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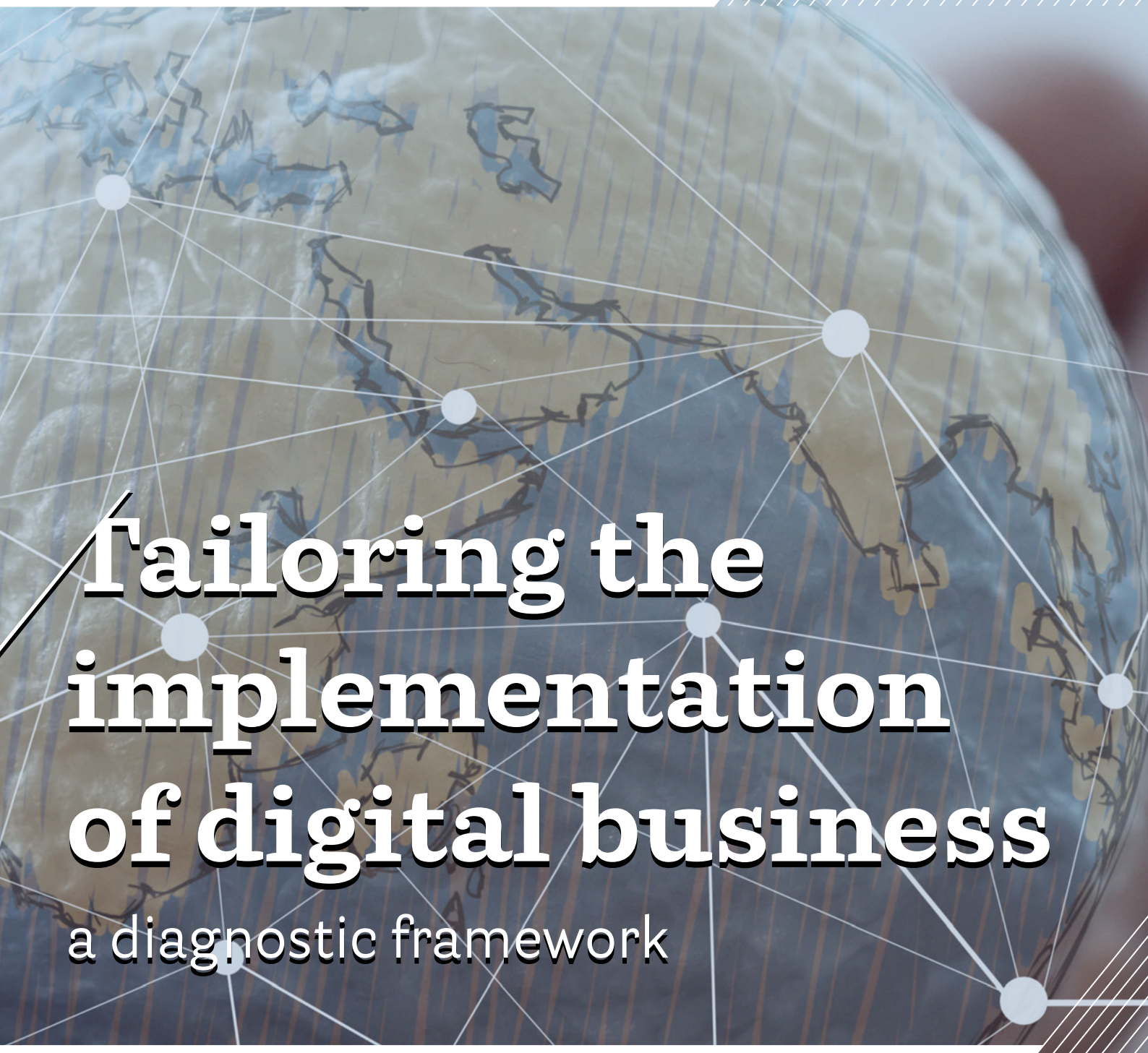

Tailoring the implementation of digital business

a diagnostic framework

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This chapter proposes a diagnostic framework that guides managers to develop a situationally appropriate and tailored implementation strategy for digital business. We distance ourselves from the view that there is one way of implementing digital business that will be effective in all circumstances. Rather, we clarify how an implementation strategy for digital business depends on the characteristics of the digital technology, the stakeholders involved, and the organizational context in which the digital business system is implemented.

Based on this insight, we propose a diagnostic framework for the implementation of digital business. The framework helps managers reflect on the complexity and risks involved from four domains of the digital business project and guides them in consciously developing a suitable implementation strategy. The framework suggests four generic types of digital business projects (uniform, pluriform, unfolding, and ambiguous) and proposes implementation strategies that match these types.

The framework supports an open dialogue with primary stakeholders to develop a shared understanding of project characteristics and align them with an appropriate strategy. It will help managers develop a deeper understanding of their project early on and during the project, resulting in more tailored and flexible implementation trajectories.

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Tailoring the implementation of digital business: a diagnostic framework

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TABLE 0
The idea in brief

The issue	The response	The bottom line
To manage digital business projects successfully, it is essential that managers adopt a tailored implementation strategy, which is based on a thorough understanding of digital technology in its context.	We propose a coherent, theory and practice-based framework that facilitates the diagnosis, implementation, and evaluation of digital business projects.	The framework supports an open dialogue with primary stakeholders to develop a shared understanding of the project characteristics and match them with an appropriate strategy.

