The new economics of organization

In classical microeconomic theory, a company is a "black box," a purposeful entity whose inner workings cannot be observed and whose behavior is determined almost entirely by the markets in which it competes. Executives and management practitioners, on the other hand, tend to behave as though changing the internal design and operation of a company can profoundly affect its performance.

Can the views of economists and managers be reconciled? Which innovations in corporate design are likely to succeed in the business environment of the next decade? We undertook a two-year research program to find out.

First, we analyzed the advantages and problems of today's largest corporations. Second, we examined the strategies and organizational designs of innovative and successful firms. These are few in number, and many of them are small. For that reason, they cannot act as a ready source of best practices for giant corporations to adopt. Yet they do offer a landscape attractive to executives for whom innovation and entrepreneurialism are aspirations rather than everyday realities.

Since the grounds for future competitive success cannot be understood solely on the basis of current practice, we also drew on the discipline of organizational economics, which analyzes organizational actions as outcomes of strategic interplay among individuals as they respond to incentives or otherwise pursue their own interests.

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In their purest forms, markets motivate and hierarchies coordinate

Have we learned to combine the best of both?

Two challenges for the corporations of the future: Entrepreneurialism and knowledge

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PICTOR INTERNATIONAL

Organizational economics thus looks inside the "black box" of the corporation by examining the task of motivating and coordinating human activity. Though not in the mainstream of economic thought, the field has matured rapidly, and several of its leading exponents have won Nobel prizes.* The work of such thinkers as Ronald Coase, Oliver Williamson, and Herbert Simon informs many contemporary practices in strategy and organization.†

Unlike classical microeconomics, organizational economics is not at odds with a managerial view of strategy and organization. Indeed, it complements it, giving us tools for designing and changing organizations with less recourse to such ambiguous concepts as "community," "trust," and "culture." There is nothing intrinsically wrong with these ideas, which may have a central part to play in the design of effective organizations. But they are difficult to define and can impede managers' communication.

With its focus on such ideas as ownership, decision rights, and incentives, organizational economics offers a practical tool in designing companies capable of responding to the business challenges of the twenty-first century.

What organizations do

Organizations exist to motivate their members and coordinate their activities. In general, corporate performance suffers when there is a lack of motivation, coordination, or both.

For many companies, the chief challenge is insufficient *entrepreneurialism:* a failure to motivate top talent to seize opportunities and make the most of them. For others, the problem is an inability to develop, apply, and capture value from new technologies and practices, and to forge value-creating linkages between processes, business units, and core functions. We might think of this as primarily a *knowledge* challenge, or a lack of coordination.

Frederick Winslow Taylor, the father of scientific management, described the classic command-and-control organization thus: "Each employee should receive every day clear-cut, definite instructions as to just what he is to do and how he is to do it, and these instructions should be exactly carried out, whether they are right or wrong."‡ Here, coordination is a matter of centrally dictating employees' activities in great detail. Treatment of this

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* Recent laureates include James A. Mirrlees and William Vickrey (1996), John F. Nash, John C. Harsancy, and Reinhard Selten (1994), Ronald Coase (1991), and Herbert Simon (1978).

† The central themes of organizational economics are presented in a highly readable form in Paul Milgrom and John Roberts, *Economics, Organization, and Management,* Prentice Hall, New Jersey, 1992.

‡ Quoted in Robert Kanigel, *The One Best Way: Frederick Winslow Taylor and the enigma of efficiency,* Viking, Sloan Technology Series, New York, 1997. Much of the conventional wisdom of modern management rests on Taylor's thinking.

ABOUT THE RESEARCH

This article draws on the work of a McKinsey research program, "Creating and leading the corporations of the future." Begun in 1996, its objective is to understand the design and conduct of the corporations that will succeed over the coming decade. Empirical studies, and case work in particular, have been combined with research into the theory of organizational economics, from which a number of important concepts have been adapted.

From McKinsey, the research team included Christian Barker, Sheila Bonini, Josh Bottomley, Jacob Dahl, Jonathan Day, Katherine Dewhurst, Nathaniel Foote, Michael Patsalos-Fox, David Meen, Martin Murphy, Jason Murray, Bryant Plavsic, Julian Snelder, John Stuckey, James Wendler, and Anne-Françoise Weyns.

