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Evaluating an IT Governance model-in-use

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Abstract

IT Governance models represent ideals for how a collection of practices or mechanisms shall enhance the achievement of IT/business alignment in the organisation. In practice IT Governance (ITG) models are interpreted and adapted to get the work done. In this paper we suggest an evaluation method for comparing an ideal ITG model (the model-in-concept) with the corresponding use of the model in daily operations (the model-in-use). Theoretically we have approached the development of the ITG evaluation method from a deployment perspective meaning that a model first is developed and described by model developers and thereafter interpreted, adapted and used in the organisational context. Further, we have applied the concept of model rationale in order to express the logic of the model-in-concept as intended by the model developers. In our action research study we show how we have developed and tested the ITG evaluation method as part of an evaluation of the deployment and use of an ITG model in a large healthcare organisation. Our findings suggests that the evaluation method give support for in depth evaluation, dialog and learning concerning the complex logic of an ITG model-in-concept and model-in-use.

Keywords: IT Governance, Evaluation, Model rationality, Model-in-use, Model-in-concept

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1 Introduction

IT Governance is understood as a collection of practices, or mechanisms, that enhance IT/business alignment affecting the whole performance of the organisation positively. The effective use of information technology relies heavily on good IT Governance (Wu et al. 2015). IT Governance (ITG) consists of the leadership and organisational structures and processes that ensure that the organisation's IT sustains and extends the organisation's strategy and objectives (ITGI 2003, Van Grembergen 2009). In the research literature are ITG practices usually divided into structures, processes and relational mechanisms (see for example Van Grembergen et al. 2003,

De Haes and Van Grembergen 2005, Wu et al 2015 and Jewer and McKay 2012). Structures concern roles and responsibilities and a structure could, for example, be an IT steering committee, IT strategy committee or that CIO reports to CEO. Examples of processes are portfolio management, Service-Level Agreements, COBIT and ITIL. Relational mechanisms has to do with the relations between ITG stakeholders that increases learning and collaboration such as IT/business co-location and IT/business training and rotation.

Research on IT Governance (ITG) characteristically concern the question of which key ITG practices that are most effective in order to align IT to business and thereby achieve top performance for the organisation. For example De Haes and Van Grembergen (2009) find that the top most important ITG practices are: IT steering committee, CIO on executive committee, Portfolio management, IT budget control, and IT strategy committee at level of board of directors.

Less research on ITG practices are found that investigates how ITG practices are carried out in daily operations in the organisational setting. The organisational deployment of ITG practices is important to understand because ITG practices that are termed or defined in the same way could be carried out in different ways by ITG workers resulting in differences in outcomes. Differences in outcomes will then influence on the multifaceted ITG practice, which is implemented as a mixture of various structures, processes and relational mechanisms, as well as affecting the alignment between business and IT in the organisation. We understand ITG practices as complex organisational undertakings that could be performed in various ways. The desirable alignment between IT and business rely on a combination of several ITG practices whose performance affect each other. Therefore it is important to better understand how defined ITG practices are carried out in daily operations and how these enactments affect related ITG practices in operation.

In this study we evaluate how a large healthcare organisation has deployed a complex IT Governance model. The ITG model in our case, pm3, is a widely used model in large organisations in Sweden. pm3 includes several different ITG practices comprising structures, processes and relational mechanisms. pm3 is a compound ITG model prescribing ITG practices that are designed and composed coherently in order to establish sustainable IT/business alignment so that the organisation's entire installed base of IT systems maintains benefits for the core business in the organisation.

Our research interest is to investigate how prescribed ITG practices, in an ITG model, are deployed and used in a large organisation and further how the deployment can be evaluated. We want to evaluate how the ITG practices are carried out compared to how they are designed and supposed to be performed according to the model. In order to compare ITG practices as prescribed by the model, with the ITG practices that are in use, we have taken on a deployment perspective (Päivärinta et al. 2010). This line of thinking is related to research about situational adaption of information systems development methods. The tension between the prescribed original method and the method in use has been described as a method usage tension between "method-in-concept" and "method-in-use" (or method-in-action) (Ågerfalk and Fitzgerald 2005). This new deployment perspective on ITG supports development of an evaluation method that compares an ITG model-in-concept with an ITG model-in-use.

The research question elaborated in this paper is then "How to evaluate the deployment and use of an ITG model?". Our purpose is to make evident the design and the results of a performed evaluation of an ITG model deployment. The evaluation

provides important insights concerning how the same ITG practice is deployed in different practical settings. This understanding brings knowledge on differences and difficulties in the practice of ITG practices and insights into how ITG workers in the organisation operates in governing the installed base of information systems in daily work. We hope that this approach also will invite other researchers to proceed with evaluative research on the operation of ITG models in practice. Such research will develop important knowledge for both ITG research and ITG practice.

The paper is organised as follows. In the next section we introduce the deployment perspective and the concept of model rationale that we have combined with the deployment perspective. Thereafter, in section 3, we introduce pm3 and describe our case and research approach. In section 4 we report pm3-in-concept and the results of the evaluation of pm3-in-use. We conclude our study by discussing three main contributions from the study which are 1) clarification of IT Governance model rationale 2) the evaluation method and 3) problems in ITG model deployment.

2 A deployment perspective on IT Governance

The use of information system development methods (SDMs) in practice has been extensively researched in the IS field (see e.g. Fitzgerald et al. 2002; Päivärinta et al. 2010). Deployment of ITG models has similarities with deployment of SDMs and therefore it is fruitful to transfer research knowledge about SDM to research concerning ITG. Below we line out the deployment perspective and the concepts of method rationale and model rationale that we have found useful for evaluating ITG practices.

