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Design and Analysis of a Strengthen Internal Control Scheme for Smart Trust Financial Service

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ABSTRACT The construction of the financial module is very important in the intelligent management of the company. The collection, transmission, and processing of relevant item information in the financial module are of great significance to the construction of the intelligent financial module. The intelligent financial processing module can improve financial office efficiency and increase the security of the financial processing process. Section 404 of the Sarbanes-Oxley Act (SOX 404) has always played a decisive role in the quality and transparency of the financial modules of the Enterprise Resource Planning (ERP) of multinational corporations, due to the mandatory nature of the Securities and Exchange Commission (SEC). The purpose of this research is to design a set of intelligent ERP financial modules for multinational corporations that could comply with SOX 404, strengthen internal controls, and improve the security and convenience of the financial module. Thereby achieving intelligent management of financial modules and intelligent prevention of risks. Our solution could fortify the preventive controls over inappropriate payments to products with quality issues, reduce manual efforts for credit memo issuance and receipt. It could also fortify the preventive controls over financial risks potentially threatened by a sudden contingent liability concerning E&O issues. It could prevent potential and unexpected frauds arisen by a malicious user to meet the requirements of SOX over preventive and detective controls over the financial system. It could also ensure the consistency of journals between the preparer's entry and reviewer's approval as well as improve the completeness and timeliness of financial statement assertions.

INDEX TERMS Sarbanes Oxley Act, ERP, financial modules, internal control, enhancement.

I. INTRODUCTION

Sarbanes-Oxley Act is a controversial United States federal law passed in response to plenty of major corporate and accounting scandals which resulted in a decline of public trust in accounting and reporting practices such as those injuring Enron, Tyco International, Peregrine Systems and WorldCom.

With this strict enforcement by SEC, compliance with SOX 404 will take large commitments of time and efforts for both

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public company management and public company auditors. What's even more, finance system modules as a part of Enterprise Resources Planning (ERP) [1]–[5] have no choice but to be enhanced or adjusted to meet the requirements of SOX 404 for US public companies or most of the multinational corporations in response to SOX compliance.

Based on the above mentioned, We have the motivation to analyze and redesign the financial modules of well-known companies. Through the analysis and processing of historical data and related items, we redesign the financial module and related processing. It makes the company's financial module become more intelligent. It can provide convenience

for the financial office and increase the security of financial processing.

The aims of this research could be summarized as follows through a case study of a leading and distinguished multinational corporation in the personal peripherals industry where the author is working at present. The objective of this research is to design a suitable set of ERP financial modules for multinational corporations that could comply with SOX 404, strengthen internal controls, and improve the quality of financial reporting. Also, this research will summarize the research findings and inductions by pros and cons in a nutshell which could be reorganized as treasurable experience and stimulative feedbacks for management concerned with other multinational corporations in a similar industry to drive the compliance of SOX.

II. RELATED WORK

A. SARBANES OXLEY ACT SECTION 404

Section 404 of the SOX [6]–[8] requires management to include an internal control report in the company’s annual report filed with the SEC. The internal control report must state that management is responsible for establishing and maintaining adequate internal control over financial reporting and contain an assessment of the effectiveness of internal control over financial reporting as of the end of the company’s most recent fiscal year.

SOX 404 also requires the company’s auditor to attest to, and report on, management’s assessment of the effectiveness of the company’s internal control over financial reporting. As a result, compliance with SOX 404 will require large commitments of time and effort for both public company management and public company auditors, so it is critical to know the compliance due dates.

Some SOX standard includes specific requirements for auditors to understand the flow of transactions, including how transactions are initiated, authorized, recorded, processed and reported.

Such transaction flow mainly takes the use of application systems for automating processes and supporting high volume and complex transaction processing. The reliability of these application systems is in turn dependent upon plenty of technology support systems, including databases, operating systems, network [35], data mining [28]–[34] / warehousing and so forth. In this way, they validate the IT systems which are involved in the financial reporting modules and, as a result, should be considered in the design and evaluation of internal control. Based on the above reason, the SOX regulates organizations to establish and implement an appropriate internal control framework and documentary processes by detail.

