

THE INNOVATIVE ENTREPRENEUR

Innovative entrepreneurs are the prime movers of the economy. The innovative entrepreneur helps overcome two types of institutional frictions. First, existing firms may not innovate efficiently because of incumbent inertia resulting from adjustment costs, diversification costs, the replacement effect, and imperfect adjustment of expectations. The innovative entrepreneur compensates for incumbent inertia by embodying innovations in new firms that compete with incumbents. Second, markets for inventions may not operate efficiently because of transaction costs, imperfect intellectual property protections, costs of transferring tacit knowledge, and imperfect information about discoveries. The innovative entrepreneur addresses inefficiencies in markets for inventions through own-use of discoveries and adoption of innovative ideas. *The Innovative Entrepreneur* presents an economic framework that addresses the motivation of the innovative entrepreneur, the innovative advantage of entrepreneurs versus incumbent firms, the effects of competitive pressures on incentives to innovate, the consequences of creative destruction, and the contributions of the innovative entrepreneur to the wealth of nations.

Daniel F. Spulber is the Elinor Hobbs Distinguished Professor of International Business and Professor of Management Strategy at the Kellogg School of Management, Northwestern University, where he has taught since 1990. He is also Professor of Law at the Northwestern University Law School (Courtesy). Professor Spulber is the Research Director for the Searle Center on Law, Regulation and Economic Growth. He served as the founding director of Kellogg's International Business and Markets Program. He is also the author of numerous books, including *The Theory of the Firm: Microeconomics with Endogenous Entrepreneurs, Firms, Markets, and Organizations* (Cambridge University Press, 2009); *Economics and Management of Competitive Strategy* (2009); *Networks in Telecommunications: Economics and Law* (with Christopher Yoo, Cambridge University Press, 2009); and *Global Competitive Strategy* (Cambridge University Press, 2007). He received his Ph.D. in economics from Northwestern University.

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Preface

Managers of existing firms already innovate – why is there any need for entrepreneurs to start new firms? The answer comes from the individuality of entrepreneurs, whether acting alone or as members of a team of founders. The economic contributions of the innovative entrepreneur result from individual initiative and creativity. Entrepreneurs can be innovative in ways that may be difficult or impossible for managers of existing institutions. This basic insight helps address the major questions in the economics of innovation and entrepreneurship.

The *innovative entrepreneur* is defined as someone who introduces commercial, scientific, and technological discoveries to the marketplace by embodying them in new firms. Innovative entrepreneurs not only provide new products and production processes but also create new transaction methods, business institutions, and industries that fundamentally change how the economy operates. Their impact on economic growth and development is extensive and evident.

The innovative entrepreneur differs from the *replicative entrepreneur* who establishes a firm by imitating or acquiring existing business models. Understanding the contributions of the innovative entrepreneur does not imply any criticism of the replicative entrepreneur. Both types of entrepreneurs establish firms that implement and diffuse inventions. Both types of entrepreneurs take risks, exercise judgment, and contribute time, effort, and personal funds. Both types of entrepreneurs provide useful products and services, invest in productive capacity, increase employment, and stimulate economic activity.

This book presents an economic theory of the innovative entrepreneur. The theory helps answer the major questions that continue to challenge researchers in economics, law, and management. The theory considers the motivation of individuals to become innovative entrepreneurs. The theory shows how individual initiative can give entrepreneurs an innovative advantage over incumbent firms. The theory examines how competitive pressures impact entrepreneurial incentives to innovate. The theory shows how market frictions affect the choice between entrepreneurship and technology transfer to existing firms. Finally, the theory considers the

contributions of innovative entrepreneurs to economic prosperity in an international context.

Innovative entrepreneurs are essential to the economy because they establish the firms that form new industries, foster economic development, and stimulate aggregate growth. Improvements in the quality of life require new products and productive efficiencies. Economic growth depends on technological change because of the limits imposed by resource scarcity and diminishing returns to factors of production. Economic development is based on the creation of new institutions, organizations, and markets. The measure of the economic contribution made by innovative entrepreneurs is the economic value generated by the firms that they establish.

