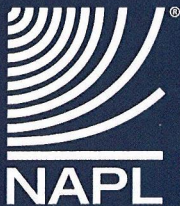


# BUSINESS GROWTH THROUGH EFFECTIVE MIS



*By Gregory S. D'Amico, Ph.D.*



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# DEDICATION

For my Mom and Dad.



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# INTRODUCTION

The graphic communications industry runs on data—data that comprise printing files, mailing lists, marketing outreach and response media, customer files, internal production, and billing information. Systems that can manage this flow of data, organize it, distribute it through various company departments and content/information stakeholders are powerful tools for customer satisfaction, business growth, and profitability.

The ability of a management information system to touch every aspect of a company's workflow and business processes makes developing and implementing an MIS system a complex, time-consuming, and costly exercise. And it is not one to enter lightly or blindly.

In this volume, printing industry authority Dr. Gregory S. D'Amico takes the confusion and concern out of the MIS installation process by guiding the reader step by step through each part of that process, explaining the benefits, the potential problems, and the solutions to those problems. He also explains the ways in which MIS can be leveraged to help companies exploit new business opportunities, enhance competitiveness in existing markets, enter new service areas, and improve operational effectiveness.

His advice is not based on conjecture; it has been developed through an extensive study of the best business research on the topic—research which, in turn, has been carried out through surveys and follow-up interviews with frontline industry companies that have experience, both positive and nega-

tive, in the real-world implementation of a multifaceted management information system.

And Dr. D'Amico has conducted his own research on the subject of MIS installation and other printing industry management topics, including interviews with a number of industry experts whose own wide-ranging experience in graphic communications is expressed in their own words in the "Industry Insights" sections that follow chapters 2-7.

As the industry continues to grow in its ability to manage and apply data and data systems, Dr. D'Amico welcomes input from those who would be willing to share their experiences in MIS development and implementation with him, and especially from those who have used this book in their own MIS implementation process.

CHAPTER 1:

# TOWARD A FULLY INTEGRATED PRINT MIS

*“If a company’s systems  
are fragmented, its business  
is fragmented.”*

In the face of internal and external forces affecting the graphic communications industry today, printing and graphic communications companies are increasingly moving toward more up-to-date print management information systems (MIS), but there still appear to be a number of barriers hampering the successful implementation of a *fully integrated* MIS in many printing companies, especially in light of the evolving nature of those companies, which now may extend to service offerings ranging from database management and fulfillment to marketing and cross-media (electronic, digital) campaigns.

Today’s printing industry has evolved to a completely digital workflow on a nearly universal scale. Job Definition Format (JDF) and Computer-Integrated Manufacturing (CIM) applications are very widely used, and while one might assume that these standardized applications are leading toward the effective use of fully-integrated management information systems in the industry, evidence currently available appears to indicate otherwise.

Although the print MIS now on the market are designed to embrace the full scope of company functions, many who have installed them report that they cannot seem to realize a fully integrated system throughout all operations. But we should not be quick to point a finger of blame at the technology, for in many cases, it seems more the result of a failure of will (or management support) than that of any technology shortcoming.

Despite the usually expressed desire of management to link all computer-assisted operations functions together and to encompass those areas not yet computerized, many company departments dig in their heels and insist on continuing to use their own standalone systems, which might still include depending on an Excel spreadsheet for estimating or accounting, all the while refusing to learn or incorporate their operations into a new, updated system. Such intransigence is a significant problem, although it is one that is not unique to graphic communications companies.

### **Enterprise Systems**

The concept of developing a fully integrated management information system is hardly new. In fact, large, multi-unit, and in many cases, international corporations have been moving toward this model, and beyond, for decades by adopting what are known as enterprise systems (ES). The aim of such systems is to fully integrate the data used throughout the organization. This includes not only data used in operations and logistics, but all aspects of financial, human resources, sales, and marketing information processing as well. One of the key elements that makes this systems succeed is that all areas of the business operation are integrated within them—no “lone wolf” units or departments are allowed to go their own way.

In a *Harvard Business Review* article entitled, “Putting the Enterprise into the Enterprise System,” Thomas Davenport outlines both the goals of an effective enterprise system and some enterprise system pitfalls. These are lessons that can be applied to companies in the graphic communications industry that are seeking to establish a fully integrated print management information system in their operations.

With respect to the anatomy of an enterprise system, Davenport describes a central database that lies at the heart of the system, and from which data are

drawn and then fed into a series of applications that support a variety of diverse company functions. He explains that using a single database can dramatically streamline the flow of information throughout an organization. In his view, that single database would comprise the following elements:

- **Financial Data**, including all information related to accounts receivable and accounts payable, asset accounting, cash management, and forecasting, as well as product cost-accounting, profitability analysis, and profit-center accounting.
- **Human Resource Data**, including information such as payroll statistics, government-required report data, time accounting, personnel planning, and business travel expenses.
- **Operations and Logistics Data**, including inventory management, material requirements planning, plant and equipment maintenance, production planning and scheduling, project management, purchasing and estimating, quality management, shipping/receiving, and tracking.
- **Sales and Marketing Data**, including order management, unit costs, pricing, sales management, sales planning, and marketing expenses.

Davenport explains that, when faced with the need to introduce a new system, there are many enticements for management to move toward an “off-the-shelf” enterprise system whose vendor promises immediate full integration of all information flowing throughout a company. And yet, he cautions, such one-stop shopping answers seldom work out as smoothly as anticipated. In fact, managers have been challenged for years, after great initial expense, with finding a way to reconcile what turn out to be incompatible systems and inconsistent operating procedures.

The reasons for the disconnect range from management information system salespeople who overpromise to customer departments that withhold information, or even company managers who simply will not make the change to a newer method that requires them and their staffs to embark on a new learning curve. The “we’ve always done it this way and it’s always worked fine” mentality may be one of the most difficult and entrenched impediments to making an ERP system work, whether it is a pre-configured or customized.

### Scores of Systems

Every large company collects, processes, generates, and stores a tremendous quantity of data from every area of its internal and external operations. The problems arise when these data are not kept in a single database repository, but instead travel through scores, or even hundreds of “legacy” computer systems that cannot share information with each other, or that are processed with software incompatible with their counterparts in other areas. In many companies, accounting, human resources, and sales cannot—or will not—use the same system or software to handle their data, even though management needs to be able to track all the expenses and income from every area that are ultimately funnelled into the company’s overall Profit & Loss statement.

While each independent legacy system may operate very efficiently in its own department and/or for its own specific, and often rigidly defined function—and on which the employees in that department have been trained and now have extensive, almost “second nature” experience—the lack of a fully centralized and integrated system can result in significant drains on productivity and hamper management’s ability to gain a clear and total picture of its operations.

In addition, maintaining different computer systems within the same organization can lead to tremendous inefficiencies and costs in terms of processing redundant data multiple times, rekeying and reformatting information from one operating system to another, maintaining additional staff members who are well trained in specific programs and yet limited in scope or unable to transfer these skills to more useful multiple-application programs, and constantly updating and/or debugging unique programming codes—or trying to figure out customized work-arounds after a key employee leaves.

Furthermore, there is the issue of indirect costs that are incurred when the company does not have a fully integrated MIS. If the sales department and order entry function cannot communicate easily with the scheduling and production areas, for example, productivity is likely to be compromised and delivery to the customer slowed—and that can put a company at a competitive disadvantage, particularly in today’s industry environment of greater short-run jobs with more rapid turnaround demands.

Similarly, if the marketing department's forecasts cannot be communicated to sales personnel efficiently, sales outcomes will be affected negatively and opportunities lost. "To put it bluntly," says Davenport, "if a company's systems are fragmented, its business is fragmented."

### **Potential Solution**

Enterprise systems offer a potential solution. By employing a single centralized information database, all modular applications in a company's activities can be supported in every function and location. With a properly operating enterprise system, a company can realize considerable gains in efficiency, productivity, and profitability, while reducing operating costs.

Davenport offers an example of how a highly efficient enterprise system can smooth operations in a large multinational operation: "Let's say, for example, that a Paris-based sales representative for a U.S. computer manufacturer prepares a quote for a customer using an enterprise system. The salesperson enters some basic information about the customer's requirements into his laptop computer, and the enterprise system automatically produces a formal contract, in French, specifying the product's configuration, price, and delivery date.

"When the customer accepts the quote, the sales rep hits a key," continues Davenport. "The system, after verifying the customer's credit limit, records the order. The system schedules the shipment; identifies the best routing; and then, working backward from the delivery date, reserves the necessary materials from inventory, orders any needed parts from suppliers, and schedules assembly in the company's factory in Taiwan.

"The sales and production forecasts are immediately updated, and a material-requirements-planning list and bill of materials are created," he writes. "The sales rep's payroll account is credited with the correct commission... and his travel account is credited with the expense of the sales call. The actual product cost and profitability are calculated in U.S. dollars, and the divisional and corporate balance sheets, the accounts-payable and accounts-receivable ledgers, the cost-center accounts, and the corporate cash levels are all automatically updated. The system performs nearly every information transaction resulting from the sale."



## Expectations Unfulfilled

As the example above testifies, an effective enterprise system can provide management with a great deal of information in real time, and, in so doing, can help the company realize large gains in productivity and speed, both contributing ultimately to profitability.

But as Davenport explains, not all enterprise system implementations are success stories. Over the course of their development, some systems have not lived up to companies' expectations. One example he cites is the case of FoxMeyer Drug, which argued that its out-of-control enterprise system project helped put the company into bankruptcy. Another is Mobil Europe, which, after spending hundreds of millions of dollars on its system, had to abandon it after a merger partner objected to its application. Even high-tech software experts are apparently not immune. According to Davenport, Dell Computer's enterprise system ended up being inappropriate for its largely decentralized model of operation.

"Some of the blame for such debacles lies with the enormous technical challenges of rolling out enterprise systems," says Davenport. "These systems are profoundly complex pieces of software, and installing them requires large investments of money, time, and expertise. But the technical challenges, however great, are not the main reason enterprise systems fail. The biggest problems are business problems. Companies fail to reconcile the technological imperatives of the enterprise system with the business needs of the enterprise itself."

## Generic Solutions

An enterprise system has certain characteristics that can affect a company's organization and culture. It imposes a centralized information system where a decentralized system might have been used before, and used effectively. It requires generic solutions even when legacy customized solutions might be preferable in some instances—or at least *appear* to current employees to be preferable.

"If a company rushes to install an enterprise system without first having a clear understanding of the business implications, the dream of integration can quickly turn into a nightmare," says Davenport. "The logic of the system may conflict with the logic of the business, and either the implementation will fail, wasting vast sums of money and causing a great deal

of disruption, or the system will weaken important sources of competitive advantage, hobbling the company.”

In short, although enterprise systems offer many potential advantages to a company, the very design of a system that can help provide these benefits may also present a danger. In the past, says Davenport, when a company developed a management information system, it would first decide how it wanted to operate and then purchase a software package that would support these operations, often rewriting and customizing code as necessary and where possible. With a highly intricate enterprise system, however, the implementation sequence is turned around: “The business must often be modified to fit the system,” he explains.

Many companies that install an enterprise system are likely to confront issues such as cost or complex operation, but those businesses that have the greatest amount of trouble—including those where systems fail outright—are more than likely companies that move toward enterprise system installation without having considered all the implications on their business’s operations, strategies, and culture.

A good deal of research has been completed in the field of MIS implementation in business organizations. In subsequent chapters, we’ll discuss some of these research findings that focus on successful enterprise system installation practices. We’ll also look at the results of our own research in the graphic communications industry with respect to how these findings can be applied to the successful implementation of a fully-integrated print MIS, and discuss findings that are unique to the realization of a successful MIS in today’s evolving graphic communications industry.

### **Four-Phase Implementation**

Adopting a company-wide, fully integrated print management information system may be a relatively recent concept in the graphic communications industry, but it is not at all new in many other industries, particularly among larger corporations, which have been moving toward this model for some time.

As noted above, many large international organizations, have incorporated enterprise systems (ES), fully integrated data management systems that op-

erate throughout the entire corporation and tie data from all facets of operations together. All departments, including operations, financial human resources, and sales and marketing, are part of these systems.

But even for many of these companies, the move toward fully integrated enterprise systems has not always been smooth as they tried to get these systems up and running—sometimes the attempt has even resulted in complete failure. A good amount of research has been done in recent years with respect to successfully implementing a company-wide MIS. Understanding the concepts gained from this research can be extremely beneficial for those updating or beginning the process of implementing a fully-integrated system.

### **Implementation Framework**

A landmark study in MIS research was published in 2000 by M. Lynne Markus and Cornelis Tanis. In their study, entitled, “The Enterprise System Experience—from Adoption to Success,” Markus and Tanis developed a four-phase framework for enterprise system implementation.

Even though the study was done a dozen years ago, their model can still serve as an excellent foundation for the successful implementation of a fully-integrated MIS since it not only identifies each implementation step and outlines what needs to be done during each step, but also warns of what typically can go wrong during each of the stages.

Markus and Tanis designed their framework on the basis of an emergent process theory that had been designed five years earlier by Markus and Christina Soh. Among the changes Markus and Tanis made to the 1995 Markus-Soh model was the addition of an initial implementation phase that includes discussions about organizational decisions and goals, and which should be conducted prior to the beginning of the project.

The 2000 study concluded that an important part of any successful implementation process includes bringing together managers, technicians, and advisers to discuss the numerous details of the MIS project well before the company undertakes to begin the implementation phases. This first new phase of the Markus and Tanis model is called Chartering. It is followed by the following three steps in the enterprise system experience cycle: the Project phase,

the Shakedown phase, and the Onward and Upward phase. (The latter three stages generally correspond to the original three-phase Markus-Soh model.)

### **Chartering Phase**

A primary goal of the Chartering phase is to make the decisions that will result in determining the cost and required financial support of introducing an enterprise-wide MIS. Participants in discussions during this phase might include various company department managers, information technology (IT) specialists, system vendor representatives, and internal or outside advisers. Their deliberations would cover topics such as:

- Building a business case for using an enterprise system,
- Choosing among available software packages,
- Naming a project leader,
- Putting together a suitable budget, and
- Developing an implementation schedule.

These early steps should be considered carefully since they will, in many cases, increase or decrease the odds of the system being accepted by employees, being given adequate support by frontline managerial and support staffs, and being realized on budget and on time. One key point: Deliberations during this period should go forward only after sufficient data-gathering about existing methods and practices has been gathered and potential short-term/long-term needs and aims for the new system have been identified.

According to Markus and Tanis, during this phase, “any of the following may occur before a project manager is named and a budget is approved: Documenting current business processes, analyzing the potential for improvement, comparing processes with the ‘reference models’ or ‘best practices’ embedded in the enterprise system’s software, selecting software, deciding which software modules to implement in what sequence, and deciding how to roll out the new functionality to various business units.”

Other chartering activities might include creating plans for how the system will be installed, supported, and eventually upgraded as and when needed. It is during this phase that management should communicate its goals to the entire organization—and solicit feedback from all quarters—as well as consider what organizational changes might be needed in order for the project to succeed (and realistically gain acceptance in all quarters).

Since the parameters of the project and the timeline established during this phase will to a great extent determine the system's final choices and limitations, any shortcuts taken or decisions avoided or pushed farther down the road can have disastrous consequences at a later date when adjustments may not be possible or attainable only with significant additional cost or delay.

Unfortunately, this is also a time when there are numerous opportunities for mistakes to be made. Markus and Tanis note that common errors or problems that can occur during this initial phase include overpromising by software vendors, failing to consider business strategy when developing a technology plan, formulating unrealistic goals, or not properly articulating key performance milestones.

They also cite “the failure to recognize need for business change, underestimating change management difficulty; misunderstanding organizational requirements, particularly as related to need for data access and reporting” as common problems encountered during chartering.

Without the proper foundation during this initial phase, a company can doom its MIS implementation to complete failure or, at best, open the door for serious problems to occur during a later phase of the implementation model.

### **Project Phase**

With proper preparation completed, the model moves on to the Project phase, which, according to Markus and Tanis, “comprises activities intended to get the system up and running in one or more organizational units. Key players include the project manager, project team members (often non-technical members of various business units and functional areas), internal IT specialists, vendors, and consultants. Again, the constellation will vary,

depending on the decision to do the project in-house, with outside assistance, or on an outsourced basis.”

Important activities during this stage include building a specific, detailed project plan, constructing a project management team, providing any needed training for team members, testing, data conversion, and, ultimately, rolling out the system.

Since this is when the “nuts and bolts” of the system are actually put together, a large number of problems can surface during this phase of MIS implementation. Among the dangers noted by Markus and Tanis:

- Putting together project sub-teams without appropriate representation from each department;
- Failing to gain sufficient knowledge and skill in software configuration;
- Relying on an inferior amount of knowledge from vendors or consultants;
- Taking what has been learned by analyzing only one department and trying to apply it to other departments, which may have very different requirements; and
- Attempting to customize the software in ways that just won't work.

One all-too-common error occurs when buyers too readily accept assurances by salespeople that their specific needs can be met with a generic system that has not been designed to handle them. It is imperative that potential buyers ask the vendor whether the system already has the capacity and configuration to handle their individual tasks and processes or will have to be changed, tweaked, or “upgraded” to do so. Be sure to include staff members from all the departments that will need to use the upgrades in any discussion with vendors.

Possible negative outcomes from dropping the ball during this phase of implementation can be as serious as the complete termination of the project because of financial overruns or the later discovery of technical problems

that may be difficult, or sometimes even impossible to trace, and that may ultimately compromise the system's ability to fulfill the tasks for which it was built in the first place.

