EIS Experiences at Marine Midland Bank, N.A.

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ABSTRACT

Devising a successful executive information system (EIS) poses novel challenges for systems designers at many organizations. Numerous attempts to design technology suitable for executives have failed because they are accustomed to using people and not tools to get their information. Lessons learned at Marine Midland Bank, N.A., during its three-year involvement with an EIS provide insightful guidelines for those responsible for EIS operations — especially for those in an early development stage. Based on their experiences, we identify several issues associated with EIS design that impact the system's survivability. These issues highlight the importance of proper up-front work in the early stages and continuing customization efforts after implementation, both of which are predicated on an understanding of the management process and staying in touch with EIS users throughout the system's life cycle.

INTRODUCTION

In 1987, Marine Midland Bank, N.A., implemented an executive information system (EIS) that has been characterized by system modifications as driving forces created incentives or pressures for change. Initially, enthusiasm surrounding the EIS was high because top officers were impressed by its capabilities — especially the graphics illustrating trends, its quick delivery of relevant information, and the ability to be "nosy" with it by scrolling through department performance comparisons. This led to an increased demand for access spurred by a "me-too" syndrome. During the first year, users were pleased with its easy, rapid access to current information and, in part, by its gimmickry. As the novelty wore off and response time increased, however, signs of system faltering became evident. There were reductions in usage rate and several requests for paper formats of screens rather than the screens themselves. Usage reductions were symptomatic of fundamental problems stemming from an incomplete understanding of how information was used to support executive activities, insufficient integration into management processes, loss of executive sponsor, and hardware problems. The EIS experiences of Marine Midland are not rare. They exemplify many of the challenges that EIS designers confront during early stages of development or that manifest after implementation. Lessons learned from their experiences can help others conduct an EIS-readiness assessment and formulate a development plan to reduce risks associated with this technology.

MARINE'S EIS: *Compass*

Senior-level managers at Marine midland Bank are supported by a sophisticated mainframe-based EIS called *Compass. Compass* is administratively set to support 100 users from the CEO to the divisional vice presidents. As Table 1 illustrates, *Compass* reprcsents a progression from an early rudimentary "sneaker-brigade" phase that began in 1985. During that phase, executive-level support was provided via PCs to approximately 25 users with data managed by corporate financial planning and analysis personnel. The sneaker brigade periodically loaded updated spreadsheets into PCs from floppy diskettes. After two years, Marine dropped this low-technology PC-upload system in favor of a high-technology mainframe-based system.

Development Process

Mainframe-based EIS considerations began when the CFO, Howard Phansteil, learned about Pilot Command Center EIS Software which ran on the same VM machine as their decision support system (DSS). Having the DSS already in place was important from a development viewpoint because it provided the infrastructure needed to supply information quickly and in the proper format to the EIS. The DSS serves as central repository of summarized and aggregated data so that the EIS does not need to pull raw data from physically distributed operational systems.

Howard Phansteil, who became senior executive spon-

Table 1
***Compass* History**

1984	Requirements research: asking users what they needed.
1985	"Sneaker brigade" PC-based EIS implemented.
January 1987	Additional requirements research: asking users what they wanted.
May 1987	Pilot Command Center installed. Prototype is completed/approved/acceptedenthusiastically by 10 officers.
Early 1988	Growth as *Compass* is rolled out to other top managers and applications added.
Mid-1988	Executive sponsor exits Marine Midland Bank. System performance declines and data integrity questions arise from users. Initial signs of system faltering become evident.
1989	Usage declines. Interviews conducted with users to identify problems/reasons for system faltering.
1990	Marine Midland Bank restructured. Non-essential applications within Bank are targeted for deletion.

sor, urged development of an EIS to serve as the foundation for automated "executive offices of the future" using Command Center. His objective was to provide a tool to Marine's top three levels of management that would further filter data, transform it into actionable information supportive of critical decision making, and present it in easily interpretable formats. In January 1987, a team of six developers was formed led by Charles Hubbard, vice president of management and financial information systems (MFIS), and Robert Pofsky, director of MFIS. From the outset, Charles Hubbard planned to build accountability into the system by addressing not just technical concerns such as user-friendliness and data base access, but also managerial concerns such as determining information requirements of specific executives and quality and integrity issues.

