A Practice-Based Framework for Enterprise Coherence*

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Abstract. In this paper, the authors discuss a practice-based framework that enables enterprises to make the coherence between key aspects, such as business and IT, explicit. The term "coherence" is preferred over the more common term "alignment", since the latter is generally associated with bringing two concepts in line (typically "Business" and "IT"). The word coherence, however, stresses the need to go beyond this. Enterprise coherence considers the alignment of *all* important aspects of an enterprise.

The core driver for the development of the Enterprise Coherence Framework (ECF), as presented in this paper, was the costly failure of many (large scale) enterprise transformation projects. These resulted in the initiation of the GEA (General Enterprise Architecting) multi-client research programme, involving twenty client organizations. This, still ongoing, research programme started in 2006. The current focus of the programme's efforts is on the continuous evaluation and further improvement of the programme's results. One of the core results of the GEA research programme is the Enterprise Coherence Framework (ECF), which enables a more explicit reasoning about the coherence between the relevant aspects of an enterprise. This framework, on its turn, enables the deliberate governance of enterprise coherence.

In this paper, both the practical and theoretical roots of the framework will be discussed, as well as experiences in its use in real world settings.

Keywords: business-IT alignment, enterprise coherence, enterprise architecture.

1 Introduction

Efforts to transform an enterprise, from its business processes to the underlying IT, often fail. In Op't Land et al. [1], the authors provide a summary of possible causes for failures of strategic initiatives: "*The road from strategy formulation to strategy execution, including the use of programmatic steering, is certainly not an easy one to travel. Research shows that less than 60% of the strategic objectives in organizations are reached.*" In addition, our own experiences[1] with enterprise transformations in

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practice, also indicate that existing methods and frameworks for enterprise architecture often fail to contribute to the success of such transformation projects.

As argued in [1,2], architecture should offer senior management the means to obtain insight, and to make decisions about the direction of enterprise transformations. As such, it should act as a means to steer enterprise transformations, while in particular enable senior management to govern coherence. In our view, existing approaches and frameworks, such as, Zachman [3], DYA [4], Abcouwer [5], Henderson & Venkatraman [6], TOGAF [7], IAF [8], ArchiMate [9,10], take an "engineering oriented" style of communicating with senior management and stakeholders in general. The architecture frameworks underlying each of these approaches are very much driven by "engineering principles", and as such correspond to a Blue-print style of thinking about change [11]. To act as a steering instrument for senior management, a Blue-print style of thinking, however, does not suffice. Stakeholder interests, formal and informal power structures within enterprises, and the associated processes of creating win-win situations and forming coalitions, should also be taken into consideration. In terms of De Caluwé [11], this is more the Yellow-print style of thinking about change.

In 2006, these experiences and insights triggered the consultancy firm Ordina to initiate a multi-client research programme (`www.groeiplatformgea.nl`), resulting in the development of the GEA (General Enterprise Architecting) method [12,2]. As a prelude to the actual start of the programme, a survey was conducted among the participating organizations to identify the requirements on the desired outcome of the programme. This survey showed that these experiences were not limited to Ordina only, but was shared among a broad range of client organizations participating in the programme[2]. The underlying issues were also considered grave enough for the participating client organizations to indeed co-invest, in terms of time and money, in the GEA research programme.

The core result of the GEA research programme is the GEA method [2]. In the research programme, this method was developed based on several case studies with the client organizations participating in the programme, using a combination of design science [13] as the overall rhythm and case study research [14] to leverage the findings from the case studies (see for example [15]). In its current form, the GEA method comprises of three core ingredients [2]. Next to the Enterprise Coherence Assessment (ECA) that allows organizations to assess their ability to govern coherence during enterprise transformation, it contains an Enterprise Coherence Framework (ECF) and a (situational) Enterprise Coherence Governance (ECG) approach. The latter includes the identification of specific deliverables to produced/results, processes needed to produce these deliverables/results, as well as an articulation of the responsibilities and competences of the people involved. The ECF, which is the focus of this paper, enables en-

[2] During different stages of the GEA research programme, the following client organizations were involved: ABN AMRO; ANWB; Achmea; Belastingdienst - Centrum voor ICT; ICTU; ING; Kappa Holding; Ministerie van Binnenlandse Zaken en Koninkrijksrelaties; Ministerie van Defensie; Ministerie van Justitie - Dienst Justitiële Inrichtingen; Ministerie van LNV - Dienst Regelingen; Ministerie van Landbouw, Natuur en Voedselkwaliteit; Nederlandse Spoorwegen; PGGM; Politie Nederland; Prorail; Provincie Flevoland; Rabobank; Rijkswaterstaat; UWV; Wehkamp.

terprises to set up their own *coherence dashboard* in terms of the enterprise coherence can be governed/improved during enterprise transformations. This, enterprise specific, dashboard enables senior management to govern the coherence between key aspects of an enterprise during a transformations.

