compatible with "events accounting", he specified the meaning of "event" as:

> A feasible observation of specified characteristics of an action with regard to which a reporter could say "I foresaw that and saw it happened myself" [26].

Further, he distinguished two types of events:

i. " Real event" which means the observed attributes of prior actions which may subsequently be reported (e.g. exchange price of a 'sale' event)
ii. "Publication event", the attributes of which are difficult to observe or verify (e.g. forecasts of sales for next period).

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[25] 25. Johnson, op. cit. p.643

[26] 26. Johnson, op. cit p. 650

Thus for an "event" to be recorded in "event accounting" it should:

    i.   Be a real event
    ii.   Have observable characteristics, and
    iii. Objectively verifiable

Hence, the "value approach" problem of arbitrary division of continuous processes through allocation and matching is avoided.

3.2.2. Characteristics of Events

"Characteristics" are those properties, which could be used to describe the occurrence of events to those who do not directly observe them. Traditionally, in accounting, events have been recorded using double entry system, which record the date of the transaction, the accounts affected and the monetary value. The monetary value has been used as a significant characteristic to describe different transactions. Under events accounting, however, events can be described by an infinite number of attributes and characteristics. But not all attributes are relevant to the user nor are they conveniently reported. Johnson asserted that characteristics should be directly observable and verifiable so as to be used in describing an event.

Traditionally, accountants have been unwilling to capture characteristics other than monetary value because of the emphasis on income determination on one hand, and the rigidity of the recording system itself on the other. Under events approach the objective of reporting, however, is to reflect observations of the real world, but not the "wishful inferences of devious managers". Thus a number of characteristics may be necessary to describe events and transactions.

3.2.3. Aggregation

Johnson discussed aggregation within the context of summation. Summation refers, in general way, to the mathematical operation of addition and may take any of the following forms:

(I) Aggregation

Which is the simple addition of the same kind of measurement on numerous occasions of the same characteristics of the same kind of happening. Aggregation can be (a) temporal or (b) sectional.

(a) Temporal Aggregation

This is when several occurrences of the same kind of event summed together to give a meaningful total. That is, several events, which are similar in nature, are aggregated over time (e.g. annual sales, monthly sales, annual purchases etc.)

(b) Sectional Aggregation

This is when events or actions relating to different firms (or different subsidiaries) are summed together to give an industry total (or group total) at a certain point in time. The important characteristic of both types of aggregation is that the resulting quotient, when sum is divided by the number of measurements, is a meaningful figure. For instance, when the event "sale" is aggregated over a year, a meaningful monthly or daily average can be obtained. Similarly, aggregation of different firms' assets can give a meaningful industry average.

(ii) Combination

Combination is the addition of numerous measurements of the same characteristics of different kinds of happenings. It can also be (a) temporal or (b) sectional.

(a) Temporal Combination

Temporal combination is the addition of different measurements of one characteristic describing different events. An example of this type, in current accounting practice, is when the value of money changes over time, and still is used as an additive attribute for different events.

(b) Sectional Combination

Sectional combination is the addition of the same characteristic of different events under one heading. An example of this is the process of netting various accounts such as sales, cash, etc. in order to get balances.

(iii) Composition

Composition is the summation of numerous measurements of different characteristics of the same or different kinds of happenings. Income statement and balance sheet are a composition of temporal and sectional aggregations and combinations. No meaningful average results, although the outcome is meaningful (e.g. income figure).

(iv) Conglomeration

Conglomeration is the addition of different measurements of different and diverse characteristics of different kinds of happenings. No meaningful outcome results since the attributes are non-additive and can not be manipulated in a rational and logical manner.

All kinds of summation mentioned above (except conglomeration) are currently used in the preparation of published annual reports. The charts of accounts of different firms are representations of combinations of aggregations while income statement and

balance sheet are compositions of temporal and sectional aggregations and combinations. Johnson, however, states that this would not be the case in an event approach since an events theory of accounting would sanction only aggregation of observation and prohibit combination and composition. He rejects both combination and composition because of the information loss, which would be suffered, if they were applied.

3.3 Storage and Communication of Data

The implementation of an expanded accounting system requires the use of databases. A database is a collection of records and files that are stored in such ways where different users can access and use. Users are able to retrieve a wide range of data and adapt it to their own programs and reports. Databases can conceptually be organized in various ways, depending on the expected use of the data and the system configuration. However, there are three major types of databases (Kroenke, 1995):

    i.   Hierarchical database model
    ii.   Network database model
    iii.   Relational database model

In hierarchical databases the files holding the data have a logical hierarchical relationships. These databases depict one-to-many or many - to- one relationships. Each data item is related to only one item above it in the hierarchy, but to number of data items below it. According to the hierarchical model, the relationships are predefined before the database can be implemented. However, expanding existing databases by adding new relationships is difficult.

In network databases, on the other hand, group of files is linked according to a certain attribute. The logical data structure allows many-to-many relationships. The storage of files in network databases is designed to promote efficient search and retrieval of data. Similar to hierarchical database data relationships must be predefined. The network and hierarchical models depict relationships by means of separate data structures, such as indexes and linked lists.

Under the relational database structure, the data is stored in separate files or tables. The tables are inter-linked by a common attribute that link each table with another. The structure of the data is independent of the actual data. The relational database model is considered as a useful tool for designing and implementing databases that are directly processes by end users. As such the relational data model represents the most important type of databases for events accounting applications.

However, the accounting literature shows various attempts to use one or more of the database structures to accommodate the events accounting system. Wheeler[27] divided accounting information into three types:

    i.   General Communication which is designed for multiple users with diverse objectives (e.g. published financial reports).

    ii.   Specific communications for single users or multiple users whose utility functions are assumed to be the same.

    iii.   Self initiated communication, which is initiated by the receiver.

The latter form is of particular importance in an "events accounting" information system. The expansion in the data under the "events" approach makes it difficult to convey huge amounts of data through the annual reports in their current form. An alternative is to store the data in a database maintained by the reporting entities and accessible to authorized users through terminals. The user can communicate directly with the database and can determine the form and content of reports compiled from that data. Wheeler describes the process:

> The development of on-line computer systems with multiple access to data banks will mean that many users of the data will be employing their own models for data manipulation.[28]

However, the user's request and manipulation models rely on, and are determined by, the kind of information available in the database, and the way in which databases are classified and organized.

Colantoni et al (1971)[29] in their effort to produce an events approach information system, assumed that any economic event can be completely described by a finite set of characteristics such as quantity, monetary value (historical cost, replacement cost, current value ... etc), location, time as well as any other codeable attributes.

The use of multiple attributes to describe transactions allows efficient storage of information in a multi-dimensional database. The main features of the proposed system are:

    i.   A binary coding scheme where similar events receive the same code.

    ii.   Finite set of similar and relevant characteristics are used to describe similar events

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[27] Wheeler (1970). Accounting Theory and Research In Perspective, p.6

[28] Wheeler, op cit p.6

[29] Colantoni, et al (1971), A Unified Approach to the Theory of accounting and information systems

iii. A tree-structure storage where general (broad) types of transactions (events) lead to more specifics types

iv. Flexible classification scheme where transactions are classified in different ways according to the attributes that are used to describe them

v. Retrieval language that can be used to retrieve, classify, aggregate and organize data

However, the proposed database is merely a collection of raw data and no aggregation scheme is proposed.

Lieberman and Whinston (1975)[30] described an "events" accounting information system that is composed of:

- A mass database, that contains records of all events in some generalized format. It contains all the financial and non-financial information.
- A user-defined structure, through which users are able to manipulate the information in the database.
- A tree-structured database where the root of the tree represents the highest possible level of aggregation of transactions
- A list structure that helps users mapping their own information and level of aggregation.

Mace (1984)[31] described an "events accounting" information system. It seems that Mace was concerned more with the resources, cost, storage capacity, and time needed for processing of data. To minimize the use of resources, Mace suggested a modified form of events accounting that has:

- Archive disks that are kept off-line.
- Current disks (on-line) that contain current events and the balances of old events (off-line events).
- Balances of off-line events represent opening (at the start of entering data on the current disk) balances.

This system is considered necessary for the following reasons:

i. It prevents indefinite expansion of the database.

ii. It reduces the generating (processing) time of using database.

Geerts and McCarthy (1991)[32] proposed a database (matrix) accounting as an alternative to the restrictive double-entry approach. The proposed model includes a

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[30] Lieberman & Whinston (1975). A Structuring of an Events Accounting Information System.

[31] Mace, op. cit.

[32] Geert and McCarthy (1990).

basic matrix (called transaction matrix) of an equally two-dimensional rows and columns. A certain row and a corresponding column in the matrix represent an account. The row holds the debits and the column holds the credits. A transaction is recorded at the intersection of the row and the column. The authors claim that the database accounting system will help wider spectrum of decision-makers accountants as well as non-accountants. Further, the matrix framework is intended to integrate financial and managerial accounting, to facilitate development of multidimensional accounting, and the move towards an "events" accounting system.

