Validating a Practical Method for Planning Co-Evolution of Business and IT in a Public Sector Organisation

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Abstract: **Background** Business-IT alignment (BITA) remains a top management concern. A method for business-driven planning of changes in information systems was proposed by Nodehi et al., and evaluated in a limited way through an educational pilot and expert interviews. **Aim** We want to evaluate the proposed method in the public sector and identify possible improvements. **Method** We conducted a case study, involving four evolution projects in a local government organisation. We identified BITA challenges in the case organisation, then moderated the application of the method by participants, and finally studied the usefulness of the method through surveys and interviews. **Results** We identified 14 categories of BITA challenges in our public sector case organisation that largely match the challenges identified by Nodeehi et al. in the private sector. Overall, the method was well-accepted and highly appreciated by all participants. Several improvement points were identified. Clear links were found between identified BITA challenges and specific elements of the method. **Conclusion** The proposed planning method was found to be beneficial for improving BITA in the public sector. Additionally, the links found between BITA challenges and method elements provide insight in *how* the method helps achieve alignment.

1 INTRODUCTION

The importance of aligning business and IT and the critical impact of such alignment on company performance is well known and has been subject of extensive research (Luftman et al., 2008; Renaud et al., 2016). Still, aligning IT with the business ranks as n°1 or n°2 issue in IT management in recent years, as reported in the yearly IT Issues and Trends study of the Society for Information Management (Kappelman et al., 2022; Johnson et al., 2023).

While some research has been conducted on how organisations have achieved alignment, a lack remains of operational tools or actionable results (Sundoro and Wandebori, 2021). To help close this gap, Nodehi et al. (2023) recently developed a lightweight method for planning the medium to long-term evolu-

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tion of digital assets. In this method, high-level evolution steps are driven by business goals. By bringing different stakeholders together, the method stimulates collaboration and collective commitment, enables rapid adaptation to possible changes during a project, and considers a broad range of relevant factors when planning a project, which helps improve coordination between business units. By providing insight and foresight into digital assets or projects, this method also enables business and IT to collaborate on achieving common goals.

To date, the validation of the method proposed by Nodehi et al. (2023) is limited, involving pilots in an educational setting and expert interviews with practitioners, but no field experiments have been concluded so far. In fact, Nodehi et al. (2023) call for future work to validate their method in practice.

Therefore, to test the method's applicability in the real world, we have started to conduct case studies in various organisations. In the current paper, we report on a completed case study within a public sector organisation. In particular, we have applied the method in four BITA planning projects in a Flemish

local government setting. Our objective is to answer the following main research question: *Is the proposed method useful for improving BITA in public sector organisations?*

In Section 2, we discuss background and related work. In Section 3, we outline our approach for evaluating the proposed method. In Section 4 we report the evaluation results. In Section 5, we discuss the interpretation, limitations and relevance of our results, and we conclude the paper in Section 6 with a summary of our contributions and avenues for future work.

2 BACKGROUND AND RELATED WORK

Proposed Method. In "A Practical Method to Plan Co-Evolution of Business and Information Technology", Nodehi et al. (2023) propose a method for planning changes to information systems, driven by business goals. They provide both the process steps for the planning method and a template for the deliverable, called an *evolution plan*. A schematic overview of their method is reproduced in Figure 1. The components of an evolution plan include an analysis of the current *situation*, a concise statement of a (business-driven) *ambition*, a series of high-level evolution steps, called *design moves*, and finally a *roadmap* in which these steps are placed on a timeline. Important activities in the evolution planning process include *stakeholder analysis*, *SWOT* analysis, definition of *actions*, *success criteria*, and assessment of *risks*. Online support materials for the method include a multi-tab data collection spreadsheet that supports tracking of information and decisions throughout the process steps. As noted by the authors, validation of the method in field experiments is lacking.

Validation of BITA Models. Models for measuring or improving Business-IT alignment that are proposed in literature have rarely been submitted to proper validation in field studies.

Kotusev (2020) proposes a pipeline of decision-making phases to operationalise the improvement of Business-IT alignment: positioning, focusing, prioritizing, assessing, and implementing. This proposal has similar objectives as the method of Nodehi et al. (2023), and also lacks validation.

Ullah and Lai (2011) propose an approach to align business goals with requirements elicitation. This approach was successfully implemented and tested at an automobile company on a business process for managing customer orders. Validation on more than a single business process is lacking.

Tapia et al. (2007) use focus groups and case studies for validation of the business-IT alignment criteria in the Value-based Business-IT Alignment Maturity Model (VITALMM) proposed by Tapia (2006). The validation was limited to the criteria and did not cover the model in its entirety. Combining focus group findings with findings from a case study helped identify refinement actions more comprehensively.