The study of the entrepreneur is particularly challenging because it is located at the intersection of the *individual* and the *firm*. The entrepreneur's life-cycle consumption decisions are interconnected with the start-up's strategic business decisions. The economic theory of the entrepreneur examines the individual's decision whether or not to become an entrepreneur, the business decisions he makes during the period of entrepreneurship, and the decision to launch the firm. The book addresses entrepreneurial finance in the context of the motivation and decision making of the innovative entrepreneur although a detailed consideration of finance is beyond the current discussion.

This book continues the work I began in *The Theory of the Firm* (Spulber, 2009a) that introduces the entrepreneur into the economic theory of the firm. There, I emphasize that entrepreneurs arise endogenously as individuals choose whether or not to become entrepreneurs and engage in establishing firms. The key step is the definition of what is a firm. The definition extends Irving Fisher's Separation Theorem, which is fundamental to neoclassical economics and finance. A *firm* is defined as a transaction institution whose objectives are *financially* separable from the consumption objectives of its owners. Through the actions of entrepreneurs, firms arise endogenously in the economy. In turn, firms establish markets and generate organizations, making these important economic institutions endogenous as well. The activities of individual entrepreneurs thus are fundamental for market economies.

This book encompasses important developments in the economics of entrepreneurship. The topic of entrepreneurship has been addressed throughout the history of economic thought.¹ The dynamic theory of the entrepreneur presented

1 A major exception has been in the development of neoclassical economics. William Baumol (2006, p. 2) observed that the entrepreneur is mentioned virtually never in the modern theory of the firm: "The more critical explanation of the absence of the entrepreneur is that in mainstream economics the theory is generally composed of equilibrium models in which, structurally, nothing is changing. But, this excludes the entrepreneur by definition"; see also Baumol (1993). The economic theory of entrepreneurship draws on other behavioral views of the entrepreneur including psychological, sociological, and managerial approaches.

here includes and extends many important developments in the study of entrepreneurs. At the dawn of classical economics, Richard Cantillon (1755) introduced the entrepreneur in his pathbreaking economic treatise. Jean-Baptiste Say (1841, 1852) provided the first comprehensive discussion of the entrepreneur in economic analysis, emphasizing how the entrepreneur's earnings depend on his personal reputation, judgment, and attitude toward risk. Entrepreneurs are central to Frank Knight's (1921) discussion of risk, uncertainty, and profit, which emphasizes both the supply of and demand for entrepreneurship.

The major works of Joseph Schumpeter lay the foundations of the theory of innovative entrepreneurship. Schumpeter (1934) in the *Theory of Economic Development* defines entrepreneurs as individuals who start firms. Later, in *Business Cycles*, Schumpeter (1939, p. 103) states that entrepreneurs are individuals who start firms in the time of competitive capitalism but suggests that innovators may be firm owners, corporate managers, or salaried employees in "the times of giant concerns" or "trust capitalism."²

In the present work, I restrict the definition of entrepreneurs to *individuals who establish firms*, whether they act alone or in teams of founders. Entrepreneurs can create start-ups and establish firms from scratch, as appears to be most common. Entrepreneurs also can be firm owners, corporate managers, or salaried employees who start new firms through spin-offs, split-offs, and spin-outs. I distinguish innovative entrepreneurs from managers whose innovations remain within existing firms.

An explosion of economic research has generated significant insights into the economic activities of entrepreneurs. Entrepreneurs play a role in developing management strategy and fostering the growth of firms (Penrose, 1959). Entrepreneurs address transaction costs by establishing firms that are market makers and specialized intermediaries (Casson, 1982, 2003). The new firms that entrepreneurs establish then create and manage markets and organizations that handle most of the economy's transactions (Spulber, 1999, 2009). Entrepreneurs are important in labor markets through both the occupational choice of entrepreneurs themselves (Lazear, 2005; Parker, 2009) and employment by new firms (Thurik et al., 2008). Entrepreneurs are key drivers of economic growth and the macroeconomy (Audretsch et al., 2006; Schramm, 2006b; Baumol et al., 2007). Entrepreneurship and innovation have made inroads in macroeconomic growth models (Aghion and Howitt, 1992, 1997, 2009). Baumol's (1993, 2002, 2010) work contributes prominently to the discussion of innovation and entrepreneurship. Entrepreneurs raise critical issues for public policy makers affecting antitrust, regulation, and fiscal policy (Holtz-Eakin, 2000; Lundstrom and Stevenson, 2005; Lerner, 2009).

