Enterprise Coherence with GEA –
A 15 Year Co-evolution of Practice and Theory

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Abstract. GEA (General Enterprise Architecting) is an enterprise architecture method which has been developed and matured over the past 15 years. The GEA method has emerged out of needs from practice, and differs from other enterprise architecture approaches in that it has a strong focus on enterprise coherence and the explicit governance thereof. This focus followed from the observed need to move beyond the Business-IT alignment and 'Business-to-IT' stack thinking that is embodied in most of the existing enterprise architecture approaches.
In this paper, we reflect on the development of the GEA method (so-far), which involved a co-evolution between theory and practice. We then present the core elements of (the current version of) GEA, and illustrate these in terms of a real-world (social housing) case. Finally, we also discuss some of the lessons learned in applying GEA across different organizations.

1 Introduction

The environment in which modern day enterprises (including commercial companies, government agencies, etc.) need to operate, changes constantly. As a result, enterprises transform almost continuously to keep up with these changes. One could even go as far as to say that enterprises need to stay 'in motion' [19]. The involved transformations may range from changes in value propositions and business processes, via changes to the information systems used to support the business processes, to changes of the underlying IT infrastructures. Furthermore, the transformations may be the result of a 'premeditated' (strategy driven) desire to change, but they can also be the outcome of numerous 'spontaneous' changes as a result of locally needed/induced changes. Enterprise transformations are also likely to touch upon a rich mix of aspects of the enterprise, such as human resourcing, finance, organizational structures, reporting structures, etc.; i.e. not just 'Business' and 'IT'. As a consequence, enterprise transformations typically involve many stakeholders [35] with differing stakes and interests, who (should) influence the direction and/or speed of the transformation.

To make (premeditated) enterprise transformations feasible and manageable, they are typically managed as a portfolio of transformation programs, where

these programs are split further into projects. Such a portfolio of programs and projects, together with the 'spontaneous' (bottom-up) changes, all need to be mutually *coordinated* while, at the same time, also maintaining alignment to the enterprise's strategy. A lack of such a coordination will likely lead to 'local optimizations' favoring short term and/or local interests over the overall interests of the enterprise. The latter ultimately leads to a degradation of the enterprise's *coherence* [13, 12, 20, 23], which GEA defines as *the extent to which all relevant aspects of an enterprise are interconnected, such that these connections facilitate an enterprise in achieving its management's desired results* [20, 23].

Traditionally, project management and program management are put forward as being responsible for such coordination tasks. However, these approaches focus primarily on the management of typical project parameters such as budgets, resource use, deadlines, etc.; i.e. "*on time and within budget*". When being too focused on such project parameters, one runs the risk of conducting only local and or partial improvements at the level of specific projects [20]. For example, when making design decisions that have an impact which transcends a specific project, projects are likely to aim for solutions that provide the best cost/benefits trade-off within the scope of that specific project, while not looking at the overall picture [18, 20]. Regretfully, however, in practice such local optimizations do not just remain a potential risk. More often than not, this risk materializes, and consequently results in reduced structural coherence of important aspects of the enterprise (such as human resources, services, customers, processes, marketing, finance, physical infrastructures, IT, etc.). As a result, enterprises often fail to actually realize the *desired* transformation; even when the involved projects may have finished on time and within budget.

As an answer to this, enterprise architecture has been positioned as a *means* to enable such coordination and associated governance of enterprise coherence [18, 26, 6, 20]. At the same time, however, one has to observe how most existing enterprise architecture approaches, such as Zachman [22], DYA [28], TOGAF [24], IAF [45], and ArchiMate [11, 8], follow a rather 'engineering oriented' style towards enterprise transformation [42, 27, 14, 35]. This engineering oriented style is typically embodied in an underlying architecture/design framework (typically involving of several columns and/or rows) in terms of which one is expected to architect/design the enterprise. This is also where we find the traditional Business-IT alignment and the Business-to-IT-stack thinking. These engineering-style approaches correspond to what De Caluwé [5] refers to as the Blue-print style of thinking regarding change.

