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# Use of expert systems in harmonizing international accounting reports

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## ABSTRACT

*A significant problem in international accounting is the presence of a variety of accounting and disclosure standards that have been adopted by various countries as they match their national information needs to specific formats. Efforts at harmonization of world-wide financial statements have been less than successful. The needs in the 1990s suggest the need for an expedient solution to this problem. The current paper addresses this problem and suggests an information systems approach—a new approach—namely, the development of an expert system which would be capable of translating disclosure in a particular country standard to one that meets internationally acceptable accounting standards or from one country standards to another country standards. The authors accept that the lack of adequate data may be the impediment to the development of the expert system and suggest a solution from database management to alleviate the harmonization dilemma.*

## INTRODUCTION

A significant problem in international accounting is the presence of a variety of accounting and disclosure standards which have been adopted by various countries as they match their national information needs to specific formats. The phenomenal growth in international business and the increased need for capital worldwide have put pressure and urgency for uniformity in financial reports. Harmonization and reconciliation efforts have been undertaken but have shown little progress.

This paper emphasizes the desperate need for uniformity in worldwide reporting, addresses the problem of harmonization, and presents a new approach—namely, the development of an expert system which would be capable of translating disclosure in a particular country standard to one that meets internationally acceptable accounting standards or even to one country standards to another country standards. It is accepted fact that the lack of necessary data may be an obstacle to make translations from one country standard to another feasible. This paper also proposes a database management solution to the identified problem. Database management, while avoiding data redundancy, providing access flexibility, preserving data integrity and data security, provides the necessary structure to organize the gathering of such data.

## BACKGROUND

The emphasis on harmonized international accounting principles is growing very rapidly. Pressures for uniformity in financial reporting are increasing by orders of magnitude. Two major pressures are the growth of international business and the increased need for capital. East block countries have opened their doors to western goods and are seeking an inflow of new capital. The European community is poised to enter a higher level of cooperation and unification in 1992 and, as a result, may capture a great deal of the world market share. U.S., Japan, and other industrialized countries are trying hard not to fall back in the race. It is not surprising that the U. S. recently has increased its emphasis on all aspects of international education, particularly in business courses.

The business world is rapidly changing and so the accounting profession should attempt to meet the need of business communities. As interaction with foreign suppliers, customers, partners, creditors, investors, and governments increases, so does the awareness of differences in accounting systems and practices and the problems related to them. Investors and especially business leaders need relevant, timely, and comparable financial statements which are in conformity with sound accounting principles and reflect a fair economic situation of a firm in order to make rational decisions. Paramount among these problems is the analysis of financial statements prepared in different ways and the need to reconcile different national standards while preparing a globally consolidated financial report. It is a well known fact that accounting is the language of business. For it to serve the needs of international investors, it must become an international language by seeking to reconcile varied accounting reports into an international or even an in-house national standard.

However, the accounting policies in many countries differ and, in many cases, bear little resemblance to each other. Accounting figures disclosed in a financial statement of a foreign subsidiary may be so strange to its parent that their effort at reconciliation may lead to questionable values and unreliable financial results. Consolidated financial statements prepared by the parent organization having foreign subsidiaries might be misleading rather than helpful to potential or actual investors.

Many steps have been taken to standardize accounting principles among countries. Previous attempts at standardization of international accounting practice have not been successful due to the great diversity and multiplicity of accounting procedures among different countries. Despite the significant efforts of numerous organizations at the regional, national, and global level, the degree of harmonization remains fairly low. Worldwide efforts have been made to eliminate or significantly reduce the differences in accounting standards. Yet the process of harmonization is still in its infancy and requires substantially new attempts and direction.

To help alleviate the problem of a lack of conformity, the International Accounting Standards Committee (IASC) was formed in 1973. This committee has worked diligently over the past years to harmonize world accounting principles and financial disclosure. So far they have issued almost 30 standards on many important accounting issues. Unfortunately, the IASC standards cannot be enforced and may not be applied among countries simply because of inconsistency with national standards within those countries. Plus, it is accused of being either too flexible or biased toward industrialized countries (Meek and Saudagaran, 1989). Clearly, various factors such as tradition, national pride, national laws, emphasis on tax reporting of net income, and extensive use of reserves continue to block the efforts of the IASC.

