New Development of Advanced ITG Framework

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Abstract
Recent research has begun to place greater emphasis on the strategic use of IT in seeking to build firm’s capability, thus innovating firm’s business value. In this context, many leading firms have been put efforts to formulate agile structures, processes, and governance mechanisms for firm’s IT activities but there is lack of conceptual framework to understand how well ITG is formed within the organization. Recent literature reviews found that ITG framework have been discussed independently rather than in an integrated and convergent manner failing to provide a comprehensive conceptual framework. The objective of this paper is, therefore, to develop a conceptual ITG framework that reflects current research gap and useful for further research and development of IT research fields.

1. Introduction
In recent years, Information technology (IT) is becoming an essential element of conducting business activities. Accordingly, investments in IT are rapidly increasing each year, and the risks associated with IT are also increasing in proportion [2],[9],[16]. In turn, ITG has become a stronger focus of attention than ever. What is ITG? As an extension of corporate governance, ITG is an attempt at introducing IT as a legitimate object of governance, implementing an official governance system based on which achievements in IT areas are continuously coordinated and controlled, and assuring accountability of IT related decision making [21],[22].

Despite such perceived importance, however, it is not yet to clearly defining the concept of ITG. In particular, there are ongoing debates regarding the difference between ITG and conventional IT management and control, what should constitute the target domain of governance and how various approaches and tools of ITG are related [12],[15],[18]. Various definitions and descriptions of ITG and conceptual framework have been proposed in both the academia and practitioners. Lee et al. summarized them based on a comprehensive survey of literatures and reviewed that ITG research categorized into three different research perspectives; ‘strategic alignment between IT and business’, ‘decision-making rights and accountabilities’ and ‘governance structure and process’ [12]. However, it has been pointed out the three domains of ITG are being discussed independently rather than in an integrated and convergent manner, failing to provide a comprehensive ITG framework that can be shared by those involved in the field.

The objective of this study is to develop a comprehensive ITG framework that reflects research gap founded by previous literature reviews and aims to contribute practitioners to understand how well ITG is formed within the organization. The conceptual framework was developed and encompasses the attributes of various frameworks that have been developed in academics. The proposed ITG framework should be useful for further research and practice of IT research field.

2. Proposing ITG Framework
2.1 Structures of Advanced ITG Framework
It is important for the ITG framework to incorporate the objectives of defining the domains and boundaries of ITG, distinguishing its elements and specifying their relationships. Based on the implications from the survey of past literatures, the implementation of the ITG framework is divided into four major domains for this study as illustrated in Figure 1.
The four domains can be summarized as follows. First is the domain for establishing the concept of ITG. It specifies the objects and the activities of ITG and distinguishes them from conventional IT activities. Second is the domain for specifying the objective system for ITG. The effects sought through ITG are elicited based on the concept of corporate governance and the relationships among the objectives are specified. Third is the domain for establishing the principle system for ITG. The aforementioned ITG objectives are summarized in the form of specific ITG principles, which become links between the means and the objectives of ITG. Fourth is the domain for designing the ITG execution system. It distinguishes overall activities that implement the ITG principles proposed earlier and designs the organizational and tactical structures for their execution. The objectives, principles and execution structures of the ITG framework developed for this study are expected to act as the foundation for introducing ITG and developing implementation policies. This study provides an initial attempt at development of such policies.

2.2 Conceptualization of ITG

The ITG framework starts with a clear establishment of the concept of governance. The act of establishing the concept of governance has several connotations. Syntactically expressed as ‘An enterprise governs A for B through C,’ the following conceptual elements need to be defined.

A. What are the objects of governance? (Objects)
B. What are the objectives of governance? (Objectives)
C. What are the means of governance? (Means)
D. What constitutes governing activities? (Constitution)

If the concept of governance is established as above, two major problems can be posed. First is the failure to clearly distinguish the objects, objectives, means and constitution of governance, which is causing a great deal of confusion in establishing the concept to governance.