To coordinate change, and ultimately ensure enterprise coherence [13, 12], stakeholder interests, formal and informal power structures within enterprises and its context, as well as the associated processes of creating win-win situations and forming coalitions, should be taken as a starting point [42, 27, 14, 35]; i.e. not just as an afterthought in terms of stakeholder specific 'viewpoints'. In terms of De Caluwé [5], a more Yellow-print style of thinking about change needs to be embraced (while also involving the other 'colors'). Where the more traditional engineering-style approaches involve a set of pre-determined aspects

of an enterprise that should be aligned, the notion of *enterprise coherence* aims to go beyond this by focusing on "*the extent to which all relevant aspects of an enterprise are interconnected*" [20, 23], where the set of *relevant aspects* is highly organisation specific.

In 2006, these insights triggered the Dutch consultancy firm Ordina to initiate a multi-client research program to develop an enterprise architecture method that would indeed focus on *enterprise coherence* and the need to more explicitly govern this coherence during enterprise transformations. By 2007 this resulted in the formal establishment of a multi-party[5] research and development program[6]. This program has resulted in the development (and ongoing evolution) of the GEA method [30, 26, 23]. Even though the group[5] of (Netherlands based) organizations participating in the development of the GEA includes e.g. banks, pension funds, and logistic companies, there is a strong presence of governmental agencies. This may be a natural consequence of three factors. Firstly, the specific branch of Ordina that initiated the development of GEA was Ordina Public, which specifically targets clients in the public sector. Secondly, enterprise/digital transformation in the (e)governmental/public context typically involve multiple stakeholder across different organizational entities. Thirdly, government-related organizations generally (certainly within the Netherlands) are open to collaborative improvement and maturation of enterprise/digital transformation.

The goal of this paper is to (1) reflect on the development of GEA as a co-evolution between theory and practice, while also (2) presenting the core of (the current version of) GEA and illustrating this in terms of a real-world (social housing) case, as well as (3) discuss several lessons learned in applying GEA across different organizations. In line with this, the remainder of this paper is structured as follows. We start, in Section 2, with a discussion of the core elements of the (current version of) the GEA method, where we will use the real-world case of a Social Housing Foundation (De Key[7]) to illustrate these elements. We then continue in Section 3 with a brief report on the development of the GEA method as a co-evolution of practice and theory, and some of the lessons learned related to this. In doing so, we will also clarify why we prefer to speak about co-evolution, and why we put practice before theory. In Section 4, we then reflect on the use of GEA across multiple (large) cases. Finally, in concluding, we will also discusses some further directions in which we plan/ expect GEA to (co)evolve further.

[5] During different stages of the GEA research program, the following client organizations participated: ABN-AMRO Bank; 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 Landbouw, Natuur en Voedselkwaliteit – Dienst Regelingen; Nederlandse Spoorwegen; PGGM; Politie Nederland; Prorail; Provincie Flevoland; Rabobank; Rijkswaterstaat; UWV; Wehkamp.

[6] `https://www.groeiplatformgea.nl`

[7] `https://www.dekey.nl`

2 Main Elements of GEA

In this Section, we present the main elements of the GEA method [23], covering the notion of *enterprise issue*, the overall perspectives of the enterprise's *level of purpose* and *level of design*, and the *integral solution contour*. In doing so, we will also illustrate these elements in terms of a recent case in which GEA was applied, involving a social housing foundation *De Key*[7]. This case also features as an illustrative case in [23].

Enterprise Issue – The main driver for enterprises to apply GEA is to deal with an *enterprise issue*, since such issues either trigger enterprise transformations, or *emerge* during an ongoing transformation. In general, an *enterprise issue* is a problem, bottleneck, challenge, or alleged solution, which is considered and controlled from the context of different perspectives within an enterprise. An enterprise issue can be a 'positive' issue, such as the desire to innovate, move towards new markets, apply new technologies to become more efficient, etc. It can also be a 'negative' issue, such as a need become more efficient, reduce costs, manage/avoid a loss of market share, become GDPR compliant, etc.

