historically, ERP systems evolved from MRP II systems, which are designed to manage a production facility’s orders, production plans, and inventories. ERP systems integrate inventory data with financial, sales, and human resources data, allowing organizations to price their products, produce financial statements, and manage the resources of people, materials, and money. Implementing ERP systems can be quite straightforward when organizations are simply structured and operate in one or a few locations. But when organizations are structurally complex and geographically dispersed, implementing ERP systems involves difficult, possibly unique, technical and managerial choices and challenges.

The complexities of what are often called “multisite” ERP implementations are discussed here. Like all computer-based information systems, multisite ERP implementations can be analyzed in terms of levels or layers (logical versus physical, hardware versus software). At each level there are different choices to make and different criteria for evaluating the alternatives. However, the layers are interdependent: Choices at one level may limit the available choices or affect the performance of the system at another level. Therefore, organizations are generally advised to start planning multisite ERP implementations at the strategic level before proceeding to the technical (software and hardware) levels. In practice, however, the sheer size and scale of such implementations may encourage organizations to tackle the layers...
entire enterprise. Indeed, our research suggests that truly enterprise-wide implementations of ERP systems in large, complex organizations are the exception rather than the rule. Therefore, one of the first issues arising in a multisite ERP implementation is that of scope.

Scope is important for several reasons. First, it defines the extent and type of benefits that can be derived from an ERP system. Implementation of only the financial modules of an ERP package in one business unit has the potential for quite different benefits than implementation of all ERP modules in every unit. Further, implementation of one standardized software configuration across multiple units has the potential for quite different impacts than the implementation of several different configurations. Second, scope specifies the degree to which the ERP system will change managerial autonomy, task coordination, and process integration in the business units of the enterprise. Change in these factors usually provokes organizational conflict and adds a “political” element to ERP implementations. Organization structural changes may be required to realize the intended benefits of the ERP system. Third, scope is associated with project management difficulties. Large scope projects require higher levels of organizational authority and broader organizational participation. They also cost more, take longer, and fail more often.

There are at least five different ways in which organizations can arrange the relationships among business units. Each is associated with a natural way to configure ERP systems and manage multisite ERP implementation projects. The approaches are total autonomy for organizational business units, minimal headquarters control over local processes, headquarters coordination of transactions between business units, network-type coordination among business units, and total centralization (headquarters control over local decisions) [6]. In addition, there are probably many hybrid arrangements.

**Business Strategy**

The “E” in ERP stands for “enterprise.” But what exactly is an enterprise? A manufacturing plant composed of multiple cost centers? A business unit with profit and loss responsibility? A collection of business operations in a single geographic location? A legal entity? An entire corporation consisting of multiple business units and legal entities? The ambiguous definition of “enterprise” means that complex organizations may implement enterprise systems in ways that do not really integrate the data and processes of the entire enterprise. Indeed, our research suggests that truly enterprise-wide implementations of ERP systems in large, complex organizations are the exception rather than the rule. Therefore, one of the first issues arising in a multisite ERP implementation is that of scope.

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**Total local autonomy.** One European multinational we studied allowed its subunits nearly total decision-making autonomy, which extended to ERP adoption. The company had different product subsidiaries operating in different countries. One country/subsidiary entity had two plants, each of which elected to acquire, configure, implement, and maintain a different vendor’s ERP package with no commonality of data or processes.

This strategy fails to capture the potential of ERP systems to integrate data, systems, and processes across locations and business units. But it does have advantages. First, it avoids the conflict associated with changes in headquarters-business unit relationships. Second, it allows companies to pursue future acquisitions and divestitures free of systems complications. Third, it reduces the risk of implementation project failure.

**Headquarters control only at the financial level.** Another pattern involves local business unit autonomy in all matters except financial accounting
and reporting. In such an organization, business units most often go their separate ways in configuring, implementing, and maintaining ERP software, with the sole exception of financial consolidation. This strategy is most effective when the units do very different things. For example, American Standard’s three unrelated businesses adopted ERP software from different vendors for operations, but each integrated its chosen package with a common financial system in a “best-of-breed” solution [1].

