

**Part I**

**Introduction**

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# 1

## The Need for Actor and Strategy Models

### 1.1 Actors and Decision-Making

Actors matter for decision-making. Realizing organizational goals and objectives, successfully implementing a large project, or achieving policy impact is only possible with the support of others. Decision-makers cannot pretend to operate in a command and control environment where their decisions are readily agreed to and taken forward by others. Governments and businesses alike need to navigate and manage their network environment (De Bruijn & Ten Heuvelhof, 2008). A fundamental part of this is knowing who the important actors are, how to activate partners and accommodate critics, when to adapt to your network environment, and when to try to influence it (Van Schendelen, 2005). Moreover, mapping the actors in a network that could offer support in case of different uncertain developments is key for adaptive management, enabling decision-makers to quickly change gears in response to emerging challenges and opportunities.

For a long time, rational planning was considered part of one realm, and understanding networks and social decision processes part of another. In one realm, decision analysts, policy analysts, economists, and engineers would support decision-makers to find smart, efficient, optimal, or robust alternatives that combine multiple objectives, taking into account various types of uncertainties. In another realm, social scientists, organizational scientist, political scientists, and the like would focus on the processes, people, and politics involved, pointing out fundamental drivers and associated dilemmas inherent in multi-actor decision-making. One only needs to think of the writings and influence of Machiavelli about power and politics in decision-making in the early sixteenth century to recognize the importance of this tradition.

These two realms offer useful pillars or poles on a continuum because there are also many fruitful crossovers that combine insights from both realms into new approaches. These approaches have grown in number and maturity in the

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past few decades. A very visible result is the use of methods and techniques traditionally used more in systems science and engineering to analyze the political and social processes of decision-making. Examples are game theory, social network analysis, and cognitive mapping (Hermans, 2005; Hermans & Thissen, 2009). These approaches represent multi-actor decision-making processes, for instance as games, transactions, debates, or information flows in networks. Essentially, they all use models to capture and explain important features of the actor interactions that drive multi-actor decision-making. Therefore, we refer to these approaches as actor and strategy models.

## 1.2 Applications of Actor and Strategy Models

The importance of, and interest in, actor and strategy models has grown over the past years. It is now widely recognized that decision-makers cannot be effective if they do not manage their actor environment. These actor environments themselves are undeniably complex. Decisions are made and implemented in decision arenas that lack clearly defined boundaries and participants. Multiple decision arenas are linked, across sectors and across multiple levels of governance. Local decisions and global networks are linked through social media and geopolitics, through globalized production networks and value chains, and for instance local cities are seen as key responders for shared global challenges (Barber, 2013). There are numerous cross-sectoral, interconnected, and hybrid networks of organizations in various forms—public, private, firms, and foundations—and information and capital readily flows across national and regulatory boundaries (Castells, 2010). Moreover, the networks and decision arenas are constantly changing, both within and outside organizations (Freeman, 2010).

As connections among people, organizations, and countries continue to grow and as traditional boundaries among groups, sectors, and segments continue to be redefined, the need for a proper understanding of the actor dimension continues to grow in importance. Actor and strategy models help to gain such understanding. Examples of past applications give an impression of the benefits to be gained from their use.

### 1.2.1 Flood Protection

The Houston Galveston Bay Area in Texas is highly prone to hurricane-induced disaster. The area has seen a longstanding debate about ways to improve flood protection, and around 2014, this debate was growing increasingly sour. Scientists could not offer a way out because the key experts and research institutes also appeared to be diametrically opposed in their positions. The debate

had become so intense and bitter that a productive communication between the two opposing sides was virtually impossible. A process structured around actor models was used to organize a workshop where stakeholders from across the divide jointly explored the complexity of the problems as well as pathways for alternative solutions. The workshop did not deny the irreconcilable differences between actor groups, but still enabled actors to eliminate outcomes that would be bad for all and rather focus on future scenarios with potential wins for at least one of the groups. Two weeks after the workshop, a platform for joint action was formed and the workshop was widely acknowledged as an important contributing factor (Cunningham et al., 2015).

### 1.2.2 Internet Innovations

In the early days of Internet video services, the late 1990s and early 2000s, Dutch actors played a key role as pioneers. By 2013, the market was dominated by US-based firms such as YouTube, Google, Apple, and Netflix. How could this happen? A social network analysis of the relations among the Dutch key actors over time provided important insights. It showed that the early innovations of the pioneers in Internet video services in the Netherlands were financially supported by the government. However, this financial support stopped when the innovation system was still in its formative phase and had not yet entered its growth phase. With hindsight, this was too early, and was an important reason why early pioneering Dutch actors could not retain their central position in this innovation network. This held important lessons for future Dutch innovation policies (Poel, 2013).

