

# PREFACE

Administrative, organizational and technological developments are taking place at an increasingly rapid pace. Structures are less and less fixed and new service and business models are necessary to maintain or improve the performance of an organization. This leads to an increasing need for management capacity to quickly choose the right direction as an organization and to maintain and strengthen coherence.

In 2006, the development of General Enterprise Architecting (GEA) has started to increase the governing capacity of organizations. An architectural approach was chosen with the emphasis on coherence. The, together with a large number of organisations, developed ideas are described in a book [143] and a thesis [152] in which the method is scientifically substantiated.

Since the development of the body of thought, many organizations have gained experience with the use of GEA. In many different ways, GEA has contributed to organizations' governing capacity and solving complex issues. This provided a wealth of information on the practical application of enterprise architecture according to the GEA philosophy.

This book is all about practice. With this book in hand you are able to 'do' GEA. It focuses on (enterprise) architects and other professionals who want to integrate 'managing coherence' into their practice. With that, they are able to provide an integrated solution for enterprise issues.

*This book consists of five parts.*

The first part focuses on solving enterprise issues. First, the main features of the GEA philosophy are described, in which the concept of coherence plays a central part. Using a step-by-step plan, it is then made clear how coherence is made explicit and how this is used to develop a solution for an enterprise issue.

In part two a number of executed GEA cases are discussed and an assignment case is provided. This part is completed with an explanation of the working method used in the case studies.

Part three discusses the establishment of the enterprise architecture function (EA function) in the situation where enterprise architecture is applied not once, but permanently and for several enterprise issues. The position of the enterprise architecture function and the processes and products that are part of the enterprise architecture practice are discussed. The competences required to fulfill the EA function are also discussed in this section.

Part four provides an instrument to measure the maturity level of managing coherence, so that targeted investments can be made in the development of the EA function.

Finally, from the perspective of the enterprise architect, the fifth section describes ways in which GEA can be combined with other instruments, such as other strategic steering instruments, EA-methods and -frameworks and reference architectures.

# LIST OF COMMONLY USED TERMS

## *Managing board*

In this book we mean by the term ‘managing board’ the highest responsible management of the relevant enterprise. Synonyms are: senior management, management team, top executives, business unit managers, C-level management, et cetera. Which term is used in practice depends on the context and scope of the enterprise.

## *Enterprise*

An enterprise is a systematic goal-oriented activity. Organizations (jointly) run an enterprise. Organizations are constellations of social-cyber-physical actors, involving people, animals, software and machines [24]. In the GEA philosophy, an organization is the realization / implementation of an enterprise in terms of legal entities, people and different types of supportive resources, for example technology, financing, housing. In this book, we focus on public and private sector enterprises with over 200 employees and a relatively high degree of division of labor.

## *Enterprise issue*

An enterprise issue is a problem, bottleneck, challenge, or alleged solution, which is considered and controlled from the context of different perspectives.

## *Enterprise architecture*

Enterprise architecture is a set of statements, processes, products, people and means that guides the development of an enterprise with a focus on coherence. In this book, ‘enterprise architecture’ is synonymous with ‘managing coherence’.

## *Enterprise coherence*

Enterprise coherence is the extent to which all relevant aspects of an enterprise are interconnected, such that these connections facilitate an enterprise in achieving the desired results.

## *Enterprise transformation*

Enterprise transformation is a fundamental change that significantly changes an enterprise’s

relations with one or more important perspectives. Examples of perspectives are: customers, employees, suppliers and investors.

#### *GEA framework*

A GEA framework is an instrument that enables us to make the coherence within an enterprise explicit and therefore managing coherence.

#### *GEA assessment*

A GEA assessment is an instrument that measures the maturity level of enterprise architecture of an enterprise.

#### *Level of purpose*

The level of purpose is the consideration level where we look at the meaning and purpose of an enterprise. The level of purpose consists of the related elements: mission, vision, core values, goals and strategy.

