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**Management and Organization
Principles for the Information
Economy**

**CEO Publication
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University of Southern California
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MANAGEMENT AND ORGANIZATION PRINCIPLES FOR THE INFORMATION ECONOMY

William H. Davidson and Stanley M. Davis

The industrialization of the economy spanned more than one and one-half centuries. During this period, industrial technologies and concepts, such as product standardization and mass production, permeated virtually all sectors of economic activity. In turn, traditional industrial logic is now being displaced by the new technologies and management concepts of the information economy.

The expanding use of information technology stimulates innovation in business practices and organization models. Information technology is driving a shift from mass production to mass customization, for example. Traditional organizational concepts, such as hierarchical communication, span-of-command, boundaries, and vertical integration are also being displaced by new practices and structures. These new structures will present significant human resource management challenges. Inter-organizational staffing, training and development requirements will rise sharply. Job descriptions and compensation systems will need to become much more flexible. Team-building will likely become more dynamic and more central to all organizations. The management of outsourcing relationships will also become an important role for HR executives. But even more important than these discrete functions, the HR community can assist in managing the broader transformation of today's organizations.

As the growing wave of business innovations are focused and refined, a new set of dominant management and organization principles will arise. The widespread application of these new models will drive the "informationalization" of the economy, a process that will occur over a period of decades. The process of transition to the new models create significant opportunities and requirements for the human resource management function.

THE INFORMATIONALIZATION OF ECONOMIC ACTIVITY

Technology, organization and human resources management, are closely linked in modern management theory. Technological realities influence the nature and organization of work.¹ Management and organization practices in any firm are closely

¹ Trist, E. L. et al, Organizational Choice (London: Tavistock, 1963)
Woodward, J., Industrial Organization: Theory and Practice (London: Oxford University Press, 1965)
Thompson, J., Organizations in Action, (New York: McGraw-Hill, 1967)
Khandwalla, P., "Mass Output Orientation of Operations Technologies and Organizational Structure," Administrative Science Quarterly, 19:74-97, 1974)

linked to the scale, complexity and rate of change in its technology.² Technology affects management in an even broader sense as well. The core technologies that support economic activity and growth ultimately help to define mainstream management and organization paradigms. Those paradigms are used to structure virtually all activities within an economy. Thus, the technological base of the industrial era, which conquered space and scale, led to unique organizational requirements.

Industrial technologies permitted businesses to operate on an unprecedented scale over great distances. The resulting business realities led to new organization needs. The responses included functional specialization, sophisticated control systems, organizational engineering (Taylor), staff functions, divisionalization; in short, the model industrial organization.

The linkages between technological capability, business practice, and organization design are not purely deterministic. Nonetheless, fundamental changes in technology that enable innovative business practices will ultimately impact organizational structures and systems. Technological change leads and supports business innovation, which drives organizational change.

This relationship is particularly important today, as we stand at a time of transition in core technologies. The electro-mechanical technologies of the industrial era have been supplemented and supplanted by information technologies. These new technologies permit radical innovation in business practices. Many such innovations can already be observed in a growing number of industries and firms. Based on these observations, we can now begin to perceive what the mainstream business practices of the information economy will look like. As these new business practices displace more traditional formulas, new organizational models and management requirements will follow.

The new business practices and organizational paradigms will both emerge slowly, but the new business practices will appear first. After these practices are applied in many sectors of economic activity, new organizational paradigms and principles will begin to appear. Since business innovation will emerge first and will drive, if not dictate, organizational solutions, our discussion begins with the elements of business practice that will characterize the information economy.

² Perrow, C., "A Framework for the Comparative Analysis of Organizations," American Sociological Review, 32:194-207, 1967
Lawrence, R. and J. Lorsch, Organization and Environment (Boston: Harvard Business School Press, 1967)
Miles, R. E., and C. C. Snow and J. Pfeffer, "Organization - Environment: Concepts and Issues," Industrial Relations, 13:224-264, 1974
Nadler, D. A., and M. L. Tushman, "A Congruence Model for Diagnosing Organizational Behavior," Organization Dynamics, 9:35-51, 1980
Frederickson, J. W., and T. R. Mitchel, "Strategic Decision Processes: Comprehensiveness and Performance in an Industry with an Unstable Environment," Academy of Management Journal, 27:399-423, 1984
Davidson, W. H., "Technology Environments and Organizational Choice," Journal of High Technology Management Research, Volume 1, Number 1, pp. 15-38, 1990

NEW BUSINESS PRINCIPLES

While the ultimate logic of the information economy may not be explicit for decades, elements of the new paradigm can now be envisioned. The application of information technology to existing industries is driving powerful changes in the way in which business operations are conducted. The emerging paradigm exhibits a series of powerful advantages over traditional operating formulas. Those advantages stem from the application of a set of new business principles that will ultimately be applied in all industries. Informationalized businesses will generally utilize the following principles in their operating configurations and processes.