The remainder of this paper is structured as follows. In Section 2, we provide a short background to the GEA research programme. Section 3 then briefly summarizes the requirements on the results of the GEA programme (and the Enterprise Coherence Framework (ECF) in particular). Section 4, 5 and 6 then discuss the actual ECF in three steps, covering the level of organizational *purpose*, the *design* level, and the *connections* between these levels respectively. In our discussions of the framework, we will include experiences/examples from real world case studies conducted at the client organizations involved in the GEA programme.

2 Background to the Research Programme

As mentioned before, the GEA research programme started with an initial survey among the participating client organizations. This initial survey indicated that a lack of coherence between different aspects of the enterprise, before, during, and after, transformations as a key cause for the failures. It also indicated the necessity to go beyond the traditional Business-IT alignment thinking as e.g. advocated in the classical paper by Henderson & Venkatraman [6]. As a result of the initial survey, the GEA programme continued with the working hypothesis: *the overall performance of an enterprise is positively influenced by a strong coherence among the key aspects of the enterprise, including business processes, organizational culture, product portfolio, human resources, information systems, IT support, etc.*. GEA refers to this coherence as *enterprise coherence* [12,2]. The GEA project partners preferred this term over the term "Business-IT alignment", as the latter would suggest as if "only" business and IT would need to be aligned. Enterprise coherence, however, stresses the need to go beyond this, and align all important aspects of an enterprise. More recent sources also explicitly acknowledge/indicate the need for enterprise architecture methods to look well beyond the traditional Business-to-IT stack, consider for example: [16,17,18].

To validate the role of coherence in the failure of transformations, a first step in the GEA programme was the development of the Enterprise Coherence Assessment (ECA) [19]. The ECA allowed us to obtain a clearer understanding of enterprise coherence, as well as the impact of adequate governance of enterprise coherence on the success of transformations. After applying this assessment to the organizations involved in the GEA programme, it was found that more than 80% of the participating organizations lack a deliberate governance of their enterprise coherence, while the lack of coherence had a negative impact on the success of the transformations [19]. A report [20] produced by the (Dutch) General Court of Auditors, on the failures on IT projects in the public sector, also corroborates these findings. In this report, the lack of coherence between several aspects is identified as a key cause in the failure of these projects.

Consequently, it became the core goal of the GEA programme to find/develop instruments to make enterprise coherence explicit enough to reason about it in a specific organization, and develop associated processes to allow it to be governed. An overview,

aimed at practitioners, of the results of the first iterations of this research programme has been reported in [2][3]. To the partners of the GEA programme, this clearly demonstrated the need for further research into governance of enterprise coherence. More specifically, the GEA programme [2] adopted the following research objectives:

1. Definition of the core indicators and factors influencing and/or defining enterprise coherence.
2. Identification of the impact of enterprise coherence on the organizational performance.
3. An instrument to assess an enterprise's level of coherence.
4. Instruments to guard/improve the level of coherence in enterprises during transformations.

The outcomes of the ECA studies were also used to gather more specific requirements on the GEA method. These initial requirements were complemented, using desk research, by requirements originating from three relevant other fields: management control [21], system theory [22,23] and strategic change [24]. More details on these requirements can be found in [2]. In the further (still ongoing) development of the GEA method, the design science method [13] was/is used as the overarching "rhythm" of the research project, combined with case study research [14] to evaluate the application of the different iterations of the GEA method.

The current version of the GEA method [2] was already refined based on several case studies with the client organizations participating in the programme. In its current form, the GEA method comprises of three core ingredients [2]. Next to the Enterprise Coherence Assessment (ECA) that allows organizations to assess their ability to govern coherence during enterprise transformation, it contains an Enterprise Coherence Framework (ECF) and a (situational) Enterprise Coherence Governance (ECG) approach. The latter includes the identification of specific deliverables to produced/results, processes needed to produce these deliverables/results, as well as an articulation of the responsibilities and competences of the people involved. The ECF, which is the focus of this paper, enables enterprise to set up their own *coherence dashboard* in terms of the enterprise coherence can be governed/improved during enterprise transformations. This, enterprise specific, dashboard enables senior management to govern the coherence between key aspects of an enterprise during a transformations.

3 Requirements on the Governance of Enterprise Coherence

Based on the triggers that lead to the initiation of the GEA programme, an initial survey was held among the members of the GEA programme to gather requirements on the governance of enterprise coherence. Based on these requirements, a first theoretical framework to explicitly reason about an enterprise's coherence was developed. This initial version of the ECF was then evolved further, based on its use in practice. In

[3] For strategic reason, the initial target of the results was the Dutch language community, as most participating organizations where also based in the Dutch language area. In the near future, these initial results will be made available in English as well.

doing so, the GEA programme used the multiple case study research approach (see Yin [14]). More details concerning the way we applied the case study approach in the GEA programme can be found in [19].