2.1 IT Governance

There exist different definitions of IT governance, but all focus on activating the link between business and IT in order to increase business benefits of IT (De Haes and Van Grembergen 2004; Schwertsik et al. 2009). One important function of ITG is to organise responsibilities into an IT governance structure that points out what kind of business and IT related decisions to be taken and by whom. IT governance emerged as a concept in the late 1990's, but the phenomenon, to try to solve the need for collaboration between business and IT, is older (De Haes and Van Grembergen, 2005) research studies can be traced back to the 1960's (Brown and Grant, 2005; Boubaker and Nyrhinen, 2008). When IT governance was introduced the discussion primarily concerned the polarisation between centralised and decentralised IT decisions. Later different categorisations have been developed in order to understand different models for ITG, for instance by using different activities (Sambamurthy and Zmud, 1999) or by using political archetypes (Weill, 2004). There are also research studies focusing IT governance as a social construction (Boubaker and Nyrhinen, 2008) rather than a function of division of responsibility.

IT managers make hundreds of decisions every week, some of them are strategic but most of them are part of the day-to-day management. The day-to-day management is usually labelled IT Service Management (ITSM). De Haes and Van Grembergen (2009) illustrate this by stating that IT governance is situated at multiple levels in the organisation, at strategic level (executives and board of directors), at management level (C-suite and senior management) and at the operational level (management of IT operations). Wilbanks (2008) means that IT Governance and ITSM should be handled as equal activities because they exist side by side in an organization and are

dependent on each other. Almost every decision affects workflow processes, information, IT systems or infrastructure in some way, which means that it can be difficult to separate day-to-day decisions from strategic decisions. Nevertheless the differentiation between governance and ITSM is central in IT governance theories. While IT governance is about organising and strategic decision making, management is about what specific decisions are made (Weill, 2004). De Haes and Van Grembergen (2004, p. 27) clarifies it further: "IT management is focused on the effective supply of IT services and products and the management of IT operations. IT governance in turn is much broader and concentrates on performing and transforming IT to meet present and future demands of the business and its customers". IT governance design requires the decision makers to take a step back from day-to-day decisions and identify which decisions are fundamental and who should make them (Weill, 2004).

We understand ITG as a wider concept than ITSM and when we use the ITG concept in this paper we include ITSM as an important part. This is in line with frameworks often mentioned in the ITG context such as COBIT, ISO 20 000 and ITIL (Pereira, and da Silva, 2012).

2.2 Deployment perspective

System development methods (SDMs) could be understood as containers of knowledge for system development processes. According to Fitzgerald et al. (2002) the use of formal methods plays different roles in the systems development process. Rational reasons for using SDMs are for example: to reduce complexity in the process, create job control, enabling the division of labour, and to standardise roles and tasks in the process. Use of SDMs can also have more political functions. Method use may signal that systems development work is carried out professionally and legitimise different types of actions. By using methods increased traceability in the development process can be achieved. Method use could also be a comfort factor for the individual developer, and good knowledge of method may also involve a power base and a career strategy. The above listed functions for ISD methods could also apply for ITG models. The vast difference is of course that ISD methods organise the development of the IT-system until the deployment of it and the ITG model organise the maintenance and governance thereafter in the organisational setting in a multi-system environment.

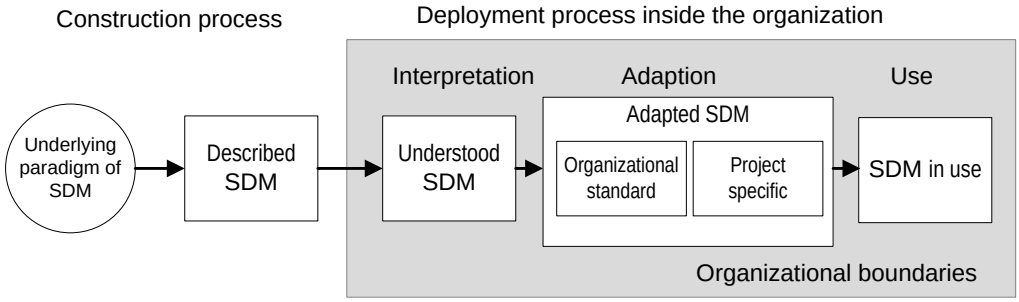

Figure 1: Deployment perspective (Päivärinta et al. 2010).

Research about differences between formalised methods and methods in action (Fitzgerald et al. 2002) is of particular interest for this study since our research involves comparing a formalised ITG model with the ITG model-in-use. Päivärinta et al. (2010) clarifies the drift from an ideal method version, the described SDM, to the method version that is used in practice by illustrating a deployment perspective (figure 1).

Figure 1 shows the process of how a SDM first is constructed and described by method developers on basis of their underlying perspective. Thereafter the method take on different versions as the method is deployed inside the organisation. According to Päivärinta et al. the method is first interpreted from the descriptions available to an understood SDM, after that there might be an adaption to organisational standards and also to project specific standards. Finally the method is acted upon and used by method users in order to get the work done. We find the deployment perspective useful and straightforward as it shows the translation process from conceptualisation to actions and use. One also intuitively understands that aspects of the original method most likely will be lost in this translation. Versions of methods-in-use could differ in, for example, activities, values, goals, rules, roles, procedures and practices.

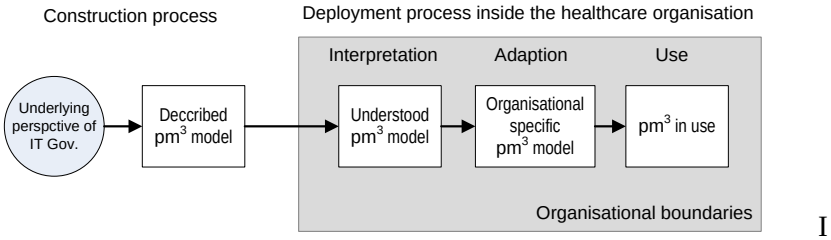

Figure 2: Deployment of the ITG model pm3 in the healthcare organisation.