For example, if strategic alignment is regarded as an object of ITG, governance can be understood as various efforts to achieve strategic alignment [2],[3],[4],[10],[11],[12],[13]. Conversely, strategic alignment can also be recognized as one of the activities that constitute ITG, or an activity carried out to achieve a higher governance objective. The second problem posed in establishing the concept of ITG is the problem of logical completeness. In other words, the concept of governance, whether as objects or activities, must be elicited with clear logical bases and standards. Otherwise, governance fails to be defined as a unified conceptual domain and its scope and boundaries become vague. Most of current discussions of ITG fail to satisfy logical completeness [13]. For example, ITGI does not offer convincing answers to why there should be five domains and whether there should be additional domains that need to be dealt with. A company in Korea added domains such as IT diagnostics to the five domains of ITGI. However, they also failed to provide clear bases or standards for eliciting the new domains, leaving an impression that their domains were established in a spontaneous and arbitrary manner.

Summarizing, the implementation of ITG framework starts with establishing the concept of governance, which must be defined by clearly distinguishing the objects, objectives, means and constituting activities of governance. Furthermore, the framework must be drawn with clear logical bases and standards.

As examined earlier, defining governance according to the substance of IT activities creates numerous problems, calling for an approach from a new perspective. The new approach can be identified when governance is defined from the objective perspective of ITG rather than the substance of IT activities. The main objective of ITG is securing effectiveness, transparency and accountability of IT activities. Defining governance from the objective perspective involves looking at it as efforts to examine whether IT activities are being carried out in accordance with governance objectives, in an effective, transparent and accountable manner, rather than differentiating governance and non-governance based on the substance of IT activities. Let's examine how
objective-based definition of governance is different from the substance-based approach.

First, in terms of the scope of governance, whereas substance-based concept of governance regards certain parts of enterprise IT activities as the governance domain, objective-based governance incorporates every enterprise IT activity into the object domain. This avoids the pitfall of arbitrary division between governance and non-governance based on the substance of activities. Second, changes in enterprise IT activities brought about by the introduction of ITG are demonstrated. In the case of substance-based governance, there have been many questions regarding the changes that ITG brings. This is because governance activities were no more than renaming or reconstructing some of enterprise IT activities. According to object-based governance definition, however, new activity axes of confirming and securing effectiveness, transparency and accountability are added to every enterprise IT activity. Third, the objects and the constituting activities of governance are clearly distinguished. As mentioned earlier, the conventional ITG methodology does not clearly define whether the proposed domains are the objects of governance or the activities that constitute governance, causing a great deal of confusion. Establishing governance domains based on objectives resolves the confusion. Specifically, every enterprise IT activity becomes the objects of governance, whereas the activities that constitute governance are defined by the means and the efforts to verify and secure the effectiveness, transparency and responsibility of the activities.

2.3 ITG Objective Structure

ITG can be regarded as the application of the concept of corporate governance to the IT domain. As an extension of corporate governance and with enterprise IT activities as the objects of governance, ITG can be described as efforts exerted by a company to verify and secure effectiveness, transparency and accountability of enterprise IT activities. ITG can be ultimately represented with the following three propositions.

1. Do IT activities contribute towards achieving enterprise objectives? (Effectiveness)
2. Are IT activities being conducted according to principles and standards? (Transparency)
3. Who takes responsibilities for IT performances? (Responsibility)

As it will be discussed in detail later, the effectiveness, transparency and accountability of IT activities are incorporated into specific principles of governance implementation. This is referred to as the "governance principle structure" in the framework proposed in this study. In order to implement these governance principles, necessary organizations need to be set up, related policy and process systems constructed and budgets and resources procured.

Figure 2 IT Activities Axes & IT Governance Objectives

It is necessary to examine the logical bases and standards based on which the objectives of ITG – effectiveness, transparency and accountability – are drawn. Without the logical bases and standards, we run into the arbitrariness problem of the substance-based definition of governance. As described earlier, ITG is defined as efforts to verify and secure the effectiveness, transparency and accountability of existing enterprise IT activities. From this viewpoint, ITG is a meta-level activity for existing IT activities, creating new activity axes. The role of ITG can be compared to a rope that tightly fastens existing IT activities to a pole. In other words, as numerous IT activities take place within an enterprise, governance ties the activities to the poles of effectiveness, transparency and accountability so that the activities do not drift away from the objectives and directions sought by the enterprise. We are well aware that in actuality, many enterprise activities are being carried out without clear goals or sense of direction simply for their own sake.

Under these circumstances, we need to ask the logical bases and standards, based on which the poles that bind enterprise IT activities - effectiveness, transparency and accountability - were drawn. The answer begins with the concept of activity mentioned earlier. Effectiveness, transparency and accountability are words that modify activity, and their logical bases can also be found in the concept of activity. Figure 2 visually demonstrates how they are elicited from the
concept of activity axes described earlier.