The first version of the ECF also allowed us to develop the Enterprise Coherence Assessment (ECA). The application of the (first version of the) ECA in the participating organizations, also resulted in further requirements towards the ECF and ECG. The resulting requirements are shown in Table 1.

Since the governance of enterprise coherence should be part of the overall organizational governance, this initial set of requirements was strengthened by augmenting it with insights from other areas relevant to organizational governance in general: management control, systems theory, and strategic change.

One of the leading approaches in the world of management control concerns the work of Simons on the "*Levers of Control*" [21]. Inspired by these levers of control the additional requirements listed in Table 2 were formulated.

The second foundation concerns the open system theory in which the organization is seen as an open system [22,23]. Within the framework of the framework formulated in this control paradigm a set of conditions for effective control has been formulated. Compliance with these conditions also implies a promise, namely to achieve an effective control situation. Inspired by these conditions for effective control we derived the additional requirements as shown in Table 3.

The third foundation for GEA is based on the notion that organizations are a social-technical system involving humans and technology. In deriving additional requirements for the GEA programme, we based ourselves on the work of Balogun, et al. [24] on "*Exploring Strategic Change*". The basic principle is that every choice made in a change process should be based on the context and the purpose of the change process. A study conducted in 2004 by Deloitte & Touche "*What is the best change approach*" [25] enhanced this basic idea with the statement that there is a link between the choice of approach and purpose of the change. Inspired by these insights we derived the additional requirements as listed in Table 4.

At the end of the requirements gathering process, we were able to establish the basic philosophy of GEA. As mentioned before, in this philosophy we took the following hypothesis as a starting point: *the overall performance of an enterprise is positively influenced by a strong cohesion among the key aspects of the enterprise, including business processes, organizational culture, product portfolio, human resources, information systems, IT support, etc.* Taking this hypothesis as a starting point, gave us the following insights. When presuming the hypothesis is true, it is natural to take the view that enterprise coherence is indeed an important issue. An issue that organizations need to deliberately influence and govern. To govern coherence one needs the levers to adjust the coherence and to be able to do this one has to be able to reason explicitly about it.

Taking our definition of coherence into account, and the fact that organizations are "living" organisms, also produces the insight that coherence has a fluid character (i.e. it changes on its own accord) which implies that the governance should be carried out on a permanent base. These insights triggered the question "*by which phenomena, and when, is the coherence of the enterprise improved or decreased?*". Coherence will especially be influenced at the moment an organization needs to answer/meet major business

Table 1. Requirements after the initial survey and applying the ECA

Success factor	*Requirement*
Strategy driven	1) It is necessary to take the concerns, and associated strategic dialogues, of senior management as a starting point.
Social forces	2) The social forces within an enterprise, be they of political, informal, or cultural nature, should be a leading element in governing enterprise coherence.
EA Vision	3) One must have an EA vision in order to be able to establish EA as a business value driver and make explicit how coherence contributes to both the image and opinion formation phases of the decision making process and must closely resemble and simulate the way of thinking. One prerequisite is that the top of the organization firmly holds this EA vision.
Commitment	4) The added value of EA as a governance tool should be recognized and promoted by all parties concerned. Also the added value of EA compared with other control tools that are in use.
Organization	5) To establish the EA function an integral approach to vision development, processes, products, people and resources needed for EA is necessary.
Customization	6) EA is a flexible concept, which means that the number and character of organizational angles to govern the enterprise and their associated relationships depend on the situation.
Customer orientation	7) The EA processes and products should support the control processes of the enterprise in a tailor made way, by supplying the necessary results supporting these control processes.
Scope	8) EA moves at a strategic level and gives direction in decision making on tactical and operational levels by means of lines of policy and must be done in an independent way to include all angles at stake in decision making processes.
Product distinction	9) From the point of accessibility and understanding it is necessary to distinguish between EA management products and EA specialist products. This means that it is possible to communicate with the right target groups and with the right EA products.
Resource allocation	10) Management must provide the EA function with people with the necessary competencies, time, budget and other resources for EA to realize the added value of EA.
Participation	11) Enterprise architects must participate in the organization's governance processes and must have direct access to managers on a peer to peer basis.
Direction	12) The EA governance products must provide direction to change programmes and the existing organization.
Completeness	13) A complete and coherent set of organizational angles must be brought together by the decision makers.
Permanence	14) EA must be arranged as a continuous process whereby coherence is permanently adjusted to the dynamics of the internal and external environment.
Event driven	15) EA must be applied as a governance instrument at the moment major business issues arise in order to establish integral solutions and approaches on time.

