ABSTRACT

The theme of SUGI17 is Information Delivery. My goal is to discuss its application to the Financial Management process, which is the generation of strategic information necessary for the achievement of business goals in an organization.

INTRODUCTION

Every organization is concerned about the flow of money. The goal of financial management is to manage the flow of money to maximize value. In corporate finance the maximized value is shareholder wealth. Managing the flow of money to maximize value involves the timely analysis and interpretation of financial information necessary for sound decision making.

FINANCIAL MANAGEMENT

If the goal is to maximize value then the function of financial management is to allocate funds to current and fixed assets, to obtain the best mix of financing alternatives, and to develop an appropriate dividend policy within the context of the firm’s objectives. These functions are performed on a day-to-day basis as well as through occasional approaches to capital markets to acquire new funds. The daily activities of financial management include credit management, inventory control, and the receipt and disbursement of funds. Less routine functions encompass the sale of stocks and bonds and the establishment of a capital budgeting and dividend plan. All of these functions are carefully carried out while balancing the profitability and risk components of the firm. The appropriate risk-return tradeoff must be determined in order to maximize the market value of the firm for its shareholders. Figure 1, at the end of this paper, diagrams the various functions, decisions, and goals.

Financial Management Decision Making

Financial Management decisions can be both clear-cut and complex. Some decisions revolve around the financial position of the firm (for example, How am I doing compared to budget or to last year? How much will it cost me to implement X discount? Should I buy or lease?). Other decisions revolve around the business and financial risks of new ventures (for example, If I slow down my growth, what is the impact on my profit and the need to borrow money?).

In general, financial decisions can be divided into three categories: capital budget decisions dealing with fixed assets (for example, What is the correct cash balance to carry? How much do I need to borrow to finance receivables and inventory, and how will I repay it?); capital budget decisions dealing with fixed assets (for example, Will the new software pay for itself and when? Should I buy or build my components?); and financing decisions dealing with long term debt and net worth (for example, Should I buy or lease? How much can I borrow? What is the best way to borrow?).

The timeliness and accuracy of these types of decisions depend on an organized and straightforward process of collecting and analyzing financial data.

The Financial Management Process

The field of financial management is closely related to economics and accounting. Economics provides a structure for decision making while accounting provides the data. The process of financial management involves the collection and reporting of accounting data followed by the analysis and modeling of the data for interpretation and decision making. Financial management also involves the auditing of the entire process to ensure accuracy. Figure 2, at the end of this paper, shows this process.

The financial management process is very consistent across organization structures, for example corporations, partnerships, sole proprietorships, governments, and nonprofit organizations. What varies is the types of analyses necessary for decisions that are specific to the organization.

Issues Facing Financial Managers

The financial management process appears to be very organized and straightforward on the surface. Detailed accounting data are entered daily into various accounting systems as determined by the firm’s needs. These data are posted in the general ledger (GL). Journal entries to the GL are posted to correct errors or provide adjustments. The GL writes out standard financial reports such as the balance sheet and income statement. The data are then analyzed in a variety of ways to provide information for decision making and goal attainment. While this standard process occurs it is monitored by auditors. The books are closed every month and the process begins all over again.

What, then, are the issues financial managers face in implementing the financial management process? In researching this topic I have identified nine significant issues that complicate and sometimes prevent the accurate and timely completion of the financial management process. Knowing and addressing these issues is critical because government statistics indicate that inadequate financing and poor financial planning are major reasons for business failures.

Integration of Data

The single greatest issue facing financial managers is the access and management of data. Financial data are collected and stored in a variety of formats across an organization. In the accounting systems they could reside in sequential files, VSAM files, or in various proprietary database file formats from dBASE to DB2® (see Figure 3 at the end of this paper). The financial analyst works with data typically stored in a spreadsheet or in the file format of a proprietary financial application package.