#### *Level of design*

The level of design is the level of consideration in which we look at the design of an enterprise, by which the level of purpose is instantiated. The design consists of the related elements:

- *perspectives* are angles from which one wishes to contemplate and to govern the enterprise.
- *core concepts* are angles from which one wishes to contemplate and to govern a perspective.
- *guiding statements* are internally agreed and published statements which give direction to desirable behaviour.
- *core models* are representations of one or more perspectives, based on and in line with the guiding statements of the corresponding perspective.
- *relevant relationships* are descriptions of the connections between guiding statements from different perspectives.

#### *Perspective owners*

Perspective owners are the people in an enterprise who have been held responsible for one or more perspectives by the managing board.

#### *Portfolio management*

By portfolio management we mean a coordinated collection of strategic processes and decisions that together enable the most effective balance between organizational change

and 'business as usual'. Portfolio management is the discipline which ensures that the strategy can be realized in a controlled manner, using the available resources.

*Managing coherence*

Managing coherence is a set of statements, processes, products, people and means, which gives direction to the development of an enterprise with a focus on coherence. In this book, 'managing coherence' is synonymous with 'enterprise architecture'.

*Issue owners*

Issue owners are the people in an enterprise who have been made responsible by the managing board for solving an enterprise issue.

# SOLVING ENTERPRISE ISSUES WITH GEA

In part 1 of this book, we explain how, according to the GEA philosophy, major enterprise issues are resolved. Therefore we first describe the GEA vision in the field of enterprise architecture and what makes GEA distinctive from other enterprise architecture methods. We will discuss specifically the concept of coherence, since this has a prominent position in the vision. An important part is making coherence explicit, so that it can serve as a basis for solving issues. Then we present a practical step-by-step plan to achieve an integral solution contour and realization plan for an enterprise issue, which maximally contributes to the goals of an enterprise.

## 1.1 Enterprise architecture

### 1.1.1 What is enterprise architecture?

Enterprise architecture, with its 30 years of existence, is a relatively young area of expertise. This entails that there is not one officially recognized definition, but that there are different insights about what enterprise architecture is. Each insight has its own approach, nuance and accentuation. In general, the purpose of enterprise architecture is comparable, namely that an enterprise 'develops in the desired direction'. The differences in insights lie mainly in the way in which this can be most effectively and efficiently achieved.

To illustrate, some examples of definitions, in which a number of different approaches, nuances and accents are visible:

'A consistent set of principles and models that guides the design and realization of the processes, organizational structure, information provision and technical infrastructure of an organization' (DYA) [120]

'Enterprise architecture is a coherent, consistent collection of principles, differentiated by assumptions, rules, guidelines and standards - sometimes laid down in patterns - that describes how the organization, the information provision, the applications and the infrastructure have taken shape and how they arise in the use' (Rijssenbrij et al) [91]

'Enterprise architecture (EA) is a discipline for proactively and holistically leading enterprise responses to disruptive forces by identifying and analyzing the execution of change toward desired business vision and outcomes' (Gartner) [31]

'Enterprise architecture is a well-defined practice for conducting enterprise analysis, design, planning, and implementation, using a comprehensive approach at all times, for the successful development and execution of strategy. Enterprise architecture applies architecture principles and practices to guide organizations through the business, information, process, and technology changes necessary to execute their strategies.' (FEAPO) [26]

'Widely practiced discipline for understanding an organization and furthering that organization's mission, goals, and practices' (BIZBOK) [10]

The differences in approach and accentuation of enterprise architecture express themselves, for example, in:

- the extent to which the focus is placed on the architecture products (models, principles, descriptions) or that the architecture process or function is central
- the extent to which (the realization of) IT facilities form the core of the approach or that a more integrated approach is used
- the extent to which (fixed) architectural layers are used (such as business, applications, data and IT infrastructure) or that an open model is used and
- the extent to which a design approach (manufacturability) or an approach to organic growth is assumed.

