

IT Governance and Its Agile Dimensions: Exploratory Research in the Banking Sector

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Abstract

Information technology (IT) plays an essential role in organizational innovation adoption. As such, IT governance (ITG) is paramount in accompanying IT to allow innovation. However, the traditional concept of ITG to control the formulation and implementation of IT strategy is not fully equipped to deal with the current changes occurring in the digital age. Today's ITG needs an agile approach that can respond to changing dynamics. Consequently, companies are relying heavily on agile strategies to secure better company performance. This paper aims to clarify how organizations can implement agile ITG. To do so, this study conducted 56 qualitative interviews with professionals from the banking industry to identify agile dimensions within the governance construct. The qualitative evaluation uncovered 46 agile governance dimensions. Moreover, these dimensions were rated by 29 experts to identify the most effective ones. This led to the identification of six structure elements, eight processes, and eight relational mechanisms.

1. Introduction

In the last decade, the deployment of information technology (IT) has become crucial for helping enterprises adopt digital innovations as developed by startups and big players [1]. Increasingly, organizations are deciding to move from traditional, plan-driven software development to agile approaches to stay competitive [2]. Yet it is of paramount importance that organizations undertake proper governance of the IT setting and processes to address fundamental changes [3]. Thus, IT governance (ITG) is important to the success of an organization [4], and especially the digital area calls for a specific focus on effective and ITG.

Implementing ITG effectively requires a set of instruments to encourage congruence with the company's mission, strategy, values, norms, and culture [5, 6], which in turn leads to desirable IT behaviors and governance outcomes [4]. A common

theme found in literature is that, in general, ITG consists of structures, processes, and relational mechanisms working together to ensure that IT and business objectives are aligned [4, 7, 8]. Furthermore, prior studies have recognized efficiency and stability as core concepts in ITG design [9]. However, given that the complexity of organizations is increasing due to dynamic market environments [10], prevalent digital technologies [11], and multi-level, multi-directional, non-linear, feedback-based relationships between business and IT [12, 13], the task of aligning business and IT remains a core challenge [10]. Many proposed methodologies, reference guides, best practices (e.g. COBIT), and frameworks, such as the IT Infrastructure Library (ITIL) or so-called conventional and traditional models, are considered too structured and, thus, inflexible [14, 15] to ensure a proper alignment between business and IT [16]. Therefore, the traditional concept of ITG is not fully equipped to deal with the current changes taking place in the Digital Age [17].

By contrast, agile strategies have evolved in recent years, especially in the area of software development [18, 19]. Independent of the business area, these agile strategies can "add value" to business organizations, through a process in which the principles of communication and collaboration are essential [20]. Thus, adopting agile principles, values, and best practices in the context of ITG can lead to an increase in the speed of decision making, improved business processes, organizational competitiveness, and other aspects [14]. With new digital technologies surrounded by innovative thinking driving new business models, flexible organizational structures, optimized processes, and novel communication ways that ignite a successful path to the future, it is essential for companies to adapt their ITG frameworks with agile governance strategies. Therefore, companies must rethink their ITG dimensions within dynamic and agile environments [21].

The focus of this practice-oriented research is relatively new, and research on how organizations are effectively implementing agile ITG dimensions in

day-to-day practice is rather scarce. Although several research projects have focused on implementation of single agile strategies within an ITG framework [2, 22], limited research has examined agile ITG dimension on a holistic level. To address this gap, we pose the following research question (RQ): *How are organizations implementing agile ITG?*

To answer this RQ, we analyzed several agile aspects of governance elements gleaned from qualitative interviews in the banking industry. In doing so, we were able to elicit major agile dimensions for ITG in the digital world. Strategies used to implement agile approaches can be grouped under the same general magnitudes—structures, processes, and relational mechanisms—as in the conventional ITG literature, which enables us to explore agile dimensions and derive the most effective ones for an agile ITG framework.

The paper is structured as follows: In Section 2, we discuss the theoretical background for this study. In Section 3, we describe the research method, after which, in Section 4, we provide the data analysis. Finally, we outline the discussion and conclusion in Section 5.