2 For an illuminating biography of Schumpeter, see McCraw (2007). Brouwer (1991) identifies and clarifies many "Schumpeterian puzzles" within the context of Schumpeter's work; see also Brouwer (2002).

Simon Parker (2009) provides a valuable comprehensive discussion of the economics of entrepreneurship. Parker (2009) offers an integrative survey of the empirical and theoretical aspects of entrepreneurship that gives an in-depth analysis of the field. His discussion addresses the determinants of entrepreneurship, financing of new ventures, performance of entrepreneurial firms, and public policy toward entrepreneurs. His wide-ranging and penetrating discussion illustrates the vast set of issues in labor economics, financial economics, and industrial organization that are important parts of the study of entrepreneurship.

Innovation and entrepreneurship are becoming a field of study in economics because of the fundamental issues raised by innovation and the establishment of firms. The American Economic Association's *Journal of Economic Literature* classification system lists "Entrepreneurship" as L26, a third-level subject in which L denotes the subject category "Industrial Organization" and L2 denotes "Firm Objectives, Organization, and Behavior." Perhaps a better location might be a major topic within the subject category: O, "Economic Development, Technological Change, and Growth." The discussion in this book suggests that combining the study of innovation with the study of entrepreneurship helps form a substantial field in economics.

This book is directed at researchers and advanced students in economics, law, technology, and management strategy. Entrepreneurs' significant contributions to the economy call for increased attention in economics teaching and research. The entrepreneur also tends to be absent from undergraduate and graduate economics courses. Johansson (2004) studies PhD programs and textbooks in economics and finds that required PhD courses in microeconomics, macroeconomics, and industrial organization and the textbooks in these fields completely exclude the concept of the entrepreneur. Johansson (2004, p. 533) concludes that "there is a need for economics Ph.D. training based on theories that incorporate entrepreneurship and institutions."

The book is organized as follows. Chapter 1 introduces a dynamic economic framework consisting of three stages: invention, entrepreneurship, and competitive entry. The process begins with an *inventor* who makes commercial, scientific, and technological discoveries. Next, an *innovative entrepreneur* applies these discoveries, creates a start-up enterprise, and attempts to establish a firm. The entrepreneur is innovative by being the first to introduce inventions to the marketplace. An entrepreneur who is successful in establishing a firm ceases to be an entrepreneur, becoming instead an *owner* of the new firm or selling the firm to outside investors. The final stage in which the role of the individual changes from entrepreneur to owner is referred to as the *foundational shift*. The framework considers the innovative entrepreneur in the context of the theory of the firm (Spulber, 2009a, 2009b).

Chapter 2 examines the Question of Entrepreneurial Motivation and presents a life-cycle theory of entrepreneurship. The inventor and the innovative entrepreneur maximize utility of consumption over their life cycle, taking into account various

market opportunities. The chapter shows, based on life-cycle theory, that inventors and entrepreneurs make consumption-saving decisions that are interdependent with their business decisions. As a result, the inventor's research and development (R&D) and commercialization decisions are interdependent with the inventor's preferences, endowment, and other characteristics. Also, the innovative entrepreneur's business decisions are interdependent with the entrepreneur's preferences, endowment, and other individual characteristics.

Chapter 3 addresses the Question of Innovative Advantage. Entrepreneurs can gain an innovative advantage over incumbent firms through individual initiative. Innovative entrepreneurs have incentives to enter the market when the profits from introducing new technologies exceed entry costs. In contrast, existing firms are subject to incumbent inertia as a result of the replacement effect of existing business and other factors. When an independent inventor can license the new technology to either an incumbent firm or an independent entrepreneur, the inventor will license to both so that the market equilibrium always generates entrepreneurial entry. With sufficiently differentiated products, the inventor licensing to both the incumbent and an independent entrepreneur has greater incentives to invent than an incumbent monopolist. The chapter also considers the importance of commercial inventions and business strategies for innovative entrepreneurship.