A conceptual Business-IT alignment model is presented by Trienekens et al. (2013) based on five alignment factors: "Intention and Support, Working Relationships, Shared Domain Knowledge, IT Projects and Planning, and IT Performance". In order to validate the alignment factor measurement model, five organisations in the Dutch financial sector were studied. The underlying model has not been generalized beyond this case study.

BITA in the Public Sector. As Winkler (2013) points out, little attention has been given to the idiosyncrasies of IT governance mechanisms in the public sector. Using existing literature, he proposes a conceptual model that identifies structural, procedural, and relational mechanisms that contribute to a (novel) construct of Administration-IT alignment and validates this model in three comparative cases. The study suggests that structural and relational mechanisms are important to achieving alignment between administration departments and IT units, while procedural mechanisms are not clearly influential.

Tapia et al. (2008) conducted an empirical study exploring business-IT alignment processes in a networked organisation, including the province Overijssel, the municipalities of Zwolle and Enschede, and the water board district Regge & Dinkel and Royal Grolsch N.V. in The Netherlands. Although the case study revealed significant findings the authors believe that the generalisability of such findings is only possible with replication.

3 APPROACH

To validate the method of Nodehi et al. (2023) in the field, we have conducted a case study in a public sector organisation. In the public sector, BITA is an important management issue, just as in the private sector, but it may come with specific challenges. While public sector organisations are moving from digitalization to digital transformation, they must adapt and become more agile in order to deliver digital services, requiring fundamental and disruptive changes in their operations (Janssen and Van Der Voort, 2016). Meeting this challenge is particularly difficult because public
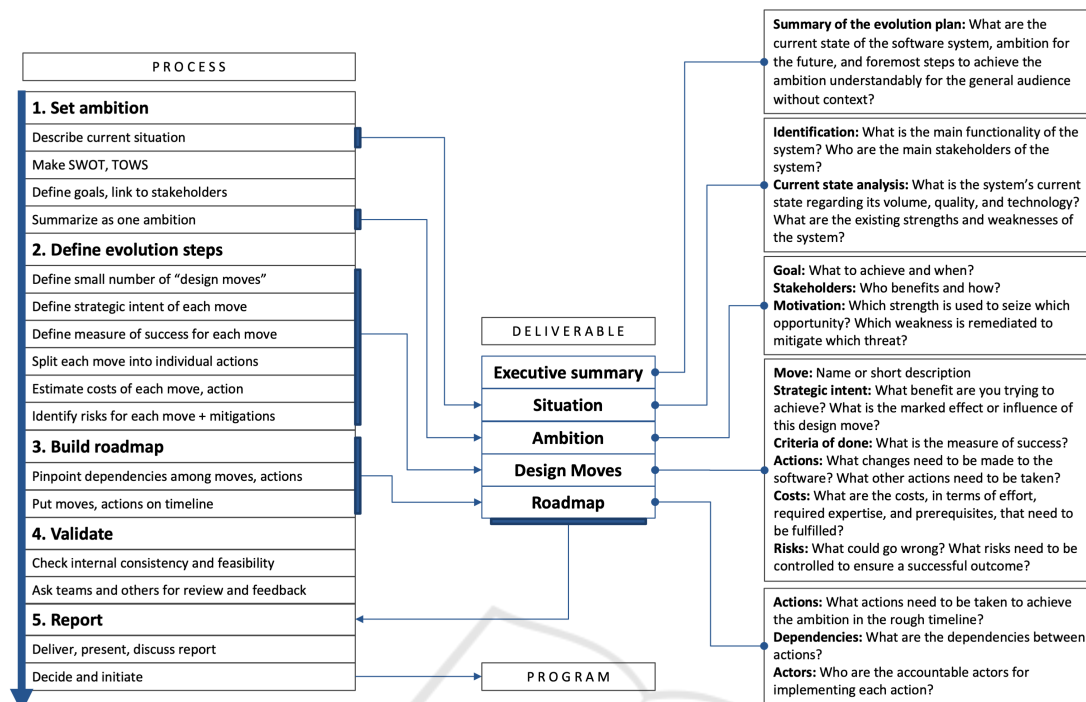
Figure 1: Schematic overview of the co-evolution planning method, reproduced from Nodehi et al. (2023).

sector organisations often are bureaucratic and inflexible, relying on hierarchical organisational structures (Ylinen, 2021).

The case organisation is a Flemish local government organisation, employing about 390 people to serve a community of about 34000 inhabitants. The first author was employed there as a Manager of ICT & Digital Information.

The case study was conducted by selecting four change initiatives with substantial IT components. For each of these initiatives, a planning team was formed that applied the planning method to collaboratively draft an evolution plan. The planning process was facilitated by the first author.