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1. Introduction

Digitalization in business may entail major organizational change. The changes can relate to a different way of communicating with customers and suppliers, redesigning business processes, introducing a new business model, implementing structural changes, acquiring new knowledge and skills, appointing digital experts, and intensifying the use of data. Digital transformation is a strategic reorientation, in which the business model, as well as the organizational culture will change fundamentally. The following case of the Judiciary system in The Netherlands illustrates how digitalization can involve a challenging change process (Greenhalgh et al., 2017).

> *".. The digitization of the judiciary system in The Netherlands must be redone, but less ambitiously. There will be no digital litigation for the time being. The current digitization project Quality and Innovation (QaI) will be discontinued. The project has cost around EUR 220 million so far, an exceedance of more than EUR 200 million from the original budget of EUR 7 million. The decision coincides with the publication of a critical report by an external ICT consultant. He has examined the progress of the project in recent weeks and concludes that it has largely failed. The council writes that the goals of QaI were too ambitious and the implementation too complicated for the project to be successful. It has been*

underestimated how complicated the digitization of the Judiciary system turned out to be because the work within the judiciary system is too complex. In addition, there was insufficient support within the judicial system for the project.." (NRC, April 20, 2018).

Digitizing a Judiciary system is a technically complex endeavor. Moreover, here, the proposed modifications did not gain sufficient support from the work floor either. Indeed, digitalization often evokes competing interests and may create insecurity among employees. Due to such factors, digital business projects often turn out to be more complex than expected and regularly lead to unintended effects (Valuer, 2021).

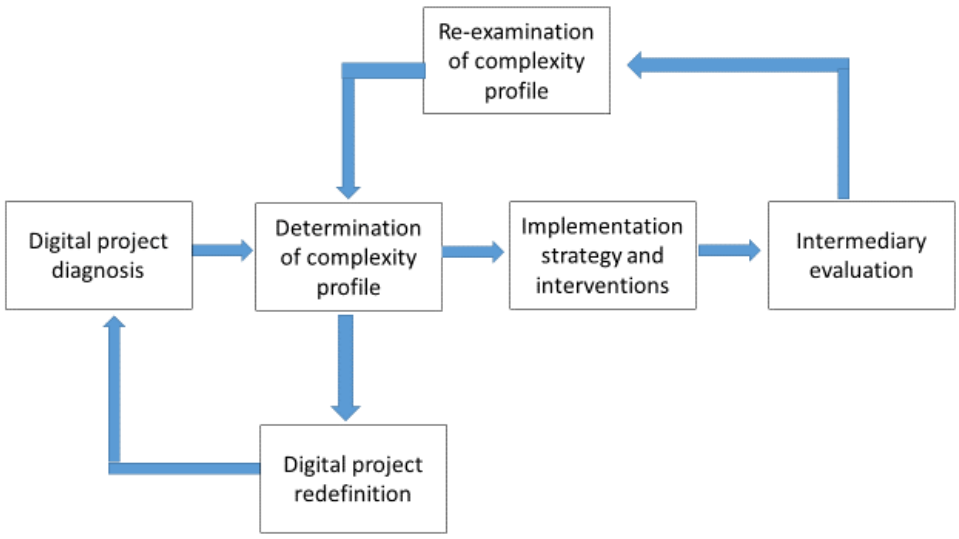
In implementing digital systems, it may seem attractive to focus on the technology, which is tangible, and to get that operative as quickly as possible. Isn't technology the driver and enabler of change? These are false hopes as implementation of the technology accompanied with some end-user training will not automatically bring the intended change. Apparently, simple proven technology can be implemented quickly, yet the interconnectedness with the other elements of the work organization cannot be underestimated. Realizing the accompanying organizational change should receive explicit guidance from managers, also after the implementation. Organizational change resulting from digitalization requires a clear vision and a matching, proactive approach that starts at the concept phase and continues until digitization is fully integrated in the normal course of business. Responsible managers often wonder how they can organize and lead the implementation of a digital business project.

The academic implementation literature originates from different fields such as information systems, psychology, sociology, innovation management, and technical sciences. This knowledge is complementary but also fragmented. Consequently, it may offer little guidance in developing an appropriate implementation strategy. How to develop a strategy that addresses the tensions between incremental versus radical, partial versus integral, top-down versus bottom-up, dictatorial versus participative, linear versus iterative, techno-structural versus social-organizational, and blueprint versus emergent change (Boonstra et al., 2017; Deszca et al., 2019). The balancing of these tensions can be confusing for managers of digital business projects, especially when the trade-offs seem not that straightforward. Which choices form a coherent and suitable implementation strategy for their digital business project? Many gurus, consultants, and suppliers simplify the question by promoting one particular strategy, for example, an agile approach (Fernandez and Fernandez, 2016); the "silver bullet" for all one's digital business projects.

In contrast, in this chapter, we draw on patterned contingency thinking (Hanisch and Wald, 2012; Howell et al., 2020; Sauser et al, 2009; Shenhar, 2001) to propose a diagnostic framework that guides the choice for a situationally appropriate implementation approach. We distance ourselves from the view that there would be one way that will be effective in all circumstances (Kwok et al., 2020). Rather, we aim to clarify how an implementation strategy depends on characteristics of the digital technology, of the interest groups or stakeholders involved, and on the organizational context in which the digital business system is implemented. This diagnostic framework can help managers not only to reflect on the complexity and risks involved in the digital business project but also guides them in consciously developing a suitable implementation strategy and monitoring it over time.

