

STRATEGY RESEARCH: GOVERNANCE AND COMPETENCE PERSPECTIVES

OLIVER E. WILLIAMSON*

Walter A. Haas, School of Business, University of California, Berkeley, California, U.S.A.

Business strategy is a complex subject and is usefully examined from several perspectives. This paper applies the lenses of governance and competence to the study of strategy.

Both the governance and the competence perspectives have had the benefit of distinguished antecedents. They have also had to deal with tautological reputations. I begin with the governance perspective, with emphasis on the six key moves through which it has been operationalized. I then examine the competence perspective in these same six respects.

Governance challenges the competence perspective to apply itself more assiduously to operationalization, including the need to choose and give definition to one or more units of analysis (of which the 'routine' is a promising candidate). The research challenges posed by competence to which governance can and should respond include dynamic transaction costs, learning, and the need to push beyond generic governance to address strategy issues faced by particular firms (with their distinctive strengths and disabilities). A lively research future for these two perspectives, individually and in combination, is projected. Copyright © 1999 John Wiley & Sons, Ltd.

Business strategy is an expansive enterprise. Not only do all of the functional areas in the business school relate, but strategy is, by nature, interdisciplinary. All of the social sciences—especially economics and organization theory—plus contract law are implicated. Indeed, in the high technology arena where some of the most difficult strategy issues reside, engineering and the law on intellectual property rights also have a bearing.

Of the various approaches to the study of strategy, this paper focuses on the governance and competence perspectives. Both perspectives combine economic reasoning with organization theory. As between these two, the governance

perspective gives greater prominence to economics, in that choice among alternative modes of governance is principally explained in transaction cost economizing terms, whereas the competence perspective gives greater prominence to organization theory, where the importance of process is especially featured.

Because the governance perspective got an earlier start and has been more fully operationalized, I begin with a sketch of the key moves out of which the governance perspective works. The long-awaited operationalization of competence is then examined with respect to the same six moves. Challenges posed by the competence perspective for governance—some of which I believe to be mistaken but the more important of which are wholly constructive—are addressed next. Concluding remarks follow.

Key words: transaction cost; contracting; competence; learning; strategy

*Correspondence to: Oliver E. Williamson, Haas School of Business, University of California, Berkeley, CA 94720-1900, U.S.A.

THE GOVERNANCE PERSPECTIVE

As I have discussed elsewhere (Williamson, 1985, 1996, 1998), the governance perspective has been the beneficiary of distinguished antecedents. Prominent among these is Ronald Coase's classic article on 'The Nature of the Firm' (1937). Rather than describe the firm in technological terms (as a production function), *firm and market* are described as alternative modes of governance, the choice between which was principally decided by transaction cost differences. His later article on 'The Problem of Social Cost' (1960) introduced the fiction of zero transaction costs but emphasized that choices, always and everywhere, had to be made between feasible alternatives. This emphasis on feasibility meant that the comparative institutional action turned on positive transaction cost features. John R. Commons likewise eschewed technology in favor of the economics of organization. According to Commons, 'The ultimate unit of activity ... must contain in itself the three principles of conflict, mutuality, and order. This unit is a transaction' (1932: 4). Not only does transaction cost economics agree that the transaction is the basic unit of analysis, but it views governance as an economizing response to the Commons triple.

Chester Barnard's insistence that organization was important and undervalued was likewise prescient. Like Friedrich Hayek, Barnard held that adaptation was the central problem of economic organization. But whereas Hayek (1945) emphasized spontaneous adaptation realized through the market, Barnard emphasized cooperative adaptation of a 'conscious, deliberate, purposeful' kind (1938: 4), working through administration. Key elements in Barnard's theory of internal organization included (1) a theory of authority, (2) the employment relation, (3) informal organization, and (4) economizing. Barnard's work was a turning point for organization theory, as subsequently developed by Herbert Simon (1947, 1957) and related work at Carnegie (March and Simon, 1958; Cyert and March, 1963) as well as by Philip Selznick (1949).

The progressive development and refinement of the market failure literature led Kenneth Arrow to observe that 'market failure is not absolute; it is better to consider a broader category, that of transaction costs, which in general impede and in particular cases block the formation of markets'

(1969: 49)—where by transaction cost Arrow had reference to the 'costs of running the economic system' (1969: 48).

These significant intellectual accomplishments and the intuitive appeal of transaction costs notwithstanding, the concept of transaction cost remained vague and elastic. There being too many degrees of freedom, any outcome could be rationalized after the fact by a suitable specification of transaction costs (Fischer, 1977).

Awaiting operationalization, Coase's 1937 article was 'much cited and little used' (Coase, 1972: 67). The operationalization of transaction costs finally got under way in the 1970s. Once begun, transaction cost economics has successively progressed from informal into preformal, semiformal, and fully formal modes of analysis (Williamson, 1996: 18–20).

Armen Alchian and Harold Demsetz (1972) proposed that technological nonseparabilities were the key factor in supplanting market by internal organization. Such nonseparabilities explain only small teams (Alchian and Demsetz, 1972; Marx, 1967, Vol. 1, Chap. 3), however, and do not engage contracting more generally.¹ How do we move beyond the employment relation to include complex contracting of other kinds? What explains the integration of technologically separable stages of activity? What explains nonstandard forms of contracting, such as customer and territorial restrictions, exchange agreements, and franchising? What explains the choice between alternative modes of finance (debt and equity)? What explains corporate governance in the large corporation? What is the economic rationale for regulation/deregulation? How does governance bear on the protection of intellectual property rights?

Directly or indirectly, these are all contractual issues—to which the lens of comparative contracting is well suited and in relation to which issues of organization are salient. My first transaction cost article (Williamson, 1971) dealt with vertical integration—or, in more mundane terms, with the make-or-buy decision. That turned out to be a prototypical problem. Variations on a few

¹ Geoffrey Hodgson holds that the 'contractual approach' is preoccupied with monitoring and metering. That is more the focus of the agency perspective (Alchian and Demsetz, 1972) rather than the governance perspective. For a comparison of these two, see Williamson (1975).

key themes followed. With the benefit of hindsight, transaction cost economics has been implemented through the six key moves described below.

HUMAN ACTORS

If 'Nothing is more fundamental in setting our research agenda and informing our research methods than our view of the nature of the human beings whose behavior we are studying' (Simon, 1985: 303), then social scientists should be prepared to name the key features of human actors to which their research project relates. Transaction cost economics names three.

Transaction cost economics eschews hyper-rationality in favor of bounded rationality—according to which human actors are intendedly rational but only limitedly so (Simon, 1961: xxiv). All complex contracts are unavoidably incomplete by reason of bounded rationality. But there is more. Are human agents myopic, in the manner of the behavioral theory of the firm (Cyert and March, 1963), or do they have the capacity for foresight, whereupon they look ahead and reposition? George Schultz's views on economics support the latter: 'my training in economics has had a major influence on the way I think about public policy tasks, even when they have no particular relationship to economics. Our discipline makes one think ahead, ask about indirect consequences, take note of variables that may not be directly under consideration' (1995: 1). The businessman Rudolf Spreckels knew this in his bones: 'Whenever I see something badly done, or not done at all, I see an opportunity to make a fortune.' Those instincts, if widely operative, will influence the practice and ought to influence the theory of economic organization. Transaction cost economics ascribes foresight rather than myopia to human actors.

Another attribute of core importance is that of self-interest. Transaction cost economics goes beyond the orthodox description of simple self-interest seeking to include strategic behavior—which manifests itself as adverse selection, moral hazard, and, more generally, as opportunism. Accordingly, human actors will not reliably disclose true conditions upon request or self-fulfill all promises. Contract as mere promise, unsus-

ported by credible commitments, will not, therefore, be self-enforcing.

But for opportunism, the courts would simply ask witnesses to 'tell us what you know that is germane to our decision.' That is not, however, the way testimony is taken. Witnesses are required to take an oath to 'tell the truth, the whole truth, and nothing but the truth': don't lie, don't conceal, don't mislead. The temptation for witnesses to prevaricate is thus recognized and, because perjury in the courtroom carries severe penalties, actively deterred.

UNIT OF ANALYSIS

Commons recommends that the transaction be made the basic unit of analysis. Transaction cost economics concurs.

To a first approximation, a transaction occurs when a good or service is transferred between technologically separable stages. Thus whereas there is a presumption that nonseparable activities will be organized under unified ownership (perhaps a team of the Alchian and Demsetz (1972) kind), the possible joinder of separable stages is not driven by technology but needs to be derived.

A basic move in the operationalization of transaction cost economics is to name the principal dimensions with respect to which significant transaction cost consequences accrue. Three of these key attributes are the frequency with which transactions recur, the uncertainty (disturbances) to which transactions are subject, and the degree to which transactions are supported by transaction specific assets. A good deal of the explanatory power of transaction cost economics turns on this last.²

DESCRIBING THE FIRM

As Kenneth Arrow observes (1999: vii):

Any standard economic theory, not just neoclassical, starts from the existence of firms. Usually, the firm is a point or at any rate a black box...

² As it turns out, asset specificity takes a variety of forms: physical, human, site-specific, dedicated assets, brand name capital, and temporal. A condition of bilateral dependency is associated with all, but the governance structure responses differ with the asset specificity particulars (Williamson, 1996).

But firms are palpably not points. They have internal structure. This internal structure must arise for some reason.

Transaction cost economics describes the firm not in technological terms (as a production function) but in organizational terms (as a governance structure). Indeed, firm and market are alternative modes of governance that differ in discrete structural ways. Chief among the attributes that describe a mode of governance are (1) incentive intensity, (2) administrative controls, and (3) the legal rules regime (Williamson, 1991). These in turn give rise to differential adaptive capacity—in both autonomous and cooperative adaptation respects. Alternative modes of governance are internally consistent syndromes of these attributes—which is to say each has distinctive strengths and weaknesses.

One of the important byproducts of this exercise is that students of organization are forced to confront the Coasian puzzle, Why not organize everything in one big firm? Thus if firms enjoy advantages in relation to markets, and if there are no offsetting burdens, then net benefits will always accrue upon taking a transaction out of the market and organizing it internally. That is contradicted by the data: both the fact of many firms and the failures of socialism in Eastern Europe and the former Soviet Union speak to the limits of central planning. What explains the limits of firms/centralization?