Table 2. Requirements originating from the management control framework [21]

Lever of control	*Requirement*
Diagnostic control systems	1) Goals have to be an element of enterprise coherence at the level of organizational purpose, and objectives must be an element of enterprise coherence at the design level of an organization.
Belief systems	2) The level of purpose of the organization must be within the scope of EA. This requirement is associated with the previous mentioned requirement “scope”.
Boundary systems	3) Boundaries must be made explicit since boundaries define relations between angles of an organization, and as such form a basic asset of enterprise coherence.
Interactive control systems	4) The effect of intended strategic interventions on the enterprise coherence should be made clear interactively and beforehand.

Table 3. Requirements originating from the open systems theory [22,23]

Conditions for effective control	*Requirement*
Specify a goal to the controlled system	1) Objectives have to be an element of enterprise coherence at the design level of an organization. (This requirement is also posed by the framework of management control, see Table 2.)
Have a model of the controlled system	2) The model of enterprise coherence must represent the dynamics of the design level of an organization.
Have information about the controlled system	3) The actual state of enterprise coherence must be represented on a permanent basis including current state as well as future directions.
Have sufficient control variety	4) Enterprise coherence governance must have sufficient levers to influence enterprise coherence on the design level and support the interdependancy with the level of purpose as well, including: forward and backward governance, event driven and cyclic governance, single and multi level governance (recursivity and projection).
Have sufficient information processing capacity	5) Restrict the complexity and information overload by differentiating enterprise coherence in several interdependent levels. Allocate sufficient resources to enterprise coherence governance, distinguished by processes, products, people, means, governance, methodology and all based on an vision.

issues. Therefore, the governance of enterprise coherence must be an integral part of, and significantly contribute to, the processes of formulating answers to the major business issues. Using coherence governance in these processes leads to integral solutions and approaches, and ultimately to a permanent improvement/maintenance of the organizational coherence.

Table 4. Requirements originating from the strategic change framework [24]

Socio-technical combinations	*Requirement*
Choice made in a change process should be based on the context and the purpose	1) The scope of enterprise coherence governance should include both internal and external angles of the organizational transaction environment. 2) The purpose of a change process should be in line with the goals on the level of purpose and the objectives on the design level. 3) The organizational aspects that are dominant in the solution for a business problem, determine the choice of approach. 4) Every change process should be argued by the application of the enterprise coherence governance before execution.
Choice of an appropriate approach determines the success	5) The "solution direction and choice of approach" should be just one element of decision. 6) Regarding the decision making process, enterprise coherence governance should contribute to both the solution direction and choice of approach of a business issue. 7) Enterprise coherence governance should guide the realization of the "solution direction and choice of approach" of a business issue. 8) An appropriate approach needs appropriate enterprise coherence products.

4 Enterprise Coherence at the Level of Organizational Purpose

As mentioned before, the ECF distinguishes three areas of coherence: coherence at the level of organizational purpose, coherence at the design level of the organization and coherence between these levels. Figure 1 provides a summary of the ECF. The different elements of the ECF will be elaborated upon in this section, and the next section. In this section we focus on coherence at the strategic level, while the next two sections will address the other two areas of coherence.

In general terms, the Enterprise Coherence Framework consists of a set of so called *cohesive elements* and *cohesive relationships* between them. The overall level of cohesion within an actual enterprise is really determined by the explicitness of the cohesive elements, and quality/consistency of the cohesive relationships, in this enterprise. This also allows enterprises to govern their cohesion, in particular by guarding the cohesive relationships. While this may sound abstract, the discussion of the cohesive elements and their relationships as provided in the remainder of this section, and the next two sections, will make this more tangible.

At the level of organizational purpose, we essentially adapt the "*Strategic Development Process Model*" as proposed by Kaplan & Norton [26], the "*Strategy Formulation*" approach by Thenmozhi [27] and the notion of endless pursuit of a company's mission from "*Building Your Company's Vision*" by Collins & Porras [28]. Based on these theories we distinguish five key cohesive elements: *Mission*, *Vision*, *Core Values*, *Goals* and *Strategy*:

Mission – the mission is a brief, typically one sentence, statement that defines the fundamental purpose of the organization [26] that is "*enduringly pursued but never*