The research team also included two academic economists, John Roberts of Stanford University and Bengt Holmstrom of the Massachusetts Institute of Technology. Their thinking has been central to the project, and they have provided conceptual and practical guidance to the team since the project's inception. Many of the ideas reported in this article were presented in John Roberts' 1997 Clarendon Lectures at the University of Oxford.

Because our goal is practical application rather than conceptual purity, we have taken liberties with some of the conceptual material of academic economics, and the McKinsey authors bear responsibility for any errors in this paper.

sort may easily lead to demotivation, as the discipline and monitoring put in place to ensure that work gets done also ensure that only minimum requirements are met.

Few executives today view organization in such a mechanistic way. Top performance now depends on extracting the full potential of talented individuals to reach levels of initiative and skill that the organizations of the past were never designed to exploit. As a result, the twin challenges of motivation and coordination are becoming ever more important. For some companies, particularly those in the fast-moving technology and pharmaceutical sectors, it is difficult to determine which is the more pressing. For most, however, one challenge predominates.

Motivation and entrepreneurialism

We all know the symptoms. When entrepreneurialism is lacking, the corporate center looms large. It makes the key decisions and launches the major initiatives, even when it professes to delegate authority. Line and functional managers lack the autonomy, the capital, and the information to make things happen.

Executives at the corporate center are responsible for critical decisions, particularly those concerning capital commitments. But as they tend to lack direct knowledge of the markets in which their companies operate, their

decisions can be poor. Critical issues inevitably receive too little attention or are overlooked.*

Lengthy authorization and consensus-building processes stifle initiative. Everyone knows that the corporate center will always intervene in matters of moment. Performance is difficult to measure and individual accountability is weak, so it is impossible to employ performance-based incentives. All these problems make it harder to attract and retain talented managers, who find they are rewarded better and have more opportunities to put their ideas into action elsewhere.

The business implications for such companies can be stark. Growth opportunities are missed. Urgent decisions are deferred. Smaller, focused competitors lure away profitable customers.

Coordination and knowledge

Many of the greatest challenges a corporation faces in coordinating its activities relate to knowledge. Though it pervades all forms of activity, knowledge has received surprisingly little management attention outside technical contexts. It must now become a central managerial concern (*see* the article that follows, "Best practice and beyond: Knowledge strategies").

It is easy to forget that finance made a similar transition not so long ago, spurred in part by the work of James O. McKinsey on planning and budgeting† and culminating in the development of modern corporate finance over the past 40 years. The theoretical and practical tools on which we now rely, such as net present value and the capital assets pricing model, were simply not available to previous generations of managers. We must learn to manage knowledge in an equally explicit and integrated way, and for the same reason: there is economic value in doing so.

Many management writers have recognized the importance of intangible assets in general, and knowledge in particular. Few managers today would confine themselves to an accountant's analysis of physical and financial assets in seeking to understand the value of a company. Yet despite the mounting interest in intellectual capital, the experience of many corporations

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* A number of economists and management thinkers have pointed out the similarities between many large corporations and socialist economies. Both feature centralized asset ownership; both are characterized by vertical information flows and central planning instead of the decentralized decision making, horizontal information flows, and price-guided coordination mechanisms of markets. Both suffer from what economists call "bounded rationality," or managers' inability to play the role of rational economic agents perfectly due to the limitations of the human intellect. Jay W. Forrester, founder of the system dynamics movement, develops this theme in his interview with Mark Keough and Andrew Doman, "The CEO as organization designer," *The McKinsey Quarterly,* 1992 Number 2, pp. 3–30.

† *See* his 1932 paper, "Adjusting policies to meet changing conditions," American Management Association General Management Series, AM116.

in managing knowledge and converting it into economic value is patchy and disappointing.

Some companies have set up business units in order to boost initiative, but have then struggled to bring about the interaction between units on which knowledge generation and value creation depend. Others remain insular, even though alliances are a powerful vehicle for value creation in their industries. Still others lack the leverage and skills to capture an adequate share of the value that their alliances create. Many lack both the incentives and the resources – people, processes, systems, and knowledge itself – to generate, refresh, and share knowledge.