### 1.2.3 Enterprise Planning

Modern manufacturing companies spend a lot of time and resources to smoothen their workflows and planning processes, integrating various decision support systems and procedures. However, it often turns out that actual integration of operations remains very difficult. Integrated and coupled enterprise planning and control systems cannot prevent continued hick-ups in planning, delays, and cost overruns. Actor models applied to different manufacturing companies showed how different units and departments in these companies, each with their own objectives and responsibilities, were still able to mess up production schedules. Production planners and operations units have to deal with units for product quality control, procurement, sales, and marketing. Their demands and sometimes strict procedures are not very efficient from a short-term operational perspective, but are sometimes critical for the longer-term success of the company. These insights could be used to improve the design of procedures and management information systems (Osorio, 2012).

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### 1.2.4 Pollution Control

Environmental pollution of land, air, and water bodies often stems from various smaller sources that together have a significant impact. In the Netherlands, a group of policy makers from different organizations, levels, and sectors established a platform to reduce such diffuse pollution. As a first step to get going and achieve some early results, they had identified areas where they expected an easy start with some early successes. Among those was the use of chemical herbicides in maintaining public spaces: chemical substances used for weed control in public parks, streets, squares, and pavements. An actor model helped to clarify the different perceptions on this issue held by the key actors involved. This showed that, in practice, a reduction of use of these chemical herbicides might be more difficult than expected. The companies using herbicides and the government agencies that contracted their services were not convinced that good alternatives would be feasible or would be less damaging. This helped government organizations to update their expectations about the chances of easy and early results, but also showed them specific areas where further research and communication would need to focus on (Hermans, 2005).

### 1.2.5 More Examples of Applications

The use and usefulness of actor and strategy models is illustrated further in Table 1.1. The table shows examples where actor and strategy models have been applied and have made a difference for several cases in the past. Although the table shows many applications in the Netherlands, a bias due to the affiliations of the authors of this book, it also shows examples from various other parts of the world. These indicate that the use of actor and strategy models is not confined to any specific country or region.

## 1.3 Scope and Structure of This Book

### 1.3.1 Purpose and Scope

The main purpose of this book is to introduce a range of models that help understand actors and their strategic interactions, and that offer useful tools to practitioners and analysts in the fields of decision-making, policy analysis, management, corporate planning, and related fields. The focus is on models that aid understanding of the behavior of actors who play a role in the larger decision arenas that affect plan implementation or policy success. We prefer to speak of actors for reasons we explain later in this book, but other labels used in practice are stakeholders, agents, players, participants, or decision-makers (in plural form).

Table 1.1 Applications of actor and strategy models

Domain	Location/Organization(s)	Purpose of Application	Year <sup>d</sup>	Reference <sup>b</sup>
Tourism	Municipality of Rhenen, the Netherlands	Identification of actors who could fruitfully collaborate on different issues for local tourism development	2004	Timmermans (2004)
Pollution control	Rijkswaterstaat and province of North Holland, the Netherlands	Ways to convince actors to reduce the use of harmful chemicals in maintenance of urban public spaces	2005	Chapter 9
Water governance	Cebu province, stakeholder platform, and research center in the Philippines	Developing an agenda for joint research and pilot projects to support the development of a regional water management strategy	2005	Chapter 10
Rural livelihoods	Food and Agriculture Organization of the UN and Government of Tanzania	Exploration of room to resolve local conflicts over water for rural livelihoods, between sectors and users	2006	Chapter 4
Water management	Ministry of Agriculture, the Netherlands	Increase knowledge of the actors in the policy arena, identify promising policies and start interaction process	2008	Chapter 8
Transport (rail)	ProRail, the Netherlands	Rail network maintenance decisions based on views and preferences of stakeholders	2009	Brinkman (2009)
European pollution standards	Association of Dutch drinking water companies (Vewin)	Processes behind establishment of official European lists of harmful pollutants—how to be more effective in getting own considerations into this process	2010	Van Overveld et al. (2010)
Sustainable development	Municipalities in Hungary	How formal and informal relationships shape learning for sustainable development in municipalities	2011	Pusztai (2011)

*(continued)*

Table 1.1 (Continued)