As shown in the figure, effectiveness, transparency and accountability are concepts created based on the combination of three axes of <objective>, <subject> and <process>. Effectiveness is a concept created by the combination of <objective> and <process>, transparency by <process> and <subject> and accountability by <subject> and <objective>. Prior to examine the significance of the combinations, however, there is a need to take a closer look at the significance of the activity axes.

The <objective> axis must be understood as a concept axis that encompasses the lower concepts of 'goal' and 'result'. Every enterprise activity has a purpose of achieving an objective and creates a result, and the result is compared with a specific goal. Such goal-result comparison is fed back to control existing activities and establish new goals.

The <process> axis is a conceptual axis that contains the 'method' and 'execution' of activity undertaking. It signifies that every activity needs an explicit or implicit specification of how the activity should be conducted, or the approach to execution, and that the action has to be actually carried out. The activity 'process' is a conceptual axis that represents the concepts associated with the actual execution of the activities.

Finally, the <subject> axis is a conceptual axis that includes multiple lower concepts, more specifically not only 'subjects' as primary performers but also 'organizations' and 'structures'. It implies that although every activity has a subject, it is neither singular nor independent, and must be understood against the backdrop of the organization's structure and hierarchy.

When the significances of the three activity axes of <objective>, <process> and <subject> are elaborated and expanded to <goal-result>, <method-execution> and <organization-structure>, it can be learned that effectiveness, transparency and accountability are concepts logically elicited from the mutual relationships established by the three axes, as shown in the figure. In other words, the three concepts are relational descriptors that modify the domain of relationships. Let's examine this in more detail. First, the 'effectiveness' of an IT activity is the act of carrying out the activity and comparing its result to the original goal. As figure 2 visually illustrates, it involves examining IT activity's result by projecting the activity on the wall created by the <activity-execution> axis and the <organization-structure> axis. Second, the 'transparency' of an IT activity is associated with whether the activity subject is carrying out the activity according to procedures. It projects the activity on the wall created by the <activity-execution> axis and the <organization-structure> axis. Third, the 'accountability' of an IT activity asks the activity's subject to be responsible for the result of the activity. It projects the activity on the wall created by the <goal-result> axis and the <organization-structure> axis.

2.4 ITG Principle Structure

The second element of the ITG framework is the ITG principle structure as shown in figure 3. The principles are drawn from the ITG objective structure described in the previous section and act as links between the ITG objective structure and the ITG means structure, which will be explained later.

This study invokes the principles in the ITG framework recommendation recently proposed by ISO 38500 as the common principles of ITG [8]. The recommendation provides six principles required for implementing ITG and how to evaluate, direct and monitor activities in accordance with the principles. Although the recommendation is subject to revision, it bears significance in that it is the first international standard proposed for ITG. The governance principles proposed by ISO as common principles are outline as follow [8].

**Common Principle 1. Establish clearly understood responsibilities for IT**
**Common Principle 2. Plan IT to best support the organization**
**Common Principle 3. Acquire IT validly**
**Common Principle 4. Ensure that IT performs well, whenever required**
**Common Principle 5. Ensure IT conforms to formal rules**
**Common Principle 6. Ensure IT use respects human factors**

![Figure 3 Construction of ITG Principle Structure](image-url)
The second category of ITG principles is the principles as premise conditions. These principles are premises to achieving each objective or the means deployed for the achievement when the principles drawn from the objectives and means of governance, or the objectives of ITG are established as effectiveness, transparency and accountability. The discussion of governance becomes meaningless without satisfying the premises. Table 1 summarizes the premises of governance objectives and means in the form of principles. These principles of premise conditions are not exhaustive and are expected to increase as we understand more about governance.

**Table 1 ITG Premise Conditions**

<table>
<thead>
<tr>
<th>ITG Premise Conditions</th>
<th>ITG Objectives</th>
<th>ITG Means</th>
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<tbody>
<tr>
<td></td>
<td>Effectiveness</td>
<td>Measurability</td>
</tr>
<tr>
<td></td>
<td>Traceability</td>
<td>Authorities and Responsibilities</td>
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<tr>
<td></td>
<td>Measurability</td>
<td>Compensation and Penalty</td>
</tr>
<tr>
<td>Presence of Architecture</td>
<td>Activity Architecture</td>
<td>Role Architecture</td>
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<td></td>
<td>Designability</td>
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</table>

Activity Principle 1. *IT activities must be traceable and measurable.*

Activity Principle 2. *Authorities, responsibilities, compensations and penalties associated with IT activities must be specified.*

Activity Principle 3. *Regulations and standards of IT activities must be specified.*

Activity Principle 4. *IT architecture must be established.*

Activity Principle 5. *The means of ITG must be designable and controllable.*

The third category of ITG principles is the IT activity principles, which are drawn from the IT activity axis explained earlier and regarded as the most specific principles.