For yet others, the knowledge challenge is more operational than strategic. An inability to share knowledge effectively means that though one business unit is aware of an opportunity, others are not, and the moment is lost. When frontline execution is the problem, an otherwise impressive knowledge advantage fails to translate into a competitive difference.

Whereas a corporation confronting an entrepreneurialism challenge typically knows where the opportunities lie but cannot motivate its people to pursue them vigorously enough, a corporation with a knowledge challenge can be blindsided by competitors exploiting opportunities of which it is not even aware. It may simply miss the boat strategically.

To find successful organizational designs, companies must solve the challenges of entrepreneurialism and knowledge in tandem. Neither the entrepreneurial drive of talented managers nor the sophistication of knowledge-based strategies will be sufficient in itself to secure success. Tomorrow's winners must have both.

The disaggregation imperative

Companies facing either or both of these challenges can best respond with some form of disaggregation: the devolution of decision-making authority within and beyond the organization, making the controlled economy of the firm more like a market. Many chief executives recognize the impact that market pressure can have on managers' performance. By devolving decision making, they seek to harness market forces to increase autonomy and accountability, boost entrepreneurialism, enhance business flexibility, and improve access to opportunities. The most important effect is to put decisions in the hands of the managers who are most familiar with the details of the business.

Internal disaggregation: Is it sufficient?

Corporations can be disaggregated in several different ways: internally, externally, or by combining elements of both. Internal disaggregation, where

decision-making authority is devolved to managers of business units but full ownership of assets rests with the corporation, is the most conservative option.

Internal disaggregation often resembles the decentralization and empowerment that many companies have embraced in recent years. The corporate center continues to intervene in planning and operations – sometimes far more than can be justified by its responsibilities to shareholders and legal authorities. This inevitably stifles entrepreneurialism and makes the company less attractive to talented managers.

Promises not to intervene suffer from what economists call "imperfect commitment." How can we believe that the corporate center won't intervene when it retains the right to do so? Not knowing when and how it might act, managers are forced to factor the possibility of its intervention into their day-to-day decision making. Despite its pledge to support autonomy, the center casts a long shadow.

Internal disaggregation can be effective only if steps are taken to tackle this problem. One approach is to establish explicit rules to govern the interaction between corporate center and units, with the CEO making a formal and public commitment to abide by them. This amounts to the staking of a "reputation hostage," an action that economists would say facilitates cooperation between two parties when one is in much the stronger bargaining position.

Another possibility is for the corporate center to limit its ability to intervene by withdrawing from certain activities and information flows, reducing its own resources, flattening the organization, or increasing the number of business units. Many of these moves raise the cost of intervention and thus reduce its frequency. ABB, for example, has a tiny corporate center but well over 1,000 business units, each separately incorporated. Intervention in one unit implies a choice not to intervene in the rest of the business.

External disaggregation: The radical alternative

At the other extreme is external disaggregation, where corporations spin off parts of their business to the financial markets, thus reducing or surrendering their ownership interest. Joint ventures may have similar effects.

External disaggregation sets formal limits on the corporate center's ability to intervene. It also exposes managers directly to the pressures of the financial markets. Both changes strengthen entrepreneurialism. Performance becomes more transparent when strict financial reporting replaces internal managerial reporting, and when the market's valuation is there for all to see. Influence costs – the direct and indirect costs incurred because of managers' preoccupation with securing the favor of the corporate center – are greatly reduced.

By allowing the managers of a unit to own an equity stake in its business, external disaggregation also helps companies deliver powerful incentives. Since strong incentives and devolved authority are economic complements – in other words, each makes the other more valuable – external disaggregation can, when properly thought out, make a substantial contribution to corporate value.*

Internal or external?

Many executives believe that internal disaggregation is superior to external because it is easier to achieve. Though spin-offs may enhance motivation, market discipline is harsh, they argue, so avoiding it should make the transition easier. External disaggregation involves heavy spending on lawyers, bankers, and investor relations personnel. By contrast, the success of exponents such as ABB, which appears to have solved the problem of imperfect commitment without relinquishing asset ownership, makes internal disaggregation seem all the more alluring.

In reality, however, internal disaggregation is much harder to get right because it is essentially a simulation. The corporate center is expected to act as if it doesn't have full control over the business units; the business units are expected to act as if they have autonomy. Both sides are expected to act as if the financial markets have a direct, enforceable claim over unit performance. As none of these conditions holds, the effectiveness of internal disaggregation depends entirely on the participants' ability to suspend disbelief and carry on the simulation.