This framework directs the steps depicted in the process model shown in Figure 1. Since its development, it has been applied a number of times by experienced project managers, which has led to adjustments. The process model shows how the framework can be used before as well as during the project and enables responsible managers to perform an integrative diagnosis of the relevant project characteristics that have been categorized into three main domains: soft technology, hard technology, and stakeholders. Based on the domains the framework offers pointers for an appropriate implementation strategy. The model is particularly useful to facilitate a dialogue between the key stakeholders about the project characteristics, stimulating a shared vision for the project and a common understanding of the complexities and risks involved. Accordingly, risk managers can use the framework to identify and mitigate the socio-organizational and behavioral risks in the project. The framework can also be used to evaluate the progress of a project.

FIGURE 1
Process model for diagnosing the implementation of digital business projects



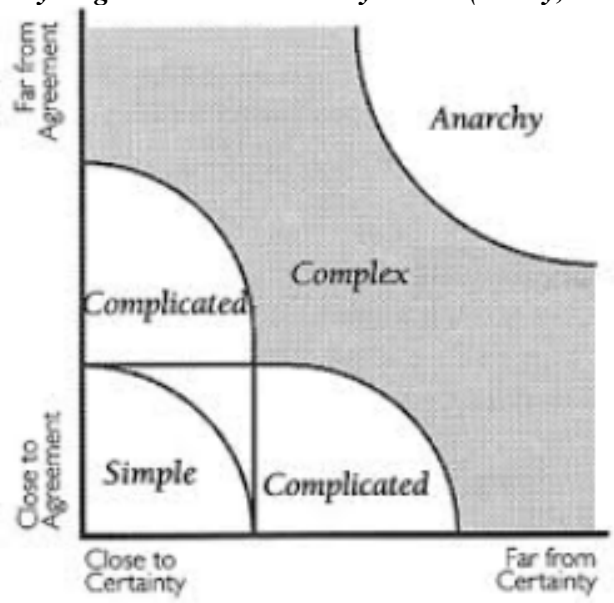
This diagnosis leads to an assessment of the complexities and accompanying risks of a digital business project (Bosch-Rekveld et al., 2011; Geraldi et al., 2011; Floricel et al., 2016). This assessment may inform the development of an implementation strategies based on the main types that we outline in section 4, or to a redefinition of the digital business project if the complexity and the accompanying risks are considered too high (Figure 1). In the next section we explain the framework's background, after which we set out the implementation diagnosis in section 3.

2. The framework's background

The framework that we explain in this chapter is based on underlying models and theories that we will review below. Since the mid-1990s, scholars have proposed project management typologies based on contingency factors (Hanisch and Wald, 2012; Howell et al., 2010).

Stacey (1996) argued in his study "*Complexity and Creativity in Organizations*" that organizational processes and, therefore also digital business projects, are often complex and require creativity, making linear, top-down approaches less suitable. He argued that two main contingencies, the degree of certainty and the degree of agreement between interest groups, should determine the strategy. Based on these assumptions, Stacey distinguishes between simple, complicated, and complex projects (Greenhalgh et al., 2017; Daniel and Daniel, 2018). When the uncertainty is high and the degree of coordination and agreement is low, Stacey frames the situation as anarchistic, see figure 2. Many digital startups' structures and cultures are characterized by a high degree of self-organization. In a seemingly uncoordinated fashion, teams work in an experimental and agile way on digitalization within an uncertain environment.

FIGURE 2
Stacey's agreement and certainty matrix (Stacey, 1996)



The digitization of the judiciary system, the example described at the beginning of this chapter, can be characterized by a high degree of uncertainty combined with limited support from the workplace. However, the project was managed in a traditional linear and top-down fashion, creating a misfit between the organizational context and the implementation strategy. This tension ultimately led to failure. In the following example, we outline a digital business project with a clear goal is outlined, but with probably a low agreement among key players, including importers and dealer networks; in terms of Stacey, this project can thus be characterized as complicated.

> *".. During the upcoming years, Volvo Cars aims to offer its electric cars only online. It wants to offer largely pre-configured electric models that can be ordered and delivered quickly and easily. Purchasing through the website should also include fewer steps. With this process re-design, the Swedish manufacturer seems to imitate the Tesla sales model, which is also characterized by relatively few options. The work of the Volvo dealers will focus on the delivery and maintenance of the vehicles." NU.nl, March 2, 2021.*

Relatedly, but in the context of policy implementation, Matland (1996) proposed four comparable implementation strategies derived from two similar contingencies: the degree of conflict and the degree of ambiguity. Matland's four strategies are: 1) administrative implementation with low conflict and low ambiguity. During administrative implementation, the goals are fixed, and the digital technology is known, the resources determine the results, and the management style is top-down. An example of a digital business project is a fishery products shop that establishes a webshop. 2) Political implementation with a high conflict potential yet little ambiguity. Stakeholders have diverging goals that may be incompatible. There is also disagreement about the resources that should be allocated to the digital business project. Negotiations and power relations determine the outcome. An example is the online sale of new cars by Volvo, as illustrated at the beginning of this section, where dealers are bypassed, and channel conflicts can emerge. 3) In experimental implementation, a low conflict potential is combined with high ambiguity. Implementers face a high degree of uncertainty that will require learning and experimenting. Step-by-step, project participants have to find their way through the fog by well-designed and monitored experiments, generating feedback on the way. An example is the development and deployment of nudging software to entice consumers to purchase digitally. 4) With symbolic implementation, there is both a high conflict potential and a high ambiguity, making the project extremely risky. This appears to be the case with the digitization of the judiciary system outlined earlier.