Audit Implications

Gallegos et al (1996) states that the most important characteristic of database to auditors is that database management systems handles all physical data access and retrieval. Since data are stored in a structured and massive collection, audit trail is not existent. Summary files are transient, created and used only long enough to validate application processing and to produce periodic reports. This will create difficulty for auditors in checking transactions and trace them to their source documents (Bassett, 1993).

Furthermore, Since events accounting involve networking and users may selectively retrieve data and process it to their own specifications, there always exists the risk of data alteration and manipulations at different accessing points of the system. The risks inherent in such a system involves but not limited to (Thomas and Douglas, 1981, Bagshaw, 1998):

i.   The possibility of consistent application of wrong routines. The presence of such risk may outweigh the benefits of accuracy if the routines applied are correct.

ii. Increased probability of data and programs alterations due to the concentration of accounting system elements in the hands of few specialists

iii. Risk of unauthorized access to data and programs

iv. Vulnerability of storage media and the organization.

v.   Multiple effects of errors in data base environments.

The existence of such high risks has important implications for internal controls, and the role of auditors. Among these are:

i.   Weak internal controls jeopardize the reliability of the entire accounting system

ii. Security measures are necessary for ensuring that only authorized users can access the system.

Thus, there is further burden on auditors who shall assess and evaluate the effectiveness of existing internal controls. The aim is to determine the strengths of the existing policies and procedures in preventing or detecting material misstatement in

the financial statements. In order to carry out this function auditors need to carry out three types of tests:

- general (administrative) controls tests
- special application controls tests
- test data

Thomas and Douglas (1981), Bassett (1993), and Bagshaw (1998) summarized the major tests under each of the above controls. The general controls include division of duties, file controls access controls, encryption and call back procedures, read only memories, hardware security, and system development controls (standardization, managerial involvement, testing and trials, training and conversion). The application controls involve batch and hash totals to check the completeness and accuracy of totals sequence checks and document counts, existence checks, consistency checks, and authorization controls. Test data is auditor-generated data that is used primarily for testing controls.

These studies have addressed the problem of incorporating the "events" approach in its purest form with information system, but they have not recognized the need for some forms of aggregation and standardization of databases.

3.4 The Validation of the Theory (The Empirical Research)

Many studies have been set out to test the effect of aggregation, present in current annul published reports, on decisions makers. The study by Benbesat and Dexter (1976)[33] tested the performance of low-analytic decisions makers (those use hypotheses testing and trial and error) and high analytic decisions makers (those use structured methods). The study found that low analytic subjects do better with disaggregated reports while high analytic prefer structured aggregated reports. The study can be considered a support for disaggregation since the average users of accounting reports are generally low-analytic (Lee and Tweedie, 1976).

Another study by Harvey et al (1979)[34] used aggregated set of information and another disaggregated set of company reports to test for the effect of aggregating accounting reports on investment decisions makers. The study found that there is a clear link between information content (disaggregation) and decision judgements and preferences.

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[33] Benbasat and Dexter (1979). "Value" and "events" approaches to Accounting -An Experimental Evaluation

[34] Harvey et al (1979). Accounting Aggregation - Users Preferences and Decision- Making

Similar studies by Abdel-khalik (1973)[35] and Barefield (1972)[36] pointed to similar conclusions that disaggregated information is preferred and results in better decisions (commercial loans by banks, for example).

Summary and Conclusions

This chapter has revealed the following points:

Firstly, there is no complete theoretical work addressing the aggregation problem and other concepts of the "events" approach. Orace Johnson's work is the main contribution in this area.

Secondly, the events accounting information system and data-base design schemes use events in a raw form but no attempt has been made to define some form of aggregation.

Thirdly, the empirical studies were concerned mainly with behavioral consideration, and even here they use disaggregated conventional accounting reports. This means these studies have not tested reports really based on "events" approach.

Nevertheless, the implications of these studies provide the basic framework that will be used to attain the objective of this study.

In the next chapter one step in that direction is taken. A sample of annual reports is analyzed in order to determine the process of aggregation that has taken place in producing these reports.

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[35] A.Abdel-Khalik (1973). The Effects of aggregating accounting reports on the quality of the lending decision

[36] Barefield (1972). The effects of aggregation on decision making success, a Laboratory study

CHAPTER FOUR
ANALYSIS OF ANNUAL FINANCIAL REPORTS
(The Current Reporting Practice)

4.1 Introduction

This chapter describes the study which was carried out on a sample of British and Saudi companies annual reports, selected from different industries to analyze the nature and extent of aggregation which has been or that appears to have been, carried out in producing these published figures. Four commonly reported items were selected for examination of the events that were grouped under each item and the characteristics that were used to describe those events. The information loss to the users of these reports is then discussed. Finally, the differences between industries in the process of aggregation are analyzed and highlighted.

4.2 The Data

The sample used in this study consists of 22 British and Saudi companies. The industrial classification of the Financial Times All Share Index (FTIC) was used to select a sample of 11 British company annual reports. The Saudi companies are chosen from the most well known companies that represent different industries in the Kingdom (a list of these companies is given in an appendix to this chapter). Two consecutive annual reports (mostly 1995 and 1996) for each company are analyzed to examine any temporal differences in reporting. The British companies are chosen for this study due to the availability of data and due to the clear regulatory framework governing financial reporting against which reporting practices could be measured.

The Saudi companies, on the other hand, are analyzed in order to cater for any differences in reporting between United Kingdom and Saudi Arabia. The sample is composed of one company from each of the important industries in the United Kingdom. In the case of Saudi sample the industrial classification is very wide and the size of companies within each class varies greatly. Thus, this situation necessitates selection of more than one company to represent individual industrial classes. The selection from within each industry, however, was made according to the availability of annual reports. The sample was selected from recent years' annual reports so as to assure reflection of the most recent developments in corporate reporting. The reason for selecting companies from different industries was to highlight similarities and differences between industries, which will be considered when the feasibility of defining standards for company databases is considered in the next chapter. It worth mentioning that no major developments in British statutory requirements governing companies financial reporting has taken place since 1985. The 1985 Companies Act has enacted and consolidated all previous Companies Acts. The 1989 Companies Act is an amendment to the 1985 Act and was mainly directed towards accommodating the European directives. However, in Saudi Arabia there is an ongoing process of

developing accounting and reporting standards by the Saudi Organization for Certified Public Accountants (SOCPA). These developments are expected to influence the reporting requirements in the foreseeable future.

4.3 The Disclosure Analysis

The following four items were selected for analysis of the disclosure by each company in the sample:

    i.   Turnover
    ii.   Staff costs
    iii. Stocks
    iv. Debtors

Since only four items were selected, they should be fairly representative of the many different items, which may appear in accounts. The reasons for the selection of the above items are that:

    i.   These items are commonly reported figures
    ii.   The aggregation for the profit and loss items (turnover and staff costs) extends over one accounting period, while for the balance sheet items (stocks and debtors) extends beyond one reporting period.
    iii. Although most companies disclose these items under similar labels, the elements included are different and diverse from company to company and from industry to industry.

For each item the analysis proceeds as follows:

    a.   The item under investigation is defined.
    b.   The statutory and other disclosure requirements for reporting of the item are reviewed.
    c.   The findings of the sample survey are summarized.
    d.   The forms and kinds of aggregation, which have taken place or appear to have taken place in producing the single figure published in the accounts, are discussed.
    e.   The extent of the possible loss of information through aggregation is considered.
    f.   Differences in the process of aggregation between the different industries are identified.

Turnover

The first of the item examined is "Turnover".

(a) Definition

Turnover is defined as the net sales of a business, i.e. gross sales less discounts and sales returns (ICMA, Terminology of M&F Accountancy). It represents the sum of revenues from the sale of goods and rendering of services in the ordinary course of business.

(b) The Statutory and Other Disclosure Requirements

The Companies Acts require turnover to comprise the amounts a company derives from providing goods and services that fall within its ordinary activities after deducting trade discounts, VAT and any other taxes based on the amounts it so derives. This process results in netting the turnover figure. Neither the gross turnover, nor the deductions can be identified separately afterwards.
SSAP (51) requires that turnover figure to exclude VAT on taxable outputs. Realizing the need for disaggregated data, the Companies Act requires the notes to the profit and loss account to include turnover analyzed by both class of business and geographical markets (CA 1989.4 Sec (55) 1).

In Saudi Arabia, the Companies Regulation (1385 H, amended 1387 and 1402) does not specify certain disclosure requirement for turnover. However, the Saudi Standard of "General Disclosure "requires that turnover (net sales or net revenue) from main activities be disclosed as a separate item in the body of the income statement as part of the results of continuing operations (paragraph 650).

Similarly the Saudi "Revenue Standard", requires that revenues from main activities of the enterprise be disclosed as a separate item in the income statement among the results of continuing operations.