Chapter 4 addresses the Question of Competitive Pressures. It has often been suggested that competitive pressures discourage innovative entrepreneurship by dissipating economic rents from innovation. The chapter shows that innovative entrepreneurs generate more creative projects than a multi-project monopoly incumbent. This occurs because the average expected returns to innovation for competing entrepreneurs are greater than the incremental expected returns for the multi-project monopoly incumbent. The chapter also considers competition among innovative entrepreneurs when there are capacity constraints so that multiple entrepreneurs remain active in equilibrium. Postentry competition among entrepreneurs selects the best technologies and adjusts capacity to market demand. The chapter emphasizes that competitive entry and exit of entrepreneurs are consistent with profit maximization rather than irrational exuberance.

Chapters 5 to 8 address the Question of Creative Destruction and show how innovative entrepreneurs overcome frictions in the market for inventions. These chapters consider a strategic innovation game in which an inventor and an established firm choose whether to cooperate or to compete. If the inventor and the existing firm choose to compete, the inventor becomes an entrepreneur. The entrepreneur establishes a firm that enters the market with a more efficient production technology and displaces the incumbent firm. If the inventor and the existing firm choose to cooperate, the inventor transfers the new technology to the existing firm.

Chapter 5 examines the effect of intellectual property (IP) and transaction costs on creative destruction. The option of entrepreneurship increases incentives to invent by reducing the impact of imperfect IP protections and transaction costs.

This need not imply that reducing IP protections is a means of increasing innovative entrepreneurship. The discussion emphasizes that commercial inventions are an important foundation for entrepreneurship and a channel for the introduction of scientific and technological inventions. IP protections for commercial discoveries are essential for efficiency in the market for inventions and contribute to innovative entrepreneurship.

Chapter 6 extends the strategic innovation game to study innovative entrepreneurs who make “new combinations.” The model examines the innovative entrepreneur when multidimensional innovation consists of a new production process and a new product. Entrepreneurship can occur in equilibrium as a result of imperfect transferability of multidimensional technologies. By mitigating creative destruction, product differentiation increases the returns to entrepreneurship relative to the returns from technology transfer to incumbents.

Chapter 7 examines how the problem of tacit knowledge affects the trade-off between technology transfer and innovative entrepreneurship. The inventor’s tacit knowledge generates returns from own-use of inventions. This contrasts with the standard view that the complementary assets of established firms generate an advantage for technology transfer over entrepreneurship. The inventor’s tacit knowledge affects the inventor’s R&D investment and the existing firm’s investment in absorptive capacity. Higher-quality inventions result in entrepreneurship, and lower-quality inventions result in technology transfer.

Chapter 8 considers how asymmetric information about the features of the invention affects the outcome of the strategic innovation game. Imperfect adoption decisions by existing firms because of organizational architecture can create frictions that favor entrepreneurship over technology transfer. Adverse selection in the market for inventions can create transaction costs that result in own-use of inventions by innovative entrepreneurs. The need for investment in costly signaling in the market for inventions can increase returns to innovative entrepreneurship in comparison to technology transfer. Agency costs associated with technology transfer further generate gains from own-use of technology by inventors who choose to become innovative entrepreneurs.

Chapter 9 examines issues relevant to the Question of the Wealth of Nations. The chapter addresses the globalization of entrepreneurship by examining the effects of international trade and foreign direct investment (FDI) on innovative entrepreneurship. Many countries have become more open to international trade and relaxed economic regulations on their domestic markets, generating extensive diffusion of entrepreneurship. Cross-country differences in labor supply and potential entrepreneurs cause differences in the extensive margins of technology utilization. International trade increases product variety but is not sufficient to address technological differences and labor immobility. Many new firms choose to internationalize their operations by operating or outsourcing abroad. By transferring innovative technology embodied in new firms, entrepreneurial FDI equalizes the extensive margins of technology adoption across countries and harmonizes the

intensive margin of technology utilization. The combination of international trade and entrepreneurship increases total benefits in comparison to both autarky and international trade without FDI.

Chapter 10 concludes the discussion by considering how innovative entrepreneurs contribute to economic growth and development. The motivation of innovative entrepreneurs suggests that public policy makers should consider the decisions of individuals contemplating innovative entrepreneurship. Policy makers should remove disincentives for individual asset accumulation and reduce legal and regulatory barriers to market entry of new firms. These policy changes should help unleash the creativity and initiative of innovative entrepreneurs.

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