The Act defines the test number for automatic control and manual control which the test sample items could be minimal, assuming that information technology general computer controls have been tested and found to be effective. And the SOX defines the test on manual controls should include a

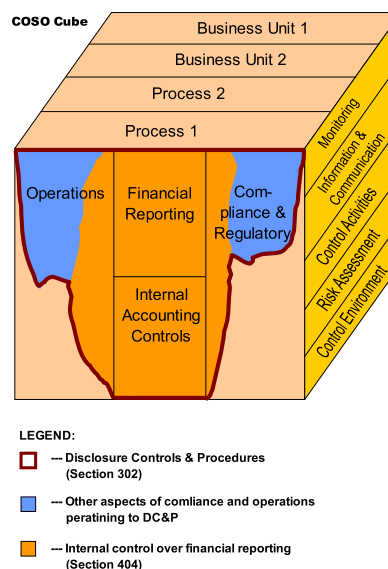


FIGURE 1. COSO internal control cube.

mix of inquiry, observation, examination, or re-performance. Inquiry, alone, however, does not provide sufficient evidence to support the operating effectiveness of a control. Effective testing will generally require examining control at a particular location/business unit in different instances. Therefore, the automatic control is more persuasion than manual control.

B. INTERNAL CONTROLS

The “Internal Control-Integrated Framework” [9]–[12] issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in 1992, is becoming a widely accepted basis for developing business control systems and assessing their effectiveness. This information tool was developed to help end-users of derivative products establish, assess, and improve internal control systems using the COSO Framework. Many of the control considerations discussed are also applicable to financial instruments other than derivatives.

The SEC states: “The COSO satisfies our criteria and may be used as an evaluation framework [13]–[16] for purpose of management’s annual internal control evaluation and disclosure requirements.” Therefore, 63% of the publicly held companies used the COSO framework of internal control.

And as part of the SOX 404 assessment, the internal control should document, test, and evaluate the five components of the internal control framework of COSO. The components are discussed as follows (as shown in Figure 1).

1) CONTROL ENVIRONMENT

The control environment creates the “tone at the top”, establishes the foundation for effective internal control, and represents the top of the corporate management structure. Currently, the IT control concept raised in the control Environment. It’s better than manual control.

2) RISK ASSESSMENT

The risk assessment involves the identification and analysis by the governance of relevant risk to achieve the objectives, which form the basis for determining control activities, and should have to identify the risks of material misstatement in the significant accounts and related assertions of the financial report. Risk assessment occurs at the company level (for the overall organization) or at the activity level (for a specific process or business unit.).

3) CONTROL ACTIVITY

The control activity is to ensure that business objectives are achieved and risk mitigation carries out. All of the control activities have been put into the policy, procedure, and practices. The activities involve approvals, authorizations, verifications, reconciliations, reviews of operating performance, the security of assets, and segregation of duties. Currently, most of the transactions of the public company perform ERP system to process the operation process. So, IT control will be an important role to perform the control activity. COSO also recognized IT control activities into two types. One is General control, the other is Application Control.

4) INFORMATION AND COMMUNICATION

The information is needed at all levels of the company to run the business operations and achieve the entity’s control activities. The information quality should be ensured in timely, appropriate, current, accurate and accessible. IT system could support the information exchange in a form, and time frame that enables personnel to carry out their responsibilities and financial reports to be generated accurately.

5) MONITORING

Monitoring is a continuous process that covers the oversight of internal control by governance. There are three sub-components in monitoring, first one is ongoing monitoring that occurs in the general course of operations, the second one is separate evaluations in periodic monitoring, and the last one is reporting deficiencies which should include a process for reporting deficiencies to the appropriate level of management and the board of directors. There are internal audits, management reviews, audit committee activities, disclosure committee activities, and self-assessment reviews be implemented into a company as the monitoring control.