FIGURE 3
Cynefin framework (Snowden and Boone, 2007)

In the field of organizational decision-making, Snowden and Boone (2007) developed a similar model. Their well-known Cynefin framework demonstrates how managers should adapt their decision-making style to the nature of the decision and the context in which decisions are being made. They distinguish the following four contexts: simple, complicated, complex and chaotic for which they proposed four matching styles: best practice, good practice, emergent practice, and novel practice respectively (Figure 3).

Starting from these earlier models, we divide digital business projects into four generic types from the dimensions of agreement and certainty, see figure 4. Within this framework, we will distinguish among uniform, multiform, unfolding, and ambiguous digital business projects. In part 4 of this chapter, we indicate which implementation strategies are appropriate for each of these projects types and which interventions may be most effective. In the next section, we will explain how you can diagnose a digital business project following the process model of figure 1.

FIGURE 4
Diagnostic framework of four generic digital business projects

		Agreement among stakeholders regarding goals and means of a digital business project	
		High agreement	*Low agreement*
Certainty on the technology, the goals and means	*Close to certainty*	***A] Uniform digital business project***	***B] Pluriform digital business project***
	Far from certainty	***C] Unfolding digital business project***	***D] Ambiguous digital business project***

3. Four domains of digital business projects

Implementation issues can emerge within and between domains and phases of the project. In order to examine the possible issues systematically, a range of implementation domain models have been developed (e.g. Pettigrew and Whipp, 1991; Damschroder et al., 2015). Particularly within healthcare, extensive systematic reviews of empirical research have led to the elaboration of well-defined domain models complemented with practice-oriented checklists with success and fail factors per implementation domain (Fleuren et al., 2004; Rycroft-Malone, J., 2004; Damschroder et al., 2015). Most of these models are not explicitly aimed at digitalization, but rather at innovation and organizational change in general. Interestingly, Greenhalgh et al (2017) developed the NASS framework for digitalization projects in healthcare.

While the models are research-based, a limitation of these models is that they are merely descriptive. They help gain insights into the digital business project and raise awareness of the possible success factors and pitfalls. However, they often lack assessment criteria and guidelines or tools for developing an appropriate implementation strategy based on this assessment.

This section, draws on a simplified combination of existing domain models (Pettigrew and Whipp, 1991; Damschroder et al., 2015) that we have translated to an assessment framework for digital business projects. We selected these models because they are common, well-researched, generically applicable, and sufficiently robust. The framework suggests per domain what the most relevant factors are that need to be evaluated. For each factor in a domain, we propose several anchors to help assess the extent to which the digital business project is relatively simple or complex in terms of both (un-)certainty and (dis-)agreement (Greenhalgh et al. 2017; Stacey, 1996;

Waltz et al., 2015). The domains we distinguish are 1) digital soft technology, 2) digital hard technology, 3) the stakeholders within the internal context and 4) the external context. This last domain encompasses the external stakeholders with power or a legitimate interest and the relevant developments digitalization in the external environment that may impact the project's process or outcomes. The assessment of these domains results in a risk profile of the digital business project. Next, in Section 4, we propose guidelines for arriving at an appropriate implementation strategy based on this risk profile.

Digital business domains

The central question is whether there is certainty and agreement about the digitalization that a business wants to achieve. This concerns the required digital technology or a mix of technologies and the envisioned change of the business model and the accompanying organizational change needed to accomplish the project's goals. To consider both domains in the model, we distinguish between what has been called the hard technology and the soft technology involved (Floricel et al., 2016), as we explain below.

Clarity and certainty about the required digital technology will be higher when digitizing a local art museum archive and lower when implementing innovative blockchain technology in processing containers in the Port of Rotterdam. The degree of agreement and commitment will be higher within a rental platform of campers (e.g., www.paulcamper.nl) than when an artificial intelligence-based healthcare decision-making system aims to replace the work of healthcare professionals (Moeini and Rivard, 2019). There can be large differences in the scope of a change in a digital business model. Developing a network of swap bicycles involves a limited organizational change compared to the transition from a chain of physical department stores, for example, Blokker, to a multichannel model. The latter transition concerns a radical socio-technological change with far-reaching consequences for the organizational structure and culture and potential challenges regarding legacy systems. These examples demonstrate that it is relevant to distinguish between hard and soft technology. Hard technology concerns the existing and the required software and hardware, such as apps, operating systems, network infrastructure, and servers. Soft technology concerns the business knowledge and models, organizational practices, and activity systems through which business objectives are achieved as well as the hard technology within them (Bessant and Francis, 2005).

In diagnosing the success and failures of digital transformation projects, several factors have proved relevant, such as the scope, the role of legacy systems, the weighting of critical performance requirements (privacy, reliability), but also the expected dynamics of technological developments (Bakhsi et al., 2016, Bosch Rekveldt et al., 2011; Morcov et al., 2020). Actor-based factors also play a role, such as the innovativeness of the organization (s) involved and the project managers' familiarity with digital technology (Van Offenbeek, 1993). In Table 1 (Soft Technology) and Table 2 (Hard Technology) these factors are elaborated based on the literature and the practical experiences of managers.

