

Developing Information Technology Policies for Enterprise Resource Planning to Improve Customer Orientation and Service

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Summary

Sustainability is critical challenge faced by enterprises nowadays. The objective of enterprises is to ensure that the short and long-term plans are engaged with the sustainability dimensions of technology, social, environmental and economics. Since Information Technology (IT) can be considered as a catalyst to the sustainability of enterprises, in this paper we concern with IT-related enterprise objectives or business goals; i.e. *improve customer orientation and service*, which is Business Goal number 4 (BG4) within Control Objectives for Information and Related Technology (COBIT). Furthermore, the Enterprise Resource Planning (ERP) system is considered as an important IT application and is commonly implemented in an enterprise; however, in many cases the ERP practices were not successful and their failure factors were not published. In this regard, we propose ten IT policies for ERP practices, which are developed based on ten IT Processes within two IT Goals (ITG), i.e. *ensure satisfaction of end users with service offerings and service levels* (ITG3) and *make sure that IT services are available as required* (ITG23). These IT Goals are aligned with BG4.

The IT policy objectives are designed to support ITG3 and ITG23 in achieving BG4. Then, ten IT Policies for ERP practices are developed based on the IT policy objectives for the related IT Processes. In this paper, we elaborate more detail the IT policy for ERP practices related to IT Process Delivery and Support 7 (DS7); i.e. *educate and train users*. The IT policy for ERP practices related to DS7 is also equipped with the management directions. Then, the procedures are developed based on the IT policy objectives and management directions; whereas the contents of the procedures are composed according to the existing Enterprise Maturity Level (EML) of the corresponding IT Process. The IT policy for DS7 is provided with three procedures and the related activities.

Hence, the IT policies for ERP practices, which were supported by the procedures, could suitably facilitate the success of an ERP system during planning, implementation and delivery of services in the enterprise. Furthermore, the IT policies for ERP practices ensured the ERP could improve customer orientation and service.

Key words:

ERP, Policy, Procedure, COBIT, Service Portfolio

1. Introduction

The globalization of customers, products and services are driving the enterprise to focus on the sustainability, which encompasses the technology, social, environmental and economics dimensions. The Information Technology (IT) is poised to play critical role to the sustainability of the enterprises [1]. The role of IT can be considered as a catalyst for the sustainability of short-term and long-term of enterprise objectives, which is known as business goals.

Moreover, the Enterprise Resource Planning (ERP) system is an important IT application, which is conceived to contribute in the success of managing business process in enterprises. Many enterprises have been running the ERP system successfully worldwide [2]. The ERP system enables an enterprise to run the business processes in the high levels of delivering service to customer, balancing demand and supply, and integrating ERP functionalities, i.e. human resources management, sales, marketing, manufacturing, operations, purchasing, and finance [3]-[4].

Even though the ERP system is widely used in many enterprises, but the success of ERP practices are rarely issued. The ERP practices involve a lengthy and complex process [5]; these will give more opportunities that many problems will affect the ERP practices. However, the problems associated with the software implementations are not new, nor specific to ERP system [6].

Many studies have reported several reasons of ERP failure reasons. The failure reasons of ERP practices can be vary from the high level management who had the objective of integrating ERP within business, to the end users who operate the ERP system; for instance, Davenport [7] reports the failure of enterprise in resolving the business needs and the new IT system, as the reason of ERP practice failures. Recent researches by Kumar *et.al* [8] and Markus *et.al* [9] stated that one of the major problems of ERP failures is the lack commitment, acceptance and readiness of the enterprise to deploy the system. Hence, the delivery and support of ERP practice

failures are considered to be the major problems, including: the lack of high level management commitment, the lack of knowledge regarding ERP system [10], the mismatch between the delivered applications and the enterprise's expectations and the lack understanding of ERP system operations.

Meanwhile, the other studies [11]-[13] consider the planning and organization, and the acquirement and implementation of the ERP practice failures, including the unclear business objective and the lack of expertise to support the enterprise, respectively. Since the ERP practice failures can be seen from different domains of Control Objectives for Information and Related Technology (COBIT) framework, in this paper we concern with evaluating the ERP readiness based on the IT processes from planning and organizing, acquiring and implementing, and delivering and supporting. Thereby, the Enterprise Maturity Level (EML) is measured to evaluate the ERP readiness in the enterprise.

Furthermore, a successful of ERP practice requires control during planning, implementation and delivery of services, particularly related to IT. Thus, the IT controls can overcome the problems of ERP failures, and regulate the life cycle of service and related decision rights. The IT controls should be supported with the business controls [14]; hence, we concern with IT policies for ERP practices within COBIT framework to achieve the Business Goals 4 (BG4), i.e. *improve customer orientation and service*. We applied COBIT due to the completeness [15] and internationally applicable IT Governance framework in many different industries [16].

Ten IT policies for ERP practices are developed in order to achieve BG4; they are based on ten IT Processes within two IT Goals (ITG), i.e. *ensure satisfaction of end users with service offerings and service levels* (ITG3) and *make sure that IT services are available as required* (ITG23). Then, the IT policy objectives are designed for the related IT Processes by considering the contents and structures of ERP system, which are based on the service portfolio referring to Sarno and Herdiyanti [17]. The IT policy objectives accommodate controls, direction and authority for the corresponding ERP system functions and the Responsible Job Functions (JF).

In this paper, we elaborate the IT policy for ERP practices which relates to IT Process Delivery and Support 7 (DS7); i.e. *educate and train users*. The IT policy for ERP practices related to DS7 is developed by considering the IT policy objectives. The management directions are also designed, and accordingly the procedures are developed. The contents of the procedures consider the EML measurement results, which are structured to improve the enterprise readiness.

2. Theoretical Consideration

2.1 COBIT

Control Objectives for Information and Related Technology (COBIT) framework provides a reference process model and common language for IT Process within enterprises. It defines 17 IT-related Business Goals (BG), 28 IT Goals and 34 IT Processes, which are grouped into four domains; they are the Plan and Organise (PO), the Acquire and Implement (AI), the Deliver and Support (DS), and the Monitor and Evaluate (ME). Each of the IT Process consists of control objectives, maturity model and general measurement for monitoring the IT Process performance [18]-[19].