Transaction cost economics addresses this puzzle by joining two hypothetical moves: replication and selective intervention. If two unified stages can always do as well as two independent stages by instructing each stage to conduct 'business as usual' when things go well (that is, by replication) and will intervene always but only when things get out of alignment (that is, will intervene selectively), then the unified firm can never do worse (by replication) and will sometimes do better (by selective intervention).

Transaction cost economics then examines the mechanisms of replication and selective intervention and finds that both experience problems of implementation (Williamson, 1985, Chap. 6). Accordingly, because of the added bureaucratic costs that *unavoidably* attend the decision to take a transaction out of the market and organize it internally, the firm is advised to integrate only for 'compelling reasons.'

PURPOSES SERVED

Transaction cost economics holds that economizing on transaction costs is the 'main case'—which is not to say the only case. The attributes of human actors are centrally implicated. Thus one productive way to think about economic organization is as a means by which to economize on bounded rationality and mitigate the hazards that accrue to opportunism. Cognitive *specialization*, within and between firms, is a means by which to economize on mind as a scarce resource (Williamson, 1999b). And *governance* is an economizing response to the Commons triple, in that governance is a means by which to infuse *order* in a relation where potential *conflict* threatens to undo or upset opportunities to realize *mutual* gains.

It is furthermore interesting that evolutionary biology proceeds similarly. As Richard Dawkins has observed, 'One unique feature of man... is his capacity for conscious foresight' (Dawkins, 1976: 200). Indeed, it is the 'capacity to simulate the future in imagination... [that saves] us from the worst excesses of the blind replicators' (Dawkins, 1976: 200). The worst consequences to which Dawkins refers have their origins in selfishness: 'a predominant quality of a successful gene is ruthless selfishness' (1976: 2)—hence the title of his famous book, *The Selfish Gene*.

Credible contracting is very much an exercise in farsighted contracting, whereby the parties look ahead, recognize hazards, and devise hazard mitigating responses—thereby to realize mutual gain. These safeguards rarely take the form of pecuniary bonds but involve instead mechanisms of governance—information disclosure, discussion, dispute settlement of a private ordering kind (such as arbitration)—which permit the parties to work through their differences and get on with the job. Having the courts available for purposes of ultimate appeal nevertheless delimits threat positions, thereby providing support for private ordering. The efficacy of governance is thus jointly determined by local efforts (self-help to craft mechanisms) and as a function of the institutional environment (polity; judiciary; laws of property and contract).

More generally, transaction cost economics works out of the discriminating alignment hypothesis, according to which transactions, which differ in their attributes, are aligned with governance

structures, which differ in their cost and competence, so as to effect an economizing result. The simple contractual schema shown in Figure 1 is illustrative.

Thus assume that there are two alternative technologies for producing a good or service. One is generic ($k = 0$), which leads to the ideal transaction in both law and economics at Node A. The second requires transaction specific investments ($k > 0$) that cannot be redeployed to alternative uses and users without loss of productive value. These transactions pose hazards of bilateral dependency. Lacking security features ($s = 0$), such transactions will pose considerable risk, which risk will be priced out at Node B. If instead safeguards are provided ($s > 0$), these can take either market forms (Node C) or unified ownership (Node D). Because internal organization experiences added bureaucratic costs, the firm (Node D) is usefully thought of as the organization form of last resort: try markets, try hybrids (long term contractual relations into which security features have been crafted), and resort to firms when all else fails (comparatively). Node D, the firm, thus comes in only as transactions have especially high degrees of asset specificity and as added uncertainty poses greater needs for cooperative adaptation. Problems of protecting intellectual property rights can also give rise to a Node D outcome (Teece, 1986; Liebeskind, 1996).

With appropriate interpretation, each class of transaction—intermediate product market, final

product market, finance, labor market, knowledge, regulation, etc.—can be passed through variations on this same simple setup and refutable implications derived. To repeat, transaction cost economics works out of a few key themes.

EMPIRICAL

Some theories of economic organization make little effort to advance refutable implications. Among those that do, few are empirically tested. Simon evidently believes that transaction cost economics is remiss in empirical respects: awaiting empirical testing, ‘the new institutional economics and related approaches are acts of faith, or perhaps of piety’ (Simon, 1991: 27).

Coase had registered similar concerns about the dearth of empirical work on contract and organization twenty years earlier (Coase, 1972), but that was before the operationalization of transaction cost economics had begun and predicted alignments were advanced. Empirical applications of transaction cost economics got under way in the U.S. in the 1980s and have grown exponentially since: the number of published studies exceeds 400 and involves scientists in Europe, Japan, India, Mexico, South America, New Zealand, and the list goes on.

It could have been otherwise, but the theory and evidence display a remarkable congruity (Masten, 1995: xi). Recent empirical surveys include Howard Shelanski and Peter Klein

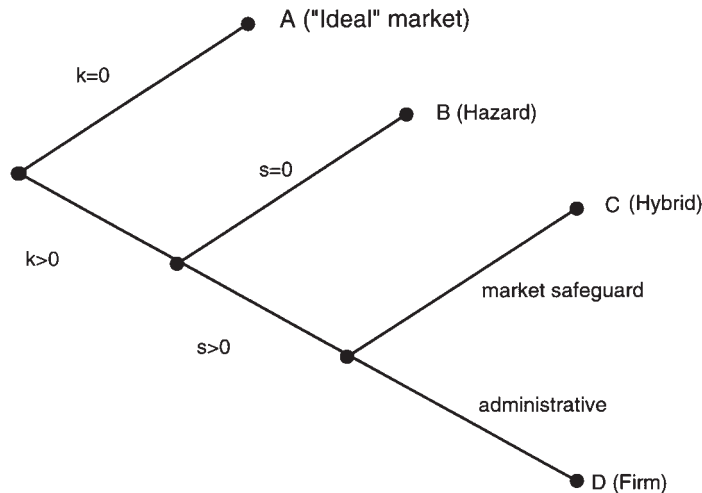


Figure 1. Simple contracting scheme

(1995), Bruce Lyons (1996), Keith Crocker and Scott Masten (1996), and Aric Rindfleisch and Jan Heide (1997).

Not only has this research been broadly corroborative of the predictions of transaction cost economics, but the importance of risk aversion to commercial contracting has been placed in doubt. To be sure, transaction cost economics, like everything else, will benefit from more and better empirical work. I have no hesitation, however, in declaring that transaction cost economics is an empirical success story. Paul Joskow concurs: 'this empirical work is in much better shape than much of the empirical work in industrial organization generally' (1991: 81).

EFFICIENCY CRITERION

Whereas I would describe the five foregoing moves as essential to the operationalization of transaction cost economics, the efficiency criterion described here is more of a conceptual rather than an operational move. It is nonetheless a conceptual move with operational significance. Because all feasible forms of organization are flawed, and because choice must be made from the feasible set, hypothetical ideals are operationally irrelevant (Coase, 1964; Demsetz, 1969).

The remediableness criterion holds that an extant condition for which no *feasible* superior alternative can be described and *implemented* with expected net gains is *presumed* to be efficient. Consider each of the italicized features.

Proposed forms of organization that make impossible demands on limited rationality fail the test of feasibility. Marginal cost pricing, for example, is often infeasible because it makes impossible information demands. Even, however, if a proposed superior alternative is feasible, it may fail the test of implementation. Collective action, for example, may be needed to implement the change, but the requisite agreement may be impossible to reach and/or enforce (by reason of bounded rationality and opportunism). Note in this connection that a potential gain may fail to be realized if agreement requires the consent of those who currently enjoy an advantage (e.g., the current beneficiaries of the U.S. sugar program). If current beneficiaries disbelieve implementation 'promises' that they will be made whole upon

terminating a program, then the requisite consent will be withheld. In that event, a preponderance of political support will be needed to override the status quo.

The presumed efficiency of an extant program is nevertheless rebuttable. The issues are somewhat involved and are discussed elsewhere (Williamson, 1996, 1999a). Absent rebuttal, remediableness stands as a reminder that it is impossible to be better than one's best.

THE COMPETENCE PERSPECTIVE

Richard Langlois and Nicolai Foss refer to a small but growing list of authors who have 'begun self-consciously referring to their work as lying within the confines of a 'capabilities,' 'dynamic capabilities,' or 'competence' approach (Langlois, 1992; Langlois and Robertson, 1995; Kogut and Zander, 1992; Foss, 1993; Dosi and Marengo, 1994; Teece and Pisano, 1994)' (1997: 13). Albeit complementary to transaction cost economics (Langlois and Foss, 1997: 4), this work is also different (Langlois and Foss, 1997: 15):

A key implication of the capabilities perspective as it relates to economic organization is that, in the terminology of G. B. Richardson (1972), the structure of complementarity and similarity among the various capabilities in the economy affects the pattern of organization (including the firm-market boundary) in ways not fully explicable in terms of the costs of transacting. Indeed, the ability to transact (and therefore the cost of transacting) is itself a capability (Winter 1988), which suggests a blurring of the boundary between production and exchange.

Much of this work draws inspiration from Edith Penrose's influential book on *The Theory of the Growth of the Firm* (1959) and Joseph Schumpeter's earlier work on *Capitalism, Socialism, and Democracy* (1942), especially as it relates to technical and organizational innovation. George Richardson's article on 'The Organization of Industry' (1972) is seminal. The book by Richard Cyert and James March on *A Behavioral Theory of the Firm* (1963) makes the case for a 'realism in process' approach to the study of organization. Richard Nelson and Sidney Winter's book on *An Evolutionary Theory of Economic Change* (1982) is in this same spirit and has had a significant

influence on the strategy literature. In short, the capabilities/competence perspective has distinguished antecedents, the overarching theme of which is the importance of process. Common theme notwithstanding, it is not obvious how to bring the more important processes together in a coherent way. Not only is process analysis hard to do, but there are many important processes. What are the priorities?

Every stream of research—orthodoxy, transaction cost economics, agency theory—has strengths and weaknesses and stands to benefit from good critics and from taking stock. The competence perspective is no exception, yet competence research has been curiously exempted from sustained critique. I do not attempt a sustained critique here but do pose two related concerns: obscure and often tautological definitions of key terms; and failures of operationalization. To be sure, ‘The early versions of most new paradigms are crude’ (Kuhn, 1970: 156). Eventually, however, all would-be contenders need to offer a positive research agenda (Kuhn, 1970: 77). There being many good ideas in the competence perspective, what precludes operationalization?