Success may prove elusive. As the poor reputation of employee empowerment programs suggests, imperfect commitment can represent an insurmountable hurdle. In many ways, external disaggregation, with the clear signal it sends, is the more straightforward choice. Companies should at least start from the assumption that it is the more feasible and powerful option.

A broader meaning of organization

At first sight, external disaggregation may appear to lead to the dissolution of the organization as businesses are spun off to the financial markets. Seen in a wider perspective, however, markets are as much a form of organization as firms. Both are means of motivating and coordinating activity. What distinguishes them, as Exhibit 1 illustrates, is the different emphasis they give to motivation and coordination.

Market forms of organization are typified by arm's-length transactions. Personal initiative dominates, and participants cooperate only when an

* For recent empirical evidence, *see* Patricia Anslinger, Dennis Carey, Kristin Fink, and Chris Gagnon, "Equity carve-outs: A new spin on the corporate structure," *The McKinsey Quarterly,* 1997 Number 1, pp. 165–72.

Exhibit 1

Forms of organization

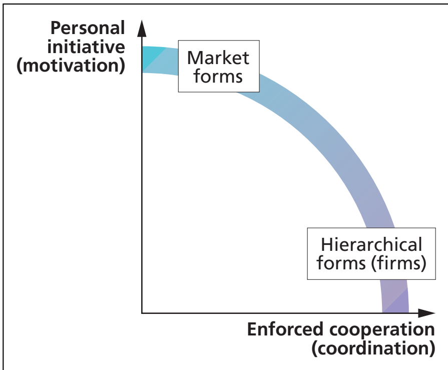


Exhibit 2

The impact of disaggregation

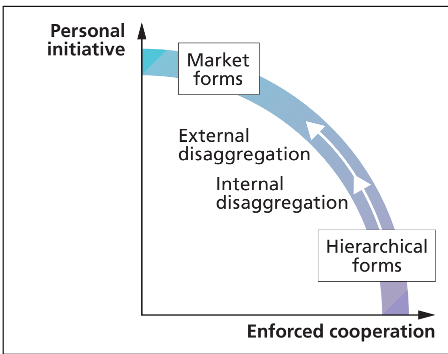
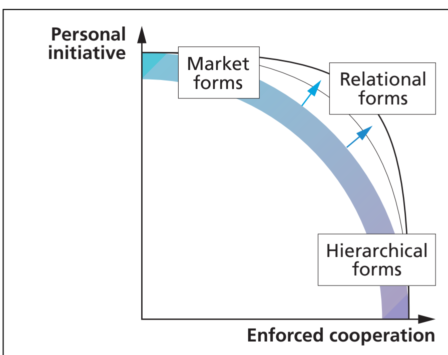


Exhibit 3

Innovative relational forms



acceptable bargain can be struck. Markets are a highly efficient mechanism for delivering simple, powerful incentives. By contrast, in firms – hierarchical forms of organization, as economists would say – a degree of personal initiative is sacrificed in the interest of cooperation.

In their purest forms, markets emphasize motivation and hierarchies emphasize coordination. Every organizational form falls somewhere between these two extremes, establishing its own tradeoff between personal initiative and enforced cooperation.

Internal and external disaggregation can both be understood as shifts away from enforced cooperation toward personal initiative (Exhibit 2). Both make a hierarchy more market-like. No organizational form is inherently superior, and many firms will combine several, using hierarchies where tight control is needed and more disaggregated forms where activities can be outsourced. When groups of firms work together, they also use different forms of organization to pursue different objectives. Viewed as a system for motivating and coordinating activity, Silicon Valley is as much an organization as General Electric or the British Civil Service.

Relational forms of organization

This framework might seem to suggest that a corporation must accept either limited personal initiative, or limited enforced cooperation. Fortunately, the reality is more promising. The broad space in the center of the curve is increasingly populated by innovative organizational forms (Exhibit 3).

These "relational" forms of organization, which include alliances, joint ventures, long-term supplier relationships, and licensing arrangements, allow companies to make market-based relationships more like the coordinated interactions within a firm. They make possible a better tradeoff between

personal initiative and enforced cooperation – one that continues to improve as organizational experiments proceed and management practice matures.

