

**ENTERPRISE RESOURCE PLANNING  
 AND THE COMPETITIVE  
 ADVANTAGE: THE EASE OF  
 INTEGRATING INFORMATION  
 BETWEEN CORPORATE  
 HEADQUARTERS IN THE UNITED  
 STATES AND FACTORIES IN MEXICO**

**By Kathleen M. Utecht, Randall B. Hayes, and  
 Patrick A. Okonkwo**

**ABSTRACT**

*The current interest in Enterprise Resource Planning (ERP) software systems is based primarily on the principle of the system: generating real time data, enabling linkages across functional areas and divisions, and, thereby, promoting the integration of information across all of the units of a business at one time. Indeed, in practice, such a system not only cultivates accurate and timely information which is available for all operations in a company, including those in global locations, but also fosters more effective decision making and the attainment of the competitive advantage. This study, therefore, examines the benefits of implementing an ERP system, in general, and SAP R/3, a type of ERP system in particular, in the headquarters of major corporations in the United States, as well as in the factories of these corporations located in Guadalajara, Mexico. More specifically, eight corporations which have adopted SAP R/3 and include AT&T, Compaq, Eastman Kodak, Hershey Foods, Hewlett-Packard, IBM, Intel, and Motorola are examined, and the benefits and merit of having the same SAP R/3 software system in their installations in Guadalajara, Mexico are explored.*

*Key Words: Enterprise Resource Planning, SAP R/3, Competitive Advantage*

**INTRODUCTION**

A critical feature of organizational life is the attainment of the competitive advantage. Attaining the competitive advantage hinges, largely, on effective strategic planning and decision making to dictate courses of action and to attain organizational performance goals. Not surprisingly, effective

strategic planning and decision making are a function, largely, of having information that is accurate, timely, complete, and relevant. Indeed, state of the art information technology enables the generation of such value-rich information.

It is to be expected, therefore, that improving the integration of information or data across the functional areas in a business is vital to effective decision making and instrumental in gaining the competitive advantage. A software system which enables this integration of information is the Enterprise Resource Planning (ERP) system which is based primarily on the principles of generating real time data, enabling linkages across functional areas and divisions, and, therefore, promoting the integration of information across all of the units of a business at one time. Indeed, in practice, such a system not only cultivates accurate and timely information which is available for all operations in a company, but also fosters more effective and visionary decision making.

One of the most popular types of an ERP system is SAP R/3 (Systems, Applications, and Products in Data Processing) which was developed by SAP AG, a German industry leader in software development which is headquartered in Walldorf, Germany, and which has offices and installations throughout the globe. Their system is based on the principles of ERP and includes a suite of modules and applications which facilitates the sharing and integration of information across the typical units of business, such as production, procurement, finance and accounting, sales and distribution, human resources, as well as a host of other areas and processes. Thousands of companies representing a variety of industries, including automotive, healthcare, financial services, retail, aerospace and defense, utilities and telecommunications, and others, have adopted SAP R/3. Not surprisingly, many of these top corporations include General Motors, Eli Lilly, Microsoft, DaimlerChrysler, Siemens, Sara Lee Corporation, Elf Atochem, Dow Chemical Company, Reebok, Procter & Gamble, Amoco, Colgate-Palmolive, Dow Corning Corporation, GTE, and Coca-Cola, to provide a sample.

Such an integrative software system has captured the attention, especially, of those corporations which have expanded globally. Indeed, having an opportunity to integrate information, not only within corporate headquarters, but also across global locations, is the ultimate desire of the corporate leader who seeks to continue to grow globally, while at the same time maintain access to and control over day-to-day operations through effective

communication and flow of information. Continued expansion and wise decisions can only serve to guarantee that the industry leader maintains its posture in the future.