C. RELATIONSHIP OF COBIT WITH SOX COMPLIANCE, INTERNAL CONTROL, AND IT GOVERNANCE

A useful assessment is to compare the COBIT four domains of IT governance with the internal control reliability model (as shown in Figure 2). Internal controls or Section 404 compliance is a major provision of SOX. The internal control reliability model maps documentation, awareness and understanding, perceived value, control procedures, and monitoring of internal controls to five levels of maturity.

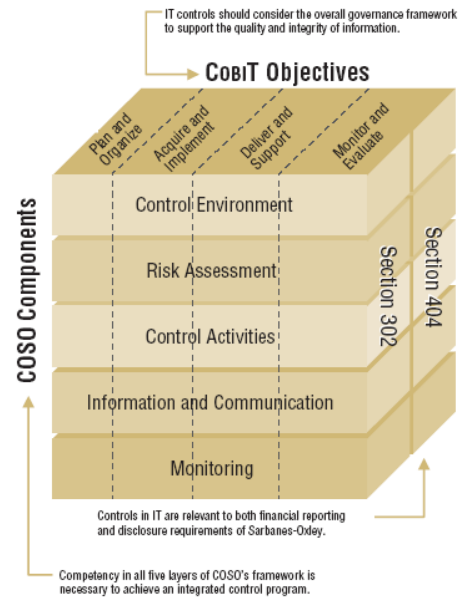


FIGURE 2. Mapping among COSO, COBIT, and SOX.

Compliance with Section 404 is attained when the four domains of IT governance are aligned with the internal controls maturity model. The underlying premise of the internal controls maturity model is that if an organization does not have defined and standardized processes, it is unable to provide consistent and reliable services. Standardized processes to provide consistent and reliable IT services are critical to SOX compliance. Maturity in all four domains of the IT governance model is required to sustain SOX compliance.

In a nutshell, several specific approaches can be used to maintain the momentum to integrate Section 404 into operational practices, including expanded use of the internal audit function, risk identification and management programs, integrated information systems to support Section 404 compliance, and active change management to design and implement Section 404 compliance as the business evolves. Application-level controls and general computer controls have been major focuses of attention in first-year projects. Many companies have used technology to help manage their Section 404 efforts and to provide control repositories and audit trails.

D. ERP FINANCIAL MODULES

ERP software is made up of many software modules. Each ERP software module mimics a major functional area of an organization. Common ERP modules include modules for product planning, parts and material purchasing, inventory control, product distribution, order tracking, finance, accounting, marketing, and HR. Organizations often selectively implement the ERP modules that are both economically and technically feasible.

A good set of financial modules could take care of all accounts related to entries and their impact on the whole system. How finance comes and how it has been utilized.

	Single-Case Designs	Multiple-Case Designs
Holistic (single unit of analysis)	TYPE 1	TYPE 3
Embedded (multiple units of analysis)	TYPE 2	TYPE 4

FIGURE 3. Four categories of case study.

The total flow of money (Cash/Bank) and total expenditures will be reflected here. As an after-effect of this, the management will be able to take their important financial decision, budgeting, etc. They can come to know about the company's financial position at any point in time. All sorts of important financial reports i.e. trial balance, trading accounts, profit & loss account, balance sheet, debtor's balance, creditors balance, cash/bank fund position and many more are covered in this module. This implies most of the accounting functions are handled through relevant transactions in other modules thereby saving a lot of time. The module contains complete functionality required for any accounting department right from vouchers to the balance sheet and profit and loss account.

III. RESEARCH DESIGN

A. METHODOLOGY-SINGLE CASE STUDY

This paragraph is divided into three portions inclusive of the reason for applying case study methodology, the category of case study employed, and the way of data collection and sample defined.