### **Shakedown Phase**

Once the system has been built, installed, and implementation has begun, the project enters the third, or Shakedown phase. Markus and Tanis characterize this phase as “the organization's coming to grips with the enterprise system,” and explain that it “can be said to end when ‘normal operations’ have been achieved (or the organization gives up, disinstalling [sic] the system).”

At this stage of implementation, they elaborate, “The project (or consulting) team may continue its involvement or may pass control to operational managers and end users and whatever technical support it can muster.” This is when “activities include bug fixing and rework, system performance tuning, retraining, and staffing up to handle temporary inefficiencies.”

Since the company will now be counting on the system to operate properly, any difficulties that are encountered can have a serious impact on its ability to complete work efficiently and on its profitability. Common problems that arise during the Shakedown phase include a disruption of normal business operations; an inability to diagnose and correct performance issues; excessive dependence on team personnel or IT specialists; and, as a result, either underuse (or non-use) of the new system. This is essentially the fish-or-cut-bait point at which either:

- Normal operations using regular application of the enterprise system are realized (with or without significantly addressing business needs—thus increasing or decreasing the level of potential success), or
- The project is terminated as a result of the serious nature of the problems encountered—such as the disruption of business operations, low level of technical performance, or an excessive amount of bugs and errors cropping up regularly.

## Onward and Upward Phase

The business enters the fourth and final step, aptly named the Onward and Upward phase, when the new system is operating sufficiently and it continues until the system is replaced with an upgrade or a different system. During this phase, the organization is finally able to ascertain and quantify the benefits (if any) of its investment.

Key players during this step include operational managers, end users, and IT support personnel (internal or external). Vendor personnel and consultants may also be involved, particularly when deliberations about upgrades are concerned. Characteristic activities of this phase include:

- Continuous business improvement,
- Additional user skill building, and
- Post-implementation benefit assessment.

Markus and Tanis note, however, that these “typical” activities are often not performed for a variety of reasons. One problem that commonly arises during the onward and upward phase is the turnover of skilled personnel who are familiar with the system and how it was built. Another danger is that today’s enterprise system can quickly become tomorrow’s legacy system, rife with modifications and work-arounds.

The enterprise system is also unlikely to enjoy a completely successful implementation during this final phase if it has not been adequately anchored into the organizational culture or if there has been a failure to manage it to the level of its anticipated results in one or more departments.

The authors note that, at this point, “several ultimate outcomes are possible: The organization may be unwilling to undertake further improvements or upgrades. The organization may decide that its investment has been unsuccessful in meeting goals or business needs. Or the organization may decide its experience has been a success. If the latter, the organization’s competitive position may or may not have been improved as a result of its use of enterprise systems.”



The Markus and Tanis four-phase model provides a solid foundational framework for a successful MIS implementation, and other researchers have used it to identify specific factors critical for the successful implementation of enterprise systems. The results of this expanded research will be covered in the next chapter.

CHAPTER 2:  
SUCCESSFUL MIS  
IMPLEMENTATION

*“Senior management must be committed with its own involvement and willingness to allocate valuable resources to the implementation effort.”*

In the previous chapter we looked at the four steps identified by researchers as comprising an effective Enterprise System (ES) implementation framework. In their landmark study, “The Enterprise System Experience—From Adoption to Success,” M. Lynne Markus and Cornelis Tanis developed the four-phase ES implementation sequence that outlines what needs to be done during each step of the implementation process, and thus serves as a foundation for the successful realization of a fully integrated management information system.

To review, the Markus and Tanis sequence comprises these four steps:

- **Chartering Phase:** Making decisions with respect to choosing and installing the system
- **Project Phase:** Developing the system and bringing the system and its users online.
- **Shakedown Phase:** Getting any “bugs” out of the system and reaching stable operations status.
- **Onward and Upward Phase:** Performing needed system maintenance and support, as well as launching any needed system upgrades.

Using the Markus and Tanis study as a theoretical framework, researchers Fiona Fui-Hoon Nah, Janet Lee-Shang Lau, and Jinghua Kuang conducted an extensive review of literature related to enterprise systems and identified 11 critical factors for successful ES implementation:

1. Enterprise Resource Planning (ERP) Teamwork and Composition
2. Top Management Support
3. Business Plan and Vision
4. Effective Communication
5. Project Management
6. Project Champion
7. Appropriate Business and Information Technology (IT) Legacy Systems
8. Change Management Program and Culture
9. Business Process Reengineering and Minimum Customization
10. Software Development, Testing and Troubleshooting
11. Monitoring and Evaluating Performance.

They published their findings in 2001 in the *Business Process Management Journal*, where they coordinated their factors with the four phases delineat-

ed by Markus and Tanis, explaining where each factor fit within the earlier study's implementation steps.

### **Team Support**

Nah, Lau, and Kuang determined that a half-dozen of these critical factors must be addressed during all four phases of the Markus and Tanis Enterprise Resource Planning (ERP) implementation model, including the first: ERP teamwork and composition. Since the composition of the project team is absolutely essential to its success, they said, the team should comprise leading individuals throughout the company, with a combination of technical and business skills represented.

The team should also include both outside consultants and company employees so that the former can help develop a system that meets the company's specific business and technical needs, while latter can develop and expand any technical skills that will be required for the design and installation of the project.

A key point made was that team members should not be expected to assume project responsibilities in addition to their regular duties. The ERP project should be "their top and only priority and their workload should be manageable," note Nah, Lau, and Kuang, who add: "The team should be given compensation and incentives for successfully implementing the system on time and within the assigned budget."

Obviously, enabling team members to dedicate this kind of time and attention will require input from the company's leadership, and top management support is another significant factor that must continue throughout the entire implementation process. But company executives must not only give the project their full support; they must also ensure that it is aligned with the enterprise's overall strategic business goals and that the ERP implementation is a top priority of the entire company, not just the team members. As we will see later in these pages, the importance of top management buy-in will be a refrain repeated throughout nearly all facets of MIS implementation and application.

“Senior management must be committed with its own involvement and willingness to allocate valuable resources to the implementation effort,” explain the three study authors. “This involves providing the needed people for the implementation and giving them the appropriate amount of time to get the job done. The role of the new system and structures should be clearly communicated to employees. And, new organizational structures, roles and responsibilities should be established and approved.”

### **Goals and Benefits**

A well developed business plan and consistent vision is another factor that is part of the entire ERP process. The business plan should address the goals and benefits of the program, as well as the needed resources, costs, and projected schedule. The business plan and vision will allow those involved to remain focused on the ultimate business benefits of the installation even if they encounter implementation roadblocks or pitfalls on the way.

“There should be a clear business model of how the organization should operate behind the implementation effort. There should be a justification for the investment based on a problem and the change tied directly to the direction of the company,” state Nah, Lau, and Kuang.

Effective communication is the fourth factor that is critical to ERP success during all phases of implementation. It is essential both to convey the goals and progress of the project team or teams throughout the company, and to ensure that individuals at every level of the organization structure receive information that will enable them to understand the need for the installation, the various stages of the implementation process, and the planned objectives and benefits for the company that will result from its implementation. Open and effective lines of regular communication help to gain buy-in for the system from most employees—you almost never get all 100% on board—and a high percentage staff buy-in is a key factor to ultimate implementation success.

It would stand to reason that skilled project management is also a key component of the total installation procedure. Project management encompasses carefully considering every facet of the operation, not just the technical aspects, such as software or hardware requirements, but studying every

place where the system will affect or be affected by business operations, from office to plant to delivery. “This includes the amount of the systems implemented, involvement of business units, and amount of business process reengineering needed,” note the study authors.

And management of the project means adhering to, and/or adjusting as needed, the overall timeline for implementation and any individual timelines within various business units or functions. “The project must be formally defined in terms of milestones,” continue Nah, Lau, and Kuang. “The critical paths of the project should be determined. Deadlines should be met to help stay within the schedule and budget and to maintain credibility.”

It will also be necessary for project managers to coordinate any appropriate training requirements with the company’s Human Resources Department and to ensure that there is a clear understanding of the scope of the effort and the various tasks that will be needed to bring individuals up to speed. This is another area where both staff buy-in and executive support are essential to implementation success, as individual department heads or line workers may believe the need for additional training is making it difficult for them to find the time to complete their existing work requirements.

This resistance is generally more often encountered early in the project implementation, when there is more concern about what may be involved. As some milestones are accomplished and progress begins to become apparent, the resistance may begin to fade somewhat. In their research, Nah, Lau, and Huang found that accomplishing an early measure of success in the process can be beneficial as it will help all those involved to remain focused on results within the planned time frame and budget.

Another key element in the success of the project and in its ability to keep moving during the entire implementation lifecycle is identifying a project leader or champion. This champion should be a high-level manager who is strong enough to set challenging goals and has enough clout to realize change. He or she should also be someone who is experienced in business and transformational leadership, and is able to assume responsibility for resolving any disagreements and neutralizing any resistance to change that may occur before or during the implementation effort.

### **Specific Phase Factors**

In addition to the first six factors, which provide constant oversight and momentum throughout the project's entire lifetime, there are five factors that are critical during one or another implementation phase. Nah, Lau, and Kuang point out, for example, that during the initial Chartering phase, appropriate business and IT legacy systems are important so that the company can maintain a stable, uninterrupted business setting while determining and implementing "the IT and organizational change required for success."

Gearing up the organizational culture to accept change is an essential factor beginning with the Project phase and continuing throughout the rest of the installation lifecycle. Change management must focus on creating an organization where everyone shares a common vision and is willing to work to see that vision realized.

One important component of a change culture is the willingness of management to involve individuals throughout the organization in the design and implementation of the new ERP system. Another is making resources available to train and educate the IT workforce. Educational programs should also be provided in support of the change effort in order to minimize resistance, particularly the pushback that is primarily a result of fear of the unknown or worry about change in general.

Another key factor that starts at the Project phase is termed "business process reengineering (BPR) and minimum customization" by Nah, Lau, and Kuang. This activity involves modification of "off the shelf" programs or even specially constructed systems that have been developed to meet individual company needs. Every activity usually has some aspects or functions that do not fit neatly into an overarching system, often because of historical gerrymandering or workarounds installed or modified over the years. The temptation is to begin tinkering with the new system to make it fit historical practices, i.e., to begin creating new workarounds to match the old. This practice nearly always results in diminishing the effectiveness of the new system and merely replicating some of the problems of the old work practices that the new system was intended to correct.

“It is inevitable that business processes are molded to fit the new system,” note Nah, Lau, and Kuang, and “organizations should be willing to change the business to fit the software with minimal customization. Software should not be modified, as far as possible. Modifications should be avoided to reduce errors and to take advantage of newer versions and releases.”

In conjunction with this step, companies should conduct a proper review of existing business processes and gain a firm understanding of what redesign efforts will become necessary when they set out to choose a new system. If changes to available systems are required, they should be included as part of the planning process, not attempted to be introduced during the later implementation phases. This will only add cost, time, and confusion to the effort.

“Broad reengineering should begin before choosing a system,” say the study authors. “In conjunction with a configuration, a large amount of reengineering should take place iteratively to take advantage of the new system. Then when the system is in use, reengineering should be carried out with new ideas.” In other words, build in any necessary changes during the planning, implement the system by modifying any existing business practices that don’t fit it—not by attempting to modify the system to retain the old, unsatisfactory practices—and then, after the new system has been operational long enough to review it properly, determine whether any modifications are still necessary or whether the new practices now in place are able to handle all requirements satisfactorily.

During the Project phase, software development, testing, and troubleshooting become very significant. “The overall ERP architecture should be established before deployment, taking into account the most important requirements of the implementation,” add the study’s authors. “Troubleshooting errors is critical,” they continue. “The organization implementing ERP should work with vendors and consultants to resolve software problems. Quick response, patience, perseverance, problem solving, and firefighting capabilities are important.”

The monitoring and evaluation process begins during the Shakedown phase. At this point, it is imperative to measure the actual results and achievements against the original implementation goals or targets; and it is beneficial,



whenever possible, to provide proof of early accomplishments as a way to help create a positive attitude and high level of confidence in the workability and meaningfulness of the project.

### **Printing Application**

The work of Nah, Lau, and Kuang represents a useful guide in identifying those factors that require attention in order to successfully implement an ERP system in any large organization, including a commercial printing business. In the following pages, we'll look more closely at their specific application to the graphic communications industry.

Even though the industry has moved steadily over the last few years toward digital workflow technologies that include management information systems (MIS), computer-integrated manufacturing (CIM), and job definition format (JDF), some commercial printers still find themselves having to deal with stubborn obstacles when attempting to install and use an effective all-digital workflow.

In a qualitative study I conducted just a few years ago, industry experts identified a number of "barriers" to implementation that ranged from an unwillingness to let go of legacy IT systems to the inability for hard-pressed employees to find time to dedicate to an MIS installation project.

As noted above, researchers Fiona Fui-Hoon Nah, Janet Lee-Shang Lau, and Jinghua Kuang identified the following enterprise resource planning (ERP) implementation factors as essential: ERP teamwork and composition, change management program and culture, top management support: business plan and vision; business process reengineering (BPR) and minimum customization; effective communication; project management; software development testing and trouble-shooting; performance monitoring and evaluation; a project champion; and appropriate business and IT legacy systems.

To determine whether these critical elements also played a role in the difficulty many printing companies were experiencing in trying to implement print MIS, I conducted a qualitative, exploratory research study that focused on the relevance of Nah, Lau, and Kuang's 11 factors to midsize commercial printing companies. The study, whose results were published in the Fall 2006 issue of *The Visual Communications Journal* of the International

Graphic Arts Educators Association (IGAEA), specifically addressed two primary research questions:

- How do the previously identified factors critical to the successful implementation of ERP systems in large corporations relate to the successful implementation of management information systems in midsized commercial printing companies, as perceived by key personnel in the printing industry?
- What other factors critical to the successful implementation of an MIS in midsize commercial printing companies are identified by key industry personnel?

### Major Impediments

This study comprised in-depth interviews with a number of graphic communications industry experts, each of whom was asked a series of semi-structured open-ended questions and follow-up conversations based upon the four phases identified by Markus and Tanis, as well as the 11 factors uncovered by Nah, Lau, and Kuang. Additional questions focused on any other factors that the participants might have considered relevant with respect to the successful implementation of MIS in the printing industry.

It is interesting to note that the participants *unanimously* considered all of Nah, Lau, and Kuang's 11 critical factors for successful implementation of ERP systems in larger corporate settings as formidable *barriers* to the successful implementation of Print MIS in midsize commercial printing companies. And these were not the only barriers they reported, as the interviewees also defined other, industry-specific roadblocks to successful print MIS implementation, such as competitiveness, lack of education and management training, and demands for customization.

We asked each expert to rank the 11 critical factors in terms of their degree of strength as a barrier by using a three-point scale. Ratings were then tallied and each factor was categorized as either a Major, Moderate, or Minor implementation barrier. Of the 11 critical factors, the study participants ranked more than half (seven) of them as Major Impediments. Interestingly, many of these

major barriers were related to a bottom-line business focus that is not especially forgiving of interruptions in productivity or added demands on staff:

- **ERP Teamwork and Composition.** Citing low industry profit margins and strong demands on operations personnel, the experts said that it is difficult to find key individuals who are able to dedicate the time and attention needed for a long-range installation project such as the implementation of an enterprise-wide resource planning system.
- **Top Management Support.** Although leaders of industry companies may be aware of the benefits of a digital workflow supported by an enterprise management information system that ties all company functions together, the experts interviewed felt those same executives were primarily focused on financial performance and stimulating sales, and were likely, therefore, to resist any project—even a properly organized Print MIS installation—that might temporarily take away from their productivity and/or their company’s ability to maintain a smooth, uninterrupted workflow.
- **Business Plan and Vision.** The interviewees believed that in midsize commercial printing companies there is a general lack of strategic planning and an inability to create a clear vision for the company. In their words, there is a tendency to “concentrate on individual areas and not to see the big picture.” Some might also say that there is a tendency to spend time and energy fighting fires, even small ones, while “not having enough time” to take a longer-range view of the opportunities and threats a company will face in the next year, let alone in the next five or 10 years.
- **Business Process Reengineering and Minimum Customization.** The experts interviewed were of the opinion that there is a common expectation among many mid-sized printers that any new print MIS will conform to the existing way of doing business in their particular company, rather than being open to the possibility, or even likelihood, that such a system will require current processes or methods to be altered.

The interviewees said that graphic communications company management expects to customize the software and have it “fit” established methods of order entry, scheduling, estimating, billing, etc.,

and that very strong resistance is realized when management and operations personnel learn that they must reengineer their processes to conform to the way the Print MIS does business in order for the new system implementation to succeed.

- **Effective Communication.** According to the study participants, clear, consistent communications are rare in midsize commercial printing companies, where no structured communications channels may exist and information may be sporadic at best. As one interviewee noted, “Management often gets things done in an informal manner, managing many tasks as part of their job responsibilities, which limits the flow of clear and timely communications.”
- **Project Management.** Lean workforces in the industry make it very difficult to find individuals who might have the time to spare on a print MIS implementation project. And with today’s executives being asked to become more directly involved in establishing and cementing customer relationships, it is increasingly difficult for leaders who “wear many hats” to give such a far-reaching effort adequate oversight.
- **Appropriate Business and IT Legacy Systems.** Since the bulk of printing (despite the growth of Web-to-print) is still customized work for each client, and since impossibly tight deadlines are the rule, not the exception, there is often a general unwillingness on the part of production and office personnel to depart from the use of legacy systems within their individual areas because they fear anything that could interrupt their workflow. Many also oppose any initiative that will require them to learn how to use new systems and change familiar, long-followed practices.