The questions most commonly asked are how do I consolidate data that reside on a variety of machine types and in a variety of formats? Also, how do I ensure that we are all working with the same data so that the bottom line is consistent? And finally, how do I ensure data entry that is accurate and consistent (for example, are they all entered within the same time series)?
Integration of Machines

Related to the data issue is the issue of integrating the different machines that are utilized in the financial management process shown in Figure 4 at the end of this paper. The large amounts of current month and historical information stored in the accounting systems and GL usually necessitate the use of a large-scale host-based system for data storage. Summaries of these data and information are often downloaded to midrange or desktop systems for the analyst's or executive’s use. The question most commonly asked is how do I link the different systems together to make them work together?

Integration of the Software

In my research I found that the typical firm has a host GL system (some were internally developed and some were purchased), a host and desktop spreadsheet, a host and desktop analysis tool, a host and desktop reporting tool, a desktop-based graphics tool, a method of uploading and downloading sequential files, and an auditing tool, as shown in Figure 5 at the end of this paper. This means that the typical firm has at least 10 software systems, from different vendors, being used to complete one process. Many firms are also either implementing or converting to an 11th system for management reporting - an Executive Information System. The question most commonly asked is how do I facilitate the transfer of information to and from each of these systems? Also, can I integrate the process?

Integrity of Results

Related to the software issue is the issue of the consistency of analytical results between different software products. With analytical tools from different vendors being used to determine the bottom line, the question most commonly asked is how do I ensure consistency and accuracy of results?

Quick Response to Ad-Hoc Requests

Most financial analyses and reports are standardized. Further, the types of analyses and reports used by firms are very consistent. But difficulty arises when a report needs further investigation to determine what it means or why the results look like they do. The explanation to these ad-hoc requests are usually critical and need to be done quickly. The activity necessary to respond to these requests usually involves accessing detailed data from the GL (if the GL collects detail) or from the accounting systems that feed the GL. In most cases this activity proves to be very time consuming and cumbersome because the data usually reside on a host system and the analysis is usually performed on the desktop. The question is how can I make the fulfillment of ad-hoc requests more efficient so that my decisions can be more timely and effective?

Different Software for Different Users

During the financial management process five distinct types of users are involved, as shown in Figure 6 at the end of the paper. Accounting clerks are usually involved in the entry of data into the accounting systems. Financial analysts extract these data for analysis and reporting. Financial managers access reports and may perform some ad-hoc analyses and reporting. Auditors are monitoring the entire process to ensure accuracy. And throughout the process MIS professionals are called upon to assist in data entry, data retrieval, data analysis, and reporting. These MIS professionals, as applications developers, also maintain and update the different software systems used in the financial management process.

All of these users have different experience levels and different needs in terms of access to the systems they use, and they have to be trained. Most firms have responded to these needs by implementing a number of different solutions for the different users (an average of 10 different solutions). The question is, can the number of different solutions be consolidated so that a firm can save on operating, training, and support costs?

Effectively Utilizing Hardware

In a recession economy and in light of the goal of financial management (maximizing value), all firms are interested in getting the most out of what they currently have. They don’t want to replace current hardware systems, rather they want them to work together. From the software perspective most firms have purchased packages that work well on a particular hardware platform but are not compatible with other software on other platforms. The question is how can an effective and efficient software solution be implemented that will exploit the specifics of the hardware in place and be compatible with other software?

Up-to-Date Tools for Long-Term Consistency

Cooperative processing is the solution to many of the data and application issues expressed. The GL is evolving toward the use of relational databases. The use of the relational model improves the overall efficiency of data management functions and opens the door to more effective communication and compatibility between hardware systems through advances in communication protocols. The question is how will the other software components react in a relational setting? Will they have to be updated or replaced to take advantage of the promise of, and need for, cooperative processing?