As mentioned earlier, enterprise IT activities are complex phenomena that consist of the three axes of <goal-result>, <method-execution> and <organization-structure>, and the ITG objectives of effectiveness, transparency and accountability are concepts elicited from the combinations of the activity axes as shown in table 2. In turn, the principles according to governance objectives can be drawn based on the activity axes that constitute each objective. For example, ITG effectiveness is a concept established by combining the <goal-result> axis and the <method-execution> axis, from which the principles required for achieving effectiveness are drawn.

**Effectiveness**

Activity Principle 1. IT objectives must be aligned with management objectives.

Activity Principle 2. IT activities must be executed with maximum efficiency.

**Transparency**

Activity Principle 3. IT activities must conform to regulations and standards.

Activity Principle 4. IT organization must fulfill responsibilities of following regulations and standards.

**Accountability**

Activity Principle 5. IT objectives must be established in an appropriate and reasonable manner.

Activity Principle 6. IT organization must take responsibilities for IT performances.

The final category of ITG principles is IT risk principles as shown in table 3. IT risks associated with IT activities are inevitable aspects that exist on each axis of IT activities as well as the objectives of effectiveness, transparency and responsibility that are formed as combinations of the axes. For example, while effectiveness is an objective of IT activities, there are various risks associated with not achieving effectiveness. In other words, risks are like shadows that accompany all IT activities, and IT risk principles are provided to manage the risks.

**Table 2 ITG Objectives and IT Activity Axes**

<table>
<thead>
<tr>
<th>ITG Objectives</th>
<th>ITG Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness</td>
<td>Measurability</td>
</tr>
<tr>
<td>Traceability</td>
<td>Authorities and Responsibilities</td>
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<td>Measurability</td>
<td>Compensation and Penalty</td>
</tr>
<tr>
<td>Presence of Architecture</td>
<td>Activity Architecture</td>
</tr>
<tr>
<td>Designability</td>
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</tr>
</tbody>
</table>

Activity Principle 1. *IT objective risks must be managed.*

Activity Principle 2. *IT process risks must be managed.*

Activity Principle 3. *IT resource risks must be managed.*
managed.
Risk Principle 4. IT effectiveness risks must be managed.
Risk Principle 5. IT transparency risks must be managed.
Risk Principle 6. IT accountability risks must be managed.

Table 3 Risks associated with IT Activities & Objectives

<table>
<thead>
<tr>
<th>IT Activity Axes</th>
<th>Risk Category</th>
<th>Risk Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal-Result Axis</td>
<td>IT objective risks (Risks associated with establishing and achieving IT goals)</td>
<td>Insufficient alignment between IT and management objectives, Lack of appropriateness and rationale in establishing objectives, Lack of consent from constituents regarding objectives</td>
</tr>
<tr>
<td>Method-Execution Axis</td>
<td>IT process risks (Risks associated with IT execution and processes)</td>
<td>Lack of process efficiency, Insufficient conformance to regulations and standards, Insufficient execution achievements</td>
</tr>
<tr>
<td>Organization-Structure Axis</td>
<td>IT resource risk (Risks associated with securing and procuring IT resources)</td>
<td>Lack of awareness regarding conformance to regulations and standards, Lack of performance responsibility, Failure to secure IT resources and capacities</td>
</tr>
<tr>
<td>IT Governance</td>
<td>IT efficiency risk</td>
<td>Failure of enterprise achievements</td>
</tr>
<tr>
<td>Transparency</td>
<td>IT transparency risk</td>
<td>Lack of legal and policy responsibilities and public trust</td>
</tr>
<tr>
<td>Accountability</td>
<td>IT responsibility risk</td>
<td>Moral hazard</td>
</tr>
</tbody>
</table>

The ITG principles outlined above are generic principles generally required for implementing ITG. The generic principles can be defined more specifically based on the circumstances of each enterprise, and some principles can be added or removed according to enterprise's characteristics and the level of governance maturity.

