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The continuing mismatch between IT governance maturity theory and practice: a new approach

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Abstract

IT governance (ITG) has stayed a challenging matter for years. Research suggests the existence of a gap between theoretical frameworks and practice. Although current ITG research is largely focused on hard governance (structure, processes), soft governance (behavior, collaboration) is equally important and might be crucial to close the gap. The goal of this study is to determine if there remains a mismatch and test the usability of a new ITG maturity model. We conducted a systematic literature review to create an overview of available ITG maturity models, used one of these in ten case studies and evaluated its usability. The study shows five new models were introduced, and only one of the new ITG maturity models covers hard and soft ITG in detail. This model and corresponding instrument was used to test its usability in practice. The instrument was evaluated positively on usability; but feedback also revealed that the assessment questions needed improvements. We demonstrate that combining the instrument with structured interviews results in an enhanced and usable instrument to determine an organization's current level of hard and soft ITG. We conclude that this new instrument demonstrates a way to reduce the mismatch between ITG maturity theory and practice.

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1. Introduction

For organizations, IT governance (ITG) is an important and challenging matter. Researchers have investigated the effectiveness of structural governance mechanisms [1–5] and relational governance mechanisms [6, 7] on ITG. Despite all efforts, the causal relationship between ITG and the performance of an organization remains unclear [8] and it is still unclear through what mechanisms IT governance affects organizational performance [9]. Research suggests the existence of a gap between theoretical frameworks and practice [10–12]. This study intends to evaluate if such a mismatch still exists.

ITG is important because it leads to higher profits. Weill and Ross conclude that firms with superior ITG have at least 20% higher profit than firms with poor governance [13]. Yet, improving ITG is difficult because it is a challenging, complex topic. Definitions of ITG in the literature vary greatly [14, 15]. Several scholars propose a trichotomy of structure, processes and relational mechanisms for ITG. An analysis of the ITG literature reveals that six streams of thought can be distinguished [16]. Four ITG streams differ in scope: "IT Audit," "Decision making," "Part of corporate governance, conformance perspective" and "Part of corporate governance, performance perspective". The last two streams differ in the direction in which ITG works: "Top down" and "Bottom up".

In practice, frameworks are the most important enablers for effective ITG [17]. A variety of frameworks devised for improving ITG exists [18]. The list of frameworks frequently used for ITG is diverse [17, 19, 20]. Except for COBIT and ISO 38500, these frameworks are not ITG-specific. The ISO 38500 standard comprises a set of six principles; however, there is "no specific and well defined exemplar framework and standard for IT" [21]. That makes it insufficient for implementation in practice. Although COBIT's scope has increased over the years, accounting and information systems are the predominant domains related to COBIT [22].

In practice, processes and organizational structures are needed, but ITG has social elements, too. Relational mechanisms can be seen as the social dimension [16] but are too limited to cover the broad range of topics from the social sciences which are relevant for ITG. The importance of social factors is also shown in a large survey of the IT Governance Institute, in which 50% of the participants selected "The culture of the organization, its ways of working and human factors" as one of the factors which influence the implementation of ITG the most [17]. In COBIT, the social dimension was introduced – using a holistic approach – in version 5.0.

We prefer the division of IT governance into hard and soft governance, as has been made before [23–28]. Current ITG research mainly focuses on hard governance (structure and processes). COBIT – as will be shown in our literature review – is the most common framework used in ITG maturity research. Researchers need to change their views of ITG as structure, process and relational mechanisms and embrace a more social view. Merging topics like organizational culture, understanding and trust, leadership, and informal organization into "relational mechanisms" does not sufficiently reflect ITG in practice. A systematic literature review in 2013 showed that the social view covering topics like collaboration, behavior, culture or social could be found in only 10% of publications [10]. Soft governance requires more attention [17, 29–32]. The "cultural and social alignment dimensions" have been "little adopted"[33].

This study pays attention to both the hard and soft aspects of ITG. Soft governance can be seen as implicit agreements and social norms [34]. Some relate soft governance to an approach "that relies on unofficial information and advice rather than hierarchy to steer local officials" in the government, institutions or industry [35]. Others relate it to organizational forms [36]. We relate soft governance to the "Bottom up" stream. Followers of this stream criticize structure, processes and top-down planning [37–39]. As shown in our literature study, the Maturity IT governance (MIG) model is the only detailed maturity model available for hard and soft ITG.