Mass Customization. While Henry Ford's operating formula called for standardization of products and services, successful businesses in the information economy will offer individually customized products to mass markets. These customized products may be built out of standard components, but they will be assembled as unique combinations of standard parts, designed by the customers themselves. Motorola Corporation, the world's leading producer of paging devices, applied this concept to its pager product line. Although pagers would readily fit Ford's logic of standard (black) units, Motorola has opted for precisely the opposite product line profile. Its new production facility in Boynton Beach, Florida can produce over 22 million unique product configurations. Deluxe Corporation, the largest check-printer in the world, also allows customers to customize individual checking products. Each of the millions of checking packages it ships each week are unique and of value to only one customer.

Electronic Self-Design. The ability to allow customers to design products and processes themselves on remote terminals is another prominent feature of informationalized businesses. This capability allows the customer to preview any potential product configuration, and to submit orders directly to the vendor, rather than using a more traditional intermediary. In Motorola's pager division, sales personnel carry portable computers that allow customers to design pagers to their own specifications. This design tool enables customers to assemble a unique configuration of product and process elements.

Rapid Response. Direct communications between the customer and the vendor will reduce the duration of the order entry and processing cycle. Response times will also be compressed through the informationalization of other fulfillment functions. Motorola can ship the first batch of customized pagers within two hours after receiving an initial order via modem from field sales representatives. Deluxe Corporation's operating policy calls for fulfillment of all orders within 24 hours.

On-Demand Production. Industrial logic calls for the pre-manufacturing of standardized products. Those products are then held in inventory in anticipation of future customer demand. Informationalized businesses will not produce finished goods until after the customer has specified the precise configuration desired. On-demand production will dramatically shrink finished goods inventories while minimizing response time. In the automotive industry, the use of traditional pre-manufacturing logic means that more than \$20 billion in finished goods inventories are currently rusting away on dealer lots in North America alone. On-demand production will ultimately eliminate such inventories.

Inter-Organizational Bonding. On-demand production need not result in delivery delays. Rapid response will be accomplished as linkages between suppliers and vendors tighten. To facilitate on-demand production and rapid response, suppliers and vendors

will develop sophisticated electronic linkages that permit co-processing of information. Parties to these electronic relationships will transmit and receive information instantaneously, and share access to each others operating systems and information resources. Electronic Data Interchange (EDI), already connecting thousands of enterprises, is the first step in this process of electronic integration. The parties to these new electronic relationships will achieve dramatically greater efficiency than now realized under traditional arrangements. Customer orders to a vendor will trigger instantaneous requests to suppliers for the requisite parts and components. Suppliers will then deliver the required components with minimal delay using just in-time or consignment delivery methods. As electronic relationships evolve, traditional order entry and processing, billing and collection functions will be completely displaced. Elimination of these traditional functions will dramatically reduce cost and time in the transaction cycle. The use of such concepts in the U.S. textile industry has resulted in savings in excess of 60% in administrative costs associated with order processing, logistics and inventories management, and dramatic reductions of more than 75% in delivery cycle times.³

Lower Variable Transaction Costs. Informationalized transactions will exhibit dramatically reduced variable costs. The elimination of traditional order entry, payables, accounting and control functions will reduce organizational overheads, resulting in lower variable transaction costs. This dramatic reduction in variable transaction costs will further facilitate the shrinking of inventories by supporting smaller efficient order quantities and shorter response times. Lower variable transaction costs will strengthen the ties between parties to an informationalized relationship, reinforcing inter-organizational bonding. A detailed example of this phenomenon at Toyota Motors is described in the next section of this article.

Disintermediation. With the shrinking of variable transaction costs, many vendors will find it possible to serve smaller customers directly rather than through traditional intermediaries. Dell Computer has pioneered direct sales of personal computers to end-users via telemarketing and mail order, for example. This disintermediation process will be facilitated by the deployment of increasingly sophisticated public information infrastructures and services, such as videotex, and the continuing growth of new logistics service providers, such as Federal Express Corporation.

