An Empirical Analysis of Influential Factors for COBIT Adoption

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Abstract: In recent years, IT organizations are in the process of introducing IT Governance as the concept and measure of transparency, accountability and effectiveness of IT activities and control for managing governance processes. In this paper, the influential factors for IT organizations to introduce COBIT(The Control Objectives for Information and related Technology) which is a typical framework for effective IT Governance execution were classified and analyzed empirically into internal and external factors. Internal factors were designed based on influential factors in the theory of innovation diffusion, and external factors were designed based on influential factors from outside certification which were absent in COBIT and expertise support from the outside. The result of this study showed that understandability, transition and effectiveness which were internal factors had no effect on COBIT introduction, and only expertise support among certification and expertise support which were external factors had significant effects. This result shows that there are lack of COBIT supports and introduction in internal IT organizations. It is expected that the result of this study will allow strategic approach of COBIT adoption in future by verifying influential factors of COBIT introduction within IT organizations.

Keywords: Cobit, IT Governance, Adoption, Framework, Diffusion of innovations

I. Introduction

Research background and purpose of the study
In recent years, IT organizations are seeking for measures to control processes effectively from the functionality standpoint. As a result, IT corporations or organizations are currently in the process of introducing IT Governance as the concept of administration and control beyond its control function. The typical framework for the establishment of IT Governance is COBIT (The Control Objectives for Information and related Technology). COBIT contains more specific details for IT Governance while accepting definitions or concepts adopted by ITIL or other standards including CMMi, COSO, PMBOK and ISO 17799, and it has been extended or evolved continuously in the order from COBIT 1.0 to audit, control, administration and Governance with the changes of the times. According to the survey report of 2008 IT Governance status [33] published by PWC, it shows that corporations or organizations which utilize IT Governance use well-known frameworks or solutions. 50% of respondents know COBIT, yet only 30% of respondents actually use COBIT into their works, revealing that introducing COBIT and its applicability of organizations for IT Governance establishment is still at early stage. Based on the survey analysis of differences in the awareness of COBIT importance and performance in IT Governance, the importance of COBIT has received almost doubled from 27% in 2005 to 51% in 2007, but the ratio of actual COBIT adoption and performance or usage has increased only 3% from 29% in 2005 to 32% in 2007[33]. Based on these survey findings, our research question can be raised as why COBIT importance for IT Governance execution has almost doubled, while actual performance is lower than other IT management framework as ITIL and ISO2000. Under this research question, the objective of this research study intends to provide various meaningful implications on the influential factors of COBIT adoption and introduction by determining and empirically verifying the influential factors of IT corporations to introduce COBIT for establishing IT Governance.

Scope of the study and organization of thesis
Our research work is presenting and answering to the following question to achieve the purpose of this study conforms to the scope of this study.
Question: What are the influential factors for organizations to introduce COBIT framework for establishing IT Governance?

II. Literature Review and Research Hypothesis Development

IT Governance
IT Governance has been recently emerged as one of important agendas for general corporations as well as public organizations. ITGI[13] established in 1998 defines that IT Governance is “maintaining responsibility of management and the board of directors, strategies and purposes of the organization with use of IT”, and it is composed of leadership or organizational structure, and process [13]. This means that the structure including the organization, process and decision making structure to support strategies and purposes of the organization should be prepared. There are various definitions for IT Governance, yet ITGI’s definition of IT Governance is mentioned here because it is the organization which is not attached to any vendor and conducts studies relatively on objective point of view. In addition, corporations might consider IT Governance as IT management such as control or efficient IT administration, but IT Governance focuses on external size, systematic and strategic IT direction for the present and future of an
organization while IT management focuses on effective internal supply of IT services and products and current IT administration. It is very important to be able to visually confirm who actually takes a certain role and responsibility and which process he/she use to handle the role and responsibility. Because, understanding business process means being able to establish accurate and appropriate business plans.

In common, IT Governance is decision making system and activities of board of directors, management and IT managers for achieving strategies and target of a corporation, transparency in IT investment, IT service, application development and IT risk management, increase and effective management of productivity through strategic connection between business and IT as a part of corporate governance structure [16].

