

STRATEGIC BEHAVIOUR IN NETWORK INDUSTRIES

A Multidisciplinary Approach

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Foreword

Strategic behaviour in the various utilities has presented governments, firms and consumers with considerable problems in the past few years. The consequences of clever interventions, sly misuse of technical capabilities, foul financial play and deceit when providing information to others have often been quite substantial. And yet, apart from some economic studies in which game-theoretic models have been applied, very little actual empirical research has been conducted on the what, how and why of strategic behaviour. This is not all that surprising, because the subjects under study may be quite reluctant to collaborate in telling researchers the full story. Also, the existence of strategic behaviour is sometimes exceedingly difficult to prove. Perhaps journalists may write that wherever there is smoke, there is fire, but for judges and investigators, serious evidence is required to make that point. The authors of this book therefore utilized a great variety of research methods to gather insights worked out into demonstrative and convincing case studies.

It is with pride and pleasure that one of the research groups of the Next Generation Infrastructures Foundation of which I am scientific director, has, after several years of theoretically and empirically studying the subject, now managed to get a book out in which the background, breeding grounds and mechanisms of this phenomenon are elaborately explained, five meaningful and characteristic empirical cases are described from different utility sectors and different countries, and credible suggestions are given to counter the downsides of this phenomenon. Moreover, it is written in a clear and accessible style, making this very useful study material not only for academics in the field (politics, policy, economics, law, systems engineering), but also for master's students. May this book prove useful for students, professionals and academics for many years in seeing through situations and circumstances plagued by strategic behaviour and in undertaking appropriate action.

Margot Weijnen
Scientific Director, Next Generation Infrastructures Foundation

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One person who we would like to thank for his contribution is Mark de Bruijne. Although he had no role to play in compiling the book or the brainstorms leading to the conceptual framework underlying it, he was willing to provide us with an invaluable chapter on Enron, which according to the anonymous reviewer of our book, was among the best documented that he had seen.

We are also indebted to Edward Elgar's anonymous reviewer who, while having a very sympathetic view of the approach we chose, provided us with constructive and useful suggestions to sharpen our theoretical and methodological choices and justifications.

Another person that we would like to mention here is Krispijn van Gasteren, a student of ours but at the same time much more than merely a student. His diligence and timeliness in arranging the format of the book, working on our editorial changes and sending it to the publisher in the right shape, indicate that he saw through our theoretical scribbles without requiring additional clarification on our part. Good student-assistants are young academics and secretaries at the same time. This is more than any one of the four authors can say of themselves.

Finally, we are immensely grateful to Hans de Waard, our conscientious translator, who ensured that large parts of the book were written in an English that both native and non-native speakers can feel comfortable with. It is with sadness that we heard he passed away after completing the work for this book but before seeing it in published form. We cherish

the idea that he was proud to work for Delft University of Technology in general and for us in particular. Hans, we will remember you with fondness.

Ernst ten Heuvelhof, Martin de Jong,
Mirjam Kars and Helen Stout

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1. Introduction

1.1 INFRASTRUCTURES

Infrastructures are the backbone of the economy and of society. In particular the network-based infrastructures (for example energy, water, information and telecommunication infrastructures and transport infrastructures for freight and passengers) provide essential services that are enabling for almost every type of economic and social activity. The annual expenditure of households and enterprises in OECD countries for services delivered over the infrastructures is relatively high, some thousands of euros per year per inhabitant. The annual investments of the infra operators and service providers are correspondingly high. The current changes in the economic structure make the crucial role of the infrastructures even more evident. The infrastructures are crucial as enablers of the present service-oriented economy. Hence, they are often labelled ‘critical’ infrastructures. The economy and society as a whole gain by well-functioning and well-performing infrastructures. This is why anything that hampers the optimal functioning of network-based industries deserves attention.

1.2 CHANGES IN NETWORK-BASED INDUSTRIES

Until recently, this world of infrastructures and utility services was a quiet world. Stable public-owned companies delivered the same products and services year in, year out. However, technological developments, liberalization, privatization, commercialization and internationalization have turned this world upside down. The changes in infrastructure-based sectors have been immense. To mention a few examples:

- The telecommunication sector has changed rapidly: until recently, this was a stable sector. Most countries had one vertically integrated provider, in most cases publicly owned, which offered a limited number of services. A few years on, this sector has changed completely. There are far more services in the market than before. The technological developments are highly dynamic. Convergence with other types of infrastructure has completely changed the relations

in this sector. There is considerable competition. The sector is predominantly private and the market is fully internationalized.