This research employs a single case study [17]–[23] methodology. In general, there are four methods in MIS research, such as case studies, laboratory studies, field studies, and field tests. Case study research involves the examination of a phenomenon in its natural setting and can be seen to satisfy the three tenets of the qualitative method: describing, understanding, and explaining.

This research employs a single case study methodology (as shown in Figure 3) by interviewing the Business process Owner (BOP) to understand the transaction flows of each financial module through the examination on narratives of the SOX 404 implementation for a leading and distinguished multinational company in personal peripherals industry where the author is working currently and ever joined the SOX and ERP improvement projects of hers.

Therefore, the focus of this study is on the enhancements of financial modules in response to SOX 404 compliance and evaluation of the effectiveness of internal controls over financial reporting system while the unit of analysis is the BOP/each financial module dyad.

B. DATA COLLECTION AND SAMPLE DEFINED

When selecting a case for a case study, researchers often use information-oriented sampling, as opposed to random sampling. This is because the typical or average case is

often not the richest in the information. Extreme or atypical cases reveal more information because they activate more basic mechanisms and more actors in the situation studied. In addition, from both an understanding-oriented and an action-oriented perspective, it is often more important to clarify the deeper causes behind a given problem and its consequences than to describe the symptoms of the problem and how frequently they occur. Random samples emphasizing representativeness will seldom be able to produce this kind of insight; it is more appropriate to select a few cases chosen for their validity.

The sample of this research was only a single case company, which is a leading multinational corporation in the personal peripherals industry throughout the world.

C. PRESENTATION OF SINGLE CASE STUDY PROCEDURES

The overall procedures for this research could be drawn in Figure 4. To begin with, a good deal of prior literature was surveyed and reviewed. Subsequently, a leading multinational “case company” in the personal peripherals industry was selected as the “unit of analysis” for this research. After conducting the case study, the single case report will be written and the deficiencies residing in each financial module will be identified. Next, the possible system enhancements will be proposed to improve the deficiencies found with the evaluation of internal control strength and SOX compliance efficacy through the post-implementation comparison analysis. Eventually, the findings and inductions of this study by pros and cons, in a nutshell, will be provided as treasureable experience and stimulative feedbacks for management concerned with other multinational corporations in the same industry to drive the compliance of SOX 404.

IV. CASE STUDY REPORT

A. COMPANY PROFILE

The case company has implemented Oracle1 ERP system since 1999 in full packages for each operation requirement with later upgrading to Oracle's newer version constantly.

Each sub-module could be diversified into several major functionalities and operated by related users throughout the world. For instance, the accounts receivables module contains customer data maintenance, credit management, receivables collection, revenue recognition [24]–[27], and bad debts allowance, royalty accruals functionality and so forth. As for accounts payables, it consists of supplier master data maintenance, payment proceeding, payables accruals, returns material authorization processing, operating expense settlements and projection. For costing module, it includes the bill of material establishment and breakdown, standard cost setup, material transactions distribution, and cost analysis and so on.

All transactions from sub-modules together with manual journals created for accounting adjustments will be imported and posted to the general ledger module for eventual financial outputs such as financial statements, managerial analysis reports, and tax purpose statements, etc.

