Innovation: An Overview

By

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This chapter provides an overview of this book on innovation. The book has two parts. The first part contains chapters that provide reviews of the academic research on innovation. The academic research reviewed includes the research in organization behavior, operations, marketing, economics and finance. The second part contains chapters that provide a variety of perspectives on innovation for managers that are practically useful and implementable. The authors of the chapters are faculty at the Olin Business School at Washington University in St. Louis. The book is thus unusual in that it brings together a synthesis of academic research on innovation with a variety of cross-functional and very practical managerial perspectives on innovation.
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1. Introduction

This is an ambitious book whose purpose is twofold. First, it seeks to provide a synthesis of the academic research on innovation from a multifunctional perspective. A diverse set of functions -- organization behavior, operations, marketing, economics and finance -- are covered. The reader should thus be able to gain a good understanding of the large body of academic research on innovation in many different business disciplines. Second, the book seeks to provide practically – implementable insights for managers who are interested in improving the innovation capabilities of their organizations. The chapters devoted to this, cover a wide range of issues ranging from organization culture and changing the mindset of the organization to the specifics of how one should contract for innovation and avoid common myths in innovation.

The book thus melds academic research with down-to-earth, practical insights about how organizations can become more innovative. All the contributing authors are faculty at the Olin Business School at Washington University, with one exception -- a consultant (Signe Spencer) with considerable experience in the area. The views expressed in this book thus have strong research support and intellectual depth.

The book is launched under the auspices of the Institute for Innovation and Growth (IIG), a new research center launched by the Olin Business School that is dedicated to innovation. The main goal of the IIG is to stimulate research on innovation and then disseminate it through publications, consulting projects for organizations, courses, and conferences.

The rest of this chapter is organized as follows. In Section 2, I discuss the first part of the book. In Section 3, I discuss the second part. Section 4 concludes.
2. The Academic Research on Innovation

In the first part of the book, there are three chapters that provide syntheses of the academic research on innovation from many different perspectives. Sawyer and Bunderson (S-B) review the research on organization. Kouvelis and Lus (K-L) review the academic research on managing the innovation process and the new product development process from operations and marketing research perspectives. Thakor reviews the innovation research in Finance.

Organization Behavior

S-B review studies of organizational innovation that focus on groups and teams. The reason for this is that there is consensus among organization researchers that most of the innovation that occurs in organizations happens in groups and teams. Examples include cross-functional task forces, process improvement committees, new product development teams, and top management groups. The idea is that teams deliver innovative breakthroughs by combining knowledge and cross-functional perspectives from various parts of the organization.

However, just composing cross-functional teams and unleashing them on the task of innovation is not enough. In order to realize the innovation potential of these teams, they should be structured and managed in ways that increase the opportunity for useful creative ideas to be recognized, selected and then combined effectively to generate innovation. S-B survey the academic research on this and find that the literature falls into four broad categories. These categories are: team composition, team process, team norms and team organizational contexts that are associated with innovation outcomes.

On the issue of team composition, the literature on innovation in groups has focused on group diversity and group turnover. On the issue of group diversity, the common perception is
that diversity promotes innovation. However, the literature has found that this common perception misses key subtleties. In particular, diversity complicates interpersonal relations and heightens conflicts, thereby possibly offsetting the benefits of breadth of perspective. The key to making diversity a net benefit is to have group members committed to the group and its goals. On the issue of group turnover, the authors conclude that the empirical evidence is unclear and ambiguous. There is however, some emerging evidence that turnover is more likely to promote innovation in firms with complex, knowledge-intensive, problem-driven tasks than in firms that have routine, coordination-intensive, process-driven tasks.

On the issue of team process, the authors provide a very thorough survey. One of their surprising findings is that despite the increasing popularity of brainstorming as a technique to spur innovation, there is substantial research evidence that brainstorming groups are less effective at generating ideas than the same number of people working alone in a “virtual” group. They go on to identify factors that make brainstorming more or less effective.

On the issue of team norms, the authors review numerous factors that are associated with stronger versus weaker learning norms in teams. They discuss three factors that have emerged as the most significant: psychological safety, power asymmetry and openness to diversity.

Finally, the authors point out that teams never operate in a vacuum – each team is a part of a broader organizational content. They go on to discuss a variety of ways in which organizational content affects innovation. They also discuss at length the significant strides made in recent decades by researchers on assessing and evaluating the informal organization through the use of social network analysis. The role of creativity is also examined.
At the end of their chapter, S-B discuss how the framework emerging from their literature review can be put into practice. They make the following key points:

(1) Social ties can help people be more creative, can help teams be more creative and can help organizations be more innovative. The research reviewed by S-B identifies several characteristics of social networks that are associated with enhanced creativity.

(2) At the individual level, it is best to be connected but not too connected. It is best to have some number of weak ties, in addition to the strong ties that characterize most work teams and organizational units. Individuals should also seek out ties outside of their local, dense network.