Data collection for the validation was performed through document review, interviews, focus groups, meeting observation, and questionnaires. Triangulation (Yin, 2018) was achieved by combining these various sources of evidence.

Participant selection was determined by their role in the organisation and their involvement in the change initiatives (projects). In addition to members of the projects, two additional top-level managers were interviewed. Participants were informed of the purpose of the study beforehand and given the opportunity to consent to recording, anonymisation, and transcription of their interviews. Survey data was anonymised.

Several different kinds of interviews were conducted. Each semi-structured interview was guided by a predefined list of key themes or concepts and key questions related to these themes. Using theoretically derived themes consistently in each interview led to comparable and valid data (Saunders et al., 2009). One-to-many interviews with members of the project team were also conducted in order to explore specific aspects regarding the method used in practice. In these focus groups, multiple participants explored the predetermined topic with the first author's role being to facilitate discussion among participants (Saunders et al., 2009).

We used four surveys in addition to focus groups to collect standardized data from a variety of participants for comparison (Saunders et al., 2009). The survey questionnaires were structured around the factors of the Technology Acceptance Model (TAM), following Riemenschneider et al. (2002): *ease of use* of the method, *compatibility* with current ways of working, *subjective norm (i.e. whether most people approve of using the method*, *usefulness* of coping with BITA challenges, and *intention* to adopt the method. The survey asked for scoring these TAM criteria on a 5-point Likert scale, for the constituent parts of the evolution plans as well as the plan as a whole.

In the execution of the study, several phases can be distinguished as we explain below.

Phase 1: Initiation of the Study. We started by gaining insight into the current state of business-IT alignment in the case organisation and the challenges faced by IT and business teams. To this end, we conducted interviews with a broad range of management team members (e.g. the general manager, and financial director), managers, and staff from various departments, thus gathering information from a variety of perspectives. Insights were gained on both a strategic and operational level. To formulate interview questions, we gathered information via documents and archival research. As a result of this phase, we were able to describe the case organisation's departure situation. Content analysis on documents and interview transcripts was performed using ATLAS.ti.

Phase 2: Introduction of the Method. In the second phase, focus groups were held for each of the change initiatives in which the evolution planning method was going to be applied. In these focus sessions, the first author explained the evolution planning method to the project members in a step-by-step manner. Moreover, as moderator, he stimulated dynamic discussions and gathered general first impressions and opinions about the evolution planning method and the resulting evolution plan. The method was then put into practice by the project members.

Phase 3: Intermediate Evaluation of the Method. During the period that the project teams were working on their evolution plans, intermediate evaluation of the method was organised in the form of three moderated focus sessions per project. In these sessions, selected elements of the method, such as *ambition*, *design moves*, or *roadmap* were evaluated by the participants. After each focus group, the participants were surveyed individually –without interfering with others' opinions– regarding the possible strengths, weaknesses, limitations, and opportunities of these elements. Feedback collected during a focus group was used by the moderator for stimulating discussion in subsequent focus groups.

Phase 4: Operational View on the Method. In this phase, all project members were asked to provide their final feedback regarding the evolution plan's contribution to a better alignment of business and IT, as well as how the method could be improved to make it better suited to public sector organisations. Members of the project were asked to give their opinions about the evolution plan as a whole, including its strengths, weaknesses, limitations, or opportunities.

Phase 5: Strategic View on the Method. We studied the strategic view on the evolution planning method through interviews with two members of the management team, who were not part of the project teams. In addition to discussing the challenges identified by the method within the organisation, we also discussed the results of the projects that implement the method. As part of the analysis, feedback was collected on ways in which the evolution plan could enhance business-IT alignment.

4 RESULTS

Table 1 lists the 15 participants in our study, their roles, and their involvement in the 4 projects where the evolution planning method was applied. The planning teams consisted of 2 to 4 members. Their roles include various management positions, domain experts, and IT or application engineers. Interviewing and moderation of focus groups were done by the first author, who was also an IT manager in the case organisation. In total, we conducted 11 semi-structured interviews, moderated 20 focus groups, and surveyed 12 participants with 4 questionnaires covering different elements of the method. The case study was carried out between February and June 2023.

4.1 BITA Challenges

To gain insight into the current state of business-IT alignment and the challenges faced by IT and business teams, we conducted semi-structured interviews with 9 of our participants (7 project members and 2 top managers). In this section, we discuss the problem categories that we identified.

The Digital Evolution. Employees in the case organisation experience an acceleration in technological developments in recent years. The organisation does not consider itself an early adopter, but is a front-runner compared to other local governments.

Dealing with Strategic New Insights. The organisation feels it lacks a structured process for capturing new strategic insights or new ideas.