(c) Findings of the Sample Survey

Tables 1-A and 1-B below summarize the findings for disclosure of turnover by companies included in the sample. The British Companies Acts exempt certain types of companies from disclosing information that other companies are required to disclose. Banking, insurance and shipping companies are not required to show the turnover for the year or the method used to compute turnover.

(d) Forms and Kinds of Aggregation

The process of aggregation that has taken place or appear to have taken place in producing turnover figure can be summarized as follows:

(I) Temporal Aggregation

The generation of annual sales figures, which include all the 'sale events' that have taken place from the beginning of the financial year up to the financial statement date reflects a high level of temporal aggregation since no monthly, quarterly or even semi-annual sales activity is shown.

Table 1-a
Disclosure of Turnover 1995 and 1996

Company	Country	FTIC	One figure	Activity	Location	Market Continental
National Westminster	U.K	Bank, Hire Purchase		*		
Bayer	=	Chemicals, Plastics		*	*	
Burmah	=	Castrol, Lubricants		*	*	*
Commercial Union	=	Insurance		*	*	
Granada	=	Leisure		*	*	
Hanson	=	Industrial (miscellaneous)		*	*	
Honda	=	Motors, Aircraft's, Trade		*	*	
Iceland	=	Drapery, Stores	*			
Imperial	=	Tobaccos			*	*
Ocean Group	=	Shipping			*	*
The British Invest Trust	=	Investment Trusts		*	*	*
SAFCO	K.S.A	Industrial	*			
Food Products	=	Industrial	*			
SPIMACO	=	Industrial	*			
SABIC	=	Industrial	*			
NADEC	=	Agricultural		*		
Aljouf	=	Agricultural				
SASCO	=	Services				
SAPTCO	=	Services				
Saudi Ceramic	=	Cement, Building Materials	*			
Taiba	=	Real estate, Services				
Azizia — Panda	=	Retail	*			

FTIC = Financial Times Industrial Classification

Table 1-b
Summary Disclosure of Turnover 1995 and 1996

Classification	Saudi Sample	British Sample	Total
Turnover reported as one figure	6	1	7
Analysis by class of business			
- Principal activity	5	8	13
Analysis by location of business	-	9	9
Analysis by geographical market			
Market (origin)	-	3	3
Market (destination)	-	-	-

(ii) Sectional Aggregation

Evidence of sectional aggregation is observed in the sample where a single turnover figure includes sales of the holding company, subsidiaries, and related companies. Even of any one of these, e.g. a subsidiary, turnover reflects both temporal and sectional aggregation of the many sale events carried out by the subsidiary over the whole year (sectional aggregation in the subsidiary results from summing of sales of the various products or services produced by different departments). Even a broad geographical analysis as required by the British statute does not reveal which products are sold in each area and what is sold to which customer or type of customer.

(iii) Sectional Combination

This form of summation is clear where turnover figure embodies the amount of gross turnover and the various deductions (e.g. VAT, allowances, returns, discounts, etc). As indicated earlier such a netting process is undesirable since it results in the loss of identification of the essential elements and events.

Moreover, the geographical and activity-based analyses breakdown the turnover items into less aggregated figures. But these figures are still featured with the same form of temporal aggregation, though sectional aggregation (annual figures) and sectional combination of the item is at a lower level than before (broken down into different activities or markets).

(e) Possible Loss of Information

The analysis of disclosure of turnover by companies in the sample reveals that:

i.   Most of the companies in the sample, which represent different industries, analyze turnover by major class of business and/ or offer geographical based analysis.

ii. Both the activity based and the geographical analysis represent a move towards disaggregation. In spite of that, the figures are still highly aggregated.

iii. A great many 'sale events' are embodied under each major 'class of business' and geographical market.

iv. The monetary characteristic is the sole attribute used to describe and group the various 'sale events'. However, in the geographical analysis, the location attribute is used to disaggregate 'turnover'.

v.   In all the companies examined, 'sale events' at different times are considered similar and thus aggregated to reach an annual turnover figure (temporal aggregation). No attempt is made to reduce the level of temporal aggregation, by disclosing monthly or even quarterly figures.

vi. Turnover is disclosed net of returns, allowances, and VAT. It is not possible to determine the amount attributable to each one. In Johnson's terminology this is a 'sectional combination'.

vii. Most of the accounting reports examined are consolidated accounts. This consolidation adds to the problem of aggregation, especially in conglomerate mergers where the activities of the merging firms are diverse. Turnover, thus, aggregates and reflects diverse activities and operations.

viii. Turnover figures of all subsidiaries are combined together in order to reach the group turnover, a process that results in the loss of identification of each subsidiary's sales (sectional aggregation).

ix. Companies are not willing generally to disclose more than is required by statute or the stock exchange, although the survey shows many cases in which separate activities and individual products can be traced. Few Saudi companies show turnover by product or sub products.

It follows from the above that product sales information as well as customer sales information is not available. Turnover is a product of price and quantity, one multiplied against the other, to produce value. However, in the absence of information on both quantity (volume) and price, users are not able to identify, among others:

i.   Increases (decreases) in volume and those in value
ii. The productive capacity and the quality of the products produced by the company, compared to competitors (both local and abroad).
iii. The contribution to modern facilities and technology by the company

(f) Industry Disclosure Differences

Turnover includes a wide range of events aggregated by accountants to produce a lump-sum figure for the company or the group. However, this process of aggregation and the resulting information loss differ from industry to industry. In industries such as engineering, food and groceries turnover is an accumulation of the sales

transactions of a wide range of different products. In other industries such as a mass production industries, turnover may include sales revenues of only one product produced in a large volume (e.g. motor vehicles, chemical industries, sugar manufacture). Similarly, customers of each industry may differ with regard to number, type, and frequency of purchase. For industries such as aircraft and shipbuilding customers are few in number and easily identifiable and information about each transaction to each customer may be needed. But this does not hold for industries like engineering, electrical and retail where customers are large in number and less significant on individual terms.

Most of the British companies in the sample tend to meet the legal and professional requirements, which together demand some levels of detailed disclosure. However, more than 50% of the Saudi sample showed turnover as one figure and about third of the sample disclosed a turnover figure broken down by principal activity. Only one company (Aljouf Agricultural Development) showed a by-product disclosure. Although there is a clear difference in disclosure between companies in different industries there is an equally noticeable difference between companies in the same sample (e.g. Aljouf & NADEC).

Thus, it is clear that there is a wide variation in reporting and this is more evident in the case of the Saudi sample than its British counterpart. And this can be attributed to the restrict statutory and professional disclosure requirements that are enforced in United Kingdom.

4.3.2 Staff Costs

The second item selected for analysis is staff costs.

(a) Definition

Staff costs are defined as being the costs a company incurs in respect of the persons it employs under contract of service (CA 1989 sch 4 (94)). It includes social security costs, other pension costs and the wages and salaries paid or payable to employees.

(b) Disclosure Requirements

The Companies Act requires companies to disclose the aggregate amounts of:
   i.   Wages and salaries paid or payable in respect of that year.
   ii.   Social security costs incurred by the company.
   iii. Other pension costs incurred.   (CA 1989 sch 4, 56 (4)).

Companies are also required to disclose the average number of employees (including directors and employees working wholly or mainly outside UK) in the financial year. The act also requires disclosure of the total average number of employees in the

financial year and a division of this total by categories determined by the directors having regard to the manner in which the companies' activities are organized.

As for the Saudi companies there is no specific legal or professional requirement yet, although it is widely anticipated that the ongoing initiation of Financial Accounting Standards will result in disclosure guidelines similar to the prevailing international requirements.

(c) Staff Costs Sample Results

Tables 2-a, 2-b, 3-a and 3-b show how the British and Saudi companies surveyed disclose the staff costs and the employee information in relation to statutory requirements.