Of particular interest is the global expansion promoted by the North American Free Trade Agreement (NAFTA) which took effect in 1994. This agreement essentially opened up free trade among organizations in the United States (U.S.), Canada, and Mexico. Not surprisingly, since that time there has been a marked increase in the exchange of goods and services, especially between the U.S. and Mexico. Additionally, many U.S. corporations have become more aggressive participants in the market, either by establishing new installations in Mexico, or by expanding current ones. Indeed, these increased linkages have demanded that communication between corporate headquarters and the Mexican-based units is open, timely, and fluid. Not surprisingly, given the benefits of ERP systems, it could be expected that adopting such a system would, indeed, guarantee the integration of information and the generation of appropriate business transactions across both the functional and global areas.

The purpose of this study, therefore, is to examine the benefits of adopting and using an ERP system at both corporate headquarters and their global operations. More specifically, eight (8) U.S. corporate leaders have been identified as using an ERP system, in general, and, in particular, SAP R/3, which is utilized extensively by industry leaders. In particular, the eight (8) companies include AT&T, Compaq, Eastman Kodak, Hershey Foods, Hewlett-Packard, IBM, Intel, and Motorola. Each of these companies have installations in Guadalajara, Mexico where the SAP R/3 system has been adopted.

Managers who are instrumental in making important decisions, and who use the SAP R/3 system, are surveyed. A set of interview questions has been designed to assess the impact of using SAP R/3 as it pertains to the exchange of information and decision making across the border, i.e., between the U.S.-based corporate headquarters and the Mexican-based installation. Particular aspects are examined in terms of accuracy of information, integration, consolidation and adaptability, currency and language, among other investigations. Data are analyzed and the results are presented as an argument for the benefits of using an ERP system across global locations, in general. In particular, specific reference is given to the results as they pertain to these eight (8) corporate leaders.

## REVIEW OF THE LITERATURE

The development of sophisticated information technology systems to facilitate the gathering of information across functional areas of business and global locations is essential. Following is a review of literature, of both a descriptive and prescriptive nature, which pertains to the growth of ERP systems, the popularity of SAP R/3, and the catalyst NAFTA has served for exploring operations between the U.S. and Mexico.

### ERP (Enterprise Resource Planning)

The basic premise of Enterprise Resource Planning is quite simple: integration of relevant data across the functional areas of business and across remote locations to ensure timely and effective managerial decision making. A comprehensive description of the components of ERP systems and functionality is presented by a guru on ERP systems, Thomas Davenport (1998). In his account, he includes examples of companies who have experienced the task of implementing such a system. Similarly, Escalle, Cotteleer, and Austin (1999) present a perspective on ERP implementation, including the impact on administrative issues and decision making. Furthermore, they include the role of SAP R/3 as a type of ERP system.

### SAP R/3 (Systems, Applications, and Products in Data Processing)

The development of the SAP R/3 software system, as an excellent example of an ERP system, has occurred over the past few years. Two primers on SAP AG, the German company which developed the system, have been made available by Michael Doane (1996, 1997). The scope of the ERP system is presented, but the major area of emphasis is on how the SAP R/3 system functions as an ERP system. Similarly, the CEO of SAP has provided his account of how the system operates, including its functionality, applications, and future potential (Plattner, 1999). These valuable sources provide the specifics on the SAP R/3 system and its growth in popularity.

### NAFTA (North American Free Trade Agreement)

Finally, it is important to emphasize the significance of the North American Free Trade Agreement which took effect in 1994 and which promoted the concept of 'one market' across the borders of the U.S., Canada, and Mexico. Cooper in

1997 provides an assessment of the economic impact of the agreement. Not surprisingly, the perceptions of the benefits and limitations of such an agreement are controversial. Obviously, to enhance the effectiveness of such an agreement, sharing information among installations in various locations is essential. Geert Hofstede (1993) has argued the importance of commonalities and differences among cultures. Indeed, the perceptions of both, i.e., between the U.S. and Mexico, need to be viewed. Hence, to promote the effective exchange of information across cultures, the cultures, first, must be examined and understood.