Vendor Support

None of the firms I surveyed actually stated that vendor support was an issue. In most cases an elaborate internal support structure has been implemented. What is important is the need for a stable partner, a vendor with a solid bottom line, and reputation. In most cases financial systems are installed and maintained for many years. The financial manager wants to be assured that the vendors they choose will be able to meet their needs and supply support when needed in the long run.

Summary of Issues

The issues listed above are real. The names have been changed to protect the innocent. The information was gathered during phone interviews with a variety of different firms and from the analysis of market information from Computer Intelligence Inc. In reviewing these issues I went back to the goal of financial management and asked myself the following question: If the goal is to maximize value then how can it be accomplished if the process put into place to quantify the goal appears to be costly (in software purchase and maintenance, software support and training), and productivity, inefficient (in software, hardware), and data incompatibility, and in processing across multiple hardware platforms), and time consuming (in integrating incompatible systems thereby delaying decision making)?

THE SAS SYSTEM FOR FINANCIAL MANAGEMENT

Information Delivery System Defined

The answer to my question and to the financial management issues stated above resides in the concept of Information Delivery, getting the right information to the right people at the right time. Information Delivery involves the process of using technology to bring people and information together. Successful implementation of this pro-
cess depends on acknowledging, addressing, and overcoming the barriers to Information Delivery: diverse data sources, diverse applications, diverse user requirements, and diverse computing environments. Overcoming the barriers involves the integration of the Information Delivery process. The end result of achieving successful Information Delivery through the integration of its process is the achievement of business goals in an organization such as improved productivity, reduced costs, improved quality, and increased value.

Solutions for Financial Management Issues

Upon review of the Information Delivery concept I discovered that all issues expressed by financial managers can be categorized within the context of the barriers to effective Information Delivery. Further, and more importantly, these barriers can be addressed with the SAS System.

Diverse Data Sources

The integration of the data resources inherent in the financial management process is a must. As a solution, the SAS System treats data as a generalized and available resource by providing transparent access to all assets wherever they reside, including system-specific host files, sequential files, proprietary database files, and application software files. This approach ensures that the financial data are accessible even though they may be stored in different places or may be organized in a variety of structures. Data from different places and in different structures can easily be linked and combined to form a virtual database that reduces redundancy and eliminates conversion and migration issues. And because data are immediately available, you'll spend less time on ad-hoc requests.

The integrity and accuracy of the data resources inherent in the financial management process is also a must. Data must be entered and maintained specifically according to the firm's Chart of Accounts. Data must also be entered and maintained in the same time series. The data management features of the SAS System eliminate this worry by ensuring accurate data entry and editing. Data can be validated as they are entered through validation routines and table lookup.

Diverse Applications

The consolidation and integration of the different applications involved in the financial management process is critical. The various applications involved in the financial management process include data entry, data retrieval, data management and consolidation, financial auditing, financial data analysis and reporting (for example, ratio analysis, trend analysis, cash budgeting, break-even analysis, working capital management, capital budgeting, cost of capital, investment analysis, variance analysis, and modeling) and management reporting through Executive Information Systems.

The most common approach used by organizations involves the purchase of off-the-shelf solutions for each of the different applications. In the long run this approach ultimately increases the firm's direct software costs, and adds to the burden of training and support. More importantly, the integration of these applications becomes very cumbersome and difficult because these stand-alone off-the-shelf solutions were not designed to work together. The SAS System is a modular, integrated system of software. The SAS System provides the firm with the ability to enter, manage, analyze, and present their data all within a powerful applications development environment that allows the firm the ability to customize any application or provide customized access to applications such as Executive Information Systems.

Data Retrieval

We've already seen that the SAS System treats data as a generalized resource through transparent data access. This is accomplished with the SAS System's Multiple Engine Architecture. A data interpreter or engine is placed between the SAS System and the data. The end user has the choice of how to best access the data. The data can be accessed either through a snapshot or extract, or through a view where no duplication of data occurs because you are working with the data as it resides in its original state. In financial applications analysts typically work with snapshots of data because there has to be a baseline for further ad-hoc reporting and because everyone involved needs to work with the same data so that the same bottom line is met. Very few decisions are made with dynamic data or data that are constantly changing, rather decisions are made on static closed data.