The goal of our research program is to determine how to improve IT governance, its effectiveness and maturity, and in the process, to answer the following questions:

- a. Which new ITG maturity models are available in literature that can be used in practice?
- b. How usable is the MIG assessment instrument for measuring hard and soft ITG in an organization?
- c. Is there (still) a mismatch between ITG practice and theoretical frameworks?

Recent research showed that decision structure and process maturity are not significantly correlated with IT performance [40], and Tonelli et al. recommend that relational mechanisms must be the primary ingredients to develop further. Others showed there could be an apparent time lag between the improvement of a company’s ITG maturity and an increase in productivity [41] or defined key impact variables acting as a mediator or moderator in the association of ITG and firm performance [8]. So far, the causal relationship of how ITG promotes firm performance remains “theoretically underdeveloped” although recent research uncovered a “significant, and impactful linkage” between IT governance mechanisms and strategic alignment and, further, between strategic alignment and organizational performance [9].

We intend to use an ITG maturity model (MM), since MMs can be seen as artefacts for determining a company's status quo and “deriving measures for improvement” [42]. Studies have shown that ITG maturity has a significant positive impact on IT performance and firm performance [13, 43–45], which is why we intend to use a maturity model to assess and enhance ITG. There are studies, however, that did not find a clear and positive correlation [46, 47].

In this study, we use the MIG model and the corresponding MIG assessment instrument [23, 48]. The MIG model is a focus area maturity model (FAMM) designed to measure hard and soft ITG. FAMMs differ from previous approaches by defining a specific number of maturity levels for a set of focus areas, which embrace concrete capabilities to be developed, to achieve maturity in a targeted domain [49]. The MIG instrument is based on the MIG model. The model and assessment instrument were developed using design science to measure hard and soft ITG [50] because an ITG maturity model covering both parts of governance did not exist [17, 23, 51]. We used an adjusted version of the MIG assessment instrument towards a model with two views: the department and the complete organization.

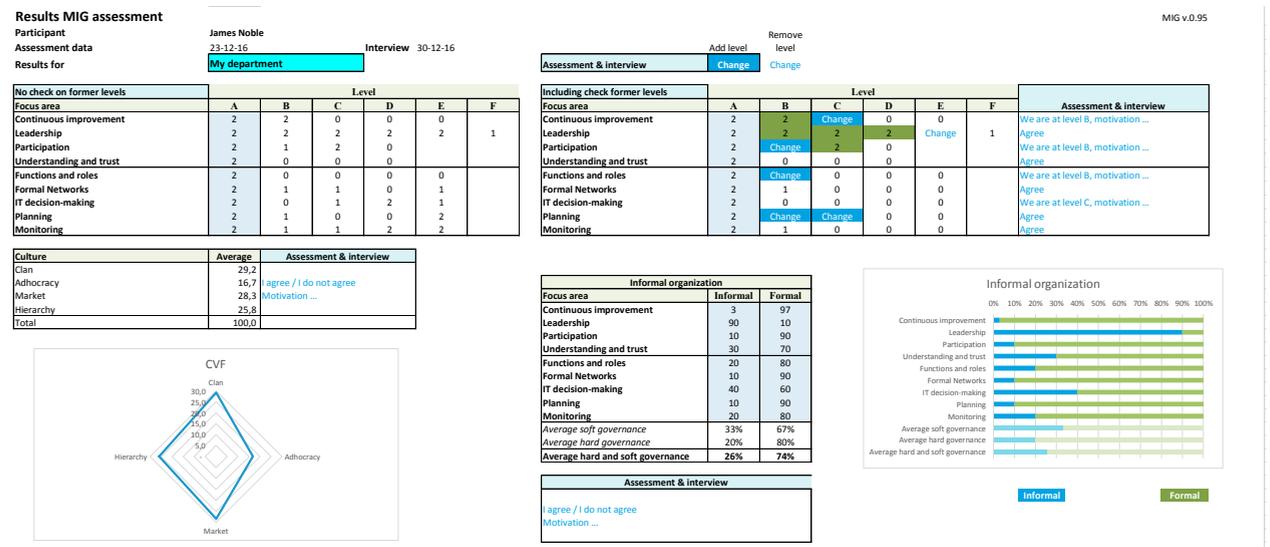


Fig. 1. Example result sheet MIG assessment instrument (corporate view).

The MIG model follows the theoretical proposition that improving ITG focus areas will result in more mature ITG, which will result in improved firm performance. The context is important because research has shown that IT governance is situational and essential for delivering information about the situational part of ITG [17, 29, 30, 52].