Exacerbating the problem is that this mindset is often coupled with the inability or unwillingness of management to free up funds to replace or modify existing systems. In many instances, the failure to update systems for long periods of time is one reason that employees are locked into legacy procedures. When companies regularly update their systems and procedures, employees become accustomed to change and experience the benefits of newer systems; consequently, they are not only less fearful of change, but have shorter and shallower learning curves to overcome when each upgrade is introduced.

## Moderate & Minor Impediments

Two of Nah, Lau, and Kuang's 11 critical factors, both of which are personnel related—were judged as moderate impediments by the printing industry experts: Change Management Program and Culture, and Project Champion. Two others—linked to the final stages of project implementation or the post-implementation period—were ranked as Minor barriers: Software Development, Testing, and Troubleshooting; and Monitoring and Evaluating Performance.

- **Change Management Program and Culture.** As noted above, environments in which change is rare generally become environments in which change is avoided or even feared. In addition, many veteran employees have experienced so much upheaval in the industry over the last 10 or 20 years that they may be “change weary.” “The management of most commercial printing companies accepts the need for change, but employees may be resistant to change because they are wedded to familiar practices,” said one interviewee. Most experts who took part in the study considered this to be a moderate implementation impediment.
- **Project Champion.** Because of demands on the time and attention of senior executives, all too often the person chosen to be the in-house project champion does not have the managerial ranking or respect to convey the importance of the project, align everyone on the team toward achieving the goals, and ensure their commitment to the venture's success. As one interviewee phrased it: “The lean staffing makes it difficult to free up high-level managers to champion the project or add it to their duties.” This, too, was viewed as a moderate impediment.

Two other factors, both in play during the final phase of system implementation, were ranked as minor impediments to successful implementation:

- **Software Development, Testing, and Troubleshooting.** A fair amount of time, patience, and resources must be allocated to the MIS project in order to “debug” the systems and get all applications running to full potential. Both time and resources are generally hard to come by in the industry—and their absence often leads to a lack of patience with the slow pace of progress that sometimes accompanies the introduction of new systems.

- Monitoring and Evaluating Performance.** Although staff time is hard to free up, the interviewees felt that once a system is installed and running, ongoing oversight of the system could be handled without great difficulty. As one put it, “Despite workflow pressures, the monitoring process is not intrusive if the commitment to Print MIS installation has been made.”

<b>Relative Importance of Critical MIS Implementation Impediment Factors In Midsize Commercial Printing Companies</b>			
<b>Major Impediments</b>	<b>Moderate Impediments</b>	<b>Minor Impediments</b>	<b>Industry Impediments</b>
ERP Teamwork & Composition	Change Management Program & Culture	Software Development, Testing & Troubleshooting	Competitive Challenges
Top Management Support	Project Champion	Monitoring & Evaluating Performance	Professional Management Training
Business Plan & Vision			Customization
Business Process Reengineering			Job-Shop Environment
Effective Communication			
Project Management			
Appropriate Business/IT Legacy Systems			

**Industry Impediments**

Participants in the qualitative study also identified a quartet of industry-specific barriers to MIS implementation at midsize printing companies:

- Competitive Challenges.** “Since the commercial printing industry is extremely competitive, printing companies have little incentive to invest in systems that appear to overlay the actual printing process without adding *immediately perceptible value* to the final product,” noted one interviewee, adding: “As a result, management is skittish about introducing a system that might interrupt the workflow or cre-

ate an unacceptable degree of downtime as a new system is installed and workers are trained in its use.”

In many cases, managers are also hesitant to try to install any system that might affect the performance of production workers on the shop floor or might contain high hidden costs with no guarantee of immediate or short-term future success.

- **Lack of Professional Management Training.** Quite often, the level of management training found in midsize commercial printing companies is not comparable to that found in major corporations that are installing enterprise resource planning systems. This is closely tied to the lack of a stated vision for the company and the inability to build a culture that is open to change.
- **Customization.** As noted above, just about any commercial printing work involves a certain—often high—level of customization. The job environment is extremely unpredictable, making scheduling and planning more difficult than in many other industries. There are a great number of variables in any given print manufacturing job, and changes often continue to occur on a job long after work has started on it. This high degree of customization in the printing industry is another formidable barrier companies face when attempting to install a fully utilized management information system.
- **Job-Shop Environment.** Hand-in-hand with customization is the strong craftsmanship aspect that is rooted in commercial printing. While it is true that there has been a good degree of computerization and digitization in nearly every part of the manufacturing process over the past 20 years, each department in the printing workflow still takes “pride of ownership” with respect to its contributions to the finished job. While this feeling of ownership can result in high-quality work and company pride, it can also act as a barrier when it is management’s desire to implement a system that will integrate, centralize, and monitor every step of the process.

Ironically, while the competitive nature of the commercial printing industry provides a reason to work toward the full utilization of print management

information systems, it can also act as a barrier to the realization of a successful MIS installation.

Similarly, although low profit margins make a new workflow system desirable, they also make it challenging to free up the capital and staff resources necessary for a successful installation. And the resistance on the part of production workers and managers to let go of established ways of doing things makes the problem even thornier.

### **Course Corrections**

When looking at the major roadblocks to successful print MIS implementation in midsize commercial establishments, the first thing that is apparent is that many of these barriers can be dealt with during the planning stages, before any actual installation activities begin. In fact, careful planning before starting the implementation should be viewed as a significant factor in implementation success.

During the planning stage, when choosing a print MIS, it is important to realize that a company does not necessarily need to purchase the fanciest or most elaborate system on the market. In fact, managers will more often than not benefit by working in the opposite direction, from the simplest or most basic system up.

According to business management guru Peter Drucker, there are two rules managers should adhere to when choosing equipment. The first: “The right question for the manager is not, ‘Isn’t there a bigger tool for the job?’ It is always, ‘What is the simplest, the smallest, the lightest, the easiest tool that will do the job?’ The second rule: “The tool has to serve the work. The work does not exist for the sake of the tool,” says Drucker. “The tool exists for the sake of production.”

Four decades ago, in his 1973 book, *Management: Tasks, Responsibilities and Practices*, Drucker wrote, “This rule is constantly violated by today’s computer users. They become fascinated by the capacity, the speed, the memory, the computational ability of a new generation of computers. As a result, when the new computer arrives, a frantic search begins to find things for it to do. In the end,” he continued, “it is being used to turn out endless reams of information



which nobody wants, nobody needs, and nobody can use. Keeping the tool going becomes an end. As a result, nobody has any information.”

It is clear that generations and generations of hardware upgrades and software versions later, Drucker’s wisdom still very much applies to today’s MIS decision-making process.

Our qualitative research also underscored another essential implementation factor revealed by the research of Fiona Fui-Hoon Nah, Janet Lee-Shang Lau, and Jinghua Kuang: process reengineering. Those interviewed said that management and production workers must understand from the beginning that they are going to have to change the way they currently get things done to suit a new computer system, and not the other way around—the computer system cannot be changed to match the way management and production workers have been doing things.

Without an understanding of this key point, a print operation will never attain a fully successful MIS implementation. Again, this must be hashed out during the planning stage of the process and when taking steps to choose the appropriate system.

Two-way communications are at the heart of this issue. Project managers must solicit and encourage department managers and line employees to provide them with as much specific information about their current processes and existing (and anticipated) needs as possible before any MIS decisions are made. Similarly, project managers must convey to these same managers and employees the capabilities, shortcomings, and changes to existing (and anticipated) processes that will inevitably occur when the system they are selecting is implemented.

And these communications should be regular and ongoing, beginning (most importantly) *before* the decisions are made, but also continuing throughout the installation, implementation, and even the monitoring process steps. Poor (or absent) communications, a lack of clear vision, or unstated or non-existent management principles will contribute greatly to resistance against a new system by management, production, and support personnel.

### **Lack of Understanding**

Resistance to the introduction of new systems or processes often comes simply because employees do not understand the need for change. This may contribute to a fear of failure when using the new systems or worry about an inability to master new processes, which, in turn, will often lead to a fear of job loss. Without a clear understanding of why management feels the company needs to change and what it expects of its employees as a result of the change, there is usually a general employee preference for the staying with the status quo.

When employees understand that the new systems are being introduced not to eliminate jobs but improve productivity and profitability, they will see that they are important to keeping the company competitive and successful—both of which will foster growth and job security, and contribute to their own success. An adequate communications effort that provides understanding of the need for change and a clear picture of where the organization is headed is a key to the successful implementation of a new management information system.

Communication is not a one-way street, however. A team leader will not only gain critical information, but increase employee buy-in for the change if he or she makes sure that production employees have adequate input into the choice of the new technology, and an opportunity to voice their opinions about various options being considered. One caveat: They must be asked for specific constructive input about system features needed for their work, not just given an opportunity to express a negative dismissal of anything new.

With the nearly universal use of Job Definition Format (JDF) in graphic communications and the increased acceptance of Computer-Integrated Manufacturing (CIM), it has become even more important to get the implementation of a complete MIS correct before advancing to automated workflow applications. The problems associated with the successful implementation of a print MIS will only become more intensified when moving into production applications and the formation of global alliances.

**Investment vs. Cost**

Competitive challenges in the graphic communications industry are intense. Very often the competitive nature of the industry and its slim profit margins lead to a less than full commitment when implementing a print MIS, and a tendency to scrape along with the least expensive and least expansive system. But, as noted earlier, a cost containment policy that results in failing to implement an adequate management information system will be penny-wise and profit-foolish, as it keeps a company from access to systems that can actually make them more competitive and profitable.

Even though tight profit margins generally make it very difficult to free up the capital and staff resources needed to properly incorporate MIS technologies, the use of capital for this kind of process improvement should be viewed as an investment in a more successful operation rather than an unnecessary expense.

One caveat: If management does decide to make a significant investment in new systems, it should also consider bringing in an experienced consultant with a strong background in print MIS to help it explore all system alternatives, make the best choices, and build confidence and acceptance among personnel. At the very least, a consultant should be included in the initial Chartering and Project phases of any print MIS implementation to help set clear goals and a vision for ultimate implementation success.

**Based on his long and widespread experience in the graphic communications industry, veteran industry consultant Donald H. Goldman offers the following view of management information system implementation and the necessity for planning:**

"It is difficult to run an efficient printing business today without an effective print management information system (MIS). The first step in implementing a new system is the planning. If adequate planning is not incorporated in the selection and implementation of an MIS, the results are often costly by dragging out the time to put the system in place, along with missing the benefits and efficiencies promised by the implementation of the MIS.

"Planning involves more than setting a timeline, but rather identifies the team responsibilities, changes in workflow, testing procedures, training methodology and go-live strategies that will minimize the impact of ongoing plant operations. With good planning, the culture of a printing company can be changed with minimum disruption and maximum acceptance of change by all the employees. No one likes a negative surprise."

### **Key Challenges**

"Top management often sees their MIS as a necessary evil rather than a way to provide a better way to do business. Many times, a new system is selected and implemented to mimic a company's legacy system rather than as a means to improve and streamline the way a company does business. They buy features like scheduling or CRM (Customer Relation Management) and browser-based modules, but never effectively use them.

"It takes a full commitment from top management to have its MIS become the company's system of record and the heart of its sales and production management. An enlightened management team recognizes it needs a print management system that does accounting, rather than the other way around.

"They see the benefits of a fully integrated MIS that can manage jobs from receipt through delivery and even billing, cost effectively eliminating redundancies that reduce costs and shorten turnaround

times. This will result in lower error costs, improved customer relations, and even better cash flow. Failures in full MIS implementations can usually be traced back to an indifferent top management team.”

“Another reason for the failure of an MIS to be implemented in a way that meets its full potential is resistance to change. To avoid this resistance, a new system with a full set of advanced bells and whistles is often installed to mimic a company’s current legacy system. Estimating, data collection, inventory, and accounting take shape to reflect the way the old system works.

“The system should be installed as a reflection of improved job flow and planned labor reductions through the power assisting of various functions, including job ticketing, scheduling, and communications with customers. Change is hard, but it is necessary to survive, and an effective MIS is part of the survival kit. It is up to top management to recognize the benefits of change by directing and supporting changes that will benefit the company.”

### **Avoiding Pitfalls**

“The planning stage is a perfect place to define the improvements needed to increase sales and reduce costs. Directed by top management, a review of every area, from getting business to processing and producing orders, needs to be conducted.

“The results of this planning step will be a guide to the specifications of a new systems and the execution of the implementation plan. Or it will result in an overhaul of a currently installed system. Too often, installed MIS are underutilized and do not need replacement, but rather, re-installation to reflect the planning-directed company changes.

“Today’s MIS vendors continue to make improvements to their systems and offer additional modules, but printing companies too often refuse to spend the money or time to add these improvements. Plus, all systems have an open architecture that allows the integration of third-party modules that provide needed benefits if the vendor does not have a suitable solution.

“One other point: Every medium-size printing company or larger should have an Information Technology (IT) manager—not a technical person who watches over your computers and network, but a management-level person who is responsible for the application of computer technology to the company to meet its changing environmental needs.

“This person should be part of the management team, providing the vision of how systems can be used and directed to meet the company’s overall sales and manufacturing improvement objectives. The IT manager functions with the authority of top management and the planning committee to make certain an overhaul or implementation of a new system meets the planning committee’s direction in a timely and cost effective way.

“To assist the planning team, many companies seek outside help. Independent advisors or consultants can be effective in identifying areas that need change and can help in developing the ways and means to put benefits in place. Also, experienced advisors can help in matching a business with the MIS that has the best potential to meet the needs of the company and they can assist in the selection process and the implementation process.

“Resistance to change is a natural response. The best way to minimize this resistance is through early involvement. While it is the right of management to implement changes and insist everyone conform to its decisions, it is better to explain the need for the change and how it benefits the company and its employees.

“When a company caves in to resistance, it means its management has lost control and has done a poor job of involving individuals in helping with the changes. Just remember: No one likes surprises. Involvement early on in the process and a constant flow of information on the nature and timetable for the changes throughout implementation can reduce resistance.”

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**Donald H. Goldman** is Principal of Consultware, Salem, Mass., a graphic arts management and technology consultancy. He provides consulting services in computer-based management information systems, as well as overall information flow and operating procedures. His expertise includes the system selection/implementation. Over the span of his career, Goldman has held management positions with a major group of printers and has pioneered developments and industry education efforts in many areas, including computer-aided estimating, digital preproduction, digital printing, and workflow management.

A popular industry speaker, author, and educator, his numerous industry honors include the prestigious NAPL Technical Leadership Award.

***“Change is hard, but it is necessary to survive, and an effective MIS is part of the survival kit.”***



CHAPTER 3:

## DATA MINING AND CUSTOMER RELATIONSHIP MANAGEMENT

*“Align your CRM implementation  
with client, employee, and shareholder goals.”*

It is only when managers look beyond the implementation issues regarding management information systems and concentrate their planning on system applications that can bring about strategic benefits to the company that the full potential of these systems can be realized. And any discussion of the benefits MIS can bring to a company would not be complete without including customer relationship management (CRM). Many strategic advantages can be gained when MIS data mining techniques are utilized within the appropriate CRM data model.

In “Application of Data Mining Techniques in Customer Relationship Management,” an article that appeared in the journal *Expert Systems with Applications*, authors E.W.T. Ngai, Li Xiu, and D.C.K. Chau note that “customer relationship management...comprises a set of processes and enabling systems supporting a business strategy to build long-term profitable relationships with specific customers,”



They further explain that compiling data on customers through an effective management information system constructs the platform upon which a successful CRM strategy can be created, pointing out that the Internet and increasingly sophisticated search engines have increased the effectiveness of companies using MIS to conduct market research and manage customer relationships.

Data mining tools are becoming a significant factor for success in the evolving global economy. “Analyzing and understanding customer behaviors and characteristics is the foundation of the development of a competitive CRM strategy, so as to acquire and retain potential customers and maximize customer value,” they write. “Appropriate data mining tools, which are good at extracting and identifying useful information and knowledge from enormous customer databases, are one of the best supporting tools for making different CRM decisions.”

#### **Four CRM Phases**

Ngai, Xiu, and Chau conducted an extensive review of articles in the scholarly literature that dealt with CRM and data mining. Building on that information base, they then focused on research that looked specifically at how data mining techniques could effectively enhance CRM strategies, reviewed and analyzed the findings, and carefully divided the results into four phases or categories of CRM activities: Customer Identification, Customer Attraction, Customer Retention, and, Customer Development.

- **Customer Identification.** “CRM begins with customer identification, which is referred to as customer acquisition in some articles,” write Ngai, Xiu, and Chau. “This phase involves targeting the population who are most likely to become customers or most profitable to the company.”

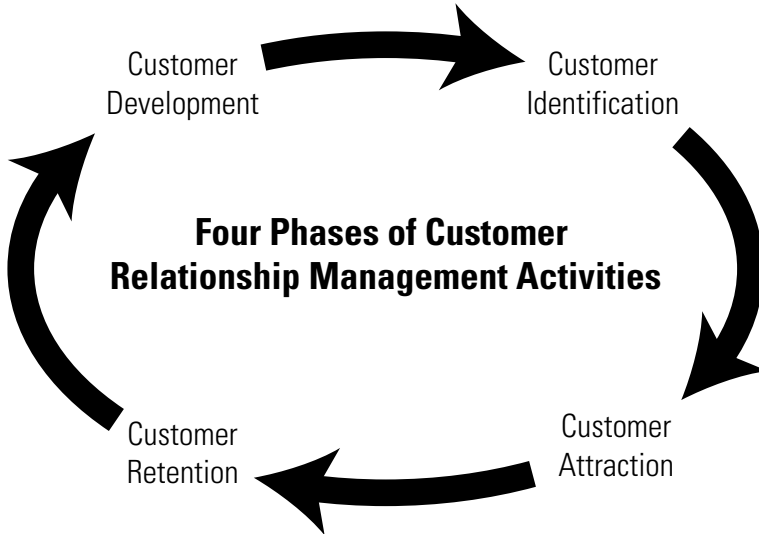
The customer identification process can include determining why customers might have been lost to competing companies and how they might be attracted to return. This stage can also include an analysis of which customer segments are the most profitable to an individual business by studying hidden characteristics of the group. The next step would be to segment customers into smaller groups or

sets that have relatively similar characteristics in terms of profitability and/or product/service requirements.