2. Theoretical background

2.1. ITG and its dimensions

ITG is a research topic that has been evolving rapidly in the last few years. Therefore, many researchers have investigated ITG. Implementing an effective ITG within a company can ensure alignment between IT and business goals [5]. To illustrate the importance of implementing an effective ITG in an organization, Weill and Ross [4] showed that up to 40% higher returns can be obtained from effective ITG. Therefore, ITG has become a crucial element for success in the modern business world for many organizations to support, sustain, and increase organizational growth [23]. Consequently, various definitions have been introduced in the literature. While some definitions such as those of Peterson [9] and Weill and Ross [4] focus on the decision-making process in the ITG framework, the definitions of the IT Governance Institute [8] and Van Grembergen [7] emphasize the structure of an ITG framework and highlight the importance of strategic alignment of IT with business. We argue that an ITG definition should include both, structure and process aspects. Therefore, merging the definition of the IT Governance Institute with Weill and Ross's characterization should help cover the most relevant dimensional concepts of current ITG research, leading to the following definition:

ITG is the responsibility of executives and the board of directors and consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends firm strategies and objectives. ITG represents the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT.

With this definition in mind, to implement ITG effectively, an organization needs to employ well-designed, well-understood, and transparent ITG dimensions [4, 5, 7] to reach the ultimate goal of effective alignment between business and IT [6]. However, determining the right ITG dimensions is complex, and managers must recognize that what strategically works for one company may not necessarily work for another [24]; that is, effective ITG does not happen by accident, and consequently top-performing companies should carefully design governance. Specifically, companies can assess the effectiveness of their ITG by evaluating how well it enables IT to deliver on four objectives: cost-effectiveness, asset utilization, business growth, and business flexibility [25]. Consequently, several studies have argued that an effective ITG requires a framework based on a mixture of the following three major dimensions [4, 8, 21, 24]:

Structure. The framework needs to answer the following questions: Who makes the decisions? Which organizational units will be created? Who will take part in these organizational units? What responsibilities will they assume [26]? Examples of traditional structures are IT steering committees, IT strategy committees, as well as structures that enable CIOs to report to CEOs [7].

Process. The process aspect targets the following questions: How are IT investment decisions made? What are the decision-making processes for proposing, reviewing, approving, and prioritizing investments? Conventional processes, for example, contain portfolio management, IT budget control and reporting, project governance methodologies, and/or information systems planning [7].

Relational mechanisms. The aspects dealing with communication and relational mechanisms pose the question of how the results of ITG processes and decisions will be monitored, measured, and communicated. Also required are mechanisms to communicate IT investment decisions to the board of directors, executive management, business management, IT management, employees, and shareholders [7]. Examples of traditional communication/relational mechanisms are a shared understanding of business/IT objectives, cross-functional business/IT training, and collaboration among principal stakeholders [9].

2.2. Toward an agile ITG

Agility is important to change the direction of the environment and respond efficiently and effectively to such changes [27]. Consequently, in recent years the term “agile” has gained increased attention from practitioners and academics because of its importance to the innovation and competitive performance of companies in contemporary business environments [28]. Agility refers to “*the ability to respond operationally and strategically to changes in the external environment. The response has to be quick and effective for the organization to be considered agile*” [29, p. 444]. This definition can be used as a proxy, representing the established definitions for agility in current research, which allows us to break them down to single ITG dimensions.

Nonetheless, limited research has combined agile strategies with governance frameworks. While current researches such as Luna et al. [14, 30], Cheng et al. [18], and Qumer [19] concentrate on providing the basic definition of agile governance, only few studies have investigated a holistic view of agile dimensions inside the governance framework. The study of Luna et al. [31] offers a first overview of nascent research with respect to agile strategies within governance and is grounded in a systematic literature review. Other existing analyses emphasize single elements that can help enhance agility within an organization through governance dimensions. For example, Power [22] identified the establishment of an agile office as an effective way of creating a focal point within the organization for the changes brought about by an agile transition. Through a case study, he showed that such an organizational unit governs the organization’s ongoing agile adoption and continuous improvement through agile strategies. He further indicated that an agile office should have a steering team comprising the business unit’s VPs, senior directors, and senior managers. Wiedermann’s [2] study provides a starting point for researchers and practitioners on how governance structure, processes, and relational dimensions can be developed in practice with a focus on DevOps cross-functional teams. Through six different case studies, she demonstrated four key governance mechanisms: the ability of teams to take over all tasks of the software delivery life cycle, the autonomy of teams in decision-making processes, the implementation of a product owner for business IT interaction within the team, and the use of a communication model for knowledge sharing and team learning. Furthermore, researchers have investigated lean governance. Ambler [32] proposed a governance framework built on the lean principles that enable agility at scale.