To complement the instrument with a corporate perspective, we have been careful not to make significant alterations to the validated instrument [53].

The adjusted instrument consists of three questionnaires:

- *Questionnaire 1*: Participants respond to 70 statements using a six-point Likert Scale, once for the department and once for the corporate perspective (the organization as a whole).
- *Questionnaire 2*: Participants divide 100 points over nine groups of two statements, again once for the department and once for the whole organization.
- *Questionnaire 3*: This questionnaire on culture is based on the Organizational Cultural Assessment Instrument (OCAI). Again, it completed twice, once for each perspective.

The participants were asked to answer each question from a departmental and a corporate perspective. While processing the results, we created two result sheets (instead of one in earlier versions, see Figure 1). Each result sheet shows the maturity level reached for each of the nine focus areas, a percentage for “informal organization,” and a positioning in the competing values framework for the perspective “Complete organization” or “Department”.

This paper is organized as follows. Section 1 introduces the topic. Section 2 presents the research methodology. The results of the systematic literature study and the case studies are described in Section 3. A discussion, the limitations, implications for future research and conclusion are included in Section 4.

2. Research methodology

Our research process was as follows:

1. Conduct a systematic literature review to locate recent literature on ITG maturity;
2. Create an overview of available ITG maturity models for hard and soft governance;
3. Conduct case studies using the MIG model and the MIG assessment instrument to test the usability for different types of users; and
4. Evaluate the results of the study.

2.1. The systematic literature review

Previous research showed a mismatch between ITG literature and practice [10, 16, 17]. These studies were based on surveys and systematic literature reviews using abstract and citation databases until spring 2013. Our review was intended to determine if new research on ITG maturity models had become available since that time. To create an overview of new ITG maturity models, we conducted a systematic literature review using Scopus. Scopus is the world’s largest abstract and citation database and includes scholarly journals and book publishers. To avoid missing relevant papers, we added some overlap and selected papers from 2012 up to spring 2018. In Scopus, we first selected papers related to “IT governance”, “governance of IT”, “IS governance” or “Enterprise Governance” in the title, abstract or author keywords. Within this large set of papers, we selected papers related to “mature” or “maturity”.

A manual selection was used thereafter to determine which papers were in scope. To be included, the paper had to satisfy the following rules: the topic of the paper must be ITG; the keyword “mature” or “maturity” must be used relating to ITG; the publication year must be 2012 or later; the paper must be written in English, German or Dutch; and claims must be justified or based on research. Duplicated studies were excluded.

The result of this study is a list of papers discussing ITG maturity that was used to create an overview of new ITG maturity literature.

2.2. The case studies

This study is based on data collected in ten case studies. “Case studies are the preferred strategy, when ‘how’ or ‘why’ questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon in some real-life context” [54]. The use of case studies is prevalent in business and IT

management education to “highlight the complex business problems faced” by managers [55]. ITG is an example of such an issue.

We conducted two case studies and students conducted eight. We chose this combination because, first, we wanted to test the usability of the MIG assessment instrument with users who were different from the researchers. Secondly, we sought to improve the research and education of Masters students registering for the IT management course. To improve research and education, students were enabled – but not obliged – to use the MIG assessment instrument to assess a medium- or large-size organization (1,000 full-time employees [FTE] or more) in a practical group assignment. When using the instrument, the students were obliged to follow the case study protocol. The use of an instrument greatly simplified the structuring of the data collection and creation of the database. The data of each assessment, as well as all data collected during the case study protocol, were input into the database. As an analytic technique, we used cross-case synthesis [54, 56] for each focus area.

The second research question was intended to determine the usability of the instrument. The purpose of evaluation in design science is to determine if an instantiation of a designed artefact could “establish its utility and efficacy (or lack thereof) for achieving its stated purpose” [57]. We combined the use of the instrument with semi-structured interviews which are seen as an essential requirement of case study research [58]. Interviews are meant to validate and evaluate [59] if the results of the instrument match the opinion of the participant and to gather information about why the participant does or doesn’t agree with the resulting maturity level.

An evaluation form was created based on an evaluation template for expert reviews of maturity models [60]. The participants were invited to fill out the evaluation questionnaire after the interview, and the students were invited to fill out the evaluation questionnaire after the presentation of the end-results to the researchers.

3. Results

3.1. Results of the systematic literature review

The systematic literature review was performed between January and April 2018. This resulted in an initial list of 70 papers. After implementing the selection criteria, 34 papers discussing ITG maturity remained. For each paper, we determined which framework or model was used. The result of this analysis is summarized in Table 1.