It is reasonable to assume that models, as well as methods, follow to a similar translation procedure so we transfer this line of thinking to apply for the deployment of ITG models, in our case pm3, as represented in figure 2.

Figure 2 then shows the conditions for this study where the ITG model pm3 had been deployed in a large healthcare organisation. The studied organisation had made adaptions of the original model into an organisational specific model and ITG workers where using pm3 on daily basis. Our research interest is on the use, in comparison with the described model. With a deployment perspective the use of the model is affected by made interpretations and adaptions.

2.3 Method rationale – ITG model rationale

Method rationale and method rationality resonance has been suggested as important analytic devices for analysing different abstraction levels of methods (Ågerfalk and Wistrand 2003; Ågerfalk and Fitzgerald 2005; Ågerfalk 2006; Karlsson 2012). According to Ågerfalk and Fitzgerald (2005) method rationale maps to three method abstraction levels that are: a) the ideal method as expressed by the method creator b) the situational method as adapted by a method configurator and c) the method-in-action as manifested by actual method-following actions. As we can see these levels maps very well onto the different method versions in the deployment perspective.

The basic idea of method rationale is that intrinsic values and goals in the ideal method, described by the method creator, should be in resonance with goals and values manifested in use, in method-following actions. Otherwise, there is a risk of losing the method's core idea (Karlsson 2012). "Method rationale exists as an expression of the method creator's values, beliefs and understanding of the development context. This 'intrinsic' method rationale is then compared with method user's values, beliefs and understanding in method configuration and systems development" (Ågerfalk and Fitzgerald 2005 p. 11). By applying the concept of method rationale on the domain of ITG models we could talk about ITG model rationale. As we are interested in designing an evaluative tool for comparing an ITG model-in-concept, as described by model creator, with the model-in-use, as manifested in model-following actions, we find the concept of method rational, converted to model rational, suitable for the purpose.

Expressing the rationale concerns making values, goals and context-understanding explicit, from the perspective of the model creator. Such standpoints are seldom being explicitly described in formalised method descriptions (Fitzgerald et al. 2002, Päivärinta et al. 2010) which means that there has to be done some analysis in order to derive the rationale. Ågerfalk (2006) makes explicit the rationale of the agile manifesto, described by a set of values and principles. He does this by extracting goals from the principles and by modelling these goals in goal clusters showing the interrelation between goals and relating goals to values. In the same vein Karlsson (2012) discusses method components as the elements expressing the rationale as goals and values. Karlsson considers that one component can be used to achieve several goals, and a given goal can be achieved by more than one method component. He notes further that goals exist at different granularities, where lower level goals are intended to fulfil higher level goals, and that goals thus exists in hierarchies or networks.

To summarise, a feasible way to move towards an ITG evaluation tool, for the comparison of ideals with actions, is to apply analytical constructs from research concerning system development methods. The deployment perspective provides a straightforward perspective on the deployment process from model construction to model use. The concept of model rationale has capacity to be a fruitful theoretical foundation for comparing ideals with practice. We also think that the rationale concept bring clarity, structure and comprehensiveness to the analysis. Model rationale can be articulated by identifying the intrinsic goals and values in the model embedded in different model components. Goals on different levels can be expressed as goal clusters or goal hierarchies.

3 Case and research procedure

Here we describe our case, the used research approach and analytical procedures.

3.1 Case: Deployment of the ITG model pm3 in a large healthcare organisation

3.1.1 IT-governance and pm3

pm3 is a well-known and widespread ITG model in Sweden, originally developed for an ITSM context. pm3 originates from academia and has its roots in the Scandinavian School of Information Systems (Iivari and Lyytinen, 1996). The model stress the need

for good organising of IT governance and maintenance (and further development) and compare this practice to the significant project tradition in the IS field (Nordström and Welander 2007). The model has been theoretically grounded in action and practice theories as well as in a sociotechnical perspective (Nordström, 2005). The pm3 model (På AB, 2014) has been further developed and refined through hundreds of implementations and in knowledge cooperation between the pm3 vendor and the organisations using pm3. Basically pm3 organises IT and business collaboration on two levels; on a team level and on an organisational level.

pm3 team level, central concepts and model components:

Maintenance object (MO): A maintenance object contains work practice-components (e.g. processes, templates, concept definitions) and IT-components (as IT-systems, applications) in support for a defined work practice. Maintenance objects are a way of delimiting responsibility for maintenance teams, which covers IT service management as well as work practice management and technical development.

Maintenance assignment: The maintenance assignment is described in a maintenance plan. The maintenance plan has the function of a project plan, governing IT service management and IT development for a maintenance object. The plan contains a time-limited assignment for the team were goals and maintenance results, of benefit for the work practice, are clearly defined.

Maintenance team: The central mechanism of the team is to establish collaboration between the work practice units and the IT-department, the team is proportionally staffed with competencies from both work practice and IT. The team is working towards goals and according to a maintenance plan.

pm3 organisational level, central concepts and model components:

Maintenance Object Architecture (MOA): The MOA is an overall description of all maintenance objects categorised and grouped into portfolios based on type of work practice support.

Steering committee structure: On the organisational level there is a structure of steering committees with explicit roles, responsibilities and relations to each other. The governing structure is for example responsible for approving maintenance plans (e.g. yearly), making priorities and coordination between MOs and with business strategies.

3.1.2 The healthcare organisation

The studied healthcare organisation provides health care to the south region of Sweden and consists of 5 hospitals and approximately 150 health centres. The deployment of pm3 had begun in late 2010. Establishing the model in the organisation included: education, analysis and definitions of roles, redefinition of all the IT-systems and applications into 19 maintenance objects in an overall maintenance object architecture. The implementation also included recruitment and staffing of 19 maintenance teams, one team for each maintenance object. Each team had set up separate maintenance plans with yearly assignments for their maintenance object. At the time of our arrival at the site, in September 2011, they were setting up steering committees responsible for overall level priorities and coordination.