Data Management Consolidation

The SAS System's powerful data manipulation language and support of industry standards gives the SAS System a wealth of capabilities to combine dissimilar files (for example, easily combine data from VSAM, sequential files, a spreadsheet, and a proprietary relational database), subset them, sort them, rename or rearrange fields, create new fields, define formats, and much more. This is especially important for ad-hoc requests that require the analyst to gather data from dissimilar file structures. Because data are readily available, they are also readily consolidated and made ready for analysis.

Financial Auditing, Data Analysis and Reporting

In the section "Diverse Applications" I listed 10 categories of financial data analysis. Within each category there are many specific routines that are used to analyze and report financial data. Reports range from simple listings to complex tables to color graphics. The SAS System has the world's most comprehensive set of financial analysis and reporting tools. The SAS System is the undisputed standard for reliable data analysis and reporting.

Executive Information Systems

The SAS System is the industry leader in Executive Information Systems (EIS). The SAS System's powerful and flexible applications development environment gives your MIS professionals the capability and flexibility they need to create and easily maintain a customized EIS tailored to the users' specific needs. They can provide the user not only with canned reports but the ability to perform ad-hoc analysis through prompt-driven systems for variance and exception reporting with hot-spotting and drill down. Taken collectively, this provides the financial manager the ability for fast and effective decision making.

Diverse User Requirements

In the section "Different Software for Different Users," I stated that at least five different types of users are involved in the financial management process. The SAS System provides each user access to the tools they need through an interface that is appropriate to their needs. The SAS System provides both menu-driven access and command-language access to its powerful tools. And, as discussed in the previous section customized interfaces can be created for specific applications and specific user requirements.
Diverse Computing Environments

Today's organization has a diverse mix of computing resources involved in the financial management process, from PC's and workstations to large centralized host systems. But with the emergence of the multivendor/multiplatform environment comes greater difficulty in integrating the organization's computing resources for maximum effectiveness.

The SAS System, with its exclusive MultiVendor Architecture (MVA), gives the organization greater flexibility to decide how and where to deploy applications for the most effective use of its computing resources. Through MVA, the SAS System has achieved true hardware independence without sacrificing its ability to exploit the particular advantages of specific environments: the friendliness of a PC, the number-crunching power of today's workstations, and the throughput of the host system. With the SAS System, financial management applications can be developed in one environment and deployed to others without modification. And because the SAS System is consistent across environments, cross-training issues are eliminated.

With the SAS System's straightforward connectivity strategy and an applications segmentation approach, financial applications can be deployed across the organization's computing resources in a truly cooperative and distributed environment. This means that you can segment an application into discrete parts, allow them to execute on the most appropriate remote machine, and consolidate results at your local machine.

SAS Institute's Service and Support to Ensure Success

In implementing a financial information delivery strategy, an organization needs a stable and reliable business partner dedicated to their success. As the world's tenth largest independent software vendor, SAS Institute is uniquely qualified to provide the level of technical support, training, and consulting necessary to ensure that success. Furthermore, as the industry's leader in research and development (with 42 percent of revenue dedicated to R&D) SAS Institute, more than any other vendor, is in a position to help its customers become the beneficiaries of emerging technology.

THE TOTAL SOLUTION

Modular in design, the SAS System can be configured to meet the needs of the financial management process. Any combination begins with base SAS software. Additional modules can be configured to meet individual needs.

The next few sections compose a list of modules that could be used for financial applications throughout the financial management process. Please refer to Figure 7 to see where the module could be used in specific parts of the process.