Table 1. Maturity models found for hard and soft ITG governance.

#	Model / framework found	# of papers	Description of the ITG model used
1	COBIT	13	Papers discussing ITG maturity (partly) using COBIT 4.1 or COBIT 5.0
2	COBIT combined with other frameworks	5	COBIT combined with other frameworks such as ITIL, TOGAF, the Business Balanced Scorecard or country-specific frameworks like DPSA
3	MIG model	4	A Focus Area Maturity Model (the model used in this study)
4	The twelve fields of action	2	The twelve fields of action of IT: auditing, compliance, development, knowledge, management, planning, production, project, quality, requirement, security, testing [61]
5	Nine ITG categories	2	Nine ITG categories: user support, decision-making of top management, review and evaluation IT tasks, ability and evaluation of IT department, risk management, CIO authority, budgeting process, outsourcing, IT project development management [62]
6	Green IT Capability Maturity Framework	1	Defines maturity curves with five levels: initial, basic, intermediate, advanced and optimizing [63]
7	An ITG maturity model with a business and IT side	1	Five level ITG maturity model with two sides: a business and an IT side [64]
8	Other types of maturity related research	6	Research papers not specifying or using an ITG maturity model (e.g. reviews, surveys, papers discussing specific ITG mechanisms)
	Total	34	

As has been shown in earlier reviews, COBIT was used in the largest group of papers (13). COBIT made use of the Capability Maturity Model (CMM) process until version 4.1, which was replaced by process capability in COBIT 5.0. COBIT 5.0 was released early in 2012 to cover all aspects that lead to effective ITG such as “culture, and so on over and above processes” [65] by defining “a holistic approach” as a driving principle [66].

None of the selected papers focused on one of the specific social focus areas mentioned in the MIG model. When the search was widened to look at papers related to COBIT but not to ITG maturity, however, some papers were easily found (e.g. for “culture”) [67].

We found five (relatively) new ITG maturity models:

1. The MIG model (presented earlier in Figure 1)
2. The twelve Fields of Action
3. Nine ITG categories
4. Green IT Capability Maturity Framework
5. An ITG maturity model with a business and IT side

Each model uses different dimensions (as summarized in the last column in Table 1). Except for the MIG model, social elements like collaboration, behavior, culture, or social are not included in these frameworks. So, it seems as of spring 2018, hard and soft ITG are covered by COBIT 5.0 in a holistic way and in the MIG model in a more specific way.

The six remaining selected papers did not specify or use a specific ITG maturity model.

3.2. Result of the case studies

We performed ten case studies in 2017. All these were performed in organizations with more than 1,000 FTEs. Eight case studies were conducted by groups of four or five full-time students. Case studies 1 and 2 were conducted by the researchers.

The first case study was performed in a large, non-departmental public body of the Dutch government. Ten participants from business and IT were invited to participate in narrow collaboration with the responsible manager of one value chain. All participants either had a management position (nine) or a key role (one) in the value chain and were involved in strategic business and IT discussions with respect to the value chain.

In general, there were large changes in the results (see Table 2) shown by the assessment and the opinion of the participant for the soft governance part and fewer changes for the hard governance part. If participants suggested changes, they were always towards a higher maturity level (in case study 1). The motivation for the change gives us some idea of how participants interpreted the focus areas. Some participants changed their opinion after an additional explanation of the focus areas, partly explaining the changes. Table 2 shows the results before and after the interviews for the department view.

Table 2: Results of the hard and soft governance, view: value chain (before; after)

Focus area		A	B	C	D	E	F
Soft governance	Continuous improvement	10; 7	0; 2	0; 1			
	Leadership	6; 2	2; 4	2; 2	0; 2		
	Participation	10; 2	0; 5	0; 3			
	Understanding and trust	10; 6	0; 4				
	Functions and roles	7; 4	1; 1	2; 5			
Hard governance	Formal Networks	8; 6		1; 3	0; 1		
	IT decision making	9; 8	0; 1	1; 1			
	Planning	7; 4	1; 2	1; 3		0; 1	
	Monitoring	7; 3	0; 3	1; 3		2; 1	

A through F represent the current maturity level in the opinion of the participant. For example, for continuous improvement, the result of the assessment showed ten times level A, but three of the participants did not agree with this result (10; 7).

Table 3 shows the results after the interviews for the focus areas of the context.