One could say that the pm3 implementation had been performed bottom-up starting with getting day-to-day ITSM operations into action, all personnel that we collaborated with were skilled in pm3 concepts and mechanisms, and necessary documents

and plans were in place. The teams were confident with the model and convinced of pm3s abilities to bring the awaited order. Interestingly, we could see that the implementation had been guided by different values. For the top management, the pm3 implementation was in line with the establishment of a strong and overall governance model, providing better control and efficiency, where the pm3 implementation was one part. Parallel with the pm3 implementation there had been several restructuring projects concerning outsourcing, reorganisation of IT-departments and centralisation of IT-systems and services on a regional level. The IT managers on the other hand, welcomed the pm3 model as a tool for bringing order and structure into daily operations of maintaining, sustaining and developing IT-systems towards business benefits balancing the needs in the care practices with the right kind of IT-support. Occasionally we got the impression that the IT-managers perceived pm3 as a cure against ad hoc, cumbersome and top-down management. We actually found that there was a widespread worry amongst IT managers that the top management would abandon the pm3 model prematurely if they could not account for fast results.

3.2 Research approach and procedures

The study has been conducted with a practice research approach (Goldkuhl 2012) and has a course of action similar to action research (Susman and Evered 1978). The research design was chosen in order to capture the complexities of organisational work by studying the empirical field as interconnected human practices and to contribute to general practice with abstract and useful knowledge. The research questions for the study were discussed in collaboration with the team responsible for the deployment of pm3 and especially with the model champion. The deployment team's main question was whether they had succeeded in the implementation of the pm3 model. They wanted to know if they had made the implementation according to the original model and if they succeeded in working according to the model in practice. Further they were interested in where their implementation was in compliance with the ideal model, and if and where deviations from the model had occurred and what that was due to. These questions overlapped with our research interest and in this study we concentrate on the development of the evaluation tool that was construed in order to investigate if the pm3 deployment were in compliance with the original model.

One important factor for the conduct of the study was the composition of the research team. The research team was chosen in relation to researcher knowledge and background in order to maximise knowledge and minimise bias; one of the researcher (second author) is the pm3 model developer and one researcher (first author) had no previous experience of the model. This researcher constellation provided an exclusive opportunity to make an in depth reconstruction of the model rationale of pm3. The other participants selected were the model champion in the organisation and her assessor and two maintenance teams working according to pm3 in the healthcare organisation. The two maintenance teams consisted of 4 persons each with roles according to pm3. The first team was responsible for the maintenance object 'internal web based communication' and the second team was responsible for 'specialist medical records' (e.g. pregnancy, physical therapy).

The overall research design comprised five steps that are discussed in more detail below: (1) Data collection concerning model use 2) Reconstruction of pm3 model rationale 3) Comparing model rationale with model use 4) Validation of the ITG evaluation tool in practice 5) Reflection and lessons learned).

3.2.1 Data collection concerning model use

The starting point and main source of data collection concerning model use was the maintenance teams' stories, or narratives, about their work. Each team selected two different episodes of change management that they had performed. They were instructed to choose one case that they considered to be successful and one case that had failed. The cases were then analysed and reconstructed together with the two different teams in two workshops that lasted 3.5 hours. Complementary interviews with 4 team members were held, also one project leader and one IT manager was interviewed. Each interview lasted just over an hour. In the workshops and in the interviews we paid particular attention to activities, problems and goals in order to understand the teams work processes, problematic areas and what goals that had guided their operations (Lagsten 2011, Goldkuhl and Röstlinger 2005). We also analysed an extensive amount of documents, such as minutes from project meetings, plans, requests for changes, steering documents and project documentation. The purpose was to develop a detailed understanding of what had happened in the cases and how the teams had been working and communicating. The pm3 champion, responsible for the overall model implementation, was also interviewed at several occasions during our time at the site.

3.2.2 Reconstruction of pm3 model rationale

The second step was to analyse and define the rationale of pm3 in-concept that resulted in an explication of pm3 rationale. We used the concept of model rationale, as explained in section 2.3, in the analysis. Beside the study of pm3 model documentation a two-day workshop was conducted were the pm3 model developer was interviewed in depth concerning the goals underpinning the pm3 model and their relations. The main question elaborated in order to explicate the rationale was what assumptions, of desirable and needed states and conditions (goals) are built into the pm3 model and how these are related in order to achieve higher level goals that are assumed to be reached by using the model. The technique used here was goal analysis (Goldkuhl and Röstlinger 2003). During the workshop the researchers worked together with developing four goal graphs expressing the pm3 rationale, figure 3 and 4 are results of this analysis. A goal graph shows how underlying goals contribute to achieving higher-level goals and becomes a formal reasoning scheme (van Lamsweerde 2001) expressing the logic or rationale.

3.2.3 Comparing model rationale with model use

The empirical material from the first step was analysed for the two separate teams by comparing each expressed goal, in the four goal graphs, with the way that the team had been working concerning the goal. This analysis means to compare model rationale with model use, which is comparing pm3-in-concept with pm3-in-use. The comparison is an evaluation of the team's status with the pm3 rationale as criteria. We used 3 markers in the evaluation; red (not at all), yellow (partly) and green (completely) for marking out the teams status concerning each goal. The evaluation of the mechanism 'business-like maintenance team' is illustrated in figure 5 for the internal communication team and in figure 6 for the specialist medical record team. A commentary explaining the reasons for each marker was also established. In this phase

complementing interviews and document studies were conducted in order to collect completing data.

The goal graphs expressing pm3 rationale were consequently transformed into an evaluation tool for evaluating the compliance to the pm3 model-in-concept.

3.2.4 Validation of the ITG evaluation tool in practice

The fourth analysis performed was the test of the evaluation tool. The evaluation tool was tested and validated in the study in three ways: 1) in the mapping of the empirical material 2) by presenting and discussing the tool in a yearly conference for pm3 users where about 40 organisations participated 3) in two feedback workshops at the healthcare organisation where the four graphs where used for presenting and discussing the evaluation results with the two participating maintenance teams. The validation is further discussed in section 5.2.