Data Access and Management

Base SAS software features include the following:

- Data access and management of any file structure
- Data manipulation language
- SQL support
- Financial report writing
- Financial data analysis
- Financial functions
- SAS Display Manager System interface

Base SAS software is the basic building block for all SAS System areas: data access, data management, data analysis, data presentation, and access to the SAS System's command language through a productive programming environment.

SAS/ACCESS software features include the following:

- Multiple Engine Architecture
- Direct menu-driven link to popular database management systems (DBMS)
- Transparent data access
- View technology

SAS/ACCESS software represents an ongoing commitment by the Institute to provide direct and transparent interfaces between the SAS System and the most widely used data management products. You can read in data from your DBMS, store data from the SAS System directly into your DBMS, and update values in a database directly from the SAS System, all without risk to data security.

Data Analysis

SAS/STAT software features include the following:

- Analysis of variance
- Regression analysis
- Multivariate analysis
- General linear models (GLM)

SAS/STAT software includes a wide range of statistical capabilities for financial analysis. These statistical techniques have been programmed into easy-to-use SAS procedures.

SAS/CALC software features include the following:

- Three-dimensional spreadsheet
- Spreadsheet linking
- Drill-down manager
- Integrated interactive graphics
- Hot-linking
- Goal-seeking
- Multiple interfaces

SAS/CALC software is a fully featured spreadsheet ideal for financial analysis, numerical modeling, and corporate-wide data consolidation and management.

SAS/OR software is an operations research tool for the following:

- Linear programming
- Modeling
- Critical path analysis

SAS/OR software is a tool that can be used for linear programming and financial modeling. The software can be used to solve inventory problems and determine minimum cost flow and maximum cost
The software also features graphing capabilities and a menu-driven interface.

SAS/ETS software is an econometrics and time series tool for the following:
• Forecasting
• Econometric modeling
• Financial reporting
• Financial functions
• Financial analysis

SAS/ETS software includes procedures for performing time series extraction, data management, and plotting; forecasting and time series analysis; modeling and econometrics; and financial reporting. The software also features a menu-driven interface for forecasting.

Data Presentation
SAS/GRAPH software features include the following:
• Information color graphics
• Presentation color graphics
• Demographic data representation
• On-line graphics management
• Interactive graphics editing

SAS/GRAPH software is used to represent information in full-color graphics or generate presentation graphics. The software can be used to generate standard or customized charts, plots, and maps. Graphics output can be stored in an online catalog. The software user can display multiple graphs on a single page and route output to a wide selection of graphics devices including graphics terminals, plotters, printers, and slide production equipment.

Application Development
SAS/AF software features include the following:
• Facility for applications development
• Create menu-driven user interfaces
• Computer-based training
• Customized help facilities

SAS/AF software is used to interactively develop menu-driven front ends to applications. Menus and fill-in-the-blank screens can be tailored to the experience level of the user. The software includes procedures for constructing screens and controlling the user's path through an application.

SAS/EIS software features include the following:
• Object-oriented programming
• Graphical user interface
• Executive dashboard
• Drill-down of graphs, text, or report output
• Exception reporting with traffic lighting
• Critical success factors
• email
• Transparent access to data

SAS/EIS software addresses both the development and presentation aspects of Executive Information Systems. SAS/EIS software allows for the rapid development of high-level information delivery systems. The software allows for total integration of an EIS application from transparent data access and management to decision support analysis to sophisticated presentation of results, all through a graphical user interface. The software is designed to tie data and applications together, and to provide sophisticated navigational capabilities.

SAS/FSP software features include the following:
• Full-screen processor for data entry and editing
• Automatic field validation
• Table lookup
• Computational fields
• System-supplies defaults
• Context-sensitive help

SAS/FSP software includes procedures for full-screen interactive data entry, editing, querying, and letter writing. The software's screen painting capabilities can be used to create customized data entry screens. The software handles any amount of data and serves as an online tracking system for those who need to scan and update information quickly and easily.