Various treatment of accounting systems among different countries contribute to lack of harmony in financial reportings. These treatments include use of historical cost/current value measurement, treatment for inflation, consolidation practice, actual/practical linkage between income tax and financial reporting, operating vs. financing treatment of leases, proliferation of appropriate computational methods for inventory, and timing differences in financial reporting. In addition, lack of complete disclosure of financial data and unavailability of detailed information blocked any possible harmonization of accounting reports.

## NEED FOR HARMONIZING FINANCIAL REPORTS

Accounting, unlike science, is not a product of the laws of nature; rather, it is man-made in response to our financial information needs with respect to economic activities. Accounting regulation varies over time as those needs change with the nature of the environment. Given varied economics, social, and political environments, it is probably impossible to use unique worldwide international accounting standards in all countries of the world.

In the 1990s the needs for harmonizing financial reports are expected to multiply. Multinational enterprises are in serious need of consolidated statements, the final product of accounting process, which should present the financial position of an economic entity (a group of companies) without taking into account the separate legal identities of each company. The international community is looking for a solution of how to accurately combine financial statements of subsidiaries from different countries which are prepared under a variety of accounting bases. Firms are seeking better methods to present their accounting reports so as to attract more capital from foreign investors. The proposed solutions so far have not led to a satisfactory resolution of the problem. To find out an appropriate solution, researchers have attempted to cluster the accounting systems used in different countries (see for example, Muller [1968], Seidler [1967], American Accounting Association [1977], Frank [1979], Nair and Frank [1980], Nobes and Parker [1981], and Alhashim [1982]).

Based on the available literature thus far, it would be reasonable to conclude that differences in environmental forces demand the use of different accounting systems. It is also clear that despite all the classifications and research efforts undertaken to facilitate the development of models that combine, compare, and generate reliable financial reports, we are still far from achieving the goal of accounting without boundaries. Furthermore, it is obvious that standardization of accounting practice by requesting the procedures of one country be adopted by others is infeasible and may be impossible. Therefore, all attention is toward harmonization of accounting practices in the world.

However, harmonization itself is defined in different ways. Choi and Mueller (1987) believe different standards might prevail in individual countries, so long as they are in harmony with each other. To Nobes and Parker (1981), harmonization is a process of increasing the comparability of accounting practices by setting bounds to their degree of variation. Kirkpatrick (1985), the former chairman of the International Accounting Standards Committee, responding to the question of what is harmonization, indicates that it does not imply uniformity of accounting standards and practices. He points out that if all preparers of financial reports either adopt IASC standards or disclose the difference between their practice and IASC's, harmonization gradually can be obtained. Finally, according to Wilson (1967), harmonization implies a reconciliation of different points of view. In his opinion accounting reports of foreign nations should be reconciled in such a way that permits better communication of information in a form that can be interpreted and understood internationally.

## **CURRENT PRACTICES TO ACHIEVE HARMONIZATION**

A number of research studies have documented the various approaches that have been adopted by providers of financial statements in order that their users and economic decision makers may understand such reports. Meek (1984) has classified these approaches into six different categories: (1) no accommodation to foreign readers such as in US, UK, and France; (2) only translation of the text as a supplemental report by German and Swiss companies; (3) translation of the text together with currency translation based on an ending period by some European and Japanese firms; (4) disclosure of the impact of some of the differences in accounting principles such as SEC minimum requirement of non-US companies participating in US stock exchanges; (5) keeping more than one set of accounting books based on different needed accounting standards done by some large Japanese multinational firms; and (6) selecting the "best" of the practice in the world according to a particular company's management opinion.

Practically, none of the above approaches is the answer to the current problem. They are either more confusing or extremely difficult, limited, and costly since separate books have to be maintained to cope with the accounting methods and policies of another country. Slipkowsky (1986) argues that it would be an interesting practice to develop financial information in two ways; one using national accounting standards and the other reconciling the national accounting amounts to ones using the international accounting standards.