- **Customer Attraction.** “After identifying the segments of potential customers, organizations can direct effort and resources into attracting the target customer segments,” note the researchers. It is quite common in the customer attraction stage to use targeted direct marketing campaigns aimed at customers with the most profit-generating potential. Direct marketing can include direct mail and coupon campaigns or direct marketing campaigns implemented via Internet resources and applications.
- **Customer Retention.** The key goal in the customer retention phase is to build customer loyalty and long-term relationships. “This is the central concern for CRM,” they write. “Customer satisfaction, which refers to the comparison of customers’ expectations with their perception of being satisfied, is the essential condition for retaining customers. As such, elements of customer retention include one-to-one marketing, loyalty programs, and complaints management.”

In one-to-one marketing campaigns, customer behavior is carefully observed and analyzed. Based on this analysis, predictions can be made about future behavior and campaigns can be developed in line with the forecasted behaviors of each particular customer or customer segment. Programs can be built upon profiles of unique customer segments, and can include personalized recommendation systems, as well as systems focused on replenishment.

- **Customer Development.** “This involves consistent expansion of transaction intensity, transaction value and individual customer profitability,” note the authors. Elements of customer development can include customer lifetime value analysis and up/cross-selling techniques. A customer lifetime value analysis can serve as an attempt to predict the total net income that can be generated from a particular customer. Up/cross-selling involves promotion campaigns designed to have customers use more products or services offered by one’s company.



“These four dimensions can be seen as a closed cycle of a customer management system,” note the researchers. “They share the common goal of creating a deeper understanding of customers to maximize customer value to the organization in the long term.”

### Hidden Features

Working within the framework of these four dimensions, data mining applications comb through large databases seeking to unearth hidden customer features and behaviors. They can then construct an appropriate mining model from the data by using one or more of several common modeling techniques, including Association, Classification, Clustering, Forecasting, Regression, Sequence Discovery, and Visualization. Following is a snapshot of each approach in the words of the researchers:

- **Association** “aims to establish relationships between items which exist together in a given record.” Association modeling is often utilized when designing cross-selling programs.
- **Classification** “is one of the most common learning models in data mining. It aims at building a model to predict future customer behaviors through classifying database records into a number of pre-defined classes based on certain criteria.”

- **Clustering** “is the task of segmenting a heterogeneous population into a number of more homogeneous clusters.” Clustering differs from classification in that the clusters are not predefined; instead, they are derived from an analysis of the data.
- **Forecasting** “estimates the future value based on a record’s patterns. It deals with continuously valued outcomes.” In forecasting, logical relationships within the model are projected forward to some point in the future. An example of a forecasting model is one that focuses on customer demand within one particular customer category.
- **Regression** “is a kind of statistical estimation technique used to map each data object from a real value to a predicted future value.” Examples can include curve fitting, predicting (and forecasting), and modeling causal relationships between variables.
- **Sequence Discovery** “is the identification of associations or patterns over time. Its goal is to model the states of the process generating the sequence, or to extract and report deviation and trends over time.”
- **Visualization** “refers to the presentation of data so that users can view complex patterns.” Visualization can be used in combination with other data mining models to help communicate a better understanding of relationships among variables, sometimes expressed via bar graphs or charts.

“A combination of data mining models is often required to support or forecast the effects of a CRM strategy,” explain Ngai, Xiu, and Chau. “In such a situation, the classification of data mining models will be based on the major CRM issues that needed to be addressed.”

Data mining, when applied to CRM, may be viewed as a method of driving business forward by analyzing information that has been gathered by the organization. The knowledge gained from such data can be used to make decisions on a variety of business fronts. For example, it can help steer decision making by forecasting the results of those decisions; help increase customer response rates in marketing campaigns through the segmentation of various

customer groups; and help predict the needs and behaviors of customers, thereby improving customer satisfaction and retention levels.

### **Long-Term Outlook**

According to *ISMguide.com*, the long-term outlook for CRM applications is bright and will continue to grow. As a strategic advisor to organizations planning and implementing CRM, social CRM, and social media initiatives, ISM notes that the Gartner Group ([www.gartner.com](http://www.gartner.com)) has predicted a positive growth rate for the CRM market, and that CRM software developers have been focusing on the small- to mid-sized market segment.

Gartner Research Director Sharon Mertz reports that there are a number of reasons for this predicted growth: “The composition of the worldwide CRM marketing is evolving as vendors continue to extend regionally, increase penetration within existing accounts and gain new clients, offer flexible deployment modes and continue to develop the channel.”

Discussing trends that are helping push data mining and CRM forward, particularly in applications for small to mid-sized companies, ISM points out that many CRM vendors have developed and are offering software packages that work in conjunction with popular third-party social media applications: “Social media is information content created by people using highly accessible and scalable publishing technologies to facilitate communications, influence, and interaction with peers and with public audiences typically via the Internet and mobile communications networks.”

ISM continues, “This interaction and the manner in which information is presented in social media applications depends on the varied perspectives and the ‘building’ of shared meaning among communities, as people share their stories and experiences through user-generated content or consumer-generated media.”

### **CRM Barriers**

Mining, organizing, and interpreting data via Customer Relationship Management (CRM) can help companies drive business forward by building profitable customer relationships on a thorough understanding of their clients’

likes and dislikes. Important as CRM may be to a business, however, implementing it can be stalled by a variety of impediments, and that means that a strategic approach is often required for successful CRM installation and use.

Research on a number of CRM initiatives, barriers, and implementation success strategies was presented in an article published in the *Journal of Service Research*, entitled, “CRM Implementation: Effectiveness Issues and Insights.” It was written by Timothy Bolding, Douglas Bowman, Steve LaValle, Vikas Mittal, Das Narayandas, Girish Ramani, and Rajan Varadarajan, whose work began with a survey of 101 U.S.-based firms that have installed CRM applications. They questioned the companies about their implementation strategies, initiatives, and hurdles; studied CRM application areas and factors associated with CRM implementation success in each company; and paid particular attention to top management business goals that were related to the successful CRM implementation.

“Conceptually, customer relationship management has been widely embraced by businesses,” write the study authors. “In practice, however, examples of success contrast with anecdotes where the diffusion of CRM into an organization continues to be a slow process and/or where CRM implementation outcomes have fallen short of expectations. Successful implementation depends on a number of factors,” they continue, “such as fit between a firm’s CRM strategy and programs and its broader marketing strategy, and intra-organizational and inter-organizational cooperation and coordination among entities involved.”

Among the corporate-level goals they identified as being associated with CRM were the following:

- Gaining flexibility while shortening response time to opportunities and risks;
- Reducing operating expenses;
- Increasing financial performance from the view of the corporate shareholders.

Among the specific initiatives, and anticipated resultant benefits, cited by the authors are the following CRM applications:

- **Strategic Brand Management**—Building a powerful, positive, and consistent brand image in line with the strategic mission of the CRM application.
- **Customer Service and After-Sales Support**—Using CRM to standardize customer service, bring it to an optimum level, gather customer satisfaction feedback, and resolve any complaint issues. This CRM application can also focus on winning back former clients.
- **Loyalty and Retention Programs**—Building in customer loyalty and retention methods by using discount cards, bonus points, and recommendation offerings.
- **Cost Reduction**—Trimming marketing, sales, and service costs, as well as reducing the number of employees, offices, and managerial layers in a company.
- **Channel Integration and Optimization**—Helping a company optimize the customer experience while cutting its own costs through the integration of low-cost channels and electronic media.
- **Sales Programs**—Targeting and gaining new profitable customers, and supporting both up-selling and cross-selling. The goal here is to provide information that will maximize the productivity of the sales force.
- **Campaign Management**—Providing the infrastructure to initiate innovative marketing programs in line with the current corporate mission.
- **Product Optimization and Management**—Providing information to help managers make decisions related to the refinement or phasing out of current products and services, as well as gathering needed data to support the development of new products and services.

Respondents to the researchers' survey identified the following indicators of a successful implementation of CRM initiatives:

- "Improving the customer experience,
- "Deepening the relationship with the customer,
- "Retaining and expanding the share of existing customer base,
- "Increasing the customer acquisition rate and the customer retention rate."

As we saw earlier in our discussion of the barriers to enterprise resource planning and management information system adoption, all too often the implementation of a CRM program can be stymied by organizational opposition to changing attitudes or approaches. "Successful implementation of CRM strategy and programs can be hampered due to a resistance to change at various levels of the organization," note the researchers, citing an instance in which "marketing managers may not easily make the transition from being responsible for all aspects of the marketing of a single product or brand to handling functions spanning multiple brands and products that are simultaneously relevant to a firm's customers."

When management determines that customer selection is going to be prioritized by CRM output rather than traditional techniques, it is also important for sales personnel to understand the need for, and cooperate with, sales campaigns that are data driven.

When asked to identify the strongest barrier to CRM implementation, about 20% of the survey respondents tied it to an attitude-related reason, with 11% blaming an "insufficient focus on change management" and 9% citing an "insufficient involvement of employees." Almost the same number (19%) selected "a lack of necessary resources" as the primary CRM barrier.

The survey asked companies to list those management steps that could best overcome the resistance to CRM implementation. Slightly less than one-third (29%) of respondents cited the need for "change management," while nearly the same number (28%) said "senior executive/ opinion leader buy-



in,” 27% said “prioritizing of company initiatives,” and 26% added “business case and ROI development.” In other words, 90% of those responding felt that resistance could be overcome by a management-supported approach or an explanation by management of the dollars-and-cents reason for the new system.

As with any change management program, it is critical for executives and managers to understand why employees resist change in the first place. Often, there is a fear factor involved. It can include the fear of losing one’s job or one’s status within the organization as an employee who has the answers about his or her area of expertise. An employee’s fear of failure at learning how to do something new or succeed with different tools or methods can also contribute to resistance. In addition, there is often a natural tendency for employees to have a preference for the ‘status-quo’—doing things the way they have always been done. It may not be the best way, but it is comfortable and “safe.”

### **Quantify Benefits**

In order to develop a company-wide dedication to CRM, management should quantify the benefits of the program in terms of an acceptable return on investment (ROI), with the projected ROI presented in terms of “acceptable metrics and available indexes.” (As noted above, more than one-quarter of companies surveyed felt this would help overcome change resistance.) Specifically, it is important that any ROI forecasts be based on an accurate estimation of the results of the marketing programs and that the projected results take into account more than one possible marketing outcome.

The research results also indicate that another critical factor is the need for CRM implementation to be aligned with the various stakeholder groups. As the researchers report, “84% of respondents said it was important to align with customer goals, 48% indicated it was important to align with shareholder goals, and 48% indicated it was important to align with employee goals.

“Managers need to recognize that CRM is an enterprise-wide concept that requires their businesses to identify opportunities to simultaneously enhance customer value while reducing costs, two effects that together create

sustainable competitive advantage and result in greater short- and long-term profitability,” say the study authors. “To achieve this, managers need to recognize that a business’s CRM initiatives are an integral part of its overall marketing strategy and not just a separate program.”

In addition, management must foster an organizational culture that is based on doing and learning from the mistakes that are inevitable in any CRM implementation process. The organization must concentrate on the potential benefits of successful CRM implementation, which include better responses to targeted marketing campaigns, higher levels of customer satisfaction and retention, increased flexibility in serving clients, higher levels of operational productivity, and a more profitable and financially sound organization.

### Managing Change

When introducing any new program, particularly one that can impact as many areas of the business as a customer relationship management initiative, it is important to consciously and deliberately manage the change process. This is not something to be left to chance. Change management begins with understanding the emotional reactions of employees and creating a program that not only helps them see the need for change, but actually involves them in the change process.

Again, as much information as possible should be provided *before* final decisions are made and *before* the actual implementation process begins. The keys here are to avoid surprises and to develop employee ‘buy-in’ through active participation in the effort.

Employee buy-in starts at the head of the management chain: “Top management support is critical to this initiative,” state the research study authors. “Clearly the more ingrained top management’s view of CRM as critical to a firm’s success, the higher is its association with the perceived success of CRM initiatives. Interestingly, when senior management views CRM as ‘useful, not critical,’ the association with perceived CRM success is negative.”

And top management support must go well beyond lip service; it must include supplying the proper financial resources for funding the project,

providing the necessary employee training, and offering the time and patience to see the project through to successful implementation, not “pulling the plug” prematurely because results are not immediately forthcoming. It is essential that top management decisions made during the implementation process reflect leadership’s dedication to CRM and its determination to stay with it long-term. To employees, top management’s actions always speak louder than words.

In line with the importance management places on the CRM initiative, ownership of the implementation project must be given to someone who is at an organizational level that is responsible for strategy, and the CRM installation mission must be viewed as a top priority of the company. Giving implementation ownership to someone at a functional or operations level, someone who does not possess the authority to get things done, is a sure-fire barrier to success.

Finally, management must not let CRM stand alone outside other company activities. Customer relationship management should be viewed as an essential strategy that is impacted by marketing and promotional efforts and that, in turn, impacts production. If customers are the lifeblood of a company—and they are, customer relationship management is the heart that keeps that blood pumping. The entire organization should realize that this is not something being implemented because it is “nice” to do or because it is the next new thing, but something that is vitally important to the success and survival of the enterprise.

“The successful implementation of CRM initiatives rests on successful cross-functional integration of processes, people, operations, and marketing capabilities that is enabled through information, technology, and applications,” the authors conclude. “Linking CRM strategy and implementation more tightly with the overall marketing strategy of a business will lead to greater CRM implementation effectiveness.”

**Interactive marketing and social media expert John Foley, Jr., has extensive experience in data gathering and analysis for a wide variety of applications. Here he offers some thoughts on the value and reach of data mining and customer relationship management systems:**

"Today, the massive amounts of data available to us for marketing and customer service is fantastic, but not having it in a useable MIS Tool can lead to wasted efforts and lost sales opportunities. Being able to mine the prospect and customer data is important; having a customer relationship management tool that allows you to analyze all aspects of the contact is very important to your company's intelligence work on pre-sales, marketing, and post-sales. There are many different ways to communicate with your target audience. Where they are in the channels, how they use these channels, and how they utilize the communication sent to them are equally important.

"The number one challenge in data mining and using a useful CRM solution is to be sure that the individual who does the work has all the skills necessary to execute and achieve your goals. For instance, if you market and sell to the financial services community, it's not a matter of whether the person understands how to use the software and analyze the contacts, but more importantly whether he understands the target audience so he can help pull data based on relevance in that vertical market.

"Data mining and analysis can be used to develop better customer service by analyzing client behavior patterns, establishing loyalty/retention programs, or can be applied to help target the most profitable customers and work to further develop those client relationships in concert with your sales manager.

"One of the things we do using good data analytics practice is share relevant content to the target audience based on their interest. For example, we provide Software for Mobile Marketing. Well, we look into our CRM solution and pull back the analytics of people that have signed up, downloaded something, or came to our website through online posts due to relevant information we shared previously around the subject of mobile marketing.

When we performed a webinar on mobile marketing not only did we achieve a 50% response to the webinar offer we also had the same amount actually participate in the webinar.

“Another thing that we do with our CRM solution is mine data in an effort to better cross-sell our other products and services. Someone might initially come into our database because they’ve signed up for our mobile website-builder tool. At that point, we’ll research to identify what type of company they are, what types of services and products they offer, and how big a company they are. We’ll also put together a little profile of what they currently do to market themselves (based on what we can see).

“Then, when it’s time to try to cross-sell the many other products and services we have to offer, we don’t just promote everything. Rather, based on their profile and what data we have in the CRM, we’ll market the product that seems best suited to them as the next step. This helps us to shorten the sales cycle and trim wasted marketing energies.

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***John Foley, Jr.**, is President/Chief Executive Officer of interlinkONE ([www.interlinkone.com](http://www.interlinkone.com)), a leading provider of innovative marketing software and services, and President/Chief Marketing Officer of Grow Socially ([www.growsocially.com](http://www.growsocially.com)), which helps companies with their online and interactive marketing efforts. Both companies are based in Wilmington, Mass.*

***“Based on their profile and what data we have in the CRM, we’ll market the product that seems best suited to them.”***

## CHAPTER 4:

# USING MIS TO GAIN A COMPETITIVE EDGE AND REALIZE BUSINESS BENEFITS

*“Accurately define expected  
benefits during the planning.”*

The previous chapters have focused on effectively implementing a print management information system and other tools such as data mining and customer relationship management by understanding and overcoming the barriers to implementation commonly faced by companies in all industries, and graphic communications companies in particular. It is hoped that this information will help you select the best system and oversee its successful implementation in your business.

Most companies implement a management information system to help improve their operations by improving workflow, enhancing productivity, and generating greater intra-department or intra-function data integration. But they can also use MIS applications to gain a competitive edge as part of an overall business strategy.