Domain	Location/Organization(s)	Purpose of Application	Year <sup>d</sup>	Reference <sup>b</sup>
Water quality	Regional water authority Delfland, the Netherlands	Design of collaborative monitoring arrangements for water quality management	2012	Hermans et al. (2012)
Construction	Contracting and construction company BAM, the Netherlands	Communication strategy for the actors involved in city road reconstruction	2012	De Booij and Hermans (2012)
Manufacturing	Manufacturing companies in the Netherlands and Mexico (DSM, MEEIN, Radiall)	Complement integration of enterprise and control systems with information on actor dependencies in manufacturing companies	2012	Osorio (2012)
Drinking water	Vitens Evides International and Lilongwe Water Utility, Malawi	Organizational and institutional incentives that contribute to performance of water companies	2013	Breeveld et al. (2013)
Innovation policy	Internet video service providers, the Netherlands	Investigate effect of policy measures on Internet innovation in the Netherlands	2013	Chapter 11
Flood protection	Houston Galveston Bay Area, USA	Establishing dialogue and joint commitment to action for flood protection in bay area	2014	Cunningham et al. (2015)
Offshore wind energy	North Sea area, for Royal HaskoningDHV	Ways to move toward coordinated offshore energy grid development between countries	2014	Satolli (2015)
Energy distribution	Energy network company Alliander, the Netherlands	Strengthening position of energy grid operators in smart grid innovations	2016	De Reuver et al. (2016)

<sup>a</sup>Year of publication of this case application in a report, journal article, or (as part of) a book.

<sup>b</sup>Reference is made to the book chapter if an application is discussed in detail in this book, otherwise a reference is provided at the end of this chapter.



Analysts working in the fields of policy analysis, project planning, management, and impact assessment have in common that they use an understanding of existing or past situations with the purpose of exploring possible future situations (Bardach, 2004; Barzelay, 2007). For strategic actor models, this means that we do not just use them to describe the current processes or settings, but that we mainly want to use them to inform decisions about a prospective future situation. We are using models to structure existing knowledge and evidence in a way that helps us to inform decision-making about situations that cannot be observed. As Walker and Van Daalen (2013) describe, this use of models to inform decision-making often involves a trade-off of rigor for relevance. A balance is needed between an accurate description of real-world situations and an informative analysis of prospective actions and their possible consequences. The models covered in this book, and the way in which they are covered, are selected and described with this trade-off in mind.

This book offers an overview and a primer on actor and strategy models. It fills the gap between, on the one hand, the relatively short texts on stakeholder analysis and power mapping such as provided by IIED (2005) or Nash et al. (2009), and, on the other hand, complete textbooks dedicated to specific approaches such as game theory (Osborne & Rubinstein, 1994; Rasmusen, 2006), social network analysis (Wasserman & Faust, 1994; Scott, 2012), value-based approaches (Keeney, 1992; Stewart, 2010), and other relevant actor modeling approaches. We provide an overview of actor models that have proven their use in different types of situations and under varying conditions. In this way, this book describes the world of actor and strategy models that exists beyond stakeholder lists, unlocking a wider toolbox for a better understanding of actors and network environments as it is now available in different corners and traditions of planning, policy analysis, and management.

By dedicating a full chapter to each modeling approach, this book offers a primer on different actor and strategy models, providing basic concepts, step-wise approaches for applications, and key references for further reading. With this, the readers will have a good basis to better structure, understand, and explore complex situations that involve multiple actors. These primers on different models are useful for professionals in the field of strategic planning and policy analysis as the primary audience, but will also offer a useful introduction for scientists, researchers, and graduate students who want to explore the field of actor and strategy modeling. This helps readers who want to develop more analytical flexibility in the ways in which they understand their strategic environments and, more generally, the interactions among actors in processes of policy development and decision-making.

In addition to a primer on different modeling approaches, the book also provides a framework to position and compare these different approaches. Combined with a comparative chapter at the end of the book, this provides insight into the differences and overlaps between models, and helps readers to make

flexible and creative use of different models and combinations, in order to meet the needs of different situations. All in all, these materials should enable the use of actor and strategy models in a range of complex problem situations to support understanding, communication, and “what-if” explorations. Also, it provides a basis for further learning for those who become interested to know more about any specific model or approach.

### 1.3.2 Structure of the Book

This book consists of three main parts. The first part is a general introduction to actor and strategy models, in this chapter and the next. In Chapter 2, we elaborate more on the conceptual and scientific underpinnings of these models and we discuss their use and limitations.

Part two forms the core of the book and discusses applications of different actor and strategy modeling approaches. This part starts in Chapter 3 with an approach for a quick-and-dirty scan of an actor network, as a first problem diagnosis that helps to make an informed choice for a particular approach for further modeling.

Each of the other chapters in the second part of the book covers one specific modeling approach in more detail. Each of these application chapters starts with a short introduction of the potential use of the approach, then continues to position the modeling approach within the scientific literature and to describe its theoretic underpinnings, and then focuses on step-wise approaches for practical applications. The last part of each chapter is always dedicated to an elaborate case example. These chapters are organized according to their focus within the conceptual framework for actor models, as introduced in Chapter 2. Chapters here cover modeling approaches based on value-focused thinking, game theory, cooperative game theory, transactional analysis, cognitive mapping, argumentative analysis, and social network analysis.

Part three of the book consists of a final chapter that contains a comparative reflection where we revisit the usefulness and limitations of the actor and strategy models and offer some further insights on model selection, combination, and future directions.

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