Strategy Formulation: The overall strategy –as formulated in a multi-year plan (MYP) customary for local governments– has been made available both internally (intranet) and externally (municipal website). But while employees are aware of the overall vision (offering customer-oriented services to its citizens), the approach to its implementation appears not widely known or is regarded as not directly applicable to day-to-day operations.

Table 1: Study participants. The evolution planning method was applied in 4 projects with a total of 13 participants. Additionally, two top managers were interviewed.

Project	Project members
A: Renew **appointment booking software** to boost employee productivity and citizen satisfaction	Manager of the department Civil Services (project owner) IT system engineer (n°1) (project owner) Domain expert (n°2)
B: **Consolidate GIS systems** to broaden access to street furniture and tree management functions	GIS coordinator (project owner) Manager of the department Facility Services (project owner)
C: **Enhance system for service request management** to optimize service delivery	Vice-general manager (project owner) Application engineer (project owner) IT system engineer (n°2) (domain expert) Domain expert (n°3) (domain expert)
D: **Replace legacy point-of-sales system** to simplify financial administration	Manager of the financial department (project owner) Application engineer (project owner) Domain expert (n°1) (domain expert) Financial director (domain expert)
Top management interviewees	General manager Manager of the department of spatial planning and development

IT Innovation: While the organisation promotes an open innovation culture at all levels, in practice, it is difficult to create time and attention for new developments. While people want to move away from outdated ways of working, they are also busy with day-to-day operations and are reluctant to change.

Relationship Between Business and IT Teams. An overall positive feeling prevails within the case organisation regarding alignment between business and IT. Nevertheless, alignment sometimes fails when it comes to cross-departmental projects. Although the IT department is open to consultation with other departments, it remains difficult for them to understand the specific needs of all departments, or to fully understand the plethora of knowledge domains within the organisation.

Digital Awareness Within the Organisation. Not all departments are equally aware of relevant technologies or technological concepts. While IT has a responsibility to raise awareness, it does not pursue this with a structured approach. Business is regularly inspired by new technology, but also routinely turns to the IT department to inquire about technical feasibility assistance.

Customisation, Technical Debt and Complexity. When departments are inspired to pursue innovations, this sometimes results in a great deal of customization, making the organisation vulnerable if internal support is lacking, or an increase in technical debt (Allman, 2012) and complexity of the software application.

Central Coordination: Project ownership is unclear in the organisation, including what project owners are responsible for and what tasks they should be performing. Although projects (and related budgets) are part of the MYP, they are not prioritized or centrally coordinated, making it hard for departments to know when projects will be launched, when they will run, or when concrete actions will be taken.

Stakeholder Involvement. The case organisation has so many different knowledge domains and corresponding stakeholders that it is not always apparent who should be involved in projects. This regularly leads to stakeholders being involved too late or altogether forgotten, in spite of good intentions.

Current Situation Analysis. Analysis of the situation at departure differs among projects. In the absence of a standard analysis approach, after project initiation, the focus shifts too quickly to specific problems, project scope, or final goals. As a result, departments experience that projects start under wrong assumptions and that a number of steps are skipped, gradually resulting in failure.

Strategy Implementation. Putting the overall strategy into practice involves a lot of ad-hoc approaches in a local government. In order for the organisation to deliver added value to its citizens, it must be able to react quickly to opportunities that arise in society. The political entities are also very sensitive to this matter, so the organisation must be agile in implementing its projects and strategy. However, putting the strategy into practice poses a number of chal-

lenges, particularly in terms of project scope, associated ambition, and potential risks.

Definition of Clear Goals. A project - at its initiation phase - is always linked to the MYP and therefore to a specific objective or goal. Yet, the added value of a project is not explicitly stated enough and is not addressed systematically. Obviously, a project is only initiated if it will add value to the organisation, but when it comes to the gaps a particular project will fill, everyone has ideas about what that project will accomplish, but it is typically viewed from a departmental standpoint. There is not enough explicit or written documentation of the added value of a project. Additionally, this added value should be viewed from multiple perspectives. A challenge for the organisation is to obtain a better consensus on the purpose of projects since stakeholders often don't or rarely have that kind of conversation.

Monitoring and Evaluation. The monitoring and evaluation of projects is another challenge that is not addressed enough across the organisation. When an evaluation occurs, it is handled by a department manager who determines whether projects were delivered on time and on budget, what pain points occurred, and how these could be avoided in the future. The IT department also attempts to make that evaluation, but it is not always easy. Sometimes the objectives of a project are too fuzzy, so ongoing evaluation and monitoring are required, for example, when purchasing a software application that is still being developed. Overall, there is no structured way to evaluate projects.