**IT Governance Framework**

Typical frameworks for IT Governance process control are COBIT as well as ISO9001-2000(Quality and process improvement), ISO20000-ITSM(IT Service Management Standard), COSO(Committee of Sponsoring organizations of the Treadway Commission), ITSM/ITIL(IT Infrastructure Library), PMBOL(Project Management Book of Knowledge)m CMMi(Capability Maturity Model Integrated), SPICE, PRINCE2(Project in Controlled Environments) [8].

ISO9000 mentions the minimum requirements for only acceptable quality system, and maintains the certification through periodic reevaluations [19].

ISO/IEC 20000 clearly states 5 core service management process groups as its main content. Using perceived benefits of ISO/IEC 20000 certification as a tool for improving outside reliability as well as managing ITSM internalization and change of internal organization could be utilized to assure objectivity and reliability through an external examination agency and maintain tension and sense of crisis in the organization through the post examination in every 6 month and the renewal examination after 3 years [45].

CMMi is a software capability maturity model for efficiently supporting process improvement activities of an organization. It has two expressional methods, and these two methods include several stages which called the maturity stage in the phased expression method and the capability stage in the consecutive expression method. And, general purpose and practice which apply all process fields in common and a specific purpose and practice which apply only one process field exist [25].

SPICE establishes process improvement goals based on the rating from the result of software process evaluation and operates the process improvement program. It deals with software development processes including development, management, customer support, quality, software development and maintenance, human and technologies, and it can be applied to small and large projects.

As a framework developed in the late 1980s by the British government, ITIL provides common framework for all activities of IT division which provides service based on IT infrastructure. ITIL explains in process method what should be included in IT service management in order to provide IT service in required level of quality. This helps maintaining consistent IT service quality [11].

**COBIT**

Control defined in COSO report [3] means policy, procedure, business practice and organizational structure established to assure that the business target can be achieved and occurrence of any unwanted accident can be prevented, exposed and changed. SAC report [37] defines the purpose of IT control as the technical description for the result or purpose expected to achieve by establishing control procedure for a specific IT activity. COBIT was developed in the standard which can be generally applicable and acceptable for exemplary task execution method in IT security and control section. COBIT is a new and innovative IT management tool, and Information Systems Audit and Control Foundation: ISACA accepted and improved existing and new technological, technical, and judicial standards and standards of specific industries based on previously retaining standard of Control Objective to create this tool.

COBIT was defined as open standard framework which provides best working-level practice for realizing effective IT Governance and control by ITGI and ISACA. 1st, 2nd and 3rd editions were published in 1994, 1998 and 2000 respectively, and 4th edition was published on December 2005. 4th edition of COBIT is used as IT Governance realization model to maximize benefits of IT Governance, protect the asset, observe regulations such as SOX (Sarbanes-Oxley) bill and increase IT investment effects. COBIT has 4 characteristics such as ① focusing on connecting Business demands with IT goals, ② aiming at the realization of effective IT Process, ③ controlling IT risk in the process and application aspects, and ④ providing a tool to monitor and measure IT achievements on each process. These characteristics of COBIT help IT Governance to play a key role of corporation governance by connecting business goals with IT.

**Theory of innovation diffusion**

Damanpour and Evan [5] defined innovation as equipment, system, policy, program, process, product, or service which is adopted by a specific organization regardless of whether the source of innovation is created in the organization or introduced from the outside, and Roger [35] defined innovation as idea, practice or object which a person or other unit of adoption considers as new.

Pierce and Delbecq [31] divided and explained the innovation process into 3 stages including initiation, adoption and implementation. Nolan [29] divided and explained the information technology diffusion stage of an organization into 4 stages including initiation, contagion, control and maturity.