The PO domain covers strategy and concerns with the identification of IT contribution to the achievement of business goals; whereas the AI domain is about developing and acquiring IT solutions. The DS domain concerns with the actual delivery of IT to achieve the business goals while the ME domain addresses performance management, including the regulatory compliance [14].

The roles and responsibilities for each IT Process are also provided to the effectiveness of IT Governance by the representation of Responsible, Accountable, Consulted and Informed (RACI) chart. The RACI chart defines what activities should be delegated and to whom. Responsible is attributed for the people who do the work to achieve the task which is approved and directed by the Accountable person. This Accountable person is the only person who is ultimately accountable for correct and thorough completion of the task. The Consulted and the Informed roles are whose opinions are sought and whose are kept up-to-date on the task progress, respectively [14],[20].

Furthermore, each of the IT Process has control objectives to successfully implement in the enterprise. Control means the policies which is equipped with procedures, practices and organizational structures. A control is needed to assure that business objectives will be achieved and undesired events will be prevented or detected and corrected [14]. The control objectives of IT Processes provide a complete set of high-level requirements for management consideration over the IT Processes considering the value and the risk of the implementation. Hence, the enterprise needs to select the control objectives that are applicable, and then decide those that will be implemented. Furthermore, the enterprise should make its own best practice which consists of the act to implement the control objectives and also consider the risk of not implementing the control

objectives. In summary, the control objectives are statements of desired results or goals which an enterprise would like to be achieved with the implementation of control procedures over related IT Processes [18],[21].

2.2 The Enterprise Maturity Level (EML) in COBIT

The EML model in COBIT is a method for evaluating the maturity of IT Processes in an enterprise, and is classified into six levels of maturity from *non-existent* (level 0) to *optimized* (level 5). This model is derived from the maturity model of the Software Engineering Institute (SEI) which is defined for the maturity of software development capability. The definition is similar to Capability Maturity Model (CMM) but is interpreted for the nature of the management of IT Processes in COBIT. Moreover, the purpose of EML model is not to assess the adherence level of the control objectives, but to identify where issues are and how to set priorities for improvements.

Within *non-existent* (level 0), the management processes are not applied at all. In the *initial/ad-hoc* (level 1), there is no standardized process. Within *repeatable but intuitive* (level 2) there is no formal communication of standard procedures. It may exist informal understanding of policies and procedures. Further in the *defined process* (level 3) the management processes are standardized, documented and communicated. It exists on the definition and documentation of policies and procedures for all key activities. Whereas in *managed and measurable* (level 4), the compliance monitoring and measurement of the implemented policies and procedures for developing and maintaining all processes are taken. Furthermore in the *optimized* (level 5), processes, policies and procedures are standardized and integrated in the continuous improvement management [14],[21].

2.3 Failures of Enterprise Resource Planning (ERP)

ERP system is an integrated software solution, which is typically offered by a vendor as a package. The package offers seamless integration of all the information that flows through the enterprise. The information also reflect the business process in the enterprise, such as financial, accounting, human resources, supply chain, and customer information [22]-[23].

Wallace and Kremzar [3] described ERP system as an enterprise-wide set of management directions that balances demand and supply, integrates the customers and suppliers into a complete supply chain, employs proven business processes for decision-making, and provides high degrees of cross-functional integration among business processes, i.e. inventory/logistics, manufacturing, sales, finance, manufacturing, marketing, customer support, and

human resources. Thereby, an ERP system enables an enterprise to run its business with high level of productivity and customer service, and simultaneously lower costs and inventories [24]. As ERP system plays an important role in business, the related problems and critical factors of the implementation have been investigated in the previous studies [25]-[28].

Nevertheless, there have been many reports of unsuccessful ERP implementations within business, including the inability of Hershey to ship candy at Halloween, Nike losing shoe orders, and FoxMeyer's failure to process orders [29]. Majed *et.al* [26] reported that 70% of ERP implementations did not achieve the estimated benefits. In other studies, the failures of ERP implementations range from 40% to 60% or higher [30]. Further, the failures of ERP system implementation projects have been known to lead to problems as serious as organizational bankruptcy [23], [31]-[32].

Hence, many studies have been investigated to determine the critical failures factor for implementing ERP [22]. Some of the failures factors are the failure of adapting ERP system; the lack quality of reengineering business process and testing; the over confidence on massive customization; the lack of support from top management, including unrealistic expectation of ERP system; the high replacement of project team members; the lack of effectiveness on consultancy and in managing project; very tight project schedule; insufficient IT infrastructure; the ambiguous concept and use of ERP system from the user's view due to the lack education and training, which may lead to resistance to change [29].

2.4 ERP Functionalities within the Service Portfolio

The term of a service represents specific business function while a system contains of organized services to accomplish a specific objective [31]. A service can provide a single discrete function or a set of related business functions. A service that perform a single function is said to be fine grained, for example : calculating total sales; the services which perform a related set of business functions are called to be coarse grained, for instance : analyzing sales history [34]. The services can communicate with each other to share business functions in a widespread and flexible way.

A service portfolio provides three levels of views, which are the conceptual view, the logical view, and the physical view [17]. The conceptual view supports the conceptualization of services and governance needs, and it covers application architectures; while the logical view provides the architecture components for the services conceptualized, hence it covers information architectures;

whereas the physical view identifies the physical implementation components of the services, and therefore it covers data and technology architecture. Furthermore, based on Sarno and Herdiyanti [17] we categorize twelve of Functional Domains (FD) in the service portfolio of an ERP system, which are Inventory (FD1), Manufacturing (FD2), Account Payable (FD3), Account Receivable (FD4), Fixed Assets (FD5), Cash and Bank Management (FD6), General Ledger (FD7), Reporting (FD8), Sales Force Automation (FD9), Marketing Automation (FD10), Customer Support (FD11), and Human Resource Management (FD12).

3. Methodology Consideration

This study concerns with Business Goal 4 (BG4) in COBIT framework, i.e. *improve customer orientation and service*. There are two IT Goals (ITGs) and ten related IT Processes to achieve BG4. The related IT Processes are grouped into the ITGs. They are *manage quality* (PO8), *enable operation and use* (AI4), *define and manage service levels* (DS1), *manage third-party services* (DS2), *educate and train users* (DS7), *manage service desk and incidents* (DS8), *manage problems* (DS10), and *manage operations* (DS13) to achieve *ensure satisfaction of end users with service offerings and service levels* (ITG3); whereas *manage performance and capacity* (DS3), *ensure continuous service* (DS4), DS8 and DS13 to achieve *make sure that IT services are available as required* (ITG23).