TABLE 1
Assessment of the project's soft technology (domain 1)

Factor	**A** **Uniform digital business project** *Simple, few socio-political and techno-logical complexities*	**B** **Pluriform digital business project** *Low uncertainty, high socio-political complexities*	**C** **Unfolding digital business project** *High technological complexities; low sociopolitical complexities*	**D** **Ambiguous digital business project** *Multiple socio-political and technological complexities*
Existing soft technology*: complexity and familiarity*	The tasks that the digital technology will support are relatively easy.	The tasks that the digital technology will support are relatively easy but still conflict-prone.	Many and complex task interdependencies need to be digitalized, not conflict prone.	Many and complex task interdependencies that need to be digitalized, conflict-prone.
Existing soft technology: *stability and predictability*	The tasks that the digital technology will support are stable with predictable variations.	The tasks are stable but powerful stakeholders may resist changes in soft technology.	The tasks that the digital technology will support or replace require significant organizational reconfiguration.	Digital technology requires significant organizational reconfiguration. Powerful stakeholders may resist.
Change in soft technology: *digitalization history and maturity*	The project builds on earlier, successful digitalization experiences or best practices.	The project builds on earlier, successful experiences, but there are bound to be winners and losers.	The project departs from earlier, successful digitalization experiences and developed best practices.	Earlier projects failed or the project logic departs from earlier, successful digitalization experiences, and there are bound to be winners and losers.
Change in soft technology: *cultural risk in terms of strength and alignment*	Strong culture with which the digitalization effort is well aligned.	The digitalization effort is aligned with the culture that is homogeneous, but the culture is weak and is not a driving or integrating force.	Heterogeneous (sub)cultures involved that seem to be aligned with the digitalization and driven by a shared goal for the digitalization effort.	Diverse strong (sub)cultures with competing logics and values that do not align with the digitalization effort
Change in soft technology: *Disruption of users' work organization*	There is only a small gap between the existing process and the new digital technology, problems with affected users are unlikely.	There is a small gap between existing processes and the new digital technology, but conflicts with affected users are likely. Users are not ready to change and to adapt.	There is a large and unknown gap between the existing and the new digital technology, but conflicts are unlikely. Users agree, are supportive, and keen to learn and to adapt.	There is a large and partially unknown gap between the existing and the new digital technology, problems with affected users are likely.
Change in soft technology: *internal process dependencies*	There is an established number of process interdependencies between existing processes and the new digital technology and conflicts with process owners are unlikely.	Disagreement with established internal process owners regarding the impact of the digital technology on the existing processes is likely.	There are many yet unknown internal process interdependencies but disagreement among process owners is unlikely.	There are many yet unknown internal process dependencies, diverging views with process owners are likely.

TABLE 2
Assessment of the hard technology of a digital business project: domain 2

Factor	**A** **Uniform digital business project** *Simple, few socio-political and techno-logical complexities*	**B** **Pluriform digital business project** *Low uncertainty, high socio-political complexities*	**C** **Unfolding digital business project** *High technological complexities; low socio-political complexities*	**D** **Ambiguous digital business project** *Multiple socio-political and technological complexities*
Existing digitalization: *legacy systems*	The digital technology will replace legacy systems without major disruptions.	Legacy systems will not be easily replaced, this will cause conflicts with those who cherish these systems.	The new digital business technologies have many interfaces with other systems, it is likely that experts cooperate effectively to achieve compatibility.	Many dependencies with other technologies/ systems, disagreement among technical experts regarding the realization of connectivity is likely.
Existing digitalization: *scope, size, and criticality*	The affected digital systems have limited scope and size or support a peripheral business function.	The digitalization effort is huge, will affect more, interrelated, and core or critical digital systems with different owners, which increases conflict potential.	The scope and size of the affected digital systems are potentially large and yet undetermined. However, internal stakeholders are cooperative and comfortable with this change under uncertainty.	The scope and size of the affected digital systems are uncertain and may affect many core processes, affected system owners may disagree with the direction, scale and scope.
Digital solution's innovativeness and substitutability	Generic plug and play, requiring minimal customization, easily substitutable when the supplier withdraws. Proven technology.	Proven technology, yet influential user groups favor different suppliers and may face substantial switching costs dependent on the technical solution.	Innovative technologies for which little expertise is available. Given the unfamiliarity, no strong preferences have been developed yet. Technical experts and supplier(s) are trusted not to withdraw.	Large scale bespoke solutions, vulnerable to supplier withdrawal.
Digital solution's dependency on external processes	The digital business system has few external process inter-dependencies and will not be affected by rapid technological developments.	There are only a few external process interdependencies, but the dependence on these external developments is high and the owners of these developments may have mixed or conflicting interests.	There are many, dynamically emerging external process interdependencies, but conflicts with external process owners seem unlikely, relevant process owners interests are compatible with the project's logic.	There are many emerging external process interdependencies, conflicts with external powerful process owners are likely due to diverging views and conflicting interests.

Stakeholder analysis

In addition to the analysis and assessment of the implementation factors per domain on the digital business project, the stakeholders need to be identified and their characteristics analyzed (e.g., Aaltonen and Kujala, 2016). The particular analysis proposed here focuses on stakeholders' influence, willingness to change, and change capacity. We separately group them into internal (table 3) and external (table 4) stakeholders.

The internal stakeholders are the actors in the focal organization or in an organizational network set up specifically for the project.