## **A NEW APPROACH TO HARMONIZATION PROBLEM**

Developing a computer-based information system (CBIS) is expected to be a better approach to the problem of harmonizing or reconciling international accounting reports. It is our understanding, based on a review of the literature, that this suggestion would be among the best and most practical solution to harmonize nonhomogeneous financial reports. Specifically, the CBIS should be capable of converting a financial statement developed (i) under a national standard into an internationally acceptable standard, (ii) under an internationally acceptable standard into a national standard, and (iii) under one national standard into another, for use in a nation using a different standard. To develop such a computer-based information system encompasses four stages. Stage 1 will include the clear delineation of the problem at hand, support for the proposed solution (a CBIS solution), identification of the appropriate CBIS, and a logical design for such a system. Stage 2, which will represent a feasibility study for the rest of the project, will identify the sources of information, the appropriate system hardware and software, and knowledge acquisition, representation and interfacing procedures. Stage 3 will encompass the stages of rapid prototyping, evaluation of its performance in its various stages of development and user acceptance of the final version of the prototype. The final stage of the project will include the actual development of the CBIS software with attending plans for system implementation and eventual maintenance. These stages are roughly comparable to the stages in expert systems (a specific CBIS) development.

## EXPERT SYSTEMS AND ACCOUNTING

Wolfe and Viator (1986) defined expert systems as systems that are designed to solve problems of a limited scope through the application and manipulation of the knowledge of experts, which is represented as data. In such systems, inference chains are employed to determine how the rules and facts of the knowledge base are carried out in solving a problem. They further state that expert systems are appropriate in accounting, since (i) the discipline seems to be growing in a direction that demands concentrated expertise in many specialized areas and (ii) expert systems are most suited for such situations. This view is shared by Shim and Rice (1988), who maintain that the appropriateness of expert systems to management and accounting applications is closer than most people realize.

Only a limited number of accounting expert systems applications have been developed to date (Booker, Kick, and Gardner, 1986). A computer search in the ABI/INFORM data base revealed only 27 references for "Expert Systems" coupled with "Accounting." Most of the applications deal with taxation, auditing, capital budgeting, control, and loan analysis. None was found in international financial reporting. Harmonizing or reconciling accounting statements prepared based on different standards still represents a fertile area for decision support/expert systems research.