- The market for energy has changed beyond recognition in a short time. Producers, network managers and suppliers have been unbundled, competition has been introduced in many links of the chain, and some companies have been privatized. A consolidation battle is taking place at the international level, resulting in gigantic companies, and the markets retain their oligopolistic character.
- Cable companies that used to deliver a respectable package of channels to living rooms anonymously for little money have become aggressive listed companies, developing new products and services for commercial reasons.

Many were highly optimistic about the consequences of the transitions. Companies were believed to become more customer-oriented, to realize great innovations, their services were expected to become cheaper and consumers would have more options. Although some of these advantages have indeed been realized, the changes are heavily criticized. The positive consequences are less visible than was hoped and disadvantages are manifesting themselves. At times, the once so peaceful utility world seems to have changed into a battlefield where companies, regulators, governments and politicians are making each other's lives miserable. This often reaches the point where the behaviour goes beyond the limits of fair play. Some examples are:

- Computer giant Microsoft made the operation of Windows Client Personal Computer Operating System conditional on the simultaneous acquisition of Windows Media Player software, thus stifling competing providers.
- AT&T, the powerful telecoms firm, was able to retain its hegemony for a long time by denying interconnection to competing firms.
- In a short time, Enron changed from a reputable energy company into a cynically operating one where deceit and window dressing were the order of the day.
- Versatel, the Dutch telecoms firm, participated in the bidding at the Universal Mobile Telecommunications System (UMTS) auction merely to drive up prices for competitors, without having serious ambitions itself to secure frequencies.

This book elaborates the idea that, although the changes in network-based sectors may potentially have positive effects, these advantages seldom materialize completely in practice. One of the reasons for these disappointing results is the 'strategic behaviour' of the players involved. For

brevity's sake, strategic behaviour can be defined here as actor behaviour in interaction settings aimed at a very one-sided realization of this actor's own interest. Since infrastructures are so important for a country, particularly for its inhabitants and for its economy, strategic behaviour that negatively affects the quality of the infrastructures and the services transmitted over them might have major adverse economic and social effects. This is sufficient reason for highlighting strategic behaviour.

Although these aspects of strategic behaviour are intuitively clear, the fact remains that scientific clarity about this concept is imperative. Research into strategic behaviour presents a specific methodological problem. Strategic behaviour is difficult to detect. There are at least two reasons for this. The first is that particular actions seem strategic from one perspective, but are not so from another perspective or at any rate are not consciously intended to be so. The second is that the actors displaying strategic behaviour will usually deny acting strategically, which makes furnishing conclusive evidence for its existence almost impossible. Strategic behaviour is surrounded by a haze of blameworthiness, causing a tendency for actors to distance themselves from such a qualification. This means that many methods of social-scientific research do not lend themselves to exploring strategic behaviour, because the respondents that are a source of information about their own behaviour in normal research may hardly be a source of information in this type of research.

1.3 PROBLEM DEFINITION OF THIS BOOK

In this book we define, describe and analyse this strategic behaviour. We do not study strategic behaviour in the world of network-based industries as an isolated phenomenon, but place it in the wider context of strategic behaviour in general. The problem definition is as follows: *What examples and types of strategic behaviour can be observed in the world of network-based industries and what arrangements are conceivable to counter it?*

The following subquestions are relevant:

- What is strategic behaviour in general?
- How does strategic behaviour arise and persist?
- What forms of strategic behaviour are present in the liberalizing and privatizing network-based industries?
- What counterarrangements are conceivable?

In the academic literature, much has been written about strategic behaviour. We should point out here that this literature is relatively one-sided.

Strategic behaviour has been profoundly analysed at the level of abstract theory, especially from an economic and a game-theoretic perspective (Joskow and Klevorick, 1979; Milgrom and Roberts, 1987; Schelling, 1978; Schmalensee, 1981; Williamson, 1977). Many of these analyses are model-oriented and present a theoretical and model-oriented exploration of particular forms of strategic behaviour. These studies do not limit themselves to the network-based industries, but essentially relate to the economy as a whole and, even more widely, to all processes and games between actors in them. Actors, then, are not only companies, but also other organizations, or even countries.