Enterprise issues can have both external and internal 'causes'. Examples of external causes include the need to respond to changes in the *environment*, such as legislation, technological developments, demographic trends or changing competitive relationships. Examples of internal causes include a need to increase efficiency, cost control, and compliance with (legal) norms and standards.

De Key: The enterprise issue

De Key is a large social housing corporation in Amsterdam with two offices. It had an issue that, in short, could be best described as "a required strengthening of the financial function". The underlying causes of this issue concerned changes in Dutch financial legislation, which imposed new requirements with respect to financial accountability for enterprises, as well as from the perspective of the supervisory bodies that controlled these aspects that required De Key to produce more detailed financial reports.

De Key's responsible financial director immediately realized that this issue could not be solved within the financial discipline only, but that a strong dependency existed with other disciplines within De Key and that solving these 'financial' issues would require the active cooperation of all managers of the involved disciplines.

In solving enterprise issues, the GEA method suggests the roadmap as shown in Fig. 1. This suggested roadmap may, of course, need situational adjustments to a specific enterprise context. In the case of De Key, for now, only the first four steps of the roadmap have been performed (the dark gray elements in Fig. 1). It should be noted that this roadmap is part of a broader framework [], provided by GEA, for the governance of enterprise coherence. For instance, the (organisation specific) GEA framework, as will be illustrated below in terms of Fig. 4, can also be used to monitor the coherence of an enterprise while it is 'in motion' (due to bottom-up and/or top-down changes).

The roadmap as shown in Fig. 1 largely speaks for itself, so due to space limitations, we take the liberty of not discussing it in detail and only highlight some key considerations. A first aspect to note is (in step 1) the role of the

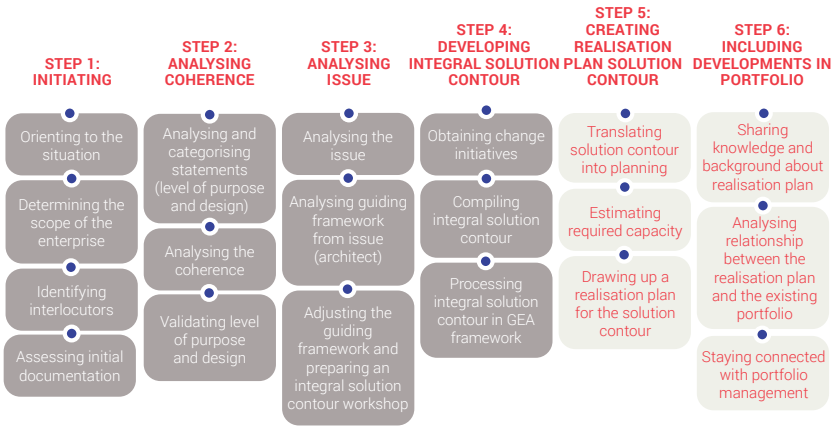

Fig. 1. Generic GEA roadmap [23]; In dark gray the steps performed at De Key so-far

interlocutors, who represent (with mandate) the different stakes, interests, and concerns, that need to be taken into consideration. As mentioned before, the key difference between GEA and existing enterprise approaches lies in GEA's focus on enterprise coherence. Therefore, step 2 involves an analysis of the existing enterprise coherence. It does so, both at the *level of purpose* and the *level of design*, which we will discuss below. This analysis is then used in the further steps to direct/guide the further analysis of the enterprise issue at hand (step 3), and then gradually develop and implement a 'solution' (steps 4 to 6).