**Headquarters coordination of operations.** In this pattern, there is a high degree of local autonomy in operations, but headquarters retains the ability to manage the global supply chain through its access to local information about purchasing requirements, inventories, and production schedules. This strategy works best when there are potential corporate benefits from common purchasing or when there are global, as well as regional, customers. To achieve this level of headquarters involvement in the ERP-supported business processes, headquarters must play a major role in chartering and managing the ERP implementation project.

**Network coordination of operations.** In this strategy, local operations have access to each other’s information, allowing for lateral coordination without a high degree of centralization or top-down control. This strategy would be most useful when the entities sell to each other as well as to external customers. ERP implementation projects designed to achieve this level of integration require a great deal of cooperation involving both headquarters and the business units.

**Total centralization.** In this strategy, all decisions are made centrally and communicated to local operations for execution. This strategy is most useful when companies need to present a single global “face” to their customers worldwide. Centralized multisite ERP implementation projects are generally top-down affairs.

Further complicating multisite ERP implementation planning is the fact that many companies implement ERP systems in order to adopt a different organizational model than the one they currently use. In other words, the implementation of ERP becomes an occasion to rethink and change the organizational model, and ERP software becomes an enabler of the new organizational model. For example, an industrial products producer with three product divisions contemplated the creation of a fourth division that would service all three product types. The ERP system implementation was designed from the beginning to support the new division. When multisite ERP implementations involve a new model for organizing and managing the business, the potential for conflict and disruption is great. Successfully managing the implementation project involves great skill in managing organizational change.

BICC Cables, a U.K.-headquartered multinational manufacturer of telecommunications and power cables, adopted a common ERP package for its 40-some facilities around the world. Formerly, each of the similar but autonomous units had control over technology decisions, subject only to central financial review. But headquarters believed that adoption of a single package, centrally configured, would reduce technology acquisition and implementation costs. Further, a common configuration would enable the company to identify and disseminate the best operating practices across units. Although the software would be centrally configured, each local unit was to set up, operate, and manage support for its own local software implementation. These changes from past practices were so great that the company was obliged to spend several years in consensus-building before beginning the implementation [4].

Another European multinational, with the pseudonym Threads, formerly had a country structure (like BICC Cables) but envisioned the need to treat Europe as a single market [2]. This strategic direction required substantially reduced local autonomy in sales, production planning, and materials management. To make this change occur, Threads adopted a process-based organizational structure and made significant changes in managers’ decision-making
authority in addition to implementing a multisite ERP configuration that would support the new way of working.

**Software Configuration**

ERP vendors have designed their packages to support a variety of logical organizational structures. Configuring ERP software involves creating a logical structure involving one or many legal-financial entities and one or many operational entities (manufacturing and/or sales and distribution units). It is not yet known whether or not the resulting ERP multisite configuration options can accommodate the full array of organizational structures found in practice, and how well these configurations can coevolve with organizational structures over time.

**Single financial/single operation.** Simple, geographically centralized organizations normally select single site ERP configurations. Complex organizations involving several plants and distribution centers might also choose single site software configurations if:

- They operate as a single management entity within a single country (so that it is not necessary to prepare different sets of financial records for management control or taxation purposes);
- They have common business processes in their plants and distribution centers; and
- Their flows of material and finished goods are managed centrally from headquarters.

One complex company that chose a single site ERP software configuration for its U.S. operations was A-dec. Often cited in the computer trade press for its initial difficulties in implementing ERP, A-dec eventually achieved stable operations and business benefits from using ERP software [9].

**Single financial/multiple operations.** Some complex organizations choose a configuration in which there is a single legal/financial company but multiple operational entities (manufacturing and/or sales and distribution units). This configuration allows the organizations to accommodate different business processes, owing possibly to differences in product types. For example, Kraft Foods, originally planned to install identical configurations at its 53 manufacturing sites but found that the one-size-fits-all ERP system did not work perfectly for this diversified manufacturer with eight product divisions and a product line that includes cheese, frozen pizza, and packaged meats [8]. But even when it is advantageous to allow for diversity in business unit operations, many organizations will value the managerial benefits of an integrated view of the company’s finances.

**Multiple financial/single operation.** An organization with a single manufacturing facility (or several that are managed as an entity) but with sales offices in different countries might select this type of multisite ERP software configuration. It is well suited to handling the diverse accounting regulations, currencies, and languages of many international businesses.