Wang et al. [33] indicated that lean governance practices such as aligning the team structure with the architecture, risk-based milestones, and staged program delivery address complexities inherent in large or distributed teams. Nevertheless, we did not find any research providing agile dimensions within the ITG construct on a complete basis. Research that comes close to an agile ITG is that of Luna et al. [14], who suggest that agile ITG dimensions should refer to the values and principles of the agile manifesto of software engineering introduced by Beck et al. [34]. The manifesto and the corresponding values and principles represent the basic foundation of agile strategies [34, 35] and should be considered in agile ITG dimensions. Madi et al. [36, p. 424] provide a list of the extracted values based on the agile manifesto: “*Collaboration, Communication, Working software, Flexibility, Customer-centric, Incremental, Iterative, Motivation, Respect, Trust, Feedback, Speed, Technical excellence, Simplicity, Self-organizing, and Learning.*” Thus, agile ITG dimensions might encompass variants of activities that determine lean team structures, short decision-making processes, fast information flows, and communication efforts related to projects. As the aim of ITG is to achieve strategic business/IT alignment [6], such agile strategies within ITG dimensions can help improve communication and collaboration and lead to both a better alignment between business and IT and enhanced responsiveness to business transformation [37].

3. Method

This study follows a qualitative approach rather than taking a hypothesis testing approach, as research in this domain is in its infancy and little research material exists. A qualitative research approach is useful for addressing the “how” question in the exploratory stage of knowledge building [38]. Therefore, according to the formulated RQ, this work can be classified as exploratory research. Exploratory research can be accessed by expert interviews, focus group discussions, and surveys [39]. Thus, a mixed approach of these in the banking sector ensures access to a range of useful data. The banking industry is appropriate for research because many banks are currently reforming their governance frameworks and business models are not fundamentally different from bank to bank. Therefore, a focus on this industry allows for an investigation of a distinct context under analogous conditions within the whole sample.

To systematically explore effective agile ITG dimensions, we defined a process in which we used a combination of steps from the scale development

approach of Rauschnabel et al. [40] and phases of a Delphi research as adopted by de Haes and van Grembergen [7]. As a result, we derived five systematic phases divided into an evaluation part and a rating part, setting the basis for this study (see Figure 1).

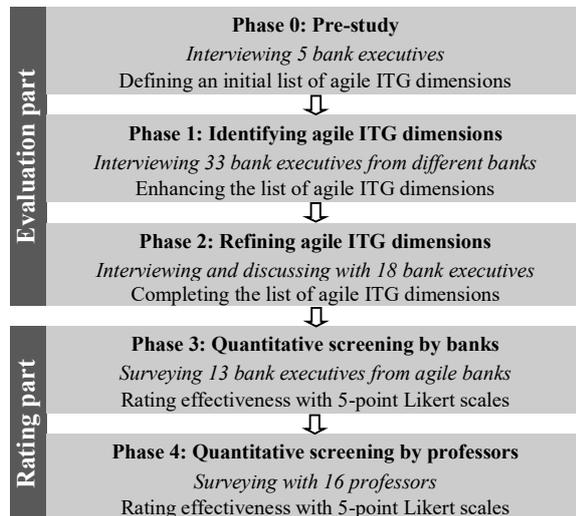


Figure 1. Research process

3.1. Evaluation part

The evaluation part contains three qualitative interview rounds conducted with bank executives. The following sub-sections present these phases.

Phase 0: Pre-study. The first step of the evaluation part entails the development of a first semi-structured questionnaire to provide a guideline. To ensure the suitability of the questions, we conducted workshops with doctoral students from Reutlingen University to formulate a first draft. The questions mainly focused on agile factors within ITG. Furthermore, the questionnaire was pre-tested with professors of the same institution. In the next step, we asked five bank executive contacts from Germany and Switzerland for an interview session. All discussions were conducted by telephone, and interviews were recorded and fully transcribed, which allowed us to analyze each text manually. This process enabled us to note relevant statements in terms of the agile strategies within the governance construct, which led to a definition of a first list of ITG dimensions [23]. Moreover, the analysis in this phase led to the core aspects of agile ITG dimensions divided into the magnitudes — structures, processes, and relational mechanisms — and set the working definition for the following phases.

Phase 1: Identifying agile ITG dimensions. This stage of the analysis contained a second round of interviews with bank executives from Germany, Switzerland, and Austria. The discussion of the transcripts during the first phase led to adjustments of the second questionnaire, which included more specific questions within the context of agile ITG. Thus, a section in the questionnaire specifically dealt with agile strategies within the ITG dimensions to identify elements in this domain. The interviews were conducted by telephone, audio-recorded, and finally fully transcribed to enable analysis of the data set. We analyzed the transcribed source texts case by case, to set the basis for the development of a system of categories for a structured evaluation of the text material. In doing so, the overall approach corresponds to the approach of a qualitative data analysis [41]. From a methodological standpoint, the qualitative data analysis is based on the formation of categories (codings) and the assignment of individual text parts to these categories. To support the encoding of the data, we used the analysis software MAX QDA. As a result, the data per category were quantitatively evaluated and qualitatively interpreted. As such, our analysis led to several new dimensions of governance, mainly in the context of agility.