Existing Frameworks and Tools. To address the above-mentioned challenges, the organisation has been seeking a structural project approach but hasn't succeeded. Therefore, the management team set up a specific working group that included representatives of both business and IT to make this a priority. It was previously attempted to create a *project information sheet* that would encourage people to think about a project's purpose, its stakeholders, possible pitfalls, etc., but in practice that document is rarely used.

In short, the case organisation is aware of the importance of alignment, but also experiences alignment challenges in a range of aspects. Many of these challenges can be related directly to challenges that were also identified by Nodehi et al. (2023) when developing their evolution planning method.

4.2 Appreciation of the Evolution Plan

We studied the appreciation of the study participants for the evolution plan as a whole and for its constituent elements both quantitatively and qualitatively.

Quantitative results were obtained through an individual questionnaire with project members, using the criteria of the technology acceptance model (Riemenschneider et al., 2002). We obtained responses on a 5-point Likert scale for all combinations of TAM criteria, project members, and method elements or entire method that can be summarized as follows:

- The average score of 4 (*agree*) was obtained across participants, for almost all combinations of method elements and TAM-criteria. Almost no difference was observed on these combinations between managers and other employees.

- For *compatibility*, average scores were 2 (*disagree*) or 3 (*neutral*) for all method elements. For *compatibility*, average scores from managers were consistently (half or entire point) lower than from other employees.

- For the element *design moves*, the average score for *ease of use*, was 3 (*neutral*), entirely due to managers providing lower scores, while the average from other employees remained at 4 (*agree*).

- For the element *monitoring and evaluation*, the average scores for *ease of use* and *intention to use*, were 3 (*neutral*), again due to lower scores from managers rather than from other employees.

- For the evolution plan as a whole, the average scores for *ease of use* was 3 (*neutral*) and for *compatibility* was 2 *disagree*. For *subjective norm*, *usefulness*, *intention to use*, the average scores were 4 (*agree*). Managers and other employees scored similarly.

Thus, while the evolution plans and their elements were for the greater part highly appreciated, its *compatibility* with current ways of working was deemed low, and *design moves* and *monitoring and evaluation* were regarded by managers as less *easy to use*.

Qualitative results were obtained through initial impressions when the planning method was first introduced, and in discussions in focus sessions. The obtained feedback was summarized and categorized into *strengths*, *weaknesses*, *limitations*, and *opportunities*. This was done for evolution plans as a whole and for their constituent elements. These results can be summarized as follows:

Strengths. The method was found to stimulate dialogue and offers insights into stakeholders' needs. It forces project teams to think through a project and document its steps. Additionally, it allows for better anticipation and early detection of potential problems. This approach enables the management to get a clear overview of the project from the beginning to

the end, preventing ad-hoc approaches and avoiding hazardous steps. Through the evolution plan, the goal of a project can be clearly formulated with the input of various departments, and a structured approach is used to plan the project. Project information is carefully documented and all important steps are taken into account to make a project team aware of relevant topics and allow them to think deeply about them.

Weaknesses. The evolution plan was seen to document project data mainly for the strategic underpinning of the project (e.g. for presentation to a management team). The template deliverable does not facilitate documentation of more detailed technical or functional information, which may also be essential for starting a project. It is often difficult to flow fluently through the different steps of the data collection form. To keep things readable, content needs to be described very generally. The process is time-consuming, requires certain skills that not everyone has, and was perceived as too elaborate for smaller projects.

Limitations. The comprehensive nature of the evolution planning method is a strength that may also be seen as a threat. Teams that are unprepared to consider a wide range of organisational and technical aspects (possibly due to insufficient motivation, mandate, allocated time, or skill diversity) may abandon the method and fall back on an ad-hoc approach. When the method does get applied fully, the roadmap that is ultimately constructed as part of an evolution plan may still be (partially) ignored or might need adjustment during the ensuing project execution. How to keep the evolution plan, and specifically the roadmap, in focus up-to-date during project execution is not currently addressed by the evolution planning method.

Opportunities. While designed for planning business-driven IT change projects, the evolution planning method could lead to a better overall project approach within organisations, as well as an overall improvement in (interdepartmental) collaboration. For any type of (sufficiently large) project, the method facilitates reflection on the various project phases, allows taking a wider range of stakeholders into consideration. and may lead to more thoroughly substantiated decisions. The concise deliverable enables a professional, more standaridzed, and efficient way of presenting project plans to higher management to support their decision processes in the context of (IT) project portfolio management and management of (digital) transformation programs.

Feedback from participants was also collected about possible adjustments or improvements of the evolution planning method, the evolution plan template, or the data collection spreadsheet. These suggestions are listed in the appendix.

