

Agency Problems in Industries Undergoing Fundamental Change: Applications to Telecommunications

Mark A. Jamison
Director of Telecommunications Studies
Public Utility Research Center
And Associate Director for Economic and Business Studies
Center for International Business Education and Research
Warrington College of Business Admin.
University of Florida
December 15, 1998

Once stable industries that become dynamic industries raise numerous management and economic issues. Population ecology and contingency theories indicate that an incumbent economic organization must reform its organizational structure, production resource and processes, products, and markets if it is to survive (Harman and Freeman, 1977; Tosi, 1984). Survival can take many forms, including reorganization, merger, and divestiture. Agency theory indicates that conflicting interests and information asymmetries affect investors' and firm managers' abilities to make changes, should they want to (Eisenhardt, 1989).

In this paper, I examine agency problems created by a fundamental change in industry economics and apply this to telecommunications. For rhetorical reasons, I consider a firm I call *M*, which is in the telecommunications industry. *M*, which is typical for the industry, had stable technology, stable and government-protected markets, and stable government regulation for decades. Technology began changing about 20 years ago and is now constantly moving and fundamentally different than when the existing industry structure and regulation were established. Also, about 20 years ago, the government began slowly removing market protection, but only two years ago removed protection from the last monopoly market, which accounts for 80% of *M*'s revenues. Customers now demand new products and are beginning to buy from alternative suppliers. (Capron and Mitchell, 1997; Colombo and Garrone, 1998; Raphael, 1998)

I organize the rest of this paper as follows. I first examine *M*'s environment using population ecology and contingency theories. Next I review agency theory and where it applies. Lastly, I describe how this applies to telecommunications.

Population Ecology and Contingency Theories

According to population ecology and contingency theories, firms exist in environments and the environments place pressure on the firms (Hall and Fagan, 1956). The relevant environmental factors are technology, inputs, output markets, rivalry, political and legal frameworks, and rules governing market behavior (Scott, 1998). Population ecology

theories focus on selection to explain or describe the types of organizations that succeed (i.e., survive) in an environment, while contingency theories describe how firms succeed (Hannan and Freeman, 1977; Scott, 1998). According to these theories and economic theory, *M*'s changing environment means that *M* will have to change its markets, technology, and organizational structure if it is to survive.

Efficiency is important for survival and *M* needs to change its technologies and markets in order to be efficient. Baumol (1977) explains how technology and product/market mixes affects firms' efficiency. He describes how firms' choices of technology and markets affect economies of scale and scope, and explains that changes to either technology or markets can increase or decrease these economies. Jamison (1998a) describes how the efficiency of a firm's technology and market choices is affected by other firms' technology and market choices. According to Baumol and Jamison, *M* needs to choose technologies and markets that allow it to operate at a lower cost than smaller, more specialized firms, and at a lower cost than the aggregate of firms who might enter *M*'s markets while serving markets that *M* does not serve.

M's organizational structure needs to change because the structure that was efficient in the stable, government-dominated environment will be inefficient in the more dynamic environment. Burns and Stalker (1961) and Tosi (1984) explain that mechanistic systems are more efficient in stable environments. Task orientation, hierarchical control, and vertical relations and communications characterize these systems. Marketing and distribution tend to be largely routine functions in these systems because firms can do little to affect demand. Burns and Stalker (1965) and Tosi (1984) also explain that organic systems are more appropriate in environments that have constant change. Organization orientation and network control, relations, and communication characterize these systems. This implies that *M* needs to develop entirely new marketing and distribution systems and move many of its development activities closer to the field. By this I mean that *M*'s systems for planning, analyzing markets, and developing new products should move towards the marketing and distribution departments to improve information and coordination (Tosi, 1984).

Furthermore, *M* will need a different type of employee. Tosi (1984) explains that successful firms in *M*'s former environment tended to have mostly organizationalist employees -- employees with lifelong careers in a single company and who identify strongly with the company -- and that *M* probably has a strong labor union. He also explains that successful firm's in *M*'s new environment will have mostly professional and externally oriented employees -- employees who are highly skilled and adaptive -- because employees, rather than process, will be key to *M*'s success. In other words, in contrast to the past where the bureaucracy determined *M*'s characteristics, now employee skills and *M*'s skills are one in the same.

Agency Theory

Agency theory addresses incentive and information problems inside and outside the firm. In agency theory, one person, the principal, wants to induce another person, the agent, to

do something that the agent does not want to do. Also, the agent has hidden information or hidden action because it is hard or expensive for the principal to monitor the agent. Often in agency theory, principals and agents have different attitudes towards risk (Eisenhardt, 1989; SalaniJ , 1997).