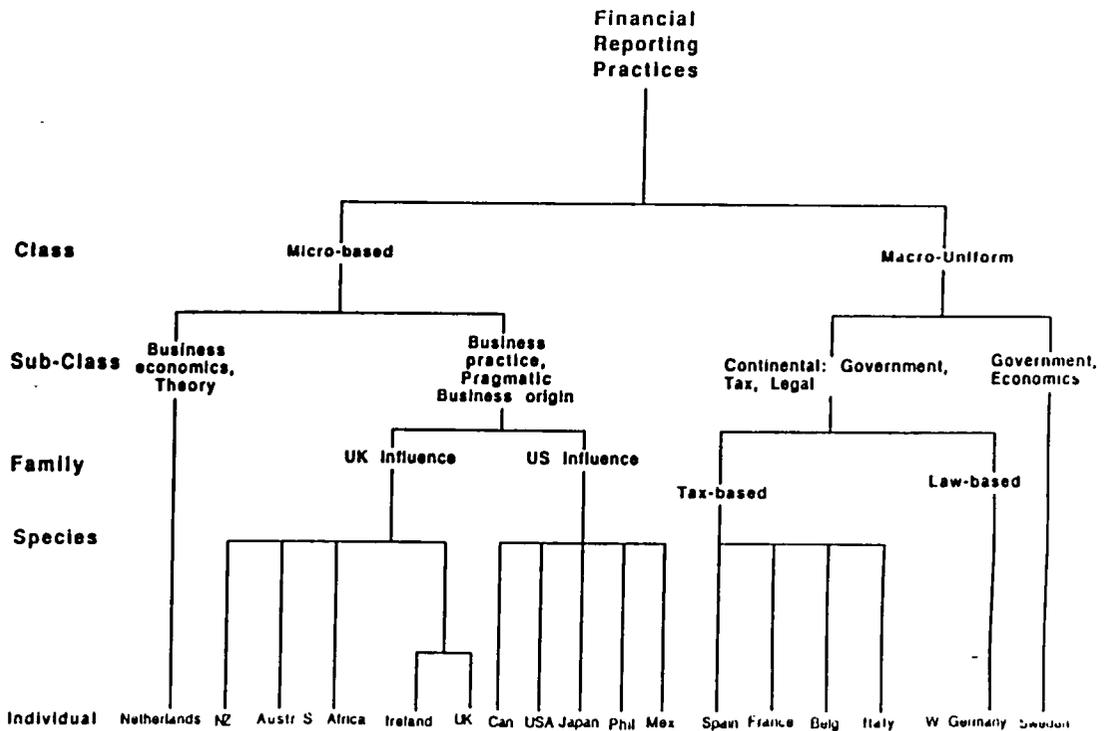
## THE PROPOSED ARCHITECTURE

The basic structure and components of an expert system can be seen in Figure 1. Figure 2 is the architecture of the prototypical system that will be developed. Each box represents the components functions. The knowledge acquisition facility, shown in the basic structure, is not needed in this system because the knowledge engineer, not an expert, will be the only one interfacing with the actual development of the computer-based information system.

There are two distinct facets that need to be considered. From an **accounting perspective**, one needs to clearly define and delineate the problem at hand. Individuals and firms are often required to reconcile or harmonize disparate accounting and disclosure standards while they evaluate or disseminate global financial reports. A financial report consists of data or information regarding numerous elements, each of which may be computed in several ways utilizing different methods. Different countries may mandate different modes of computation for these elements. Table 1 provides a partial list of these accounting elements and the variety of ways by which each of them can be computed. For the reconciliation process to be effective, therefore, one needs to (i) identify each possible element required in global financial reporting, (ii) for each element, identify possible methods of computation, and (iii) we also need translation rules to convert from one method to another. The outcome of this process would result in the specification of the basic components of the proposed system—namely, its knowledge base and inference engine.

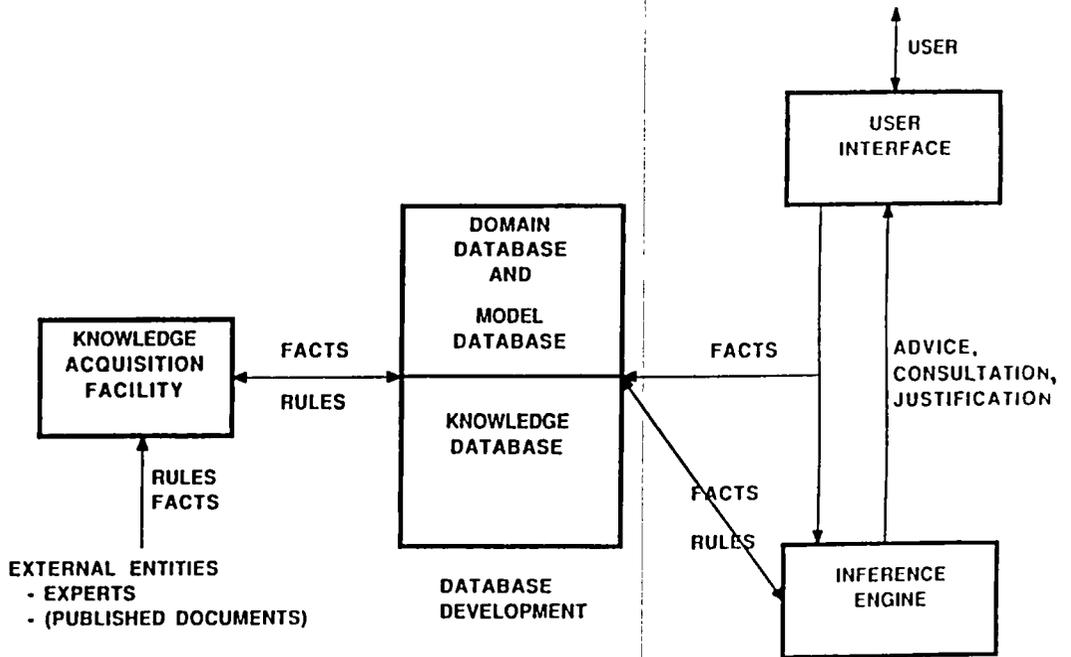
**Figure 1. A Suggested Classification of Accounting Systems by Practices**

Source. Christopher W. Nobes and Robert H. Parker, *Comparative International Accounting*, Homewood, Ill.: R. D. Irwin, 1981, p. 213.



**Figure 2. Basic Structure of an Expert System**

Source. Modified from Martinez Teri, "Expert Systems. Definition, Development, and Applications in Accounting," unpublished paper, Oakland University, 1988.