Determining Information Requirements

Conducting executive interviews to determine information needs was made very difficult. First was the difficulty of getting the intended users to focus on a technology that was unfamiliar to them, with the notable exception of those who managed the technology-sensitive businesses. The uninitiated group tended to voice their frustrations with the content and currency of available data to a point where the delivery vehicle seemed irrelevant to them. The second difficulty, which was exacerbated by the first, was securing extensive executive time for specification of information needs. Faced with this situation, initial information requirements for *Compass* were stated through intermediaries who reported directly to the executives. It was later realized that this approach led to too many assumptions about how information from *Compass* would be used by executives.

Addressing Quality and Integrity Issues

Issues of quality, i.e., accuracy, availability, timeliness, and completeness, as well as security, data integrity, and credibility were each addressed during design. *Compass'* data base resides on a single mainframe to avoid confusion. It draws its data from the corporate data base and four functional areas: accounting, finance, human resource, and retail. *Compass* displays the names, addresses, telephone numbers, and dates of all sources of information on each screen so that users do not attribute data values to those who support the system. Preformatted displays are stored hierarchically on PCs to facilitate drill down. The credibility of *Compass'* data base is ensured by gathering information from other systems automatically to eliminate errors resulting from re-entering data. *Compass* does not create information not already resident in the Bank's financial data bases. This prevents the production of data that might conflict with those data bases or that is unavailable to other systems. Due to the nature of much of the data and applications thought to be needed by the targeted user group of executives, it was built primarily to have weekly updates, although some types of information were to be refreshed on a monthly basis. The infrequent update schedule occurred because executives, when asked their information needs, responded, "what we have is pretty good, so do that." Eventually, this proved to be a critical mistake.

Architecture

Executives gain access to a data base of applications and standard reports via a window-based graphical interface running on the PCs. Applications reside on Marine's network of IBM 3090, 308X, and 3033 mainframes linked via coaxial cable to the XTs, ATs, or PS/2 Model 50s and 60s that are located in executives' offices. Current *Compass* applications and their functions are listed in Table 2.

In May 1987, a prototype consisting of six applications was demonstrated for Chairman John Petty, President Geoffrey Thompson, and eight other top officers who made up the Bank's operating committee. The prototype was well received and appreciated by the 10 executives. Subsequently, they helped refine and enrich the screen reports and formats

Table 2
EIS Applications at Marine Midland Bank

Application	Function
Profitability Analysis	Provides profitability measures for each department and comparison of departments' performances relative to each other. Also supports business investment decisions. Reports are based on a single template that can be used to present different types of data and views of similar data. Approximately 1,500 different views are available for drill down or to access specific data for an executive's particular division.
Financial Analysis	Provides eight different reports for pre-close balance sheet analysis, criticized assets, statement of conditions, and reserve position to support funding decisions and post-closing adjustments.
Economic Analysis	Provides weekly interest-rate spread report together with monthly interest-rate forecast to support marketing and funding decisions.
Consumer Trend	Tracks consumer credit trends, consumer credit delinquencies, and product demand across demographic variables to support marketing programs.
Human Resources	Tracks staff counts, personnel expenses, recruitment, training, turnover rates, staffing trends, salary analysis, fringes as a component of total compensation, and other related statistics.
Calendar	Group calendar and personal calendar for scheduling decisions.
Outside News Services	*American Banker* to support environmental and competitive awareness.

of the prototype. Information requirements were tailored and tested through prototyping and executive hands-on sessions. Initially, *Compass* was considered a success as judged by frequency of use by the original users and requests for access by others. Even though *Compass* was intended for use by senior level executives only, demand for access led to it being extended to controllers and administrative assistants who serve as providers and filters of information. In this way, *Compass* also began supporting those who support the executives. To manage dissemination, the system was rolled-out to others three at a time. To facilitate use of the system, users received personal training sessions and reference cards explaining the applications and navigation paths. As Compass propagated beyond top officers, response time degraded.