3.2.5 Reflection and lessons learned

The last step in the analysis is to pass a judgement of the benefits of the designed approach for evaluating an IT-governance model-in-use. The approach, presented in this paper, was designed by joining three components into a coherent evaluation tool. The combined components are 1) the deployment perspective, 2) the concept of model rationale and 3) the goal graph technique. We perform this concluding analysis by discussing our experiences and what we believe this approach contribute with in the discussion in section 5.

4 Evaluation results

4.1 pm3-in-concept

The reconstruction of pm3 rationality, which represents pm3-in-concept, is based on the three central mechanisms in pm3 at the team level which are: ‘Efficient maintenance objects’, ‘Explicit maintenance assignments’ and ‘Business-like maintenance teams’. The goal graph in figure 3 expresses the overall rationale of pm3 where the overall goal is to achieve sustainable IT/business alignment.

The three central mechanisms in pm3 build on each other; Efficient maintenance objects (1) are at the base and a means for achieving Explicit maintenance assignments (2) and Business-like maintenance teams (3). (Note that we have numbered goals for practical reasons of making it easier to discuss the content in the graphs; the numbers do not consider any pm3 logic). Implementation and deployment of pm3 is expected to lead to Good organisation (control) of all maintenance and development activities (4). This in turn will bring a situation where the Maintenance organisation is separated from the line organisation (6), meaning that the maintenance organisation should be built up by autonomous units with clear goals and time-based assignments in the same way that project organisations are organised. This in turn will lead to a situation of Governable IT (7), and the overall goal of Sustainable IT/business alignment (8). An important result of implementing and using a model shared by all is that the model brings a Mutual language (5) which makes it possible for stakeholders to meet in Knowledge development (9) and ongoing dialog concerning improvement of ITG practice in the organisation.

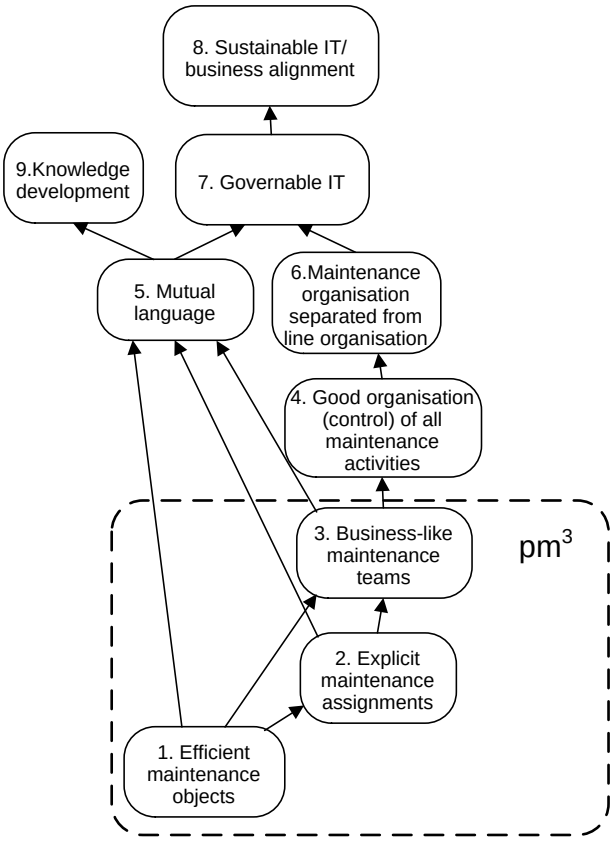

Figure 3: Overall pm3 rationale.

We have developed detailed goal graphs explaining the logic for each central mechanism in pm3 (goal 1, 2 and 3 in figure 3 above) but we choose to only show the graph for "Business-like maintenance teams" to illustrate our study for limitation reasons. The goal graph for 'Business-like maintenance teams', below in figure 4, shows in detail the logic of the goal number 3 in figure 3 above. The central mechanism of the maintenance team is to make up collaboration between work practice (business) units and IT units. The team should be proportionally staffed with competencies from both work practice and from IT. In figure 4 are Efficient maintenance objects (5) a precondition for Clarified stakeholders (6), which is a precondition for Clarified roles of responsibility (7) in the maintenance team. The other precondition, for goal number 7, is that there is a Role structure coordinating work practice and IT roles (9) that is described for the whole maintenance organisation. A central idea with the team is that the members have Shared responsibilities for different parts of the work (3). In order to accomplish this, General and shared work procedures (12) are necessary, as well as an Explicit maintenance assignment (1), which in turn is a precondition in order to tailor the staff for the Assignment (2). A Buyer-vendor relationship (8) is also a goal, and, in order to accomplish this balanced situation, it is necessary that members in the team keep a Professional attitude and behaviour (10) that, for example, includes acting according to the expressed professional roles and responsibilities. Finally, a Mandate and level based decision-making structure (4) is a prerequisite for establishing Business-like maintenance teams.