For the corporation, the result can be a sphere of influence that extends beyond the assets it owns and controls itself. This enables it to leverage others' assets to create value while minimizing its own capital outlays, to expand into new markets, and to draw on outside knowledge and talent. Corporations such as Coca-Cola have become skilled at knowing when to push activities (such as bottling) outside their ownership boundaries, and when to pull activities into their sphere of influence in order to extend their reach.

Such an approach often produces a diversity of organizational forms within a single enterprise. Some activities remain tightly controlled in hierarchies; others are pushed into markets; and yet others operate in relational forms. For an example, consider British Airways. Network scheduling, the heart of its operation, is managed close to the corporate center. Catering is outsourced to Gate Gourmet, a division of Swissair. Ticket sales and distribution are conducted via a number of market-based channels. Finally, BA manages a series of franchises and alliances with other carriers to own and fly aircraft and provide cabin crews.

Managing relational forms

Not every corporation that enters a relational form will gain. In many cases, the combination of personal initiative and enforced cooperation that alliances and other relational forms allow will create incremental value. However, the split of that value may favor one of the partners.

The key to capturing value within a relational form is ownership of an asset that is needed to make the greater value creation possible, and that is not readily available elsewhere. In the language of economists, such an asset is both scarce and complementary. Investment in such an asset increases returns on investment in its complementing assets.

Intangible assets such as brands, reputation, and knowledge often play this role in partnerships. A corporation that possesses strong relationships with customers, advanced manufacturing skills, or a key component technology can attract a partner that has a product in need of distribution, manufacturing, or technical improvement, and bargain hard for a substantial share of the value created by the partnership.

The value of intangible assets changes over time as a technology edge erodes, say, or a partner becomes an insider in a previously unfamiliar market. As a result, capturing the value from a relational form calls for careful planning and continuous monitoring. This is particularly true of knowledge-intensive

industries, because the value of knowledge tends to be especially volatile. In economic terms, the value generated by a relational form should remain high so long as both the scarcity and the complementarity of an asset are maintained.

But complementarity also operates within the corporation. Successful firms have assets and features of management in which each element increases the value of the others.[*] Conventional management wisdom, endorsed in such books as *In Search of Excellence*[†] and *Built to Last,*[‡] holds that alignment is an important goal: returns are increased when strategy, structure, systems, and so on are aligned. Complementarity renders this somewhat vague notion both precise and empirically testable.[§]

Complementarity explains not only how some organizations manage to create exceptional value, but also why becoming one of them is so difficult. The paradox of complementarity is that it makes exceptional returns possible, but rare.[||]

It is this very tendency for elements of a system to reinforce one another (the inertia or "stickiness" encountered by any manager who has ever worked on a change program) that makes it so hard to move from a low-value system of complements to a higher-value one. The early steps in the transition reduce value, often sharply, because complementarity is being reduced. Only after the change has reached an advanced stage does the positive effect of the new emerging system of complements outweigh the negative effect of the disturbance to the older system that is being replaced.

A further paradox is that disaggregation, as a process that fosters diversity across the corporation, actually increases local complementarity. This is so because in complex corporations with multiple activities and business units, there may be no single system of complements that applies across the board. Disaggregation makes it possible to tailor systems of complements unit by unit. A disaggregated technology firm, for example, may find it valuable to

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[*] *See* Paul Milgrom and John Roberts, "Complementarities and fit: Strategy, structure, and organizational change in manufacturing," *Journal of Accounting and Economics,* April 1995, Volume 19 Numbers 2–3, pp. 179–208.

[†] Thomas J. Peters and Robert H. Waterman, Jr, New York, Harper & Row, 1982.

[‡] James Collins and Jerry I. Porras, New York, Random House, 1994.

[§] *See* Casey Ichinoswki, Kathryn Shaw, and Giovanna Prennushi, "The effects of human resource management practices on productivity: A study of steel finishing lines," *American Economic Review,* June 1997, Volume 87 Number 3, pp. 291–313, which demonstrated complementarity between human resources practices in 36 steel finishing lines in 17 US companies. Lines operating with a complete set of "modern" practices (such as multiattribute incentive pay, extensive screening of new workers, and off-line training in technical skills and team problem solving) achieved a 6.7 percent productivity increase over those operating in a "traditional" manner. Yet changing one variable at a time had virtually no effect on productivity.