In mid-1988, warning signs that the EIS was no longer sustaining the initial level of executive excitement were evident. Usage rates, which were constantly monitored, dropped to a point where *Compass'* economic justification have come into question by all concerned. Robert Pofsky, director of management and financial information systems, and Stephen Robinson, who became director of *Compass* in 1988, conducted personal interviews with users to determine what had gone wrong to cause usage rates to deteriorate. During the interviews, users were asked what they liked and disliked, what information and applications they used and did not use, and most importantly, why. In the next section, guidelines for EIS design based on the lessons learned from their design process and interviews with the executive users are discussed.

GUIDELINES FOR EIS DESIGN

We recommend several guidelines — some provocative — to avoid situations that lead to system failure and to improve the potential for EIS success, if an EIS project is undertaken. As a framework for the guidelines, we have presented them as core issues to be resolved in the course of an EIS project.

Existence of an Information Delivery Problem: The firm contemplating adoption of an EIS, or any new technology, should ask itself the question: *Is there a real business problem the technology is designed to address?* If designers cannot find and focus on an executive information problem, the technology is acquired for its own sake — a "solution to a nonexistent problem," in effect. If an EIS is introduced because the technology is fashionable, without real thought to practical application in the existing managerial environment and the information systems (IS) infrastructure, it is doomed to fail.

Technological Maturity of the Organization: The technological maturity of an organization and its executives needs to be considered prior to adoption because the *degree of technology comfort* influences EIS receptiveness. Low-technology concerns such as banks tend to have a management culture that is less sensitive to technology and its capabilities. Their senior management are inclined to be conservative and not encourage innovative use of IS. This type of corporate culture is less likely to embrace a progressive tool such as an EIS. It may be wiser, perhaps necessary, to wait until technologies are widely used and accepted in the industry prior to introducing them into such firms.

Understand the Management Process: Senior level management processes must be understood prior to design because they are not processes that can be molded around a new technology. Inherent in systems development, when a system is designed, the job content of employees is redesigned. For lower-level job functions, it is possible to enact significant alterations in activities and decision making processes. But for executive-level functions, there is precious little latitude in the degree of change that will be tolerated. Failure to tailor the EIS to fit corner offices will result in an EIS that disturbs rather than supports the dominant coalitions in an organization. Changes can be expected after EIS implementation, but if the initial version does not fit and facilitate the way executives work, they are in the position to summarily reject the EIS. This reaction leaves the designers with little or no recourse.

Incentives for Use: Given the constraints and characteristics of the user set, it becomes necessary not only to fashion the new tool around senior management's processes, but also to provide "carrots" to encourage changes in those processes. A top priority should be to get the executives hooked on the EIS by basing it on existing internal information and communication structures within the organization. Afterwards, attempts can be made to foster improvements in those structures. An approach to increase acceptance is to ensure that the EIS is perceived as a trapping of power and prestige, especially for executives who are unfamiliar with PCs. For many senior managers, the keyboard is a hurdle and a mouse is not a solution. Executives may consider PC use déclassé unless the symbolism surrounding the EIS reflects a befitting amount of status and the interface is executive-friendly. Status symbolism elevates PC usage from the realm of clerical activity to executive support.