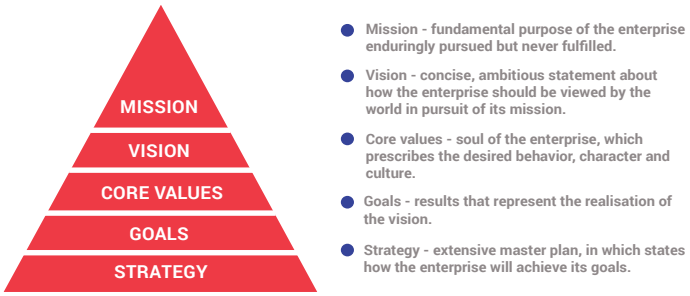

Fig. 2. The elements of coherence at level of purpose [23]

Level of purpose – The level of purpose is the consideration level where GEA considers the meaning and purpose of an enterprise. At this level, GEA essentially adopts the "*Strategic Development Process Model*" as proposed by Kaplan & Norton [10], the "*Strategy Formulation*" approach by Thenmozhi [25] and the notion of endless pursuit of a company's mission from "*Building Your Company's Vision*" by Collins & Porras [4]. Based on these theories we distinguish five key concepts: *mission*, *vision*, *core values*, *goals* and *strategy*, see Fig. 2.

The *mission* involves a brief, typically one sentence, statement that defines the fundamental purpose of the organization [10] that is "*enduringly pursued but never fulfilled*" [4]. 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 [10]. The "*enduringly pursued but never fulfilled*" qualification refers to the fact that the act of *achieving* a mission is never finished; realising the fundamental purpose is an ongoing effort.

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 [10]. *Core value statements* prescribe a desired behaviors, character and culture [10] and are required for an enterprise to be, or become, successful within its formulated vision. *Goal statements* involve a formulation of a desired stage of development for an enterprise working towards achieving the enterprise's vision [10]. The *strategy* involves a comprehensive master plan in which it is stated how an enterprise will achieve its goals. It should also maximize the competitive advantages and minimize competitive disadvantages [25].

Vision statements	**Mission elements**					
	De Key	*Dynamics of the city*	*Ring A10*	*People*	*First steps*	*Housing market*
We are in line with current developments and remain true to values that have traditionally determined De Key's identity.	x	x				
Spatial the urbanisation has consequences: for example, to build homes, more high-rise buildings are needed.		x	x			x
Our contribution to the dynamism in Amsterdam is to create and manage affordable forms of housing that are attractive to people who want to take their first steps in the housing market.	x	x		x	x	x
We continue to build current home ownership with active portfolio management, innovative housing concepts and by supporting initiatives.		x		x		x

Fig. 3. Excerpt of De Key's Mission-Vision matrix [23]

De Key: Level of purpose

The mission of De Key is[8] (translated from Dutch): "*De Key contributes to the dynamics of the city of Amsterdam by enabling people to take their first steps on the housing market, inside, or just outside the A10 ring.*" (The A10 is a highway around the core of the city.)
In capturing the level of purpose, in terms of Fig. 2, all elements were captured, and confronted to each other using matrices 'flowing' down the triangle. In other words, core elements from the mission were confronted to the statements of the vision, these were then confronted with statements capturing the core values, etc.
At De Key, this involved: 1 mission statement, 14 vision statements, 4 core values, 8 goal statements, and 15 strategy statements. Fig. 3 provides an excerpt of the matrix linking vision statements to key elements in the mission.

Level of design – The level of design, is concerned with a (high level perspective) on the design of the enterprise, by which the level of purpose is instantiated. This level concerns *perspectives*, *core concepts*, *guiding statements*, *core models*, and *relevant relationships*.

Perspectives concern the angles from which one wishes to contemplate and to govern the enterprise. The set of perspectives used in a specific enterprise de-

[8] `https://www.dekey.nl/Media/9b0b72d9c89e08f9232917106b273dc0/original/ruimte_voor_beweging.pdf/`

pend 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. *Core concepts* concern the core concepts in terms of which one wishes to contemplate and to govern a perspective. *Guiding statements* are internally agreed and published statements which give direction to desirable behavior. They may involve overall policy statements, more specific objectives, as well as principles. *Core models* are models of one or more perspectives, based on and in line with the guiding statements of the corresponding perspective(s). *Relevant relationships* are descriptions of the connections between guiding statements from different perspectives.