Rogers [35] explained that organizational innovation is mainly influenced by three factors. The first factor is an
individual factor and he explained that more active attitude of each individual to change leads to higher innovation capability of the organization. He asserted this as positive relationship that more positive attitude of a member to change will lead to better innovation result of the organization. The second factor is internal factor of the organization, and he asserted that the factors including surplus resource, size of organization, correlation and complexity have positive relationship to innovation, and convergence and formality have negative relationship to innovation. The third factor is external factor of the organization, and he explained that an organization with higher openness reacts more sensitively to environmental change and conducts innovation activities continuously to survive in dynamic circumstances. Therefore, he asserted that an organization with a higher relationship with other outside organizations has a higher innovativeness. He also asserted that the introduction of new one has effect through innovation diffusion model and objective evaluation on innovation by perceived innovative characteristics. Perceived innovative characteristics here are complexity, compatibility, relative benefits, observability and trialability that users feel when comparing with existing one, and the dependent variable of innovation is acceptance or rejection of innovation.

Kwon and Zmud [18] presented individual characteristics, task characteristics, innovation’s characteristics, organizational characteristics, and environmental characteristics as the factors influencing innovation. Individual characteristics are Individual factors such as education and experience, and task characteristics are factors related to task environments such as autonomy of diversity of task. Innovation’s characteristics mean complexity, interchangeability and relative benefits of innovation. Thus, various variables are examined in the study on the influential factors of innovation. COBIT introduction for IT Governance establishment which this paper intends to study requires change in organization, process and mechanism aspects [41]. Therefore, it is necessary to verify if complexity, interchangeability, and relative benefits which are the characteristics of innovation could act as the influential factors for an organization to introduce COBIT framework since the framework introduction is approached as the concept of innovation whether this innovation is small or big in the organization.

Hypotheses Development

Complexity means the level of end users’ perception or recognition to accept or not to use a new innovation continuously [35]. Cooper and Zmud [4] discovered that more complicated information system could reduce its adoption and become obstacle to its introduction and diffusion. Premkumar [32] explained that complexity could be obstacle to the introduction of information technology since it could hinder innovation elements to be integrated with other parts of an organization. Complexity of COBIT framework which is an object of this study is defined as understandability of an organization on COBIT framework.

H1: Understandability of COBIT framework will have positive effect on intent to introduce.

O’Callaghan et al. [30] classified the concept of compatibility into technological compatibility which shows how much a new technology is compatible with existing software, hardware and technological process and operational compatibility which shows how much a new operation is compatible with existing operational process of an organization. These technological and operational compatibilities can be explained with change inside of an organization as a result. Therefore, it is necessary to verify through this study if change from the introduction could act as the influential factor of COBIT framework introduction.

H2: Organizational changes occurred from COBIT framework introduction will have negative effect on intent to introduce.

Relative benefits among characteristics of innovation means that a certain innovation element which intends to adopt organizational innovation could bring more advantage than previously operated. This advantage expects efficiency, effectiveness, economic profit and improved status [35]. Therefore, it is necessary to verify through this study if this relative benefits, that is, perceived benefits could act as the influential factor of COBIT framework introduction.

H3: Perceived benefits obtained from COBIT framework introduction will have positive effect on intent to introduce.

COBIT framework supports measurement and definition of governance process maturity level in the organization, but it does not support external maturity improvement and external publicity of service improvement through process quality improvement. Therefore, it is necessary to verify through this study if absence of this external certification could act as the influential factor of COBIT framework introduction.

H4: Absence of external certification in COBIT framework will have negative effect on the intent to introduce COBIT framework.

According to the survey study on the IT Governance recognition and execution of Korean corporations conducted in 2007 by Lee et al [23]. In this survey, more than 70 large Korean corporations were responded and shown that their perceived importance of IT Governance was averagely 6.1 point on a 7-point scale. According to the study on project execution method according to its importance and risk, IT outsourcing decision making matrix shows that consulting and outsourcing rather than sending human resource and handling works as proxy are carried out as strategic importance is higher[36]. Therefore, consulting or outsourcing is carried out in case of IT Governance with higher strategic importance. In addition to that, according to the result of the study conducted by Lederer & Salmela [21], the level of information system professional’s participation, retained knowledge and technology has effect on the system quality. Therefore, it is necessary to verify through this study
if availability of support from outside experts or consultants, expertise knowledge and information support and acquisition could be the influential factors of organizations to introduce COBIT frame.