Phase 2: Refining agile ITG dimensions. In the third questionnaire, we adjusted the questions with the analysis output from the previous two phases and focused on more specific themes in the context of agile ITG dimensions. Furthermore, in contrast with the previous phases, which included a random sample of agile and non-agile banks, in this stage we considered a selected sample of only agile banks. We did this using the analysis of the previous phases. Thus, executives of 18 banks from Germany, Switzerland, and Austria agreed to an interview session. All conducted interviews were recorded. To analyze the data source of this phase, we listened to the tapes and transcribed only relevant text passages that fit the context of agile governance dimensions. Such an approach represents a refining process [42]. Thus, this procedure allowed us to assign the new coding components to a group in the existing list and to further enhance the dimensions with new ITG mechanisms. Moreover, the respondents were invited to a focus group session to discuss the outcomes. Thirteen executives took part in a closed-door meeting in which the results were evaluated. This led to several modifications of the draft list of items and provided a complete cycle for understanding the respondents' points of view about agile governance dimensions. In turn, the outcome of this phase led to extensive insight into agile governance dimensions.

3.2. Rating part

As Rossiter [43] proposed, after defining a broad range of agile ITG dimensions, the next step is to reduce the number of items. Such a reduction might lead to a core collection of items that can be applied in quantitative research projects. Therefore, the rating part consisted of two rounds of quantitative surveying. Experts were asked to rate the outcomes in terms of their effectiveness.

Phases 3 and 4: Quantitative screening. Similar to the Delphi research work of De Haes and Van Grembergen [7], respondents were asked to rate the “perceived effectiveness” (0 = not effective, 5 = very effective) of each of the reviewed agile ITG dimensions. Phase 3 included 13 members of the focus group, while in phase 4 we questioned 16 professors from different universities from Germany, Switzerland, and Austria considered experts in the governance domain. Note that with such a research approach, different people often have different understandings of the same concept, also referred to as the “inadequate preoperational explication of constructs threat” [44, p. 64]. To address this, we raised the questions in the survey more in depth. Specifically, we provided short and unambiguous definitions of agility, the processes, structures, and relational mechanisms (based on literature). We also pilot-tested the questionnaire for ambiguity and vagueness with professors and doctoral students at Reutlingen University before sending it to the experts. Table 1 gives an outline of the position, function area, and gender of the respondents of each phase.

Table 1. Overview of the respondents

Interview partners		Phase 0	Phase 1	Phase 2	Phase 3	Phase 4
Sample size		5	33	18	13	16
Position	Board members and executives	1	20	6	3	
	Management level 1	4	13	12		
	Middle management				6	
	Specialists				4	
	Professors					16
Function area	CEO/board		9	2	3	
	IT (CIO / COO / head of position)	1	9	3	4	
	Digitalization Unit	2	7	8	2	
	Corporate Development	1	6		2	
	Business Department		2	3	1	
	Sales and Relationship Management	1		2	1	
	School of Economics /Social Science					7
	School of Business Informatics					3
	School of Business Management					3
	School of Computer Science					2
School of Applied Psychology					1	
Gender	Male	4	31	16	10	10
	Female	1	2	2	3	6
Firm size	Small (<500 employees)	1	18	6		
	Medium-sized (500–2000 employees)	1	8	3		
	Large (>2000 employees)	3	7	9		

4. Data analysis

Data analysis identified several agile ITG dimensions. Thus, during the evaluation part, the respondents uncovered 46 dimensions overall. In Table 3, each dimension contains its selected resulting from the coding process as well as the respective percentage per phase for each dimension. Furthermore, the total is listed, summarizing the three steps. In the rating part, all dimensions were rated according to their “perceived effectiveness” on a 5-point scale (0 = not effective, 2 = mildly effective, 3 = moderately effective, 4 = effective, 5 = very effective) by the respondents in the corresponding round. Thus, for each dimension "x", we calculated the score, average, and standard deviation (SD_x), per phase respectively, which provided an overview of how the two groups and the respondents of each group were rating the governance dimensions. Note that space limitations prevented us from deeply analyzing the sample sizes by inference statistics; instead, we identify general effective agile ITG dimensions based on the mentioned rating scale. Therefore, we summed up Phases 3 and 4, which resulted in a final sample size of 29 ratings. The last column in Table 3 provides the final average rating and standard deviation per dimension. We added all ITG dimensions having an average rating equal to or greater than 3.75 to the pool of effective dimensions. The critical value of 3.75 on the 5-point scale represents an ITG dimension to strive toward “effective” or “very effective”. Therefore, ratings higher than 3.75 imply greater effectiveness of a dimension. In Table 3, the darkly shaded boxes indicate ultimate effective agile ITG mechanisms. The analysis uncovered 22 effective agile dimensions (six structure elements, eight processes, and eight relational/communication mechanisms). We discuss only some of these dimensions in the following sections because of page limitations.