These new business principles are being applied in a growing range of industries. Firms that aggressively utilize the superior technology and logic of the information economy will dramatically improve performance and displace their traditional rivals, until the economic landscape has been completely restructured, one industry at a time. This process will occur only if the new paradigm offers systematic, concrete advantages over traditional methods and structures. Where will those advantages be realized, and what is the magnitude of superiority for the new paradigm?

PERFORMANCE BENEFITS

Traditional performance measures that will exhibit a dramatic improvement in informationalized businesses include turnover and productivity ratios. Working capital turnover will improve dramatically under the new paradigm. Finished goods inventory,

³ Gladar, F. et al, U.S. Competitiveness: The Case of the Textile Industry (Lexington, Mass: Lexington Books, 1987)

in particular, will shrink as a percentage of sales. Introduction of on-demand production and rapid response logistics systems will permit vendors and users to shrink inventory positions sharply. While the automotive industry continues to carry literally tens of billions of dollars worth of finished goods inventory, other industries are rapidly freeing up capital and eliminating the costs of carrying inventory.⁴

The application of these principles to the automotive industry could result in the liberation of tens of billions of dollars that are now tied up in finished goods inventories. The reduction of inventories would also dramatically lower inventory carrying costs, typically estimated at 25% to 35% of the value of goods held. Given the automotive industry's huge stock of finished goods, it is interesting to note Henry Ford's philosophy on work-in-process inventory.

"Having on hand twice the material as is needed is precisely the same as hiring two men to do the job that one man ought to do. Hiring two men to do the job of one is a crime against society".⁵

Shrinking inventories is an important performance improvement opportunity. Not only can inventories be reduced: The opportunity to trim resources devoted to managing inventories looms large.

Financial working capital can also be freed up, as payments are accelerated through electronic linkages. The cost of managing financial working capital, which can be thought of as "transactions-in-process", can be reduced dramatically by the adoption of new payments mechanisms. The traditional billing and payments process is remarkably inefficient. In a typical industrial transaction, the customer's order is entered and processed, and the goods are shipped, often after considerable delay. In most distribution sectors, for example, less than 60% of orders are filled from existing stock. After the goods are shipped, the vendor prepares an invoice and mails it to the customer. This invoice is then processed by the customer's payables department, after receiving appropriate clearances from other units. A check is issued and mailed to the vendor, often after a prescribed delay. The vendor then processes the check and delivers it to their bank for deposit. It is there processed and transmitted to the clearing bank, where funds are released to the vendor's account. This entire process typically takes 60 to 90 days to complete, requiring the active participation of over a dozen different units within the customer, vendor and financial institutions that process the transaction.

In the new paradigm, these transactions will be processed far more quickly and efficiently. Orders will be transmitted from the customer to the vendor electronically. Those orders will be entered and processed instantly and goods will be produced and shipped rapidly in response to the order. A growing number of firms today are utilizing electronic data interchange (EDI) and electronic funds transfer (EFT) in settling business transactions.⁶ In this new paradigm, payment can be made on the same day that the shipment is received by the customer. This payment method can eliminate much of the time and the cost associated with traditional payment systems. Instantaneous payment greatly reinforces just-in-time delivery. The result can be a reduction of

4 Bowersox, D. J. et al, Leading Edge Logistics (Oak Brook, Ill.: Council of Logistics Management, 1989)

5 Ford, Henry, Today and Tomorrow (New York: Doubleday, 1926)

6 Sokol, C., EDI: The Competitive Advantage (New York: McGraw-Hill, 1989)

90% or more of the time required to complete a transaction under traditional methods. The resources and attention devoted to transactions in process can shrink accordingly.

The typical manufacturing business today carries approximately 30% to 40% of its assets in the form of working capital. As working capital is sharply reduced, asset turnover ratios will increase sharply. Sales and profits per dollar of assets may rise by 50% or more as assets shrink, transactions are accelerated, and overhead functions and costs are trimmed.

Velocity

The elimination or simplification of overhead activities will reduce the cost and throughput time for fulfillment of any given order. The result is increased business velocity, another critical characteristic of the new operating paradigm. The importance of velocity has been highlighted in a series of books and articles on the central role of time as a competitive weapon.⁷ The ability to respond rapidly to customer requests is one important dimension of business velocity. A second dimension is the cycle time associated with any given activity within an organization. Velocity can be increased through re-engineering to shrink the number of units involved in any given activity and to simplify the work of each such unit. Time-based competition is an area of growing emphasis throughout the economy today, and new time-driven business practices are emerging that will redefine the mainstream of management.