Table 3: Results of the context, view: value chain, after the interview

	Focus area	Min.	Max.	Avg.	σ	Agree	Not Agree
Context	Culture						
	- Clan	25.0	48.0	35.8	7.3	10	0
	- Adhocracy	0.0	25.0	13.5	9.2	10	0
	- Market	0.0	24.2	13.4	8.9	10	0
	- Hierarchy	18.3	68.3	37.3	17.1	9	1
	Informal organization	31%	57%	46%	9%	10	0

In the table, Min, Max, Avg, and σ are the minimum, maximum, average, and standard deviation of the values/percentages between the participants' answers. Agree and Not Agree show if the participants agreed with the result of the assessment. The participants mostly agreed with the results. There was one exception: One participant responded that his score for Hierarchy was too low (18.3) and for Market too high (24.2).

3.3. Comments and evaluation on the usability of the MIG assessment instrument

In general, the comments on the MIG instrument were positive regarding the use of the instrument: “The way of visualizing the results is very clear” or “The tool delivers very fast an indicative impression of the maturity of several ITG processes”. The comments on the statements and documentation were more critical: “Without the interview, the participant might misinterpret questions” or “To get reliable results, it's necessary to interview the participants”. The case studies resulted in a considerable list of proposed improvements for the instrument, some important, some minor. These suggested improvements have been analyzed and categorized (see Table 4).

Table 4. Overview of case studies (after the interviews)

#	Sector	Size (x 1,000)	# Participants	# Students	Improvements suggested
1	National government	57	10	0 (researchers)	2, 3, 5
2	National government	110	7	0 (researchers)	2, 3, 5
3	Financial sector	5.5	4	5	3, 4
4	Education	2.9	5	4	1, 2, 5
5	Financial sector	54	4	4	3, 4
6	Fashion industry	15	8	5	3, 4
7	Industrial sector	64	5	5	1, 2
8	Food industry	0.8	5	5	1, 2
9	IT services	24	5	4	2
10	Cleaning	13	7	5	1, 2

‘Improvements suggested’ lists the top five suggested improvements for the MIG assessment instrument:

1. The number of assessments is too low.
2. Equivocal, unclear or too black and white statements/questions.
3. Participants need more or better explanation of the semantics/terms used in the assessment.
4. Students would welcome a more detailed or standardized interview plan.
5. Basing the results only on whether a participant agrees 80–100% is not sufficient.

The suggested improvements will be used as evaluation input for the design cycles of the MIG assessment instrument.

After completing the case study, the participants of case studies 1 and 2 as well as the students were invited to fill out a short evaluation questionnaire. The questionnaire used a six-point Likert scale ranging from “Disagree completely” valued as 1 point to “Agree completely” valued as 6 points. The questionnaire was returned by 8 participants in case 1 (80 %), 6 participants in case 2 (86 %) and 20 students (56 %).

Table 5. Summary of the evaluation.

# [†]	Statement	Case 1	Case 2	Students
10	The MIG instrument is useful for conducting assessments	4.3 (0.8)	4.7 (0.8)	4.4 (1.1)
11	The MIG instrument is useful for the practice in my organization	4.3 (1.0)	4.5 (0.8)	3.9 (1.0)
12	The MIG instrument <u>combined with interviews</u> is useful for the practice in my organization	4.9 (0.9)	5.2 (1.0)	5.1 (0.9)
17	The results of the MIG instrument can be used in practice in my organization	3.9 (1.1)	4.5 (1.0)	4.0 (1.1)
22	The results of the MIG instrument <u>combined with interviews</u> can be used in practice in my organization	4.6 (0.5)	5.2 (1.0)	5.0 (0.9)
33	Would you suggest any updates or improvements related to the MIG instrument?	N(7); Y(1)	N(6); Y(0)	N(2); Y(18)
37	Would you suggest any other updates or improvements related to the MIG model?	N(7); Y(1)	N(6); Y(0)	N(15); Y(6)

Table 5 presents the results for case 1 and case 2 based on the participants’ evaluation and the students’ evaluation. The evaluation comments for each case study already were summarized in Table 4. The number between parentheses is the standard deviation. In general, the responses from the students during the practical exams were positive, e.g. it was a “great learning experience for our team” (case 3).

4. Discussion and conclusion

This study intends to evaluate if the MIG assessment instrument can be used to determine the current hard and soft ITG of an organization according to the MIG model. This section summarizes the answers to the research questions.