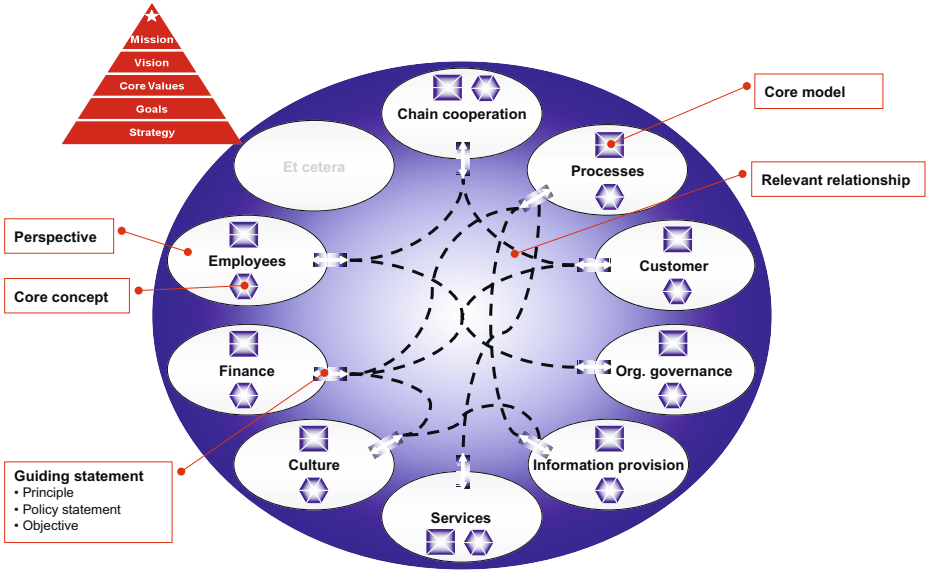

Fig. 1. GEA coherence elements

fulfilled" [28]. It should include what the organization provides to its clients and inform executives and employees about the overall goal they have come together to pursue [26].

Vision – the vision is a concise statement that operationalizes the mission in terms of the mid to long-term goals of the organization. The vision should be external and market oriented and should express – preferably in aspirational terms – how the organization wants to be perceived by the world [26]. Senge [29] indicates that in a vision there must be a creative tension between the present and the enticing imagination of the future and has to show enough ambition, which can be translated into goals and strategies.

Core values – the core values of an organization prescribe its desired behaviour, character and culture [26]. We consider core values as guiding statements at the highest level of sense giving in an organization. Together with the mission, the core values are therefore regarded as most invariant.

Goals – the vision operationalized in terms of concrete goals. These goals acts as success factors in judging the feasibility of strategies. The goals, as success factors, define the desired outcome (short term goals) from successful strategy execution [26].

Strategy – a strategy of an organization forms a comprehensive master plan stating how the organization will pursue its mission. It should also maximize the competitive advantages and minimize competitive disadvantages [27].

These cohesive elements lead to the organizational purpose triangle as depicted in Figure 2.

Fig. 2. The organizational purpose triangle

The coherence at this level can be derived, and made explicit, by the organization's definitions of the cohesive elements and establishing/assessing the consistency and quality of the relationships between the elements:

- The strategies should arguably lead to the achievement of the set goals, while not violating the core values.
- The goals should be in line with the vision of the organization, and ultimately its mission, while being consistent with its core values.
- The core values should at least be consistent with the organization's mission.

To indeed be able to establish/assess the consistency and quality of these cohesive relationships, it is of great importance that an organization's definitions of the elements are indeed available, and are explicit enough. They do constitute the fundamental drivers that shape the enterprise coherence at the design level of the organization. In practice, the elements at the organizational purpose level are often documented in rather broad and informal terms, also increasing the risk of a low level of enterprise coherence at the design level.

5 Enterprise Coherence at the Design Level

At the design level, the organization's strategy is translated into the blue-prints of the operational organization, involving a.o. its business processes, financial flows, logistic flows, human resources, information systems, housing, machines, IT, etc. To achieve enterprise coherence, the coherence at the design level needs to be governed as well. Decision makers need indicators and controls to indeed govern the coherence at this level.

5.1 Perspectives

A distinction between coherence at the level of organizational purpose, and coherence at the level of design, is consistent with the "*Structure follows strategy*" principle from Chandler [30]. This leads to the question *How do we make the enterprise coherence explicit on the design level of the organization?* Since a person is unable to have an in depth overview of the entire organization, let alone to control it, it is necessary to distinguish multiple angles of governance. For the several angles of governance, GEA introduces the cohesive element of "Perspective". In GEA a perspective has been defined as: *an angle from which one wishes to govern/steer/influence enterprise transformations.*

The set of perspectives used in a specific enterprise depend very much on its formal and informal power structures. Both internally, and externally. Typical examples are culture, customer, products/services, business processes, information provision, finance, value chain, corporate governance, etc. In GEA's view, it are really these perspectives that need to be aligned, in order to achieve enterprise coherence.

As an example, Table 5 shows the perspectives that were selected by one of the Dutch Ministries participating in the project. This set of perspectives also illustrates the need to align more aspects of an enterprise rather than just business and IT. Several of the perspectives may put *requirements* towards IT support, *information provisioning* followed by *communication* being the dominant ones in this sense. However, the chosen set of perspectives shows that when it comes to *alignment*, the stakeholders do not think in terms of Business/IT alignment, but in a much refined web of aspects that need alignment.