The primary advantage of the principle structure described above is that it is drawn logically and systematically. While the international ITG standard proposed by ISO 38500 provides six principles that correspond with the common principles of the principle structure suggested in this study, it does not provide a convincing explanation regarding how the six principles were elicited and why there should be six principles. The principle structure proposed in this study starts with the concept of objective-based governance and creates IT activity axes that generate the objectives and the activity and risk principles drawn from the IT activity axes based on a single logical frame with a consistent flow.

The principles described above have correlations. The common principles are the highest principles that are defined more specifically than others. For example, the common principle that "IT roles and responsibilities must be clearly defined" is related with the premise principle "authorities, responsibilities, compensations and penalties associated with IT activities must be specified" and the risk principle "IT responsibility risk must be adequately managed". Each principle can also be more specified based on how the objects of governance are classified. If IT activities are further classified into IT planning, IT development and IT operation, above principles can be refined to fit the specific activities. In addition, each principle can be tailored for each activity area. For example, governance principles can be drawn for each IT decision-making area proposed by Weil and Ross including 'IT principles', 'IT investment and priorities', 'IT architecture', 'IT infrastructure' and 'application system requirements' [22].

In summary, the proposed principle structure is a generic structure for governance implementation that can be tailored according to the characteristics of the objects depending on how the objects are established.

2.5 ITG Execution Structure

The ITG execution structure was examined in three domains of structure: activity, organization and resource as shown in Figure 4. There are two issues that arise from designing the ITG execution structure. One is the issue of internal consistency. It addresses whether the means deployed to implement ITG can create overall harmony without causing conflict, implying that the design of the governance execution structure should be approached from a systematic perspective.

First, ITG activity structure refers to the structure of activities that implement the objectives and principles of ITG. The activity structure can be expressed in various forms for different enterprises. A point to note while specifying the ITG activity structure is setting an appropriate boundary between ITG and IT management activities [12]. As pointed out in the earlier discussion on the object of governance, it is not easy to conceptually
distinguish ITG from traditional IT management activities.

ITG specifies, legitimizes and externalizes the entire set of IT activities being carried out in the current organization. It has also been explained earlier as efforts to evaluate, modify and improve the governance objectives of effectiveness, transparency and accountability. The efforts of governance that involve specification, legitimization, externalization, evaluation, modification and improvement are initially reflected in the governance principle structure, and the implementation of ITG activity structure calls for specifying the efforts into appropriate concept of activity.

![Figure 4 Construction of ITG Execution Structure](image)

In here, the ITG processes were created based on the ISO recommendation [8]. Examining the significance of each activity, 'evaluation' is the act of evaluating the proposals and options for business IT activities, 'directing' is the act of directing and leading the establishment and execution of IT plans and policies, and 'monitoring' is the act of overseeing the performance and conformance of IT activities. 'Evaluation', 'directing' and 'monitoring' constitute a single activity cycle for implementing ITG.

Table 4 provides a more specific example of the activities that comprise 'evaluation', 'directing' and 'monitoring' ITG activities are established for specific governance objectives and principles. In other words, when there are specific governance objectives and governance principles drawn from the objectives, ITG activities specify the overall activities required for implementing the governance objectives and principles. Table 5 contains a more specific example of evaluation-directing-monitoring for some of related principles. As in the table, evaluation-directing-monitoring can be specified for each ITG principle.

![Table 4 Example of ITG Process](image)

<table>
<thead>
<tr>
<th>Principle Structure</th>
<th>Evaluation</th>
<th>Directing</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITG Activities</td>
<td>Options and Proposals for IT Business IT Application</td>
<td>IT Plans and Policies</td>
<td>IT Performance and Conformance</td>
</tr>
<tr>
<td>ITG Activity Structure</td>
<td>- Diagnostics and evaluation of current and future IT strategies and application</td>
<td>- Allocation of IT authorities and responsibilities</td>
<td>- IT application, measurement and analysis</td>
</tr>
<tr>
<td>ITG Org. Structure</td>
<td>- Analysis and evaluation of current and future management environment and IT requirements</td>
<td>- Establishment and execution of IT strategies and plans</td>
<td>- Verification of conformance to IT principles</td>
</tr>
<tr>
<td>ITG Resource Structure</td>
<td>- Examining the effectiveness of IT plans and policies</td>
<td>- Establishment of IT investment direction</td>
<td>- Verification of conformance to IT rules and regulations</td>
</tr>
</tbody>
</table>