Information Customization: Continuing efforts to further customize and refine information delivery are needed because initial information requirements differ from sustaining information requirements. Houdeshel [4] has observed that selecting executive information occurs in two phases. During the *Initial Phase,* work focuses primarily on the information that is immediately available. Frequently this focus occurs because those who are involved in EIS implementation think initially in terms of information and reports that are currently being used [2]. A consequence of this approach is an EIS whose primary value is its ability to supply users with quick access to new views of existing information. Subsequently, the *Sustaining-Enhancing Phase* emerges during which information contents are enhanced with the addition of more comprehensive and customized coverage. By this time, designers have developed rapport with executive users increasing their ability to customize and provide extended information coverage. Progression to the second phase of information requirements is critical because expediency as an impetus for usage is not compelling enough. In order to sustain usage enthusiasm, information that executives would find especially tantalizing and newly meaningful needs to be provided via the EIS.

Executive Sponsorship: The executive sponsor should be someone highly visible to provide the *look what I have that you don't have* type of motivation. When an EIS is used conspicuously, it entices use by other executives and initiates the cascade downward. This is essential to get and to keep key people on the system. Knowing that colleagues or superiors are using an EIS to access information acts as a powerful motivator. When an EIS is used by top officers of the organization to brief themselves on a regular basis and prior to meetings, its usage is encouraged. Executive involvement also is needed to ensure financial support for maintenance. As such, the EIS becomes destabilized when there is a loss of executive sponsorship.

Currency of Data: Developers need to adjust their thinking to consider the new practicality and tactical business advantage that an EIS can provide to decision makers functioning in an ever more dynamic business climate. The electronic delivery mechanism has a clear advantage over paper with regard to speed and efficiency of distribution. This is best leveraged when applied to information that is refreshed frequently. External news services, for example, are updated continuously.

Development Mentality: Developers need to be aware of the temptation to design systems, applications, screens, etc., that they *think* will be most useful to others. Often, developers develop systems that *they* want. Too frequently systems are implemented with fancy features of which the developers are proud, but for which others have little use [5]. Even worse, systems may lack some really useful features that a user might need. "What is missing is the reality test — a thorough understanding of how users actually do or will perform their jobs and of the environmental conditions of the user organization" [5]. This predicament arises when executives are unwilling to participate actively in the initial EIS design phase.

Response Time: Executives are intolerant of slow response. Response times from instantaneous to five seconds are acceptable, but longer response times cannot support *just-in-time thinking,* i.e., being able to access information while still thinking about it. As an EIS evolves through the addition of new users, data sources, applications, services, response times can increase exponentially. The hardware and technology must be able to support increased demands without impairing the entire system.

Exclusivity of Information: An EIS should never be used to deliver only information which is available entirely through other media. Providing something that is not available otherwise, such as hypertext, graphical displays or data with textual annotations, is necessary to ensure that executives remain EIS users rather than return to previous information sources. Exclusivity of information can be the stimulus that fosters acceptance of the new technology, maintains the allure of the EIS, and ultimately makes executives EIS-dependent. If all information is otherwise provided, it can lead to an "is this all there is" reaction.

Quick Turnaround: Once the decision to develop an EIS is made, a prototype should be developed and refined, through quick iterations. Because information requirements change, executive information problems intensify, and users do not want to wait 12 months to see the completed *system solution.* It is important to provide quick turnaround of new applications or functions.

The Importance of Paper and the Feedback Process: Prior to the elimination of any conventional source of information, the potential impacts of that change have to be identified and analyzed. In most organizations, paper still constitutes an essential part of the feedback loop. People are accustomed to writing notes/comments on paper copies for their later use and, more importantly, for circulating that information to others to elicit their comments. This part of the feedback process cannot be ignored when designing a new delivery system. Screens are most suitable for graphical analysis and less so for textual and tabular presentation formats because people tend to prefer viewing and receiving tabular reports on paper.

Screen Design: Screens need to be designed to display useful messages. Screens that are too busy or have too many colors detract from their usefulness. Graphical screen design is an art form often underestimated in importance. Designers should be conscious of the way information is presented to prevent information bias — particularly with graphics.