**Multiple financial/multiple operations.** This type of ERP configuration is most appropriate for the country-based organization structure of the typical multinational company. Many international automobile manufacturers have adopted this approach to configuring ERP software for their multicountry operations.

**Technology Platform**

The *site* in multisite has a different meaning at the level of the technology platform than it does either at the strategic level or the software configuration level. Here, site refers to a combination of a central database and one or more applications servers. At one extreme, organizations with many units and geographic locations may elect a centralized architecture with remote access to the central site via telecommunications lines and access devices like PCs. At another extreme, much of the data and processing capabilities can be distributed to various locations. It is easier and often cheaper to configure ERP systems for centralized architectures: distributed implementations pose challenges concerning data replication, response times, and support costs. However, distributed architectures may be preferred for reasons of database size and performance, telecommunications costs and policy (particularly when implementations involve multicountry networks), maintenance costs, risk management, and local management autonomy.

Millipore Corp. previously managed its enterprise data in three different locations around the world: Europe, Japan, and the U.S. Betting that a globally centralized ERP system would give them greater management control over customer orders, Millipore relocated its European data processing operations to corporate headquarters in Massachusetts. Among the steps in this migration are the creation of a common accounting structure, an ERP software upgrade, enhancements to the corporate network infrastructure, and a database upgrade [7]. This example clearly shows the interdependence of the strategic, software, and technical platform layers in a multisite ERP implementation.
Practical Execution
Even when a company has completed the strategic planning, the software configuration, and the infrastructural support for a multisite ERP implementation, the company may still face considerable complexity in getting from the capability to the reality. When multiple locations are involved (with different managerial reporting lines, languages spoken, and national cultures), managing a multisite ERP implementation project is challenging at best. Organizations have choices about how they will handle the key decisions and events in the ERP experience cycle: decisions can be made centrally (with or without consultation) or locally; events can be orchestrated to happen all at once or in a sequence of phases.

“Big Bang” deployment. At one end of the spectrum, Quantum Corp. undertook a “big bang” implementation of its new ERP software. The company shut down its operations worldwide for eight days while transitioning over to its new systems and processes. This highly risky maneuver made sense in light of the company’s business strategy and organizational model, which required the worldwide capability to promise product availability to customers [9].

Phased rollout. In the previously mentioned example of BICC Cables, headquarters made the decision to pursue common software. But, knowing this decision would prove unpopular in an organization used to local autonomy, management initiated a lengthy process of consensus building, coordinated by a newly hired CIO. In the first phase of this strategy, a team with representatives of business units around the world established, through process modeling, that the units operated in similar ways, making the adoption of a common package feasible. A second task force selected the common package. Then a central team was formed to design a common software kernel. Lastly, local units were chartered a few at a time to implement and operate the software [4].

A major consideration at BICC Cables was how to manage the rollout of new software releases. The company wanted to have no more than three software versions in play at any time (the old one being replaced, the new one being installed, and the future version being tested at headquarters). But practical issues remained: How does one prepare an organization for technology changes as frequently as every year or 18 months? Should one site be upgraded before all sites were installed on the old version? Resolving such issues is an ongoing process. Kraft Foods, previously mentioned, decided not to wait until it had completed its rollout of a standard ERP configuration before it began reconfiguring ERP software for 20 units where the standard configuration failed to meet business unit needs [8].

Conclusion
Multisite ERP implementations are tricky on at least four different levels: business strategy, software configuration, technical platform, and management execution. At each level, the term site takes on different meanings and raises different kinds of issues. Successful multisite ERP implementations address the interactions and trade-offs among the four different levels.

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M. Lynne Markus (m.lynne.markus@cgu.edu) is a professor of Management and Information Science at the Peter F. Drucker Graduate School of Management and the School of Information Science at Claremont Graduate University.

Cornelis Tanis (cornelis@keyperformance.com) is a consultant with the European office of Key Performance International, a firm specializing in enterprise software implementations, and was previously affiliated with Baan Institute and the Baan Company.

Paul C. van Fenema (pfenema@fac.fbk.eur.nl) is a Ph.D. candidate in MIS at the Rotterdam School of Management, Erasmus University, The Netherlands, and a visiting research assistant at the Department of Decision Sciences and Information Systems at Florida International University.

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