Table 5 Example of ITG Activity Structure

<table>
<thead>
<tr>
<th>Principle Structure</th>
<th>ITG Activities</th>
<th>Evaluation</th>
<th>Directing</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Principle Structure</td>
<td>Examination and evaluation of IT roles and responsibilities</td>
<td>Instill IT roles and responsibilities and direct towards their fulfillment</td>
<td>Constant monitoring of whether IT roles and responsibilities are being fulfilled</td>
<td></td>
</tr>
<tr>
<td>Principle 1: IT activities must be traceable and measurable</td>
<td>Review, evaluate and select the means of tracing and measuring activities</td>
<td>Direct so that IT activities align IT and management objectives</td>
<td>Monitor whether activity tracing and measuring mechanisms are operating properly</td>
<td></td>
</tr>
<tr>
<td>Activity Principle Structure – Effectiveness</td>
<td>Review and evaluate the method of aligning IT and management objectives</td>
<td>Direct so that IT activities align IT and management objectives</td>
<td>Monitor IT performances from the view of aligning IT and management objectives</td>
<td></td>
</tr>
<tr>
<td>ITG Activities</td>
<td>Constant monitoring of whether IT roles and responsibilities are being fulfilled</td>
<td>Monitor whether activity tracing and measuring mechanisms are operating properly</td>
<td>Monitor IT performances from the view of aligning IT and management objectives</td>
<td></td>
</tr>
<tr>
<td>ITG Activities</td>
<td>- Review and evaluate the means of securing IT and IT conformance to regulations and standards</td>
<td>- Direct so that IT activities align IT and management objectives</td>
<td>- Constant monitoring of conformance to regulations and standards</td>
<td></td>
</tr>
<tr>
<td>ITG Activities</td>
<td>- Review and evaluate the means of securing</td>
<td>- Direct so that IT organization conduct its</td>
<td>- Ask IT organization of responsibilities</td>
<td></td>
</tr>
</tbody>
</table>
IT organization must take responsibilities for IT performances.

<table>
<thead>
<tr>
<th>Risk Principle Structure</th>
<th>IT organization must take responsibilities for IT performances.</th>
</tr>
</thead>
<tbody>
<tr>
<td>activities</td>
<td>while taking responsibilities for the performances</td>
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<tr>
<td>s for performances and provide adequate compensation and penalty</td>
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</table>

However, since ITG consists of 23 principles as explained in the previous section, specifying detailed activities for each of the 23 principles can make the ITG activity structure exceedingly complex. Accordingly, the enterprise needs to elicit significant governance activity groups while moderating the complexity of the structure [1],[17],[22].

ITG organization structure extended by adding decision archetypes based on Weil and Ross which are ‘Business Monarchy’, ‘IT Monarchy’ ‘Federal’, Feudal’ and ‘Duopoly’ [22]. We have determined to answer following questions: 1. Which proposed ITG principles can delegate or fit into appropriate organization types (i.e. decision archetypes)? 2. Which proposed ITG principles can allocate or fit into appropriate ITG activities?

Lastly, IT resource structure aims to identify what resources are available for comply certain principles or ITG objectives. Two different approaches are plausible to derive different ITG resources: Prescriptive & Descriptive and identify four different domains as shown in figure 5.

There are four ITG resource domains. ‘Social-Structure’ describes formal governance committees such as Board Level Committee, IT ROI Evaluation Committee and ITA review board. ‘Technical Structural’ or ‘Technical-Process’ can be describe as a formalized methodology such as IT COBIT [7], BSC(Balanced Scorecard), EA/ITA(Enterprise Architecture/IT Architecture), TCO (Total Cost Ownership) and ITSM (IT Service Management). Lastly, ‘Social-Process’ can be differentiated into two types: social process and human resource aspect. The former examples are such as SOX, Basel-II, Corporate Communication while latter aspect focuses on training and development.