GEA approaches enterprise architecture from a business perspective and focuses on the (strategic) decision-making process in an enterprise. In doing so, all angles relevant to the management and tailored to the enterprise are included and the coherence between them is continuously optimized. An appropriate extent of coherence provides better government, better operation and better performance.

From that approach, according to GEA, enterprise architecture is best described as:

*Enterprise architecture is a set of statements, processes, products, people and means that guides the development of an enterprise with a focus on coherence.*

*The intended effect of the application of the enterprise architecture is the permanent increase of the controlling power of an enterprise and thereby its strength, speed and flexibility.*

*Enterprise architecture provides this direction through active participation in the control processes and provides permanent insight into the coherence of the enterprise components and aspects and the relevant environment.*

### 1.1.2 The added value of enterprise architecture

The added value of enterprise architecture is particularly evident in directing major and complex enterprise issues that impact large areas and multiple aspects of an enterprise. In practice, it has proved difficult to manage the content of such major changes from the start. Important aspects are often overlooked or an issue is incorrectly regarded as, for example, an IT issue or a financial issue, while it later turns out that it affects many more aspects of the operation. This leads to repairs afterwards, insufficient support for the solution contour, failure to meet expectations and mutual misunderstanding.

Enterprise architecture ensures that all relevant perspectives and their interrelationships are consciously included in the solution contour. This is done by substantive steering of an enterprise issue early in the decision-making process.

By operating in this way, enterprise architecture contributes to improving the performance of the enterprise, among other thing by:

- lowering costs
- connecting people and increasing involvement and cooperation
- increasing the reaction speed
- improving management effectiveness
- improving goal orientation and
- increasing support for solutions.



### 1.1.3 Enterprise architecture methods and frameworks

In enterprise architectural practice, multiple methods and frameworks for enterprise architecture are used. A combination of elements from multiple methods is often combined within one organization.

Methods and frameworks for enterprise architecture that are widely used in the Netherlands (in addition to GEA) are:

- TOGAF (The Open Group Architecture Framework) – The Open Group [113]
- DYA (Dynamische Architectuur) – Sogeti [120, 141]
- NAM/BTF (Novius Architectuur Methode/Business Transformatie Framework) – Novius [7,111]
- The Zachman Framework™ – John A. Zachman [166, 167]
- Solventa Thinking Frame for Architecture – Solventa [105]

In part 5 they are briefly typified by scope and approach and a combined application with GEA is discussed.

### 1.1.4 The position of GEA

The architectural methods and frameworks went through the necessary developments in recent decades. For example, Gartner [30] speaks of ‘The EA (R) Evolution - 25 Years in making’, which involves three ‘waves of architecture’. Namely the phases *framework driven*, *process driven* and *outcome driven*.

The first wave emerged in the 1980s and was characterized by the creation / completion of frameworks with the aim of identifying mainly ICT-oriented relationships. This wave can therefore be characterized as a ‘construction grid paradigm’. Important representatives of this wave are Zachman & Sowa [106], TAFIM (Technical Architecture Framework for Information Management) [115], The Integrated Architecture Framework [164] and Tapscott [112]. The lessons learned during this wave taught that, despite all the great promises, it turned out that it did not have enough of a completed framework to achieve effective and flexible IT solutions. It lacked, among other things, architectural vision, processes, products, staffing, means, management and methods. Many of these architecture initiatives therefore ended prematurely in practice.

In response to failure to deliver on the promises of ‘framework driven architecture’, the second wave emerged in the late 1990s. This wave was mainly characterized by the recognition of architecture processes and the introduction of the so-called ‘working under archi-

ecture', or the 'architectural development paradigm'. The idea was: architecture is more the result of a process than of a design. Here, as well, the aim of architecture was to achieve effective and flexible IT solutions and 'working under architecture' was mainly focused on the ICT domain. Important representatives of this wave are the methods DYA (Dynamic Architecture for modeling and development) [120], TOGAF (The Open Group Architecture Framework) [113], EAF (Enterprise Architecture Framework) [31] and FEAF (Federal Enterprise Architecture Framework) [25].