There are three basic families of principal-agent (PA) models (SalaniJ , 1997). In adverse selection, the agent has hidden information about his characteristics and the principal moves first in the formal model. The principal's problem is to offer a contract that induces the agent to reveal his true type. An example of an adverse selection problem is a corporate board of directors (BOD) (the principal) trying to determine the abilities of potential CEOs (the agents). In signaling, the agent has hidden information regarding his type and moves first. The agent's problem is to take some visible action that the principal will correctly interpret as revealing the agent's type. An example of a signaling problem is a CEO (the agent) taking an extraordinary action to signal his type to his BOD (the principal) (Hermalin and Weisbach, 1998). In moral hazard, the agent moves first and takes some action that the principal cannot observe. The principal's problem is to establish a contract that induces the agent to take actions that the agent does not want to take, but that the principal values. An example of a moral hazard problem is a manager (the principal) offering a sales agent (the agent) incentives to increase sales.

Principals base their choice of mechanisms for solving adverse selection and moral hazard problems on the costs and benefits of the alternative approaches. There are two basic types of mechanisms – behavior-based contracts (command and control) and incentive contracts. Greater principal information, greater outcome uncertainty, greater agent risk aversion, high costs of measuring outcomes, and length of relationship are positively related with behavior-based contracts and negatively related with incentive contracts. Greater principal risk aversion, high costs of measuring behavior, and goal conflict are negatively related with behavior-based contracts and positively related with incentive contracts. (Eisenhardt, 1989; Sappington, 1991; Shirley and Xu, 1998)

Incentive contracts can have numerous features. I describe a few common features, all of which have their basis in economic rent seeking behavior dating back to Adam Smith. The first feature is the rationality or participation constraint (Laffont and Tirole, 1994). Anticipated in the management literature as Barnard's (1939) and March and Simon's (1958) willingness to participate (Tosi, 1984), this feature says that the principal and the agent must each receive utility that exceeds their individual reservation utilities in order to be willing to produce. The second feature, incentive compatibility or truth telling, requires that the agent be better off expending effort rather than shirking, or truthfully revealing her type rather than lying. This works by making the agent at least a partial residual claimant of the benefits of the relationship (Sappington, 1991). Incentive compatibility implies that the performance measure must be something the agent can affect (Laffont and Tirole, 1994). It also implies that, because incentive contracts shift risk to agents, agents need to be either risk averse or compensated for their risk (Eisenhardt, 1989; Sappington, 1991). Incentive compatibility is comparable to Barnard's (1939) and March and Simon's (1958) willingness to produce and Selznick's (1949) recognition of agents' outside interests (Scott, 1998).

Sappington (1991) describes other contract features that are useful in particular situations. He explains that credible commitment by the principal is important, especially if circumstances change (Shirley and Xu, 1998). This implies either third-party enforcement or subgame perfection (Piketty, 1993). The principal's commitment is subgame perfect if, once the agent has truthfully revealed his information or type, it is in the principal's best interest to keep his commitment. A menu of contracts can improve performance if the agent's postcontractual knowledge will be better than his precontractual knowledge. All monitoring, even the slight use of imperfect monitoring, improves outcomes, with the caveat that some types of employees and organizations do not respond well to monitoring (House, 1984). When there are multiple agents and limited ability to commit, principals can obtain improved performance by using tournaments which reward agents for both actual and relative results. Loser-bear-all tournaments can induce better performance than winner-take-all tournaments when relatively little effort is desired. Second-best price auctions are effective in selecting agents and second sourcing improves postcontracting performance. In ongoing relationships, basing compensation on both past and future performance improves outcomes, but using past results to set future goals reduces performance.

Application to Telecommunications

In business, scholars have typically applied agency theory to problems such as compensation, acquisition and diversification, BOD relationships with CEOs, financial structure, employer-employee relations, buyer-seller relations, vertical integration, regulation, and innovation (Eisenhardt, 1989; Sappington, 1991). As my population ecology and contingency theory section implies *M*'s change in organizational structure and in types of personnel will create new PA problems in compensation, employer-employee relations, and innovation. However, for the remainder of this paper, I focus on PA problems created by industry restructuring.