Then, the content of Enterprise Maturity Level (EML) measurement is composed according to the Maturity Model in the COBIT for the corresponding IT Process. The EML value is calculated according to the current condition in the enterprise. Furthermore, the IT Processes are correlated with the Functional Domain (FD) within the ERP system. Hence, the EML value represents the ERP practices in the enterprise.

Meanwhile, the development of IT policies for ERP practices is based on the related IT Processes. Hence, there are ten IT policies for ERP practices, which aim to achieve BG4. Furthermore, the structure of IT policies for ERP practices adopts the structure of IT process description in COBIT in order to have the reader familiar with the IT policies. The IT policies for ERP practices are developed by considering the IT policy objectives; then, the related procedures are derived accordingly. Further, the contents of the procedures also consider the EML measurement results in order to help the enterprise improving the ERP practices. Thereby, the suitable procedures are appropriate for the readiness of the enterprise to plan, implement and deliver the ERP services.

4. The Proposed IT Policies for ERP Practices

This section proposes ten IT policies for ERP practices and the corresponding procedures, as well as the management directions. In order to describe the methodology we take the Information Technology (IT) Process, i.e. *educate and train users* (DS7) as the example.

The Enterprise Maturity Level (EML) measurement from level 0 to level 5 for DS7 are elaborated; the examples of EML measurement for level 2 and level 3 can be seen in Table 1 a) and 1 b) respectively. Table 1 c) describes that the IT Process maturity level is 2.45, which is calculated based on the EML values from level 0 to 5.

We present Table 2 to elaborate the IT policy objectives, which are designed effectively and efficiently according to the Control Objectives for Information and Related Technology (COBIT) processes. The IT policy objectives for ERP system in Table 2 are structured based on the control objectives of IT Processes which relate to the achievement of BG4. The IT policy objectives accommodate the authority, the direction and the controls for the corresponding Functional Domain (FD) in the ERP system. Since the IT policies for ERP practices control the FD in the ERP system, we also describe the relation between the FD and the IT Processes. Firstly, we chose the Responsible Job Functions (JF) based on the Responsible functions for each IT Processes in COBIT. Secondly, the related FDs are considered by the Responsible JF to support the successful achievement of IT policy objectives for the related IT Process.

Furthermore, each IT process has the IT policies for ERP practices which are developed by considering the IT policy objectives. Hence, we present Figure 1 to elaborate the IT policies for ERP practices; they are ordered by sequences number from one to ten. It consists of the title, the control over IT Process in COBIT, the relation with the FD in ERP system based on Table 2, the alignment with business requirements, and the general actions to perform the IT policies.

Moreover, since we consider the IT Process DS7, Figure 2 is equipped to present the management directions, which include the inputs for DS7 and the corresponding outputs of policy implementation, and also the Job Functions (JF) and activities which represents Responsible, Accountable, Consulted and Informed (RACI) chart. Hence, the IT policies for ERP practices ensure that the ERP system is aligned with the business requirements. Thereby, the success of ERP system implementation can be achieved accordingly because the IT policies for ERP practices as IT controls supported the business controls in order to design the integrated application controls in the enterprise.

Table 1: The EML measurement of *educate and train users* (DS7)

a) The EML measurement level 2				
IT Process Name	Educate and Train Users			
IT Process ID	DS7	Maturity Level	2	
No	Statement	Weight		
1.	The enterprise identifies the training and education of ERP system including the identification of training curriculum based on the service portfolio of ERP system.	1		
2.	The enterprise considers the training and education programs of ERP system in the employee performance plans based on the role of managing the ERP system based on the service portfolio.	1		
3.	Informal training and education of ERP system is taught by the different instructors, who deliver the same training curriculum with different approaches regarding with the service portfolio of ERP system.	1		
4.	The training and education programs address the ethical conduct, and system security awareness and practices of ERP system based on the service portfolio of ERP system.	1		
5.	The enterprise is highly reliance to the individuals' knowledge related to the service portfolio of ERP system.	1		
6.	The enterprise communicates the identification of training and education of ERP system consistently, including the training curriculum based on the service portfolio of ERP system.	1		
Total Weight =		5		

Do you agree?				
Not at all	A little	To some degree	Completely	Value
0	0.33	0.66	1	
	v			0.33
	v			0.33
		v		0.66
		v		0.66
		v		0.66
		v		0.66
Compliance =				0.66

b) The EML measurement level 3				
IT Process Name	Educate and Train Users			
IT Process ID	DS7	Maturity Level	3	
No	Statement	Weight		
1.	The training and education of ERP system programs are managed, communicated, and documented considering the RACI chart and the target group, which are based on the role of managing the ERP system based on the service portfolio.	1		
2.	The delivery mechanism and the related processes of training and education regarding with ERP system are standardized and documented considering the target group.	1		
3.	There are some established information about budgets, resources, facilities and trainers of training and education of ERP system, considering the training curriculum based on the service portfolio, and training and education programs.	1		
4.	The training and education programs are held formally on ethical conduct, and system security awareness and practices of ERP system based on the service portfolio of ERP system.	1		
5.	The training and education of ERP system performances are monitored according to the training curriculum, and training and education programs and all deviations are detected by the management.	1		
6.	The problem analysis of training and education of ERP system is often applied.	1		
Total Weight =		6		

Do you agree?				
Not at all	A little	To some degree	Completely	VALUE
0	0.33	0.66	1	
	v			0.33
	v			0.33
	v			0.33
		v		0.66
	v			0.33
		v		0.66
Compliance =				0.44

c) The value of IT Process maturity level			
Level	Compliance	Contribution	Value
0	0.50	0.00	0.00
1	0.58	0.30	0.17
2	0.66	0.70	0.46
3	0.44	1.00	0.44
4	0.41	1.30	0.54
5	0.50	1.70	0.84
IT Process Maturity Level =			2.45

Table 2: The IT Processes, the IT policy objectives for ERP practices, the responsible JF and the related FD