(3) At the team level, although team cohesion is associated with greater work satisfaction and efficiency, it runs the risk of reducing team creativity. Team members should make sure to remain connected outside of their team. Team leaders should:
   - provide incentives to members who bring information from external ties
   - give time in the schedule for these ties to be pursued
   - watch out for too much cohesiveness

(4) At the organization level, a small world structure is more innovative than either a network with all dense ties, or a network with exclusively weak ties. Organization leaders can increase the likelihood of a small world structure by:
   - frequent reassignment of staff
   - innovation labs
   - shadowing staff in another unit
   - incentive systems that reward cross-unit contacts and exchange of information
   - office space architecture that increases the likelihood of encounters with different others that might lead to a weak tie being formed
Operations and Marketing

In this chapter, K-L review the academic research in operations and marketing to provide insights into how the innovation process, particularly new product-development projects, should be managed. They begin by noting the importance of new product development to firms – almost 30% of companies’ sales are from new products.

Because the literature on the subject is vast, the review focuses on a few selected topics such as Platform-Based Product Development, Disruptive Innovation, Portfolio Management and Resource Allocation, and Incentives.

On the issue of Platform-Based Product Development, the authors note that it provides several important benefits to companies in industrial practice, including the greater flexibility of tailoring products to meet the varying needs of different customer segments, reduction in system complexity, shorter product lead-times, reduction in unit production costs, improved service levels and competitiveness within the market place. There are many examples in practice. One of the most successful stories of product development using platform-based approach is by Kodak in the development of its single-use cameras. This case study is discussed in depth in the chapter.

Next, the authors discuss Disruptive Innovation, which is one of the most important innovations that threaten the competitiveness and survival of many top companies in their industries. The concept of disruptive innovation was first introduced by Clayton Christensen with the concept of sustaining innovation. Sustaining innovation can be described as an incremental (or radical) increase in the performance and features of an existing product in an established market. Such innovation initially targets the high-end of the existing market to derive best customers’ higher margins, and then spread downward through the low-end market segment
over time. An example of a sustaining innovation is the evolution of Pentium processors with new features added in every model which attract the high-end customers at first.

Disruptive innovation, by contrast, brings a new product into the market which initially underperforms the existing product in the key dimensions that the high-end customers value, but more appealing to low-end market or new customers on alternate dimensions such as its lower price, simplicity and more convenience of use.

The research question is: what is the impact of disruptive innovation on existing and emerging markets, and when does it pay for a firm to engage in disruptive innovation? The research they survey indicates that the answer depends on whether the innovation is offered to the market by the incumbent firm or a new entrant, the difference between the maximum price the customer is willing to pay and the manufacturer’s unit production cost, and the relative appeal of the product (whether broad or niche). The authors conclude by observing that more research is needed on how to position new products in the market.

On the issue of portfolio management and resource allocation, the authors focus on the literature that has examined project selection processes and resource allocation processes. The question is: how do you optimally manage project portfolios, so that both routine and innovative projects receive the necessary resources? Unless this is done, innovative ideas may die due to lack of organizational resources.

Their survey of the literature reveals that different types of projects require different management processes. While radical breakthrough projects face higher risks and uncertainties, the ones associated with incremental/derivative projects are lower. It is clear that the firms should make investments to the development of breakthrough project besides the incremental
ones to remain competitive in the market. The incremental projects may require very tightly controlled processes. Breakthrough innovations require processes that are much more tolerant of risk and accommodate longer payback periods.

Finally, on the issue of incentives, the authors note that to reduce the cycle time for introducing new products, companies need to focus on the impact of funding authority and incentives on the dynamic allocation of resources between different innovative projects over a specified portfolio review cycle. The research suggests that managers have higher incentives for their efforts when they were given funding authority. However, giving authority to the managers who make the resource allocation decisions as well as their increased career concerns shift the balance of the project portfolio towards a more incremental strategy, i.e., the manager’s interest is in investing in improvements to existing products. While this provides higher profits in the short run, it will affect the firms’ long run success and competitiveness in a negative way. One possible future research direction is to develop proper incentive schemes that increase the managers’ willingness to allocate more resources to radical breakthrough projects, thereby shifting the portfolio balance towards a radical strategy.

**Finance and Economics**

My chapter on the role of innovation in Finance and Economics reviews two strands of literature on innovation in Finance and Economics. The first has to do with how innovation is financed and its impact on shareholder value. The second has to do with financial innovation, which is the process by which new financial securities and structures are created. In both cases, I discuss the managerial decision-making implications.
On the first strand, I address four questions. The first is: does innovation create shareholder value? What is the evidence? The research on this indicates that it does, but the impact is industry-specific. Moreover, the answer to the question depends on what kind of value we are talking about. It appears that on average entrepreneurs are inadequately rewarded for the risk they take in innovative ventures. However, entrepreneurs engage in such activity because they are optimistic, and this produces benefits for society. That is, “social value” is created from innovation, even though entrepreneurs earn inadequate risk-adjusted returns on average.