TABLE 3
Analysis of the salient internal stakeholders: domain 3

	A **Uniform digital business project** *High capability and readiness of stakeholders*	**B** **Pluriform digital business project** *Socio-political complexity, high capability, and low readiness of stakeholders*	**C** **Unfolding digital business project** *Technical/functional complexity, low capability, and high readiness of stakeholders*	**D** **Ambiguous digital business project** *Multiple complexities, low capability, and low readiness of stakeholders*
Top management capability	The digital business project benefits from a consistent, sustainable and pro-active, visible top management support and project ownership.	Conflicts about the digital transformation between the project team and top management or within the top management are likely. Top management is ambivalent or internally divided.	Top management consistently supports and owns the digital business project but may want to adapt the goals due to environmental turbulence.	Support from top management regarding the digital business project is inconsistent and ambiguous. Conflicts are likely. Project ownership and sponsorship is not stable.
Top management commitment Resources	Clarity about the necessary resources, and these are available for the digital business project, in terms of finances, staff and expertise.	Disagreement about the necessary resources, negotiations to make the resources available are ongoing.	Uncertainty about the necessary resources, given the novelty of the project, but there is a confidence that resources will be made available when needed.	Uncertainty about the necessary resources, given the novelty of the projects. Discussions and conflicts about the availability of resources are likely.
Project team	The digital business project team is stable and experienced. The members are available and committed to the project. They are perceived as credible by the adopting organization.	The digital business project team members do not fully agree about the operational project goals, means, and tactics. Conflicts within the project team are likely.	The harmonious project team is uncertain about the feasibility of the project. They cannot boast of extensive experience with this type of projects.	Within the project team members disagree about the project goals and the overall direction of the project, and the implementation strategy.
Other internal stakeholders with a legitimate interest	Powerful internal stakeholders generally agree regarding the digital business project goals and required resources	The project causes disagreement about project goals, means, and implementation approach among powerful internal stakeholders.	Project goals are fluid, but disagreement among powerful internal established and emerging internal stakeholders is not likely.	Project goals are fluid and diverging views about these changing high-level project goals among established and emerging internal stakeholders are likely.

TABLE 4
Analysis of the salient external stakeholders: domain 4

	A **Uniform digital business project** *High capability and readiness of salient*	**B** **Pluriform digital business project** *Socio-political complexity, high capability, and low readiness of stakeholders*	**C** **Unfolding digital business project** *Technical/functional complexity, low capability, and high readiness of stakeholders*	**D** **Ambiguous digital business project** *Multiple complexities, low capability, and low readiness of stakeholders*
Digital technology partner	The digital technology partner is experienced, the technology is straightforward, and we seek to develop a long-term relationship with this partner. Conflicts are unlikely.	Conflicts with the digital technology partner are likely due to the short-term relationship and diverging interests between the adoption and technology partners.	The digital technology is new and complex. The technology partner is strong (in terms of size, age, and experience), we wish to develop a long-term relationship with this partner. Conflicts are unlikely.	The digital technology is new and complex. Our technology partner is not experienced in dealing with these new technologies. Conflicts are likely due to diverging viewpoints and interests.
External stakeholders such as suppliers and customers	The digital business project has a stable and harmonious external environment. External stakeholders are supportive, conflicts are unlikely.	The digital business project has a stable but controversial environment. Conflicts with external stakeholders are likely.	The digital business project has a turbulent but harmonious and supportive external environment. Conflicts with established or emerging external stakeholders are unlikely.	The digital business project has a turbulent and controversial environment. Conflicts with existing and emerging external salient stakeholders are likely.

4. Tailoring implementation strategies of digital business

Informed by the risk profile that results from the digital business project diagnosis, implementers can develop an appropriate overall implementation strategy. The guidelines presented in this section are derived from a range of situational change and project management theories (Cameron and Green, 2019; De Caluwe and Vermaak, 2003; Van Offenbeek and Koopman, 1996; Maylor et al., 2013; Maylor and Turner, 2017; Moeini and Rivard, 2019; Snowden and Boone, 2007; Waltz et al., 2015). To the extent needed, they have been translated to the context of the implementation of digital business projects. We outline four generic implementation strategies that match the main risk profiles that may result from the assessment. We will discuss these strategies in the following order, and we conclude with a reflection on hybrid risk profiles:

1. Planned strategies match with uniform digital business projects;
2. Stakeholder management strategies match pluriform digital business projects;
3. Learning and experimenting strategies match unfolding projects;
4. Dialogues and future scenarios suit ambiguous projects.

1. Planned strategies match uniform digital business projects

Uniform digital business projects are characterized by a high degree of certainty, which implies a relatively stable environment and a high degree of agreement among stakeholders. A deterministic way of thinking characterizes planned implementation strategies. Sufficient resources are released, and project activities are identified and allocated to project participants. This means that clear project goals and a blueprint of technical and functional requirements can be formulated. Such a plan usually has predefined phases and activities with milestones at which decisions are based on predefined go-no go criteria. Advanced project planning techniques and tools are often applied, including activity network techniques to identify critical paths (e.g. dynamic programming, decision trees) and project risk analysis techniques (e.g. scenario planning) (Pich, Loch and De Meyer, 2002).

A technically competent project team knows what is expected and carries it out. Communication about the project is mainly unequivocal and takes place through known channels in a direct way. Intensive, interactive communication directed at sense-making and negotiation is less invested in. The implementation of a timely training plan direct at the integration of the system in the work routines, the availability of user support and the installation of an end-user platform of some sort for feedback ensure that employees can effectively use the digital technology to their and the organization's benefit, see table 5.