The IT Processes	IT policy objectives for ERP practices	Responsible JF	Related FD
PO8 : <i>Manage Quality</i>	<ul style="list-style-type: none"> - Establishment of quality management system (QMS) related to the ERP system - Identification of ERP standard and quality practices - Maintenance of the acquisition and development standard for ERP system - Alignment of customer requirement with ERP standard and quality practices - Continuous improvement of QMS related to the ERP system, and ERP quality practices - Measurement, monitoring and review of ERP standard and quality practices 	CIO	Reporting (FD8), Customer Support (FD11)
AI4 : <i>Enable operation and use</i>	<ul style="list-style-type: none"> - Planning for the operational of ERP system according to RACI - Knowledge transfer to Business Management of the ERP system - Knowledge transfer to End Users of the ERP system - Knowledge transfer to Operational and Support Staff of the ERP system 	<ul style="list-style-type: none"> • Head of IT development • Training department • Head of IT operation 	Reporting (FD8), and Customer Support (FD11)
DS1 : <i>Define and manage service levels</i>	<ul style="list-style-type: none"> - Definition of service level management framework regarding with ERP system - Definition of ERP services - Definition of Service Level Agreements (SLAs) for ERP services - Definition of Operational Level Agreements (OLAs) for delivering ERP services - Monitoring and reporting of ERP service level achievement - Review of SLAs and contracts for ERP services 	<ul style="list-style-type: none"> • IT service manager • Head of IT operation • Head of IT development • Head of IT administration 	Inventory (FD1), Manufacturing (FD2), Marketing Automation (FD10), and Customer Support (FD11)
DS2 : <i>Manage third-party services</i>	<ul style="list-style-type: none"> - Identification of third-parties relationship within ERP system - Formalization of third-parties relationship management within ERP system - Identification and mitigation of third-parties risk management within ERP system - Monitoring of third parties performance related to ERP system 	<ul style="list-style-type: none"> • Head of IT administration • Head of IT operation • Head of IT development • CIO 	Inventory (FD1), Manufacturing (FD2), Account Payable (FD3), Reporting (FD8), and Marketing Automation (FD10)
DS3: <i>Manage performance and capacity</i>	<ul style="list-style-type: none"> - Establishment of performance and capacity planning regarding with ERP system - Assessment of current performance and capacity regarding with ERP system - Forecasting future performance and capacity regarding with ERP system - Availability of IT resources for ERP system - Monitoring performance and capacity of the IT resources for ERP system 	Head of IT operation	Inventory (FD1), Manufacturing (FD2), Account Payable (FD3), Reporting (FD8) and Sales Force Automation (FD9)
DS4 : <i>Ensure continuous service</i>	<ul style="list-style-type: none"> - Identification of ERP system continuity framework - Identification of ERP system continuity plans - Establishment of priority in recovery situation according to critical IT Resources in ERP system - Maintenance of ERP system continuity plans - Testing of ERP system continuity plans - Training of ERP system continuity plans according to RACI - Distribution of ERP system continuity plans - Identification of ERP system recovery and resumption plans - Identification of offsite backup storage regarding with ERP system recovery and resumption plans - Identification of post-resumption review regarding with ERP system 	<ul style="list-style-type: none"> • Head of IT operation • Head of IT administration • Head of IT development • PMO 	Inventory (FD1), Manufacturing (FD2), Reporting (FD8), and Customer Support (FD11)
DS7 : <i>Educate and train users</i>	<ul style="list-style-type: none"> - Identification of education and training of ERP system according to the service portfolio - Delivery of education and training of ERP system according to RACI - Evaluation of education and training of ERP system according to RACI 	<ul style="list-style-type: none"> • HR manager • Training department • CIO 	Reporting (FD8), Human Resource Management (FD12)
DS8 : <i>Manage service desk and incidents</i>	<ul style="list-style-type: none"> - Establishment services desk function for ERP system - Registration of customer queries in ERP system - Identification of incident escalation procedures in service desk for ERP system - Identification of incident closure procedures in service desk for ERP system - The report of the service desk performance for the ERP system 	<ul style="list-style-type: none"> • Service desk/incident manager • Head of IT development • Head of IT operations • System analyst 	Inventory (FD1), Manufacturing (FD2), Reporting (FD8), and Customer Support (FD11)
DS10 : <i>Manage problems</i>	<ul style="list-style-type: none"> - Identification and classification of ERP system problem - Establishment of problem management system related to ERP system - Identification of problem closure procedures in problem management system related to ERP system - Integration of configuration, incident and problem management system related to ERP system 	<ul style="list-style-type: none"> • Problem manager • Head of IT development • Head of IT operations • System analyst 	Inventory (FD1), Manufacturing (FD2), Reporting (FD8), and Customer Support (FD11)
DS13 : <i>Manage operations</i>	<ul style="list-style-type: none"> - Definition of ERP system operation procedures and instructions - Organization of ERP system related job scheduling according to RACI - Monitoring of ERP system infrastructure and related events - Establishment of safeguarding over sensitive ERP system assets - Identification of preventive maintenance procedures for ERP system hardware 	Head of IT operations	All of ERP Functional Domain (FD)

1. Policy for IT Process of Managing ERP System Quality

Control over COBIT IT Process of

Managing Quality (PO8)

related to ERP Functional Domain (FD) of

Reporting (FD 8) and Customer Support (FD11)

addressing the business needs for ERP system of

ensuring the continuous improvement of the quality of ERP system to optimize service delivered and maximize the benefits of implementing ERP system in the enterprise

is accomplished by

defining the Quality Management System (QMS) related to ERP system, managing the ERP standard and quality practices, and continuous improvement of QMS related to ERP system and the ERP standard and quality practices

2. Policy for IT Process of Enabling ERP Operation and Use

Control over COBIT IT Process of

Enable Operation and Use (AI4)

related to ERP Functional Domain (FD) of

Reporting (FD8) and Customer Support (FD11)

addressing the business needs for ERP system of

assuring the satisfaction of RACI and end users regarding with the service offerings and service levels of ERP system to seamlessly integrate the solutions of ERP system into business

is accomplished by

developing the knowledge transfer mechanism of ERP system based on RACI, and providing the training materials for the knowledge transfer