Combined, this leads to the structure as exemplified in Fig. 4. The perspectives as shown there are just illustrative. The actual set of relevant perspectives in a specific situation is organization specific.

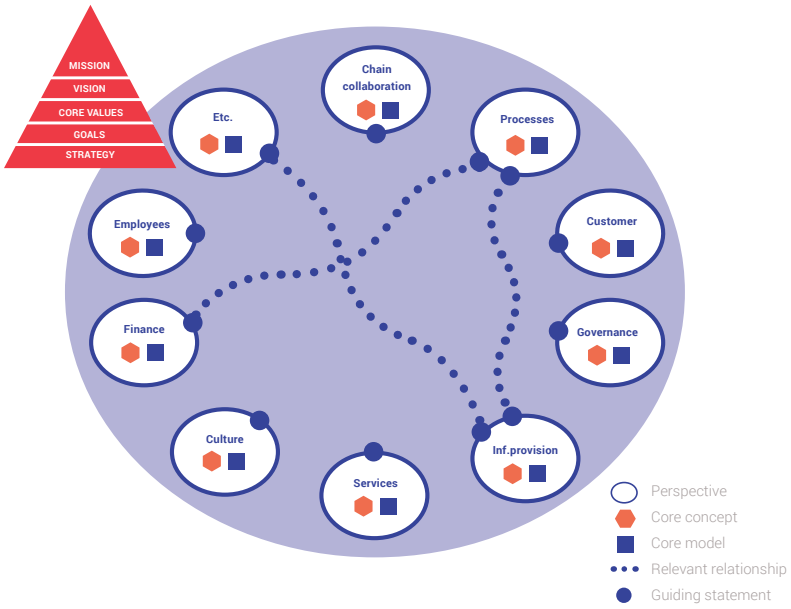

Fig. 4. Elements of the GEA framework, [23]

De Key: Level of design

At De Key, ten perspectives were identified: *Finance*, *Customer*, *Real estate*, *Services*, *Suppliers*, *Governance*, *Employees*, *Stakeholders*, *Processes*, and *Information provision*. As an illustration, Fig. 5 shows for each of the identified perspectives the number, and kinds of, guiding statements that were formulated.

What was interesting is that for the *Real estate* and *Stakeholders* perspectives no principles were formulated, while for the *Suppliers* perspective no objectives were formulated. These observations raised concerns for the respective perspective owners. For instance, for a social housing foundation it is rather 'odd' to manage real estate without clear (business) principles. Similarly, one would expect that for the management of suppliers there to be clear objectives.

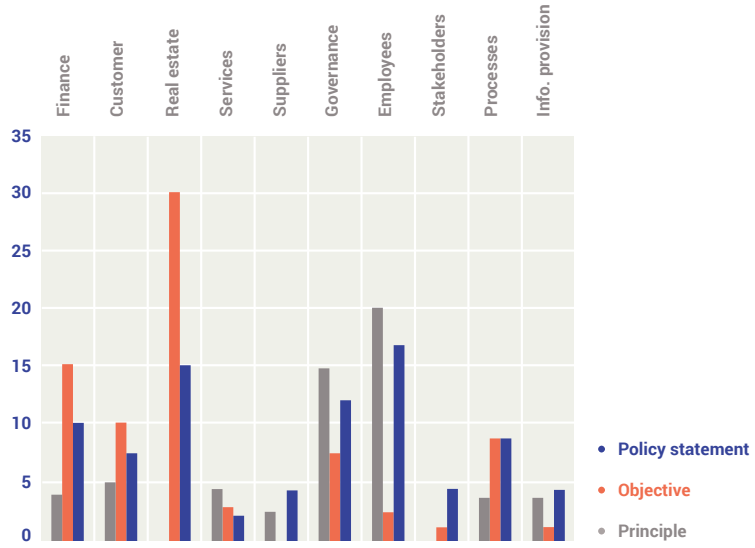

Fig. 5. Guiding statements per perspective, [23]

Integral solution contour – As shown in Fig. 1, based on the analysis from step 2 and 3, step 4 involves the development of an integral solution at 'contour' level. The design of this 'integral solution countour' will need to answer the insights from the two analysis steps.