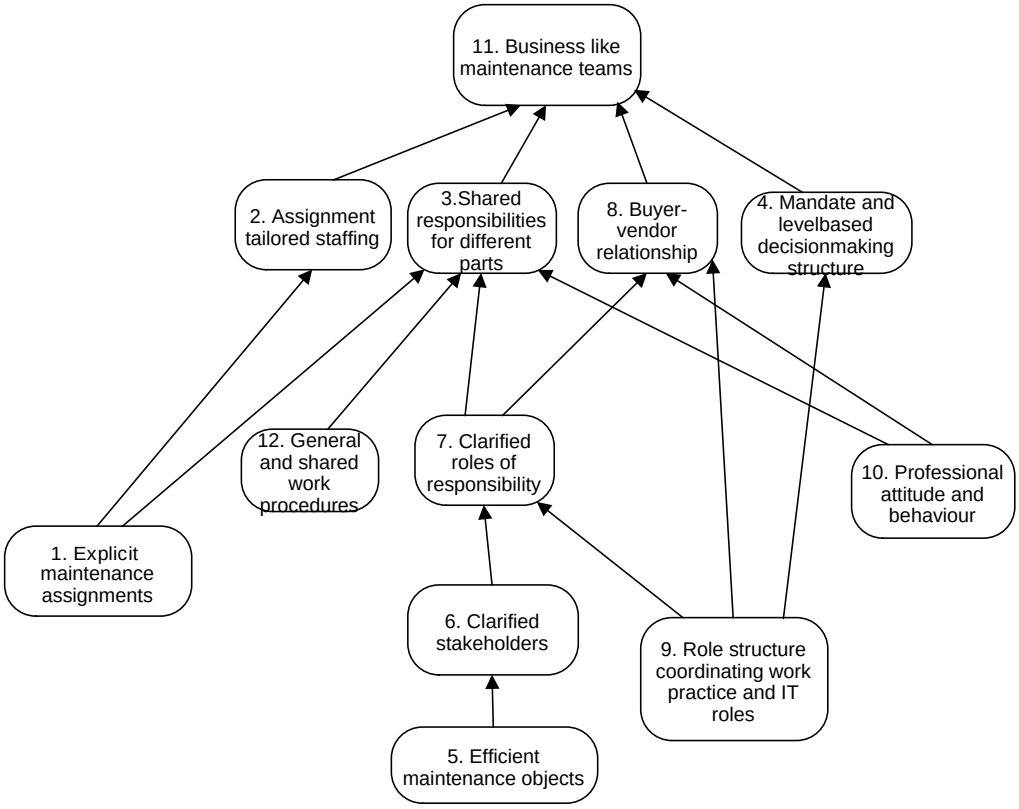

Figure 4: The rationale of 'Business-like maintenance teams' in pm3.

4.2 pm3-in-use

By comparing the rationality expressed in goal graphs with how the teams were working in daily operations we made findings concerning the deployment of pm3. The next two sections show how we have used the graph as an evaluation tool by using coloured markers. We used 3 markers in the evaluation; red (not at all), yellow (partly) and green (completely) for marking out the team's current status concerning each goal.

4.2.1 Evaluation of 'Business like maintenance teams' - Internal communication

By comparing the maintenance teams' narratives of successful and failed cases and analysis of documents (e.g. maintenance plans, project plans and request for changes) concerning each goal we could evaluate to what degree they were meeting the goals. Figure 5 contain the evaluation of the maintenance team for internal communication and figure 6 illustrates the same for the specialist medical record maintenance team.

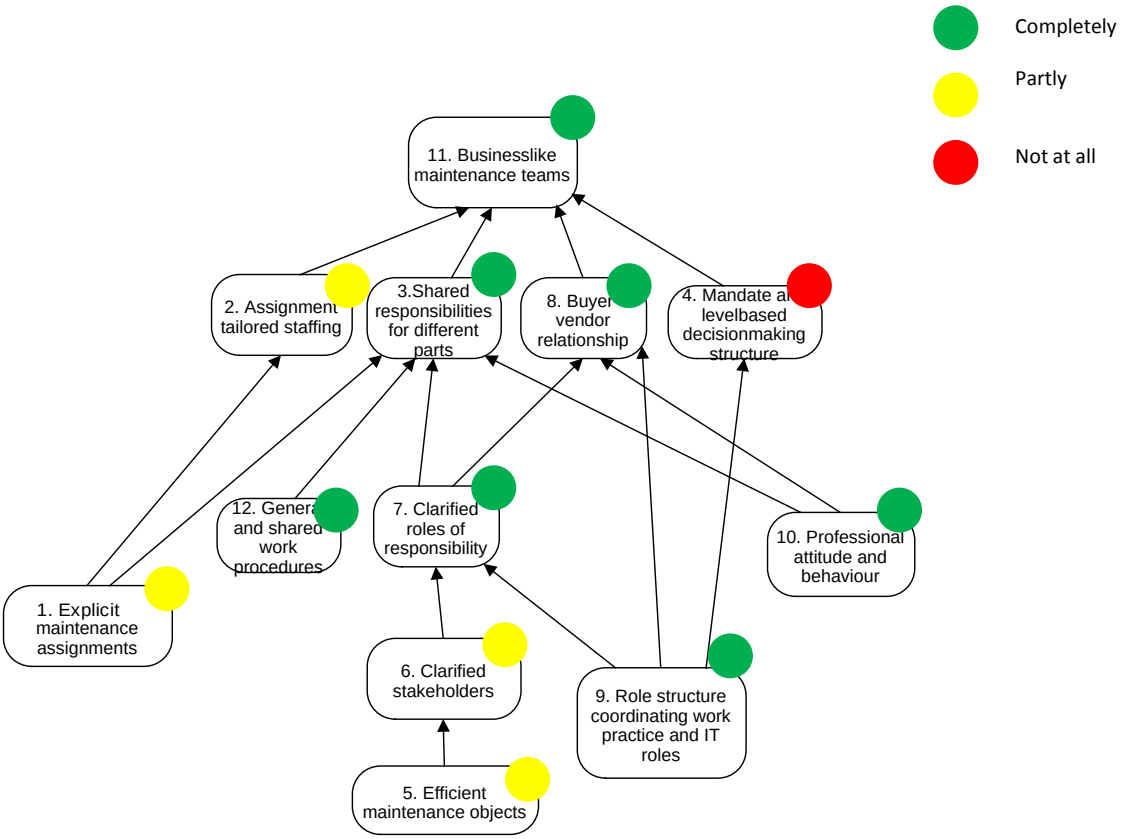

Figure 5: Evaluation of 'Business like maintenance teams' - Internal communication.