TABLE 5
Planned strategies

	Close to agreement	*Far from agreement*
Close to certainty	**A) Planned strategies** **Role of top management:** Take the initiative, be committed and provide sufficient resources. **Approach**: Develop a blueprint of the desired end situation. If necessary, use external experts. Apply advanced planning techniques. Define formal stages with milestones. Make decisions to make progress irreversible. Formulate go-no-go criteria. Learn from best practices from other organizations. **Team** Appoint a technically competent project manager and project team. Protect the project team from external interruptions. **Internal context** Communicate unambiguously with relevant stakeholders about project progress. Extensive interactive communication is not necessary. Train and educate, provide interactive help. **External environment** Apply an action-oriented approach with technology partners and other stakeholders. Inform external stakeholders proactively throughout the project.	***B] Stakeholder management strategies***
Far from certainty	***C] Learning and experimenting strategies***	***D] Dialogues and future scenarios***

2. Stakeholder management strategies match pluriform digital business projects

Pluriform digital business projects are characterized by a stable environment and a high degree of certainty combined with little agreement among influential stakeholders: powerful interest groups think differently about the objectives of the digital business project and about the resources required to achieve these goals. Project leaders are recommended to assess the power and interests of stakeholders and to consider how to approach the different points of view. This requires, among other things, a politically experienced project leader, as well as a timely and comprehensive involvement of influential stakeholders. Negotiations, adjustments (Waltz et al., 2015), strategic use of time, pilots and use of incentives are typical strategies that suit multiform digital business projects. Sometimes it can be wise to limit the scope and size of a project so that the steps and thus the concessions become smaller. It can also be effective to coordinate negotiation processes formally and transparently and to create breaks for breathing time during a project (Doloi, 2013), see table 6.

TABLE 6
Stakeholder management strategies

	Close to agreement	*Far from agreement*
Close to certainty	***a) Planned strategies***	***B] Stakeholder management strategies*** **Role of top management:** Support the project manager and the team. Provide sufficient resources or don't get started. **Approach**: Reduce the size and scope of the project. Assess power relations and interests. Find an overarching, common goal and translate this into separate ways of thinking and interests. Make adjustments to accommodate losers. Use time strategically. Use pilots to show the project outcome. Compensate losers. Be flexible in the project approach and planning, create freedom of choice and customization. **Team** Appoint a politically experienced project leader with legitimacy who knows the organization or network well. **Internal context** Involve and activate influential internal stakeholders in a timely manner. Coordinate negotiation processes. Build-in breaks for breathing with attention to what has already been achieved. **External environment** Negotiate contracts and exit strategies with external partners, such as technology suppliers. Involve external stakeholders early on, assess their interests and power, and negotiate conflicts of interest. Try to reach an agreement on critical topics in good time.
Far from certainty	***C] Learning and experimenting strategies***	***D] Dialogues and future scenarios***

3. Learning and experimenting strategies match unfolding projects

Unfolding projects are characterized by uncertainty combined with agreement among stakeholders. When digital technology is new or changing rapidly, or when the internal requirements or the requirements of the external environment (e.g. customers) are subject to change but are not necessarily contradictory (Eisenhardt and Tabrizi, 1995), learning and experimenting are effective implementation strategies (Highsmith, 2009). A learning and experimenting strategy is based on a global and flexible vision instead of a specified end state. The project's business case is global, and the resources required are not entirely clear. In terms of the internal context, top management supports the project and is also part of the learning process. Those involved in learning and

experimenting support the flexible project goals and contribute fully to the team effort (Fernandez and Fernandez, 2016).

Learning and experimenting strategies often relate to relatively small and incrementally developing digital business projects. In terms of content, the problem is generally understood, and project teams often use agile and scrum-like methods (Fernandez and Fernandez, 2016). In terms of the internal context, the vision must be supported by top management (Boonstra, 2013) and by other influential internal stakeholders. The same applies to external parties with an interest in the project.

Typical implementation approaches include continuous consultation between team members and dialogues with internal stakeholders and technology companies and customers, in agile and scrum-like sessions (Fernandez and Fernandez, 2016), leading to interim results. Incrementalism, short-term sprints, and flexible longer-term planning are part of this. Functional and technical requirements change gradually and solutions evolve. The leadership style stimulates self-organization instead of top-down management. Continuous interactions between different actors, including experts and business partners, are necessary, see table 7.

TABLE 7
Learning and experimenting strategies

	Close to agreement	*Far from agreement*
Close to certainty	*A) Planned strategies*	*B] Stakeholder management strategies*
Far from certainty	***C] Learning and experimenting strategies*** **Role of top management** Create an environment for experimentation, learning, and failure. Provide continuous interactions between different actors, including experts and business partners. Encourage self-organization. Provide adequate resources. **Approach** Use agile and scrum methods. Implement step by step. Short term sprints and flexible longer term planning. Let requirements and solutions evolve. **Team** Appoint a project leader and team members who have experience with agile methods. Communicate regularly with the project environment to adapt. Internal environment Regular collaboration and communication with internal stakeholders. Promote continuous interactive communication. **External environment** Develop a partnership with technology partners based on solidarity. Keep external stakeholders well informed, involve them in crucial choices that affect their interests.	*D] Dialogues and future scenarios*

4. Dialogues and future scenarios match ambiguous projects

Ambiguous projects are characterized by a high degree of uncertainty and little agreement. In such situations, different internal and external interest groups dominate the course of events during the project. The outcome cannot be predicted as it depends on the changing views of powerful actors and environmental developments (Snowden and Boone, 2007). The garbage-can decision-making model (Cohen et al., 1972) is an appropriate metaphor for such ambiguous situations. Streams of stakeholders, problems, options, and solutions emerge. Choices are difficult to make and execute as the project is dominated by ambiguous goals, uncertain technologies, and fluid participation (Pich et al., 2002). Multiple solutions are pursued in parallel, with the best chosen when it emerges by chance (Sobek et al., 1999).