As noted earlier, the concept of transaction costs, which is central to the study of governance, also suffered from a tautological reputation. Although Coase responded that a tautology is the ‘criticism people make of a proposition that is clearly right’ (1988: 19), that is not entirely satisfactory. Sooner or later, a would-be theory must be asked to show its hand.

The concept of competence is also important and it too has acquired a tautological reputation (Porter, 1994; Mosakowski and McKelvey, 1997). Its obvious importance and intuitive appeal notwithstanding, a relentless commitment to the operationalization of competence is needed lest the study of competence experience the fate of American Legal Realism and run itself ‘into the sand’ (Schlegel, 1979: 459). Nicholas Georgescu-Roegen’s view of the scientific enterprise applies: ‘The purpose of science in general is not prediction, but knowledge for its own sake,’ yet prediction is ‘the touchstone of scientific knowledge’ (1971: 37). There being many would-be theories of the firm, there is a need to sort the wheat from the chaff. Predictions, data, and empirical tests provide the requisite screen.

Awaiting such developments, the competence perspective relies primarily on success stories

to make its case. The influential article by C. K. Prahalad and Gary Hamel on ‘The Core Competence of the Corporation’ (1990) helped to move the idea of core competence onto the agenda by ascribing greater core competence to Japanese than American corporations during the decade of the 1980s—especially contrasting the American firm GTE and its Japanese counterpart NEC. Whereas GTE plodded along, NEC moved ahead vigorously. More generally, Japanese firms were believed to be flourishing while their American counterparts were languishing (Prahalad and Hamel, 1990: 81–85). Ironically, considering the Japanese success at subcontracting, Prahalad and Hamel conclude that ‘too many [American] companies have unwittingly surrendered core competencies’ by engaging in outsourcing (Prahalad and Hamel, 1990: 84).

David Teece, Gary Pisano, and Amy Shuen ‘define those competences that define a firm’s fundamental business as core. Core competences must accordingly be derived by looking across the range of a firm’s (and its competitors) products and services’ (1997: 516). This is very nearly circular, in that it comes perilously close to saying that a core competence is a competence that is core. Teece *et al.* add in a footnote that ‘Eastman Kodak’s core competence might be considered imaging, IBM’s might be considered integrated data processing and service, and Motorola’s untethered communication’ (1997: 516, n. 4).

Both the Prahalad and Hamel and Teece *et al.* concepts of core competence are expansive and elastic. The ideas that firms possess both strengths (competences) and weaknesses (disabilities) and that they are engaged in intertemporal competence tradeoffs (in relation to which the condition of competition plays an important role) are, to say the least, underdeveloped. There being no apparatus by which to advise firms on when and how to reconfigure their core competences, the argument relies on *ex post* rationalization: show me a success story and I will show you (uncover) a core competence.³ (Or show me

³ More informative, often, than success stories are stories about failure—especially the failures of once successful enterprises to adapt to new circumstances. What is responsible for the inability to adapt? It being the case that firms have both competences *and* limitations, is the failure a predictable consequence of the limitations to which the firm is subject?

a failure and I will show you (uncover) a missing competence.)

Giovanni Dosi and Teece more recently describe the competence perspective as follows (1998: 284; emphasis in original):

...a firm's *distinctive competence* needs to be understood as a reflection of distinctive organizational capabilities to coordinate and to learn. By 'organizational capabilities' we mean the capabilities of an enterprise to organize, manage, coordinate, or govern sets of activities. The set of activities that a firm can organize and coordinate better than other firms is its distinctive competencies. Posed differently, a distinctive competence is a differentiated set of skills, complementary assets, and organization routines which together allow a firm to coordinate a particular set of activities in a way that provides the basis for competitive advantage in a particular market or markets.

This is in the expansive tradition to which I refer above and covers a lot of ground: competence entails coordination and learning, is based on skill, assets, and routines, and is judged in comparison with rivals.

Big ideas often take a long time to take on definition. Thirty five years expired between Coase's 1937 article and efforts to operationalize transaction costs in the early 1970s. Dating the origins of competence is arbitrary, but one candidate is Richardson's 1972 article in which 'capabilities' are introduced. If a 35-year gestation interval is added to 1972, the birth year for competence, after which operationalization will progress rapidly, will be 2007.⁴ On the possibility that the six-part program through which transaction cost economics works has relevance for competence, I examine how competence relates or could relate to these same six moves.⁵

Are those limitations remediable? If not, the 'failure' is the product of the syndrome of attributes that describe the firm. Having gone down a path to which highest expected net gains were projected at time t , the firm has to live with the (path dependent) consequences at time $t + T$.

⁴ The other obvious candidate is Penrose's 1959 book. In that event, the birth year of competence, given a 35-year gestation period, would be 1994.

⁵ That could be an unfair comparison, in that competence is asked to play on transaction cost turf. I can understand, therefore, if competence scholars propose a different basis for comparison. A parallel comparison across these same six moves is nonetheless instructive.

HUMAN ACTORS

The cognitive assumption out of which the competence approach works is that of bounded rationality, although that is sometimes implicit rather than explicit. Plainly, bounded rationality is featured in the behavioral theory of the firm (Cyert and March, 1963), which is an important forerunner to the work on evolutionary economics by Nelson and Winter (1982). Competence-based research, moreover, ascribes great importance to learning and implicitly assumes incomplete contracting, both of which owe their origins to bounded rationality.

As between myopia and foresight, the competence perspective mainly emphasizes the former.⁶ In the behavioral theory of the firm, for example, search is local and 'simple-minded,' learning takes the form of trial-and-error, and adaptations are induced by crises (so the firm resembles a fire department more than a strategic actor). The literature from experimental psychology (Kahneman, Slovic, and Tversky, 1982) is often cited in support of myopia, especially in relation to the learning and evolutionary literatures (Dosi, Marengo, and Fagiolo, 1996).

The competence literature is chary on the subject of self-interest. Foss, Christian Knudsen, and Cynthia Montgomery make no mention of self-interest whatsoever in their examination of behavioral assumptions (1995: 12–13) and others treat it gingerly. Self-interest in the Carnegie setup admits to subgoal pursuit, but Simon eschews opportunism in favor of 'frailties of motive' (1985: 304). Indeed, much of the competence literature displays an active aversion to opportunism and places emphasis on what Diego Gambetta has referred to as 'the elusive notion of trust' (1988: ix).

Whereas the competence perspective concedes the need to economize on mind as a scarce resource, it is curiously reluctant to treat trust in a calculative way. The concept of credible commitment, for example, which implies a calculative approach to contract and plays a crucial

⁶ The resource-based approach associated with Penrose, however, views strategy as having a strongly intentional element (Foss, Knudsen, and Montgomery, 1995: 12). As Sidney Winter puts it, 'The heart of the normative guidance offered by the resource-based view lies in the idea of leveraging the idiosyncratic profit opportunities in existing resource endowments' (1995: 148).

role in the economics literature, usually goes unmentioned. By contrast, both mind and trust (the absence of opportunism) are scarce resources under the transaction cost economics setup, whence the cost-effective development and deployment of both mind and trust are projected.

UNIT OF ANALYSIS

Foss *et al.* hold that the routine is the basic unit of analysis for evolutionary theory whereas the resource is the basic unit of analysis for resource-based theory (1995: 10). Sidney Winter evidently agrees and discusses resources and routines as follows (1995: 149; emphasis in original):

[According to] Wernerfelt (1984)... the term 'resources' embraces 'anything that could be termed a strength or weakness of a given firm...—(tangible and intangible) assets which are tied *semi-permanently* to the firm.' Subsequent discussion in the literature has emphasized the resources that underlie competitive advantage ('strengths'), and has sought to identify the characteristics such resources must have if success is to be sustained. The term 'routine' has been used in evolutionary economics in a similarly expansive fashion. Nelson and Winter (1982) say that '...most of what is *regular and predictable* about business behavior is plausibly subsumed under the heading 'routine.'

Joseph Mahoney and Rajendran Pandian observe that 'The essential theoretical concept for explaining the sustainability of rents in the resource-based framework is "isolating mechanisms"' (1992: 371). A list of eleven such mechanisms is then developed, to which they ask, 'what is the generalizable insight' (1992: 371)? Their response that 'isolating mechanisms exist because of *asset specificity* and *bounded rationality*' (Mahoney and Pandian, 1992: 373; emphasis in original) is very much in the spirit of transaction cost economics. Arguably, however, the concept of resources is more composite, in that it refers to a cluster of related transactions. In that event, the challenge is to define and dimensionalize clusters.

According to Nelson and Winter, 'routines play the role that genes play in biological evolutionary theory' (1982: 14). Routines are persistent, heritable, and selectable 'in the sense that organisms with certain routines may do better than others' and grow relatively (Nelson and Winter, 1982:

14). Three kinds of routines are distinguished: short run routines that determine the firm's operating characteristics; investment routines; and routines which 'modify over time various aspects of the operating characteristics' (Nelson and Winter, 1982: 16–17). These routines inform 'the dynamic processes by which firm behavior patterns and market outcomes are jointly determined over time' (Nelson and Winter, 1982: 18), which is the core concern of evolutionary theory.

If routines are to economic organization what genes are to biology, then we are evidently onto something very basic. As Dosi *et al.* put it, routines are 'foundational' (1996: 10). But how, then, does the routine get implemented? The department store pricing study by Cyert and March (1963, Chap. 7) is the most fully developed illustration of the explanatory power of routines of which I am aware.

As against the orthodox prescription to set prices on the basis of marginal costs and demand elasticities, Cyert and March maintain that prices are set by simple routines. Exclusive items and import items excepted, the standard department store markup rule is simple: 'Divide each cost by 0.6 (1-mark-up) and move the result to the nearest \$.95' (Cyert and March, 1963: 138). Other (more extensive) routines apply to sale pricing and mark-downs (Cyert and March, 1963: 140–145). The predictive powers of these three routines were thereafter tested with the following results (Cyert and March, 1963: 147):

- (1) normal pricing: from a random sample of 197 invoices, 188 were correctly predicted;
- (2) sales pricing: from a random sample of 58 items, 56 were predicted correctly;
- (3) mark-down pricing: from a sample of 159 items selected, 140 were correctly predicted.

The criterion for judging a successful prediction in all three cases is that prices must be correctly predicted 'to the exact penny.'