Table 5. Example definitions of perspectives

Perspective	**Definition**
Information provisioning	All processes, activities, people and resources for obtaining, processing and delivery of relevant information for our organization.
Collaboration	Collaboration needed to contribute to a common result on the team, entity or organization levels.
Processes	A coherent set of activities needed to deliver results of our organization.
Governance	Influencing our organization such that the desired corporate goals are attained.
Employees	All persons who execute tasks or activities within our organization.
Stakeholders	Legal entities or persons for whom the activities of our organization are important.
Culture	Explicit and implicit norms, values and behaviour within our organization.
Services	All services that our organization, within legal frameworks, or through agreed appointments with statutory authorities, establishes and delivers to customers.
Finance	The planning, acquisition, management and accountability of funds our organization.
Customers	Customers of a service of our organization
Law & regulations	All legal frameworks that form the basis for the task performance of our organization.
Communication	An active process in which information is exchanged between two or more parties or persons, regardless of how that is achieved.

In principle, GEA's concept of perspective is related to the notion of viewpoint as defined in architecture standards such as TOGAF [7] and the IEEE Architecture definition [31]. These concepts are, however, not the same. A perspective is an angle from which one wants to *govern* enterprise transformation. Given the underlying concern of this desire to govern, a viewpoint can be defined that captures the way one wants to view/contemplate the enterprise from this concern. As such, one might say that GEA's notion of perspective could be defined as a "governance viewpoint".

Note again, that GEA takes the stance that the set of perspectives used by a specific enterprise on its *coherence dashboard* is highly organization specific. This set is therefore expected to not correspond to the cells of well known design/engineering frameworks such as Zachman [32], TOGAF's content framework [7] or the Integrated Architecture Framework [8].

5.2 Core Concepts

The practices of the organizations participating in the GEA programme have shown that in general nine to twelve perspectives are identified. The reason for this span (nine to twelve) of perspectives is rooted on the general administrative span of control. In practice, however, we did encountered several situations in which senior management initially wanted to govern the enterprise from far more than twelve angles. In these cases we quite naturally discovered clusters of perspectives with a high correlation, allowing us to compose these perspectives into broader ones. This also led to the realization that another cohesive element was needed: "Core Concepts". A core concept, within a perspective, is defined as: *a concept that plays a key role in governing the organization from that perspective*. In the cases where we were initially confronted with many more than nine perspectives, most of these actually turned out to be the core concepts within more broader defined perspectives.

Examples of core concepts within the perspective of Finance are: "Financing" and "Budgeting". In Table 6, we have listed some of the core concepts that are relevant to one of the Dutch Ministries participating in the GEA programme.

Table 6. Example core concepts

Information provision	Processes	Governance	Stakeholders
Digitization	Time and place independent	Policy cores	Labor market
Integrality	Selection policy	Programs	Municipalities
Security	Efficiency	Scaling up	Labor force
Standardization	Actor	Collectivity	Employers Unions
Facilities	Effectiveness	Mission/vision assessment	Employee Unions
Information	Predictability	Employer ship	Funds
Maintenance	Planned	Themes and tasks	Other Ministries
Systems	Procedures	Functioning	Independent administrative bodies
Ownership		Organization	Society
Storage			Social and Economic Council
Architecture			Research agencies
			Social partners
			National Archive

5.3 Guiding Statements

To be able to govern the perspectives, and subsequent core concepts, a directional framework is needed consisting of "Guiding Statements" which form an additional class of cohesive elements. We define a guiding statement as: *an internally agreed and published statement which directs desirable behaviour*. Guiding statements may therefore cover policy statements, (normative) principles [33] and objectives. To make the perspectives, including their core concepts, governable, the guiding statements must be assigned to the perspectives and core concepts they pertain to. Some examples of guiding statements are shown in Table 7.

Table 7. Guiding statements relevant to the *processes* perspective

Processes
A dual situation in which paper and digital systems or more systems are used in parallel, should where possible be avoided.
Our organization uses tenet that the entire work of staff and processflow of documents goes digital.
The concept of flexible working means customization (instead of one size fits all).
Existing paper-based processes in our organization are as much as possible adjusted to the features of the automated document management system.
Integral approach: It is important to think about sustainability already at the "front" of the information chain.
Selection policy must play a fully involved role at the beginning of the "information creation".
The coming years it is expected that firm pressure will be on the business operations and IT to operate cost-efficiently.
Working smarter with fewer people.
We aim to ensure the government can operate decisively, transparently and fast.
We involve at the front of the process the external actors in the issues and developments we are working on.
We must have more attention to the process.
In 2012, our work is supported by a modern work environment and we as professionals are equipped to let this environment operate as optimal as possible for us.
We want better performing processes, more efficient and effective.
We want more predictability in our processes.
It must be clear how processes flow through the organization and who has which responsibilities.

5.4 Core Models

To better communicate the directions provided by the guiding statements, it is common to use models to provide more specific instructions. These models provide instructions that represent more specific choices/directions that are consistent with the guiding statements. In other words, these models are in line with the guiding statements formulated for that particular perspective. These models are cohesive elements as well, which we refer to as "Core models". We define a core model as: *a high level view of a perspective, based on and in line with the guiding statements of the corresponding perspective*.