Table 2-a
Disclosure of Staff Costs (1995 and 1996)

Company	Country	FTIC	one figure	As required	Not Disclosed
National Westminster	U.K	Bank, Hire Purchase		*	
Bayer	=	Chemicals, Plastics		*	
Burmah	=	Castrol, Lubricants		*	
Commercial Union	=	Insurance		*	
Granada	=	Leisure		*	
Hanson	=	Industrial (miscellaneous)		*	
Honda	=	Motors, Aircraft, Trade			*
Iceland	=	Drapery, Stores		*	
Imperial	=	Tobaccos			*
Ocean Group	=	Shipping		*	
The British Investment Trust	=	Investment Trusts			*
SAFCO	K.S.A	Industrial			
Food Products	=	Industrial	*		
SPIMACO	=	Industrial		*	
SABIC	=	Industrial			*
NADEC	=	Agricultural		*	
Aljouf	=	Agricultural	*		
SASCO	=	Services	*		
SAPTCO	=	Services	*		
Saudi Ceramic	=	Cement, Building Materials			*
Taiba	=	Real estate, Services			*
Azizia –Panda	=	Retail	*		

(39)

Table 2-b
Summary Disclosure of Staff Costs (1995 and 1996)

Disclosure of Staff Costs	Saudi Sample	British Sample	Total
-As one figure	5	-	5
-As required by statute	2	8	10
-No figure is shown	4	3	7
- Further breakdown	-	-	-
Total reports examined	11	11	22

Table 3-a
Disclosure of Employee Information (1995 and 1996)

Company	FTIC	Not	One	As required	Territorial	Operating
National Westminster	Bank,Hire Purchase			*		
Bayer	Chemicals, Plastics			*		
Burmah	Castrol, Lubricants			*		
Commercial Union	Insurance				*	
Granada	Leisure			*		
Hanson	Industrial (miscellaneous)				*	
Honda	Motors, Aircraft's, Trade					*
Iceland	Drapery, Stores		*			
Imperial	Tobaccos	*				
Ocean Group	Shipping			*		
The British Invest Trust	Investment Trusts	*				

(40)

Table 3-b
Summary Disclosure of Employee Information (1995 and 1996)

Employees Information	Saudi Sample	British Sample	Total
- Not disclosed	11	2	13
- Disclosed as one figure	-	1	1
- Disclosed on activity basis	-	5	5
- Disclosed on territorial basis	-	2	2
- Disclosed by operating co.	-	1	1
Total reports examined	11	11	22

Three British companies and four Saudi companies did not disclose information on staff costs while two British companies and all Saudi sample did not disclose employees information in both 1995 and 1996. The other British companies in the sample disclosed staff costs as required by law, no more no less. About half of the Saudi companies in the sample disclosed the staff cost as one figure among the general and administrative expenses. Only two companies provided breakdown between selling wages and salaries and general and other wages and salaries. As for employee information, half of the sampled British companies disclosed the information required by law, while the remaining companies showed further breakdown. Figures reported are highly aggregated and include different types of costs paid or payable to different classes of employees at different points in time.

(d) Forms and Kinds of Aggregation

The type of aggregation that have taken place can be summarized as follows:

(i) Temporal Aggregation

The 'staff costs' items are a collection and accumulation of the payments made to individual employees on weekly or monthly basis over the whole accounting period. Thus, costs of the early weeks of the year are combined with the latest payments in that period. This process precludes information on whether increases in these costs are attributed to inflation, increase in productivity or working time.

(ii) Sectional Aggregation

Many of the annual reports in the sample were group accounts of companies with multiple products or projects. It may be true that they summed together costs of employees working at different companies, different locations, different projects, different departments, and different products to disclose the company or group total costs

Thus costs paid or payable to or on behalf of different individuals, with different skills, experience, etc., are added together. In the case of the Saudi companies there is complete loss of information since the annual reports show no individual figures.

(e) Possible Loss of Information

In producing the staff costs figures, the monetary characteristics is the only attribute employed, which means that analyses other than those based on monetary characteristic are not possible. Within the same company, employees are different with respect for example, to expertise, skill, department, project, and the location of work.

However, the information loss is more evident in the Saudi sample since the staff costs are embodied within the general and administrative expenses in some cases or under direct expenses in others.

(f) Industry Disclosure Differences

No significant differences exist between industries regarding the type of information required on staff costs since employees in different industries have similar features and characteristics. However, the relative importance of labor costs depends partially on whether the industry is labor- or capital-intensive.

4.3.3 Debtors

The third item selected for analysis is debtors.

(a) Definition

'Debtors' or accounts receivable are the customers or others, owing money to the business (ICMA, Terminology of M&F Accountancy). Debtors, represent the revenue of 'sale events' not paid for at a particular moment in time which in the case of annual accounts, is the balance sheet date.

A distinction is made between trade debtors (i.e. those arising from the sale of goods and rendering of services on credit) and other debtors (e.g. debt due from the sale of fixed assets or investments).

(b) Disclosure Requirements

The British Companies Act requires that all debtors should be disclosed as current assets, no matter when they fall due for payment. For each item included under debtors, however, amounts falling due after more than one year should be shown separately. The sub-headings required, which may be disclosed on the face of the balance sheet or in the notes are:

- Trade debtors.
- Amount owed by group undertakings
- Amounts owed by undertakings in which the company has a participating interest.
- Called up share capital not paid.
- Prepayments and accrued income.

The Saudi Disclosure standard requires that:
Current assets are to be shown in main categories reflecting the nature of each in the body of the balance sheet, for example: cash, temporary investments, debtors and notes receivables, inventories, and prepaid expenses (paragraph 597).

(c) Findings of the Sample Survey

Tables 4-a and 4-b indicate how the companies surveyed disclose information about debtors in the financial statements.

Forms and Kinds of Aggregation

The forms and kinds of aggregation that have taken place may be summarized as follows:

(I) Temporal Aggregation

Table 4-a
Disclosure of Debtors (1995 and 1996)

COMPANY	CLASS	No disclosure	One figure	Trade & others	Further Breakdown	Market Destination
National Westminster	Bank, Hire purchase			*		
Bayer	Chemicals			*		
Burmah	Castrol, Lubricants		*			
Commercial Union	Insurance		*			
Granada	Leisure			*		
Hanson	Industrial (Miscellaneous)			*		
Honda	Motors, Aircraft, Trade			*		
Iceland	Drapery, Stores		*			
Imperial	Tobaccos	*				
Ocean Group	Shipping			*		
British Investment Trust TrustAzizia-Panda	Investment trusts		*			
SAFCO	Industrial			*		
Food Products	Industrial		*			
SPIMACO	Industrial			*		
SABIC	Industrial		*			
NADEC	Agricultural				By product	
Aljouf	Agricultural				By major debtors	
SASCO	Services			*		
SAPTCO	Services			*		
Saudi Ceramic	Cement/Building Materials			*		
Taiba	Real estate, Services			*		
Azizia- Panda	Retail		*			

Table 4-b
Summary Disclosure of Debtors (1995 and 1996)

	Saudi Sample	British Sample	Total
- No disclosure	-	1	1
- Debtors' as one figure	3	4	7
- Distinction is made only between			
Trade debtors and other debtors	6	6	12
- Further Breakdown	2	-	2
Total number of reports examined	11	11	22

It is clear from the tables that no one company in the sample (British and Saudi alike) made a distinction between `one year' and "more than one year " receivables. This broad classification aggregates single credit transactions occurring over a long period - other companies did not make such a distinction.

(ii) Sectional Aggregation

The trade debtors of all companies constituting a group are added together. Further, within each company these debts arise from the sale of different products or rendering of services to different types of customers. However, in the case of Saudi companies two disclosed trade debtors on product basis and another two companies show major trade debtors separately and classify the remaining ones as "sundry" or "other" debtors.

(e) Possible Information Loss

The disclosure of debtors as currently practiced does not provide information about:
  i.   Debts of individual customers, or types of customers
  ii. Whether the company's customers are regular or irregular ones, and whether credit is given to unsatisfactory customers.
  iii. Whether the amounts falling due after one year include debts which are long-term in nature, and which ones are old and what is the age pattern of other debtors.

(f) Industry Disclosure Differences

The information loss caused by disclosure and classification of debtors does not apply equally to all companies in different industries. For instance companies in aircraft or shipping industries have few customers and the debts are relatively long-term in nature. Information about each individual customer is important and easy to obtain - on the other hand, other industries such as food and chemicals have a large number of debtor accounts, which are usually short-term in nature. Information about each individual debtor may be insignificant and difficult to maintain.

4.3.4   Stocks

The fourth item selected for analysis is stocks.

(a) Definition

Stocks represent the raw materials, work in progress, finished goods and goods in transit, or a consignment, at the end of an accounting period (ICMA, Terminology of M & F Accountancy).

(b) Disclosure requirements

The British Companies Act requires that stocks should be analyzed between the following four categories:

1.   Raw materials and consumables
2.   Work in progress
3.   Finished goods and goods for resale
4.   Payments on accounts

SSAP 9 requires the accounts to show the sub-classification of stocks and work in progress "in a manner which is appropriate to the business and so as to indicate the amounts held in each of the main categories."

In Saudi Arabia, as mentioned above, paragraph 597 of the "General Disclosure" standard requires disclosing current assets (among which is debtors) in the body of the balance sheet. However, more explicit requirement comes from Inventory Standard issued by Saudi Organization for Certified Public Accountants (SOCPA) in 1997, which states that:

> Inventory shall be classified in the balance sheet as a separate item and be classified into suitable categories that best suits its nature, if deemed important in body of the balance sheet or in the footnotes accompanying the statements. (Paragraph 123).