Industry restructuring will force *M* to establish new buyer-seller relationships. Colombo and Garrone (1998) identify five technological components that will make up future communications services: content (conversations, film archives, electronic news, etc.), multimedia hosting (hardware and software interface for content providers and users), backbone network, user access network, and user terminals. *M*'s traditional role has been to provide user access and limited backbone network. Noam (1994) explains that systems integrators will combine these components to provide the new services. Colombo and Garrone (1998) explain that this system integrator performs information and network intelligence management, provides user interfaces, gains access to content, and retails services. Assuming that government competition policies will prevent a single firm from monopolizing these components, *M* needs to decide where to establish buyer-seller relationships, where to enter joint ventures or alliances, and where to combine components under common ownership.

If *M* chooses to simply supply components and not be a systems integrator, *M* will encounter a PA problem with the systems integrators that may cause it to abandon this strategy. The systems integrators will have superior information regarding final markets,

technical and economic needs of other components, and their own effort. These systems integrators are, in a sense, sales agents for *M*. Anderson (1985) finds that the greater the difficulty in evaluating agent performance, the more complex and hard-to-learn are the product lines, and the greater the demand for nonselling activities, the more likely *M* is to vertically integrate. Jamison (1995) and Weisman (1995) find buyer-seller problems that give *M* an incentive to expand its backbone network business. Jamison (1998b) explains that *M* will have further incentives to extend its user access business into new areas to provide end-to-end networking service in competition with other integrated providers.

Given these incentives, it is not surprising that many telecommunications carriers are expanding beyond their traditional markets. However, there is little consensus on how they should do it. Colombo and Garrone (1998), contend that carriers should avoid mergers and develop equity and non-equity joint ventures. Baldwin (1998) argues that carriers should either build any new assets they need or be subject to stricter government regulation. McCourt (1998) argues that carriers should avoid mergers because they can be unwieldy. Jamison (1998b, 1998c) believes that efficient restructuring will involve combinations of start-up entry, mergers, alliances, and divestitures.

Larger carriers are engaging in mergers and alliances (Jamison 1998b). These mergers and alliances present PA problems for shareholders and managers. Studies show that managers overpay for acquisitions (Han, Suk, and Sung, 1998; Morck, Shleifer, and Vishny, 1990). This is particularly true when the bidder is diversifying or buying a rapidly growing target (Morck, Shleifer, and Vishny, 1990). Some researchers believe that managers overpay because they systematically make errors or simply imitate other firms without analysis. (Morck, Shleifer, and Vishny, 1990; Haveman, 1993; Haunschild, 1993) Other studies identify PA problems as a reason for overpayment. In an early study, Amihud and Lev (1981) concluded that managers benefited from risk diversification, but Agrawal and Mandelker (1987) show that managers have other ways to diversify risk. PA-related studies sometimes conflict, but in general they conclude that mergers benefit managers by giving managers room for career growth, ensuring long term survival of the firm when shareholders would be better off selling the assets, increasing management pay, giving managers more positions on other firms' BODs, and building empires. (Avery, Chevalier, and Schaefer, 1998; Donaldson and Lorsch, 1983; Fowler and Schmidt, 1988; Morck, Shleifer, and Vishny, 1990; Shleifer and Vishny, 1989; Trautwein, 1990) Chang and Suk (1998) and Han, Suk, and Sung (1998) verify that managers have better information than shareholders and BODs about firm value and use this information to overpay for acquisitions. They also show that methods of payment affect the information asymmetries. Cash-financed acquisitions provide a clearer view of the acquisition value than do stock-financed acquisitions, so bidding shareholders tend to have positive returns to the acquisition.

Other studies find market-based checks on managers' tendency to overpay in acquisitions. Shleifer and Vishny (1988) find that poor stock performance is generally followed by higher CEO turnover even when the CEO controls the BOD, but conclude that the risk is small. They also find that hostile takeovers are a way of disciplining non-value-maximizing managers. This is consistent with Mitchell and Lehn (1990) who find that

firms seeking value-decreasing acquisitions are taken over with a higher frequency. Walsh (1988) shows that turnover rates in acquired management teams are significantly higher than normal turnover rates.

Countering the overpayment claims, Porter (1980) argues that the US market for companies is efficient, so bidding shareholders should expect few gains in competitive bidding. This is consistent with the findings of Bradley, Desai, and Kim (1988) which show that multiple-bidding contests lower bidder returns. Porter (1980) states that exceptions to his hypothesis will occur under certain conditions; for example, if the acquiring firm can improve the strategic position of the target firm, use the acquisition as a base from which to change industry structure, or be assisted in its existing business.