## METHODOLOGY

### Description of the Research Site

The research is conducted in eight companies, i.e., AT&T, Compaq, Eastman Kodak, Hershey Foods, Hewlett-Packard, IBM, Intel, and Motorola. Each of these companies has corporate headquarter locations in the U.S., and each has installations in Guadalajara, Mexico. These sites were chosen because they are leaders in their respective industries and because they have global installations, particularly in Guadalajara, Mexico.

### Description of the Research Sample

The population from which the sample is drawn is comprised of executive and managerial employees in each of the installations in Guadalajara, Mexico. These employees work with the SAP R/3 system and are knowledgeable regarding its capabilities and functionality. Furthermore, they are in constant contact with corporate headquarters in the U.S. and rely on information exchanged to facilitate decision making across functions and locations. The input from these individuals is aggregated or grouped so that one set of data from each installation is generated.

### Description of the Research Measures

A total of twenty questions comprise the interview questionnaire which was developed based on the review of the literature, personal experience with SAP R/3 functionality, and on informal discussions with corporate users in remote locations and with colleagues. The questions are organized into five major categories to reflect the hallmarks of ERP, in general, SAP R/3, in particular, and with regard to the relationship between the corporate headquarters and the installation in Guadalajara, Mexico. More specifically, the categories include Information,

Functionality and Integration, Consolidation and Adaptability, Currency, and Language. Within each category, specific questions assess the measure of each. For example, with regard to Currency, questions are presented which request responses regarding availability, ease, and accuracy of currency exchanges when both the parent company and Mexican facility engage in real-time business transactions. Additionally, with regard to Language, questions explore the availability, ease, and accuracy of translating information. What is especially important are those questions which address the accuracy and timeliness of information exchanged between U.S.- and Mexican-based functions which, indeed, would affect strategic decision making.

### Description of the Data Collection Process

A review of the literature, as well as experiences and discussions with corporate users of ERP and SAP R/3, provide the framework for the interview questions developed. Executives and /or managers in each installation in Mexico were identified and selected as the contact person for data collection. The questions were shared in an interview format, with responses being open-ended.

## RESULTS

An examination of the responses to the questions generated reflect, as expected, that those executives and managers in Guadalajara, Mexico benefited from utilizing the same ERP system as that utilized at corporate headquarters, i.e., SAP R/3. Following is a summary of the responses by category and company. For purposes of confidentiality, and because the responses across all companies are very similar, the responses have been grouped. Not surprisingly, results overwhelmingly support the adoption of a common software system, as noted.

A brief discussion of the preceding results, presented according to assessment category and general company remarks follows:

**Information:** Not surprisingly, all respondents in the survey indicate overwhelmingly that what is vital to successful decision making is the access to accurate and timely information. For example, comments from managers working at Hershey Foods in Guadalajara reflect the absolute need to have an information system that is common to all locations and which allows the exchange of information and data in real time. These sentiments are echoed by employees from Hewlett-Packard who also indicate that if corporate headquarters in the U.S.

and the facility in Guadalajara were not using the same software system, that would obstruct the flow of information and certainly delay transmittal and subsequent strategic decisions.

**Functionality and Integration:** Typical comments regarding the need to include the sharing of information across all business processes and locations to enable integration of information are also abundant. Generic responses from executives at both Motorola and Eastman Kodak reinforce the notion that, indeed, ERP systems, in general, and the SAP R/3 system, in particular, enable information to be shared across functions and global locations. It is mentioned that this is essential for effective decisions to be made. Again, this capability is enabled through the use of a common system among the various installations.

**Consolidation and Adaptability:** Because of the peculiarities associated with operations in different locations, adjustments have to be made. More specifically, with regard to the utilization of software systems, some features and applications have to be consolidated and tailored to fit a particular location. Therefore, respondents applauded the use of a common system such as SAP R/3 which allows customization and adaptive capabilities. For example, at Intel, because of constant changes and upgrades, unifying information and installing changes enables the company to exchange information in real time and without disruptions. Similar experiences at Compaq have been registered, suggesting that due to the nature of cultural differences, having a common system is imperative to facilitate change and adaptation.