Table 5-a: Disclosure of Stock Items (1995 and 1996)

Company	FTIC	No Disclosure	One Figure	RM - WIP FG	Further Breakdown	Obsolete inventory
National Westminste	Bank,Hire Purchase	*				
Bayer	Chemicals, Plastics			*		
Burmah	Castrol, Lubricants			*		
Commercial Union	Insurance	*				
Granada	Leisure		*			
Hanson	Industrial (miscellane			*		
Honda	Motors, Aircraft's,			*		
Iceland	Drapery, Stores		*			
Imperial	Tobaccos		*			
Ocean Group	Shipping		*			
The British Invest Trust	Investment Trusts	*				
SAFCO	Industrial			*		
Food Products	Industrial			*		
SPIMACO	Industrial			*		
SABIC	Industrial			*		
NADEC	Agricultural				By product	
Aljouf	Agricultural				By product	
SASCO	Services			*		*
SAPTCO	Services			*		*
Saudi Ceramic	Cement/ Building			*		
Taiba	Real estate, Services	*				
Azizia-Panda	Retail			*		

(47)

Table 5-b: Summary Disclosure of Stock Items (1995 and 1996)

	Saudi Sample	British Sample	Total
- No stock figure shown	1	3	4
- Stock shown as one figure	-	4	4
- Raw materials, W.I.P, Finished Goods & Resale	8	4	12
- Obsolete Inventory	2	-	2
- Further Breakdown	-	2	2
Total	11	11	22

(c) Findings of the Sample Survey

Tables 5-A and 5-B indicate how the companies in this survey classify the stock items in the balance sheet and in the notes to the accounts.

(d) Forms and Kinds of Aggregation

The aggregation of the stock items that has taken place may be summarized as follows:

(i) Temporal Aggregation

All the figures reported were shown as of the balance sheet date. There is no breakdown to show the time of manufacture or acquisition of the stocks. Thus, no information is made available about the age of the stock, which is of particular importance in times of inflation. However, two Saudi companies report amount of inventories that are old and obsolete and another company shows the amount of slow moving stock. This disclosure is a step in the right direction but it falls short of meeting the possible demand of giving further details about the age of different products, especially those representing the main source of production or income. However, no British company in the sample disclosed any information to that effect.

(ii) Sectional Aggregation

Sectional aggregation is very high in current annual reports, since the items of stock (raw materials, finished goods, work in progress etc) show the amounts for the group or the company as a whole. The stocks of companies comprise stocks of different products, which are of different quantity, quality, price, cost, location and dates of acquisition. Although not required by law or professional pronouncements, some Saudi companies disclosed turnover on product and even by- product basis and another company shows amounts by category.

(48)

Furthermore, it is evident that only the cost of all the stocks and work in progress was shown but all other characteristics that could be used to describe inventory were totally ignored.

(e) Possible Information Loss

Different methods are used by accountants to ascertain the price of the units charged to production and the price of those left in stock. LIFO, FIFO, average and moving-average methods, used for valuation and income determination purposes, affect the value of ending stock and the value of the materials placed into production or sold. This process of valuation, whatever the method used, destroys information about the quantities of each item purchased, the cost and the quantity of each item sold or consumed. This is in addition to the information loss caused by the failure of the current system to take account of other characteristics such as location, time, quality etc.

(f) Differences Between Industries

The disclosure of stock items as a single figure for the whole company or group represents a high level of aggregation. However, this does not hold for all types of industries. For instance, the raw material stock of an engineering company includes more types of raw materials than that of a car manufacturing company. Disaggregation by type of stock or supplier may be easier and less expensive in the latter case than in the former one. Similarly, in printing and tobacco industries the kinds of raw material are few and easily identifiable, while for canning and food industry they are too many and come from different suppliers (e.g. different agricultural products, steel, chemicals and preservatives, etc).

The same can be said about finished goods stock. In mass production industries such as sugar, car manufacturing and tobacco, the stock includes few and identifiable products and shows them as one item. However, this has different implications for different industries. While it may be considered as high level of aggregation in the retail industry, it may not be so in the sugar industry where only one product is produced.

Conclusion

This chapter described the study conducted to examine and analyze annual reports of selected British and Saudi companies. The study revealed that annual reports in their current forms are highly aggregated. The examination of the forms and levels of aggregation that have been applied in producing a representative selection of commonly reported accounting figures has indicated important result. That only a very few characteristics have been used to describe those accounting events, such that

information which may be important to user decisions is not recorded and reported to those users.

The analysis also showed that regardless of the statutory and professional requirements there are wide variations in disclosure practices between different countries, and among industries in the same country, or among companies in the same industry.

In the next chapter, criteria to be used in determining what forms and levels of aggregation may be allowed in producing events approach accounting information will be defined. Then, the implications of the differences between various companies and industries for the definition of events, characteristics, and the process of aggregation for defining standards for events-approach databases will be examined.

APPENDIX (Chapter 4)

List of the companies included in the sample surveyed

1. THE BRITISH COMPANIES

Name of company	Financial Times Industrial Classification	Years of Accounts
Bayer	Chemicals, plastics	1995,1996
British Investment	Investment Trusts	1995,1996
Burmah Castrol Plc	Castrol & Lubricants	1995,1996
Commercial Union	Insurance	1995,1996
Granada	Leisure	1995,1996
Hanson Group	Industrial (Misc.)	1995,1996
Honda	Motors, aircraft ,trades	1995,1996
Iceland Group Plc	Drapery and Stores	1995,1996
Imperial Group plc	Tobaccos	1995,1996
National Westminster Bank PLC	Bank, Hire Purchase and leasing	1995,1996
Ocean Transport & Trading	Shipping	1995,1996

2. THE SAUDI COMPANIES

Name of company	Industrial Classification	Years of Accounts
Saudi Arabian Fertilizers Company (SAFCO)	Industrial	1995,1996
Taiba for Investment and Real Estate development	Services	1995,1996
National Agricultural Development Company (NADEC)	Agricultural	1995,1996
Saudi Pharmaceutical Manufacturing Company (SPIMACO)	Industrial	1995,1996
Saudi Public Transport Company (SAPTCO)	Services	1995,1996
Saudi Ceramic Company	Cement, Build materials	1995,1996
Saudi Basic Industries Company (SABIC)	Industrial	1995,1996
Food Products Company	Industrial	1995,1996
Aljouf Agricultural Development Company	Agricultural	1995,1996
Saudi Automotive Services Company (SASCO)	Services	1995,1996
Azizia – Panda United Inc	Services (Retail)	1995,1996

CHAPTER FIVE
THE AGGREGATION CRITERIA

5.1 Introduction

The analysis of the sampled items in the previous chapter of this study showed important results:

1. The reported balances of the examined items in the income statements and balance sheets represent high levels of aggregation and that is common to all companies in the sample.
2. The underlying details that comprise each aggregated balance can not be captured from the currently available published reports.
3. The published annual reports in their current form are incapable of communicating significant additional information and details without significant impact on users and resources.
4. The computer system provides an acceptable alternative through a database system in which details about all relevant events are made available to users through an inquiry or retrieval system.

However, databases are similar to published reports in that they require standards if they have ever to be useful and comparable between different companies. The standardization of databases helps financial reporting in different ways:

- By speeding the use of different company databases.
- By promoting efficient use of different databases since the retrieval and inquiry processes are made similar among different companies.

But what implications does the standardization of databases bring about? At this stage one can think about four major Implications. The first implication is that information should be stored in similar form. Second, the events that need to be recorded and the allowable (relevant) characteristics should be specified. Third, the level of aggregation for each allowable: or admissible event is stated.

This chapter discusses and identifies the criteria to be used in deciding what kinds and forms of aggregation may be permitted or required.

5.2 The allowable Aggregation Criteria [37]

The importance of achieving some forms and levels of aggregation is recognized by many writers and well supported by many studies (as has been established in chapter three of this study). However, it is difficult to state what would be the optimum level of aggregation to be followed in producing and communicating accounting information. Thus, there is a need to decide upon criteria or properties to be observed in determining the levels and forms that may be allowed in accounting data.

In the following paragraphs we discuss and attempt to define criteria to be used in determining an optimum level of aggregation. The criteria defined and discussed are:

1. Information overload criterion
2. Information loss criterion
3. Economic criterion
4. Cost criterion
5. Homogeneity criterion
6. Flexibility criterion

Although the ideas of some of these criteria may be found in the literature as acknowledged in the following pages, the criteria have for the most part been developed as part of this study.

5.2.1 Information Overload Criterion

Information overload may result from that:

(i) Users may be unfamiliar with the new information, or
(ii) Additional information can not be assimilated.

AAA (SATATA) recognizes the problem thus:

> Beyond some point, additional data could overwhelm a decision-maker and make it physically impossible for him to consider and impound incremental messages."[38]

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[37] 37. Abuzar M.A. Eljelly (1986). An Analysis of permitted or required forms of aggregation and the feasibility of achieving standards for event approach company databases.

