Organizing COBIT Control Objectives for Effective Information Technology Compliance

S. Topçu and B. Metin
Boğaziçi University, Management and Information Systems Department, Istanbul, Turkey
sezgintopcu@gmail.com, bilgin.metin@boun.edu.tr

***Abstract*— In this study, a helpful approach that provides effective implementation of control objectives for IT (COBIT) compliance processes for organizations is presented. This is based on grouping control objectives according to their relations with each other. For this purpose, an in-depth interview technique was employed as the research method in the study.**

I. INTRODUCTION

The use of information (IT) is very critical in the business operations of many companies. The rapid change in technological environment brings difficulty in managing IT environment, controlling IT resources, which in turn pose critical risks to organizational/business needs. Satisfying business needs and minimizing risks are crucial factors for an organization in a competitive business environment. According to Ward and Peppard [1]; during the last decade, information technology has been playing an important role for organizations in achieving their goals. Both private and public sector organizations have been experiencing higher expenditure on IT, and consequently, higher benefits are expected by their stakeholders. Thus, it is crucial for both organizational forms to achieve effective IT governance and thus be able to obtain more effective use of IT.

In line with the legislations issued by Banking Regulation and Supervision Agency (BRSA), COBIT framework is now compulsory in Turkey for the purpose of bringing banks' information technology and business processes into a reliable control platform. Furthermore, COBIT framework is accounted as a warranty guideline which can contribute to the improvement of IT processes of many organizations.

In this study, the relations between COBIT control objectives were taken into account in order to improve the effectiveness of COBIT studies. For this purpose, in-depth interview technique [2] and expert opinions were employed. Findings of our study suggest that the proposed model is going to contribute to project effectiveness.

II. IT GOVERNANCE AND COBIT

Establishment of IT governance brings in significant benefits to the organization. One of these benefits is the harmonization of IT and all IT-related units in the organization. Another one is the enhancement of organizational opportunities and the acquisition of skills in the direction of expanding the gains. In addition, effective IT governance and organizations utilize their own IT resources on time and in compliance with the laws, legal adjustments such as legislation [3].

It becomes indispensable to establish IT governance in many financial or production organizations having more complicated systems. In previous years, Banking Regulation and Supervision Agency (BRSA) issued legislation on supervising IT processes for the financial supervisions in Turkey. Because of the specified legislation, it is obligatory for banks to make IT process arrangements based on COBIT framework and establish IT governance [5].

The first COBIT framework was published by IT Governance Institute (ITGI) in 1996. As illustrated in Fig. 1, COBIT framework consists of four main domains [6].

Currently, COBIT 4.1 that is the latest published version includes 34 main control objectives [7]. Organizations should work on these 34 main control objectives to keep their IT processes in compliance with COBIT model. These control objectives could be listed as in Table I.

III. PROPOSED APPROACH: ARRANGEMENT OF COBIT CONTROL OBJECTIVES

Upon the evaluation of COBIT control objectives, it was observed that some of the control objectives have similarities or correlations. During the planning phase of the COBIT implementation projects, it is possible to structure these correlations such a:

- Service-based
- Risk evaluation
- Time
- Budget

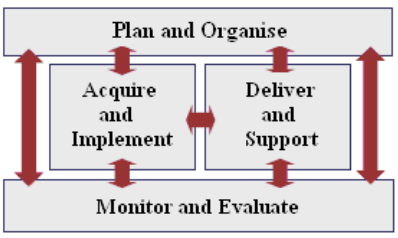

Figure 1. COBIT domains (PO, DS, AI, ME)

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However, for an effective management of the project, determination of control objective relationships might be essential. For instance, implementation of the specified processes can be worked out by associating "AI5 Procure IT Resources" and "DS2 Manage Third-party Services" control objectives together. These control objectives can be managed one after another. This associative approach would enable contribution to the utilization of the source and management activities more effectively.

IV. Methodology

Our study illustrates that working on similar or correlated COBIT control objectives simultaneously may have a positive effect on project effectiveness during project implementation. Therefore, in-depth structured interviews were held with experts with at least two years of experience in COBIT advisory or supervision projects.