[||] Complementarity also figures in a recent article by Michael Porter that positions corporate strategy as the selection of highly complementing activities within a firm; *see* "What is strategy?," *Harvard Business Review,* November–December 1996, pp. 61–78.

establish different talent profiles, incentives, performance measures, and cultures for its research, marketing, and manufacturing units.

As disaggregation proceeds, an outmoded, low-value system of complements at the corporate level may be called into question, perhaps for the first time. A large, diversified, and poor-performing technology corporation that establishes a relational form with a smaller, more focused, and higher-performing partner, for instance, may gain more from learning how to change than from the actual business the two do together.

The difficulty of knowledge management

Instilling entrepreneurialism, while by no means easy to achieve, is none the less a readily comprehensible objective. The goals and means of knowledge management are altogether more difficult to grasp.

As an asset, knowledge has complex characteristics all of its own: extraordinary leverage and increasing returns; a tendency toward fragmentation and leakage; a need for refreshment; and uncertainty as to value creation and value sharing. Thanks to these characteristics, the need to manage knowledge more effectively is both a primary driver of disaggregation and a practical constraint on it. This is in sharp contrast to the challenge of entrepreneurialism, which can usually be addressed simply by increasing disaggregation.

Disaggregation helps to solve the knowledge challenge by increasing a corporation's "surface area," or the number of points at which it has access to knowledge. Corporations that participate in a multitude of relational forms are much more likely to stay in the knowledge flow than those that do not. Such access is as important in continuously refreshing knowledge as it is in acquiring it in the first place.

Moreover, knowledge generation often flourishes in smaller units, partly because their organization can be tailored to their specific challenges and requirements, as with the disaggregated technology firm that creates distinctive incentives and other design elements for research, marketing, and manufacturing. Knowledge generation also functions better in smaller units because the greater autonomy that comes with smaller scale is a strong complement with knowledge-generating activities. This explains why the outright acquisition of partners for their competence in generating knowledge so often fails. The complementarity within the unit disappears when it is assimilated into the organization of the new parent.

Yet disaggregation can also put up barriers to the generation of knowledge. Every business unit will have a bias toward maximizing its own value, and

will refuse to participate in knowledge sharing and other forms of cooperation unless they are in its interests. When they are not, opportunities to create value at the corporate level will be forgone.

Disaggregation can pose other difficulties too. The cost of coordination may surge as more units lead to many more interactions. Value capture may decline as a corporation discovers that some of the scarce complementary assets in its partnerships are held not by itself, but by its newly independent partners. Finally, the corporation may find that although as a disaggregated whole it remains in the knowledge flow, its corporate center is outside the flow and becoming less able to play a part in maximizing value creation. In extreme cases, such circumstances may lead to the breakup of the corporation.

On balance, however, we believe that companies should approach disaggregation more radically that they have to date. The effective design of relational forms and incentives can limit the risks involved. In any case, corporate centers would do well to show more humility in describing the role they play. Many have a long way to go before they can justly claim to have a positive effect on their company's ability to manage the challenges of entrepreneurialism and knowledge.

The shape of the modern firm

What sorts of corporation would result from the systematic application of the design principles we have outlined? Our research suggests that no single model will prevail. Rather, organizations will adopt a variety of shapes, and change them as new strategic challenges emerge.

One broad tendency can be identified, however. Economists speak of "the modern firm" as a federated body rather than a single hierarchical enterprise – one where the decisions of constituent units often precede or powerfully influence those of top management. Whereas historically firms have vertically integrated in order to control access to scarce physical resources, modern firms are internally and externally disaggregated, participating in a variety of alliances and joint ventures and outsourcing even those activities normally regarded as core. In the past, the incentives employed by firms were weaker than those that markets can provide; today, designers of modern firms are creating innovative and powerful incentive systems (*see* the article that follows, "Industrial venture capitalism: Sharing ownership to create value").