In a classic *Harvard Business Review* article, “Information Technology Changes the Way You Compete,” F. Warren McFarlan provided the groundwork for how information technology can be used as a competitive weapon. In determining how MIS might be able to help companies compete, McFarlan states that leaders must begin by answering five questions. If the answer to *any one* of the five is yes, he says MIS can most likely be used as a competitive device—and he advises that this approach should be given the highest level of attention by senior management.

McFarlan’s first question is this: **“Can IS Technology Build Barriers to Entry?”**

McFarlan explains the importance of this issue by discussing how information technology systems can be used to open up new channels that are easy for customers to use, but difficult for other companies to replicate. “A successful entry barrier offers not only a new service to appeal to customers but also features that keep the customers ‘hooked,’” says McFarlan. “The harder the service is to emulate, the higher the barrier for the competition. An example of such a defensible barrier is the development of a complex software package that adds value and is capable of evolution and refinement.”

Applications for these systems can be internal or external, ranging from placing work orders to ordering supplies or monitoring the need for machine maintenance. He cites one example in which an industrial distributor was able to create new electronic order gateways for its customers. Once the system was in place, its customers did not want other distributors’ systems on their premises.

When price—or rapid turnaround—is important to customers, the company that offers such electronic installation systems can make great advances in market share and put strong pressure on its rivals. And, says McFarlan, by supplying salespeople with electronic tools that increase response time—for example, speed of price quotes—a company can create another type of competitive barrier. Such a system not only lends considerable support to members of the sales team, but also increases their confidence level and allows them to sell more aggressively. Effective salespeople spend a good

amount of time in the field, and mobile communication resources can provide a strong competitive advantage.

There is one more advantage in offering advanced electronic ties to customers. In terms of branding, companies that do so will be seen as leaders in the industry, states McFarlan. “While a company may have difficulty in maintaining an individual advantage, it can parlay a series of innovations into a valuable image; it can be seen as a company that is at the leading edge.”

### Staying Put

The second question McFarlan asks companies to answer is this: **“Can IS Technology Build in Switching Costs?”**

The “switching” referenced here is jumping to another supplier. The goal is to use information systems to create increased operational dependence on one supplier, making it inconvenient or expensive for customers to switch to a competitor. Ideally, says McFarlan, the electronic system should be easy for customers to use, but it should also contain “a series of increasingly complex and useful procedures that insinuate themselves into the customer’s routines. Finally, the customer will have to spend too much money and time to change suppliers.”

McFarlan cites electronic home banking as an excellent example of this type of system. Once a customer becomes familiar with one bank’s system and has coded all monthly creditors and transactions, he or she will be more resistant to changing banks than before. He provides another example, in which a heavy machine manufacturer uses electronic services that add value to its product offerings while simultaneously increasing the costs for customers who want to switch suppliers.

“The company has attached electronic devices to its machinery installed on customer premises. In case of mechanical failure, the device signals a computer program at corporate headquarters and the program analyzes the data, diagnoses the problem, and either suggests changes in the machine’s control settings or pinpoints the cause of the failure and identifies the defective parts,” explains McFarlan. “In the same vein,” he continues, “another manufacturer has supplemented such a service with immediate dispatching of spare parts.”



## Basic Changes

The third of McFarlan's five questions is, "**Can the Technology Change the Basis of Competition?**"

In asking this question, McFarlan builds upon a business philosophy that was set forth by Michael E. Porter in the *Harvard Business Review* article, "How Competitive Forces Shape Strategy." In the article, Porter analyzes three competitive paradigms that can change the basis of competition: cost-based, product differentiation, and specialization.

In some industries that are highly sensitive to cost-based competition, companies can use information technologies to develop characteristics that vary so much they cause tremendous changes in the basis of competition. This is not a new development. McFarlan provides an example in which, as early as the mid-1970s, a major distributor of magazines to newsstands and stores used information technologies to reduce costs with respect to sorting and distribution applications. With the resultant reduced staff and lower levels of inventory, the distributor was able to secure a position of lowest-cost provider.

Another way in which technology can change the competitive landscape is through product or service differentiation. In this approach, a company offers a different combination of product features to set itself apart from the competition. The variations can be in the form of additional services, superior quality, or any new product or service wrinkle.

For instance, as McFarlan discusses, by 1977 the same magazine distributor decided to capitalize on the fact that its customers were not very far along in terms of determining their true costs and profit structures. It used new technology to go outside its traditional business services and provide its customers with a service that actually helped *them* improve *their* business.

"By using its records of weekly shipments and returns from a newsstand, the distributor could identify what was selling on the newsstand," he explains. "It developed programs that calculated profit per square foot for every magazine and compared these data with information from newsstands in economically and ethnically similar neighborhoods that often carried very

different mixes of merchandise. The distributor could thus tell each newsstand every month how it could improve the product mix.”

This company went well beyond simply distributing magazines—or even becoming the most efficient or low-cost magazine distributor. It used information technology to provide value-added features that changed the basis of competition and ultimately allowed the company to raise its prices significantly without complaints from its very satisfied customers.

### Target Focus

One way to change the competitive basis is through specialization—focusing on only one small part of a market and distinguishing itself by unique cost or product features. In another *Harvard Business Review* article, “How Information Gives You Competitive Advantage,” Porter and co-author Victor E. Miller state that “by selecting a narrow scope...a company may be able to tailor the value chain to a particular target segment to achieve lower cost or differentiation. The competitive advantage of a narrow scope comes from customizing the value chain to best serve particular product varieties, buyers, or geographic regions. If the target segment has unusual needs, broad-scope competitors will not serve it well.”

Specialization is a time-honored tradition among graphic communications companies that have long served one of dozens of niche product, service, or vertical industry markets. In some cases, this specialization was based on employee expertise or single-purpose equipment, a situation that is changing somewhat as new multi-application equipment and technology advancements open entry into these markets for more generalists.

### New Equation

Here is the fourth of McFarlan’s five questions: **“Can IS Change the Balance of Power in Supplier Relationships?”**

According to McFarlan, the development of linked electronic systems can become an effective tool in changing the balance of power in supplier relationships, giving the supplier with advanced capabilities such as just-in-

time inventory systems or computer-based communications a competitive advantage.

He offers as an example a large retailer that linked his materials-ordering system electronically to his suppliers' order-entry system. "The retailer's computer continually monitors the suppliers' finished-goods inventories, factory scheduling, and commitments against his schedule to make sure enough inventory will be available to meet unexpected demand by the retailer. If inventories are inadequate, the retailer alerts the supplier."

And question number five: **"Can IS Technology Generate New Products?"**

A company can effectively use information technologies to develop new products or services that offer higher quality or cost less. Information technologies can also be used to deliver goods in new ways, or to modify existing products and services that can be custom-tailored to meet specific clients' needs. There are numerous potential applications in graphic communications, ranging from new services to new ways of ordering repeat work or staying in touch with customers to anticipate their needs.

The important point behind each of these questions is that a company's management should keep an open mind and be willing to brainstorm and come up with new applications of information technologies in its own particular business environment. As McFarlan puts it: "Achieving advantages requires broad IS management and user dialogue plus imagination.

"The process is complicated by the fact that many IS products are strategic though the potential benefits are very subjective and not easily verified," he continues. "Often a strict ROI focus by senior management may turn attention toward narrow, well-defined targets as opposed to broader strategic opportunities that are harder to analyze."

McFarlan warns that management should not allow the use of over-simplified rules to determine MIS investment levels. For instance, judging an MIS investment as a percentage of sales can be an inconsistent measure depending on the unique organization in question, particularly since the level of MIS investment should also be made in the context of strategic growth potential in various market segments.

In addition, warns McFarlan, as an MIS becomes an integral part of a company's competitive strategy, it is important that it puts proper steps in place so that members of the organization protect the confidentiality of the organization's particular MIS plans: "Great care should be taken in choosing the attendees at industry meetings and in determining what they can talk about and what information they can share with vendors and competitors."

MIS technology can often create new opportunities for companies to improve their competitive position, so it is important that graphic communications company executives and managers consider this technology not only as a way of improving operations workflow and productivity, but also as an important weapon in its arsenal of competitive strategies. The goal is to work toward new ways of building communication networks that can effectively create a competitive advantage in a company's unique graphic communications product service offerings.

### **Business Benefits**

In addition to using a technological advance not simply as an operational tool, but as an opportunity to derive a competitive edge that may range from intensifying customer relationships to offering new products or services, management can also realize additional benefits from information technology by viewing the impact of MIS from a somewhat different perspective.

That perspective comes courtesy of authors Joe Peppard, John Ward, and Elizabeth Daniel, who believe that when companies add a management information system its managers too often focuses on the implementation of the system rather than its benefits. In an *MIS Quarterly Executive* article entitled, "Managing the Realization of Business Benefits from Information Technology Investments," they suggest that when the focus is solely on implementation, even though the IT system installation might be a technical success, it achieves no actual business benefits.

"This failure to realize benefits is primarily due to methods and tools that emphasize improving the supply-side of IT delivery, including the use of outsourcing. No IT investment is ever just about technology," state Peppard, Ward, and Daniel. The article, based on the authors' research over a 10-year period, looks at how organizations could improve their return on

the investments they make in IT, and offers a way for managers to target, plan for, and realize its benefits.

“This approach implies new ways of working between IT professionals and business managers that complement the best practices in delivering IT solutions, but engages business managers in a way that enables them to apply their collective knowledge to creating business value from IT enabled change,” they explain.

In their research, they uncovered a number of reasons management believed had contributed to the failure of IT installations to represent a good investment for their organizations. In some instances, for example, “When considering return-on-investment (ROI) calculations, organizations are too preoccupied with manipulating the denominator—reducing spend—and are failing to focus on how deploying IT can create business value and deliver significant benefits to the organization.”

In addition, many companies consider the traditional investment process as some kind of “ritual” that they must “get through” before any project can commence, and, as a result, they end up overstating the benefits that can be realized.

### **Identify and Define**

Peppard, Ward, and Daniel recommend that management clearly identify and accurately define the expected benefits of the new system during the planning stage of the project, and *develop a plan that covers exactly how each benefit will be realized in each stage* of the IT project. This plan will then serve as the benefits roadmap throughout the installation, shakedown, and post-installation stages.

“An important element of the approach, which is central to the successful delivery of benefits, is the involvement of key stakeholders in the development and execution of this benefits realization plan,” they write. “These stakeholders are the business managers and users who will be responsible for changing how they work, as well as making effective use of the new systems and technology.”

In analyzing the results of their research, Peppard, Ward, and Daniel set forth a number of principles that they believe will form the foundation for realizing benefits from implementing information technology systems:

- **“IT has no inherent value.”** By itself, information technology does not create or provide any benefits to management. Simply finding and adding a new IT system should not be the end goal or the only goal.
- **“Benefits arise when IT enables people to do things differently.”** In order to realize benefits, individuals or groups within the organization (and sometimes those in the customer or supplier base) must begin to do things in more effective or efficient ways. This should be the real goal of adopting new technology.
- **“Only business managers and users can release business benefits.”** Because benefits will only emerge by improving the way that management and users (and possibly customers and suppliers) work within the business process, it is only through the efforts of these individuals that change can actually happen. Once again, it is not the system per se that is beneficial; it is using the system to make things better that counts.
- **“All IT projects have outcomes, but not all outcomes are benefits.”** IT projects can produce both negative and positive outcomes. The goal of management, in addition to protecting against negative outcomes, is to make sure that the positive outcomes are transformed into actual business advantages. Put another way, adopting a new IT system should never be a matter of “change for change’s sake.”
- **“Benefits must be actively managed for. Benefits are not outcomes that automatically occur.”** Since there is often a long time period between the completion of the implementation stage of an IT project and the realization of its benefits, management must continue to work toward the actualization of defined benefits long after the implementation stage of the process has ended. There should not be backsliding to legacy practices because they are more familiar or because managers cannot find time for employees to obtain the training needed to use the new systems.

### **Problems vs. Innovation**

The article authors also found that management can increase the probability of success from its IT investment if, in its planning, it differentiates between two distinct types of IT goals: problem-based implementation and innovation-based implementation. “While both are likely to be present in any large-scale IT project, the impact on employees and other stakeholders will be quite different and the issues that need to be managed will be very dissimilar,” they write. “In managing implementation, it is crucial to identify the type of intervention that is being considered and plan accordingly.”

When looking at its IT investment as a problem-based or ‘ends driven’ implementation, management may have the following goals:

- Improve operations in such a way as to remove a current disadvantage of the firm against competitors;
- Stop the level of productivity from declining to a point in the future when it would become a competitive disadvantage;
- Remove barriers that are blocking new opportunities.

Examples of problem-based interventions cited by Peppard, Ward, and Daniel: “Integrating customer data to provide a single point of contact for customer enquiries; implementing an ERP system to remove reconciliation problems between production and finance; providing employee self-service applications via a portal to reduce administration and purchasing costs; and providing laptops [or tablets, smart phones] to mobile sales forces to ensure the accuracy of customer quotations.”

When it comes to innovation-based, or ‘ways and means’-driven interventions, management’s goals are more proactive, usually including:

- The exploitation of a new business opportunity;
- Making their company more competitive in an existing market by adding to the its core competencies using IT;
- Improving the way something is already done using IT;

- Using a new IT system to allow the company to do something it could not accomplish before.

The authors provide the following examples of innovation-based goals: “Creating an online sales channel to reach new customers; introducing vendor-managed inventory for key suppliers; allowing customers to undertake self-billing, deploying a data warehouse and analytics to automate operational decision making; and introducing mobile technologies for professionals to work online during client engagements.”

### Managing End Results

“IT benefits management” is a term coined by Peppard, Ward, and Daniel to refer to the process of organizing and managing so that potential benefits from the use of IT systems are actually realized. When managing toward IT benefits, the company’s goals become the central target, not the technology itself.

“The process of producing a benefits realization plan can be summed up as a series of questions that have to be answered in order to develop a robust business case for the investment and a viable change management plan to deliver the benefits,” they explain. “The questions are focused around organizational or business improvements and changes and *not* IT.”

Among the questions management should answer:

- Why do we have to improve?
- What improvements are necessary or are possible?

“These have to be agreed on by the key stakeholders and become investment objectives,” note the authors. Other questions include:

- What benefits will be realized by each stakeholder if the organization objectives are achieved?
- How can each benefit be measured?
- Who owns each of the benefits and will be accountable for its delivery?



“The benefit owner will be responsible for the value assigned to the benefit in the business case,” they write, adding that management must then ask, What changes are needed to achieve each benefit? “This is the key to realizing benefits through identifying explicit links between each of the benefits and required changes,” explain Peppard, Ward, and Daniel.

Finally, management must determine who will be responsible for ensuring each change is made successfully and how and when the changes can be made. Note the authors: “This requires an assessment of the organization’s and specific stakeholder group’s ability and capacity to make the changes.”

They point out that it is more than likely that no single individual will be able to address all these questions. Consequently, a key part of their implementation system is forming a Benefits Dependency Network (BDN) of individuals to provide the proper answer to each question. The network should include all key stakeholders in the IT investment project. “The BDN provides a framework for explicitly linking the overall investment objectives and the requisite benefits with the business changes which are necessary to deliver those benefits and the essential IT functionality to both drive and enable these changes to be made,” they write.

**Chief Executive Officer Michael J. Mulligan's ABG Print.com is a Manhattan-based printing company that uses digital technology to meet clients' time-sensitive demands and MIS to develop business strategies based on client behaviors. Here he shares some of the company's MIS applications:**

"At ABGPrint.com we use MIS to effectively pinpoint trends so as to respond rapidly to changes in the marketplace as business becomes more complex and demanding. Along these lines, we use MIS as a relational database that organizes and records the many processes within our business and allows us to track the cause and effect of decisions made.

"When planning the system, we designed a metrics template to identify key business indicators such as lead conversion rate, revenue improvement, profitability, time/profit ratio, etc. Organizing and analyzing this information with MIS allows us to see how behaviors such as follow-up calls, blogging, and automatic quotes affect overall growth.

"Because we consider the customer as the primary growth engine for our business, the goal is always to maximize the customer experience, and MIS helps us understand which behaviors are working and which aren't. By way of specific example, we have learned that our success rate on "web2lead" estimating increases by 38% when we follow up with a phone call within 10 minutes of the initial inquiry.

"MIS allows us to compare the success rate of phone conversations versus email correspondence and set realistic goals for improvement. If we want to increase sales growth in a certain sector, we inspect our communication with the client from inception to completion. It has become clear that if we set goals as behavioral objectives, monitor the communication, and scrub the data, we can drive positive outcomes. The metrics we are looking at along with the results of our business intelligence show us the areas for improvement.

“Another example of how MIS helps us maximize the customer experience is our follow-up discipline. With the goal of keeping customers loyal, we at ABG have developed a system for following up with customers after we make a sale. For instance, after a job is completed, we will follow up with the customer 24 hours later and survey their experience. Thirty days later, if we haven’t heard from them, we’ll reach out again and inquire about any upcoming needs they might have. After the 30-day mark is the 60-day mark and finally the 90-day mark.

“MIS alerts us to how much time has gone by since our last correspondence with the customer, and generates analytics about how the dynamics of our relationship correlated to revenue.”

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**Michael J. Mulligan** is President and Chief Executive Officer of ABG Print.com, New York, N.Y., a document printing and distribution company for business-to-business customers. The company’s website notes that “ABG empowers clients to complete their printing, binding, finishing, and delivery in as little as four hours, 24 hours a day.” Among its “clients and partners:” Deutsche Bank, Credit Suisse, JP Morgan, Morgan Stanley and MasterCard.