Some of the benefits can be seen today at Toyota Motors. Toyota originated many of the methods associated with just-in-time inventory management.⁸ In the process, it achieved inventory turn ratios as high as 35 to 40 times per year, compared with ratios of 6 to 8 for its U.S. competitors. Much of the success of these efforts can be attributed to Toyota's intimate, integrated supplier relationships. But reduction of inventories is not the sole, or even the primary, benefit of these relationships. Toyota recently introduced a new program in Japan called "Monday morning, Friday afternoon." The program allows customers who place an order for a specific vehicle configuration on Monday morning to receive the car the following Friday afternoon. This program embraces the notion of customer self-design and rapid response, and it also provides a useful indicator of how such approaches can result in dramatic operating efficiencies.

As orders are entered into Toyota's production schedule through dealers, suppliers scan changes in the production schedule on an on-going basis. They are then able to ascertain demand for parts without receiving specific purchase orders from Toyota. Suppliers deliver the required parts as dictated by the production schedule. They do not then invoice Toyota for their deliveries. Toyota reviews its production records, and is able to determine parts usage by evaluating the mix and quantity of automobiles that were produced in a given period. This production record, plus predetermined prices, allows Toyota to initiate payments to suppliers without the traditional order entry, processing, billing, collection and settlement functions. As a

⁷ Keen, P.G.W., Competing in Time, (Cambridge: Ballinger, 1988)
Stalk, George, Jr. and Thomas M. Hout, Competing Against Time
(New York, The Free Press, 1990)

⁸ Ohno, Taiichi, Toyota Production System (Tokyo: Diamond Press, 1978)
Womack, J. et al, The Machine that Changed the World (New York:
Rawson, 1990)

result, this new operating paradigm dramatically reduces not only cycle times and working capital requirements, but the costs associated with overhead functions.

Overhead Reduction

The implementation of these types of operating systems can drive dramatic reductions in head-count, and proportional increases in productivity measures. Ford Motor Company completed a benchmarking study several years ago of its finance, control and accounting functions. In comparison with its Japanese automotive counterparts, Ford found that it had over thirty times more head-count in these functional areas than Toyo Kogyo Corporation (Mazda), for example.⁹ By re-engineering its operations to more closely resemble the processes followed by its Japanese counterparts, Ford was able to reduce head-count in these areas by 75%.¹⁰ Even that level, however, remains about five times higher than the current level exhibited by Mazda. But even Mazda's overhead may be too high! If the Toyota operating procedures described above became a core approach for managing these functions, virtually all head-count in these areas could be eliminated. Since direct labor is no longer the principal source of labor costs in organizations, productivity gains in such overhead areas are the key to improved efficiency and competitiveness.

Precision

There is such a broad-based interest in increasing business velocity and shrinking overhead that perhaps insufficient attention has been paid to the concept of business precision. One of the central themes of management focus in the past decade has been total quality management (TQM).¹¹ The quality movement, in some instances, is highly complementary to the business principles that are described above. However, quality improvement often is focused principally on doing "the thing right." Doing the right thing may be more important. The concept of precision is relevant here as it relates to customer-specified product design and process selection.

It will increasingly be possible for customers to design products to their own specifications, and to select the actual production and delivery processes used in providing the product or service. In this instance, the concept of precision rather than quality takes center stage. The ability to deliver exactly what the customer wants, how he wants it delivered, when he wants it, is of growing importance in a variety of industries.¹² That issue is somewhat distinct from the quality issue. Ultimately, the convergence of these two trends, of doing the thing right and doing the right thing, will provide a very powerful source of competitive advantage; when firms are able to do the right thing right. As the total quality movement becomes more focused on processes as opposed to products, the convergence of these two concepts is facilitated.

⁹ "Ford of Europe Finance" in Davidson, W. H. and J. de la Torre, Managing the Global Corporation, (New York: McGraw-Hill, 1990), pp. 417-434

¹⁰ Hammer, M., Reengineering Work: Don't Automate, Obliterate", Harvard Business Review, July-August, 1990

¹¹ Juran, J. M., Quality Planning and Analysis, (New York & McGraw-Hill, 1970), Crosby, P., Quality Without Tears, (New York: Plume, 1984)

¹² These points are developed in Davis, S., Future Perfect (Reading, Massachusetts: Addison - Wesley, 1987)

While the current emphasis on quality raises new performance measures, such as defect rate, into focus, concern for precision will also lead to new performance measures. Both concerns ultimately contribute to the broader achievement of customer satisfaction.

