This is the fourth annual special issue of *Industrial and Corporate Change* devoted to research on telecommunications policy and strategy. The papers in this special issue represent research discussed at the annual conference of the Consortium for Research on Telecommunications Policy and Strategy, held at the University of Michigan Business School in Ann Arbor, during June, 1998. The Consortium seeks to sponsor interdisciplinary scholarship affecting both policy and management in the telecommunication industry. The Consortium has research nodes at the University of Michigan, Northwestern University, University of California at Berkeley and Harvard University. Over the course of the past four years, and with the ongoing generous financial support of the Ameritech Foundation, the Consortium has succeeded in encouraging research from the fields of economics, public policy, corporate strategy and engineering. The 1998 conference reflected the Consortium's success, as leading researchers from both North America and Europe convened with senior federal and state policymakers and telecommunications industry management to discuss current research and provide informed direction for ongoing research programs.

The common theme of both the Conference and of the papers published here is investment in telecommunications infrastructure. Within this focal context, the theme was purposely kept broad in the hope of encouraging scholars to define the actors and substance of investments in telecommunications that are most salient in today's rapidly changing telecommunications industry. Our logic was driven by the very character of the telecommunications industry. Converging technologies, conflicting and changing regulations, and burgeoning markets are hallmarks of today's telecommunications industry. In such an environment, investment by
incumbent firms and new entrants in new technologies, services and infrastructure is fraught with risks, uncertain rewards and unintended consequences. This complex environment makes research on investment even more challenging yet all the more necessary in order to better understand firm performance, industry evolution and social welfare. In order to provide the most current state of research in this dynamic industry we have published scholarly works that provide the clearest and strongest results, both initial and final, from a number of ongoing research programs.

The papers in this volume reflect three related themes concerning investment incentives. First, public policy affects investment by firms. Kulwant Singh shows that public policy oriented to managed competition can be consistent with increased investment. Glenn Woroch shows that facilities competition policy influences investment in new capacity. Similarly, Francis Pampush, Ken Dunmore and Debra Aron argue that policies concerning unbundled leasing opportunities will influence incentives to invest in emerging technologies underlying new infrastructure. David Teece and James Green then provide a comparative review of approaches to regulation of competition in the United States, the United Kingdom, Australia and New Zealand.

Second, firm strategy, independent of policy, also affects investment directly. Susan Garrod shows that firms in information-intensive industries, such as the telecommunications sector, are particularly quick to respond to investment by competitors. Sumit Majumdar finds that firms that invest in greater human capital, measured in employment costs, achieve greater investment scale. In a variation on this theme, Seshu Madhavapeddy, Victoria Bylys, Shalom Manova and George Brody show that firms' pricing strategies strongly influence consumers' decisions to invest in emerging wireless telecommunications infrastructure.

Third, firm strategy affects investment indirectly, as firms must undertake substantial organizational changes and achieve substantial growth in order to create the basis for new investment. Within this theme, two papers address issues concerning interfirm activities. Mark Jamison outlines the strong mergers and alliances incentives that telecommunications firms face in order to adapt their capabilities in the face of the changing competitive, technical and regulatory environment. Laurence Capron and Will Mitchell, meanwhile, review the outcome of several mergers in the telecommunications sector, showing that post-acquisition behavior tends to be consistent with needs for business reconfiguration that firms require if they are to undertake new investment, rather than with attempts to gain market power. The next two papers address growth incentives for investment. Mani Chacko and Will
Introduction

Mitchell show that firms that operate in industries with substantial network externalities, such as the telecommunications sector, have particularly strong incentives to achieve substantial size because their growth rates tend to increase once they pass a size hurdle. Anuradha Nagarajan argues that the standards-setting strategies that firms and governments use will influence incentives to invest in new telecommunications technology, drawing on the example of telecommunications-based intelligent transportation systems. In the final paper within this theme, Brad Killaly argues that prior organizational changes, such as changes in markets served and mode of service, will influence a firm’s ongoing ability to undertake investments.

The papers present a common proposition that investment is the result of firm strategy. There is an underlying behavioral assumption of the research that recognizes firms as essentially rational economic actors making investments in order to enhance performance. As simple as this behavioral foundation may seem, the reality that a firm’s limited information-processing and decision-making capabilities severely compromise its abilities to make profitable investment decisions place strong constraints on firm strategy. Perhaps in no other industry are models of bounded rationality more apt, due to the extent and rate of change in technologies, regulations, competition and market opportunities in the telecommunications sector. In order to start to understand the evolution of the telecommunications industry and the implications for social welfare, researchers have begun to take a stronger interest in the foundations of constrained firm behavior and how firm strategies and decisions affect both firm performance and industry evolution.

The implications of the research for telecommunications policy are twofold. First it is clear from the research that telecommunications firms are engaged in an ongoing struggle to adapt to the torrent of change in their environment. Given this context, policymakers must be sensitive to the need for firms to adapt to environmental conditions in an institutional setting which allows for change without the fear of unforeseen shifts in the regulatory landscape. If we are to believe that firms are boundedly rational, and that the bounds are particularly stringent in the rapidly evolving telecommunications industry, then policy is best focused on establishing clear and certain rules of the game. Second, and closely related to the first point, it is clear that policies which alter the competitive rules of the game, especially unexpected changes, will probably lead to unintended consequences. As firms themselves change and adapt in the telecommunications industry they acquire knowledge from their successes and failures. A model of firm behaviour in which firms are considered capable of learning implies that changes in institutions and policies run the risk of destroying the cumulative competitive and innovative
knowledge of incumbent firms, young and old alike. The velocity of evolution in the telecommunications industry, driven by investments and change by both incumbents and entrants, will probably yield surprising and perhaps counterproductive outcomes of regulation that attempts too fine-grained a management of strategic activity.