***“If we set goals as behavioral objectives,  
monitor the communication, and scrub  
the data, we can drive positive outcomes.”***

CHAPTER 5:

SALES FORCE AUTOMATION:  
APPLICATIONS, BARRIERS,  
SOLUTIONS

*“Active involvement by the sales team  
in the planning process will lead to much broader  
acceptance of the technology.”*

Using management information systems for customer relationship management (CRM) enables companies to employ data mining techniques that go beyond prospecting for potential new clients and extend to a variety of sales force automation (SFA) applications.

Despite its name, sales force automation is not simply a means to improve the workings of a company’s internal sales operations process, but also offers some real benefits from the customer’s perspective, as can be seen in the research article, “The Benefits of Sales Force Automation: A Customer’s Perspective,” by Othman Boujena, Wesley J. Johnston, and Dwight R. Merunka in the *Journal of Personal Selling and Sales Management*.

“It appeared that SFA affects the sales function on five main levels: salesperson productivity, information processing, communication effectiveness, perceived competence, and customer relationship quality,” explain Boujena, Johnston, and Merunka in discussing their review of existing SFA research.

A main objective of SFA applications is to improve the productivity of a salesperson’s day-to-day job aligned with increasing the efficiency of the overall sales team, and the authors’ research indicated that the systems do realize a number of benefits in those areas, including “reduction of errors common to manual sales processing, reduced support costs, improved closing rates, and increased average selling prices as a result of more accurate and timely pricing information.”

They found that SFA also improves productivity by allowing sales personnel to assist in the data mining process of locating prospects, developing leads, and categorizing clients through effective account profiling procedures. In addition, sales personnel gained experience in terms of collecting and analyzing relevant data useful in their daily selling routine, including information on existing product offerings from their own company and records pertaining to their existing clients’ buying patterns, as well as information about their competitors’ offerings and market objectives.

“Thanks to a centralized CRM database, SFA enable sales force-facilitated and faster access to a huge amount of information on products, customer records, competitive offers, and new leads,” note the researchers. “Therefore, salespeople can better inform the customer about product specifications and usage situations and more accurately fulfill customer needs, and that enables the company to offer more products and services and perform more appropriate customer data analysis.”

When preparing their sales presentations, sales personnel can use SFA to obtain detailed information on key prospects, reducing the time they need to prepare proposals, and increasing the effectiveness of their presentations. SFA makes providing follow-up information after a sales presentation easier as well.

“Salespeople who use technology can sift through customer data and focus on critical information, putting them in a better position to demonstrate customer interest and make the sale,” state Boujena, Johnston, and Merun-

ka. “For example, the salesperson can track customer records and then identify accounts that might be good prospects for cross-selling and up-selling efforts, as well as those that may no longer remain profitable.”

### **Effective Outreach**

Their research also revealed that SFA improved salespeople’s ability to communicate with customers, increasing their facility in responding quickly to customer requests and satisfying their needs. The data that SFA make available to salespeople enable them to prepare more effective presentations with respect to their firm’s product/service features and their advantages over competitors’ offerings, and allow them to provide customized solutions on very short notice.

According to Boujena, Johnston, and Merunka, “Firms that use SFA systems to initiate superior market-sensing and customer-linking capabilities are in a position to inform and guide internal processes responsible for creating customer value, as well as understand customer needs more easily across functions. The combined result is a more knowledgeable and competent sales force and support staff.”

Their study indicates that a customer’s perception of a salesperson’s competence is increased when that salesperson utilizes SFA since it helps one to be more knowledgeable about product and service categories, customer issues, and general industry information. Since SFA makes customer purchase and payment records readily available, it also gives sales personnel the opportunity to ask the appropriate questions with respect to customer problems and provide suitable solutions.

“Greater access to database knowledge held elsewhere in the sales organization can be crucial in helping the salesperson build customer trust and commitment, as well as ward off competitors,” note the authors.

Sales Force Automation also permits salespeople to provide added quality value to the customer relationship. Research by Boujena, Johnston, and Merunka indicates that SFA helps make sales individuals appear more dependable, likeable, and more honest in the eyes of the customer, thereby enhancing the level of trust the customer has in the salesperson.

According to the researchers, SFA enables sales personnel to “better communicate customer benefits more effectively through interactive sales presentations” and allows “the salesperson to keep commitments and enhance regular contacts with customers—increasing customer perceptions of the salesperson’s dependability.” And, they add, “SFA can also contribute to customer satisfaction by enhancing the salesperson’s ability to meet customer expectations.”

### **Benefit Quartet**

In the second stage of their research—qualitative field investigation focusing on the benefits of SFA from a customer perspective—the authors conducted semi-structured interviews with seven purchasing agents from various companies, collected and analyzed new data, and generated some interesting new findings. Based on the analysis of this qualitative data (as well as a further review of the existing literature) they unearthed “four major SFA perceived benefits: Salesperson professionalism, customer interaction frequency, responsiveness, and customer-salesperson relationship quality.”

The benefit *from the buyer’s view* that was mentioned most often was a perceived increase in professionalism on the part of sales personnel using SFA. Buyers stated that they believed SFA had a positive effect on salespersons’ behavior and even their appearance, and they believed that using SFA resulted in salespeople offering clearer and more effective presentations. “By providing access to large amounts of data, SFA enables sales representative to tailor their sales messages to each customer, a form of adaptive selling, or alter sales approaches across and during customer interactions,” state the researchers.

A second major benefit revealed through analysis of qualitative data was customer interaction frequency (CIF), which relates to building a business partnership through the effective communication of critical information. The research showed that SFA plays a role in allowing customers to be better informed and to make better purchasing decisions. “The resultant enhanced information role of the salesperson gives buyers tremendous help during the decision-making process, because, as organizational literature notes, uncertainty reduction is the most important challenge for decision makers such as buyers,” explain the study authors.

In addition, SFA allows sales representatives to better schedule their time and make appointments more effectively. By using SFA applications, they can call on buyers at the appropriate time intervals and be better prepared. “Calls from salespeople are better informed, so meetings become more structured and focused because the object of the call has already been communicated to the buyer (e.g., by email) and appropriate follow-ups ensue.”

Sales force automation also provides salespeople with the ability to better respond to customer requests, and the information and communication abilities of the technology increase the salesperson’s responsiveness to customer needs. Boujena, Johnston, and Merunka point out that the data indicate “it is important for buyers to be able to reach the salesperson whenever needed, which highlights the concept of availability, or the presence of the salesperson for problem solving during the business cycle.”

Furthermore, SFA provides salespeople with the opportunity to improve their ability to manage their territory. The automation of administrative tasks leads to more effective coverage of existing and potential clients.

### **Relationship Quality**

There was a fourth benefit to buyers from SFA indicated by the research data, one that customers believed followed as a result of the increased level of salesperson professionalism, interaction and responsiveness: A higher level of customer-salesperson relationship quality. In turn, several other benefits followed from this perceived relationship enhancement: Customers appeared to have more trust in the salesperson, there was a higher level of commitment between customers and salesperson, and an overall greater level of customer satisfaction was noted.

“By enhancing salesperson professionalism, interaction frequency, and responsiveness, SFA leads to a more customer-oriented selling, which helps to build and develop better customer relationships,” conclude Boujena, Johnston, and Merunka. In addition, a satisfied customer is more likely to recommend the sales professional to other buyers in his or her own network.

The results of this research study imply that SFA can go far beyond automating sales tasks and archiving information; it can provide opportuni-



ties to increase levels of customer satisfaction, build customer loyalty, and provide the means to establish an expanded customer base. The researchers suggest that the results of their study should encourage management not to focus solely on measuring the productivity of salespeople when justifying an investment in SFA, but also to view it as a tool for increasing satisfaction among existing clients and potential customers, and for building better long-term customer-sales personnel relationships through improved communications, trust, and responsiveness.

### **SFA Barriers**

Although sales force automation is capable of greatly improving efficiency and the effectiveness of sales-related activities, 55%-75% of SFA projects fail, according to findings in the research article, "Impediments to Sales Force Automation," by Earl D. Honeycutt Jr., Tanya Thelen, Shawn T. Thelen, and Sharon K. Hodge. In the research study, which appeared in the *Journal of Industrial Marketing Management*, the authors identified and explained the barriers that often prevent successful SFA implementation, categorizing the impediments under seven headings:

- Planning
- Communicating
- Evaluating
- Perceived benefits/costs tradeoff by salespeople
- Time and effort
- Newly defined responsibilities
- Lost independence.

Sales force automation success can be waylaid at the very beginning if planning activities are not carried out properly. According to the researchers, a company seeking to install an SFA system should begin by identifying specific business problems that need to be solved and then finding and applying the proper technology to solve the problems. Specific goals can include

better communications with clients, faster response time with respect to service, increasing sales volume, or better coverage of sales territory.

While this would seem to be a logical first step, the researchers found that it is far from the norm. “Given the cost and turbulence generated by SFA adoption....it is amazing that firms fail to develop useful SFA goals or clearly communicate a purpose for implementing SFA,” state Honeycutt, Thelen and Hodge. Some managers said that they just wanted to get “as many things automated as possible.” Others simply felt that it was chancier not to automate than to apply the new technology. With such generalized goals, it “makes it nearly impossible to plan, communicate, and evaluate the benefits of an SFA effort,” explain the researchers.

Simply establishing specific goals for SFA is not enough, however. Those goals must be accurate and grounded in reality via two-way communications throughout the organization. And it is particularly important that everyone understand what company and sales force efforts are going to be needed to bring these goals to fruition.

According to the researchers, “When salespeople do not understand the benefits offered by new technology, they only see an added responsibility or burden....This can be further exacerbated by managers who adopt the position that a salesperson’s quota should be increased after implementing SFA in order to pay for that investment.”

It is also paramount to set accurate expectations, through two-way communication, regarding what the new technology can (and cannot) deliver and what company-wide and sales force efforts must be undertaken to make it work as desired. Doing so means the organization’s investment and effort does not end with the purchase of equipment and software. “Support mechanisms must function during the installation stage, *and throughout the life of the project*, which is the point where expectations clash with reality,” state the researchers.

One common, but often overlooked, barrier to successful implementation occurs when the costs and time required to train the sales team are grossly underestimated. Salespeople will often require more training and technical support than those in other areas of the company. Another common error is

that management will play up the features of the new system (for example, the number of potential applications) instead of highlighting the specific benefits to the salespeople themselves (e.g., the ability to share inventory levels on site with the customer or check the status of a job delivery remotely.)

### **Missing Metrics**

Just as the lack of specific goals can be an impediment to a successful SFA implementation, the absence of clear metrics can also be a barrier. It is difficult to determine the success of SFA if no metrics have been developed to determine exactly what that success comprises. It is not surprising that this is often a problem, since research results have demonstrated that management often fails to have any clear and specific goals for the SFA implementation. This management failure can be particularly discouraging to the sales force with respect to having a motivation to perform, even when salespeople have a positive outlook about SFA technology in general.

“There is evidence that a significant number of companies do not develop tools—at the company, department, or individual salesperson levels—to track SFA progress,” write the study authors. “This is because it is difficult to quantify and establish measurement mechanisms for intangible ‘soft’ benefits, such as better access to data or improved communication. The lack of well-defined goals complicates the evaluation process because the sales force is unclear about what is to be achieved. This quandary underscores the importance of initial planning and its impact on later stages.”

Another issue making the evaluation of an SFA a complicated matter is that it is difficult for managers to estimate a financial return on investment (ROI) without accurate program costs. While the initial upfront costs of purchasing hardware and software are apparent, the indirect costs of training and system support, operations maintenance, system upgrades, sales downtime and technological obsolescence, which together can account for a large part of the system investment, are often much harder to track.

It is not uncommon for salespeople to question the benefits of SFA—or, for that matter, of virtually any new technological “improvement” to the way in which they are accustomed to working. Quite often they are concerned with the large amount of time and effort they feel they will have to invest in

learning the systems in order to attain promised goals and benefits that have not been clearly determined and/or communicated.

When it comes to implementing new products or services, the researchers make an important distinction between sales personnel and other employees. “Due to the nature of their job, salespeople are accustomed to assessing the features, advantages, and benefits of a new product or service,” they write. “There is evidence, however, that organizations fail to convince or ‘sell’ salespeople on the advantages and benefits of the new technologies, assuming that it is sufficient to simply demonstrate superior features.”

### **Time and Effort**

The time and effort required for the sales team to master the new system can themselves be a barrier, even when the advantages and benefits of the SFA project are defined and have been clearly communicated. “For salespeople with little IT experience, the non-material cost, i.e., time and effort to learn, may appear insurmountable. Based upon the type of technology covered by a specific SFA system, *attaining proficiency may require over 100 hours of salesperson training time,*” note the researchers. “This is a substantial investment—100 hours away from serving customers and meeting sales quotas—for a salesperson who is already skeptical of SFA technology.”

As noted, the learning time will quite often be viewed as a distraction from serving existing customers, acquiring new clients, and meeting sales quotas—and, for salespeople, that means they feel they are being required to make their own personal “investment” in a system they may not have wanted in the first place via their lost revenue opportunities. This ‘distraction syndrome’ is further compounded by the fact that there is often not enough training and support provided by the organization to help salespeople get up to speed with the SFA system quickly or to learn how to use it fully enough to derive all its potential benefits.

While the primary goal of an SFA should be to free salespeople from administrative tasks and focus their energy on effective selling, quite often an SFA imposes new, and often poorly defined responsibilities on the sales staff—responsibilities which they may see as mundane and non-productive. The researchers found that the majority of the findings in the literature

indicate that, somewhat counter-intuitively, sales force automation tools do not actually increase selling time.

“Although SFA allowed salespeople to become more efficient at administrative tasks, the time saved was not redirected to selling,” they write. “Instead, time was usurped by new administrative and analytical tasks that were created by SFA technology. While some salespeople felt that SFA decreased their workloads, a larger percentage reported a workload increase.” Many sales representatives found that their job responsibilities changed with the introduction of SFA and that their new responsibilities were not clearly understood or defined. This often led to a feeling of anxiety and uneasiness that did little to improve productivity.

### **Lost Independence**

Although graphic communications customers technically are an intangible asset of the company itself, most salespeople feel they have earned the customer's loyalty and dutifully guard their contact information from their peers, and sometimes from their employer as well. Their resistance to sharing this information can result in yet another impediment to a successful SFA installation.

Successful salespeople spend years developing relationships with their clients and build on these relationships to form a successful sales practice where a major portion or all of their monetary rewards are based upon commission. A salesperson can interpret any contact information sharing as a loss of power and, potentially, as a loss of personal earnings and company status.

“Under this scenario, salespeople may believe that customers and sales leads “belong” to them rather than the organization and remain theirs even when they change employers,” write the study authors. “Salespeople may also view in-depth customer knowledge to constitute value to the company and competitive advantage over peers. SFA adoption can threaten this environment by forcing salespeople to provide detailed current and potential customer information, via a database, that is available to anyone in the organization.”

An SFA system usually allows sales managers to view detailed reports on each account that may contain sensitive customer information. Salespeople will commonly view this as a threat to their ability to maintain control of the account and lead them to fear that if others have the same access to this information, they become less valuable to the company because the account could just as easily be served by some other staff person or even by automated customer contact/follow-up.

These feelings of loss of power or control are not totally unfounded, note the researchers, writing: "It is rational for a salesperson to fear being replaced by technology. Certain SFA technologies can replace salespeople and reduce the number of sales positions. This is true at firms with business models that are designed for a non-personal communication approach via email, Internet auction, or electronic data interchange."

SFA applications are also interpreted by some salespeople as some sort of "Big Brother" counter-force to sales independence, making them feel as though they are being "watched" throughout their daily routines. An SFA monitoring feature only allows management to measure the use of the technology, but it can easily be interpreted by salespeople as serving primarily as tool to monitor and control them.

The researchers point out that a salesperson's perceptions are generally colored by how he or she views the technology application itself. If a salesperson believes it is being installed to enhance his selling performance, generating a win-win situation, he will likely accept it. The application will be met with resistance, however, if he feels the technology will be used to make his job harder to do, less important, or, in extreme cases, make his position obsolete.

"In order to reduce anxiety, firms should be transparent with salespeople about the purpose of SFA adoption," the study authors advise. "If firms introduce a new SFA tool and this is followed by a reduction in the sales force, the next round of SFA will be met with greater resistance. SFA is a continuous process; therefore, firms can increase the likelihood of success if the sales force associates SFA adoption with positive results."

## SFA Failures

The SFA success barriers noted above (plus some additional impediments) were grouped into four general categories in the article, “Why is My Sales Force Automation System Failing?” by Robert M. Barker, Stephan F. Gohmann, Jeian Guan, and David J. Faulds, which appeared in the Kelley School of Business journal, *Business Horizons*:

- Disruption of Established Sales Routines
- The “Big Brother” Effect
- Different Expectations Between Sales Management and Sales Staff
- Perceived Lack of Commitment by Senior Management.

## Changing Things Up

Barker, Gohmann, Guan, and Faulds agree that the disruption of established sales routines and practices acted as a barrier to the effective implementation of SFA. They also found that the amount of experience a salesperson had and his or her age were two factors that helped add to the amount of resistance generated by a particular salesperson. They found that the more experience a salesperson had, the more ingrained selling behavior had become.

More experienced salespeople were less likely to change their selling habits simply because they have worked so well for them in the past. In fact, these salespeople often feel that their value to the company is actually based upon their unique set of selling experiences gathered over time. For this group, replacing their proven selling habits with untested ones is hard to accept.

Furthermore, the literature shows that in comparison to younger, less experienced salespeople, veterans have a stronger negative feeling about information systems applications overall, and tend to resist their use in the sales process. Some may also feel that it is too late for them to change, that an “old dog cannot learn new tricks” and probably should not have to try to.