4.1. Effective agile structures

In terms of agile structures, 10 dimensions were identified during the evaluation part, six of which were rated as effective. One of the highest final average rated dimensions is “short and flexible decision paths” (average rating = 4.6). During the interviews, this structure element was raised in more than 30% of cases. Short and flexible decision paths are important for speediness and flexibility in several processes. As the respondents highlighted, using fast decision-making paths can help ensure more deliberate, thoughtful decisions by organizing

Table 3. Agile ITG dimensions and their perceived effectiveness

x	Agile ITG dimensions	Evaluation part								Rating part								
		Phase 0 Sample size = 5		Phase 1 Sample size = 33		Phase 2 Sample size = 18		Total Sample size = 56		Phase 3 Sample size = 13			Phase 4 Sample size = 16			Final Rating Sample size = 29		
		Mentions	%	Mentions	%	Mentions	%	Mentions	%	Score	Average x	SD _x	Score	Average x	SD _x	Score	Average x	SD _x
Agile Structures	1 Interdisciplinary and self- organized project teams	5	100	13	39.4	8	44.4	26	46.4	51	3.9	0.6	73	4.6	0.5	124	4.3	0.6
	2 Short and flexible decision paths			13	39.4	4	22.2	17	30.4	61	4.7	0.5	72	4.5	0.5	133	4.6	0.5
	3 Project organization with product owner			11	33.3	5	27.8	16	28.6	49	3.8	0.6	60	3.8	0.8	109	3.8	0.7
	4 Digital transformation units			13	39.4	3	16.7	16	28.6	44	3.4	0.7	56	3.5	0.9	100	3.4	0.8
	5 Innovation lab			7	21.2	5	27.8	12	21.4	46	3.5	0.9	71	4.4	0.6	117	4	0.8
	6 Transformation Board / Innovation Board	5	100			6	33.3	11	19.6	54	4.2	0.9	59	3.7	1	113	3.9	0.9
	7 Multidisciplinary Transformation/ Innovation Committee	5	100					5	8.9	49	3.8	0.8	70	4.4	0.7	119	4.1	0.8
	8 Incubators with own agile structures					5	27.8	5	8.9	34	2.6	0.9	50	3.1	0.8	84	2.9	0.9
	9 Matrix organization structures			3	9.1			3	5.4	26	2	1	44	2.8	1	70	2.4	1
	10 Leadership Board					1	5.6	1	1.8	38	2.9	1	45	2.8	0.9	83	2.9	1
Agile Processes	11 Using agile practices (e.g. Scrum, Devops, design thinking)			20	60.6	16	88.9	36	64.3	52	4	0.8	69	4.3	0.5	121	4.2	0.7
	12 Trial and error processes	2	40	17	51.5	10	55.6	29	51.8	54	4.2	0.9	58	3.6	0.8	112	3.9	0.8
	13 Innovation processes	4	80	10	30.3	15	83.3	29	51.8	43	3.3	0.6	59	3.7	0.8	102	3.5	0.7
	14 Use of key performance indicators (KPIs) for agility/ smart analysis processes	2	40	10	30.3	13	72.2	25	44.6	44	3.4	0.5	56	3.5	0.9	100	3.4	0.7
	15 Fast/agile decision-making processes			15	45.5			15	26.8	57	4.4	0.5	73	4.6	0.6	130	4.5	0.6
	16 Agile project and product management	3	60	6	18.2	4	22.2	13	23.2	47	3.6	0.5	66	4.1	0.5	113	3.9	0.5
	17 Lessons learned processes			10	30.3	3	16.7	13	23.2	42	3.2	1.4	64	4	0.8	106	3.6	1.1
	18 Prioritizing processes			8	24.2	5	27.8	13	23.2	41	3.2	1.2	55	3.4	0.5	96	3.3	0.8
	19 Process Reengineering (Automatization and digitalization)	4	80			7	38.9	11	19.6	45	3.5	1.2	55	3.5	1.2	100	3.5	1.2
	20 Ad hoc meetings / coordination processes			4	12.1	4	22.2	8	14.3	45	3.5	0.7	57	3.6	0.8	102	3.5	0.8
	21 Optimized IT architecture	1	20			7	38.9	8	14.3	48	3.7	0.9	61	3.8	0.9	109	3.7	0.9
	22 Change management processes					7	38.9	7	12.5	46	3.5	0.6	64	4	0.8	110	3.8	0.7
	23 Prototyping	3	60			3	16.7	6	10.7	58	4.5	0.6	67	4.2	0.6	125	4.3	0.6