3. Policy for IT Process of Defining and Managing ERP Service Levels

Control over COBIT IT Process of

Enable Operation and Use (AI4)

related to ERP Functional Domain (FD) of

Inventory (FD1), Manufacturing (FD2), Marketing Automation (FD10), and Customer Support (FD11)

addressing the business needs for ERP system of

ensuring the alignment of IT –related business goals align and the IT goals regarding with ERP system

is accomplished by

defining the agreements regarding with service and operational level of ERP system, and monitoring, review, updating and communicating the achievement of service and operational level

4. Policy for IT Process of Managing Third-party Services within ERP System

Control over COBIT IT Process of

Manage Third-party Services (DS2)

related to ERP Functional Domain (FD) of

Inventory (FD1), Manufacturing (FD2), Account Payable (FD3), Reporting (FD8), and Marketing Automation (FD10)

Fig. 1 The IT policies for ERP practices to improve customer orientation and service

4. Policy for IT Process of Managing Third-party Services within ERP System (continued)

addressing the business needs for ERP system of

ensuring the satisfaction of third-party services for RACI and end users, while providing adherence of the benefits, costs and risks regarding with the agreements

is accomplished by

identifying the third-party services within ERP system, structuring formally the service relationship, and managing the third-party performance, including risk mitigation

5. Policy for IT Process of Managing ERP Performance and Capacity

Control over COBIT IT Process of

Manage Performance and Capacity (DS3)

related to ERP Functional Domain (FD) of

Inventory (FD1), Manufacturing (FD2), Account Payable (FD3), Reporting (FD8), and Sales Force Automation (FD9)

addressing the business needs for ERP system of

providing optimal performance and capacity of ERP infrastructure, and resources and capability regarding with ERP system to assure that the information resources from ERP system supporting business requirements are available continuously

is accomplished by

establishing the plan, the monitoring, the report, and the forecast of ERP system capacity, availability and performance

6. Policy for IT Process of Ensuring ERP continuous service

Control over COBIT IT Process of

Ensure Continuous Service (DS4)

related to ERP Functional Domain (FD) of

Inventory (FD1), Manufacturing (FD2), Reporting (FD8), and Customer Support (FD11)

addressing the business needs for ERP system of

providing the automated solution of the ERP service resilience to assure the minimum of business impact in the event of ERP service disruption

is accomplished by

establishing and maintaining the ERP contingency plans, including the training and the testing, and the back-up, the recovery and resumption plans.

7. Policy for IT Process of Educating and training users related to ERP system

Control over COBIT IT Process of

Educate and Train Users (DS7)

related to ERP Functional Domain (FD) of

Reporting (FD8) and Human Resource Management (FD12)

Fig. 1 The IT policies for ERP practices to improve customer orientation and service (cont.)

7. Policy for IT Process of Educating and training users related to ERP system (continued)

addressing the business needs for ERP system of

providing user training of the ERP system based on RACI, and monitoring and measuring the result of the training to increase the effective use of ERP system implementation in the enterprise

is accomplished by

managing the curriculum and the delivery of training, and evaluating the training performance.

8. Policy for IT Process of Managing ERP service desk and ERP incidents

Control over COBIT IT Process of

Manage Service Desk and Incidents (DS8)

related to ERP Functional Domain (FD) of

Inventory (FD1), Manufacturing (FD2), Reporting (FD8), and Customer Support (FD11)

addressing the business needs for ERP system of

providing a well-designed and well-performed ERP service desk and ERP incidents to increase productivity through the response of the queries in a prompt delay and to address the root cause quickly

is accomplished by

establishing and managing the criteria of ERP incidents and procedures of ERP service desk, and monitoring and reporting the performance of ERP service desk

9. Policy for IT Process of Managing ERP system problem

Control over COBIT IT Process of

Manage Problem (DS10)

related to ERP Functional Domain (FD) of

Inventory (FD1), Manufacturing (FD2), Reporting (FD8), and Customer Support (FD11)

addressing the business needs for ERP system of

providing minimal defects and rework of service solution and delivery to maximize the availability of system, improve service offerings and service levels, which can ensure the satisfaction and convenience of ERP users according to RACI

is accomplished by

managing the integration of problem management system, including identify the ERP system problem, define the solutions and resolve the ERP system problem, record and analyze the trends of ERP system problem

10. Policy for IT Process of Managing ERP Operation

Control over COBIT IT Process of

Manage Operation (DS13)

related to All of ERP Functional Domain (FD)

addressing the business needs for ERP system of

providing operating policies and procedures of effective data management and ERP infrastructure maintenance to maintain data integrity, help reduce business delays and minimize the ERP operating costs

is accomplished by

defining the policies and procedures for operating ERP system, particularly regarding with data processing and sensitive assets. and maintaining the ERP infrastructure

Fig. 1 The IT policies for ERP practices to improve customer orientation and service (cont.)