The latter projects require investments in defining and initially limiting their boundaries, developing future scenarios, and debating the project recurrently among those involved. External and internal stakeholders, including the top management, need to participate in these debates. Due to the potential conflicts present in these

projects, the suggestions made for multiform digital business projects also apply. Stakeholders with power and interests are intensively involved, and different views should be explicitly addressed and resolved through negotiations and coalition building. Neglecting them will most probably backfire. Patience and time for reflection are also recommended (Snowden and Boone, 2007). See Table 8.

TABLE 8
Dialogues and future scenarios

	Close to agreement	*Far from agreement*
Close to certainty	*A) Planned strategies*	*B] Stakeholder management strategies*
Far from certainty	*C] Learning and experimenting strategies*	***D] Dialogues and future scenarios*** **Role of top management** Participate actively in strategic dialogues. Encourage dissent and promote diversity consciously. Provide adequate resources. **Approach** Develop future scenarios. Make use of experiments and pilots. Use methods that can help generate ideas, encourage creative and innovative approaches. **Team** Appoint a project leader who is experienced in complex and unpredictable contexts. Team members should feel comfortable with a high degree of uncertainty. **Internal environment** Debate the project with knowledgeable internal stakeholders. Invite internal experts to stimulate discussion. **External environment** Involve outside experts and opinion leaders to stimulate discussion. Develop an appealing vision of the future and include external partners. Organize dialogues with potential future partners to assess possible collaboration

5. Hybrid risk profiles

Digital business projects have many relevant features and characteristics on which they may vary from one another. This means that managers will come across projects that cannot be straightforwardly classified in one of the proposed categories. The soft and hard technology, the project content, the internal context, and the external environment may point towards different configurations. Certain factors can yield uncertainty and disagreement, while other factors of the same project may be clear and unequivocal. Take the example of a standard enterprise software system. Here, the technology may be straightforward. Powerful and unwilling stakeholders can characterize the internal context. The external environment may be highly unpredictable by a high dependence on the technology partner and lacking insights on future customer reactions. This implies that a project diagnosis must take a differentiated look at the technology, the internal context, and the external environment. Furthermore, sensitivity to interactions between these domains needs to be fostered. Different types of strategies and associated interventions may be appropriate for different domains of the same project in practice. Projects can also change during their lifetime. For example, functional and technical requirements can be diffuse at the outset and become clearer after probing during later phases of the project. This means that projects may require a combination of implementation strategies that need adaptation over time as the digital business project evolves.

5. Conclusion

The purpose of this chapter was to present a coherent and theoretically grounded framework and process model that can help managers diagnose digital business projects to develop an appropriate implementation strategy. We used patterned contingency theory as a theoretical lens. Guided by this lens, we based the framework on a synthesis of knowledge about digital business, project complexity, project typologies, change management, and project management strategies. The resulting framework assesses four primary domains - soft and hard technology and internal and external project stakeholders – that are assessed on two contingencies: agreement and certainty. This assessment results in four generic digital business project types and four corresponding project management strategies. We recognize that a hybrid strategy may be called for, e.g., when simple digital technology is combined with a complex internal context and turbulent external environment. The model proposed in this chapter also creates awareness of hybrid implementation strategies. Our model promotes awareness among managers to develop tailored strategies to balance tensions and combine contrasting strategies and interventions over time (Boonstra, 2013; Smith and Graetz, 2011).

A second caveat is that the use of this diagnostic framework provides a subjective, or ideally intersubjective, assessment of the domains of a digital business project and the resulting consequences for an implementation strategy. The application is subjective because, ultimately, managers and other key actors involved in the

diagnosis have to assess and weigh each domain based on the characteristics discussed. To prevent the 'blind' application of the framework, we explained the assumptions behind the various complexities and risks. Also, the framework indicates general measures to control the risks or reduce complexities, but these are guidelines rather than operational prescriptions.

Various applications are conceivable for the described framework, depending on the phase, the client (s), and the digital business project context. The framework outlined in this chapter can for example, be used:
- as a risk analysis of an ongoing project on behalf of the project owners,
- as a resource for project managers to support or evaluate their implementation strategy,
- a checklist at the start of a digital business project to jointly define the focus areas of the project and arrive at an estimate of the feasibility.
Let's remember that the diagnosis is a snapshot: project ambitions, context factors, and the implementation strategy can change along the way. When far-reaching changes occur during the process, re-assessment is required.

We have experienced that thinking about the nature of a digital business project and its boundaries is helpful before arriving at a final evaluation of the four main domains. In our view, the diagnostic framework is most useful as a sense-making vehicle. It may help negotiate a shared vision and ambitions between key actors (client(s), project leaders, user managers, system administrators, project consultants). One option is first to assess the domains individually and then discuss them. A clear, joint image of the digital business project is created, in which the different perspectives have been incorporated. By talking about concrete characteristics that may lead to failure or success, it becomes clear whether the expectations concerning goals, yields, and responsibilities are synchronized.

We hope the framework will help managers develop a deeper understanding of their project early on and during the project, resulting in more tailored and flexible implementation trajectories. We welcome user experiences, feedback, and recommendations to develop further and improve this framework.

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