This book focuses on strategic behaviour of actors in the network-based industries. On the one hand, network-based industries are ordinary industries. The companies in these network industries will therefore behave in a way similar to that of companies from other industries. The strategic behaviour that companies display in those ordinary industries can also be expected to feature in the network-based industries. On the other hand, the network-based industries have some special characteristics that may influence the intensity and the nature of the strategic behaviour in these sectors. This might lead to other strategic behaviour, in addition to the regular strategic behaviour.

1.4 STRUCTURE AND APPROACH

This book starts in Chapter 2 with a description of strategic behaviour in general. What are the general characteristics?

In Chapter 3 we explore the general literature about strategic behaviour, focusing on two questions: what is its origin; in other words, what are the breeding grounds for strategic behaviour? And what concrete strategic behaviour can thrive on these breeding grounds?

Chapter 4 zooms in on the network-based industries. It describes in more detail what this world looks like and what changes are taking place in it. We will then discuss six different opportunities for strategic behaviour, which may help to identify the ways in which actors employ strategic behaviour. These are the strategic use of rules, strong ties with the government, bottleneck facilities, the essential and indispensable nature of infrastructure utilities, the strategic use of the factor time and the use of financial resources.

In Chapters 5 to 9 we present five highly diverse empirical case studies in which several forms of strategic behaviour occur, thriving in the three different types of general breeding grounds and employing one or more of the six infrastructure-specific opportunities to display this strategic behaviour.

In each of these chapters, we first describe the events and interpret and identify the strategic actions, and at the end we always set out in a table what they were and what opportunity or opportunities were chosen for this behaviour.

In selecting the case studies, we opted for a spread over various economic sectors: aviation (open skies), telecommunications (AT&T and UMTS), electricity (Enron) and IT (Microsoft).¹ In addition, the selection is based on variety as regards the geographical setting of the case studies. The events discussed in the five chapters take place in, for instance, the United States, the European Union, the Netherlands, Germany and Austria. In addition, the case studies are marked by a great diversity of actors. We not only look at the interests and behaviours of national governments and former monopolists, but also deal with the actions and reactions of, for example, the European Commission, national regulators and new market entrants.

In Chapter 10 we present an analysis based on the empirical findings from our case studies. First, we will discuss what dominant pictures of strategic behaviour in the network-based industries have emerged from our empirical material. Then, we will compare our empirical findings with the theoretical literature on strategic behaviour. This will result in a theoretical overview of strategic behaviours in the network-based industries.

Finally, in Chapter 11 we present a number of potential counterarrangements. These arrangements can be employed to counter strategic behaviour or mitigate its effects. We will subsequently discuss three traditional counterarrangements (competition engineering, skimming returns and consumer protection) and two alternative arrangements (hybrid governance and regulators).

NOTE

1. Microsoft may not be the most obvious case study in the context of a book on strategic behaviour in network-based industries, because one would usually associate network-based industries with sectors like transport or electricity. Nevertheless, we believe that this case study makes a valuable contribution to our research. Besides, in our view, the industry of which Microsoft is a part can most definitely qualify as a network-based industry. In the first place, this industry fills a distinct utility function. Computers have a key function in today's society and are indispensable for the functioning of the economy as a whole. Besides, the industry can also most clearly qualify as a network-based industry as regards technological features. Here, we would like to point in particular to the bottleneck character of the service. Emmons also points out that Microsoft's current operating system can be characterized as a basic infrastructure. According to Emmons, the fact that Microsoft has, in the course of time, increasingly faced pressure from government regulators can be explained by the 'increasing perception among the public

– both individual consumers and corporate clients – that Microsoft's operating system has become a type of basic infrastructure. Hence, Microsoft now confronts the type of scrutiny traditionally faced by companies with near monopoly control of access to essential facilities like rail systems, telecommunications networks, and electricity transmission systems' (Emmons, 2000, p. 7).

REFERENCES

- Emmons, W. (2000), *The Evolving Bargain. Strategic Implications of Deregulation and Privatization*, Boston, MA: Harvard Business School Press.
- Joskow, P.L. and A.K. Klevorick (1979), 'A framework for analyzing predatory pricing policy', *The Yale Law Journal*, **89**(2), 213–69.
- Milgrom, P. and J. Roberts (1987), 'Predation, reputation, and entry deterrence', *Journal of Economic Theory*, **27**(2), 280–312.
- Schelling, T.C. (1978), 'Altruism, meanness, and other potentially strategic behaviors', *American Economic Review*, Princeton American Economic Association, **68**(2), 229–30.
- Schmalensee, R. (1981), 'Economies of scale and barriers to entry', *Journal of Political Economy*, **89**(6), 1228–38.
- Williamson, O.E. (1977), 'Predatory pricing: a strategic and welfare analysis', *The Yale Law Journal*, **87**(2), 284–340.