	24 Decentralized innovation budges					4	22.2	4	7.1	48	3.7	1	62	3.8	0.9	110	3.7	1
	25 Co-creation workshops with clients					4	22.2	4	7.1	59	4.5	0.6	69	4.3	0.8	128	4.4	0.7
	26 Agile risk management					4	22.2	4	7.1	47	3.6	0.6	56	3.5	0.9	103	3.6	0.8
	27 Flagship projects					3	16.7	3	5.4	38	2.9	1.1	63	3.9	0.9	101	3.4	1
	28 Regular planning cycles					3	16.7	3	5.4	42	3.2	1.2	57	3.6	0.8	99	3.4	1
	29 Regular IT releases					2	11.1	2	3.6	40	3.1	1.1	48	3	0.8	88	3.1	1
Agile Relational Mechanisms	30 Transformational leadership	4	80	18	54.5	17	94.4	39	69.6	50	3.8	0.7	65	4.1	0.6	115	4	0.7
	31 Open communication and participation	5	100	18	54.5	9	50.0	32	57.1	59	4.5	0.5	74	4.6	0.5	133	4.6	0.5
	32 Continuous employee training / cross-functional trainings on agile working			15	45.5	10	55.6	25	44.6	54	4.2	0.5	71	4.4	0.6	125	4.3	0.6
	33 Use social/digital media			12	36.4	3	16.7	15	26.8	42	3.2	0.8	54	3.4	0.7	96	3.3	0.7
	34 Lean communication structures			12	36.4	1	5.6	13	23.2	54	4.2	0.8	69	4.3	0.6	123	4.3	0.7
	35 Empowerment of employees			6	18.2	6	33.3	12	21.4	52	4	0.9	70	4.4	0.9	122	4.2	0.9
	36 Regular management dialogues and events (i.e. sounding boards)			6	18.2	3	16.7	9	16.1	41	3.2	0.9	57	3.6	0.8	98	3.4	0.9
	37 Regular cross-divisional communication					8	44.4	8	14.3	48	3.7	1	63	3.8	0.8	111	3.7	0.9
	38 Specific innovation rooms / novel open-plan offices	1	20	6	18.2			7	12.5	42	3.2	0.7	59	3.7	0.8	101	3.5	0.8
	39 Employee recruitment					7	38.9	7	12.5	51	3.9	1	54	3.4	0.9	105	3.7	1
	40 Management attention / Management as example					6	33.3	6	10.7	59	4.5	0.6	66	4.1	0.9	125	4.3	0.7
	41 Rewards					1	5.6	1	1.8	45	3.5	1.2	62	3.9	0.8	107	3.7	1
	42 Cooperation and collaboration with	5	100	25	75.8	11	61.1	41	73.2									
	- Startups			17	51.5	4	22.2	21	37.5	50	3.8	0.7	61	3.8	0.8	111	3.8	0.7
	- Business partners			14	42.4	7	38.9	21	37.5	47	3.6	0.6	61	3.8	0.6	108	3.7	0.6
	- Outsourcing partners			6	18.2	1	5.6	7	12.5	39	3	0.8	53	3.3	0.9	92	3.2	0.9
	- Internal teams			7	21.2			7	12.5	43	3.3	0.8	58	3.6	1.1	101	3.5	1
- Research partners			5	15.2			5	8.9	43	3.3	0.7	68	4.3	0.7	111	3.8	0.7	

relevant information and defining alternatives. This can lead to greater efficiency because people can come to the same conclusions on similar issues. Such aspects are also reflected in the dimensions “interdisciplinary/small project teams”. Of 56 interviewees, 26 indicated the importance of having implemented such teams to enhance agility. Accordingly, this dimension was rated with a final average effectiveness of 4.3 (out of 5). Organizations might use interdisciplinary/small teams to work agilely on a complex project that requires multiple skills expertise to succeed. However, each project has its unique characteristics. Therefore, the respondents viewed having implemented a project organization as important to facilitate the coordination and implementation of project activities. A project structure can take various forms, with each form having its own advantages and disadvantages. Thus, 28.6% of the respondents highlighted the need for a project organization with an own product owner. This agile dimension received an average effectiveness rating of 3.1 out of 5.