Existing evidence indicates that, even though PA issues exist in the current wave of telecommunications mergers and alliances, strategic and efficiency effects are masking the PA effects. Jarrell, Brickley, and Netter (1988) find that deregulation often drives mergers. They also find that market globalization tends to offset any potential growth in market power. Pfeffer (1972) argues that mergers are a way for firms to decrease dependence on their environment, which may be valuable to shareholders when the environment is uncertain. Capron and Mitchell (1997) find that production efficiency and strategic reconfiguration are the main drivers of telecommunications mergers. They show that the mergers generally involve value-increasing restructuring and resource redeployment for the acquired and acquiring firms. The mergers have their most beneficial effects on geographic coverage, R&D, product quality, design cycles, and cost efficiency. Pricing becomes more difficult with acquisitions and even though prices tend to decline, profits tend to increase.

Conclusion

When shareholders thwarted British Telecom's attempted purchase of MCI, it appeared that PA problems would dampen telecommunications restructuring. Based on the available evidence, PA problems exist in both merger and non-merger situations and the merger PA problems may be the least costly.

Bibliography

Lessons to be Learned from Telecoms Alliances. South China Morning Post, April 18, 1998, downloaded from Infoseek, <http://www.infoseek.com/>, May 15, 1998.

Agrawal, Anup and Gershon N. Mandelker. (1987). "Managerial Incentives and Corporate Investment and Financing Decisions," *The Journal of Finance* 42(4): 823-837.

Anderson, Erin. (1985). "The Salesperson as Outside Agent or Employee: A Transaction Cost Analysis," *Marketing Science* 4:234-254.

- Amihud, Yakov, and Baruch Lev. (1981). "Risk Reduction as a Managerial Motive for Conglomerate Mergers," *Bell Journal of Economics* 12(2): 605-617.
- Avery, Christopher, Judith A. Chevalier, and Scott Schaefer. (1998). "Why do Managers Undertake Acquisitions? An Analysis of Internal and External Rewards for Acquisitiveness," *The Journal of Law, Economics, and Organization* 14(1): 24-43.
- Baldwin, Susan. (1998). "Consumer Perspectives on ILEC Mergers," Presentation before the National Association of Regulatory Utility Commissioners (unpublished).
- Baumol, William J. (1977). "On the Proper Cost Tests for Natural Monopoly in a Multiproduct Industry" *American Economic Review* 67(5): 809-822.
- Bradley, Michael, Anand Desai, and E. Han Kim. (1988). "Synergistic Gains from Corporate Acquisitions and Their Division between the Stockholders of Target and Acquiring Firms," *Journal of Financial Economics* 21(1): 3-40.
- Burns, Tom, and George M. Stalker. (1961). *The Management of Innovation*. London. As summarized in Tosi (1984).
- Capron, Laurence and Will Mitchell. (1997). "Outcomes of International Telecommunications Acquisitions: Analysis of Four Cases with Implications for Acquisitions Theory," *European Management Journal* 15(3): 237-251.
- Chang, Saeyoung and David Y. Suk. (1998). "Failed Takeovers, Methods of Payment, and Bidder Returns," *The Financial Review* 33: 77-84.
- Colombo, Massimo G., and Paola Garrone. (1998). "Common Carriers Entry into Multimedia Services," *Information Economics and Policy* 10: 77-105.
- Donaldson, Gordon and Jay Lorsch. (1983). *Decision Making at the Top*. New York.
- Eisenhardt, Kathleen M. (1989). "Agency Theory: An Assessment and Review," *Academy of Management Review* 14(1): 57-74.
- Fowler, Karen L. and Dennis R. Schmidt. (1988). "Tender Offers, Acquisitions, and Subsequent Performance in Manufacturing Firms," *Academy of Management Journal* 31(4): 962-974.
- Hall, A. D., and R. E. Fagen. (1956). "Definition of System." *General Systems: The Yearbook of the Society for the Advancement of General Systems Theory*, 1, 18-28. As cited in Scott (1998).
- Han, Ki C., David Y. Suk, and Hyun Mo Sung. (1998). "The Evidence of Bidders' Overpayment in Takeovers: The Valuation Ratios Approach," *The Financial Review* 33: 55-68.