In short, the participants generally agreed with the ease of use, conformance to subjective norm, and usefulness of all elements of the method. They also expressed their intention to use the method. They deemed the method's compatibility (with the current way of work in the organisation) to be low.

4.3 Strategic and Operational Perspectives

In the last two phases of our study, semi-structured interviews and focus groups were held to gain insights into the operational and strategic views on the method. In this section, we discuss the outcomes in relation to the previously identified BITA challenges of the organisation.

Strategy Formulation. Evolution plans provide guidance and aid in the formulation of strategy by forcing project teams to think differently and by bringing strategy to the project level. Despite not being a crystal ball, the evolution plan prevents making mistakes by providing a critical perspective and structured approach to strategic planning.

Relationship Between Business and IT. organisation-wide thinking is stimulated by the evolution plan. A project team within this case study not only considered departments from the beginning that should be involved, but later involved others that would also be affected. Business and IT are brought together through the evolution plan. This structured method of collecting project information provides a good basis for discussion between departments and clarifies who is involved in a project. Thus, the evolution plan encourages collaboration and prevents departments from overriding one another. As a result, business and IT can reach a consensus and build a better relationship.

Digital Awareness Within Organisation. As part of the evolution plan, (new) technological concepts may be brought forward in project meetings, but they do not directly improve digital awareness or knowledge. When applying the evolution planning method, business departments are able to provide structured input on specific functionalities. In this way, information can be shared in both directions, and bringing together IT and business knowledge automatically increases awareness.

Central Coordination. Although the evolution plan adds value to managing individual projects, it has no direct impact on centrally coordinating and prioritizing a multitude of them. It is nevertheless important

for all department managers to be aware of upcoming or ongoing projects. It allows them to jump on board if necessary or useful. As a result, the overall project planning is improved and internal miscommunications are avoided. By providing the necessary information to create an overview of upcoming projects and ongoing projects, the evolution plan could enhance central coordination. In order to increase control over these projects, all roadmaps can be bundled together.

Stakeholder Involvement. When a project begins, stakeholders are brought to the forefront through the evolution plan. The tool not only identifies stakeholders, but also discusses their impact and level of support, as well as allowing project teams to consider possible actions. While extensive labeling is perceived as unhelpful, it does contribute to better alignment of specific needs.

Current Situation Analysis. Despite the effort involved, SWOT and TOWS analyses encourage project teams to thoroughly analyze their current situation. They prevent the start of a project without an overview of the current situation. In addition, it could also prevent parallel actions or projects from being initiated to accomplish the same goal. Even though TOWS provides the needed motivation and substantiation for the project's aspirations, its added value is subject to debate.

Strategy Implementation. In an evaluation plan, all necessary actions are predefined before the actual start of a project, which forms the basis for a concrete action plan. Further, the evolution plan provides higher management with structured information about the project's implementation. While in the case organisation, potential risks are often only considered after a project has begun, an evaluation plan uses a structured approach to surface potential risks and mitigation actions before the project starts. While the evolution plan helps clarify in a pragmatic way the practical execution of a project, it still lacks an element to gather comprehensive functional or technical information about the project, requiring the use of additional tools in order to gather all information in one place.

Defining Clear Goals. The evolution plan plays an important role in defining the goals and added value of projects. By doing so, stakeholders can reach a consensus on the project's objectives. Despite the evolution plan outlining a project's ambition, it does not explicitly link it to the organisation's overall objectives.

Monitoring and Evaluation. Regardless of the length of a project, the evolution plan forces project teams to consider monitoring and evaluation consciously. By doing so, a project team can keep track of the progress and goals of the project. Project monitoring and evaluation cannot be overlooked when a project team applies all the elements of the evolution plan. There are, however, some questions unanswered because this element has not been applied in this study.

Existing Frameworks and Tools. In the past, the case organisation tried to introduce a *project information sheet* to raise awareness of a project approach, but it was never really implemented. Existing other frameworks have not been applied, mainly because they are thought to be too theoretical and difficult to apply. With evolution planning, project teams are guided through all the important project steps in a structured and (chrono)logical manner. The application of the evolution plan is also viewed as time-consuming by some. This is why opinions about the 'lightweight' label on the evolution plan differ. Possibly, when using the method not just once, but repeatedly, teams will be able to apply it more efficiently.

Thus, the evolution planning method can be explicitly related to 10 out of 14 previously identified BITA challenges. For the remaining four identified BITA challenges (the digital evolution; dealing with strategic new insights; IT innovation; customisation, technical debt and complexity), a relation might exist, but was not explicitly uncovered in our interviews.

In short, the evolution planning method was experienced, both at the strategic and operational level, as an effective approach for countering many of the identified BITA challenges.