Although they contend that their computer model 'lends itself to further elaboration and testing' (Cyert and March, 1963: 148), few organization theorists and almost no economists have followed that empirical lead.⁷ Nelson never-

⁷ Many potential units of analysis never take on sufficient definition to be broadly useful. Simon, for example, refers to the sociological concept of role as a potential unit of analysis,

theless maintains that routines inform the idea of core competence (1991: 70):

The notion of a hierarchy of organizational routines is the key building block under our concept of core organizational routines... If the lower-order routines for doing various tasks are absent, or if...there is no practical higher-order routine for invoking them [as needed]..., then the capability to do that job lies outside the organization's extant core capabilities.

The pricing rules to which Cyert and March refer are presumably the lower-order routines in such a scheme of things, while the routines for switching among pricing rules are higher-order. But while there is no disputing that department stores with better lower-order and higher-order pricing routines will perform better than those with worse, the possession of such a core competence does not take us very far in describing the overall competitiveness of this or any other department store. What are the questions to which the concept of routine is permitting us to give answers? What are the attributes with respect to which routines are described?

Implementing this last would be tantamount to treating the routine as the counterpart of the transaction. But there is another possibility: routines are a way by which we describe organization forms. Such a concept is suggested by Benjamin Coriat and Dosi, who distinguish between 'two archetypal sets of routines..., namely 'Tayloristic' and 'Ohnistic' (loosely speaking, 'Japanese') production methods' (1998: 116). It is their position that 'particular sets [clusters?] of routines can be traced back to the

but observes that 'the term has never been given sufficiently precise definition' (Simon, 1961). He thereafter goes on to nominate the decision premise as the unit of analysis: 'Behavior can be predicted ...when the premises of the decision are known (or can be predicted) in sufficient detail' (Simon, 1961). The decision premise as the unit of analysis for the study of organization has yet to be shown to have broad applicability.

The same applies to the concept of capabilities, which Richardson introduces with the observation that the functional activities in an industry need to be 'carried out by organizations with appropriate *capabilities*, or, in other words, with appropriate knowledge, experience, and skills' (1972: 888; emphasis in original). He subsequently concedes that the 'notion of capability is no doubt somewhat vague' (1972: 888) and refers to Penrose on how capabilities slowly evolve (Richardson, 1972: 888). The operationalization of capabilities has also been slow to evolve, which may explain the replacement of the term capabilities by competence.

coevolution between corporate patterns of knowledge distribution and mechanisms of coordination and governance' (Coriat and Dosi, 1998: 116).

So conceived, routines are a much more composite concept than the pricing rules to which Cyert and March refer. Indeed, Taylorism and Ohnism are more akin to the organization form distinctions that I made when examining the organization of work (Williamson, 1980). This latter entailed the comparison of six work modes—putting-out, federated, communal-emh, peer group, inside contracting, and authority relation—across product flow attributes, job assignment attributes, and incentive attributes. The Coriat and Dosi groupings (knowledge distribution; mechanisms of coordination; governance) are related but different. Might these be worked up in such a way as to operationalize the study of work organization more fully and effectively? Still another possibility is to operationalize the concept of routine by appealing to the cognitive science notion of 'script' (Nooteboom, 1999b).

DESCRIBING THE FIRM

The competence perspective also rejects the idea of the firm as a production function and emphasizes management and organization features instead. Starting from the basic unit of analysis, suppose that the firm is described as the aggregation of those basic units for which internal organization enjoys a comparative advantage. The firm then is a bundle of related resources (from the resource-based perspective), a bundle of routines (from the evolutionary perspective), and a bundle of transactions/contracts (from the transaction cost economics perspective).

According to Geoffrey Hodgson, the competence perspective can answer the same key questions of the existence, structure, and boundaries of the firm 'at least as well as the transaction cost and other contractarian theories' (1998: 181). He thereafter argues that the principal factor 'explaining the existence, boundaries, nature and development of the firm is the capacity of such an organization to protect and develop the competences of the groups and individuals contained within it, in a changing environment' (Hodgson, 1998: 189). But while he follows this with a series of interesting remarks about formal and informal relations, tacit knowledge, mental models, organi-

zational learning, trust, dynamic corporate culture, and the like, we are never told why these effects work better (or worse) in a unified firm (AB) rather than in two autonomous firms (A and B).

Relatedly, Hodgson (and the competence perspective) never address the limits to firm size issue—except, perhaps, in the limits to growth to which Penrose (1959) refers. Thus although Hodgson avers that ‘Firm competences have limits of scale and scope’ (1998: 192), the supporting logic is not developed. The burdens of bureaucracy are curiously slighted by the competence literature.

This does not, however, mean that the competence perspective is unneeded. One possibility, which I discuss later, is that transaction cost economics informs the *generic* decision to make-or-buy while competence brings in *particulars*. That is broadly congruent with Dosi’s view (quoted by Hodgson (1998: 195)) that ‘the boundaries of the corporation need to be understood not only in terms of transaction cost considerations, but also in terms of learning, path dependencies, technological opportunities, selection, and complementary assets’ (Dosi, 1994: 231). Evidently composite transactions (clusters) and process considerations need to figure more prominently. I do not disagree but would urge that there is a need to breathe operational content into such competence features.

PURPOSES SERVED

According to Penrose, the distinctive competence of the firm resides in making better use of its resources (1959: 24). Sidney Winter similarly describes firms as ‘repositories of productive knowledge’ (1988: 175), to which Martin Fransman agrees (1994: 715). Differential learning within and between firms is evidently key: ‘firms exist because they can more efficiently coordinate collective learning processes than market organization is able to’ (Foss, 1996c: 18). Hodgson concurs that firms enjoy efficiency advantages in relation to markets because of ‘the relative intensity and longevity of interpersonal relations within the firm and the group and institution-based characteristic of much of the learning and knowledge within that organization’ (1998: 193).

This line of argument finesses the question, however, of when to learn in a single, combined firm rather than in two or more autonomous firms. Thus

the decision to buy in the market rather than make to one’s own needs is not between zero firms (market) and a single firm (produce internally) but rather is between (at least) *two* firms (supplier and buyer) and *one* firm (produce internally). Given that all firms are repositories of knowledge and that all firms learn and develop interpersonal relations, the question is when is this best done in separate firms rather than in one. That issue is never addressed, much less worked through, in a comparative institutional way.

A related issue has, however, been posed by Teece (1986) and subsequently addressed by Julia Liebeskind (1996) in the context of weak property rights for knowledge. If interfirm contracting exposes a firm to the leakage of proprietary knowledge (because the knowledge cannot be patented, possibly because the knowledge disclosed is much broader than that which can be patented, and/or patents cannot be effectively enforced), then a firm will take self-protective measures to reduce the leakage of such knowledge. Goods or services which, in a regime where proprietary knowledge is secure, would be contracted out will be undertaken by the firm instead (Teece, 1986).

As Liebeskind points out, that implies that the mechanisms for protecting knowledge internally are superior to those that attend interfirm contracting. Albeit intuitively ‘obvious,’ that intuition needs to be worked through. What, precisely, are the mechanisms through which this differential protection is realized? As Liebeskind develops (1996), the comparative institutional action resides in interfirm and intrafirm differences in the mechanisms of governance.

That, in effect, is a transaction cost argument. She particularizes it, however, by observing that ‘not all firms may be equally competent at deploying their institutional capabilities to protect their knowledge’ (Liebeskind, 1996: 104). I agree and would urge that a second move be made: *Which* firms are more and which are less competent in deploying their institutional capabilities to protect their knowledge? If and as this question is addressed, we begin to operationalize the competence perspective.

EMPIRICAL

As discussed above, much of the competence perspective entails *ex post* rationalizations for

success and has been remiss in predictive respects. Yasemin Kor and Joseph Mahoney nevertheless contend that 'resource-based theory has begun to generate a substantive stream of statistical data analysis' (1998: 28) and list nearly 50 articles of this kind. Many of the hypotheses to which they refer test for the 'importance of' various resources—of which unique resources, organizational factors, competencies, and property rights are prominently included. The generic hypothesis is that 'more' of the resources named have a positive influence on the growth and performance of the firm. Whether, however, more resources are really better than less should be judged comparatively—in that some resources will be put to more productive use if the firm accesses them through outsourcing. No such comparative assessment is attempted.

That moves the issues onto transaction cost turf, but they can be returned to the more composite competence perspective by repeating the strategy referred to above: *Which* firms with what organizational attributes will deploy what types of resources to more productive advantage? Issues of an organization form kind, akin to those discussed earlier (Coriat and Dosi, 1998; Williamson, 1980), are implicated.

One way of looking at the research opportunity is to view transaction cost economics as feeding into the competence perspective in much the same way as organization theory is grist for the study of governance (where the latter is examined in Williamson (1996, Chap. 9)). Albeit underdeveloped, the relation between governance and competence is beginning to take shape and would appear to hold promise.

EFFICIENCY CRITERION

The core competence literature frequently describes transaction cost economics as static and avers that competence deals with dynamic efficiency, where dynamic efficiency 'is essentially about learning and innovation' (Hodgson, 1998: 188). This 'emphasis on dynamics and learning in an out-of-equilibrium context enables a more satisfactory accommodation of the real world of firm heterogeneity' (Hodgson, 1998: 189). Path dependency is often implicated, sometimes with a claim that path dependency is responsible for inefficiency (where inefficiency is

judged by comparing an actual condition with a hypothetical ideal). That is in the zero transaction cost tradition of Pigou with which Coase (1960) took vigorous exception. A feasible criterion for judging dynamic efficiency is never proposed. Remedialness considerations are never reached.

Challenges posed by the competence perspective for transaction cost economics

There are many respects in which the competence and transaction cost perspectives are congruent. Both take exception with orthodoxy, both are bounded rationality constructions, and both maintain that organization matters. Also, as discussed above, they deal with partly overlapping phenomena, often in complementary ways. But there are real differences and some tensions between the two. I deal here with competence challenges of two kinds: those that I regard as largely mistaken, and those which pose research opportunities.

MISTAKEN CRITIQUES

Transaction cost economics needs good critics, but some of the criticisms that have been made are, I think, overdrawn or mistaken. The three criticisms on which I focus here are that (1) opportunism does not have the organizational consequences that have been ascribed to it, (2) transaction cost is a static concept and needs to be made dynamic,⁸ and (3) governance does not engage the issues of management. These are not new criticisms. That I have been 'misunderstood' on these matters is disconcerting. Authors have an obligation to make themselves clear.