According to Senn and Smith (1987), the knowledge base represents an expert's knowledge about a specific area. The knowledge base is usually a rule-based system consisting of a series of "if-then" rules. It could, however, also be example based. The inference engine provides a method of reasoning by applying the rules and facts in the knowledge base to a problem. The inference engine may be backward-chaining (goal-driven), forward-chaining (data-driven), or a combination of the two. It might be appropriate, at this point, to stress that the inference engine takes in the data from the user and applies it to the knowledge and data base. In our current context, if one needs to convert a financial report developed under German standards to IASC formats, the user may need to supply to the expert system data regarding the methods used to calculate various elements under German and IASC standards. The expert system would possess the knowledge to convert from one method to another and also the process of generating a financial report from one standard to another. That is, the effectiveness of the system will depend upon the completeness of the data provided. This facet of system development is the most intensive. Coats (1988) claimed that "(m)ost of the effort used to develop expert systems is spent on deciding what knowledge should be encoded into the knowledge base and inference engine."

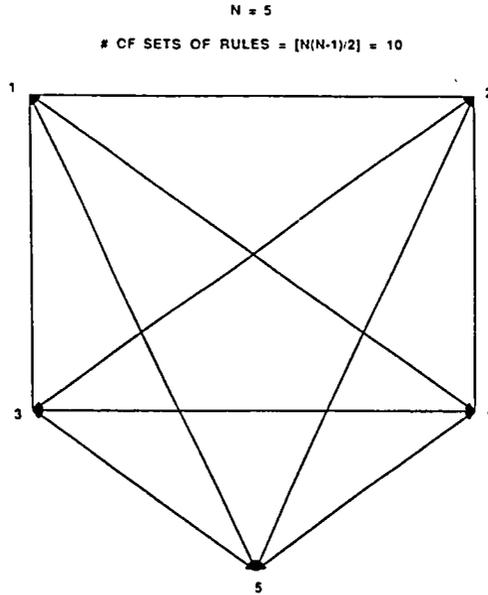
## FUNCTIONAL LOGIC OF THE PROPOSED SYSTEM

Functionally, the system will possess the knowledge (rules) for converting financial statements developed under different national standards into the IASC format (or a pre-selected country standard, say the US) and vice-versa. It will not possess rules for directly converting financial reports developed under any specific national standard into another specific national standard. The system will use the IASC format as the central "clearing house" (or "intermediary" or "common denominator") to make such conversions. In other words, if a U. S. company wants to compare financial reports of a U. K. firm in the U. S. format, the system will first convert the financial reports of the U. K. company to the IASC format and then convert the financial reports of the U. K. company from the IASC format to the U. S. format.

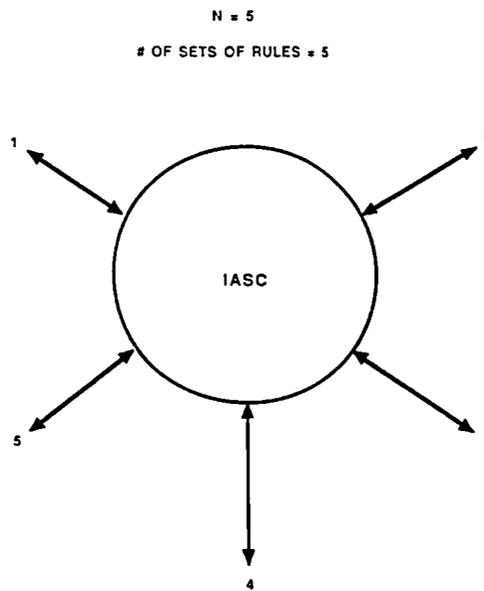
In terms of cost effectiveness with respect to developing and maintaining the proposed system, the above approach is the preferred solution. Assume that there are  $N$  nations with  $N$  different national standards, each wanting to compare the financial reports of all the other nations in its own format. Further, assume that the average cost of developing and maintaining each set of bilateral conversion rules is  $K$  dollars. Then, altogether the system will need to possess  $[N(N-1)]/2$  sets of bilateral rules, at a total cost of  $[N(N-1)/2]K$  dollars. For example, as shown in Figure 3, for  $N = 5$ , the system will need to maintain  $[5(5-1)]/2 = 10$  sets of rules, at a total cost of  $10K$  dollars. Compared to this, if we use the IASC format as the intermediary format for conversion purposes, the system needs to maintain only  $N = 5$  sets of rules, at a total cost of  $5K$  dollars (see Figure 4). In general, the savings is  $[N(N-1)/2-N]K$  dollars.