The second question is: why do firms do basic research that does not directly generate a product with revenue potential? The research on this reveals that most people think of the research that firms wish to engage in as “applied research”, which is research that can be converted into commercially profitable products and services. However, firms also engage in basic or fundamental research, even though there is high uncertainty and it is difficult for the firm investing in that research to appropriate all the rents. The question is why. My review chapter lists a variety of factors that induce firms to engage in basic research, including the important point that basic research by firms is often done accidently while they are in the pursuit of applied research. These factors also provide guidance to managers about when basic research makes sense.

The third question is: how do companies set hurdle rates for innovative projects? Here the research indicates that the correct approach is to view innovative projects as real options, and there are quantitative techniques for valuing these options.

The fourth question is: how do innovative firms get financed? In response to this, the chapter reviews a large body of work on venture capital and initial public offerings (IPOs), as
well as some research on how compensation contracts should be written to incent managers to engage in innovative projects.

The second strand of the literature being reviewed has to do with financial innovation. Again, four questions are studied. The first is: how do we define financial innovation? The literature survey shows that the definition includes not only new instruments, but also new technologies, institutions, and markets. The number of financial innovations introduced in the past thirty years that satisfy this definition is enormous.

The second question is: why is there so much financial innovation? Here the literature review reveals half a dozen factors that generate innovation incentives, including technological shocks, globalization, taxes and regulation. These factors are discussed in depth in the chapter.

The third question is: who are the innovators and what are their incentives? Here the literature indicates that the innovators are financial institutions, especially investment banks, and that innovation incentives are stronger in functionally-separated financial systems - - like the one in the U.S. when the Glass-Steagall Act separation of commercial banking from investment banking and insurance was in place - - than in universal banking systems. Moreover, large firms and those affected most adversely by existing market conditions innovate the most.

The final question covered in the chapter is: what are the social benefits of innovation? Although there is not a consensus on this, it appears that financial innovations can benefit society by improving market liquidity and lowering the cost of capital for firms.

Thus, my review chapter reveals numerous insights that have emerged from the academic research on the financing of innovations in non-financial firms and the process of financial innovation that is dominated by financial firms.
3. Innovation Insights from a Managerial Perspective

In the second part of the book, there are four chapters that provide a wealth of new innovation insights for managers. In the first chapter, Konczak and Spencer ask how business leaders can update the right climate for innovation within their organizations. They note that “organizational climate” refers to employees’ perceptions of how it feels to work in a particular setting. These perceptions affect employees’ performance. They identify six dimensions of organizational climate that affect employees’ ability to perform. Emerging from their discussion is a very interesting framework that leaders can use to align their organizations with the optimal innovation output from their employers.

In the second chapter in this part of the book, Chun and Thakor describe an approach to innovation that can be used by individuals as well as organizations. They call it the “unblocking” approach. The idea is that the ability to innovate is impeded by the assumptions we make about the situation we are in. These assumptions define the paradigm we operate within, and they may be explicit or implicit. Because we choose to operate mostly within the box defined by our assumptions, we fail to see the possibilities that lie outside the box. Recognizing these possibilities requires identifying and discarding an important assumption about our paradigm, and this is not easy to do because each assumption often has ample empirical support. For example, airlines operate under the assumption that the only thing customers care about is price and that the main component of price they will focus on is the most salient - - the basic ticket price without any of the add-ons for extra bags, extra leg room, etc. The authors identify a systematic approach that can be used to determine which assumptions of the paradigm should be challenged in order to pursue innovation. They discuss numerous case studies and outline practically-implementable steps.
In the third chapter called “Contracting for Innovation”, Argyres examines how organizations should manage relationships with their own employees who come up with innovative ideas. He discusses three approaches to managing these relationships: contract design, relational governance, and tournaments. He also examines the relative importance of the three approaches. He concludes that contract design is perhaps the most generally-applicable approach and deserves special attention from managers. He identifies settings in which relational governance or tournaments may be important mechanisms as well.

Finally, Knott’s chapter examines numerous myths about innovation in general and R&D in particular. She identifies some of the findings that have emerged from past research that seem to have intuitive appeal. She then focuses on more recent research that combines insider experience with more sophisticated data and methods, and argues that many of the prescriptions from past theory are invalid. For example, she points out that a widely-held belief appears to be that spillovers and imitation by others dilute the innovation incentives of firms. However, the research she reviews shows that innovation is highest in industries with the highest spillover rates. This has the striking implication - counter to conventional wisdom - that patents probably have only minimal impact on innovation.

Collectively, these four chapters point out that there is a wealth of practically-relevant research on innovation from which managers can learn. Many widely-held beliefs about innovation are wrong. Stimulating innovation is not just an art - it is a science too.

4. Conclusion

This is a book on innovation that has taken the unusual approach of surveying the academic research on innovation from many different functional perspectives, and has also
included various chapters that address specific decision-making issues in innovation for managers. A plethora of insights are contained in these chapters. A distinguishing feature of these insights is that they are based on research, and they also explore a variety of myths about what innovation is and how it should be nurtured.