Customer Satisfaction

Perhaps the most important benefit of adopting new business practices will appear in the area of customer service and satisfaction. Customer satisfaction is increased when business precision and response time are improved, but there are a number of other dimensions of customer service that can also be enhanced. For example, the typical home loan application and approval process today requires extensive documentation and a 45-90 day approval period. New tele-lending services are available that will approve a home loan in less than 24 hours with minimal documentation, at costs that are highly competitive with traditional vendors. The ease and convenience of such new lending services provides a level of customer service that is dramatically superior to more traditional offerings.

Lenders who offer such services must have extremely sophisticated information systems that can access borrower credit histories, employment records, credit references, financial data, property title data bases, and sophisticated expert systems to process such applications rapidly. But all of that is invisible to customers; they only see crisp, convenient and timely service.

The concept of direct customer access may also drive enhanced customer service. In many businesses, it is necessary to go through an intermediary to enter an order or request for service. Not so long ago, in many parts of the United States, it was necessary to go through an operator in order to place a telephone call. The operator would ask "number please", and then place the call for the customer. As the telephone industry moved into direct dial mode, customers placed their own orders, and the number of telephone calls soared while the operator staff, and variable transaction costs, shrank dramatically. These efficiency gains were not realized at the expense of customer service. Few if any callers would prefer to go through an operator in placing all their calls, and operators are available when needed.

Intermediaries appear today within many industries. It is still typical, for example, to use a travel agent to purchase an air ticket, a freight forwarder to arrange trucking and shipping services, and to work with the functional equivalent of an operator in placing hotel or car rental reservations. Customer service in these and other industries may be enhanced by offering customers direct connections to order entry systems that can be accessed instantly 24 hours per day. These direct access systems may offer assistance in helping to define a customer's needs, and they may also offer other value added services that would not be available through traditional sources, such as price minimization options, preview prior to purchase, and packaging of multiple services through a single source. In such instances, customer service may be enhanced while efficiency is simultaneously increased.

NEW STRUCTURES

The implementation of such concepts will lead to the emergence of an entirely new set of operating realities for the typical organization. As this transition occurs, predictable shifts will occur in the structure of markets and firms.

Direct access systems hold important implications for market structures. The next period of history will be marked by both the enhancement and the elimination of existing intermediaries. This process can already be seen in the air travel industry. Just a decade ago, the process of selecting and purchasing an air ticket was a complex and time consuming process. Customers typically met in person with their travel agents, who reviewed their itinerary and checked possible flights in a master flight guide. After flight options were identified, the travel agent would call several airlines to determine seat availability and price. Additional calls would then be made to order selected flights and ticketing, billing and settlement would be completed over a period of several weeks.

This traditional process was displaced in the 1980's as computerized reservation systems made their way rapidly into the travel agent community. These reservations systems allowed the travel agent to instantaneously review travel options, select flights, preselect seating and other flight options, print tickets and settle payment. Travel agency productivity was greatly enhanced, and the ticketing portion of customer service in the air travel industry was improved significantly. Those airlines that had taken the lead in developing such computerized reservations systems found that their competitive positions were greatly enhanced.¹³ The next phase of evolution in this industry is now beginning. Services such as the on-line OAG and EAASY SABRE systems allow individuals to select, order and purchase air tickets from terminals in their own homes and offices, completely bypassing the traditional travel agent. Information technology first enhanced the travel agency, and now threatens to eliminate it.

Similar trends will emerge in other industries as customers gain direct access to order entry systems. Intermediaries are also threatened by another trend, as buyers and sellers come together directly in new electronic markets.¹⁴ Today, securities, foreign exchange, real estate properties, coins, and many other items change hands primarily, if not exclusively, through traditional intermediaries. As the information economy unfolds, buyers and sellers will connect directly through the medium of these new electronic markets.

The trend towards electronic markets will be accelerated by the deployment of new public information services such as videotex. Today, on average, one in six Americans has a personal computer at home. Only a small fraction of these personal computers are now connected to information services such as Prodigy or Dow Jones. In France, far fewer homes have personal computers, but almost six million, or a quarter of all households, have a Minitel terminal that allows access to over 13,000 information services.¹⁵ As the personal computer becomes seen less as a data processing instrument and more as a gateway to information services, fundamental changes will occur in many markets.