While following these guidelines will not guarantee EIS success, ignoring even the seemingly innocuous core issues can lead to a poor technology investment. In the next section, the primary factors contributing to the weaknesses of *Compass* and the proposed redesign efforts to rectify them are discussed.

Compass Weaknesses and a Revitalization Strategy

There are several fundamental factors contributing to dampened enthusiasm and lower usage rates. Foremost was the loss of the senior executive sponsor. *Compass* is not integrated thoroughly into the management process. It provides retrieval capabilities, but does not function as a communication tool. Electronic-mail continues to run in a totally separate software environment. E-mail had existed first and there was strong resistance to change. Attempts were made to integrate *Compass* with e-mail, but it did not come out seamless and the fact that it is not remains an impediment to acceptance. Response times became inconsistent because *Compass* lacked dedicated hardware. The update schedule became unacceptable as the executives' level of expectations increased. Unreliability of certain data, which was a problem prior to the EIS, continued to be a problem because of the infrequent updates. Finally, ergonomic weaknesses in the design, which resulted from trying to provide users with extensive flexibility in how they viewed data, made several applications too complicated for executives to use.

Addressing impediments to further development requires that distinctive advantages be built into the EIS. Toward this end, Director of *Compass* Stephen Robinson formulated a strategy to revitalize the system. Planned changes to *Compass* include:

- Find a new sponsor who is willing to use his/her business as a pilot for testing new applications and changes to the management process that incorporates EIS functionality.
- Integrate *Compass* into the management process by targeting it as a primary communication tool.
- Eliminate information and entire applications, if necessary, to increase speed of the EIS.
- Eliminate alternative access methods to provide some degree of information exclusivity.
- Provide access to more external sources of information.
- Provide fast, easy conversion from screen to paper.
- Integrate *Compass* into e-mail to exploit the synergies that occur when the two are used together. In this way, *Compass* becomes a primary vehicle for management communication.

Enacting these changes necessitates improvements in the infrastructure surrounding the EIS — including a bigger or dedicated processor and changes to the telecommunications network configuration — as well as improvements to the MIS applications that feed the EIS and its interfaces. As the price tag for these improvements grew into the hundreds of thousands, the question had to be asked: *Can the expenditure be justified for such a limited user base in a world of severely limited IS budgetary resources?* Even though the EIS itself

was relatively low in cost to run, its environment was becoming prohibitively expensive because of competing demands for organizational resources.

CONCLUDING REMARKS

The high visibility of EIS technology and the ever increasing expectations of the target audience heighten the risks associated with systems design. Traditionally, executives have been insulated from information systems development of EIS. With the advent of EIS, IS departments must respond to challenging business imperatives coming from the executive suite. Implementors must understand what makes servicing this class of end user unique. One paramount consideration must be that the requirements of this user set are as fluid as the environment in which they work, and not subject to re-engineering on the part of the implementor to fit a preconceived process model. As a result, even successful EIS applications become eternal prototypes that never free themselves of the burden of refinement and re-validation.

An EIS that serves only to provide electronic delivery of data to the executive will most likely fail to satisfy the expectations that have become associated with the technology. Given the level of exposure involved, the price of such a failure is high. The reaction is often one of pessimism and skepticism [3]. Most executives associated with an unsuccessful EIS rarely consider reviving it in their lifetime [1].

Maintenance of the link between the functionality of the application and the mission of the organization is the function of both implementor and the Executive Sponsor. It is this link that sustains the life of the application, and allows the impact of the technology to grow. In the case of MMB, the link was never adequately established, and, in the absence of an executive sponsor to address the issue, the EIS never found its role in the management process. Ultimately, its contribution to the organization's current mission amounted to an additional item on the list of budget reductions. The irony here is that in other organizations in crisis, EIS has proven to be a vital tool for helping executives cope with the challenges of adverse business conditions.

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