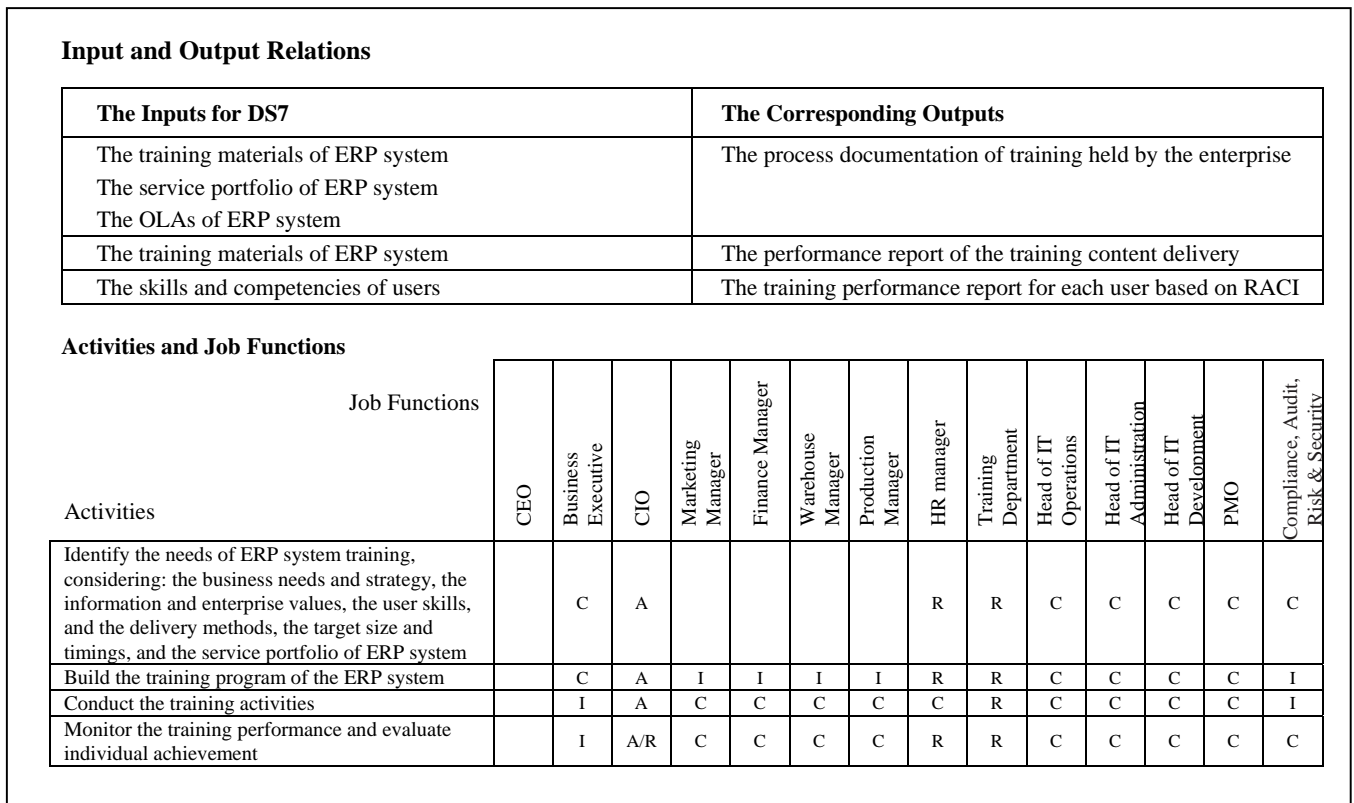


Fig. 2 The management direction for IT policies related to the educate and train users (DS7)

Furthermore, we categorize the EML measurement result less than 2.5 out of 5 as the foundation level; whereas the result between 2.5 and less than 3.5 as the intermediate level and the result starting from 3.5 up to 5 as the advance level. These categorizations determine the contents of the procedures in the IT policies for ERP practices. Hence, the contents of the procedures for DS7 should aim to improve the foundation level into the higher level, i.e. the intermediate level and up to the advance level, since the EML measurement result for DS7 is 2.5. The contents of the procedures for DS7 consider the improvement of the documentation and effective communication, and further to ensure that best practices are followed by monitoring and measuring the performance. Based on the IT policy objectives in Table 4, the IT policies for ERP practices for DS7 consist of three procedures. Figure 3 shows the detail description of IT policy objectives related to DS7. Then Figure 4-6 describes the procedures of IT policies for ERP system related to DS7; those are 1) identification of education and training of ERP system according to the service portfolio, 2) delivery of education and training of ERP system according to RACI, and 3) evaluation of education and training of ERP system according to RACI.

- Identification of education and training of ERP system according to the service portfolio
 - The contents of training curriculum considering: the business needs and strategy, the information and enterprise values, the user skills, and the delivery methods, the target size and timings, and the service portfolio of ERP system, which includes: data/information, application and technology architecture.
 - The establishment and the regular update of the curriculum
- Delivery of education and training of ERP system according to RACI
 - The preparation : the delivery mechanism, and the training schedule and appointments
 - The people : the target group based on RACI, the teachers, trainings and the mentors
 - The documentation : the training records, including registration, attendance
- Evaluation of education and training of ERP system according to RACI
 - The evaluation of training content, quality and cost for future curriculum
 - The evaluation of individual performance regarding with training activities