(53)

So instead of providing information confusion may arise in the process and may cause confusion to users of financial reports. The argument is based on the limited capacity of human beings to digest large amounts of data in a limited amount of time, and is supported by a number of studies. Benbasat and Dexter (1979) found that users using a database (containing raw event data) take a longer time to make decisions than those who use aggregated reports. Other studies (Otley & Dias (1971), Abdel-Khalik (1973), Harvey et al (1979)), concluded that disaggregation of information is desirable but that too much detail reduces the user's capability to absorb or process the data. Thus, a required form of aggregation must consider these factors, by providing for disaggregated information but at the same time preventing excessive detail. For instance, some companies have a wide range of products, which if reported separately would cause information overload but it would be inappropriate to produce a single turnover figure.

The information overload criterion established here, to be used in deciding upon an appropriate level of aggregation in an event accounting system, may be stated as follows:

> **The volume of data presented to users must not be so great as to cause information overload or to cause undue delays in making the data useful for decision making.**

5.2.2 Information Loss Criterion

Aggregation results in information loss to the users of accounting information. The Report of the Committee on Concepts and Standards states that:

> **In general aggregation carries with it a loss of information contained in the unaggregated data, since it is not possible to determine from aggregated data the contents of unaggregated data uniquely.[39]**

For instance, daily product sales may be added together to arrive at the annual sales figure. This process results in the loss of information on sales by transaction, daily, weekly sales etc. In spite of the information loss resulting from conveying summarized figures, aggregation may help users of accounting information to have a clear perception and understanding of the essential elements. In the above example, reporting sales on a transaction basis may give more information but it may result in the loss of clear perception and understanding of the activities.

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[38] 38. AAA (SATATA).

[39] 39. Report of the Committee on concepts and standards- internal planning and control, p.89

The information loss criterion established here to be used in deciding upon an appropriate level of aggregation in an events accounting system, may be stated as follows:

Aggregation of data may be permitted for the purpose of keeping the basic elements and critical events ready for identification by the users of accounting information, but not to cause loss of information about essential variables and events.

These two criteria, the information overload and information loss, are conflicting criteria. If excessive detail causes information overload, aggregation results in information loss. A compromise between the two seems inevitable. However, it has to be stressed, here, that any compromise produces an aggregation level which may be appropriate for certain users but not for others.

5.2.3 The Economic Criterion

The form and level of aggregation may depend on environmental factors such as the general economic conditions that prevail and the tendency of the purchasing power of money to change. In an inflationary period, for instance, the greater the frequency of change in the value of money, the less temporal aggregation may be appropriate. On the other hand, the less frequent the change is, the more temporal aggregation may be allowed. Moreover, sectional aggregation may be a function of the number and diversity of the activities carried out by enterprises. In a time of increased merger activity, particularly conglomerate type, sectional aggregation should be maintained at a minimum level. When the British Companies Act requires disaggregation of turnover according to the main business activities, it seeks and requires a reduction in sectional aggregation.

The economic criterion established here, to be used in deciding upon the appropriate level of aggregation in an event accounting system might be stated as follows:

Economic conditions may affect the required level of aggregation. Inflation may necessitate more temporal disaggregation; while increased merger activity may dictate more sectional disaggregation.

5.2.4 Cost Criterion

The cost of recording, storing and updating detailed information may be too high for the companies to meet. The American Committee on Concepts and Standards recommends that the information loss is compensated for by cost savings in recording, reporting and using the information, because unaggregated data are more expensive to record and report than aggregated data. Gray[40] claims that a further potential cost is incurred where the existing control systems need to be adapted to allow for the new

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[40] Gray, S.J. Segmental or disaggregated financial statements, p.34

information and detail. It has been argued, however, (Harvey and Keer, 1983)[41] that the incremental cost for collecting and recording the information to external parties, over that which is likely to be required for managerial purposes, is low.

McCarthy (1982)[42] stressed that, during design of an actual databases, decision usefulness and storage costs may make it impractical to store events data indefinitely. So it is necessary to identify items for which temporal aggregation may be appropriate. Moreover, cost savings may be realized if events details are kept off-line in less expensive storage devices, while more aggregated data is stored in an on-line direct storage accessible to authorized users of the databases (Mace, 1984)[43].

Nevertheless, because of the possibility of information overload, it may be undesirable to provide detailed data even if the data are supplied at a low cost. The cost criterion here, to be used in deciding upon an appropriate level of aggregation in events accounting system, may be stated as follows:

The cost of keeping detailed information must not be so excessive as to outweigh the benefits of keeping these records.

5.2.4   Homogeneity Criterion

An important factor that has to be considered before a level of aggregation is to be determined for each item or account is that different accounts are different with respect to the events constituting them. For example, a cash account consists mainly of two broadly homogeneous types of events (cash payments and cash receipts). Aggregation of such events does not represent a problem; hence, broad grouping can be maintained. On the contrary, debtors are not as homogeneous in a similar way to justify a similar broad grouping of the cash events. Rather, a lower level of aggregation is needed to reveal the nature of debtors accounts with respect to aging of the debt, credit standing, type of the debtor, probability of default etc.

The homogeneity criterion established here, to be used in deciding upon an appropriate level of aggregation in events accounting system, may be stated as follows:

The level of aggregation may be partially determined by the nature and Degree of homogeneity of the variables and elements included under any one item or account.

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[41] Harvey, M. and Keer F, Financial Accounting Theory and Standards

[42] McCarthy (1982). The REA Accounting Model: A Generalized Framework for accounting systems in a shared data environment.

[43] Mace, op cit.

5.2.6 Flexibility Criterion

The ability of any information system to produce different information reports depends on the flexibility of aggregation that characterizes the database. The report of the committee on Concepts and Standards explains that:

> **Flexibility refers to those properties of the data structure of an accounting system, which allow such data to be the basis for several types of information and reports[44].**

However, the aggregation level itself is a function of the number of characteristics the system captures in the recording process, and the grouping of events that is effected on the basis of these characteristics. Further, the Committee recommended that flexibility of the system could be enhanced by:

(I) Enlarging the classification scheme and/or
(ii) Using a lower level of aggregation when the database is designed

This is because no further detail is possible beyond the minimum level of detail available in the database. A more flexible system, however, is generally preferred to a less flexible system because the former can provide more information and classification than a non-flexible system. But, this flexibility does not come without cost, as recording and processing of large amounts of data is expensive. For example, the segregation of the value dimension into its two components (price, quantity) adds more flexibility to the system but the cost of maintaining the records on that basis may be high.

The flexibility criterion established here, to be used in deciding upon an appropriate level of aggregation in events accounting system, may be stated as follows:

> **A number of characteristics may be necessary to enhance the flexibility of the system, but the cost of recording and maintaining these records should be so high as to outweigh the benefits.**

Conclusion

Six criteria have been identified which will provide a basis for deciding on levels and forms of aggregation for data items in event approach databases. Satisfaction of these criteria will involve trade-off and compromise since there are conflicts between them, which imply the need for an optimal rather than ideal solution. These criteria will be used in the following chapter where the feasibility of achieving standards for allowable forms of aggregation, to be followed by all companies in different industries, is examined.

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[44] Report of the Committee on Concepts and Standards, op. cit. p. 90.

CHAPTER SIX
FINANCIAL DATABASE STANDARDS

In this chapter the criteria that are developed in the previous chapter will be applied to the same account items analyzed in chapter four. The purpose of this is to examine the implications of the differences between industries for achieving standards for company databases.

6.1 Testing the Criteria

In the previous chapter differences between industries with respect to events and their characteristics and the process of aggregation were analyzed and criteria to be used in deciding on the permitted or required forms and levels of aggregation were defined. In this section, the question of to what extent is it possible to achieve standards for events-approach databases is considered.

It is useful to restate that the analysis in the previous chapter, of the reported items, indicates that:

(a) These items are highly aggregated
(b) There exist some differences between industries in respect of:
    (I) The events aggregated under each item are different;
    (ii) The same characteristics are used differently by various industries and companies
(c) The process of aggregation differs between these industries, and even between companies within the same industry
(d) There are differences between countries resulting from the differences in company laws and professional reporting and disclosure standards (U.K and Saudi Arabia)

What then are the implications of these differences for the feasibility of achieving standards to be followed by all companies and industries? What compromises is necessary to accommodate these differences, and reach an agreement on the allowable forms of aggregation? In the following paragraphs we address these issues with reference to the four items, turnover, staff costs, stock and debtors, which were analyzed in the previous chapter.

6.2 Turnover

Turnover, as currently reported is disclosed net of returns, allowances, VAT (in the case of British companies) etc., with the result that neither the gross sales nor the various deductions can be identified. This process of netting is not allowable in event databases, because each of these components is a separate kind of event and embodies different information, which deserves to be communicated separately.