The marker for clarified maintenance assignments (1) and efficient maintenance objects (5) are inherited from separate analysis based on goal graphs for these areas in pm3. The evaluation showed that parts of the maintenance assignment were missing in the maintenance plan and that it therefore was difficult to staff the entire maintenance assignment (2). Similarly, the evaluation of the efficient maintenance object (5) showed that the work practice parts of the maintenance object were missing. Due to this, all stakeholders were not identified (6). However, the parts that the existing maintenance team covered fulfilled the intentions in pm3. Roles of responsibility were clarified (7), and the role structure coordinating work practice and IT roles was defined (9). The team shared responsibility for different parts (3) and the maintenance team had general and shared work procedures. The collaboration was characterized by a buyer-vendor relationship (8) and the holders of the roles acted with a high degree of professional attitude and behaviour (10). The only red marked goal for this maintenance team was due to the fact that the level of responsibility exceeded the maintenance team's mandate (4), which made it hard for them to decide on central questions. This could be explained by an organisational decision in the deployment process of pm3. Our conclusion from the evaluation is that the role structure was clarified, the work procedures were described and working, and that the holders of the roles had a high degree of professionalism.

4.2.2 *Evaluation of 'Business like maintenance teams' - Specialist medical records*

The markers for clarified maintenance assignments (1) and efficient maintenance objects (5) are inherited from separate evaluation based on goal graphs for these areas. The definition and management of objectives did not work in this team, and it was therefore difficult to reach a staffing in line with the maintenance assignment (2). In the maintenance plan we found clarified stakeholders (6), clarified roles of responsibility (7), and a role structure that coordinated work practice roles with IT roles (9). But the narratives told us about a maintenance team that did not share responsibilities (3) and that also lacked general and shared work procedures (12). We partly traced this back to the role holders' lack of professional attitude and behaviour, which lead to a non-working buyer-vendor relationship. We also identified a problem with the mandate for the maintenance team (4), similar to the one for the internal communication team. Our conclusion from this evaluation is that the structure of the roles was clarified but the team lacked general and shared work procedures and a professional attitude preventing them to be business-like in operations.

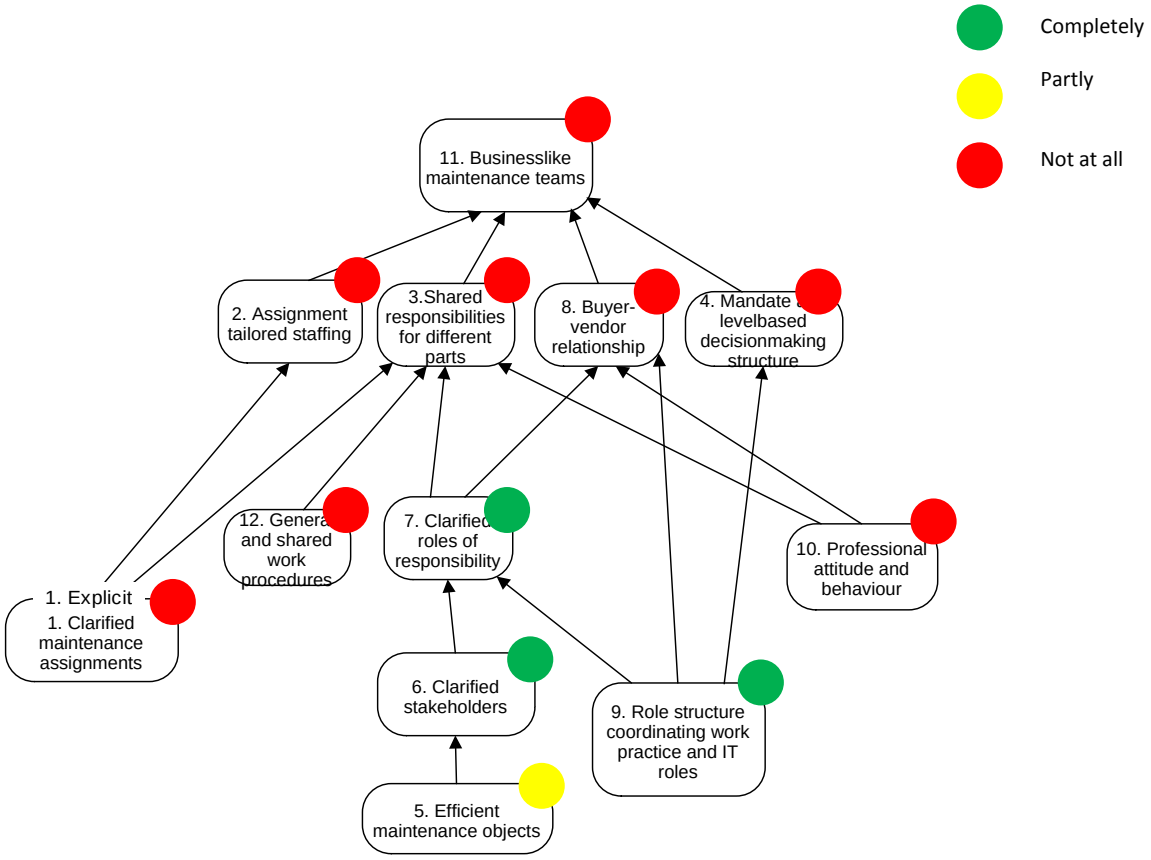

Figure 6: Evaluation of 'Business-like maintenance teams' - Specialist medical records.

5 Discussion and contributions

We have identified three contributions from our study that we believe are important to discuss. First, we have defined and expressed the rationale in an IT governance model in a clear manner. Expressing this rationale give guidance on how it is intended to achieve sustainable IT/business alignment by the use of the ITG model (section 5.1). Second, we have used the deployment perspective in combination with pm3 rationale as an evaluation method that has proven to be useful in organisational practice (section 5.2.). Third, the evaluation results also identified main problems in the deployment of the ITG model in the investigated healthcare organisation (section 5.3).