The effects of grouping the control objectives which can be associated were investigated through interview questions. Using in-depth interview technique, the experts were asked to choose the correlated control objectives that are shown in Table I. It was requested to choose two correlated control objectives in the first step of the interview and more than two correlated control objectives in the second step.

Finally, experts were asked whether determining the correlations between different control objectives and making classifications and grouping based on these correlations would make a positive effect on implementing COBIT project process.

TABLE I
COBIT Control Objectives

Planning and Organization
PO1 Define a Strategic IT Plan and direction
PO2 Define the Information Architecture
PO3 Determine Technological Direction
PO4 Define the IT Processes, Organization and Relationships
PO5 Manage the IT Investment
PO6 Communicate Management Aims and Direction
PO7 Manage IT Human Resources
PO8 Manage Quality
PO9 Assess and Manage IT Risks
PO10 Manage Projects
Acquiring and Implementation
AI1 Identify Automated Solutions
AI2 Acquire and Maintain Application Software
AI3 Acquire and Maintain Technology Infrastructure
AI4 Enable Operation and Use
AI5 Procure IT Resources
AI6 Manage Changes
AI7 Install and Accredit Solutions and Changes
Decision and Support
DS1 Define and Manage Service Levels
DS2 Manage Third-party Services
DS3 Manage Performance and Capacity
DS4 Ensure Continuous Service
DS5 Ensure Systems Security
DS6 Identify and Allocate Costs
DS7 Educate and Train Users
DS8 Manage Service Desk and Incidents
DS9 Manage the Configuration
DS10 Manage Problems
DS11 Manage Data
DS12 Manage the Physical Environment
DS13 Manage Operations
Monitor and Evaluate
ME1 Monitor and Evaluate IT Processes
ME2 Monitor and Evaluate Internal Control
ME3 Ensure Regulatory Compliance
ME4 Provide IT Governance

V. Results

In the first step of the interview, the following decisions were made; the control objectives that were associated by at least 50% of the interview participants are classified as "correlated", the ones associated by 60% or more are considered "strongly correlated". "Correlated" and "strongly correlated" COBIT control objectives obtained through the specified analysis of the interview results are displayed in Table II.

Considering the interview results, nine associated control objective pairs were determined. Five of them are in the "strongly correlated" groups among the nine "correlated" groups. The groups were formed by combining intersecting the correlated pairs and grouped into four main groups.

As stated above, in the second step of the interview, the participants were asked to group control objectives without restricting the number of the groups that they can form. They were also free to form as many groups as they wish, only if each control objective could be assigned only in one group.

The criteria, which were used to determine "correlated" and "strongly correlated" pairs in the second step of the interview, are different from the first one. These criteria can be defined as: Let v consists of {1,..,10}, x consists of {1,..,7}, y consists of {1,..,13}, z consists of {1,..,4}, and let define as $C_t = \{PO_v, AI_x, DS_y, ME_z\}$ as control objectives group, $i \in C_t$, $j \in C_t$, g(i) is the number of participants who assign i to any group, h(i,j) is the number of participants who assign i and j to the same group, n is the number of participants.

Let define equivalence relations such that, where $i \in Ct$ and $j \in Ct$ and $i \neq j$:

$$R = \{ g(i)/h(i,j) \geq 0.60 \wedge g(i)/n \geq 0.40 \} \quad (1)$$

$$S = \{ g(i) / h(i,j) \geq 0.70 \wedge g(i)/n \geq 0.50 \} \quad (2)$$

Where R is the condition for "correlated" pairs and S is the condition for "strongly correlated" pairs.

Table III shows correlated control objectives and groups according to interview step 2. In Table III, upon the examination of the responses received in the second step of the interview, 13 "strongly correlated" control objective pairs were determined among 27 "correlated" pairs. The grouped control objective pairs in relation to results are given in Table IV and Table V considering conditions in (1) and (2).