To speed up innovations, several executives noted that an organization needs to set up specific labs as well as new organizational units. Innovation labs were mentioned by 21.4% of the cases and received an average rating of 4 on the effectiveness scale. Respondents also noted that such labs can promote creativity, information sharing, and new knowledge building and can support various types of work, such as individual and small group work and large groups of diverse members of an organization. These environments are creative, fast, and flexible in optimizing innovations. Furthermore, the executives mentioned the importance of having organizational units such as “Transformation Board/Innovation Board” (19.6%) and/or Multidisciplinary “Transformation/Innovation Committee” (8.9%), which had an average effectiveness rating of 3.9 and 4.1, respectively. The respondents noted that the setup of new dedicated units for digital change allows for better communication and more intensive collaboration. Overall, structure elements should be kept simple to allow agile decision making.

4.2. Effective agile processes

Regarding agile process dimensions, the respondents identified 19 dimensions as important to enhance agility within a governance framework. Of these, seven components were considered effective. One of the highest rated dimensions highlighted by 26.8% of the bank executives was “Fast/agile decision-making processes” (average rating = 4.5). These are significant for acting in a flexible and

speedy manner when making decisions. Therefore, many respondents indicated that they use agile practices such as scrum, design thinking, lean approach to promote such processes. The use of agile practices was noted by 64.3% of the respondents and rated with 4.2 on the effectiveness scale. The executives further noted that taking higher risks by following trial-and-error processes (51.8% / 3.9 average rating) might enhance the company’s agility. Such processes stimulate people to act in self-organized ways and ensure continuous learning. Equally effective with a rating of 3.9 is agile project and product management, which 13 of 56 respondents noted. Therefore, every project should be managed and executed in small parts, as this helps make better decisions and solve issues more effectively, with less wastage of time and resources. Few executives regarded change management processes (12.8% / average rating 3.8) as a way to prepare and support organizational change toward agility.

According to 10.7% of the respondents, agility is critical to accelerate innovation within a company. They noted that in an ever-changing business landscape, in which technologies and processes are constantly evolving, opportunities are ever present. Therefore, prototyping was highlighted as an effective mechanism to promote innovations and react agilely on new requirements during the development phase (average rating = 4). Few executives (7.1%) suggested undertaking co-creation workshops with clients. However, such processes were rated as highly effective (average rating = 4.4) and represent the second most effective agile ITG dimension within the agile governance process part.

4.3. Effective agile relational mechanisms

One of the highest-ranked relevant dimensions, in terms of agile relational mechanisms, was open communication and participation. Of the 56 executives, 32 agreed that involving employees and communicating transparently had become increasingly important to achieve their strategic goals and enhance agility within their organizations. Consequently, this mechanism received an average rating of 4.5 from experts during the rating phase. Furthermore, continuous employee training and cross-functional trainings on agile working received a high effectiveness rating (4.3). Respondents considered this a key element to adopt skills in critical thinking and strategic thinking and to build relationships across organizational silos. New skills would allow them to move with greater speed and agility and to creatively tackle challenges. In the

evaluation part, this relational mechanism was emphasized by 44.6% of the interviewees. Moreover, transformational leadership was highlighted as an important way to motivate people. With 69.6%, this dimension received one of the most frequent mentions during the evaluation part. Furthermore, it was rated with an average of 4 on the effectiveness scale by the experts during the rating part. According to the respondents, leaders still rely on the old autocratic leadership method; nowadays, however, they must also take the responsibility for and have competence in carrying out new styles of leadership. Thus, transformational leadership needs to involve employees by promoting, coaching, and evolving, not simply giving transactional orders. Consequently, in 10.7% of the cases, management attention was emphasized as another effective dimension (average rating = 4.3). It is important for management to pay more attention to agility and act as an example for the employees.

Closely related to the described relational dimensions was the element “Empowerment of employees”, which was highlighted as imperative by 12 of the 56 banks to enable employees to make strategic decisions, which in turn allows organizations to react dynamically in a more agile manner in today’s changing business and IT environment. Accordingly, this mechanism had an average rating of 4 and was considered a more-than-effective dimension.