5 DISCUSSION

In this section, we draw a number of general lessons from our study results. Also, we discuss limitations, threats to validity, and generalisability of our findings. Finally, we share some reflections relevant to others who may wish to run similar studies.

5.1 Lessons Learnt

A first major takeaway from our study is that indeed public sector organisations struggle with business-IT challenges. In fact, the challenges identified in the case organisation largely match those found by Nodehi et al. (2023) when developing the evolution planning method.

Alignment challenges might even be greater in a local government, such as our case organisation, com-

pared to similar-sized organisations in the private sector due to operating in a wide range of knowledge domains, each having its own requirements, constraints, dynamics and (policy) goals.

The necessity for improving BITA is felt strongly in public sector organisations, not to remain market-competitive, but in order to cope in an agile way with an ever-expanding suite of tasks, new demands for implementation of laws and policy, and unexpected societal events (e.g. the Covid-19 pandemic or the refugee influx from the Ukraine-Russia war).

Our study has shown that the evolution planning method is valuable for Business-IT alignment in the public sector. When applied to four projects in the case organisation, the method was found to have a strongly positive influence on the identified BITA challenges. The domain experts, IT experts, and managers involved in these projects were able to apply the method successfully. They reported favorably on the ease of use and usability of the method and explicitly recognized its value in coping with their BITA challenges.

In particular, the evolution planning method was experienced to facilitate broad and early stakeholder involvement, to stimulate efficient collaboration between departments, to help set and communicate clear shareable goals, to expedite strategy implementation, to drive thorough and timely analysis of current state and future risks, and to increase chances of project success.

The evolution planning contributed in a limited way, or only indirectly, to increasing digital awareness, improving central coordination, and strategy formulation.

5.2 Limitations, Threats to Validity, and Generalisability

Our case study covers only one public sector organisation, more precisely one Flemish municipality. Because we established connections between specific BITA challenges and elements in the evolution planning method that help solve them, we can hypothesize that any (public sector) organisation that faces such challenges would benefit from the method. Still, further study is needed to establish whether our results can truly be generalized to other types of public sector organisations in other geographical and cultural areas.

The researcher that acted as interviewer and moderator of the focus groups was also an IT manager at the case organisation. This may have introduced some bias into the data collection. More importantly his tacit knowledge (of the organisation) may have been

a factor in the successful application of the method. This means that having an "internal" moderator may be a best practice or prerequisite for using the method with success.

The decision to use the evolution planning method as a new approach in the four selected projects was fully supported by the management of the case organisation. This decision was clearly communicated throughout the organisation, as well as the theory behind the method and the objectives the organisation wanted to achieve with it. Thus, management support and communication are likely also success factors that must be replicated in any organisation that wants to apply the method.

Our case was conducted on a tight time schedule. The application of the method ended with the delivery of the four evolution plans. Success was measured through the perception of the project team members, during and right after the planning process. The actual execution of the delivered plans was still to be initiated or ongoing when our study ended. Thus, to validate that successful planning with the method ultimately also leads to successful projects, a follow-up or longitudinal study would be needed.

Since project execution was out of scope, the element of the planning method that involved *monitoring and evaluation* was only described theoretically to the participants. As also indicated by the participants, no definitive conclusions could be drawn for these elements.

While we extensively studied the state of departure of the organisation regarding BITA in a qualitative manner, we did not apply any standardized instrument for (quantitatively) measuring its alignment maturity (Luftman et al., 2017). This could have been useful, since alignment maturity at the outset might be a factor for how fruitfully the method can be applied. On the other hand, this would add to the data collection burden in the study.

In the study, we observed several indications that the evolution planning method could be useful also outside the specific context of Business-IT alignment. Several of the identified challenges, such as stakeholder engagement, current situation analysis, strategy implementation, or clarifying goals, also occur when IT is not involved. Hence, the method may likewise be useful to create alignment when organisations consider general change initiatives.

5.3 Reflection

Some reflections on our case study could be useful for researchers that might wish to run a similar study.

Firstly, the study greatly benefited from thorough preparation and strict planning. An extensive study protocol was drawn up beforehand and used throughout. This made it possible to run the study in a limited time and obtain detailed and reliable results.

Secondly, data collection, processing, and analysis proved to be a very intensive process due to the large number of data points and the relatively short duration of the study. Thus, when conducting a similar study, sufficient research support should be budgeted.

Thirdly, we took care to spread the evaluation of the method over a number of focus group sessions (5 per project) that were separated by about 1 week. This ensured that adequate time could be spent introducing, implementing, and evaluating all method elements.

Finally, we were able to conduct all interviews and focus groups in person. This allowed ample interaction and information exchange and ensured that highly valuable feedback could be captured.