¹³ Hopper, Max D., "Rattling Sabre-New Ways to Compete on Information," Harvard Business Review, May-June 1990, pp 118-125.

¹⁴ Malone, T. W., et al, "The Logic of Electronic Markets", Harvard Business Review, May-June 1989, pp 166-169.

¹⁵ At the end of 1990, Prodigy and Dow Jones each reported approximately 600,000 subscribers. For an overview of the Minitel system, see Housel, T. and W. H. Davidson, "The Development of Videotex Services in France," International Journal of Information Systems, Summer, 1991

One Minitel service in France, Teleroute, allows anyone desiring trucking services to list their cargo, origin, destination and schedule. These requests for service can be scanned by trucking companies, or matched automatically against the schedules posted by truckers with available capacity. This service, one of the most widely used in France, dramatically improves capacity utilization and customer service, while eliminating freight brokers. By contrast, in the U.S., as much as half of trucking capacity on the road at any time is unused, because of empty backhauls and partial shipments. An electronic market for trucking services could dramatically reduce the size of the trucking fleet, and cut fuel consumption, labor costs, shipping delays, pollution, traffic congestion, accidents and overhead.

The benefits of electronic markets are considerable, and we will see a wide variety of such markets appear in the next decade. As they appear, vast segments of our current economy may disappear due to disintermediation. While traditional intermediary structures are being dismantled, two new types of structures will be built. The first type includes the electronic markets or "infomediaries" that connect buyer and seller and execute transactions.

Third party information clearing houses help bring buyer and seller together in a growing range of businesses. FTD has been in the business of connecting customers and florists for decades. Pizzanet is a new infomediary that helps independent pizza parlors compete against giant chains in home delivery. Infomediaries are appearing in the cattle and coin markets. Superior Livestock Auctions of Forth Worth, Texas, sold almost one million head of cattle in 1990; all electronically. Images and information about specific cattle are broadcast to remote buyers and orders are entered and processed electronically. The cattle and the buyers remain at home, reducing travel costs and risks, and increasing the scale and efficiency of the market.

The rare coin market is a fragmented market of individual traders, brokers and auction houses. Monthly price sheets give some reference points on coin values, but the coin market is highly idiosyncratic and inefficient. That is changing rapidly with the introduction of coin grading standards and coin pricing information. "ANNIE", or the American Numismatic Exchange, now provides real-time price information on coin transactions by grade of coin over dealer terminals. The next generation services will bring high-quality coin images and electronic trading to this market. And as this market has become more organized and efficient, major investment firms are now committing funds to coin investments for the first time.

Similar infomediary functions will be developed by entrepreneurs, enlightened existing firms, and consortiums in virtually all industries over the next decade. These infomediaries represent a significant shift in the structure of industries and markets. A second broad-based trend also holds important implications for industry and market structure.

INTER-ORGANIZATIONAL DEVELOPMENT

Most organization development (OD) efforts have historically been focused within a single organization. We are now seeing the start of a significant shift toward inter-organizational development. Tremendous benefits may be realized through focusing resources and efforts here. The principal thrust bringing organizations together will be electronic linkages, such as EDI, EFT and other electronic links. Without parallel OD efforts, however, the information linkages in themselves will not be sufficient to realize the full benefits of these new relationships. Inter-organizational

effectiveness depends primarily on human resource management initiatives. HRM initiatives to support integration may take a number of forms. Joint training and development activities, career planning and paths that cut across multiple organizations, integrated planning and review activities, and task force and committee structures involving multiple organizations will be important areas of emphasis in building effectiveness.

HRM executives can play a key role in developing and maintaining enclaves designed to exist within other organizations, and in hosting "immigrant" enclaves within their own organization. Infrastructure support in areas such as benefits administration, performance review, and training must be provided and coordinated across organizations. The issue of re-entry from external assignments must also be managed.

These inter-organizational activities differ from more traditional "boundary-spanning" functions. In many instances, boundaries between organizations will become transparent, particularly those related to information resources. Vendors will be able to directly access suppliers' quality data, production schedules, delivery schedules, inventory positions, and operating systems. Suppliers will be able to view vendors' production and shipments data, marketing information, R&D, and other functional data. Thus, the challenges of information flow and communication may be diminished.