5.1 IT Governance model rationale

The pm3 rationale, expressed in goal graphs, explains how central concepts and desired states are related in the pm3 model. The rationale expresses how goals intend to lead to higher level goals in formal reasoning schemes. Expressing the rationale serves as a grounding process for the pm3 model which ensures that there is congruence between different parts of the model and that the model is consistent. Expressing the rationale contributes to assessment and further development of the pm3 model. This study has had an impact on the latest version of pm3 where clarifications concerning the importance of professional attitude and behaviour has been added. The expressed rationale should also be helpful when comparing pm3 with other models for IT maintenance and governance as for example ITIL.

In addition, the expressed rationality should be especially useful when working with deploying the model in an organisation as part of education. Expressing the rationale allow detailed discussion and dialogue and could assist in creating realistic expectations, identifying colliding mind sets or developing more conscious adaptions of the model on an organisational level.

5.2 Evaluation method

In this study we have designed an evaluation method for evaluating an IT governance model-in-use. The evaluation method was designed by joining three components into a coherent evaluation tool; the combined components are 1) the deployment perspective, 2) the concept of model rationale and 3) the goal graph technique. The evaluation contributed to useful results and we could diagnose model-use in detail at the team level and identify which goals had been achieved and which goals that had problems.

The results from the evaluation are judgments concerning if the deployment has implemented the conceptual ITG model, comprising various ITG practices, as intended. The conclusions that can be made from the evaluation results concern deviation and compliance to central practices prescribed by the model. And maybe more important, the results make evident complex relationships between different ITG practices. By the use of the graphs these relationships can be discussed, analysed and questioned by model users giving rise to learning and improvement. The logic inherent in the method builds on assumptions that might not fit the organisational context, then the evaluation could provide understanding for developing a more useful adaption of the ITG model. The model rationale in the graphs could also be used as self-assessment tools for different parts of the ITG organisation and stimulate dialog and learning as base for continuous improvement of the overall ITG practice.

The evaluation method has been validated in the study in different ways. The mapping of the empirical material required to compare the empirical data with the goals in the graphs and make a judgement of if the goal was completely, partly or not at all fulfilled. The comparison and judgment could be performed without analytical troubles, due to logical mismatches between empirical data and the structures in the graphs, which we mean is a validation of the evaluation method. In this analysis we also found that higher level goals could be fulfilled in other ways than what was suggested by the pm3 model. Certainly there could be different lower level goals or states leading to desirable higher level goals. The usefulness was also confirmed in the feedback workshops with the two teams where the graph technique, with red, yellow and green markers, proved to be a strong pedagogical tool for feed-backing evaluation results and learning. The use of the marked graphs established a fruitful and detailed dialogue with team members where actions and measures were identified and analysed, both as separate parts and as a whole. We especially noticed that the marked graphs were helpful when presenting critique and "misuse" of pm3 because we could explain the critique in a context and this provided a constructive perspective. The main advantage of using the graphs is that they give support for zooming in on one part or goal as well as zooming out on the whole context, which we perceived productive both in our analysis and in the dialogue together with the model users. Finally the evaluation method and the case was presented and discussed at a conference with professional pm3 users from other organisations. At this meeting the discussions with other model users showed that the evaluation approach is both comprehensive and of value for similar practices.

5.3 Evaluation results

From our evaluation we found that the studied healthcare organisation seemed to have problems at the "heart" of IT governance - the IT/business alignment. The evaluation of how the teams used pm3, based on the rationale in the three different goal graphs, showed that maintenance objects, assignments and teams focused on IT components, separated from their work practice context. We believe this is a consequence of an IT biased deployment process where important work practice components and roles had been omitted. According to pm3 it is unlikely to reach IT/business alignment when only scooping IT and engaging IT people. We also found that a less structured maintenance team could perform successfully (internal communication) through a high degree of professionalism by the role holders. And, correspondingly, well-described maintenance plans and role structures (specialist medical record) are not enough; the role holders must take on professional attitudes and behaviours in order to put plans and structures into a successful work performance.

5.4 Limitations

A limitation in this study in that we do not offer detailed instructions on how to make the data collection concerning the method-in-use, this is a subject for further research. Our own data collection method and procedure for comparison is described in the methodology section (in 3.2.1 and 3.2.3), however this description is still too brief in order to function as evaluation methodology. Another limitation is that we do not discuss the proposed evaluation method in relation to other methods for evaluating ITG models. In our study of the ITG literature we have not found a systematic ap-

proach for evaluating an ITG model- in-use which is the reason for why we instead turned to the literature concerning method rationale.

6 Conclusions and future research

Deploying a new model for IT governance in large healthcare organisations is a complex undertaking. IT governance models are compound comprising various ITG practices and operates cross organisational borders involving all management layers. In order to gain the benefits from implementing an ITG model there has to be a broad understanding of the model's practices and rationale.

In this paper we have proposed an evaluation method for evaluating an IT governance model. The base for the evaluation is the ITG model-in-concept that is compared with the ITG model-in-use. We have approached the development of the ITG evaluation method from a deployment perspective where we also have applied the concept of model rationale. ITG model rationale expresses the intrinsic values and goals of an ideal model. Further, we suggest that the goal graph technique is appropriate in order to express the rationale in a clear manner. Goal graphs enable the comparison between ideals and actions by the decomposition of complex rationale into goal hierarchies. Separate goals in these hierarchies can then be compared with corresponding model-following actions. We have tested the method by using it in an evaluation of an ITG model deployment at a large hospital where the usefulness of the evaluation approach has been demonstrated.

Our next step is to carry out a more systematic review of the ITG literature in order to identify and compare evaluation approaches in this area. Another path of our future research is to further explain the pm3 model and compare pm3 with similar models and practices in the ITG field.

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