2. Defining strategic behaviour

2.1 THE CONCEPT 'STRATEGIC BEHAVIOUR'

Strategic behaviour is a frequently used concept. Sometimes authors refer to strategic behaviour when they attempt to explain why the results of institutional changes such as privatization and liberalization can be so disappointing. Expected positive effects such as lower prices, innovation and better services fail to materialize. The number of competitors in network industries is usually low. Consequently, one of the explanations given in such cases is 'strategic actor behaviour' of one or more of the players involved. In such cases, the concept 'strategic behaviour' is used comparatively loosely and associatively, without defining it clearly or separating it from other modes of behaviour. However, in spite of this lack of clarity it appears to be a socially and scientifically relevant phenomenon.

Within the academic world, economists make the most rigorous use of the concept, calling it either strategic behaviour or opportunistic behaviour, and often do so in a stylized manner. Although academically rigorous, economic publications often restrict themselves to analytical descriptions of fictitious situations or stylized, generic interpretations of real-life situations (Hurwicz and Reiter, 2006; Dixit and Nalebuff, 1993; Kreps, 1990). This is a very good starting point, but not complete for our purposes. Since this book attempts to get much closer to 'what happens on the ground' and to actually see what strategic behaviour means in practice and how it evolves, we will depart from the economic 'rational choice' game-theoretic notions and then systematically expand on those and add characteristics to develop the concept towards a more inter-disciplinary definition. One of the notions on which we continue to build is the lasting effect of the concept of self-interest. The essence of strategic behaviour is that strategists do what they do to serve their own interest. They do so in a sly, opportunistic manner, by camouflaging their intentions. They do so by using the ambiguity of their behaviour. The reason is that it appears possible in many cases to give two meanings to their behaviour: the first meaning being that with their behaviour they serve their narrow self-interest. Meaning two is that, instead, with their behaviour, they serve a broader interest. Strategists will consistently refer to this second meaning and indignantly reject other interpretations (see for more details the last

part of this chapter); in other words rationalization and motive diverge. All actors concerned may display such strategic behaviour. To mention just a few: incumbents, (potential) entrants, regulators, ministries, administrators, government officials, public interest groups, and so on.

This chapter examines the concept of strategic behaviour more closely. It will begin with the main insights derived from game theory and rational choice theory, as well as outlining its limitations. Subsequently, six additional characteristics of strategic behaviour 'in the real world' will be given.

2.2 GAME THEORY AND RATIONAL CHOICE THEORY: FEATURES AND LIMITATIONS

Game theory was introduced in a famous and agenda-shaping publication by Von Neumann and Morgenstern (1944). Its central theme is always the reasoning that in multi-actor environments with a game character, actors adopt a self-seeking attitude and try to pursue their goals rationally. They do this in interaction (anticipation and reaction) with other actors in their environment. The preferences of these actors and the values from which they originate are clearly defined. Today there is a large group of these theories, which employ advanced mathematics, but whose link with developments in practice is at least problematic. Assumptions underlying the calculations are properly set out at the beginning, but the outcomes fail to use the 'wealth of empirical reality', nor can they be retranslated to them (Scharpf, 1997, p. 2). Their most important value is a different one, that is showing basic economic heuristics behind emergent phenomena. Theories of this kind introduce distinctions that may be fertile theoretically but that soon fade in practice. For example, they distinguish between sequential games (i.e. players only make moves in succession) and synchronous ones (i.e. players are allowed to make moves simultaneously) (Friedman, 1983 and 1990). Of course, games in reality can contain both elements. Evolutionary game theory as developed in biology often remains closer to empirical evidence than in economics, but the level of complexity in the world of animals is far lower than among humans and the artefacts constructed around them (Maynard Smith, 1982; Axelrod, 1984).

It is very important to keep a close eye on the actual world here, which is full of uncertainties and where different games criss-cross. In this actual world, it is usually wise not to rely on just one strategy. Thus, we in fact encounter the core message that results from the confrontation between theory and practice: misunderstandings, misinterpretations and miscommunications are untreatable in the mathematical models, but for game