**Figure 4. Direct Bilateral Conversion of Financial Reports Developed Under Different National Standards**



**Figure 5. Indirect Conversion Using the IASC Format as the Intermediary Format**



## DATA PROBLEM AND DATABASE MANAGEMENT SOLUTION

A factor that is rarely, if ever, discussed in the literature may be the real culprit slowing down the progress towards global harmonization. International accounting academicians and practitioners realize that solutions at harmonization may fail because, even if the will exists, the data allowing for transaction from one country standard to another may not be available. As an example, a Japanese multinational operating in Canada and France besides Japan will not be able to standardize on one method of inventory valuation since that method most likely will be a rarely used procedure in another. If it does keep inventory valuations in the generally acceptable procedure of the respective country, the corporation runs the risk of not being able to translate the financial statement of one country subsidiary into another — the dilemma in harmonization. For both of the above objectives to be facilitated, the Japanese multinational would be better off if it routinely gathered the requisite data in a database as will be explained later.

Table I presents a comparison of the accounting standards in eight countries in regard to inventory valuation, fixed assets valuation, R & D treatment, long-term lease, allowance for bad debt accounts and secret reserve allowable.

**Table I. Example of Accounting GAAP among Countries**

Accounting Standard	U.S.	U.K.	France	Japan	Canada	West Germany	Australia	Nether- lands
1. Inventory Valuation								
LiFo	Yes	not for TAX	rarely used	Yes	Not for TAX rarely used	Yes	not allowed	Yes
FiFo	Yes	Yes	Yes	rarely used	Yes	Yes	Yes	Yes
W. Average	Yes	Yes	Yes	Yes	rarely used	Yes	Yes	Yes
2. Fixed Assets Valuation	HC	C/RC/GP	HC/GPL	HC	HC	HC	HC	HC/RC
3. R & D	Expensing	Expensing	Expensing	Expensing	Capitalize for Devel- opment Costs	Expensing	Permit Capitali- zing	Expensing
4. Lease	Capitalize	not required	not required	not required	Capitalize	not required	not required	not required
5. Allowance for Bad Debt accounts	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
6. Secret Reserve allowed	No	No	Yes	No	No	Yes	No	No

HC = Historical Cost  
RC = Replacement Cost  
GPL = General Price Level

The theory and practice of database management provide an adequate solution to the identified data problem in global harmonization of financial statements.

A **database management system (DBMS)** — a software) allows one to create, use, and maintain software that is not tied to a particular set of files. That is, features built into database management systems make it possible to separate the user/program view of data from the way the data are stored (Senn, p. 345). Through the concept of data independence, data are kept separate from the programs that process them. Therefore, data can be tailored to accommodate several users with differing needs, without actually changing the structure. The **data structure** feature of a DBMS permit users to use stored data without having to necessarily know or be concerned about how the data are actually stored. Database administrators usually organize data according to user needs and the database management system assembles the necessary items and records for the user (Senn, p. 348). The user does not have to know how the data are stored, which files contain the data, or whether the stored record contains more than the data items needed for his application. He merely has to specify the desired data and the database management system will locate and assemble them for use (Senn, p. 348).

The **database architecture** defines the database and gives structure to its environment. It accounts for the separation of the logical and physical relationships and defines the database through **schema and subschemas** (Senn, p. 355). The **schema** is a description (framework) of the logical view of the entire database, that is — it is a list of the names and attributes of each record type in the database and the relationship between those record types. It is the data administrator's (the person responsible for database design and fulfillment of the objectives of managing data) logical view of a database. There is only one schema for a database. A **subschema** represents the logical view of data items and records held by a specific user or group of users. It is a subset of the database and therefore a subset of the schema. Generally, only some of the items in the schema are typically included in an individual subschema; that is, only those items a person will actually need or use for a given application are in the subschema. The others are ignored. Obviously, one or more subschemas may be related to a schema. The subschemas represent the users' logical view of the database (Senn, p. 357).