“From a human capital perspective, older salespeople will be less likely to change their sales routines, since they will not receive the benefits of this

investment over as long a period of time as will their younger coworkers,” they write.

The authors also believe that at the outset, when planning to purchase an SFA, management must make sure that the system has enough flexibility to work within the boundaries of the established sales practices of its sales personnel—and in particular, those of its veterans. This point further supports the idea that sales personnel should be included in the planning stage of the implementation process and that planning efforts should focus on the practical benefits of an SFA system to the company’s current sales team, not just to the system’s “bells and whistles”-type features that may or may not be introduced to employees in the future.

Encouraging participation from its sales team in the planning project, management should welcome suggestions as to which capabilities should be included in the system. In this respect, active involvement by the sales team in the planning process will lead to a much broader acceptance of the technology application, since more voices will be heard and there will likely be multiple proponents of the system during the process.

Barker, Gohmann, Guan, and Faulds are also of the opinion that managers could encourage system adoption by the sales force if they were to offer incentives to those who use the technology most effectively. They suggest that any incentives should be something that the salespeople would value, and that would help demonstrate the strong commitment management has to the success of the system as well as to the success of its employees.

### **Countering ‘Big Brother’**

Reinforcing what the researchers in the previously cited study posited, Barker, Gohmann, Guan, and Faulds indicate that the sales force will view as obtrusive the idea that management can gain access to real-time information about their sales contacts and sales activities, even if this is not a reality. “To counteract these negative perceptions, management should clearly communicate how real-time access to information will be used, and explain the benefits that the organization will reap from implementing SFA,” they explain. “It should also specify, prior to implementation, exactly how and when the reporting features of the SFA system will be utilized.”



Barker, Gohmann, Guan, and Faulds also suggest that management let salespeople know that if an individual salesperson's results remain within accepted parameters, then their sales activity will be monitored on a periodic basis only, not every day or even every week. In addition, the researchers suggest offering incentives if sales representatives reach pre-established sales levels when they are utilizing the SFA system. They also believe that sales managers should explain that the goal of information gathered through the SFA system will be used only to assist the sales team in its sales efforts.

Furthermore, any new "policies and procedures implemented in conjunction with SFA should reflect input from the sales force, and be revised as the system evolves. It is vital that management spell out to the letter policies regarding the transfer of sales leads, handling of new accounts and prospects, and compensation issues. Clarifying these issues in advance and responding to the sales force's concerns ought to alleviate their anxiety, and thus build more confidence in the SFA system," the researchers state.

### **Aligning Expectations**

In general, management will usually underestimate the amount of time and resources necessary to get an SFA system implemented and utilized by the sales force while overestimating its performance benefits. When they conducted a series of in-depth interviews with various business units that had recently implemented an SFA system, Barker, Gohmann, Guan, and Faulds found significant differences between the goals and expectations of company managers and the expectations of salespeople. In broad terms, while managers focused more on using the system to gather data on administrative and sales activities, salespeople were more interested with having system flexibility and better information regarding sales leads.

According to the researchers, "Differences between management and the sales force regarding cost/benefit expectations, as well as perceived system usefulness, result in differing acceptance behaviors. Ultimately, these differences may lead to a lack of understanding by management as to the reluctance of the sales force to use the system."

The researchers also found that sales individuals from the SFA vendor company may often downplay the costs of an SFA system in their presentations to management, while highlighting the administrative benefits to management; at the same time, they will emphasize the sales lead-generating benefits to the sales force.

It is not uncommon, therefore, for management to underestimate the costs of implementing and fully utilizing an SFA system, and it is important that executives understand the true costs involved with the installation of an SFA system and allow sufficient time for planning, implementation, shake-down, and system upgrades and revisions.

“As with any change in a business process, SFA will require a period of adjustment for personnel whose routines have been affected. Research in information acceptance shows that if workers are given time to appreciate the benefits of the system, their likelihood of acceptance increases,” note the researchers.

They go on to explain that managers must realize that economic returns on an SFA expenditure may sometimes not be realized until a year after the initial investment. Unlike other MIS investments, such as production or commerce technology, SFA systems take a longer amount of time to get up to speed and staff use—and returns will begin to show in areas such as improved system use and better customer service.

In addition to reiterating the direct goals of the system, it is important for management to reassure salespeople that the SFA system will provide outstanding long-term results by ultimately increasing their sales success.

To help in this regard, the researchers suggest that management “create an environment in which salespeople can communicate best practices for using the system, and reward users who do so. When there are problems with the system, information about the problem and potential solutions should be provided immediately to users through organizational blogs or website pages [or social media]. Managers need to keep salespeople apprised of how the system is affecting the bottom line, and identify salespeople who are using the system successfully.”

### **Total Commitment**

When management is advised to provide the resources needed to install an SFA system effectively, it means it must be willing to do more than free up the funds to obtain the system and the money and time to train employees to use it. It must often sell the need for such a system to the many individuals throughout the organization who will be affected by its implementation. The absence of such communications reinforcement will often be misinterpreted by the salespeople as a lack of commitment from management with respect to the project, ultimately leading to a “why bother?”—“If management doesn’t really care, why should we?”—mindset amongst sales staff members.

“Given the enterprise nature of an SFA system, it must be integrated across several organizational boundaries,” write the researchers. “As a result, users other than the sales force—such as manufacturing or warehousing—may also experience a change in their processes. For these users, the technology confers limited benefits, but added costs. If senior management does not champion the system to these user groups, then these users might not fully support the system, leading to a reduction in its level of realized functionality.”

Barker, Gohmann, Guan, and Faulds stress that an internal marketing effort must be part of a senior management commitment to the program. This effort must effectively communicate clear long-term goals for the system that have been jointly established by sales management and the sales force.

“Managers should be vocal champions of the effort, publicizing features and functionality through organizational communication mechanisms. They can also offer incentives to those salespeople who most effectively utilize the system, and reward top performers,” they write. “In addition, managers should participate in training and orientation sessions to demonstrate their commitment to the importance of the system to the organization.”

### **Building Trust**

Managers who generate an atmosphere of trust with their salespeople will often have more success in facilitating a change such as the introduction of an SFA system. In their article, “Navigating Through Rough Waters: The Importance of Trust in Managing Sales Representative in Times of Change,”

Kevin M. McNeilly and Marian B. Lawson focus on the impact of sales representatives' relationships with their managers during periods of transition.

The results of their study, which were published in the *Journal of Industrial Marketing Management*, show that sales representatives who have a higher level of trust in the sales manager will be more open in accepting change, particularly over the long term.

McNeilly and Lawson point out that "sales managers' behaviors influence the representatives' trust, and that this trust affects the representatives' attitudes about organizational changes." Based on this observation, they encourage those with responsibility for re-engineering any practices affecting the sales process to "respect the relationships that managers have established with their representatives," noting that "organizational changes should be seen as opportunities to build upon, rather than disrupt, the trust of the sales force."

The researchers set up their study on three basic premises about sales representatives and managers:

- "Reps who have more trust in their sales managers are more likely to have confidence in their unit's ability to implement organizational change programs."
- "Reps who have more trust in their sales managers are more likely to expect a favorable outcome from organizational change programs in the short term."
- "Reps who have more trust in their sales managers are more likely to expect a favorable outcome from organizational change programs in the long term."

And they found that "sales managers must establish themselves as 'familiar and credible' sources" if they are to establish and maintain their sales representatives' trust. They also discovered that when an organizational change involves new processes or allocations of resources, fairness issues assume significantly greater importance, and morale can be negatively affected if some sales representatives believe that they have been treated unfairly. "Whether

it is real or not, this situation can cause frustration to other reps and reduce customers' loyalty to the company.”

McNeilly and Lawson note that familiarity with the employee and his or her efforts and achievements were also factors in the manager-employee trust equation. “Representatives must see managerial input, either about performance reviews or about the effects of organizational changes, as being grounded on a credible understanding of them and their work.” For example, the researchers found that the amount of time a sales manager spent with his or her sales teams, even to the point of accompanying them on sales calls, had a profound impact on the positive nature of their relationship.

Salespeople represent a particularly challenging group when implementing any change because they generally have a strong yearning for independence and are powerfully motivated to achieve success on their own. Their power and their earnings are built on achievement, not effort, and they are reluctant to stick with anything that doesn't yield sufficient results, whether it's an employer, a customer, or a new process or method.

One way to help ease their acceptance of new ideas or approaches is to involve them in the planning and implementation process, being mindful of the amount of time they can “spare” away from traditional methods while learning new ones, and tailoring the SFA system to address their concerns as much as possible. In short, sales managers should build trust and then build on that trust with their sales team, as well as every member of the organization who will be affected by the change, throughout every phase of the SFA implementation process.

**NAPL Vice President and Senior Consultant Mike Philie provides sales management and strategic consulting services to graphic communications companies of every size and in every market. Here he offers his view of the importance of sales force automation:**

“For printing companies working through the structural changes of the graphic communications industry, placing an emphasis on the sales team, the sales strategy, and the tools they rely on to carry out the mission have never been more important. No longer can they leave it to chance that the sales reps will find work that is profitable, sustainable, and can help an organization meet its growing needs.

“One way to help foster success in this environment is to focus on the selling activities that take place upstream from the quoting and negotiating stages of the deal. The preferred way to lead and manage that process is through an SFA or CRM system. Used effectively these programs can help identify, monitor, and report on the activities of the sales team. The structure of such a system allows for best practices to be established, practiced and tracked to help identify ideal prospects, set strategy, and minimize the sales cycle time.

“At the same time, the challenges involved in introducing and implementing an SFA/CRM system can be many. Some key issues involve transitioning the sales team, primarily the legacy reps, from their independent nature and bringing accountability into play—particularly during a time when new business is harder to come by and existing client budgets have eroded. Conversations about trust, too much computer work, and someone looking over their shoulder dominate the landscape.

“The best thing a management team can do to implement these tools is to build the system into the everyday communication channels of the business. Use the system as a central part of the business-building strategy. Too often I see companies force the reps to use the application, but there remains little if any feedback

on the data collected or used for strategy implementation. These are company-wide business building tools, not just for use by the sales team.

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**Mike Philie** is a Vice President and Senior Consultant in the National Association for Printing Leadership Consulting Group. Specializing in sales and sales management training, as well as sales strategy development, he has broad experience in on-site consulting at printing companies of every size and in every industry segment. He is also a frequent speaker at industry conferences and has participated in numerous printing seminars and webinars.

***“The structure of such a system  
allows for best practices to be  
established, practiced, and tracked.”***

## CHAPTER 6:

# USING MIS TO BUILD STRONG GLOBAL STRATEGIC ALLIANCES

*“The ability to achieve effective communication patterns is essential to the success of virtual team functioning in global installations.”*

The formation of global alliances among companies in the graphic communications industry has become an important strategy as industry members seek to grow and prosper in a time of fundamental structural change. The establishment of effective management information and communications systems can play a major role in the effort. In my own research, published in the *Visual Communications Journal* in the article, “Factors for Successful Strategic Alliances Among Midsize Commercial Printing Companies,” I found effective information technology communications systems to be one of six major factors in the successful formation of alliances. The remaining five: Trust/participant character, senior management support, ability to meet performance expectations, clear goals, and flexibility.

In his article entitled, “Success Factors for Implementing Global Information Systems,” Markus Biehl discusses the challenges associated with the



implementation of global information systems (GIS), explaining: “A GIS must interface with intrafirm and interfirm software in several ways:

- “Providing an IT backbone in all countries in which the firm and its supply chain partners do business;
- “Ensuring the exchange of highly structured information worldwide, even as local customization is allowed in each country;
- “Managing a vast amount of information, including border procedures, duties, tariffs, and exchange rates; and
- “Providing optimization techniques that facilitate the global logistics network.”

These challenges become more intensified when there are cultural and language differences between companies in different countries and where legal issues, technology, and vendor support vary. According to Biehl, when a project manager is not familiar with the demands of implementing a global IT system, what would be a simple domestic implementation project can turn into a nightmare when going global.

The goal of Biehl’s study, published in the magazine, *Communications of the ACM*, was to identify the key factors for successfully implementing a global information system. Not surprisingly, his review of the literature revealed a number of factors that we have seen previously in relation to other system installations, including: top management support, well-understood business processes, building cross-functional teams and establishing good cross-functional cooperation, good communications, clear project goals, and effective management of employees who are affected by the change.

He then took his research effort to Toronto, Canada, where he looking for the presence of GIS success factors (and absence of factors in failed GIS projects) at 16 major implementation projects conducted by eight multinational firms with operations in that city. His findings validated most of the factors identified in the literature (and listed above), and delved deeper into some of them to uncover additional influences on project success or failure.

## Perception and Reality

He discovered, for example, that there was often a discrepancy between managers' responses to his questions about the projects and their actual practices. While all 16 companies cited the need for top management support, for example, actual support was not evident in companies where the projects failed. "In six of the eight failed projects, top management did not perceive the task as urgent," says Biehl. "Moreover, in four of the unsuccessful projects, top management did not understand the project's intricacies and initially withheld approval when it was proposed.

"These factors indicate that even though top management claimed to support the project—that support did not really exist," he continues. "In these cases top management did not make the project a top priority. This conjecture was supported by the fact that most of the eight failed projects were considered not disruptive or urgent during implementation, further leading management to conclude that no special attention was needed."

Lack of top management support took a number of different forms. In one firm, management was less than enthusiastic to supply all the financial resources needed for the project. In another, poor leadership led to a delay in the implementation phase and the project had to be reassigned to another group within the firm. And in a third failed project, management had a poor understanding of the project's goals and eventually halted it in mid-stream due to what were judged to be unsatisfactory results.

Biehl's research also found that there was not only a need to involve a significant number of employees throughout the firm, as well as external partners in the implementation of a system, but there was a need to bring these individuals on early in the process and let them take part in the actual system design. "Managers of four unsuccessful projects admitted that, in hindsight, they had neglected three critical factors: Not using cross-functional teams; not engaging in cross-functional communication; and not bringing end users on board early enough during the project," writes Biehl. "Consequently, these implementations were painful, with only moderately successful results and low user acceptance. Most were not completed on time or within their planned budgets."

Beyond the need for top management support and detailed planning with user input, Biehl found that there must also be a strong element of flexibility in the GIS implementation process. In most global system implementations, things will not go as expected, he explains, noting that “despite the planning, the managers of successful projects had to address many of the same hurdles as managers of unsuccessful projects, including tight constraints on time and resources, technical glitches, and end-user training.

“What set them apart,” he continues, “was that *they had expected* the projects would be disruptive to their firms’ operations and that difficulty would result. Due to detailed up-front planning they were able to flexibly respond to the situations and complete the projects successfully. Six of the successful projects also remained largely within their planned timeframes and budgets.”

Many other issues that can complicate the GIS implementation underscore the importance of remaining flexible and expecting the unexpected, among them: the need to exchange data while allowing for regional customization, the use of different accounting policies and requirements of varying taxation laws, and the problems inherent in trying to deal with different languages and customs.

“Unlike local IS implementations, recognizing the need for more resources and cross-departmental involvement alone does not ensure successful GIS implementation,” cautions Biehl. “Detailed planning, flexibility during implementation, and competent leadership are much more crucial for implementing a global IS than for implementing a local IS.”

### **Successful Leadership**

Guidelines for successful leadership of a global information system installation can be found in a study by Timothy Kayworth and Dorothy Leinder that focused on success factors for any type of virtual team effort. While their study, entitled, “The Global Virtual Manager: A Prescription for Success,” was not GIS specific, many of the challenges and success factors they discuss in the report are applicable to a global implementation and very supportive of Biehl’s findings.

To identify the critical success factors of the management of a global virtual team, Kayworth and Leinder focused on the issues and challenges faced by a group of 12 culturally diverse global teams whose participants came from Europe, Mexico, and the United States. Their research findings indicate that global virtual teams need to address challenges in four key areas: Communication, culture, technology, and project management.

“The complexities of virtual team environments (e.g., time, distance, culture) may place a significant strain on the ability of team members to frame issues, achieve mutual levels of understanding, and reach consensus on key decisions,” write Kayworth and Leinder. “Consequently, the ability to achieve effective communication patterns is essential to the success of virtual team functioning.”

Their analysis of team member comments led to the development of several recommended communication success factors:

- Virtual team members should continually engage in communications and should use a wide variety of computer-mediated systems. Feedback from team leaders is essential.
- Team leaders should establish “ground rules” for engagement that spell out exactly how often and in what manner team members should communicate with each other.
- Face-to-face meetings should be held as often as possible, either in person or through video conferencing. As Kayworth and Leinder explain, “Research suggests that rich face-to-face interaction can facilitate communication through building team trust and enabling members to exchange valuable social, emotional, and contextual information. Getting to know one’s virtual team peers is vitally important to subsequent team member communication effectiveness.”

Communication issues are also exacerbated by cultural factors, leading to what the researchers refer to as “communication distortion.” In a global installation project, these can include differences in language, ethnicity, nationality, religion, and world views in general. In addition, miscommunica-

tion can arise when companies in a virtual team alliance have distinct organizational cultures with different customs, values, and operational norms.

“Regardless of the source, the fact remains that ‘cultural factors’ may lead to information distortion and various instances of miscommunication,” write the study authors. “To offset these problems, it is vitally important to undertake a strategy to build awareness of cultural distinctions among team members. This could be accomplished through various team-building exercises... as well as through more formal training methods.”