TABLE II
CORRELATED CONTROL OBJECTIVES AND GROUPS ACCORDING TO INTERVIEW STEP 1

	Correlated control objectives	Group number	Grouped control objectives
1	PO1 and PO3 [a]	1	PO1 PO3 PO5 DS6
2	PO1 and PO5 [b]		
3	PO5 and DS6 [b]		
4	PO10 and AI1 [a]	2	PO10 AI1 AI2 AI7
5	PO10 and AI2 [a]		
6	PO10 and AI7 [b]		
7	AI1 and AI2 [b]		
8	AI5 and DS2 [a]	3	AI5 DS2
9	DS8 and DS10 [a]	4	DS8 DS10

[a] "strongly correlated" group. [b] "correlated" group.

TABLE III
CORRELATED CONTROL OBJECTIVES AND GROUPS ACCORDING TO INTERVIEW STEP 2

	Control objectives	g(i) / h(i,j) ≥0.60	g(i)/n≥0.40
1	DS8 and DS10*	0.88	0.80
2	AI2 and AI7*	0.87	0.70
3	PO1 and PO3*	0.87	0.60
4	PO1 and PO6*	0.87	0.60
5	PO3 and PO6*	0.87	0.60
6	AI1 and AI2*	0.77	0.70
7	AI1 and AI7*	0.77	0.70
8	DS1 and DS2*	0.77	0.70
9	DS5 and DS12*	0.75	0.60
10	ME1 and ME4*	0.75	0.60
11	PO4 and PO6*	0.71	0.50
12	ME2 and ME3*	0.71	0.50
13	ME2 and ME4*	0.71	0.50
14	AI1 and AI6	0.66	0.60
15	AI6 and AI7	0.66	0.60
16	PO8 and PO9	0.66	0.40
17	PO8 and AI7	0.66	0.40
18	ME3 and ME4	0.66	0.40
19	PO5 and PO6	0.62	0.50
20	PO10 and AI1	0.62	0.50
21	PO10 and AI2	0.62	0.50
22	AI2 and AI6	0.62	0.50
23	DS4 and DS5	0.62	0.50
24	DS4 and DS12	0.62	0.50
25	ME1 and ME2	0.62	0.50
26	ME1 and ME3	0.62	0.50
27	DS2 and DS3	0.60	0.60

* pairs are compliant with S and pairs are compliant with R conditions.

All pairs within 27 control objectives were grouped into six based on the shared "correlated" control objective pairs revealed upon the examination of the results of the second step of the interview, which are demonstrated in Table IV. There are 13 "strongly correlated" control objective pairs which are compliant with S condition in (2) and grouped into another six based on the shared control objectives, which are demonstrated in Table V.

The intersection group that the associated control objectives obtained from the data of the first step of the interview and the associated control objectives of the second step of interview is also defined as follows:

G_1={"PO1, PO3, PO5", "AI1, AI2, AI7, PO10", "DS8, DS10"} , which is based on correlated ones and

G_2={"PO1,PO3","AI1,AI2,AI7", "DS8,DS10" } based on strongly correlated ones.

It is apparent that the control objectives comprising these sets are highly correlated because the elements of "G1 and G2" sets were selected, classified and associated in two separate interview steps.

TABLE IV
GROUPS FORMED OUT OF "CORRELATED" CONTROL OBJECTIVES ACCORDING TO INTERVIEW STEP 2

Group Number	Control Objectives
1	PO1, PO3, PO4, PO5, PO6
2	PO8, PO9, AI7, PO10, AI1, AI2, AI6, AI7,AI6
3	DS1, DS2, DS3
4	DS4, DS5, DS12
5	DS8, DS10
6	ME1, ME2, ME3,ME4

TABLE V
GROUPS FORMED OUT OF "STRONGLY CORRELATED" CONTROL OBJECTIVES ACCORDING TO INTERVIEW STEP 2

Group Number	Control Objectives
1	DS8, DS10
2	PO1, PO3, PO4, PO6
3	AI1, AI2, AI7,
4	DS1, DS2
5	DS5, DS12
6	ME1, ME2, ME3,ME4

VI. CONCLUSION

In the present study, in-depth interview technique was implemented in order to answer whether project management effectiveness could be improved by associating and classifying COBIT control objectives. All

participants of the interview enunciated that grouping these correlated control objectives would contribute to project management effectiveness. As a result, designing or auditing the control environment can be managed in an effective way, if the control objectives are grouped regarding the similarity or dependency of each other. This fact is correct even if domains of control objectives are distinct.

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