The other primary feature of database design is **relatability**. Relatability is the capability to define relationships between record types and to retrieve data based on those relationships (Senn, p. 343). As mentioned earlier, the schema — in addition to providing the names and attributes of the record types — also provides the relationship between these record types.

## HARMONIZATION AS A DATA BASE PROBLEM

Let us reconsider the examples of the valuation of inventories and assets and try to reformulate them in terms of database principles.

**Valuation of Long Term Assets:** The record type defining this entity would be the valuation of long term assets. Each asset would be an **instance (or occurrence)** of this record type. Data items associated with this record type would be: (i) when the asset was acquired, (ii) at what cost, (iii) method of depreciation, (iv) estimated life of the asset, (v) residual value of the asset, (vi) timing of valuation for replacement cost, (vii) amount of valuation for replacement cost, (viii) general price level (GPL) at the time of revaluation, etc.

**Table IIA. Long Term Assets Schema and Subschemas**

SCHEMA DATA	Cost	Time of Acquisition	Method of Depreciation	Estimated Useful Life	Estimated Residual Value	Timing and Term of Disposition	Specific Price at each period	GPL at each period	Foreign Currency Exchange Rate	Etc.
Equipment I	*	*	*	*	*	*	*	*	*	*
.	*	*	*	*	*	*	*	*	*	*
.	*	*	*	*	*	*	*	*	*	*
.	*	*	*	*	*	*	*	*	*	*
Equipment n	*	*	*	*	*	*	*	*	*	*
<b>Other Assets</b>										
<b>Subschema for a U.S. multinational firm used in the U.S. (historical cost is used)</b>										
	*	*	*	*	*	*				*
<b>Subschema for a U.K. subsidiary for use in the U.K. (assume GPL is used)</b>										
	*	*	*	*	*	*		*		*
<b>Subschema for a U.K. subsidiary for use in the U. S. consolidated statements (historical cost is desired)</b>										
	*	*	*	*	*	*		*	*	*
<b>Subschema for a Dutch subsidiary for use in Netherlands (assume replacement cost is used)</b>										
	*	*	*			*	*			*
<b>Subschema for a Dutch subsidiary for use in consolidated statement in U. S. (historical cost is desired)</b>										
	*	*	*	*	*	*	*		*	*

\* denotes information is needed

All of these data items associated with the record type will form the schema. When the US multinational is preparing its domestic (US) financial statements, its subschema would only include data items pertaining to historical costs; that is — when the asset was acquired, at what cost, method of depreciation, estimated life of the asset, and residual value of the asset. If the preferred or favorable method for the UK subsidiary is GPL method, its subschema will include only those data items pertaining to GPL computations; that is — when the asset was acquired, at what cost, method of depreciation, and the GPL at the end of each period. For a consolidated report, the subschema pertaining to the UK subsidiary would include only those data items that related to historical costs; that is, when the asset was acquired, at what cost, method of depreciation, estimated life of the asset, residual value of the asset, and the GPL at the end of each period. Table IIA describes the relevant schemas and subschemas.

**Table IIB. Inventory Schema and Subschemas for a Japanese Multinational Firm**

SCHEMA DATA	System of Record Keeping	Costing System	Quantity of each Purchase	Cost of each Purchase	Timing of each Purchase	Quantity of Outlay	Market Value at each Period	Foreign Currency Exchange Rate	Etc.
Inventory Item I	*	*	*	*	*	*	*	*	*
.	*	*	*	*	*	*	*	*	*
.	*	*	*	*	*	*	*	*	*
.	*	*	*	*	*	*	*	*	*
Inventory Item n	*	*	*	*	*	*	*	*	*
Subschema for a Japanese Multinational in Japan (LiFo mostly used)	*		*	*	*	*			*
Subschema for a Canadian subsidiary for use in Canada (FiFo mostly used)	*		*	*	*	*			*
Subschema for the Canadian subsidiary for use in consolidated statement in Japan (LiFo)	*	*	*	*	*	*		*	*
Subschema for a French subsidiary for use in France (assume weighted average used)	*		*	*	*	*			*
Subschema for a French subsidiary for use in the consolidated statement in Japan (LiFo)	*	*	*	*	*	*		*	*

\* denotes information needed

*Note:* Most of the data are required in each of the subschemas because the different methods provide different results due to computation scheme (costing system) and not because of different data item used.