The larger challenge to be faced comes in the area of operating integration. Until operating procedures, standards, formats and even language have become consistent, the benefits of integration will not be realized. There are a variety of frameworks for managing the integration process. One organization, Florida Power & Light, distinguished by winning Japan's Deming Award, uses an interesting framework to manage the integration process. This company classifies its suppliers into five categories. The first category is a qualified supplier under traditional terms. By the time suppliers reach the fifth category, all transactions with Florida Power & Light are engaged over electronic linkages, and both firms have direct access to virtually all the other parties information resources and systems, which are fully aligned in terms of formats, procedures and structures. The two firms function in a co-processing environment for information management purposes.

The evolution through these various stages of electronic integration can be managed formally, with specific benchmarks used to indicate transition from one stage to the next. Such integration of information resources and functions is an essential element for success in strategic alliances, customer-supplier relationships, and interdivisional or cross-functional activities within a single organization.

Without the active involvement of the human resource management and organization development functions, however, successful integration is unlikely to occur. Active partnership between information systems and human resources executives may be the key to creating and maintaining effective business relationships. While information systems can provide the technical capability for inter-organizational bonding, the HR function must manage the staffing, training, team-building, and organization development and maintenance activities that are essential to effectiveness.

ORGANIZATIONAL IMPLICATIONS

Inter-organizational development efforts will commence at the periphery of the current organization and work inwards. More fundamental forces will impact the very core of today's organizations.

Organizational models have historically followed the business and operating principles that emanate from new technological capabilities. The core organizational models of the industrial economy did not emerge until relatively late in the industrial era. Those organizational principles, such as functional specialization, divisionalization, and budget-based control systems, appeared decades after the industrial enterprise itself. Under the premise that organization change follows shifts in business practices, the organizational models of the information economy will not emerge for some time. While the outlines of future organization models are now less clear than the business practices that will be conducted in those organizations, there are some lines of development that can already be perceived.

The business principle of real time customization, when applied to organization, suggests that firms may create unique combinations of standard organizational components in real time. Teams of specialized units or individuals can be assembled with relatively short notice to meet the needs of any particular business situation. This principle was espoused by the chief executive officer of Canada Trust Corporation, now the largest trust bank in London, during a planning meeting several years ago. He told the assembled senior executives of this fast-growing Canadian financial institution that none of the executives in the room would have offices in the new corporate headquarters building then being constructed in Toronto. After the initial shock, he then described how each officer would instead utilize whatever facilities were necessary to complete their current projects or assignments. He also told them that none of them would have a secretary. They would use human resources assembled specifically to support the specific activity in which they were engaged at any point in time. Executives would have constant access to all of the information resources of the organization via a sophisticated corporate information infrastructure.

While radical in today's world, such an approach may not seem so novel in a decade's time. Many firms are already experimenting with the concept of flexible organizations, and team-based structures. The concept of the network organization calls for the ability to assemble customized teams to address specific business requirements.¹⁶ At a more basic level, flexible organizations will be necessary to support new business practices such as on-demand production. Scheduling and staffing becomes far more complex when customers dictate demand levels and delivery modes in real time. Organization planners must find solutions to address these basic business requirements.

We foresee another fundamental shift in the notion of organization. The traditional logic of vertical integration has played an important role in the industrial economy. Vertical integration can be justified in many ways, but it is principally a response to market failure. If products or services can be secured reliably and efficiently from external markets, the case for vertical integration generally breaks

¹⁶ Miles, R. E. and Snow, C. C., "Organizations: New Concepts for New Forms," California Management Review, 3:62-73, 1986

down.¹⁷ The information economy is likely to drive significant increases in the efficiency of markets, as new market access and information dissemination mechanisms greatly increase the range of participants in any given market. As a result, the foundation for vertical integration will be eroded.

The shift away from vertical integration, or internalization, is highly consistent with the current focus on "core competencies" or those elements of the value added chain where a party has the strongest competitive advantage.¹⁸ Network organizations, such as Benetton or Apple Computer, focus on core functions and rely on a network of independent parties to perform the remainder of the functions essential to any given business.¹⁹ We believe this logic will be extended dramatically in the information economy. It is intimately linked to the phenomenon of outsourcing. Firms are securing a growing range of services and supplies from independent, external vendors.

Any function within an organization can, theoretically, be outsourced. But we needn't turn to outside firms to provide outsourcing services. Organizations can contract with their own internal units to provide business services. In the process, they are literally converting organization into business. That transition holds very important implications in terms of incentives, equity participation, performance analysis and measurement, tax, benefits and retirement planning, and a whole series of other organizational issues. Human resource managers will play a vital role in the transition from the monolithic corporations of today to the constellation enterprises of tomorrow.