The integral solution contour is more than the sum of change initiatives, it is about meaningful coherence and the creation of mutually supportive and reinforcing changes within an enterprise to support and improve its performance. Initially, there may be contradictions with other change initiatives, there may be overlap, and change initiatives may clash with guiding statements from other perspectives. All change initiatives, starting with the initiatives with the highest priority must be examined for these problems. Any disagreements must be brought to the attention of the relevant perspective owners who must decide how these matters will be resolved. Once the disagreements have been solved, an integral solution contour can be described and submitted to the board of the enterprise for decision making.

De Key: Developing the integral solution contour

A one-day workshop was organized, which included the perspective owners from De Key, issue owners, some De Key board members and two GEA supervisors.
Once the GEA supervisors had explained the workshop and making the aforementioned items available, the issue owners explained the results of the issue analysis (Fig. 1, step 3) in depth using their (earlier) prepared presentation.
Once all the issues of the participants had been addressed, the workshop moved to a level where it became clear that all the participants really understood the issue, and its degree of importance and urgency. Subsequently, the integral solution contour for the relevant issue as described above was co-created.

3 The Development of GEA

In this Section, we discuss the experiences in the development of GEA. We start with short discussion of the general background, and then structure the remainder of this Section around some of the key lessons learned.

As discussed in the introduction, the initiative to develop the GEA method was taken by the Dutch consultancy firm Ordina in 2006. As a prelude to the actual start of the development, a survey was conducted among the participating organizations to identify the requirements on the desired outcomes. It also validated the need to more explicitly govern *enterprise coherence*, beyond mere Business-IT Alignment. More recent publications [13, 12] provide further (a posteri) support for this motivation.

Organize the need – From the start out, the ambition of the GEA research program was to follow a science-driven approach. From a research methodological perspective [43], the development of GEA involved a design science [7] effort, with an important role for cases studies [46] as a way to drive the iterations. It was, therefore, also important to have a good understanding of the needs for/requirements on GEA in practice, and it was necessary to have access to real-world cases. Therefore, the next step was the creation of the multi-client[5] research program[6] involving clients (i.e. future 'users' of the method) that saw a real need for the method.

Validation of need by financial commitment – In the initial stages (i.e. the first five years) of the research program, the participating members were also required to provide a financial contribution to the program. This financial contribution was not only meant to cover (some) of the costs of the program. Requiring a substantial financial contribution also implied a (1) validation of the shared understanding of the need to develop GEA, and (2) commitment to the development of GEA (e.g. by way of real-world cases).

Value for practice before rigor for science – Next to the industrial partners, the research program also involved an advisory board involved five senior researchers from different Universities, covering management sciences, organizational sciences, and business informatics. This is also where a first interaction between practice and theory took place. The need for the development of GEA was clearly born in practice. However, already at the start, the senior researchers in the advisory board were then able to already provide input regarding relevant existing theories/methods that could be integrated into the design of the GEA method. This resulted in a series of white papers [30, 31, 33] (in Dutch) documenting the need for GEA, its initial design, as well as positioning in relation to existing related instruments (such as the balanced score card [9], and McKinsey's 7s model [3]). Next to the advisory board with senior researchers, there was also a clear intention (and commitment from Ordina) to sponsor a part-time PhD candidate [27].

Nevertheless, soon it became clear that for the GEA program to succeed from the perspective of the industrial partners, and thus for the *continuity* of the program, it was necessary to first focus on *establishing value for practice*.