User Interfaces
SAS/ASSIST software features include the following:
• Menu-driven interface to the SAS System
• Can be tailored to user needs
• Specific submenu for forecasting

SAS/ASSIST software is a menu-driven interface to many of the data access, management, analysis, presentation, and applications development capabilities described in the section "The Total Solution."

Cooperative Processing
SAS/CONNECT software features include the following:
• Perform distributed processing
• Download data subsets for local testing and prototyping
• Store applications centrally and distribute as needed
• Activate SAS sessions simultaneously on multiple remote machines
• Access graphics commands remotely, display graphics locally
• Perform remote program execution

SAS/CONNECT software is a convenient vehicle for uploading and downloading all kinds of data and applications including data sets, data views, full-screen catalogs, graphics catalogs, and data from previous SAS releases, as well as external files such as text or binary files. A connection between multiple SAS sessions gives users the ability to transfer data between sessions and across hard-
ware platforms. This same connection provides remote submission capabilities; specifically, SAS statements can be sent from the local session to the remote session for execution.

The SAS System supports many different modes of communication across multiple hardware platforms. Various network hardware supported includes Token Ring, Fiber, and Ethernet.

Protocols supported across these networks include LU2, LU6.2, DECnet, TELNET, TCP/IP, and asynchronous lines. By combining the Institute’s SAS/CONNECT software with one of these lines of communication, users have access to SAS software applications and data files among DOS, OS/2, Windows, MVS, VM, VMS, AIX, and other UNIX-based applications. (See Figure 7 at the end of this paper.)

SUMMARY AND CONCLUSION

The overall goal of SAS Institute, as shown in Figure 8, is to provide SAS System users with a single, integrated solution for all their financial applications and information delivery needs. That means making the software accessible to a wide range of users; giving users more capabilities so they have more flexibility in choosing and customizing applications; and making the SAS System available and easily accessible on multiple computing platforms.

Accessibility

The SAS System provides both a task-oriented menu-driven interface as well as a programming interface, enabling a wide range of users to access SAS System capabilities. End users get up-to-speed quickly with a built-in tutorial and context-sensitive help available throughout the system. The flexible applications development environment features both an object-oriented language and a command language that enables programmers to fully customize user access to the SAS System.

Flexibility

With its broad range of financial management features and capabilities, the SAS System can be configured to address any aspect of the financial management process involving accessing, managing, analyzing, or presenting data. The SAS System can meet the varying applications needs of the entire financial management process, thereby reducing the overhead of supporting multiple applications packages.

Portability

Because the SAS System and applications built with the SAS System run the same across all environments supported by the software, there are few migration and cross-training issues. This enables an organization to decide where an application belongs and preserve its investment in existing hardware.

Modularity

The SAS System consists of separate modules that may be combined to meet the specialized needs of an organization. Then, as needs grow and change, new capabilities can be added in a completely integrated manner. Organizations build on what they already have and what they already know.

Power

The SAS System is known throughout the industry for its superior data handling, financial data analysis and reporting capabilities.

Service and Support

As the world’s tenth largest independent software vendor, SAS Institute is uniquely qualified to provide the level of technical support, training, and consulting necessary to ensure that success. Furthermore, as the industry’s leader in research and development, SAS Institute, more than any other vendor, is in a position to help its customers become the beneficiaries of emerging technology.

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Figure 1  Functions of Financial Management

Daily Functions
- Credit Management
- Inventory Control
- Receipt and Disbursement of Funds

Occasional Functions
- Stock Issues
- Bond Issues
- Capital Budgeting
- Dividend Policy

Decisions
- Profitability
- Trade-off
- Business and Financial Risks

Goals
- Maximize
- Value
Figure 2 The Financial Management Process
Figure 3  Data Structures
Figure 4 Hardware Platforms
Figure 5  Analysis and Reports
Figure 6  Different End Users
Figure 7 The SAS System-Appropriate Modules
Figure 8 The SAS System for Information Delivery