OPPORTUNISM

Opportunism is so familiar that we often fail to acknowledge it and its consequences when we

⁸ Another frequent criticism of transaction cost economics that I do not address here is that both production and transaction costs matter. I agree. My paper with Michael Riordan examines these issues and concludes that most, but not all, of the qualitative predictions that obtain when production costs are held constant survive when production cost differences are introduced (Riordan and Williamson, 1985).

see it.⁹ The legal oath to which I referred earlier is one illustration, but there are many others. Absent opportunism, all of the following would vanish: moral hazard, adverse selection, shirking, filtering, undisclosed subgoal pursuit, distortions, and all other strategic deceptions. If, moreover, as hitherto stated, governance arises (in part) to mitigate these hazards, then to assume the absence of opportunism will miss much of the action. Our understanding of economic organization would be needlessly impoverished as a consequence.

To concede opportunism is not, however, to celebrate it. Some economists have nevertheless been heard to say—often in jest, but not always—that ‘avarice is the only reliable human motive.’ That is a cynical and unhelpful construction. Many students of organization are understandably put off by opportunism (Ghoshal and Moran, 1996; Kogut and Zander, 1996; Hodgson, 1998).

Kathleen Connor and C. K. Prahalad (1996), in an influential and thoughtful critique (with which, however, Foss (1966a, b) takes exception), concede that opportunism has a massive influence on economic organization but insist that many interesting problems of organization are posed *even in the absence of opportunism*. They take the position that information asymmetry, in a world of bounded rationality/zero opportunism, is a candidate condition upon which to construct a ‘knowledge-based theory of the firm’ (Connor and Prahalad, 1996: 484). A key part of their argument is that because ‘some of each person’s knowledge remains private’ (Connor and Prahalad, 1996: 483), ‘honest persons may disagree as to the best allocation of individual responsibilities, or whether a particular arrangement of decision roles has the potential to generate net gains,’ whence markets may need to be supplanted by an authority relation, thereby to avoid disagreement, haggling, and discord (Connor and Prahalad, 1996: 483).

My main response to this argument is that zeroing out opportunism has different and more pervasive organizational consequences than Con-

nor and Prahalad describe. The general effect of presuming the absence of opportunism is that we enter the world of what Frank and Fritzie Manuel describe as ‘utopian fantasies’ (1979: 1). As I have developed elsewhere (Williamson, 1999b), the ideal forms of organization that will be observed under zero opportunism will take the form of a peer group (if every member has the same ability) or ideal merit assignment (if abilities differ). But a somewhat different and more operational way to put it is that the incentive, control, and contract law differences that define alternative modes of governance (Williamson, 1991) all vanish if opportunism is zeroed out. Thus (1) no incentive differences will appear among modes because all members of every group subscribe to the same ‘general clause’ (Williamson, 1975: 237, 91–93; 1985: 64–67) and implement the same objective function in the same fully committed way; (2) all cost-effective regularities (practices and procedures) that are adopted by one group will also be adopted by another—whatever the nominal form of organization (private firm, public bureau, nonprofit, autonomous market) from which they start; and (3) contract law differences serve no purpose among groups all of which share the same purpose and converge to the same form. Note, moreover, that the conflict and haggling to which Connor and Prahalad refer will never appear in opportunism-free groups, it being the case that every such group will work out its differences instrumentally.

There is, however, a caveat—especially to my argument that control differences vanish. The above argument assumes that initial conditions do not matter. If the organization form that is prescribed for a task is ‘nearly optimal’ for one group but far from optimal for another, then the second will need to undergo greater change, which will place it at an initial disadvantage—which disadvantage could be compounded by differential learning. But this does not imply that the firm is the superior form. Thus although Connor and Prahalad ascribe authority (centralization) benefits to firms, there will be other transactions for which markets (decentralization) will be the favored form.

The possibility that initial conditions can be more consequential than they are usually treated by transaction cost economics is nevertheless

⁹To deny or suppress opportunism in the study of economic organization is tantamount to staging Hamlet without the Prince of Denmark—which, however, is not to say that such a play/theory of organization could not be staged. (Team theory (Marschak and Radner, 1972) is illustrative.)

well-taken. I return to this issue in my discussion of strategy and learning, below.

DYNAMIC TRANSACTION COSTS

A common critique is that transaction cost economics is static because it works out of an equilibrium contracting setup. Richard Langlois (1992) takes this position in his paper on 'Transaction-Cost Economics in Real Time.'¹⁰ According to Langlois, dynamic transaction costs are 'the costs of persuading, negotiating, coordinating, and teaching outside suppliers' (1992: 113). So construed, dynamic transaction costs are 'the costs of not having the capabilities you need when you need them' (Langlois, 1992: 113). More generally 'these costs of persuasion... [are] costs of coordinating separate stages of production. David Teece encapsulates the argument nicely' (Langlois, 1992: 115), whereupon Langlois quotes Teece as follows (Langlois, 1992: 115):¹¹

If there is a high degree of interdependence among successive stages of production, and if occasions for adaptation are unpredictable yet common, coordinated responses may be difficult to secure if the separated stages are operated independently. Interdependence by itself does not cause difficulty if the pattern of interdependence is stable and fixed. Difficulties arise only if program execution rests on contingencies that cannot be predicted perfectly in advance. In this case, coordinated activity is required to secure agreement about the estimates that will be used as a basis for action. Vertical integration facilitates such coordination.

This argument also reduces, at least in some respects, to a contractual-incompleteness argument. Were it feasible to stipulate exhaustively the appropriate conditional responses, coordination could proceed by long-term contract. However, long-term contracts are unsatisfactory when most of the relevant contingencies cannot be delineated. Given these limitations, short-term contracts are likely to be considered instead... Even if short-term contracts are defective neither on account of investment disincentives nor first-mover advantages, the costs of negotiations and the time required to bring the system into adjustment by exclusive reliance on market signals are apt to be greater than the costs of administrative processes under vertical integration.

¹⁰ The argument is repeated in his paper with Foss (Langlois and Foss, 1997).

¹¹ The original appears in Teece (1976: 13).

I have no problem with the argument that vertical integration can arise in response to ex ante investment concerns as well as in anticipation of ex post contracting problems. Indeed, the explanation that Langlois ascribes to Teece is one that I had made previously. I see no reason, however, to refer to ex post contracting as a static construction and ex ante as dynamic. Both are intertemporal arguments and are consonant with the basic transaction cost economics thesis—namely, that problems of organization are not predominantly technological but have their origins in the attributes of transactions on the one hand and of human actors on the other.

As an examination of my original statement reveals,¹² incomplete long term contracts will prospectively fail to anticipate and/or make correct provision for future contingencies (the March and Simon argument), while classical market contracting will not reliably effect convergent expectations (the Malmgren argument). The first of

¹² My initial treatment (since reproduced in *Markets and Hierarchies* (1975: 87–88)) is as follows (Williamson, 1971: 120–121):

[I]f there is a high degree of interdependence among successive stages of production and if occasions for adaptation are unpredictable yet common, coordinated responses may be difficult to secure if the separate stages are operated independently. March and Simon (1958: 159) characterize the problem in the following terms:

Interdependence by itself does not cause difficulty if the pattern of interdependence is stable and fixed. For, in this case, each subprogram can be designed to take account of all the subprograms with which it interacts. Difficulties arise only if program execution rests on contingencies that cannot be predicted perfectly in advance. In this case, coordinating activity is required to secure agreement about the estimates that will be used as the basis for action, or to provide information to each subprogram unit about the activities of the others.

This reduces, in some respects, to a contractual incompleteness argument. Were it feasible exhaustively to stipulate the appropriate conditional responses, coordination could proceed by contract. This is ambitious, however; in the face of a highly variable and uncertain environment... long-term contracts [can be expected to experience strain and] vertical integration may be indicated.

But what of the possibility of short-term contracts? It is here that the convergence of expectations argument is of special importance. Thus assume that short-term contracts are not defective on account either of investment disincentives or first-mover advantages. It is Malmgren's (1961) contention that such contracts may nevertheless be vitiated by the absence of structural constraints. The costs of negotiations and the time required to bring the system into adjustment by exclusive reliance on market (price) signals are apt to be great in relation to that which would obtain if successive stages were integrated and administrative processes employed as well or instead.

these has reference to timely adaptations (ex post), the second to timely convergence (ex ante). Both are intertemporal applications of transaction cost reasoning.

But my major point is this: intertemporal complications are not merely incidental but are *central* to the transaction cost economics project—which is hardly what one expects from what Langlois describes as a static construction. The most familiar of these is the Fundamental Transformation, which argument takes issue with the atemporal proposition that ‘competition for the market’ will assuredly yield an efficient outcome if large numbers of qualified bidders tender bids at the outset. What was missing but needed to be introduced was an examination of contracting in its entirety—to include contract execution and contract renewal. If, in effect, what had been a large numbers bidding condition at the outset is thereafter *transformed* into a small numbers supply relation (when the transaction in question is supported by nontrivial investments in durable, nonredeployable assets), then intertemporal contractual complications appear. More broadly, intertemporal considerations also enter into the transaction cost economics setup in the following respects: governance structures are predominantly instruments for adaptation, it being the case that adaptation (of both autonomous and cooperative kinds) is the central problem of economic organization; organization has an intertemporal life of its own, which has special ramifications for bureaucracy; the efficacy of reputation effects are subject to intertemporal limits; the remedialness criterion casts a very different intertemporal interpretation upon path dependence; and disequilibrium contracting complications are posed by real time events in the high technology arena.

That transaction cost economics engages these intertemporal issues is not to say that it has worked all of these out in a satisfactory way. I entirely agree that transaction cost economics stands to benefit from more fully dynamic constructions. But whereas saying dynamics is easy, doing dynamics is hard. Always and everywhere the need is to work through the mechanisms of economic organization in a ‘modest, slow, molecular, definitive’ way.¹³

¹³ The phrase ‘modest, slow, molecular, definitive work’ originates with Peguy. See Williamson (1996: 13, n. 9).