This wave has also taught us that despite all the great architectural promises of the process-driven architecture, many major transitions - including those that took place 'under architecture' - failed, or the success of which was disputed. In our opinion, this is mainly due to the starting point of ICT taken in the architecture vision instead of an integrated approach as a starting point.

In section 1.2.2 we discuss what we believe to be the paradigm shift and the characteristics of the 'third wave of architecture'. For each characteristic, we will indicate how we implement this in practice with the GEA method. We call this third phase 'performance driven architecture'. We see the overall characteristic 'performance driven' in the sense of 'adding value to' or 'improving performance of' the enterprise. We call the corresponding paradigm; 'performance improvement paradigm' (see Figure 1). We see the paradigm shift from the second to the third wave in terms of architecture processes and products with a partial scope at tactical / operational level, towards a steering instrument with an integral scope at strategic level, aimed at improving the performance of an enterprise. Precisely for this reason, GEA has been developed from a business perspective. Representatives of the third wave include GEA [143,148, 152], Novius Architecture Method / Business Transformation Framework (NAM / BTF) [7, 111] and Solventa Thinking Frame for Architecture (STF) [105].

As a 'third wave' architecture method, GEA has a certain approach and a number of accents [149, 150]. GEA's position in the field of enterprise architecture is described in this section on the basis of three aspects:

- The focus and vision
- The purpose and intended effect
- The approach and the process

### **Focus and vision: coherence**

GEA is an enterprise architecture method that focuses on coherence. A good coherence in an enterprise is a precondition for excellent performance. Practice shows that coherence in enterprises can often be improved [143]. Lack of coherence leads to less good management and business operations. After all, a limited view of coherence results in decision-making on