This also meant that, e.g. towards the research needed for the part-time PhD project, the primary focus had to be on doing real-world cases (in real-world circumstances) with the project partners, and then at a later stage leverage these towards scientific reflection and publications. This also resulted in additional white papers (e.g. [29, 32]) documenting the cases (which were also beneficial in attracting additional project partners). At a later stage, once the program was well on its way, and the first version of GEA had been documented in terms of a book [26], there was room for more scientific reflection and rigor [43, 44, 39, 37, 41, 40, 38, 36, 34, 35, 42]. This also resulted in the finalization of the PhD project [27] sponsored by the GEA program.

Loosely coupled co-evolution of practice and theory – Next to the previous lesson learned on *value for practice before rigor for science*, the ongoing work in the GEA program also resulted in a series of parallel research activities. These research activities were formally separate from the GEA program, but partly inspired by the findings within the GEA program, while some of the findings of these parallel research activities flowed back to the GEA program.

For instance, an important concept in GEA is the notion of *guiding statement*, which involves of *policy statements*, *objectives*, and *principles*. The need for a better understanding of these concepts also triggered more explicit work on the concept of *architecture principles*, which a.o. resulted in [6]. The latter then, in its turn, also enabled the GEA program to further mature these concepts within the GEA context.

The need for more coordination in enterprise transformation to ensure enterprise coherence, was also one of the triggers for the *Architectural Coordination of Enterprise Transformation* project [20]. PhD candidates involved in the latter project also interacted with the project members of the GEA program, to obtain case material for their work. Conversely, different results reported in [20] provide(d) more theoretical underpinning(s) of the GEA method.

The need to involve multiple stakeholders in a collaborative setting, also inspired work towards an approach to use collaboration engineering concepts to structure such interactions [17, 16]. These results are expected to be integrated into future versions of GEA, in particular when developing more explicit tool support for the method (see the discussion on future research in Section 5).

Finally, now that the GEA method is well established (and also internationally available [23]) there is a growing need (and ambition) to be able to more explicitly *quantify* enterprise coherence and its impact on the performance of enterprises. First steps in this direction have already been published [2, 1].

In each of these examples, the needs from GEA-related *practices* inspired the development of new concepts and theories, while some of the latter then flow(ed) back towards the further development of GEA. As such, we also prefer to speak about co-evolution from practice and theory, consciously putting practice first (rather than the often used order of theory and practice), while using the word 'co-evolution' rather than the often used "*from practice to theory and back*".

Controlled initiation; independent growth – As mentioned the GEA program was initiated by the consultancy firm Ordina. Having one organization in

clear control of the development proved valuable in order to organize the need, financial commitments towards the joint development, etc.

However, after the establishment of a first stable version, and making this widely accessible [26] (to a professional audience), enterprise architects working at other consultancy firms also became interested in co-developing the GEA method. This then triggered the transfer of the GEA method to an independent foundation. This foundation[9] now manages the further development of GEA from a more neutral position.

4 Lessons Learned From Applying GEA in practice

Over the past 10 to 15 years, GEA has been applied to several cases. This includes several smaller cases, but also a number of larger cases. Table 1 shows (partially anonimized) some of the key figures of the larger cases. Case 5 to 7, were conducted at the early stages of the development of GEA. For those stages, no detailed breakdown of the number of guiding statements is available.

On average these cases involved 2.5 person-month involvement of two external consultants, and on average 0.25 person-month per perspective owners. Combined, this is an average of $2.5 \times 2 + 0.25 \times 10 = 7.5$ person-months in total, per case.

		Guiding statements #				Guiding statements %			
Case	Perspectives	Policy statements	Objectives	Case Principle	Total	Policy statements	Objectives	Principle	Total
1 [40, 38]	12	111	51	73	235	47	22	31	100
2	10	75	64	152	291	26	22	52	100
3	9	347	93	20	460	75	20	5	100
4 [23]	10	108	95	66	269	40	35	25	100
5 [44]	10								
6	11								
7	10								

Table 1. Overall indicators per project

Applying GEA in each of the (larger and smaller) cases has resulted in several lessons learned. In the remainder of this Section, we discuss some of these lessons.