![Figure 5 ITG Resource Structure: IT ROI](image)

Figure 5 ITG Resource Structure: IT ROI

However, all above meta-level concept generally introduced to ensure internal consistency among the elements of a structure is maturity, which signifies that the combinations of elements vary according to the level of maturity [6]. For example, in achieving 'effectiveness' of ITG, the combinations of governance means vary each area of structure, process, society and technology according to the level of maturity, which can be captured as the concept of 'maturity'. The level of maturity can be applied for each independent means. Taking the 'process' governance means as an example, the level of maturity can encapsulate how well the comprehensive sum of the processes is prepared. In such cases, research on the 'ITG maturity model' becomes required including the elements that determine maturity, what the level of maturity is and the combinations of element values they yield according to the maturity level.

Examination of internal consistency of the ITG execution structure is required from not only the viewpoint of maturity but also the contingency theory perspective, which claims that the combinations of governance execution means can vary according to enterprise's circumstances. In this case, the circumstances surrounding the enterprise must be studied in detail. Another issue regarding the design of the ITG execution structure is the requirement for comprehensiveness, which involves encompassing the entire governance domain and not relying on a particular methodology or technique. Most conventional ITG methodologies and techniques are devoted to particular governance objectives or means. As the examples, IT BSC focuses on effectiveness, Weill and Ross's decision-making theory on responsibility and the SOX conformance structure on transparency. As pointed out earlier, the governance execution structure proposed by the framework of this study escapes from methodologies and induces tailored...
combinations of means. Conclusively, the design of the ITG execution structure must implement a means structure equipped with internal consistency and comprehensiveness free from methodologies based on the level of governance maturity and the circumstance theory model.

4. Conclusion

Although the ITG framework proposed in this study offers a simple structure consisting of the three axes of governance objectives, principles and execution, it helps summarize and integrate the complex discussions regarding ITG.

First, the framework establishes the objectives and means of governance as independent axes to pursue conceptual clarity. One of the reasons that past discussions regarding ITG were confusing was that the objectives and means were not separated but mingled and intertwined. Second, the framework expands the horizon of awareness of the ITG concept into the social domain, whereas many of the ITG methodologies and tools currently being developed run the risk of being confined to the technical domain. In other words, the ITG proposed by the framework of this study is a Socio-Technical enterprise phenomenon that encompasses both social and technical domains. Third, the framework acts as the conceptual anchor for examining ITG. Although numerous concepts are being proposed regarding ITG, there are hardly any discussions about their similarities or relations. The framework of this study establishes a key conceptual anchor of ITG, aligns it with many related concepts that are currently being discussed to clearly understand and compare their significances. Fourth, the framework acts as the classification scheme. The framework of this study classifies the roles and functions of various ITG methodologies and tools according to their objectives and means and provides the correlations among them to help companies effectively design and implement ITG structures. Fifth, the framework offers external comprehensiveness, which deals with the issues of whether a framework is capable of representing all of existing methodologies, or conversely, whether existing methodologies can be positioned in the scope of the given framework.

As pointed out earlier, most traditional governance methodologies are complex and not singular in their objectives and means. They combine various governance objectives and means to construct a comprehensive methodology, which in itself is a compound governance phenomenon. The objective of the framework proposed in this study is to unravel the compound phenomenon. In other words, the framework identifies the primitives that constitute the compound phenomenon and breaks down composites such as traditional methodologies with the primitives. Accordingly, the external comprehensiveness of the proposed framework is ultimately linked to the comprehensiveness of the primitives that constitute the framework. The point boils down to whether the primitives are comprehensive enough to sufficiently represent the semantics of every governance phenomenon in terms of its representation power, and whether the primitives are capable of breaking down and representing the semantics of the governance phenomena contained in traditional methodologies.

The proposed governance means structure establishes four categories of the means domain around the two axes of 'society-technology' and 'structure-process'. Such a means structure has logical completeness in that any means falls into one of the four categories. Naturally, the framework can be modified and complemented if additional elements become necessary in the process of breaking down traditional methodologies with the primitives of the framework.

The greatest benefit of the external comprehensiveness of the framework is the ability to design a governance structure free from methodologies, as explained earlier. In other words, an enterprise can be free from the risk of becoming dependent on a particular methodology for designing its governance structure, allowing the enterprise to combine and apply various means provided by each methodology at its discretion according to its circumstances. Traditional ITG methodologies are broken down with the primitives of the ITG framework, which allows each enterprise to combine and integrate them to design an optimal governance structure.

5. References


Minimum Baseline through Delphi Research, *Communications of the AIS*, Vol. 22, April. 2008, pp. 443-