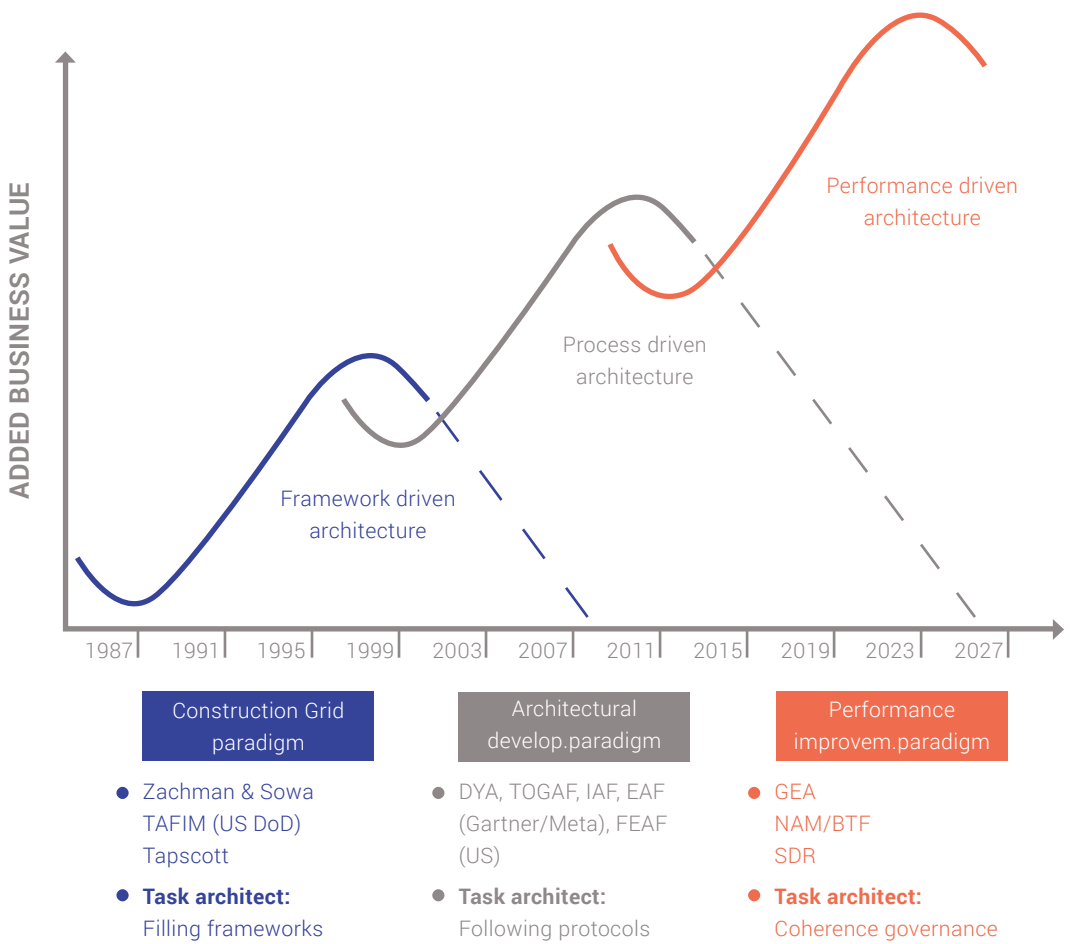


Figure 1. Waves of architecture

arguments that are too limited and results in one-sided solutions for enterprise issues. As a result, the return on investment falls short of expectations. GEA distinguishes itself from other architectural methods by focusing on the coherence of an enterprise and is able to make this coherence explicit, to govern the explicitly made coherence and to measure the 'enterprise coherence governance'.

**Purpose and intended effect: increasing the governance capacity**

GEA aims to increase the governance capacity of enterprises. Practice shows that 'gut feeling', lack of time, opportunism, the 'issues of the day' and (business) political considerations can dominate the climate in the boardroom [157]. It is no easy task in this complicated world to keep an enterprise on track. Due to the increasing complexity and acceleration

of changes in society, the positive effect of enterprise coherence governance is increasing. Developments that influence the coherence of an enterprise follow each other faster and faster. One can think of:

- strategic reorientation
- scenario development
- alliances
- outsourcing
- product / market development
- cost and complexity reduction
- comply with laws and regulations
- digital transformation

How can one adequately answer these challenges while improving the performance of an enterprise? Because intuition and 'gut feeling' are not always justifiable, GEA has been developed as a steering instrument to enable enterprises to develop higher-quality solutions and to allow boardroom members and managers to make more decisive decisions.

### **Approach and process: organic growth**

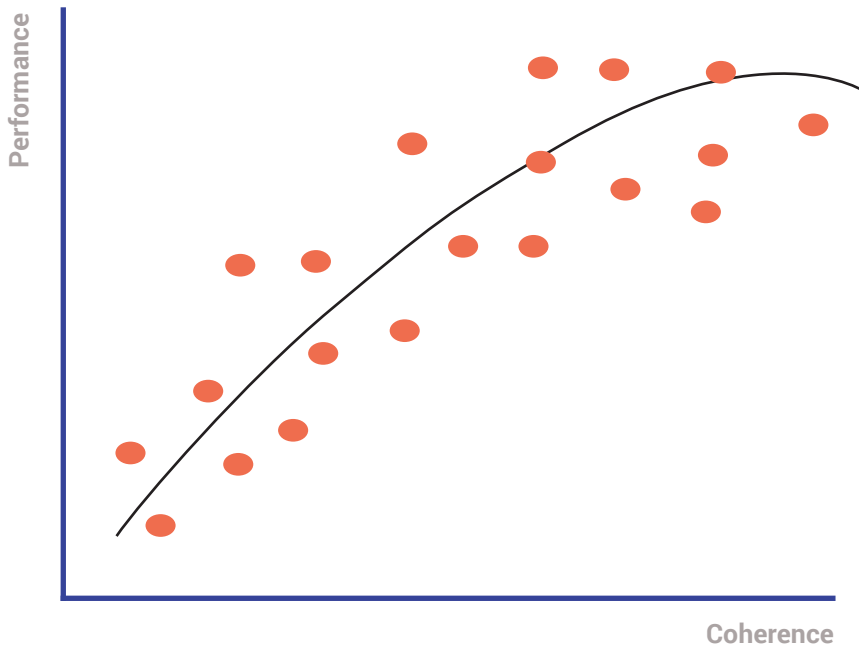
GEA does not provide a blueprint approach, but supports enterprises in organic growth [149]. This is done by developing integral solution contours for enterprise issues. For this, the explicit made coherence is used. When this happens, new or changed elements are added in the explicit made coherence at the level of purpose and the level of design. Because of this way of working, the latest guiding frameworks always determine the formulation of solution contours for enterprise issues. This enables GEA to support organic growth of an enterprise.