Despite the term "modern," there is strong evidence that disaggregated, federal designs go back several hundred years. The eighteenth-century North West Company featured decentralized decision making, a franchise-like structure, and strong incentive systems, features that enabled it to overtake

the entrenched Hudson's Bay Company despite its overwhelming structural advantages.[*]

More recently, a revolutionary analysis of the famous General Motors/Fisher Body case suggests that the relationship between the two firms, both before and after GM's acquisition of Fisher, was highly collaborative and based as much on the knowledge of the Fisher brothers as on the hard assets of Fisher Body's plants.[†]

We suspect that global competition, the growing importance of knowledge work, and the plummeting cost of information technology will increase the pressure on firms to adopt a modern disaggregated design. Our experience suggests that the role of the chief executives of the world's top corporations has already shifted from that of master entrepreneur or chief monitor of performance to that of architect, responsible for designing the organization to achieve the best tradeoff between personal initiative and enforced cooperation.

Given the size and scope of today's corporations, this is a daunting leadership task. Those who rise to the challenge will find that the principles of organizational economics provide useful tools for the job.

[*] *See* Paul Milgrom and John Roberts, *Economics, Organization, and Management,* pp. 6–9.

[†] *See* Susan Helper, John Paul MacDuffie, and Charles F. Sabel, "The boundaries of the firm as a design problem," in press.

FURTHER READING ON ORGANIZATIONAL ECONOMICS

Kenneth J. Arrow, *The Limits of Organization,* W. W. Norton, New York, 1974

Christopher Bartlett and Sumantra Ghoshal, "Beyond the M-form: Toward a managerial theory of the firm," *Strategic Management Journal 14,* Winter 1993, pp. 23–46

Alfred D. Chandler, Jr, *Strategy and Structure,* MIT Press, Cambridge, Mass., 1962

S. J. Grossman and Oliver Hart, "Corporate financial structure and managerial incentives," in John J. McCall (ed.), *The Economics of Information and Uncertainty,* University of Chicago Press, Chicago, 1982

Bengt Holmstrom, "Agency costs and innovation," *Journal of Economic Behavior and Organization,* 1988 Number 12, pp. 305–27

Robert Kanigel, *The One Best Way : Frederick Winslow Taylor and the enigma of efficiency,* Viking, Sloan Technology Series, New York, 1997

David Kreps, "Corporate culture and economic theory," in James E. Alt and Kenneth A. Shepsle (eds.), *Perspectives on Positive Political Economy,* Cambridge University Press, Cambridge, England, 1990, pp. 90–143

Paul Milgrom and Bengt Holmstrom, "Regulating trade among agents," *Journal of Institutional and Theoretical Economics,* 1989 Number 146, pp. 85–105

Paul Milgrom and John Roberts, *Economics, Organization, and Management,* Prentice Hall, New Jersey, 1992

Paul Milgrom and John Roberts, "Bargaining costs, influence costs, and the organization of economic activity," in James E. Alt and Kenneth A. Shepsle (eds.), *Perspectives on Positive Political Economy,* Cambridge University Press, Cambridge, England, 1990, pp. 57–89

Paul Milgrom and John Roberts, "Complementarities and fit: Strategy, structure, and organizational change in manufacturing," *Journal of Accounting and Economics,* April 1995, Volume 19 Numbers 2–3, pp. 179–208

Edith T. Penrose, *The Theory of the Growth of the Firm,* John Wiley, New York, 1959

Matt Ridley, *The Origins of Virtue,* Viking, New York, 1997

Richard P. Rumelt, Dan E. Schendel, and David J. Teece, *Fundamental Issues in Strategy: A research agenda,* Harvard Business School Press, Boston, Mass., 1994

Richard Schmalensee and Robert D. Willig (eds.), *Handbook of Industrial Organization,* Elsevier Science, North Holland, 1989. *See* especially the articles by Oliver Williamson, "Transaction cost economics," pp. 135–82, and Bengt Holmstrom and J. Tirole, "The theory of the firm," pp. 61–134

Herbert Simon, "Organizations and markets," *The Journal of Economic Perspectives,* Spring 1991, Number 5, pp. 25–44

John A. Stuckey, *Vertical Integration and Joint Ventures in the Aluminum Industry,* Harvard University Press, Cambridge, Mass., 1983

Karl Erik Sveiby, *The New Organizational Wealth: Managing and measuring knowledge-based assets,* Berrett-Koehler, San Francisco, 1997