**Valuation of Inventories:** The record type is valuation of inventories. Each purchase represents an instance (or occurrence) of this record type. The data items associated with this record type are: (i) flowing method, (ii) costing system, (iii) time of purchase, (iv) cost of purchase, (v) volume of purchase, (vi) volume of sales, (vii) market value at the end of each period, and (viii) foreign currency exchange rate. In this example, as shown in Table IIB, the schema and subschemas are similar. This is because the valuation of inventories by the different methods does not depend on different data items but on computational methods.

**Table III. Some Needed Information**

1. Inventory Valuation:
  - System of record keeping (Perpetual vs. Periodic)
  - Costing system (FIFO, LIFO, Average, etc.)
  - Quantity of each purchase
  - Cost of each purchase
  - Timing of each purchase
  - Quantity of outlay (usage or sales)
  - Market (replacement) value at the end of each period
  - Foreign currency exchange rate
2. Fixed Assets Valuation:
  - Cost of each asset
  - Time of acquisition
  - Method of depreciation
  - Estimated useful life
  - Estimated residual value
  - Timing and term of disposition of any asset
  - Specific price (replacement value) at the time of revaluation
  - GPL at the time of revaluation
  - Foreign currency exchange rate
3. Research and Development (R & D):
  - Amount of expenditure
  - Time of spending
  - Nature of the expenditure (research vs. development)
  - Method of amortization if it is capitalized
  - Foreign currency exchange rate
  - Etc.
4. Lease:
  - Amount of lease payment
  - Life and other terms of contract
  - Estimated value at the maturity
  - Market interest rate
  - Whether lessee is able to purchase the asset at a bargain price
  - Method of amortization
  - Foreign currency exchange rate
  - Etc.
5. Allowance for bad debt accounts:
  - Amount of accounts receivable
  - Amount of credit sales
  - Method of estimating allowances
  - Policy on valuation of accounts receivable
  - Foreign currency exchange rate
6. Secret Reserves:
  - Time or origination
  - Amount of reserve at each time
  - Sources of reserves
  - Detail information on calculation of reserves
  - Timing and amount of usage of any part of the reserves
  - Foreign currency exchange rate
  - Etc.

Table III depicts the data items associated with the six previously mentioned accounting entities.

## **ADVANTAGES OF VIEWING HARMONIZATION IN DATA BASE TERMS**

The most important advantage of framing the harmonization dilemma as a database problem is that, if the database architecture is appropriately designed and implemented, the availability of the requisite data for translation to occur from one format to another will never be in doubt. Each subsidiary would routinely collect and store all potentially needed data to effect a translation(s). Data may be selectively retrieved and manipulated based on the application (statements in a particular format). Since storage costs are reasonably inexpensive, the additional overhead need not be a burden to most firms. Enterprises may choose how extensive their databases should be depending on their strategic goals. A firm, with the resources and the will, may decide that it wants to have the flexibility to convert any country format into any other country format. In this case the database would be very extensive. Record type schemas must account for all data items to be available so that all formats are accommodated. At the other end, a firm may choose to have the flexibility of converting any format to the home country standard. In this case, the data needs are more modest. At an intermediary point, firms may choose the flexibility of converting any standard to some of the more important formats. Of course, firms may also choose to have local databases in the countries they operate in, with sufficient data to satisfy local needs. In this case, however, harmonization may prove to be infeasible.

A database approach also provides the following general benefits: avoids unnecessary data redundancy, provides access flexibility, provides for evolution of the database, preserves data integrity and ensures security (Senn, pp. 342-345).

## **OVERHEADS OF VIEWING HARMONIZATION IN DATABASE TERMS**

Establishing a global accounting database may be expensive, especially if subsidiaries are currently meeting only their local data needs. Many such organizations may not have had much experience in developing global databases. In addition, there may be legitimate trade-offs between the need for translation of financial reports and the need to store data. Firms embarking on such a development must deliberately consider its strategic mission before undertaking the task.

## **CONCLUSION**

An expert systems solution is a viable option for harmonizing international financial reports. However, before harmonization can be attempted, firms need to generate the relevant data for a successful outcome. Database management provides the necessary structure to organize the gathering of such data.

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