## **1.2 Enterprise coherence governance**

### **1.2.1 What is coherence and its importance?**

The definition used by GEA for coherence is: 'Coherence is the degree to which all relevant aspects of an enterprise are connected in such a way that they optimally support the achievement of the goals of the enterprise' [152]. GEA assumes a direct relationship between the degree of coherence (as defined above) and the performance of an enterprise (see Figure 2). After all, everyone does feel that if there is a bad coherence in an enterprise, the performance will not be optimal. The definition of coherence also provides an answer to the required degree of coherence. Namely, the degree of coherence to which it optimally facilitates the enterprise in achieving the intended results. With too much coherence, cha-

racterized by, for example, a too high regulatory burden, performance will decrease. If the coherence, which is characterized by having an enterprise architecture vision, but no translation of this vision into activities, the intended performance will not be achieved.



**Figure 2. Relationship between coherence and performance**

Based on the idea that the aforementioned relationship between coherence and performance is true, it is important to be able to make the coherence of an enterprise explicit. Otherwise, this remains a vague concept for many and one does not find the starting points to be able to govern and measure coherence. The need to be able to coherence governance is based on the assumption that only through this governance better coherence can be effectuated. If coherence is not consciously governed, the degree of coherence will be an (undesirable) accident.

## 1.2.2 Characteristics of enterprise coherence governance according to GEA

The seven characteristics that GEA recognizes are [149, 150]:

- coherence
- holistic
- integral
- recursivity
- causality
- organic growth
- co-creation.

We characterize the combination of these characteristics as the 'performance improvement paradigm'. In this paradigm, boardroom members and managers are supported in their decision-making processes through enterprise architecture. All necessary input for decision-making concerning the relevant enterprise issue is available. The coherence of the enterprise at all levels is and remains guaranteed. The submitted decisions enjoy relatively high support. We call the task of the enterprise architecture function in this paradigm 'enterprise coherence governance' (see Figure 1).

### **Characteristic 1: Coherence**

The goal of enterprise architecture in the vision of GEA is performance improvement by enterprise coherence governance. Here, an important starting point is the belief that there is a relationship between the level of coherence in an enterprise and the level of performance. With regard to 'enterprise coherence governance', GEA strives to improve coherence at the level of purpose of an enterprise, at the level of design of the enterprise and between these levels. With the GEA method, an enterprise is able to make these forms of coherence explicit and then govern them permanently.

### **Characteristic 2: Holistic**

Holistic concerns the idea that the properties of a system (physical, biological, technical, chemical, economic, etc.) cannot be explained by only taking the sum of its components. In other words, the whole is more than the sum of its parts. This concerns the so-called emergent properties of complex organized systems, which are not visible by a mere reduction of their constituent parts. Applying this view to organizations also implies awareness of the synergistic effects to be achieved. In this view, properties of the entire system are a result of the whole of the underlying properties of parts of the same system. If those underlying properties influence each other positively, this leads to synergy.