The well known design/engineering frameworks, such as Zachman [32], TOGAF's content framework [7] or the Integrated Architecture Framework [8], have an important role to play in the development of the core models within the different perspectives. Based on their respective underlying "design philosophies", these more design/engineering oriented frameworks provide a way (1) to ensure completeness and consistency from an engineering point of view, (2) to enforce/invite a specific line of reasoning on the design/construction of the enterprise and (3) to classify/structure the different core models. The latter, is also where modelling languages such as ArchiMate [10], e3Value [34], BPMN [35], or UML [36] can be used. Furthermore, frameworks such as Zachman [32], or TOGAF's content framework [7], can be used to further structure the core models within the perspectives.

5.5 Relevant Relationships

The real world case studies conducted within the GEA programme have shown that guiding statements can be allocated pre-dominantly to one perspective, although they

often also address other perspectives as well. This means that it is possible that a single guiding statement relates several perspectives and in this way establishes one or more relationships between these perspectives. To clearly connect the perspectives from both ends, while firmly founding these relationships within the involved perspectives, the guiding statements are (re)formulated in terms of the concerns/scope of each of the involved perspectives. Similarly, such relationships may also exist between the core concepts and core models of different perspectives.

These relationships are an important feature in ensuring the coherence between the different perspectives. Therefore, we introduce an additional cohesive element: "Relevant relationship", which we define as *a description of the connection between guiding statements from different perspectives*. The relevant relationships should explain in particular the causal relationship between the guiding statements involved.

By formulating the cohesive elements on the design level, the coherence at this level is made explicit. This is illustrated, and summarized, in (the earlier shown) Figure 1. This diagram also shows nine *example* perspectives. As argued before, the actual set of perspectives depends on the organization. Note, that the diagram only aims to put the role of the different cohesive elements in perspective. The diagrams is by no means intended for stakeholder communication.

5.6 Experiences

The presence of a good documented enterprise mission, vision, core values, goals and strategy are preconditions to be able to determine the content of the cohesive elements on the design level of the organization and they are the essential resources for this determination. Case studies with GEA have also shown that GEA makes the relationships between different perspectives of an organization explicit in such a way that it becomes possible to develop integral solutions for important business issues. New and adjusted guiding statements within a perspective will affect other perspectives through the relevant relationships. The insight in the enterprise coherence given by the relevant relationships contributes to the governance of the organization, since the impact of a change in one perspective can be translated into possible effects on the other perspectives. As an example, consider the situation depicted in Figure 3. In this example, "Acquisition", as part of the growth strategy, is a new and important perspective. The main guiding statement in this perspective is: *We acquire only organizations with cutting edge knowledge appropriate to the spearheads of our services*. This statement has implications for other perspectives, primarily for the perspective "Knowledge". In this perspective, due to the new relevant relationship Acquisition/Knowledge, the existing guiding statement: *We innovate our knowledge concepts in line with our service priorities by knowledge CREATION* is adjusted to the guiding statement: *We innovate our knowledge concepts in line with our service priorities by knowledge INTEGRATION*. The relevant relationship responsible for this adjustment is formulated as: "*innovation by buying service concepts*". The change of this guiding statement in the perspective "Knowledge", will subsequently invoke a causal series of first order and even second and higher order changes to guiding statements in other perspectives.