It is important, therefore, to report the gross amount of sales and these set-off separately, from which the net amount of the transaction can be calculated if required. Reporting each individual sales transaction, however, would cause information overload to the users of the reports, particularly in industries such as retailing (like Azizia-Panda United in Saudi Arabia or Iceland PLC In Britain) and where large numbers of transactions take place continuously. Also in other companies in service industries, such as Saudi Public Transport Co (SAPTCO) or Saudi Automotive Services Company (SASCO), reporting of sales by customer or even individual trips results in voluminous details. However, users can employ their own application programs to generate the required level of detail required for a certain decision. The cost of these programs and the processing time required to generate such reports may force users to accept some levels of aggregation in the database. However, this does not hold in other industries such as aircraft and shipbuilding, where information on each single transaction may be as important as information on the whole sales activity in other industries.

In light of all these conflicts, aggregation of all sales transactions of each product may be an acceptable compromise for the following reasons:

(i) Each sale of a product is a unique event, which differs from other sales in terms of quantity, quality, location, demand etc.
(ii) `Sale events' of the same products are homogeneous events, which may be added together, especially if sold at the same price.
(iii) Information overload, processing time, and cost will be reduced in accessing databases of companies with great volumes of transactions.
(iv) No considerable information loss will be sustained in databases of industries such as shipping, since information about individual products will be retained. This is due to the fact that one unit of production may be produced over a long period of time.

This requirement is not actually difficult to achieve, in our sample on Saudi company (Aljouf Agricultural Development Company) disclosed turnover on product basis (14 main products).

Flexibility in generating different kinds of information and reports is supported, when characteristics other than monetary attributes are captured by the system. Customer, type of customer, time, location, quantity, etc, are all relevant characteristics that add to the flexibility and number of classifications and reports that may be extracted from databases. However, a characteristic (e.g. individual customer) may be very relevant and not difficult to capture by a company in the shipping industry, where information about each individual customer is relevant and basic, and non-availability of such data may result in information loss to the users. However, in retail or hotel industries, for example, it is neither possible, nor significant to obtain information on individual customers within reasonable cost limits and without causing information overload to the users of databases. Further, the processing time and costs to the users of these databases will tend to increase if such information is provided, and a higher level of

aggregation is required for a certain decision. A possible compromise is to require all databases to classify customers according to their type rather than on an individual basis. This may be an acceptable compromise within the constraints of the criteria defined earlier:

(I) Voluminous details about each individual customer are eliminated.

(ii) Type of customer classification retains the homogeneity criterion within each class and represents a group with similar characteristics (demand, taste, etc)

(iii) Benefits to companies, since fewer amounts of data are kept on-line for users direct access. For users, reductions in the processing costs, the processing time, and information overload are realized.

(iv) Companies with fewer customers may be able to disclose the same information that is disclosed on individual basis, if each customer stands as a separate type. If so, conformity with the required standard will be achieved at no information loss.

Similarly, the "location of sale" characteristics differs from industries such as retail and service industries which may have large numbers of locations and distribution centers, to industries such as aircraft and cement industries where only a few locations exist. For the former industries, classification on these bases may prove to be difficult, insignificant and costly to implement. However, for the latter industries it is a basic and less expensive information to the users. In light of this analysis, a regional classification may be appropriate for the following reasons:

(I) It reduces the information overload, costs, and processing time in extracting information from the databases of those industries with different and large numbers of locations.

(ii) No information loss is expected to incur for those industries with few sales locations, since their original classification may probably conform to the required standard classification.

(iii) Regional locations may be considered as a homogeneous basis under which sales events within that region are accumulated.

So far, we have been concentrating on the characteristics, which are bases for sectional classification and aggregation. The time characteristic, the basis for temporal aggregation and classification is also important in the optimum aggregation decision. The previous chapter analysis has revealed that all companies in different industries report turnover figures on an annual basis. Not a single company in both the British or the Saudi sample showed breakdown on less aggregated temporal basis. Does this imply that a standard regarding temporal aggregation is easier to achieve than one on sectional aggregation? It does not seem so. Some variations and differences exist between various companies and industries necessitate a compromise to achieve a standard. Generally these variations may be attributed to two factors:

(I) The velocity of turnover

(ii) The changing price of the products and the general price changes.

Industries such as food and retail where turnover is volatile and spread evenly over the year, are more vulnerable to price changes and other environmental factors, than industries with a less volatile turnover, such as shipping and aircraft. Different levels of aggregation would result by reporting sales actively by transaction, by day, by month. A scheme to classify sales by transaction or on a daily basis may be refuted on the following grounds:

(a) It may be insignificant in industries like retail and may cause information overload to the users of data- bases. Further, it increases the processing time and cost of application programs.

(b) It may be insignificant and impractical in industries where turnover is observed over relatively longer time periods.

(c) Both transaction and daily bases do not reflect changes in prices or changes in demand of products.

Thus, a classification by month may be appropriate compromise, since it gets rid of the above mentioned inadequacies of classification by transaction and by day, for example. Shareholders and other users may be willing to accept this level of aggregation, firstly because it results in the reduction of cost and information overload. Secondly, the information loss is insignificant. Companies may also save costs that would have been incurred in keeping detailed information on-line for long periods of time.

In summary, the analysis of the above forms and levels of aggregation for turnover has revealed the following:

(1) Any form or level of aggregation carries with it a loss of information to the users of accounting information. However, the scale of the loss differs between companies and industries due to the nature of their activities. For example, the loss of information on sales activities is less significant in retailing industry, when aggregation is effected on product- basis, than in shipbuilding industry where information about each transaction may be necessary.

(2) Shareholders and other users may be willing to accept some forms and levels of aggregation, so as to reduce the costs and time required for processing, and aggregating detailed data items.

(3) Achieving standards for turnover may be difficult to achieve without a considerable degree of compromise between conflicting criteria.

(4) Achieving standards for temporal aggregation is much easier than sectional aggregation although there are some differences between companies and industries regarding the velocity of turnover and the change in prices of their products.

6.3 Debtors

It was shown previously that some industries have few customers and others have a large number of customers. This reflects on the number and kind of trade debtors in

each of these industries. For aircraft and shipping companies, the trade debtors are usually few in number and long-term in nature. In many cases, failure to pay or default by any one debtor may jeopardize the very existence of the company. Thus, information on each debtor may be important and basic to the users of databases, especially if a customer debtor, whose account represents a sizable portion of account receivables, gets into financial trouble. Moreover, the cost of obtaining and maintaining information on this basis is not high. Other characteristics such as location, credit standing, regularity and type of debtor may be important as well.

However, for other industries such as retail, engineering, and chemicals, information about each individual debtor may be unnecessary and involve excessive details, which may result in information overload to the users of databases. The cost of updating and maintaining these records on-line may also be high for the companies to meet. On the other hand, in some industries, the amount of debts are large and the credit periods granted are longer, while in other industries, such as food and chemicals, the amounts involved are usually small and the credit periods are relatively short. Hence, less aggregated figures are needed in the latter case to reveal the nature and the aging of receivables while, a broad classification on individual debtor's basis may be appropriate in the former case.

Thus, a trade-off between the information loss that may result if classification other than on individual debtor basis is effected in industries with few large debtors, and the information overload that may be caused if companies having huge number of debtors with small amounts outstanding disclose information on that basis. The compromise may lie in defining a homogeneous grouping as classification by type of debtor (individuals, government units, short-term, long-term, etc), within which sub-classification by product may be allowed. It was shown previously that some companies, such as NADEC, already disclose such information in their current annual published reports. For other companies like SPIMACO one debtor (such as ministry of health) assumes the large amount of accounts receivable. The industries and companies with few customers may meet that by classifying each individual debtor separately.

Furthermore, aging may be affected on a monthly basis, a classification which reveals the age pattern of each debt especially that of regular debtors. Aging on less than monthly basis may not be necessary even where companies face liquidity problems. If at the extreme a company is forced to sell its account receivables (factoring) accounts of less than a month old are usually sold at close to book values, without significant losses.

6.4 Stocks

Companies in different industries acquire different types of raw materials from different suppliers. Each acquisition transaction represents a separate event, for which information on the type of raw materials, supplier, price, use, etc., is given. The

current valuation of stocks, followed in current reporting practice, results in complete information loss about the acquisition and consumption or selling of the stock. The various methods used by accountants to price the inventories such as FIFO, LIFO, etc. affect the reported income and the value of the remaining stock in the balance sheet. This means that any aggregation on this basis tends to reflect the same shortcomings of the valuation used.

However, the objective of any events-based reporting of stock should be to provide useful guides to each user to assign his own valuations. This may involve keeping records of physical quantities and prices of all stock items. Nevertheless, a large number of homogeneous items and the continuous flow to customers or in production is a common characteristic of inventories, which may make it possible to allow for some form of aggregation.

Similarly, disclosing information about each transaction would cause information overload and excessive processing costs to the users of data-bases, particularly in industries such as canning, chemicals and components where a wide variety of raw materials are acquired at different times, at different prices and from different suppliers. However, in industries such as car manufacturing, printing, and tobacco, types of raw materials are few in numbers and suppliers are easily identifiable. A compromise to avoid information overload that results if companies having a wide range of materials disclose every detail about each one, is to define grouping in such a way that similar raw materials held in stock for the same purpose or for certain products are grouped together. Companies in industries with few raw materials will find it easy to follow such classification, particularly if each type of raw material is held for different purposes and conforms to the standard requirement.