Technology also plays a role in the effectiveness of GIS project communications. In the research by Kayworth and Leinder, a number of teams being studied used multiple computer-mediated systems to handle a wide range of communication challenges. They cited one example of the importance of a strong communication channel that involved work being done on a critical design issue for a software project where there was a “need for high group interaction, immediacy of feedback, as well as the need to view others’ comments in a synchronous manner.”

### **Management Quality**

Finally, Kayworth and Leinder found that the quality of project management (i.e., team leadership) was a critical factor in the success of a virtual team project, particularly in light of the complex nature of virtual team formation. Many comments made by members of various teams during the research suggested that the quality of project management had a profound effect on a project’s success or failure.

“First, effective team leaders were able to set goals for individual team members and to provide constant feedback regarding performance relative to these goals,” write the researchers. “Second, effective team leaders were able to engage in activities to build cohesiveness among team members. (Some team leaders incorporated their sense of humor or were able to share personal aspects of their lives in order to get to know team members better.)

“A third dimension of effective project management was demonstrated by the leader’s degree of flexibility and empathy expressed towards other team members,” they continue. “And, finally, virtual team designers should seek virtual team leaders with high degrees of awareness towards other cultures. Team leaders with a variety of work and personal experience in other cultures will potentially have a greater degree of awareness regarding the potential for cultural biases that may lead to information distortion and miscommunications.”

Kayworth and Leinder concluded that the more “culturally aware” a manager of a virtual team was, the better he or she would be able to deal with culturally based team issues in a responsible and effective manner.

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**Dean Michael R. Cunningham, Ph.D., of San Diego State University shares his experiences in forming global alliances during his leadership of Cunningham Graphics International, a highly successful multinational graphics communications company:**

"In 1989, I founded Cunningham Graphics International (CGII). The formation of effective global alliances was a critical factor in order for the company to be competitive as a print and media solutions provider in financial and commercial industries. A key element of our success in forming these alliances was the building of an effective IT communications system. Within a few years of my taking the company public on NASDAQ in 1998, we had operations in seven countries and employed more than 1500 people—a result of being able to have many of our alliance members join our parent company.

"We understood from the beginning that developing an effective global information system would present a number of challenges, including the geographical distance between companies, language differences, cultural customs, and trade custom variations. Additionally, due to the nature of our business, we realized that speed and complete accuracy were also critical to our success.

"I believe there were four major components in the building of our successful global IT system: Having the top management of each organization express a sense of urgency and provide a strong commitment to the project; having the right team in place; establishing clear goals and effective communications; and patience.

"The leaders of each company understood the urgency of having an effective IT system and made it a priority. This priority was expressed through the involvement of members throughout each level of each organization and the availability of needed financial resources—without resistance on the part of top management.

“The right team was in put in place for this mission. We built the team with members on all levels throughout the network alliance. It was clear to them that this mission was a priority.

“Thirdly, clear goals for our system were established and effectively communicated throughout the network. Consensus on the goals for the IT system were established before implementation began and we worked hard to communicate these goals throughout all levels of the alliance network. We worked diligently to accomplish each milestone in a logical order toward completion of the project.

“And, as business veterans, we realized everything might not go exactly to plan and that there would be unexpected barriers to the implementation process of our international IT system. We decided early on that we would rise above each and every unexpected challenge and not let any of them block the realization of our vision—emerging as a leading force in international print and media solutions for financial and commercial industries.”

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**Michael R. Cunningham, Ph.D.**, is Dean of the College of Business Administration at San Diego State University, where he has taught management courses since 2005 and as served as a member of the College of Business Advisory Board since 2006. He previously taught at Cal Poly San Luis Obispo and New York University. Dr. Cunningham earned his Ph.D. and Master's degrees from New York University and earned his undergraduate degree in business administration from the University of Massachusetts Amherst.

Prior to his university-based work, he was the Founder, Chairman, and Chief Executive Officer of Cunningham Graphics International, a company he built from 11 employees to more than 1,500 in 12 years. The company was taken public and listed on the NASDAQ stock exchange in 1998, and was purchased by ADP in 2000.

***“We built the team with members  
on all levels throughout the network  
alliance. It was clear to them that  
this mission was a priority.”***





## CHAPTER 7:

# ADDRESSING THE CHALLENGES OF MIS SECURITY MANAGEMENT

*“Information security policies need to clearly delineate the responsibilities of every one in the organization to protect information.”*

While information technology systems can bring many benefits to organizational effectiveness and even profitability, whether as a management information system, enterprise resource planning system, sales force automation, or global information system, they also bring one potential negative: the security danger inherent in any system open to use by multiple users in multiple situations.

The multitude of challenges faced by IT managers and any company executive or manager responsible for some or all aspects of system security are discussed by researchers Rodrigo Werlinger, Kirstie Hawkey, and Konstantin Beznosov in their study, “An Integrated View of Human, Organizational, and Technological Challenges of IT Security Management.”

The research team used qualitative methods to understand how organizations adopted the best security practices with respect to IT systems. They gathered their data through interviews with 36 security practitioners from 17 different organizations, including representatives of the academic world, government, and private businesses.

In addition to validating and extending the results of other studies, their work provides an integrated framework that classifies the challenges found by IT security practitioners. This framework includes three major categories: Human, organizational, and technological factors.

### **Human Factors**

Within the category of human factors, the authors grouped their findings in three subset categories: Lack of security training, lack of security culture, and communication of security issues.

Security training issues were a common factor among participant organizations. “Specifically, it was found to be difficult to implement security controls when people do not have enough orientation or education about best IT security practices,” state the authors. “Both lack of security culture and training influenced the perception of risks that stakeholders have within the organization.”

The absence of a security culture made it particularly hard to change the existing practices of employees, which made it difficult to safeguard data. “For example, several employees might use the same account to access one system. In other cases, employees considered their privileges to access data as a status symbol and resisted the loss of privileges as a result of organizational changes,” explain Werlinger, Hawkey, and Beznosov.

In addition, the communication of security issues was ineffective whenever the goals of the security system were not understood by the employees. “Some thought that employees must understand the goals of the security controls without feeling that they have to blindly follow orders from the IT security group,” they write. “Communication was found to be particularly difficult when stakeholders do not hold a common view of risks.”

## Organizational Factors

In terms of organizational factors, data findings were categorized into the following extensive list of subsets: Risk estimation, open environments and academic freedom, restricted budget, security as a second priority, tight schedules, business relationships with other organizations, distribution of IT responsibilities, access control to sensitive data, size of the organization, and top management support.

“Risk estimation was mentioned in several interviews. Participants found it difficult to assess both the potential consequences if the risks were not mitigated, as well as the success of mitigation controls,” explain Werlinger, Hawkey, and Beznosov. “Stakeholders were said to require security training and experience before they can estimate risks, which made it necessary for security practitioners to try to effectively communicate potential losses for the organization.”

In the academic applications, research participants saw an open academic environment as another challenge to security. The fact that professors and students were used to working in an atmosphere of academic freedom and a sense of collegial trust posed a challenge to implementing technical solutions that could counteract security compromises in colleges and universities.

Budgetary restrictions for security programs were cited by research participants as another barrier to effective security controls. When individuals do not recognize the need for security, it becomes difficult to obtain the necessary funding for it.

There was also the problem of organizations not taking security seriously enough or putting it high enough on their priority lists. As the study authors explain, “Security may be a relatively low priority for some organizations. Participants from non-academic organizations discussed the trade-off between security and business processes. This trade-off was reflected in specific situations where our participants had to either relax security policies or justify the application of security controls.

“One participant described how the application of security patches that decreased the performance of certain applications triggered a conflict between IT security people and internal users,” they continue. “A lack of priority for

security may also make organizations overlook the need for enforcing security controls when they hire services externally. If security is not part of the big picture, external workers might not be made aware of or trained about the security controls in the organization.”

Even when priority was not a problem, finding time to attend to security issues was. In fact, no matter how much time was allocated for project planning, selection, and installation, it never seemed to be enough, and tight schedules were viewed as another possible barrier to effective security solutions. When other business priorities lead to time constraints, human error may result and this could make organizations more likely to experience security breaches.

Werlinger, Hawkey, and Beznosov also identified interactions with outside entities as having potential to compromise security, writing, “Business relationships with other organizations posed a challenge when the organizations involved did not have similar standards in their security levels. This may also occur when organizations merge or acquire other organizations, resulting in internal silos with different needs and practices in terms of IT security.

“This problem can be more difficult to solve when IT security is not a main priority of the business,” they add. “For example, one participant explained how they had to sacrifice the application of security policies when her organization started to interact with other organizations with different security requirements.”

Another security issue for participants occurred when IT responsibilities were distributed across internal organizational units. In the organizations studied by the researchers, there were quite often a number of administrative departments that shared IT networks and systems, and in each of these departments a different individual was responsible for the local IT infrastructure. Some participants believed that this put the security of the entire system in jeopardy.

Bottom line: The effect of decentralization within one organization was similar to the challenge posed when interacting with other organizations. In both situations, decisions related to IT security come from multiple

sources, and that can lead to conflicting solutions, miscommunicated ideas, overlap and/or duplication of activities (and, sometimes, expenditures), or the opposite: problems falling “between the cracks” when one department erroneously believes that another is taking care of the problem.

Another significant challenge for any IT installation is controlling access to data. “It is particularly challenging for organizations without centralized access control when sensitive data is distributed in different areas of the organization and this data needs to be accessed by stakeholders from different networks and systems,” note Werlinger, Hawkey, and Beznosov.

And although larger enterprises might seem better equipped to handle security in terms of budgets and personnel, the researchers found that the bigger the organization, the bigger the security issues and possible problems. “It was difficult to understand how security controls could be integrated in the existing infrastructure,” they explain. “Large organizations (in terms of divisions, branches and quantity of people) can find it difficult to recruit managers with the ability of assessing security risk, considering the complexity of technical and managerial aspects.”

And, as has been seen in virtually every other project area looked at in early chapters, this study found that a lack of top management support was a major impediment to achieving security success. “One participant identified it as a determinant factor in the map of challenges,” say the researchers. “When there is no support from management, security is not a priority within organizations. However, when top management understands the importance of IT security and gives more priority to security practices, employees within the organizations follow this example and incorporate security practices in their day-to-day activities.”

### **Technological Factors**

It may seem counter-intuitive regarding installation of advanced technology systems that are supposed to improve operations, but study participants frequently cited technical issues as barriers to IT security. The researchers categorized these factors into four subsets: Complexity of systems, vulnerabilities in systems and applications, mobile and distributed access, and lack of efficient security tools.

System complexity was an impediment for many participants. “The need for having open and secure networks had an influence on the interactions between participants and security vendors,” state Werlinger, Hawkey, and Beznosov. “It can be difficult for vendors to understand the architecture of the network and offer products that suit the organization’s needs. The complexity of networks and systems is also a challenge when implementing security controls in organizations. For example, a typical network could have firewalls, DMZ’s proxies, switches behind the firewall, routers in front of the firewalls, mail servers and not enough people to look after the overall security of these interconnected devices.

“Other organizational factors, such as decentralization of IT management, interaction with other organizations, and distributed sensitive data increased the complexity of technical solutions. These technical solutions needed to restrict access from different users with different needs and security requirements,” they add.

System vulnerabilities add a degree of difficulty to the work of security practitioners and GIS implementation managers. To protect systems against potential attacks, security updates must be monitored and installed on a regular basis. The study participants described the need for these frequent updates as a patch management of vulnerabilities in open-source applications.

Mobility and distribution of user access also presented a challenge when it came to ensuring system security. Laptops presented a particularly significant problem because of their portability. When they were taken home by individuals lacking technical expertise, they were often returned infected with viruses or malware that had been picked up during home usage. Mondays were cited by one research participant as especially bad days for IT personnel who had to deal with equipment being returned after a weekend in a home or travel environment.

Finally, a lack of effective support from security tools was identified as another issue that impacted companies’ ability to maintain IT security. “One participant complained about the lack of effective support from security tools that are too bloated and difficult to use to perform simple, specific tasks (e.g. scan a system),” note the researchers.

## Solutions Framework

A framework on which to build solutions for many of the barriers to IT security described above was the result of a research effort by Joo Soon Lim, Atif Ahmad, Shanton Chang, and Sean Maynard. They presented their findings in the article, “Embedding Information Security Culture: Emerging Concerns and Challenges,” where they noted that their work was based on a review of earlier studies, plus results of previous research by Lim and other colleagues.

They suggest that the degree to which Information Security Culture (ISC) becomes anchored in Organizational Culture (OC) relies on six components:

- Senior management involvement in security practices;
- Assignment of security responsibilities;
- Security policy enforcement;
- Security awareness;
- Security training; and
- Allocation of security budget.

Again as we have seen in so many aspects of effective MIS practices, senior management involvement is identified by Lim, Ahmad, Chang, and Maynard as a major factor when building an IT security program. In fact, they identify senior management involvement as “essential in implementing information security practices.”

Assigning responsibilities leaves no doubt as to which individual(s) or department is responsible for assuring the practice of IT security policies. “Information security policies need to clearly delineate the responsibilities of *everyone* in the organization to protect organizational information,” state the authors.

The enforcement of security policies can be considered one of the most effective ways to protect company information. The researchers note that “the main objective of security policy is to influence and direct the actions and



behaviors of organization members. Security policy also helps to develop an ISC by specifying what is acceptable or unacceptable behavior in relation to security practices.”

The study authors explain that security awareness is not the same as security training. Security awareness is more of an organizational culture issue. “Awareness programs teach employees to be conscious about information security policies and procedures,” they explain. “Past researchers suggest that investing in security awareness and culture is more effective than [investing] in security policies.”

Nonetheless, security training is also (obviously) a significant component of an IT security program. In the succinct words of the researchers, “Organizational members must be trained to handle security problems.”

Getting adequate financial resources from senior management is a common dilemma for information security managers, one that is obviously intensified when senior management involvement in the overall program development and implementation is lacking. As Lim, Ahmad, Chang, and Maynard explain, “Organizations that are inclined to treat security spending as a cost often struggle to gain funding for security implementation. The findings suggest that there is a need for security managers to educate and convince senior management that, without sufficient allocation, it is almost impossible to have effective information security practices in place.”

**Industry veteran and graphic communications management adjunct professor David Rosenthal provides his experience-based insight into some of the many challenges of security management faced by companies in today's primarily shared-data based industry:**

"Management Information Systems is all about managing information that a business needs to run effectively. MIS is indicative of a systems approach to developing an information framework that includes and is not limited to guidelines, policies, procedures and measurable standards. Ideally, the effective use of MIS as a management tool will enhance productivity and support margin improvement.

"This writing draws on my first-hand career experience as part of the leadership team of an innovative and pioneering print provider firm. We served an array of market verticals and niches that largely include advertising related data-driven direct marketing initiatives. Security became a driver of our business in a host of ways. Two critical success factors include protecting the confidentiality of data, and ensuring the effective and successful use of data.

"Print service providers must have a working knowledge, or at the very least, a heightened awareness of MIS and data security when accepting data-driven programs and projects. The use and management of data requires an additional set of knowledge skills that go beyond print, adding an array of responsibilities and challenges to the print and related services provider.

"Data is intellectual property that may contain high-value and non-public information with associated implicit rights and responsibilities to its owner and those entrusted to manage it. Data must be protected, accessible only to authorized personnel, managed by experienced data professionals, all in a reliably secure environment. Integrity of data content is critical to the successful outcome of the job at hand.

"Understanding the aim of the project from the perspective of the client, and the purpose or function of the data, can influence the overall success of the project. My anecdotal observation is if an error is to occur when producing a data-driven print job, the likelihood increases that the error will be linked to the use of (variable or personal) data.

The real out-of-pocket cost of an error may go far beyond simply the production cost, even when factoring in postage or shipping charges and lost opportunity cost to the printer. The liability of a security breach may have open-ended exposure including and not limited to damages to the client and to the client's customers.

"Recognizing the associated and added risk, our firm proactively established *Data Management Procedures* for the specific purpose of working with our customers on data-related and security issues. We implemented protocols that would consistently and reliably ensure successful and timely outcomes. This activity reinforced relationships and streamlined the workflow for both external and internal clients.

"Immediately upon receipt of data, content is securely identified and stored. We accept the responsibility to always review the data and instructions with a holistic perspective. We then discuss the data with the client, and challenge the instructions should we believe they may be incorrect or will yield an undesired or alternate outcome. These discussions frequently stimulate a broader understanding of the overall intent and nuances of the job. We then review and assess the data file, and make certain it is in good order, is complete, and contains all of the essential information.

"We develop a set of *Business Rules*. Some are generic and tie into our overall MIS systems and procedures; others are specific to the job at hand and may be implemented in agreement with the client. We manage the file and show the client a *proof* of the data as it will appear in the production run. We audit the entire data file to verify that data integrity is intact throughout. In addition to viewing *normal* records, we search for *extraordinary* files and define how they will be treated.

“Not too long ago a well-known business enterprise opted to reach out to their customers by sending a direct mail package. The firm’s internal *Customer Number* was the customer’s Social Security Number. Somehow that non-public Customer Number clearly appeared in the address block on the face of the outer envelope! That non-public Social Security Number of their entire customer file was made public. How did that happen?”

“Assume nothing. Ask questions. Verify answers. Use *Common Sense*.”

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**David G. Rosenthal** is President of the Shepard Communications Group, Inc., East Brunswick, N.J., and previously served as Senior Vice President, Sales and Marketing, for Webcraft Technologies, Inc. of New York City. He is a Member of the Advisory Board and Adjunct Professor at New York University School of Continuing and Professional Studies Program of Graphic Communications Management & Technology. He holds A.S. and B.S. degrees in Printing Management from Rochester Institute of Technology and is a previously served as Chairman of the Board of the Association of Graphic Communications.



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