Preface

In real life most situations corporate managers face are characterized by both strategic and market uncertainties with respect to the economic environment. Following the liberalization and deregulation of Western economies, very few industries remain protected, whereas most companies face fierce competition in their respective economic sectors. Certain European governments used to favor high administrative barriers shielding certain "natural monopolies" from competitive entry. Such protected monopolies included the telecommunications, electricity, and gas sectors. European governments recently had to enforce deregulation schemes, opening up many economic activities to new, potentially foreign market participants. At the same time sectors traditionally populated by many firms have undergone significant consolidation, yielding oligopolistic situations with a reduced number of players. These two ongoing concurrent phenomena—liberalization and continuing consolidation—highlight the emphasis corporate managers increasingly put on *strategic uncertainty* and market structure.

Besides strategic uncertainty, managers face increasing *market uncertainty*. With a reduced life cycle for many products, firms can no longer rely on a given offering but have to renew their product portfolio frequently to sustain or enhance their revenue stream in light of competitive pressures. The IT industry has evolved most rapidly, putting companies unable to respond to market developments and technological uncertainty at a severe disadvantage.

At the core of this dilemma lies a classic trade-off between commitment and flexibility. Managers can stake a claim by making large capital investments today influencing their rivals' behavior or take a "wait-and-see" or step-by-step approach to avoid possible adverse market consequences tomorrow. The assessment and optimal management of strategic options is critical for firms to succeed in today´s constantly changing

business environment. Whether to invest in a new product or enter a new market is a critical decision management should address with proper analytical tools in assessing options and deciding whether to make this or that strategic move.

This book aims to make accessible to a wide audience recent results on how to achieve and quantify balance between flexibility and commitment through the new approach of "option games." We believe that this approach can play an important role in managing modern business in a changing global marketplace. Option games help model situations where a firm that has a real option to (dis)invest in specific projects faces competition. Such situations lead to two, sometimes conflicting, main sources of value for the firm. First, there is a value of waiting or flexibility related to the real option that the firm holds to make future better-informed decisions. Second, there is a value of commitment in light of the strategic interaction with competitors. The trade-off between these two forces calls for a careful balancing act. From a modeling perspective, the examination of such a trade-off calls for a combination of the real options and game theory approaches to decision-making.

In the first part of the book, we discuss prerequisite concepts and tools concerning basic game theory, industrial organization, and real options analysis. We are then in a position to amalgamate these diverse fields into a unified framework for option games. This makes the task at hand very ambitious because these fields of research normally require different tool kits and needed results are scattered around in disparate parts of the literature. We aim to fill this gap here by synthesizing the existing literatures to provide a consistent and accessible account of options and games. We combine some of the best materials, tools, and ideas found in diverse books and research works on game theory (e.g., Fudenberg and Tirole 1991; Osborne 2004), industrial organization (Tirole 1988), and real options analysis (Dixit and Pindyck 1994; Trigeorgis 1996) and go beyond current knowledge to chart new territory. The current book brings important materials and ideas together in a unified framework, which makes it much easier for managers and academics to enter and understand this new field. The second part of the book presents the new approach in discrete time, while the last part on continuous-time option games is not covered in any systematic way anywhere and is an important addition. For pedagogical convenience and for the sake of simpler and clearer exposition and buildup of the basic ideas, we first present each of the building blocks step by step to form the supporting foundation and columns of the structure, with the richer theory coming later

(culminating toward chapter 12) as the keystone that will complete the arch.[1]

The book should be especially appealing to the academic community, particularly in the areas of strategy, economics, and finance. It is the first book that combines the aforementioned fields in such a way that it is accessible to an audience that is not necessarily expert in all fields involved. The book should also be of interest to (academically trained) practicing managers who are interested in applying these ideas. It provides many strategic insights and a ready-to-use tool kit offering quantitative guidance for important competitive trade-offs faced by the modern firm. We attempted to strike a balance between making the book accessible to a wider audience while simultaneously making it challenging and rigorous, subjecting the art of strategy to a scientific inquiry. The book provides a very pragmatic and intuitive, yet rigorous approach to strategy formulation.

We owe an intellectual debt to the many scholars who made significant contributions to the related literatures and to the many individuals who provided us with generous comments, criticism, ideas, and suggestions. We thank Avinash Dixit for his feedback, prologue, and encouragement. Marcel Boyer, Marco Días, Kuno Huisman, Grzegorz Pawlina, Sigbjørn Sødal, and Jacco Thijssen made invaluable detailed comments and provided suggestions for improvement on the entire manuscript. Several other colleagues offered valuable comments on select parts of the book or on specific chapters: Christoph Flath, John Khawam, Bart Lambrecht, Richard Ruble, and Bruno Versaevel. We also thank Stefan Hirth, Helena Pinto, Artur Rodrigues, and Han Smit for useful comments. We thank Robert J. Aumann, Rainer Brosch, Peter Damisch, Marco Días, Avinash Dixit, Eric Lamarre, Scott Mathews, Robert C. Merton, Reinhard Selten, and Jean Tirole for enhancing the relevance of this book with their valuable interviews and comments. The authors would like to thank Arnd Huchzermeier for his support. Jane MacDonald from the MIT Press has been most enthusiastic, efficient, and supportive. Last but not least, we would like to thank our families, alive or departed, for their love and support.

1. Chapter 12 can be thought of as the climax of the book, but we need to introduce various key notions (e.g., investment trigger, open-loop vs. closed-loop equilibrium) in a step-by-step fashion to facilitate and smooth out the exposition. Several of the issues left unresolved in the earlier parts of the book are addressed in chapter 12.