The shifting of organizational resources from support and staff functions to what become business units holds important implications for corporate effectiveness. In essence, organizations that follow this path will be losing mass. They will become lean competitors. As staff and support functions, which often tend to be heavily bureaucratized, shift over to profit center businesses, we can expect to see an acceleration in the effectiveness and competitiveness of these companies. This trend can even be seen in the functional area that is most critical to the informationalization of businesses and organizations. The information systems function has been converted into a profit center in a growing number of organizations.²⁰

Outsourcing means the firm's cost structure will shift from one which entails significant fixed organizational overheads, to one in which a growing portion of the cost structure will be variable. That provides greater flexibility to the enterprise. A lower fixed cost structure will be valuable in periods of volatile demand, and it also gives the organization the kind of flexibility needed to shift to on-demand production and delivery

17 Scherer, F. M., Industrial Market Structure and Economic Performance, (Chicago: Rand-McNally, 1970)
Chandler, A., The Visible Hand, (Cambridge, MA: Belknap Press, 1977)
Williamson, O., Markets and Hierarchies, (New York: Free Press, 1975)

18 Prahalad, C. K. and Hamel, G., "Core Competitiveness," Harvard Business Review, May-June 1990, pp 79-94

19 These two examples are described in: "Benetton (A) and (B)" in Davidson, W. H. and J. De la Torre, Managing the Global Corporation (New York: McGraw-Hill, 1990)
and "Apple Computer", University of Virginia Case Study Number 0295

20 Allen, Brandt, "Make Information Services Pay Its Way," Harvard Business Review, January-February, 1987.

of goods and services. Traditional concepts of capacity utilization will become far less important as a growing portion of the value chain becomes variable cost.

The shift toward outsourcing will likely lead to increasingly sophisticated differentiation of corporate functions. Precise differentiation facilitates effective outsourcing, allowing the mother organization to retain control over key functions where desired.

Greater differentiation suggests that the basic structural unit of any organization will increasingly be driven down to the level of small teams or even individual persons. By such a process, we may yet come to the workerless factory: there will be no "workers" in the factory. They will all be self-employed business units. Many of those business units may consist of simply one person, and we may see the emergence of entirely new forms of cooperatives or unions.

It is also highly likely that information systems will ultimately displace many traditional corporate staff functions. Phillips Petroleum, for example, discovered in deploying an executive information system that it was able to reduce its staff to line ratio from about one-third to about one-eighth. By providing executives in the firm with direct access to virtually all corporate information resources, reliance on staff greatly diminished, and corporate performance surged. Phillips Petroleum jumped from being towards the bottom of the pack in the oil and chemical industry, in terms of returns on assets and profitability, to second place in just a few years following the introduction of this information system. Corporate executives attribute much of this dramatic improvement to the deployment of the executive information system.²¹ Such information systems are of the same type that allow mortgage bankers to review and approve loan applications in minutes instead of months. Such systems allow dramatic reductions in the number of units and individuals involved in any given decision, promoting organizational velocity and efficiency. These trends reinforce and enable the goal of empowerment within organizations.

CONCLUSION

The full implications of these shifts for HRM executives are not yet apparent. It is clear that the complexity and scope of HRM activities will increase dramatically. It is also likely that the HRM function itself will become increasingly differentiated, and that specific functions will be outsourced, often to former employees. Benefits planning and administration, recruiting, outplacement, employee training and executive development are only a few of the human resource management functions that are increasingly supported, if not provided, by external services. The HR function must not only manage this process for its own function, but support similar trends throughout the organization.

Human resource managers will be inextricably involved in defining and administering the terms for a myriad of new employment and supplier relationships. The very nature of the contract between organizations and their participants will undergo dramatic change. This trend can be anticipated and facilitated by creating flexible, innovative job descriptions and employment contracts. In turn, as diversity

21 From conversations with Robert Wallace, former president of Phillips Petrochemical Company

grows, the need for efforts to promote team-building, cultural focus and cohesion, and administrative integrity will rise accordingly.

HR executives will also play a central role in defining and implementing inter-organizational development efforts. Concepts such as the network organization, strategic alliances, EDI and many others, while sound in terms of business logic, will require considerable HR attention if they are to realize their full potential. But HR executives must also tend to their knitting. The administration of benefits, evaluation, compensation, and other core functions in the midst of dramatic organizational change will require considerable time and attention. Perhaps by enlightened and innovative management of these primary functions, HR executives can best play a central role in anticipating, enabling and supporting the broader transformation process for their organizations.