**H5: External support will have positive effect on the intent to introduce COBIT framework.**

### III. Research Methodology

#### Research Model

The influential factors of COBIT introduction for IT Governance establishment were classified into internal factors and external factors and the following research model is proposed to examine whether each influential factor has effect on COBIT introduction based on hypothesizes we have developed in previous section.

![Research Model](image)

By classifying internal factor into understandability, change and perceived benefits, and external factor into certification and expertise support, the model is designed to examine if each factor has effect on the intent to introduce COBIT.

#### Measurement Development

In this section, we examined how the factors are classified in precedent studies related to the influential factors of innovation and information technology introduction. With regard to the factors of ERP introduction, Branford [2] classified the influential factors into innovation characteristic, organizational characteristic, and environmental characteristic in the study. Del Aguila-Obra [1] classified the influential factor of information technology introduction into organizational factor, external factor and technological factor. Capability and circumstance in the organization for COBIT introduction such as technological factor, innovation factor, organizational and individual factors and influences occurred and measured in the organization such as perceived benefits are classified as internal factor and environmental factor occurred and measured from the outside with regard to COBIT introduction is classified as environmental factor based on precedent studies so that the influential factors are classified into two groups in this study.

COBIT introduction for IT Governance establishment requires changes in the organization, process and mechanism aspect [41]. Therefore, it is approached in the concept of innovation regardless of its scope inside of an organization. Influential factors of introduction are classified into internal factors and external factors as defined above, and internal factors are classified into relative benefits, complexity and compatibility from the influential factors in the theory of innovation diffusion of Rogers. External factors are classified into certification and expertise support in this study.

The following operational definition and measurement index are designed in this study under the judgment that measuring the level of direct COBIT understanding rather than overall IT understanding could bring more substantial result for analyzing the influence of introduction focused on COBIT framework [35][32][7][27][9][39].

- **Change factor** is change in the organization and members due to COBIT framework introduction. This also means internal change of the organization due to innovation, and the level of difficulty and fear due to change in the organization and personal work was designed to measurement index [18][35][32][39].
- **Perceived benefit** is defined as the measurement index on the level of the organization and members’ expectation on work effectiveness due to COBIT framework introduction[35][10][17][40][7][32][6][39].
- **Operational definition and measurement index on if availability of certification factor which could obtain efficiency such as quality management internally and customer’s reliability externally through publicity has effect on COBIT framework introduction were designed as follows.[15][22][44][20][26].
- **Operative definition and measurement index on if availability to receive expertise support and information from the outside has effect on COBIT introduction were designed as follows.[7][12][32].

#### Sample and Data Collection

This research is to examine the result of each decision maker’s intent who is in charge of IT division strategy and planning or deciding the introduction so that the unit of analysis in the study was set to ‘corporation’, and 100 questionnaires from 120 questionnaires collected from head of IT strategy and planning division in 200 corporations in KOSPI and 100 corporations in KOSDAQ based on their market capitalizations from November 25th 2009 to December 19th 2009 excluding 20 questionnaires with inconsistent responses were analyzed.

### IV. Results and Analysis

#### Analysis of descriptive statistics

The result of descriptive statistics analysis in this study is as follows. The understandability of COBIT framework was the mean value of 4.5 on a 7-point scale, change according to COBIT framework introduction was the mean value of 4.73, perceived benefits of COBIT framework was the mean value of 4.75, external certification was the mean value of 4.39, and expertise support on COBIT was the mean value of 3.82. Lastly, intent to introduce COBIT framework which was an independent variable was the mean value of 4.26.
The result of factor analysis
The factor analysis on COBIT framework was conducted based on 17 questions in COBIT framework including 3 questions on understandability of COBIT framework, 3 questions on effect of COBIT framework introduction, 3 questions on external certification, 3 questions on availability to learn information on COBIT, and 4 questions on plan of COBIT introduction, and the following result of the study was obtained.