**Currency:** It is of no surprise that a key feature of integrative, adaptive software systems is the ability to enable the sharing of information across processes and locations. In particular, because twenty-first century society is a society of global organizations, cultural differences in currency are an important part of the system. This was especially emphasized by the respondents from IBM who pointed out the thrust of business at IBM spans several global locations. Being able to do business in the respective currencies of different locations, and being able to conduct business in real time and without delays in determining currency exchange rates, are the strengths of an ERP system. It is not surprising, therefore, that promoting a common system of utilization of SAP R/3 across all locations will enable the user to enjoy this luxurious feature.

**Language:** Finally, and as expected, having a system which allows information to be exchanged according to the respective languages of various global locations is also a desired feature of any software system promoting information exchange. One of the strengths of the SAP R/3 system is that immediately information or data that are transmitted are translated into the respective languages of the global installations. Again, this feature only serves to strengthen subsequent decision making. Utilizing a common software system, utilized by both corporate headquarters and respective global locations, certainly puts into motion this capability. As mentioned by executives from AT & T, this feature is one of the most attractive and one which pushed the envelope in adopting SAP R/3.

**TABLE 1**  
**Assessment Category and Company\***

Category	Company Responses
Information	Available, Accurate, Timely Information
Functionality and Integration	Comprehensive, Complete Sharing of Information
Consolidation and Adaptability	Consistent Applications, Tailored to Nature of Business and Location
Currency	Accurate and Timely Currency Exchanges
Language	Accurate and Timely Translation of Data

\*All eight (8) companies agreed, conceptually and perceptually, on the assessment of the five (5) criteria as indicative of the benefits of integrating information between corporate headquarters and their factories in Mexico when both use the same ERP system, i.e., SAP R/3.

**SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS**

The purpose of this research study is to present evidence that information technology systems are critical to effective decision making in corporations. Furthermore, systems which enable the sharing of information across business processes in global locations are attractive in enhancing strategic decisions in a global society. In particular, ERP systems, in general, and the SAP R/3 system, in particular, have been featured as one system which responds to this need and promote this capability. Additionally, it is argued that companies with installations in various global locations should adopt one common system across all installations, e.g., SAP R/3. Responses to questions which pertain to the merit of using one system, based on information, functionality and integration, consolidation and

adaptability, currency, and language are presented and reflect the views of executives and managers from eight U.S. based organizations with installations in Mexico. These are identified especially because of the influence of NAFTA and the importance of conducting business between these two geographic locations. Results indicate, as expected, an overwhelming need to adopt a common system not only across business processes, but also across business locations.

To lend additional credibility to and support for this type of research, additional studies assessing other corporations with installations in Mexico can be conducted. Additionally, it is recommended that further studies, similar to this one, address other parts of the globe as well.

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- Kathleen M. Utecht received her B.A. from Elmira College, M.A. from the University of Lancaster, England, and Ph.D. from Michigan State University. She is currently Associate Professor in the Department of Management at Central Michigan University, and teaches courses in human resource management and organizational behavior. She is a recipient of the Ameritech Excellence in Teaching Award 2000, and was named an SAP Distinguished Scholar in 2001.
- Randall B. Hayes received his Bachelor's degree from Colgate University, and his MBA and Ph.D. degrees from the University of Michigan. He is currently professor of Accounting and Information Systems. He has taught accounting courses in accounting and systems at the MBA and undergraduate levels, and has taught in several executive education programs. His research interests include the management uses of accounting information and he has published numerous articles in the area. He also supervises the consulting concentration within the MBA program of Central Michigan University.
- Patrick A. Okonkwo received his B.S. degree in Business Administration from Morningside College, MBA in Marketing from Syracuse University, and his Ph.D. in Marketing and Logistics from Michigan State University. He is Professor of Marketing and Logistics in the Department of Marketing at Central Michigan University. He also serves as co-director of the Center for Supply Chain Management at Central Michigan University.