Fig. 3 The detail description of IT policy objectives related to DS7

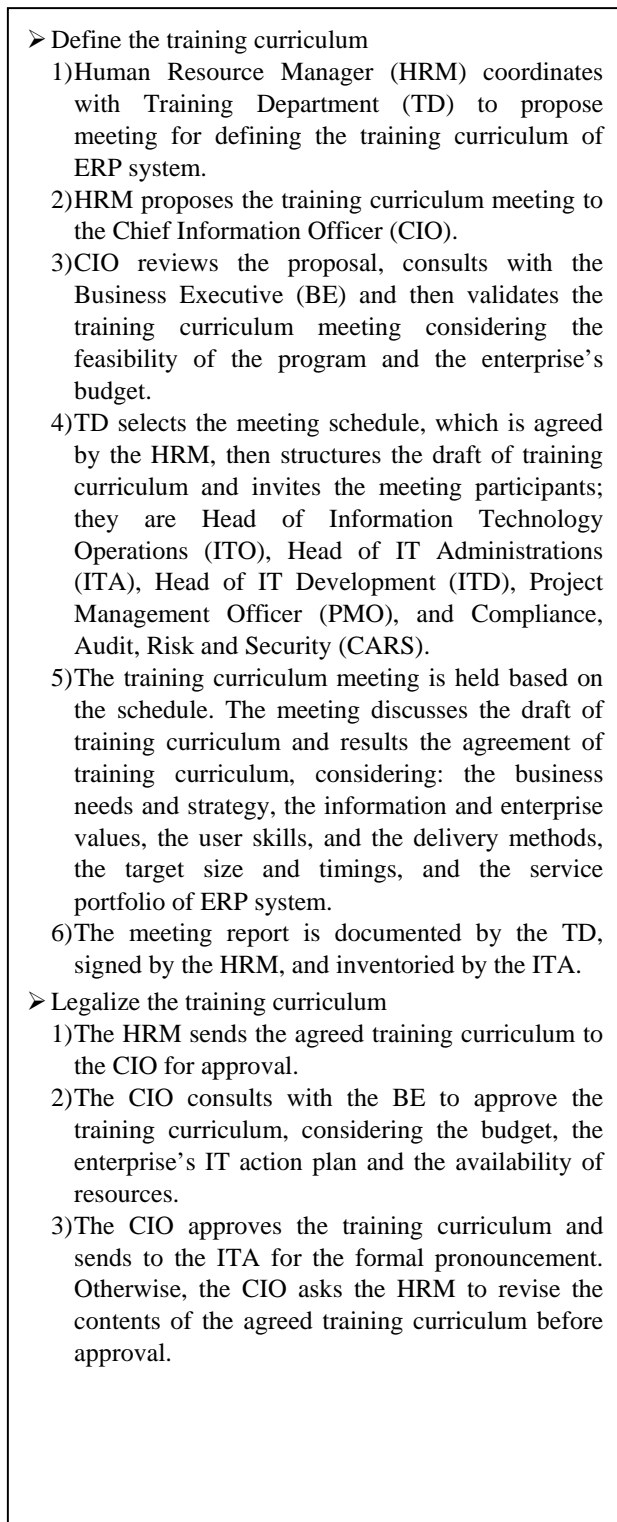


Fig. 4 Procedure identification of education and training of ERP system

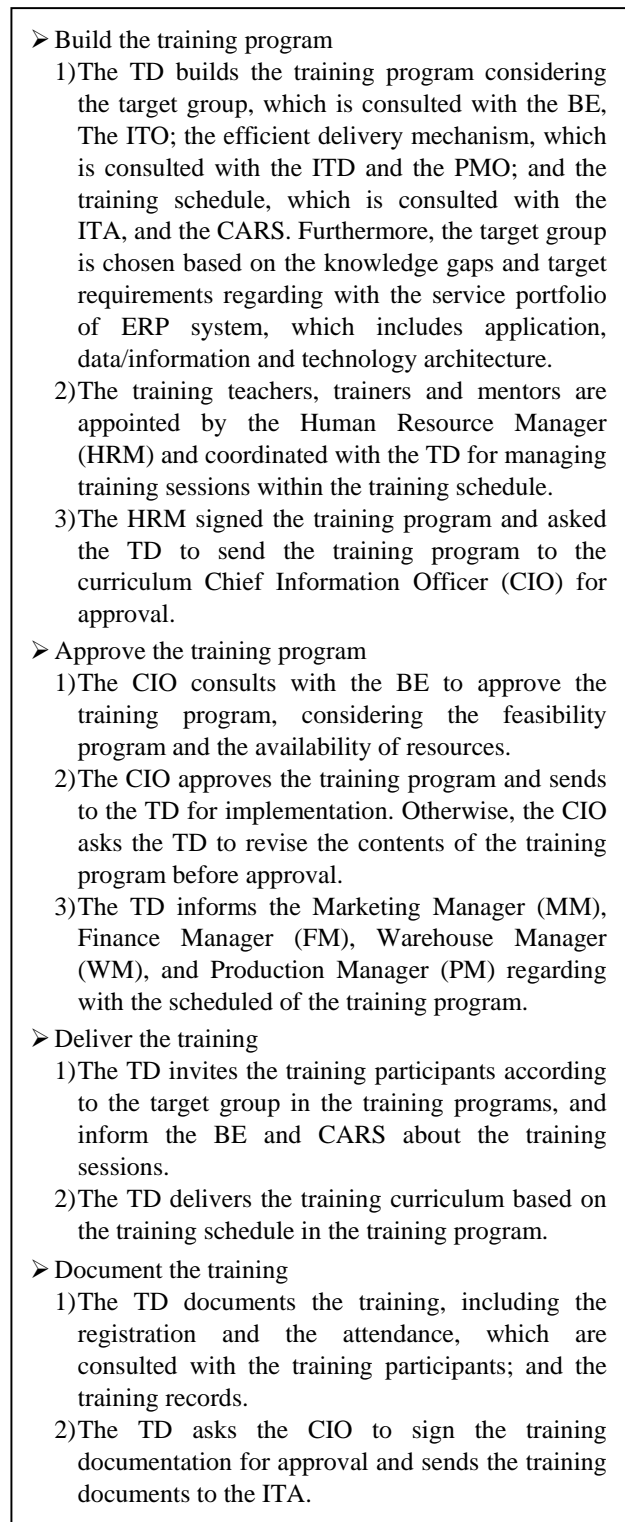


Fig. 5 Procedure delivery of education and training of ERP system

- Evaluate the training performance
 - 1) Training Department (TD) evaluates the training content delivery upon completion for relevance and quality, which are consulted with the Head of IT Administrations (ITA) and the Compliance, Audit, Risk and Security (CARS); for effectiveness and retention of knowledge which are consulted with the Head of IT Operations (ITO), the Head of IT Development (ITD) and the Project Management Officer (PMO); for the cost and value, which are consulted with the Chief Information Officer (CIO) and the Human Resource Manager (HRM).
 - 2) Training Department (TD) evaluates the training content delivery upon completion for relevance and quality, which are consulted with the Head of IT Administrations (ITA) and the Compliance, Audit, Risk and Security (CARS); for effectiveness and retention of knowledge which are consulted with the Head of IT Operations (ITO), the Head of IT Development (ITD) and the Project Management Officer (PMO); for the cost and value, which are consulted with the Chief Information Officer (CIO) and the Human Resource Manager (HRM).
 - 3) The TD records the evaluation of the training performance, which is signed by the HRM, and asks the CIO for the approval.
 - 4) The TD sends the approved evaluation of training performance records to the ITA and informs the evaluation of training performance to the Business Executive (BE) monthly.
- Evaluate the individual performance
 - 1) The HRM evaluates the individual performance regarding with training program, and consults with training participants.
 - 2) The HRM records the evaluation of individual performance to the employee careers path and asks the CIO for the approval.
 - 3) The HRM informs the general individual performance regarding with the ERP system training to the BE monthly.

Fig. 6 Procedure evaluation of education and training of ERP system

5. Conclusions

We have described the methodology and developed the Information Technology (IT) policies for Enterprise Resource Planning (ERP) practices to improve customer orientation and service. The policy was developed based on the specified IT processes related to the achievement of Business Goal 4 (BG4) in COBIT, i.e. *improve customer orientation and service*. Since the proposed IT policies for ERP practices were aligned to the IT goals and the Business Goals, then successful implementation of the ERP could be achieved optimistically.