Good inputs for level of purpose – 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.

Benchmark in numbers – Based on the experience across the different cases the following average numbers seem to be relevant benchmarks for larger (1000+ employees) enterprises:

1. The number of perspectives will be between 9 and 11.
2. The average number of key concepts will be 4 to 8 per perspective.
3. The number of guiding statements for a large enterprise will be between 200 and 400.

[9] `https://www.groeiplatformgea.nl/groeiplatform-gea/stichting/`

4. The distribution of the guiding statements will be approximately 10 to 25% principles, 30 to 45% policy statements and 30 to 45% objectives.

Without assuming these numbers to represent an absolute truth, they provide important indicators of when a strong deviation from the patterns is visible in an enterprise. When strong deviations do occurs, it is important to discuss these deviations with those responsible, such as the perspective owners, and to see whether it is necessary to change, to remove or to add elements at the level of design. In the case of De Key, we already saw (in Section 2) that there were less than expected principles for the *real estate* perspective, while there were no objectives formulated for the *suppliers* perspective. In another case, a GEA survey found that there to be 198 policy statements, 1 principle statement and 1 objective statement. This is a striking example of a not very result-oriented enterprise, which is stuck in policy-making processes.

Of course, an interesting question is what the *added value* is of using GEA in practice. Given the size, the complexity, and situatedness, of enterprise transformations in general, a comparative study between transformations that applied GEA and transformations that did not, is difficult. However, across the projects in which GEA was applied, several 'feats of arms' can be identified, such as:

- With the help of GEA, the EU-accreditation of a large agency, which had gotten completely out of control, was safeguarded within one year.
- At a Dutch ministry, the unnecessary start up of a large (and costly) project, initially triggered by a change of a law, was prevented.
- In the context of a large digitization program at a ministry, GEA was used to break (within two months) a stalemate in a decision-making process that had been stuck for a year.
- With the help of GEA, the financial function of a large housing corporation was brought up to the level required by regulators within 3 months.

5 Conclusion & Further Research

In this paper, we reported on the GEA method for enterprise architecture, and its development as a co-evolution (so-far) between practice and theory, as well as associated lessons learned. We presented the core elements of (the current version of) GEA, and illustrate these in terms of a real-world (social housing) case. Finally, we also discussed some of the lessons learned in applying GEA across different organizations.

Towards the future, we see several challenges for further co-evolution between practice and theory. Firstly, there is a need to better quantify the notion of enterprise coherence. Initial work in this direction has already been reported in [1, 2], but much more work remains. Once the notion of enterprise coherence has been quantified more explicitly, it also becomes possible to find causal relations between (the level of) enterprise coherence and the concept of EBIT(D)A; i.e. an enterprise's economical performance in terms of *earnings before interest*, *taxes*, (*depreciation*), and *amortization*.

A second challenge involves the growing desire to develop more tool support for GEA. Doing so, however, requires a more explicit meta-model. As one of the next steps, we also foresee the development of more explicit meta-models.

A third challenge involves the integration with existing enterprise architecture approaches. The fact that GEA differs from other enterprise architecture approaches by its strong orientation towards the governance of enterprise coherence, does not mean that existing enterprise modeling/architecting/engineering approaches cannot be combined. Even more, we see potential benefit in doing so in terms of e.g. the core models used at the *level of design*, as well as the elaboration of such models towards actual solutions. These models may, for instance, provide some (organization specific) standardization of the modeling constructs used to express core models.

Finally, we also see opportunities to more explicitly support collaborative processes involved in gathering guiding statements across the different perspectives (and stakeholders), and the development of the integral solution contour. There we plan to investigate the integration of existing work regarding collaborative approaches to enterprise architecture (e.g. CAEDA [17]) and support by collaborative tools for policy formulation [15].

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