However, in general, communication and relational structures should be lean to ensure fast and flexible communication. This dimension was highlighted by 23.2% of the respondents during the evaluation part and had an average rating of 4.3 in the rating part. An additional important governance dimension respondents noted was cooperation and collaboration. During the whole study, this component was mentioned (73.2%) the most by the executives. Looking into detail, collaboration, and cooperation with startups and research partners had an effectiveness average rating of 3.8 out of 5. Nevertheless, while assistance with research partners was highlighted by only 8.9% of respondents, cooperation and collaboration with startups was mentioned by 37.5%. The comments from the following executive bring this to the fore:

Cooperation is our linchpin ... because most FinTechs [startups] just do not take all the value chain, but only focus on individual steps on the customer interface; then we act as the partner in the background. This is something we live and have always lived [by]; that's why we have no fear of contact there, we do a lot. (COO)

5. Discussion and conclusion

The goal of this study was to specify the major effective agile elements for ITG in the digital world to identify how organizations implement agile ITG. Our findings extend existing knowledge about ITG mechanisms in terms of agile dimensions within a governance framework through an exploratory qualitative research study. Extant research has centered primarily on traditional ITG mechanisms (e.g. [6, 9]), while a few researches have focused only on single agile dimensions (e.g. [2, 22]). Thus, this research advances the theoretical understanding of agile dimensions in governing IT within an organization. In addition, the research identifies the most effective dimensions among them.

Today’s companies need flexible, complementary, adaptive, and collaborative ITG dimensions if they are to prosper in a turbulent environment, in which the challenge is to sustain value realization from IT rather than restraining its importance by emphasizing control. In this context, the uncovered agile dimensions can help them understand agile strategies within the governance construct. The respondents in our survey claimed that implementing agile strategies within ITG enables the formulation of an IT strategy and the enactment of IT alignment. As such, 46 agile dimensions were identified, 22 of which were rated as effective. When it comes to an agile ITG structure, organizations might use different approaches to ensure that IT and business objectives are aligned. Our findings present several structural dimensions such as the creation of new committees, boards, incubators, and labs focusing on innovation and transformation initiatives. Furthermore, the majority of respondents noted that they have already implemented interdisciplinary and self-organized project teams as well as short and flexible decision paths. These aspects might enable them to gain, share, and implement knowledge; speed up decision-making processes significantly; and thus meet business demands in fast-changing environments [2]. In terms of agile processes, the results indicate that many firms adopt dimensions to ensure flexibility, responsiveness, and reliability in their decision making. The most effective agile process dimensions the interviewees used focus on the iterative development of products, learning through trial and error or prototyping, and increasing speed in decision making by setting up lean processes and agile management procedures. With respect to relational mechanisms, the results show that organizations implement agile dimensions to foster dynamic knowledge sharing, fast communication, and individual empowerment. Moreover,

transformational leadership, collaboration, and cooperation with partners are critical to master digital transformation projects successfully.

As Gartner [45] showed, two separate modes of IT delivery exist, one focusing on stability and one on agility. While mode 1 is traditional and sequential, emphasizing safety and accuracy, mode 2 is exploratory and non-linear, emphasizing agility and speed. However, the explored dimensions in this research should be taken as one side of the balancing act to the traditional ITG mechanisms and not the desired end state within one mode. Therefore, effective ITG needs to consider a combination of traditional and agile dimension to master digital transformation. In the literature, this is also known as the ambidexterity approach. According to Tushman and O'Reilly [46, p. 324], an ambidextrous organization must have the ability “*to both explore and exploit – to compete in mature technologies and markets where efficiency, control, and incremental improvement are prized and to also compete in new technologies and markets where flexibility, autonomy, and experimentation are needed*”. Thus, an effective ITG framework changing in response to the demand for agility in organizations calls for future research on ambidextrous approaches. The two systems—traditional and agile—should work together, with a constant flow of information and activity between them [47]. In other words, to be effective an ITG governance framework must work seamlessly and organically with traditional ITG, as well as agile ITG dimensions, so that the whole organization is working to ensure that tasks are completed with efficiency and reliability, constantly and incrementally improving itself, and handling today’s increasingly strategic challenges with speed and agility. Therefore, the interaction between the traditional and the agile dimensions needs to be optimized in managing strategies to positively affect the agility of a company.

In conclusion, our data provide relevant perspectives of new agile ITG dimensions implemented within the German-speaking banking industry. Moreover, the study highlights the most effective dimensions, as rated by experts, that can serve as measurement items for the agile side of the governance construct in future research. In the discussion part, we emphasized the need for an ambidextrous aspect within the governance construct. Future research focusing on other sectors, countries, and factors could enhance knowledge building in the domain of agile ITG. As such, the current study should help stimulate further investigation into combining agile strategies with ITG capabilities.

10. References

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