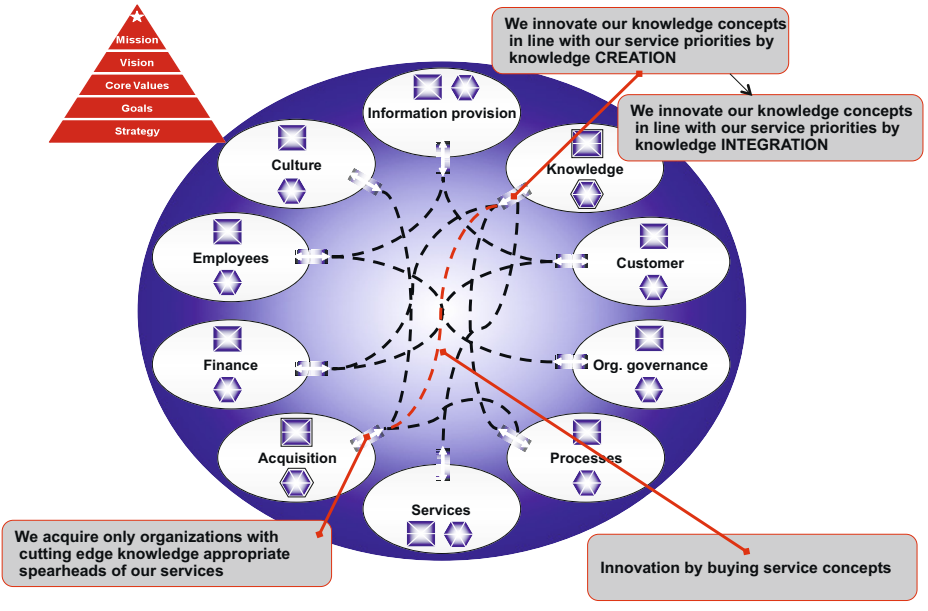

Fig. 3. Example of the working of a relevant relationship

6 Coherence between the Levels

Besides horizontal coherence on one level of contemplation, we also distinguish vertical coherence between two adjacent levels of coherence. To realize the strategic fit, as proposed in the "Strategic Alignment Model" of Hendersson & Venkatraman [6], we correlate the cohesive elements defined on the purpose level with the cohesive elements defined on the design level. This has been illustrated in Figure 4.

The fundamental, transcendent, nature of the mission of a company gives a high level understanding of the core activities to excel in, and the desired behaviour. Therefore the enterprise's mission harbours information on relevant perspectives and principles. The guiding statements should therefore also be motivated in terms of the mission. As soon as guiding statements are allocated to different perspectives, enterprise coherence is made explicit by coupling them by means of relevant relationships.

In its vision, an organization elaborates on its envisioned position in the future. Vision statements indicate new candidate perspectives and/or new core concepts. They may also underpin and/or confirm the role of the already identified perspectives and core concepts. Furthermore the envisioned position of the organisation in the future is translated into principles and policy statements. Core values diffuse to the design level by way of principles. These values may also indicate major or minor focus areas to govern, respectively the perspectives and core concepts. Objectives on the design level, defined as a more concrete formulation of an organisation's goal, are derived from the goals on the purpose level. Also goals may indicate major or minor focus areas to govern. Finally the strategy, seen as the strategic execution path to achieve the enterprises

Intensity of coupling Strong ++ Weak +		Core factors on design level						
				Guiding statemts				
		Perspectives	Core concepts	Principles	Objectives	Policy statements	Core models	Relevant relationships
Core factors on the level of meaning	Mission	++		++				++
	Vision	++	+	++		++		++
	Core values	+	+	++				++
	Goals	+	+		++			++
	Strategy	++	++	++	++	++		++

Fig. 4. Correlation between the cohesive elements on two interrelated levels of coherence

goals, supplies the content to major focus areas, the perspectives, minor focus areas, core concepts, and directional information, guiding statements.

In practice there will be many internal and external sources available to gather definitions of the cohesive elements on both the purpose and the design level. As part of the overall governance of enterprise coherence, it is important to continually guard the consistency between these sources and the definitions of the cohesive elements obtained so far. Collectively, the "formal" definitions of the cohesive elements provide the steering instrument which allows senior management to influence enterprise coherence. Different source/documents that deal with the strategy, design, and operations of the enterprise should of course be consistent to the definitions.

In the course of time, several factors may lead to disturbances in already achieved coherence. In such a case, an adjustment in the coherence must be made. An example of such adjustment of a disturbance in the relationship between the level of purpose and the level of design, concerns Philips. During the initial stages of the market for mobile phone, Philips was one of manufacturers of such devices. After some time the dynamics of the selected product×market combination intensified in such a way, that this combination no longer fitted to the definition of Philips' level of purpose. Philips' overall strategy was to operate in slowly circulating markets. However, due to this intensifying dynamics of the mobile phone market, Philips would either have to make fundamental changes at its level of purpose, or make a change to its design level. Philips decided to do the latter, and indeed has withdrawn itself from the mobile phone market.

7 Conclusion and Further Research

In this paper we discussed the Enterprise Cohesion Framework (ECF) as it has been developed iteratively in the multi-client GEA research programme. The framework

consists of a number of cohesive elements and relationships expressing the cohesion in an enterprise. As such, it allows enterprise to make their coherence explicit, thus enabling them to govern their coherence. During the development of the framework, members of the GEA research programme applied it to their own organizations. An elaborate discussion of such a case, can be found in [15]. Some insights from these applications include:

- Making enterprise coherence explicit by means of the ECF does indeed require an initial investment, but this investment leads to a clear return on investment in terms of a better understanding of the enterprise's environment, and the coherence in the views among all parties involved.
- When using the ECF operationally, the key players within an organization (i.e. the representatives of the perspectives) do not only get to know and trust each other better, but moreover gain a better insight into and understanding of each other's domains. This means that enterprise coherence is not merely something that takes place in terms of "documents", but actually gets embedded in the social processes among the key players in the enterprise.
- The process of bringing and keeping the key players together in the workshop sessions puts a lot of stress on the required competencies of the facilitators (i.e. the enterprise architects).

In line with the design science rhythm of the GEA programme, we will continue to apply the GEA method in client projects, and based on that further evaluate, extend and improve the GEA method.

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