In GEA's view, these synergistic effects can only be achieved if there is permanent gov-

ernance at the right level of coherence. Everyone feels that if there is less coherence in an enterprise, the whole will perform less well and possible synergetic effects will not be achieved. In other words, then 1 plus 1 will yield 2 in the favorable case and a negative number in the worst case.

### **Characteristic 3: Integral**

We see the scope of enterprise architecture as the enterprise as a whole, all-encompassing. In practice, the scope of enterprise architecture is often indicated as 'business' and 'IT', where the word business generally refers to 'processes' and, in the best case scenario, to 'products / services' and 'organizational structure'. In GEA, we took distance from this 'business and IT' dichotomy and do not recognize the so-called gap between them. In this context, we see the use of the word 'business' as a euphemism for 'the rest'. It is about the coherence between all important business aspects (including IT). If the word 'business' is used in GEA, this is in the meaning of the total enterprise. Enterprise coherence governance in accordance with the GEA method, and thereby giving substance to the integral aspect, takes place by using the explicit made coherence of the enterprise for the development of integrated solutions for enterprise issues. This way of working implies that the guiding frameworks of all major perspectives of the enterprise are taken into account. The perspectives are defined by the enterprise itself, GEA does not have a prescribed model in this. This results in solutions that have a much better 'fit' with the bigger picture and which in turn strengthen coherence.

### **Characteristic 4: Recursivity**

Recursivity is 'self-repeating'. For example, a process is recursive if one of the steps that the process consists of requires repetition of the entire process. And so on and on, because the same process is repeated over and over in a recursive process. In the case of recursive application of enterprise architecture, a part of the enterprise to be considered is once again considered as a total enterprise. Applying an architecture method recursively creates the opportunity to realize the benefits of fully applying architecture at and between all levels of an enterprise, or to enterprise coherence governance. In practice, we have not encountered this application in other architectural methods. For a more detailed explanation of recursivity, we refer to section 1.7.1.

### **Characteristic 5: Causality**

Existing architecture methods often portray logical relationships of an enterprise. Logical relationships are understood to be connections that everyone immediately sees as present and accepts them as such. The Customer perspective, for example, is decisive for the Products / Services perspective; the Products / Services perspective is this for the Processes perspective; the Processes perspective is supported by the Information provision perspective, et cetera. Logical relationships are generally described as properties between objects

# GEA

## Enterprise Architecture in Practice

*Governable, organizational and technological developments are taking place at an increasingly rapid pace. Structures are less and less fixed and new service and business models are necessary to maintain or improve the performance of an organization. This leads to an increasing need for governing capacity to quickly choose the right direction as an organization in the event of major changes and to maintain and strengthen coherence.*

This book shows how the General Enterprise Architecting (GEA) governing instrument is used to govern the enterprises' coherence. Since the development of GEA, many organizations have gained experience in applying the instrument. In many different ways, GEA has contributed to the managing capacity of organizations and the solution of complex issues. This provided a wealth of information about the practical application of enterprise architecture according to the GEA philosophy.

This book is intended for (enterprise) architects and other professionals who want to use 'enterprise coherence governance' in their practice. Solving enterprise issues is central to this book. On the basis of a concrete roadmap, it is explained how 'coherence' is made explicit and how this is used to develop a solution for an enterprise issue.

From this basis, this book further elaborates on:

- how GEA works in practice
- the relationship with portfolio management and agile working
- the design of the enterprise architecture function and the measurement of its maturity
- how GEA can be combined with other tools, such as strategic governing tools, enterprise architecture methods and frameworks, and reference architectures.

This book enables the reader to 'do' GEA and to fit it into daily architectural practice. With the aim of improving the performance of organizations.