- Hannan, Michael T., and John Freeman. (1977). "The Population Ecology of Organizations," *American Journal of Sociology* 82(5): 929-964.
- Haunschild, Pamela R. (1993). "Interorganizational Imitation: The Impact of Interlocks on Corporate Acquisition Activity," *Administrative Science Quarterly* 38: 564-592.
- Haveman, Heather A. (1993). "Follow the Leader: Mimetic Isomorphism and Entry into New Markets," *Administrative Science Quarterly* 38: 593-627.
- Hermalin, Benjamin E. and Michael S. Weisbach. (1998). "Endogenously Chosen Boards of Directors and Their Monitoring of the CEO," *American Economic Review* 88(1): 96-118.
- House, Robert J. (1984). "Amatai Etzioni's 'A Comparative Analysis of Complex Organizations,'" in *Theory of Organizations*, Henry L. Tosi, ed., London, pp. 85-91.
- Jamison, Mark A. (1995). "[A Competitive Framework for Pricing Interconnection in a Global Telecommunications Market](#)," *Denver Journal of International Law and Policy* 23(3): 513-533.
- Jamison, Mark A. (1998a). "[A Further Look at Proper Cost Tests for Natural Monopoly](#)." (unpublished).
- Jamison, Mark A. (1998b). "[Emerging Patterns in Global Telecommunications Mergers and Alliances](#)," *Industrial and Corporate Change* (forthcoming).
- Jamison, Mark A. (1998c). [Telecommunications Mergers: Impacts on US Customers and Markets](#) (unpublished).
- Jarrell, Gregg A., James A. Brickley, and Jeffry M. Netter. (1988). "The Market for Corporate Control: The Empirical Evidence Since 1980," *Journal of Economic Perspectives* 2(1): 49-68.
- Laffont, Jean-Jacques, and Jean Tirole. (1994). *A Theory of Incentives in Procurement and Regulation*. Cambridge, Massachusetts.
- March, James G. and Herbert Simon. (1958). *Organizations*. New York. As summarized in Tosi (1984).
- McCourt, David. (August 27, 1998). "Resist the Urge to Merge," *The New York Times*.
- McTaggart, James M., Peter W. Kontes, and Michael C. Mankins. (1994). *The Value Imperative: Managing for Superior Shareholder Returns*. New York.
- Mitchell, Mark L. and Kenneth Lehn. (1990). "Do Bad Bidders become Good Targets?" *Journal of Political Economy* 98(2): 372-398.

- Morck, Randall, Andrei Shleifer, and Robert W. Vishny. (1990). "Do Managerial Objectives Drive Bad Acquisitions?" *The Journal of Finance* 45(1): 31-48.
- Noam, Eli M. (1994). "Beyond Liberalization: From the Network of Networks to the System of Systems," *Telecommunications Policy* 18: 286-94.
- Pfeffer, Jeffrey. (1972). "Merger as a Response to Organizational Interdependence," *Administrative Science Quarterly* 17(3): 382-394.
- Piketty, Thomas. (1993). "Implementation of First-Best Allocations via Generalized Tax Schedules," *Journal of Economic Theory* 61(1): 23-41.
- Porter, Michael E. (1980). *Competitive Strategy*. New York.
- Raphael, David E. (1998). "The Future of Telecommunications: Connectivity Through Alliances," *Business Economics* 33(2): 32-36.
- SalaniJ , Bernard. (1997). *The Economics of Contracts: A Primer*. Cambridge, Massachusetts.
- Sappington, David E. M. (1991). "Incentives in Principal-Agent Relationships," *Journal of Economic Perspectives* 5(2): 45-66.
- Scott, W. Richard. (1998). *Organizations: Rational, Natural, and Open Systems*. New Jersey.
- Shirley, Mary M., and Lixin Colin Xu. (1998). "Information, Incentives, and Commitment: An Empirical Analysis of Contracts Between Government and State Enterprises," *The Journal of Law, Economics, & Organization* 14(2): 358-378.
- Shleifer, Andrei and Robert W. Vishny. (1988). "Value Maximization and the Acquisition Process," *Journal of Economic Perspectives* 2(1): 7-20.
- Shleifer, Andrei and Robert W. Vishny. (1989). "Managerial Entrenchment: The Case of Manager-Specific Investments," *Journal of Financial Economics* 25(1): 123-139.
- Weisman, Dennis L. (1995). "Regulation and the Vertically Integrated Firm: The Case of RBOC Entry into Interlata Long Distance," *Journal of Regulatory Economics* 8(3): 249-266.
- Tosi, Henry L. (1984). *Theories of Organization*. New York.
- Trautwein, Friedrich. (1990). "Merger Motives and Merger Prescriptions," *Strategic Management Journal* 11: 283-295.

Walsh, James P. (1988). "Top Management Turnover Following Mergers and Acquisitions," *Strategic Management Journal* 9: 173-183.