The same can be said about finished goods and stocks. In mass production industries such as sugar, car manufacturing and shipbuilding, the stock includes few (sometimes one) and identifiable products while in others (e.g. food and canning industries) it includes a wide range of products. Reporting information on each item of stock (quantity, quality, cost, acquisition or manufacturing date, current value etc.) may be difficult in some industries and may cause information overload, while it may be easy in others. On the other hand, aggregation of all stocks together would result in information loss about the different products in the stock. Aggregation of stock items on product-basis may be a possible compromise since it avoids the information loss about each product in industries with few stock items while in industries with wide ranges of stock it eliminates the information overload that would result if each stock item is reported separately.

6.5 Staff Costs

Disclosure about staff costs on individual employee basis is neither relevant nor practical for reporting purposes. Thus some forms and levels of aggregation are

necessary to avoid the information overload and excessive costs to the users of databases when details about each individual employee costs are reported.
All companies in different industries commonly record information about staff costs. Although detailed information is available to all companies, they are generally reluctant, for unforeseen reasons, to voluntarily disclose detailed information about the cost of their labor force. However, There may be some differences with respect to the number, quality, and importance of the labor force between different industries. For instance, the number of employees in an agricultural or construction company, such as Aljouf Agricultural Development Company, is larger than that of a pharmaceutical company, such as SPIMACO. In other industries such as electronics, and information technology employees represent the most important resource of the company. And thus reporting of details about employees is considered more important than in other industries. Generally, employee information about labor-intensive industries is more important and may well be needed by users of financial reports than that is required from capital-intensive industries.

Regardless of these differences, similar information may be recorded, and required to be reported by all companies to the users of accounting information. Hence, the feasibility of achieving standards is enhanced by these similarities.

The critical issue, therefore, is to seek a level of aggregation, which would eliminate information overload and reduce the time and costs of obtaining the information by users of accounting information.

Disaggregation according to employee skill, for example, may be appropriate. Staff costs may be disaggregated into skilled, semi-skilled and unskilled employees' costs. Grouping on these bases has the advantage of reflecting the most important feature of workforce. Additional reports and classifications could be generated if records of other characteristics such as location, sex, experience, project, age etc. are maintained. Classification on the basis of these characteristics does not violate the homogeneity criterion and meets the flexibility criterion defined before.

The Implications of the Analysis

It is pointed out that accounting reporting can take advantage of the rapidly developing information technology that may allow disclosure of accounting information that was not feasible not a long time ago. In principle this makes it possible to implement a pure events accounting system, where every transaction or piece of information one can think of could be made available through companies' maintained databases. This trend contributes to the solution of long standing problems pertaining to value based accounting system, such as the problem of measurement and classification, the problem of aggregation and other problems mentioned earlier in this study.

The development of database models that are designed to hold accounting information and helps in the execution of this tremendous level of disclosure. The development of

telecommunication systems and programs further help end -users in accessing these remote data bases

Other developments, which further help the computerization of external financial reporting, are the increased awareness and sophistication of people all over the world in using computers. This comes at a time where costs of hardware, software and communication systems are at low and affordable levels to many people. This is currently evidenced by the prosperity of the technology industry all over the globe due to the increased demand for its products.

Regardless of these positive technical developments that help the execution of the proposed accounting system there may be a need to standardize databases so that data items are stored in similar format. The standardization of company' databases is essential for:

- Comparability of companies' databases
- Efficiency in retrieving, using and updating of these databases
- Effectiveness due the low costs of information access and processing resulting from standardization.

The empirical industry analysis in the previous chapters shows that:

There exist differences between industries regarding the amount of required disaggregation In some industries certain levels of aggregation are sufficient since disaggregated information do not provide incremental information about the underlying activities. In such industries, such as retailing, there is a possibility of information overload and confusion to users of accounting information if very detailed accounting data is submitted, although the existing and future technology makes such reporting possible.

On the other hand, the application of the aggregation criteria to the accounting items chosen from the annual reports, shows that:

- The availability of information technology makes it possible to expand accounting disclosure to levels that may not be possible using current published reports.
- Additional attributes and characteristics of accounting transactions can be captured and controlled
- It is possible to achieve standards in company databases
- The achieved standardization of company databases comes at high level of compromise between the conflicting criteria that are developed initially to help the standardization process.

The question of whether this system can be applied worldwide is not easy to answer in this research. However, one can think of various factors that may hamper the worldwide application of such reporting system:

1. There exist wide differences in levels of user sophistication and awareness among different countries of the world. Thus, although technology is spreading at high rate but still in many countries technology at still at its infancy, and it will take time to reach levels comparable to those of advanced countries.
2. The cost of technology, in form of hardware, application, and telecommunication systems may act as a barrier of rapid and wide scale adoption of technology in many poor countries of the world.
3. The cost of developing and, maintaining databases in companies may be very high especially in small companies with insufficient resources to implement such a system without impairing profitability.
4. The security of databases of companies especially those with weak security systems that are incapable of keeping out unauthorized users and hackers.
5. The rapid change in technology may add further burden on companies and end-users alike, since it may bring with it changes in database systems. Although in developed countries this may not take long time to adapt; it may be long and difficult process in developing and poor countries.
6. The unfavorable experience of the world in developing unique set of international accounting standards may point to the difficulties that may encounter attempts to develop database standards.

Conclusion

In this chapter, the difference between various companies and industries in the definitions of events, characteristics of events, and the process of aggregation as well as the implications for defining standards for events approach databases have been examined.

The chapter outlines the necessary compromises that are deemed to be necessary to accommodate differences between industries emanating from the nature of those industries.

The chapter also explores the relation of the results of the analysis in this study and the information technology. Finally, the chapter highlights the factors that may hamper the application of the standardized database system in all countries, and for all companies.

CHAPTER SEVEN
SUMMARY AND CONCLUSIONS

This study was set out to examine the possible impact of information technology on accounting and financial reporting. The major goal was to examine the possibility of replacing or supporting the existing financial reporting with a computer-based database reporting system. The impetus behind this orientation is that it makes use of the increasingly available information technology to mitigate the enormous problems that underlie the current published financial reports.

To achieve the stated purpose of the study, a sample of published annual reports of British and Saudi companies in different industries was analyzed. The following four representative items were selected for examination:

Income Statement

(i) Turnover
(ii) Staff Costs

Balance Sheet

(I) Debtors
(ii) Stocks

The income statement items represent the two most important elements of revenues and expenses, while the balance sheet items are two important and major items in all companies' balance sheets.

The analysis was carried out for two purposes. The first purpose was to investigate the process of aggregation, which had taken place or was likely to have taken place in producing the reported figures. The second purpose was to examine whether there were any differences between industries and between countries regarding the aggregation processes.

The study confirmed that items currently reported in the annual published reports are highly aggregated. It was argued that this results in inflexibility in using the information and in loss of information, which would have been useful for decision making, if less aggregated information was provided. The study shows that statutory and professional requirements were unsuccessful in promoting comparability of published annual reports among different companies and industries. It was argued that this might be due mainly to the nature of activities constituting each of the different industries and the different nature of transactions and events undertaken by different companies and in different industries.

(67)

The following criteria were defined as a basis for deciding what constitutes an allowable or required form of aggregation:

1. The information overload criterion: which states that the volume of data presented to users must not be so great as to cause information overload or to cause undue delays in making the data useful for decision making.

2. The information loss criterion: which states that any aggregation of data, should not result in loss of information about essential variables and events.

3. The economic criterion: which states those economic conditions (inflation and merger activity) may affect the required level of aggregation

4. The cost criterion: which states that the cost of storing and reporting detailed information must not be so excessive as to outweigh the benefits of storing and reporting that information.

5. The flexibility criterion: which states that the information made available, must be in a form, which will serve the needs of a number of different user groups for a number of different uses.

6. The homogeneity criterion: which states that the level of aggregation may be partially determined by the nature and degree of the homogeneity of the variables and elements included under any one item or account.

These criteria were used to decide and develop forms and levels of aggregation, which may be required, for the four items examined in this study. It is clear from the analysis that these forms and levels of aggregation could only be achieved by compromise and in respect of differences between industries.

However, one factor, which may make it feasible to achieve standards for databases, is that most of the characteristics relevant for describing events and transactions are currently available within companies for management purposes.

On the other hand, it was shown that many companies have already took steps to provide detailed information (e. g turnover on product basis), which means that the criteria defined in this study are applicable and does conform to reality.

A final word of caution is that the criteria used in this study are not exhaustive and they only represent an attempt to define levels of aggregation that may be permitted or required for meaningful financial reporting that takes advantage of rapidly developing information technology.

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