We have proposed ten IT policies for ERP practices in order to achieve BG4. The IT policies for ERP practices were structured by considering the IT policy objectives, the corresponding Functional Domain (FD) in the ERP system and the Responsible Job Functions. In this paper, the IT policy for ERP practices for IT Process Delivery Support 7 (DS7) i.e. *educate and train users*, is equipped with the management directions as a basis for the development of the procedures. Thereby, the procedures are developed considering the IT policy objectives and the results of the Enterprise Maturity Level (EML). As a result, three related procedures for DS7 have been developed and elaborated in detailed.

Hence, the IT policies could improve the ERP practices in the enterprise. Furthermore, the IT policies for ERP practices ensure the successful achievement of the BG4 during planning, implementation and delivery of the IT services corresponding to the ERP application.

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References

- [1] SAPTM, "SAP thought leadership: The business of sustainability", USA: SAP AG, Rep. 50 093 933, 2009.
- [2] C. Koch, "Flipping the switch", *CIO*, vol. 9, no. 17, 1996.
- [3] T.F. Wallace and M.H. Kremzar, *Making It Happen*. John Wiley & Sons, Inc., 2001.
- [4] M. Themistocleous, Z. Irani, and R.M. O'Keefe, (2001), "ERP and application integration", *Business Process Management Journal*, vol. 7, no. 3, pp. 195-204, 2001.
- [5] S. Conner, "And the keyboard's connected to the backbone," *Chemistry and Industry*, pp. 1-2, May. 18, 1998.
- [6] J.E. Scott and I. Vessey, "Implementing enterprise resource planning systems: the role of learning from failure", in *Information Systems Frontiers*, vol. 2, no. 2, pp. 213-232. The Netherlands: Kluwer Academic Publishers, 2000.

- [7] T.H Davenport, "Putting the enterprise into the enterprise system", *Harvard Business Review*, pp. 121-131, July-August, 1998.
- [8] V. Kumar, B. Maheshwari, and U. Kumar, "An investigation of critical management issues in ERP implementation: empirical evidence from Canadian organizations", *Technovation*, vol. 23, pp. 793-807, 2003.
- [9] M.L. Markus, S. Axline, D. Petrie, and C. Tanis, "Learning from adopters experiences with ERP-successes and problems", *Journal of Information Technology*, vol. 15, pp. 245-265.
- [10] S. Chang, "ERP life cycle implementation, management and support: implications for practice and research", in the *Proceedings of the 37th Annual Hawaii International Conference on System Sciences*, Hilton Waikoloa Village Big Island, Hawaii, January 5-8, 2004.
- [11] E.J Umble, R.R Haft, and M.M Umble, "Enterprise resource planning: implementation procedures and critical success factors", *European Journal of Operations Research*, vol. 146, pp. 241 – 257, 2003.
- [12] S. Bagchi, S. Kanungo, and S. Dasgupta, "Modeling use of enterprise resources planning systems: a path analytic study", *European Journal of Information Systems*, vol. 12, pp. 142 – 158, 2003.
- [13] T.C. Loh, and S.C.L Koh, "Critical elements for a successful enterprise resource planning implementation in small-and medium-sized enterprise", *International Journal of Production Research*, vol. 42, pp. 3433-3455, 2004.
- [14] IT Governance Institute, *COBIT 4.1*, USA, 2007.
- [15] Aksoy, Nejat, "COBIT fundamentals", presented in *ISACA Fall Conference*, September 26th, 2005.
- [16] IT Governance Institute, *IT Governance Global Status Report*, USA, 2008.
- [17] R. Sarno, and A. Herdiyanti, "A service portfolio for an enterprise resource planning", *International Journal of Computer Science and Network Security (IJCSNS)*, vol. 10, no. 3, pp-144-156, 2010.
- [18] R. Sarno, *Audit System and Information Technology*, Surabaya : ITS Press, 2009.
- [19] R.S. Kaplan and D.P. Norton, *The Balanced Scorecard: Translating Strategy into Action*, Massachusetts : Harvard Business School Press, 1996.
- [20] K. Brennan, *A Guide to the Business Analysis Body of Knowledge (Babok Guide)*, International Institute of Business Analysis, 2009, p. 29.
- [21] R. Sarno, *Business Success Strategy utilizing Information Technology*, Surabaya : ITS Press, 2009
- [22] A. Wong and H. Scarbrough, *Critical Failure Factors in ERP Implementation*, Warwick Univ., Warwick, UK.
- [23] T. Davenport, "Putting the enterprise into the Enterprise System", *Harvard Business Review*, vol. 76, no. 4, pp 121-133, 1998.
- [24] H. Kalbasi, "Assessing ERP implementation critical success factors", M.S. thesis, Luleå University of Technology, 2007.
- [25] A. Parr, and G. Shanks, "A model of ERP project implementation", *Journal of Information Technology*, vol. 15, no. 2, pp. 289-303, 2000.
- [26] A. Majed, A. Abdullah, and Z. Mohamed, "Enterprise resource planning: A taxonomy of critical factors", *European Journal of Operational Research*, vol. 146, pp. 352-364, 2003.
- [27] C. Soh, S.K. Sia, and J. Tay-yap, "Cultural fits and misfits: is ERP a universal solution", *Communications of the ACM*, vol. 43, no. 4, pp. 47-51, 2000.
- [28] M. Sumner, "Risk factors in enterprise-wide/ERP projects" *Journal of Information Technology*, vol. 15, pp. 317-327, 2000.
- [29] M. J. Cotteleer. (2002). ERP: payoffs and pitfalls. *Harvard Business School Working Knowledge* [Online]. Available: <http://hbswk.hbs.edu/item.jhtml?id=3141&t=operations>
- [30] G. Langenwalter, *Enterprise Resources Planning and Beyond: Integrating Your Entire Organization*. St. Boca Raton, FL: Lucie Press, 2000.
- [31] W. M. Bulkeley, "A cautionary network tale: Fox-Meyer's high-tech gamble", *Wall Street Journal Interactive Edition*, 1996.
- [32] L. Markus, S. Axline, D. Petrie, and C. Tanis, "Learning from adopters' experience with ERP Problems encountered and success achieved", *Journal of Information Technology*, vol. 15, no. 2, pp. 245-265, 2000.
- [33] Architecting the Enterprise Ltd., *Aligning ITIL V3 Service Design with TOGAF 9*, USA, 2009.
- [34] *SOA Development Life Cycle Management*, Methodologies Corporation, (646) 290-5894.



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