4.1. Which new ITG maturity models are available in literature that can be used in practice?

Our systematic literature review revealed 34 papers discussing ITG maturity since 2012. COBIT was used in 13 papers and 5 more combined with other best practice frameworks. COBIT 5.0 includes the social dimension by discerning seven enablers: “Principles, policies and frameworks”, “Processes”, “Organizational structures”, “Culture, ethics, and behavior”, “Information”, “Services, infrastructure, and applications” and “People, skills, and competences”, translating them into four common dimensions: “Stakeholders”, “Goals”, “Lifecycle” and “Good practices” [65]. This, however, might be an oversimplification.

None of the selected papers focused on social or more specific soft governance-related focus areas as included in the MIG model. Finding common dimensions which are usable in practice was the starting point for the design of the MIG model. This design process, for example, demonstrated the need for different maturity models for each soft governance focus area [48]. As of spring 2018, hard and soft ITG are covered by COBIT 5.0 in a holistic way and in the MIG model in a more specific way.

4.2. How usable is the MIG assessment instrument for measuring hard and soft ITG in an organization?

The purpose of this study was to evaluate how the designed MIG assessment instrument could be used to determine the current ITG maturity of an organization according to the MIG model. The purpose of the case studies

[†] # is the number of the statement on the evaluation form

was to get an impression of the hard and soft ITG, not an exact measurement. Some student groups pointed out that the number of participants was low. This was not an issue for educational purposes and measuring the usability of the model, and the group of participants selected by the researchers was larger. The study showed that the statements in the instrument needed more or better explanation. Combining the assessment with the interviews mitigates this issue.

In general, the participants on average evaluated the tool with a 4.6 score in case 1, 5.2 in case 2 and 5.0 by the students on a Likert scale of 6 meaning completely agree. As the version of the instrument used was version 3, which is still in development, we interpret these results as meaning that the instrument is useful for practice but improvements still are needed. The case studies show that the investigators – full-time students and the researchers – could use the instrument in ten case studies to determine the current hard and soft ITG maturity in the opinion of the participants.

The differences between the assessment and the interviews are substantial. For the time being, the interviews still are required. Almost all the participants agreed with the results for “Culture” and “Informal organization”. This was no surprise for “Culture” because the MIG instrument makes use of an already validated research instrument (the OCAI).

The result sheet of the MIG assessment instrument was helpful for structured interviews discussing the focus areas. We received substantial positive comments on the usability of the tool in general: “The way of visualizing the results is very clear” and “delivers very fast an indicative impression of the maturity of several ITG processes”. The case studies also resulted in a considerable list of proposed improvements for the instrument. Suggestions include adding an improved explanation of the semantics, a more detailed or standardized interview plan and a representation of the results that better indicate the percentages scored (e.g. by showing the values).

We conclude that the combination of the MIG assessment instrument and structured interviews is useful for measuring hard and soft ITG. From an educational perspective, the results are positive, too. We received responses such as [it was a] “great learning experience for our team”, and one of the participating organizations sought to participate in the exercise again next year “as they are in a change process and are interested to know how they progress”.

4.3. Is there (still) a mismatch between ITG practice and theoretical frameworks?

We found two frameworks covering hard and soft ITG: COBIT 5.0 in a holistic way and the MIG model in a more practical way. None of the selected papers showed a practical way of using COBIT 5.0 to measure or improve hard and soft governance. The case studies we conducted show that the MIG model and assessment instrument need improvement but, in general, the participants agreed that the instrument is usable when combined with interviews. The MIG model is largely based on scientific models. Our study demonstrates a way to reduce the mismatch between ITG maturity theory and practice. Applying the MIG model results in a new approach with a focus on hard and soft ITG maturity.

4.4. Limitations

These case studies show that it is possible to use the tool to map the current ITG of an organization into the MIG model. The investigated organizations were different in size and industrial sector. The validation, however, was limited to ten organizations in the Netherlands and large multi-nationals, varying widely in size and industrial sector, thus validating the maturity levels of the MIG model, and thus indicating that the improvement of ITG and its contribution to firm performance need more research.

4.5. Next steps

These case studies show that the instrument needs improvements. The improvements will continue for several cycles, a new version will be available yearly. Each year, we expect students and/or researchers to execute approximately ten case studies. The data will be used to create an improved version of the MIG instrument for the

next year. We expect to need multiple cycles to reach the ultimate goal – a publicly available – instrument that can be used, without interviews, by the members of an organization to correct the results.

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