6 CONCLUSION

In this paper, we have reported on the findings of the first field experiment for the evolution planning method proposed by Nodehi et al. (2023). Through our case study, involving 4 changes initiatives in a local governmental organisation, we have been able to make a number of contributions to the BITA body of knowledge:

- We confirmed that the BITA challenges identified by Nodehi et al. (2023) through interviews with experts from multiple private sector organisations likewise are present in public sector organisations.

- We extended the evidence of the usefulness of the evolution planning method. This evidence was limited to educational pilots and expert interviews and is now extended with a comprehensive case study in a public sector organisation.

- We were able to link specific BITA challenges to specific elements or characteristics of the evolution planning method that help to resolve these challenges. This elucidates *why* the method is effective.

- We identified several possible improvements of the evolution planning method, either to remedy weaknesses, or to refine the method for use in the public sector.

Based on these contributions, we see several avenues for future work:

- Though comprehensive, our case study involved only a single public sector case organisation. Additional case studies in both private and more public sector organisations are needed.

- Our case study was limited to the planning phase itself. Follow-up or longitudinal studies would allow us to study whether successful planning also leads to successful projects. They would also specifically allow to more closely study of the 'monitoring and evaluation' elements of the method, which come into play during project execution.

- Suggested improvements and adjustments that were identified in the course of our case study can be used to develop an improved version of the evolution planning method. Such an improved version could then be subjected again to field testing.

Finally, we list a number of recommendations for the successful application of the planning method in practice, which may be taken into account by organisations that wish to use the method:

- The evolution planning method looks almost deceptively simple, but requires substantial attention, thought, and collaboration to apply well. The method is best learned by a combination of careful explanation, moderated application, and learning by doing.

- To enhance knowledge of evolution planning and promoting its adoption, management should consider to organize 'evolution planning expert meetings' where projects are discussed and new insights, knowledge, challenges, and success stories are shared.

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APPENDIX

During the case study, participants suggested a number of improvements to the method, the evolution plan template, or the supporting data collection spreadsheet. These suggestions are listed here.

Intro

- Use different fields to add additional information (not all information in 1 comment-field)
- Add mandatory fields for budget & link to strategic plan (MYP)
- Add a field for project description (it is not explicitly mentioned)
- Add a field for description of project scope (in & out of scope)
- Add a field for project accountability (e.g. member of the CMA)
- Add a field for describing the reason for doing a project
- Add a field for management summary
- Mention the dates of any project change in this element
- Add the function of project members + date that they started participating in the project
- Add a clear definition of the role of a project owner

Stakeholder Analysis

- Do not use the terms promotors, defenders, latents and audience. Just add two yes/no fields for 'stake in the project' and 'influence over the project' to avoid confusion.
- Creation of two separate columns for stakeholder and stakeholder group
- Usage of a drop-down menu to select stakeholder groups, impact or support levels

Current Situation

- Split up one large field into separate rows for SWOT and TOWS information
- Bundle SWOT and TOWS into a single-screen

Ambition

- Drop-down list to choose stakeholders that were already mentioned in the previous element

Gap Analysis

- Drop-down menu for selecting 'type of gap'
- Add other type of gaps that are more specific for the case organisation (e.g. security, efficiency,. . .)
- Provide clear definitions of the type of gaps

Design Moves

- Avoid confusion about the name 'design moves' (i.c. better translation into Dutch)

- Avoid outcome and output to be formulated too ambitiously.

- Emphasize the horizontal approach of this element (i.c. not first go through all possible design moves)

- Costs should be more elaborated instead of being mentioned in one single column

Benefit Generation

- Automatic selection of previous information (e.g. design moves, stakeholders) via a drop-down menu

Risk Assessment

- Drop-down menu to select design moves from the previous element

- Attention must be paid regarding to the translation of the risk-matrix terminology

- Using the risk matrix should be made more easy and efficient

Mitigation Actions

- Risk ID's and risks should be added automatically based on the previous element

- Using the risk matrix should be made more easy and efficient (pointers and arrows)

Roadmap

- Integration with a Gantt-chart tool would be an advantage

- Another specific tool for creating roadmaps shall provide a better overview of (the timing of) multiple projects

Monitoring and Evaluation [This element is not tested in practice during the research and only explained theoretically.]

Evolution Plan as a Whole

- Add extra tab that can be used to collect all functional/technical needs in a project

- Automating the data collection form would improve efficiency and user experience

- Explicitly mention 'project communication' in the methodology (e.g. as a recurring design move or extra tab)

- Only use the most important information for the final (strategical) PowerPoint or use another document format

- Provide a methodology example that is based on the case organisation

- Add an extra tab for 'Lessons learned'