MANAGEMENT

Coase contends that both production function and governance structure theories of the firm are remiss in management respects (1988: 38):

...economists have tended to neglect the main activity of a firm, running a business... [This neglect] has tended to submerge what to me is the key idea in ‘The Nature of the Firm’: the comparison of the costs of coordinating the activities of factors of production within the firm with the costs of bringing about the same result by market transactions or by means of operations taken within some other firm.

Although I do not claim that the firm-as-governance structure makes *adequate* provision for management, it certainly makes *significant* provision for management. For example, transaction cost economics took exception with the proposition that markets and hierarchies have identical access to fiat (Alchian and Demsetz, 1972) from the very outset (Williamson, 1975). Provision was also made for ‘informal organization’ (Barnard, 1938) as a factor that supports added compliance and cooperation within firms as compared with markets (Williamson, 1975, 1990) and for differential bureaucratic costs between markets and hierarchies (Williamson, 1975, Chap. 7; 1985, Chap. 6). More generally, adaptation is taken to be the central problem of economic organization, in relation to which firms enjoy the advantage over markets in cooperative but not in autonomous adaptation respects. Indeed, the firm is described as a syndrome of ‘managerial’ attributes (Williamson, 1991) in which (comparatively) low-powered incentives, extensive administrative controls, and its own dispute settlement machinery are combined (specifically, courts will often refuse to hear intrafirm disputes, the effect of which is to make the firm its own court of ultimate appeal (which contributes to the differential access to fiat to which I refer above)). More recently, considerations of differential probity have been examined in the context of transactions where failures of loyalty and real time responsiveness could undermine integrity (Williamson, 1999a). And the importance of cognitive specialization has also been featured (Williamson, 1999b).

To repeat, however, significant provision for management does not imply adequate provision for management. Cognitive specialization is

underdeveloped. Our understanding of bureaucracy is still imperfect. Entrepreneurship continues to elude our understanding. Venture capital poses many puzzles. Knowledge-based and learning-based theories may have significant comparative institutional ramifications. As between focused critiques that deal with managerial particulars and sweeping critiques that are vague and unspecific, the former are much more useful.

RESEARCH OPPORTUNITIES

Although I group the above critiques under the heading of mistaken, these are probably better described as 'unfocused' or 'overdrawn.' Plainly, research opportunities reside in all of them. My purpose here is to address three more constructive critiques that are raised by the competence perspective to which governance, in varying degrees, can respond.

BEYOND PIECEMEAL

Transaction cost economics is a microanalytic exercise in which transactions are aligned with alternative modes of governance so as to effect an economizing outcome. That can be illuminating but may also lead to incorrect predictions if interaction effects are missed or if holistic consequences are glossed over.

The practice of examining transactions 'as if' they were independent will not do if there are significant interaction effects between them (Nickerson, 1997).¹⁴ The neglect of technological nonseparabilities means, in effect, that the trans-

¹⁴ The qualifier 'significant' is consequential. If the argument is that transaction cost economics has focused too much on the immediate effects of strong interactions to the neglect of weak interactions which, in the long run, are consequential, I would appeal to the two main theoretical findings of the literature on nearly decomposable systems (Simon, 1962: 129):

- (a) in a nearly decomposable system, the short-run behavior of each of the component subsystems is approximately independent of the short-run behavior of the other components;
- (b) in the long-run, the behavior of any one of the components depends in only an aggregative way on the behavior of the other subcomponents.

Near decomposability is a widely observed design principle in complex social systems and reflects respect for the cognitive overload (bounded rationality) and ability to shrug responsibility (opportunism) that beset fully connected systems.

action has been incorrectly specified. That applies also to contractual nonseparabilities.

Such effects are easy to correct in principle: redefine the transaction to take these effects into account. In practice, that may require deeper knowledge of how the system actually works (Nickerson, 1997) and/or a sensitivity to subtle but lurking strategic features (Williamson, 1985: 318–319).

A more troublesome argument is that of aggregation. Taking a more holistic view, the firm as a whole is different from and larger than the sum of the parts.¹⁵ The economics of atmosphere is intended to reflect such considerations. That brings in informal organization and flags the limits of calculativeness (Williamson, 1993). But there is more to it than that. Appealing to the Coriat and Dosi (1998) suggestion that organization form is the way we describe clusters of routines could well turn out to be an instructive way by which to uncover and better understand systems considerations. Inasmuch as transaction cost economics purports to be interested in all regularities whatsoever, it stands to benefit from research in the competence tradition on holistic consequences.

BEYOND GENERIC GOVERNANCE: STRATEGY

Richard Rumelt, Dan Schendel, and David Teece observe that 'Of all the new fields of economics, the transaction cost branch of organizational economics has the greatest affinity with strategic management' (1991: 14). They also observe that 'strategic management is about coordination and resource allocation *inside the firm*' (Rumelt *et al.*, 1991: 19; emphasis in original). And they challenge strategy scholars to supply 'a coherent theory of effective internal coordination and resource allocation, of entrepreneurship and technical progress' (Rumelt *et al.*, 1991: 19).

That is a tall order. One way in which trans-

¹⁵ For example, if the bureaucratic costs of managing a transaction internally vary with the size and complexity of the firm, then whether the firm should integrate transaction N+1 will not be independent of the fact that N-Q transactions have already been internalized (where Q is the number of outsourced transactions). I conjecture that such aggregation effects are of second order importance, but others could be more consequential.

action cost economics can participate in this project is to push beyond the generic level at which it now operates to consider resource/capability/endowment particulars. Rather, therefore, than ask the question 'What is the best generic mode (market, hybrid, firm, or bureau) to organize X?', which is the traditional transaction cost query, the question to be put instead is 'How should firm A—which has pre-existing strengths and weaknesses (core competences and disabilities)—organize X?'

In effect, the traditional transaction cost query assumes that the specialized investments needed to support a transaction (or related set of transactions) have not yet been made—either by the firm or by potential outside suppliers. If, however, either the firm or potential outside suppliers have made *pre-existing investments*, of a (largely) nonredeployable kind, that are well-suited to support the transaction in question, then the alignment calculus will be tilted in favor of the form that possesses such specialized, underutilized capacity—at least temporarily (until the investment renewal decision comes up for consideration) and possibly longer. Path dependency considerations thus arise in this way.

Taking an inventory of pre-existing investments, by the firm and its potential suppliers, is tantamount to including previously omitted variables. Such should help to reduce the unexplained variance in simple tests of the generic alignment hypothesis. Considerations of learning (see below) are also implicated.

Yet another move would be to make allowance for competition, taking the market niche to be served (say α_1) as given. The question here is, How do the pre-existing strengths and weaknesses of firm A compare with those of its extant rivals with respect to market niche α_1 ?

Still further moves can be contemplated. The firm and its extant and potential rivals can be examined in relation to a variety of niches: How do the pre-existing strengths and weaknesses of firm A compare with those of extant and potential rivals with respect to market niches described by ($\alpha_1, \alpha_2; \beta_1, \beta_2, \beta_3; \gamma$)?

An even more ambitious move would be to reposition the firm, to build up core competences and/or relieve disabilities (Shapiro and Varian, 1999). The question at this level is, 'How should firm A, with its pre-existing strengths and weaknesses, reposition for the future in relation to the

strategic situation (actual and potential rivalry; actual and potential market niches) of which it is a part or to which it can relate?'

A sixth move would be to go beyond value realization to include strategizing, where the object is to deter and discipline actual and potential rivals. This introduces issues with which game theory is especially concerned.

Each of the foregoing moves is summarized in Table 1. Transaction cost economics relates productively to all, of which the first three are the easiest to implement. That is gratifying in that, although many strategy scholars aspire to push out the time horizon to work on problems of the last three kinds, a huge number of interesting strategy issues surface at levels one through three.¹⁶

This exercise nevertheless operates at a very high level of generality. At best I offer added perspective. Awaiting operationalization of competences (where I expect that asset specificity will continue to play an important role) and of niches (where marketing and population ecology have a lot to offer), there are no refutable implications.

LEARNING

Although transaction cost economics made early provision for the difference between explicit and tacit knowledge (Williamson, 1971) and thereafter developed the contractual/organizational ramifications of firm-specific human capital, in that both worker and firm have incentives to craft added contractual safeguards as human asset specificity builds up (Williamson, 1975, Chap. 4), it makes only limited contact with the subject of learning. Learning being a large subject, it is not possible to relieve this lapse here. I will, however, relate learning to foresight and examine the ramifications for some of the myopic biases to which learning is subject.

¹⁶ I conjecture that level 5 will often be implemented piecemeal rather than as a comprehensive plan (in which mergers and acquisitions, investments, contracting, finance, marketing, etc. are all considered simultaneously). Be that as it may, transaction cost economics could have an important role to play in taking an inventory of a firm's assets (and those of its rivals) and in assessing the hazards associated with alternative planning scenarios. Jackson Nickerson describes such an undertaking in his dissertation (1997).

Table 1. Transaction cost economics and strategy

level 1:	generic How do alternative generic modes (markets, hybrids, firms, bureaus) compare for purposes of organizing transaction X?
level 2:	particular How should firm A, with its pre-existing strengths and weaknesses (core competencies and disabilities), organize transaction X?
level 3:	fixed niche How do the pre-existing strengths and weaknesses of firm A compare with those of its extant rivals with respect to market niche α_1 ?
level 4:	variable niche How do the pre-existing strengths and weaknesses of firm A compare with those of its extant and potential rivals with respect to niches described by $(\alpha_1, \alpha_2; \beta_1, \beta_2, \beta_3; \gamma)$?
level 5:	repositioning How should firm A, with its pre-existing strengths and weaknesses, reposition for the future in relation to the strategic situation (actual and potential rivalry; actual and potential market niches) of which it is a part or to which it can relate?
level 6:	strategizing If firm A possesses monopoly power, how can it best deter and discipline actual and potential rivals?

As stated at the outset, transaction cost economics assumes that economic actors have the capacity to look ahead and recognize contractual hazards and investment opportunities. Often, however, the requisite recognition will come as a product of experience. Whether positive or negative, the basic proposition is that, once the relevant features have been disclosed, the firm will react to such knowledge by taking actions that mitigate future hazards and more fully realize future gains. Learning through experience—by discovering more about the environment and suppliers and rivalry, after which appropriate adaptations are worked out—is more ambitious than merely trial-and-error learning but is less ambitious than the idea of farsighted contracting to which I referred earlier.