According to Eigen values of subdivided variables of COBIT framework from the result of factor analysis on COBIT framework, understanding of COBIT framework, influence of COBIT framework introduction, effect of COBIT framework introduction, external certification, availability to learn COBIT information, and plan of COBIT introduction were verified to be 1.123, 1.038, 1.219, 1.251, 160, and 1.865 respectively, and since all Eigen values are higher than 1, all items forming the factors are valid.

Reliability analysis
The reliability assessment on survey items was conducted by calculating Cronbach’s α coefficient. Reliability coefficients based on the final items after removing any factor lowering reliability in the reliability analysis are .53 for understandability, .56 for change, .61 for perceived benefits, .51 for external certification, .61 for expertise support and .65 for intent to introduce so that understandability, change and external certification are in fifth, and perceived benefits, expertise support and intent to introduce are in sixth.

Regression analysis
The result of the analysis shows that expertise support among external factors has positive meaningful effect on the possibility of COBIT framework introduction, and other variables do not have a meaningful effect on the possibility of COBIT framework introduction. This result of the analysis means that higher recognition of expertise support on COBIT has higher effect on the possibility of COBIT framework introduction. The explanatory power of the model in this study was 18.9%, and it was statistically meaningful at the 95% significance level.

As a result of data analysis so far conducted, Hypothesis 1, 2, 3 and 4 are dismissed, and only Hypothesis 5 ‘expertise support’ has a meaningful influence on the COBIT framework introduction. And also, β value shows that expertise support has positive effect on dependent variables.

V. Conclusion

Conclusion and its implications
Intents of Korean corporations to introduce COBIT as the framework for establishing IT Governance were examined in this study. The result of this study shows that understandability of COBIT framework, changes in the organization and duty according to COBIT introduction, and internal factors of perceived benefits have no effect on intent to introduce. In addition, external certification which COBIT framework doesn’t have was studied and verified in the viewpoint that many Korean corporations can get profit by acquiring ISO certification for efficient process management and outside publicity activities. But, the result of this study shows that effectiveness of external certification has no effect on COBIT framework introduction. On the other hand, the result of this study shows that only expertise support among external factors has effect on COBIT framework introduction.

Reasons and solutions for inactive COBIT introduction and utilization can be derived from the result that external expertise support has effect on COBIT framework introduction.

COBIT utilization is not active because corporations and organizations lack precise understanding on COBIT. This lack of understanding can be a reason for corporations and organizations not being exposed to COBIT knowledge and information due to low market maturity on IT Governance and COBIT. Acquisition of basic information on organizational benefits from understanding and utilizing fundamental purpose of COBIT and indirect experience of COBIT introduction cases from other similar corporations could have positive effect on the introduction. It is well worth enough to examine how COBIT can help improving the level of IT Governance in an organization based on interests in IT Governance. As shown in the result of this study and many advices from experts, it is urgent to cultivate IT Governance human resource. This means that there is a shortage of internal experts who can successfully establish IT Governance through COBIT framework. And, another issue is that IT officer should have faith in successful IT Governance establishment after deciding IT Governance introduction. COBIT successfully executed and operated in foreign countries not being appropriate for organizations in Korea means that there is no expert who can customize it according to domestic circumstances and characteristics of domestic corporations. Hopefully, the base for COBIT framework will be expanded in future through improvement of IT officers’ understandability including the cultivation of COBIT experts for IT Governance establishment and the attraction of educations and programs for IT corporations and IT major.

Limitation of the study
As explained at the implications before, COBIT framework understandability of IT officers in Korean corporations was relatively low. Therefore, technological factor of COBIT framework was excluded and effectiveness in the wide sense among internal factors was used instead in this study. If functional characteristics of COBIT could be evaluated according to work characteristics of an organization due to high technological understandability of IT officers on
framework, influential factors of COBIT framework introduction could be subdivided and analyzed in fields and functions from the technological aspect so that this study could be more meaningful.

References

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