Consider the issue of level 2 strategy, where both the firm and its suppliers have pre-existing strengths and weaknesses for producing a good or service. Assume, in particular, that the firm has not yet made the requisite specialized investments itself and that outside suppliers are partly qualified in this respect. Out of considerations of timeliness and the costs of self-learning, the firm decides to procure from one of these outsiders. A contract of medium duration is agreed to.

The parties are then faced with unanticipated disturbances during contract execution to which

adaptations are required. Both parties learn better about the nature of the contractual hazards and of their abilities to communicate and their propensities to cooperate. Learning also takes place with respect to the nature of the specialized investments needed to support the transaction.

Such learning will have a bearing on contract renewal. Are the disturbances and associated hazards greater or less than projected? Are the communication needs great or little? Are the bilateral mechanisms for working through the problems adequate? Serious dissatisfaction on the part of either buyer or seller could result in nonrenewal. Even if, moreover, the parties are satisfied in these respects but the requisite *new* investments in nonredeployable assets are especially great, reaching a new agreement for continuing outside supply could be difficult. More generally, the point is this: a predictive theory of economic organization will be enriched by making more prominent provision for the many ways in which learning influences the intertemporal governance choice calculus.

Transaction cost economics also has a bearing on the 'biased learning' issues that are dealt with in recent articles by James March (1991) and by Daniel Levinthal and March (1993), where I will put emphasis on the latter (which builds upon the former). Both articles illustrate how the lens

of organization theory can and should apprise economists about important phenomena that are ignored or undervalued in the usual economic approach to economic organization.

Levinthal and March begin with the proposition that 'The effectiveness of learning in the short run and in the near neighborhood of current experience interferes with learning in the long run and at a distance' (1993: 97). They then go on to describe the major learning mechanisms that organizations employ, the problems of myopia that arise, and the tradeoffs that are posed. They observe with reference to the first that (1993: 97; emphasis in original):

Organizations use two major mechanisms to facilitate learning from experience. The first is *simplification*. Learning processes seek to simplify experience, to minimize interactions and restrict effects to the spatial and temporal neighborhood of actions. The second mechanism is *specialization*. Learning processes tend to focus attention and narrow competence.

Unsurprisingly, these learning mechanisms come at a cost, of which myopia is salient. Three myopic tendencies are distinguished: (1) ignore the long run, (2) ignore the larger picture, and (3) overlook failures. Regarding the first, 'normally sensible forms of specialized adaptation' sometimes produce 'dysfunctional second-order effects...: A strategic problem is created by the fact that learning in one domain is likely to be rewarding in the short run, but it leads to a longer-run potential decay of adaptive capability in other domains' (Levinthal and March, 1993: 102). Also, organizational power that is used to exercise control over an environment, which yields short-run advantage, can come at the cost of 'atrophy of capabilities to respond to change' (Levinthal and March, 1993: 102).

As with all unanticipated consequences, transaction cost economics responds by (1) making note of these previously unrecognized regularities and (2) asking what lessons for more efficient organizational design reside therein. Once disclosed, dysfunctional consequences and other long run propensities will not be mindlessly repeated or ignored. Upon being apprised of costly biases, lapses, or distortions, the object is to mitigate the effects in question *in cost-effective degree*.

Myopia of the second kind involves subgoal pursuit at the expense of the larger picture. The

incentive to free-ride on the efforts of others is an example (Levinthal and March, 1993: 104):

...the best strategy for any individual organization is often to emphasize the successful explorations of others. Such a strategy, if followed by all, produces no innovations to imitate and a downward spiral of refining existing technologies and strategies. The system as a whole underinvests in exploration.

Overcoming failures of a systems kind normally involves collective action. Albeit the 'obvious' move, such action is sometimes prohibitively expensive (Arrow, 1969). In the event that it is too costly to effect a merger among the autonomous parts, if cooperation is too costly to effect through contract, and if corrective public policy is beset with problems of its own, then the fact that the 'system as a whole underinvests in exploration' is simply a condition with which we need to come to terms.

The propensity to overlook failures arises because 'Organizational learning produces...a biased history.... As learners settle into those domains in which they have competence and accumulate experience in them, they experience fewer and fewer failures. Insofar as they generalize that experience to other domains, they are likely to exaggerate considerably the likelihood of success' (Levinthal and March, 1993: 104). Inasmuch as 'organizations promote successful people to positions of power and authority, rather than unsuccessful ones, it is the biases of success that are particularly relevant to decision making' (Levinthal and March, 1993: 105). As with underinvestments in exploration, however, whether such promotion biases are remediable turns on whether a superior alternative can be devised.

The upshot is that while competence research on learning and path dependency is especially good at uncovering biases, the lens of transaction cost economics (with special emphasis on the remedialness criterion) affords comparative institutional perspective. Both are needed.

CONCLUSIONS

The competence perspective is attuned to good issues and challenges both orthodoxy and the governance perspective to be responsive. As

developed herein, I see the relation between competence and governance as both rival and complementary—more the latter than the former, since some of the differences turn out to be more apparent than real.

I begin with a statement of the six key moves out of which the governance perspective works and has been progressively operationalized. On the possibility that this sequence has lessons for the long-awaited operationalization of competence, I next take the competence perspective through these same six moves. Challenges posed by competence for the governance perspective—some of which I believe to be mistaken, but others of which are constructive—are then addressed.

Given that both governance and competence are bounded rationality constructions and hold that organization matters, both share a lot of common ground. To be sure, there are differences. Governance is more microanalytic (the transaction is the basic unit of analysis) and adopts an economizing approach to assessing comparative economic organization, whereas competence is more composite (the routine is the unit of analysis?) and is more concerned with processes (especially learning) and the lessons for strategy. Healthy tensions are posed between them. Both are needed in our efforts to understand complex economic phenomena as we build towards a science of organization.

ACKNOWLEDGEMENTS

This paper was initially presented as a Keynote Address to the conference on 'Competences, Governance, and Entrepreneurship' on Bornholm Island in June 1998 and was later presented at the Institutional Analysis Workshop at the University of California, Berkeley. Comments from Fred Balderston, Glenn Carroll, Nicolai Juul Foss, Jeffrey Macher, Jackson Nickerson, the referees and, especially, Will Mitchell are gratefully acknowledged.

REFERENCES

Alchian, A. and H. Demsetz (1972). 'Production, information costs, and economic organization', *American Economic Review*, **62** (December), pp. 777–795.

- Arrow, K. (1969). 'The organization of economic activity: Issues pertinent to the choice of market versus nonmarket allocation'. In *The Analysis and Evaluation of Public Expenditure: The PPB System*. Vol. 1. U.S. Joint Economic Committee, 91st Congress, 1st Session. U.S. Government Printing Office, Washington, DC, pp. 47–73.
- Arrow, K. (1999). 'Foreword'. In G. Carroll and D. Teece (eds.), *Firms, Markets, and Hierarchies*. Oxford University Press, New York, pp. vi–vii.
- Barnard, C. (1938). *The Functions of the Executive*. Harvard University Press, Cambridge, MA (fifteenth printing, 1962).
- Coase, R. H. (1937). 'The nature of the firm', *Economica N.S.*, **4**, pp. 386–405. Reprinted in O. E. Williamson and S. Winter (eds.) (1991). *The Nature of the Firm: Origins, Evolution, Development*. Oxford University Press, New York, pp. 18–33.
- Coase, R. H. (1960). 'The problem of social cost', *Journal of Law and Economics*, **3** (October), pp. 1–44.
- Coase, R. H. (1964). 'The regulated industries: Discussion', *American Economic Review*, **54** (May), pp. 194–197.
- Coase, R. H. (1972). 'Industrial organization: A proposal for research'. In V. R. Fuchs (ed.), *Policy Issues and Research Opportunities in Industrial Organization*. National Bureau of Economic Research, New York, pp. 59–73.
- Coase, R. H. (1988). 'The nature of the firm: Meaning', *Journal of Law, Economics, and Organization*, **4** (Spring), pp. 19–32.
- Commons, J. R. (1932). 'The problem of correlating law, economics, and ethics', *Wisconsin Law Review*, **8**, pp. 3–26.
- Connor, K. and C. K. Prahalad (1996). 'A resource-based theory of the firm: Knowledge versus opportunism', *Organization Science*, **7** (September–October), pp. 477–501.
- Coriat, B. and G. Dosi (1998). 'Learning how to govern and learning how to solve problems: On the co-evolution of competences, conflicts, and organizational routines'. In A. Chandler, P. Hagstrom, and O. Solwell (eds.), *The Dynamic Firm*. Oxford University Press, Oxford, pp. 103–133.
- Crocker, K. and S. Masten (1996). 'Regulation and administered contracts revisited: Lessons from transaction-cost economics for public utility regulation', *Journal of Regulatory Economics*, **8**, pp. 5–39.
- Cyert, R. and J. March (1963). *A Behavioral Theory of the Firm*. Prentice-Hall, Englewood Cliffs, NJ.
- Dawkins, R. (1976). *The Selfish Gene*. Oxford University Press, New York.
- Demsetz, H. (1969). 'Information and efficiency: Another viewpoint', *Journal of Law and Economics*, **12** (April), pp. 1–22.
- Dosi, G. (1994). 'Boundaries of the firm'. In G. Hodgson, W. Samuels, M. Tool (eds.), *The Elgar Companion to Institutional and Evolutionary Economics*, Vol. 1. Edward Elgar, Aldershot, pp. 229–237.
- Dosi, G. and D. Teece (1998). 'Organizational competencies and the boundaries of the firm'. In R. Arena and C. Longhi (eds.), *Markets and Organization*. Springer-Verlag, New York, pp. 281–301.

- Dosi, G. and L. Marengo (1994). 'Some elements of an evolutionary theory of organizational competences'. In R. England (ed.), *Evolutionary Concepts in Contemporary Economics*. University of Michigan Press, Ann Arbor, MI, pp. 157–178.
- Dosi, G., L. Marengo and G. Fagiolo (1996). 'Learning in evolutionary environments', working paper.
- Fischer, S. (1977). 'Long-term contracting, sticky prices, and monetary policy: Comment', *Journal of Monetary Economics*, **3**, pp. 317–324.
- Foss, N. J. (1993). 'Theories of the firm: Contractual and competence perspectives', *Journal of Evolutionary Economics*, **3**, pp. 127–144.
- Foss, N. J. (1996a). 'Knowledge-based approaches to the theory of the firm: Some critical comments', *Organization Science*, **7** (September–October), pp. 470–476.
- Foss, N. J. (1996b). 'More critical comments on knowledge-based theories of the firm', *Organization Science*, **7** (September–October), pp. 519–522.
- Foss, N. J. (1996c). 'Firms, incomplete contracts, and organizational learning', *Human Systems Management*, **15**(1), pp. 17–26.
- Foss, N. J., C. Knudsen and C. Montgomery (1995). 'An exploration of common ground: Integrating evolutionary and strategic theories of the firm'. In C. Montgomery (ed.), *Resource-Based and Evolutionary Theories of the Firm*. Kluwer, Boston, MA, pp. 1–17.
- Fransman, M. (1994). 'Information, knowledge, vision and theories of the firm', *Industrial and Corporate Change*, **3**(3), pp. 713–757.
- Gambetta, D. (1988). *Trust: Making and Breaking Cooperative Relations*. Basil Blackwell, Oxford, U.K.
- Georgescu-Roegen, N. (1971). *The Entropy Law and Economic Process*. Harvard University Press, Cambridge, MA.
- Ghoshal, S. and P. Moran (1996). 'Bad for practice: A critique of the transaction cost theory', *Academy of Management Review*, **21**(1), pp. 13–47.
- Hayek, F. (1945). 'The use of knowledge in society', *American Economic Review*, **35** (September), pp. 519–530.
- Hodgson, G. (1998). 'Competence and contract in the theory of the firm', *Journal of Economic Behavior and Organization*, **35** (April), pp. 179–201.
- Joskow, P. L. (1991). 'The role of transaction cost economics in antitrust and public utility regulatory policies', *Journal of Law, Economics, and Organization*, **7** (Special Issue), pp. 53–83.
- Kahneman, D., P. Slovic and A. Tversky (eds.) (1982). *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge University Press, Cambridge, MA.
- Kogut, B. and U. Zander (1992). 'Knowledge of the firm, combinative capabilities, and the replication of technology', *Organization Science*, **3**, pp. 383–397.
- Kogut, B. and U. Zander (1996). 'What do firms do? Coordination, identity, and learning', *Organization Science*, **7** (September–October), pp. 502–517.
- Kor, Y. and J. Mahoney (1998). 'Penrose's resource-based approach', working paper number 98-0126, University of Illinois.
- Kuhn, T. S. (1970). *The Structure of Scientific Revolutions*. University of Chicago Press, Chicago, IL.
- Langlois, R. N. (1992). 'Transaction-cost economics in real time', *Industrial and Corporate Change*, **1**(1), pp. 99–127.
- Langlois, R. N. and P. L. Robertson (1995). *Firms, Markets, and Economic Change: A Dynamic Theory of Business Institutions*. Routledge, London.
- Langlois, R. N. and N. Foss (1997). 'Capabilities and governance: The rebirth of production in the theory of economic organization', working paper.
- Levinthal, D. and J. March (1993). 'The myopia of learning', *Strategic Management Journal*, Winter Special Issue, **14**, pp. 95–112.
- Liebesskind, J. (1996). 'Knowledge, strategy and the theory of the firm', *Strategic Management Journal*, Winter Special Issue, **17**, pp. 93–107.
- Lyons, B. (1996). 'Empirical relevance of efficient contract theory: Inter-firm contracts', *Oxford Review of Economic Policy*, **12**, pp. 27–52.
- Mahoney, J. and J. R. Pandian (1992). 'The resource-based view within the conversation of strategic management', *Strategic Management Journal*, **13**(5), pp. 363–380.
- Malmgren, H. 1961. 'Information, expectations and the theory of the firm', *Quarterly Journal of Economics*, **75** (August), pp. 399–421.
- Manuel, F. and F. Manuel (1979). *Utopian Thought in the Western World*. Harvard University Press, Cambridge, MA.
- March, J. (1991). 'Exploration and exploitation in organizational learning', *Organization Science*, **2** (February), pp. 71–87.
- March, J. and H. A. Simon (1958). *Organizations*. John Wiley, New York.
- Marschak, J. and R. Radner (1972). *The Theory of Teams*. Yale University Press, New Haven, CT.
- Marx, K. (1967). *Capital*, Vol. 1. International Publishers, New York.
- Masten, S. (1995). 'Introduction to Vol. II.' In O. Williamson and S. Masten (eds.), *Transaction Cost Economics*. Edward Elgar, Brookfield, VT, pp. xi–xxii.
- Mosakowski, E. and B. McKelvey (1997). 'Predicting rent generation in competence-based competition'. In A. Heene and R. Sanchez (eds.), *Competence-Based Strategic Management*. John Wiley, Chichester, pp. 65–85.
- Nelson, R. (1991). 'How do firms differ, and how does it matter?' *Strategic Management Journal*, Winter Special Issue, **12**, pp. 61–74.
- Nelson, R. and S. Winter (1982). *An Evolutionary Theory of Economic Change*. Harvard University Press, Cambridge, MA.
- Nickerson, J. (1997). 'Toward an economizing theory of strategy: The choice of strategic position, assets, and organizational form', Ph.D. dissertation, University of California, Berkeley.
- Nooteboom, B. (1999b). 'Innovation, learning and industrial organization', *Cambridge Journal of Economics*, **23** (March), pp. 127–150.
- Penrose, E. (1959). *The Theory of Growth of the Firm*. John Wiley, New York.

- Porter, M. (1994). 'Toward a dynamic theory of strategy'. In R. Rumelt, D. Schendel and D. Teece (eds.), *Fundamental Issues in Strategy: A Research Agenda*. Harvard Business School Press, Boston, MA, pp. 423–461.
- Prahalad, C. K. and G. Hamel (1990). 'The core competence of the corporation', *Harvard Business Review*, **68**(3), pp. 79–91.
- Richardson, G. (1972). 'The organization of industry', *Economic Journal*, **82** (September), pp. 883–896.
- Rindfleisch, A. and J. Heide (1997). 'Transaction cost analysis: Past, present, and future applications', *Journal of Marketing*, **61** (October), pp. 30–54.
- Riordan, M. and O. Williamson (1985). 'Asset specificity and economic organization', *International Journal of Industrial Organization*, **3**, pp. 365–378.
- Rumelt, R., D. Schendel and D. Teece (1994). *Fundamental Issues in Strategy: A Research Agenda*. Harvard Business School Press, Boston, MA.
- Schlegel, J. H. (1979). 'American legal realism and empirical science: From the Yale experience', *Buffalo Law Review*, **29** (Spring), pp. 195–323.
- Schultz, G. (1995). 'Economics in action: Ideas, institutions, policies', *American Economic Review, Papers and Proceedings*, **85** (May), pp. 1–8.
- Schumpeter, J. A. (1942). *Capitalism, Socialism, and Democracy*. Harper & Row, New York.
- Selznick, P. (1949). *TVA and the Grass Roots*. University of California Press, Berkeley, CA.
- Shapiro, C. and H. Varian (1999). *Information Rules*. Harvard Business School Press, Boston, MA.
- Shelanski, H. and P. Klein (1995). 'Empirical research in transaction cost economics: A review and assessment', *Journal of Law, Economics, and Organization*, **11** (October), pp. 335–361.
- Simon, H. (1947). *Administrative Behavior*. Macmillan, New York.
- Simon, H. (1957). *Models of Man*. John Wiley, New York.
- Simon, H. (1961). *Administrative Behavior*, 2nd ed. Macmillan, New York (Original publication, 1947).
- Simon, H. (1962). 'The architecture of complexity', *Proceedings of the American Philosophical Society*, **106** (December), pp. 467–482.
- Simon, H. (1985). 'Human nature in politics: The dialogue of psychology with political science', *American Political Science Review*, **79**, pp. 293–304.
- Simon, H. (1991). 'Organizations and markets', *Journal of Economic Perspectives*, **5** (Spring), pp. 25–44.
- Teece, D. (1976). *Vertical Integration and Vertical Divestiture in the U.S. Oil Industry*. Institute for Energy Studies, Stanford, CA.
- Teece, D. (1986). 'Profiting from technological innovation', *Research Policy*, **15** (December), pp. 285–305.
- Teece, D. and G. Pisano (1994). 'The dynamic capabilities of firms: An introduction', *Industrial and Corporate Change*, **3**(3), pp. 537–556.
- Teece, D., G. Pisano and A. Shuen (1997). 'Dynamic capabilities and strategic management', *Strategic Management Journal*, **18**(7), pp. 509–533.
- Wernerfelt, B. (1984). 'A resource-based view of the firm', *Strategic Management Journal*, **5**(2), pp. 171–180.
- Williamson, O. E. (1971). 'The vertical integration of production: Market failure considerations', *American Economic Review*, **61** (May), pp. 112–123.
- Williamson, O. E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. Free Press, New York.
- Williamson, O. E. (1980). 'The organization of work', *Journal of Economic Behavior and Organization*, **1** (March), pp. 5–38.
- Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. Free Press, New York.
- Williamson, O. E. (1990). 'Chester Barnard and the incipient science of organization'. In O. E. Williamson (ed.), *Organization Theory: From Chester Barnard to the Present and Beyond*. Oxford University Press, New York, pp. 172–206.
- Williamson, O. E. (1991). 'Comparative economic organization: The analysis of discrete structural alternatives', *Administrative Science Quarterly*, **36** (June), pp. 269–296.
- Williamson, O. E. (1993). 'Calculativeness, trust, and economic organization', *Journal of Law and Economics*, **36** (April), pp. 453–486.
- Williamson, O. E. (1996). *The Mechanisms of Governance*. Oxford University Press, New York.
- Williamson, O. E. (1998). 'Transaction cost economics: How it works; where it is going', *De Economist*, **146** (April), pp. 23–58.
- Williamson, O. E. (1999a). 'Public and private bureaucracies', *Journal of Law, Economics, and Organization*, **15** (April), pp. 306–342.
- Williamson, O. E. (1999b). 'Human actors and economic organization', working paper.
- Winter, S. (1988). 'On Coase, competence, and the corporation', *Journal of Law, Economics and Organization*, **4** (Spring), pp. 181–197.
- Winter, S. (1995). 'Four Rs of profitability: Rents, resources, routines, and replication'. In C. Montgomery (ed.), *Resource-Based and Evolutionary Theories of the Firm*. Kluwer, Boston, MA, pp. 147–158.