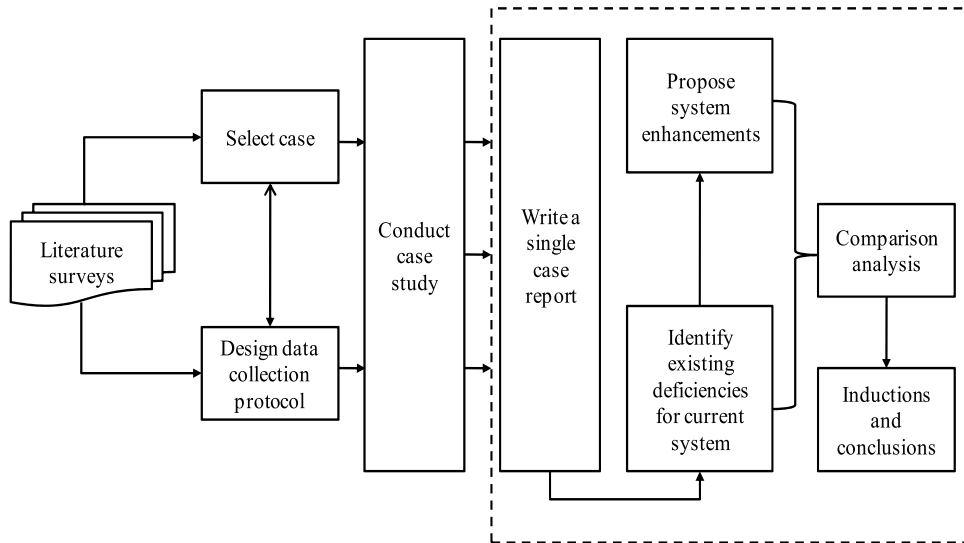


FIGURE 4. Case study procedures of this research.

Foundational Remediation	Implementation	Derive Benefits	Incremental	Capabilities
<p>SOX</p> <ul style="list-style-type: none"> Identify Control Impact Document process change 	<p>11i controls</p> <ul style="list-style-type: none"> Design and Develop controls Internally test new controls 	<p>Remediation & resolution</p> <ul style="list-style-type: none"> Externally Test new controls 	<p>Identify, Document controls and tests</p> <ul style="list-style-type: none"> Identify, Document controls and tests 	<p>Identify, Document controls and tests</p> <ul style="list-style-type: none"> Identify, Document controls and tests
<p>Data</p> <ul style="list-style-type: none"> Data Quality Management Model Foundational Data Migration Strategy 	<p>Data Conversion</p> <ul style="list-style-type: none"> Design Test 	<p>Identify additional data</p> <ul style="list-style-type: none"> Conversion cutover testing 	<p>Follow established procedures for data</p> <ul style="list-style-type: none"> Follow established procedures for data 	<p>Follow established procedures for data</p> <ul style="list-style-type: none"> Follow established procedures for data
<p>Process</p> <ul style="list-style-type: none"> NPI Global Forecast Shop Floor control Order Schedule MRO Procurement 	<p>Regional Design and Configuration</p> <ul style="list-style-type: none"> Gap Analysis Build Te Scenarios 	<p>Monitor and measure Process changes</p> <ul style="list-style-type: none"> Test Process changes 	<p>Trade Management</p> <ul style="list-style-type: none"> Marketing Online Incentive Comp Expanded Planning Inventory Opt 	<p>TETT</p> <ul style="list-style-type: none"> TETT
<p>Systems</p> <ul style="list-style-type: none"> Detail Project Plan Build 11i Prototype Core Team Training 	<p>Prepare and conduct Conference Room Pilots(CRP)</p> <ul style="list-style-type: none"> Hyperion, Agile, PeopleSoft, and Customizations and Integration Projects 	<p>Post Production Support</p> <ul style="list-style-type: none"> Configuration Testing Performance testing User Acceptance End User Training 	<p>Implement new capabilities</p> <ul style="list-style-type: none"> Implement new capabilities 	<p>TETT</p> <ul style="list-style-type: none"> TETT

FIGURE 5. ERP system upgrade of the case company.

B. THE PROCESS OF ERP UPGRADE

With escalation of business scale in age of globalization, the case company, as a leading multination corporation in its industry, the top management of case company was taking into consideration to upgrade ERP system to copy with the more and more sophisticated business transactions incurred day by day in a huge volume and synchronize the updated information in each entity throughout the world in a concurrent timeliness basis.

The following procedures are regarded as crucial concerns when the company determined to upgrade its ERP system.

- 1) Compare the existing pros and cons of the current system with those of other distinguished multinational companies in a similar industry.

- 2) Identify and review if any enhanced functionality by Oracle 11i could be supported and fortify the current and future insufficiency in system requirements.
- 3) Request for approvals by top management concerned for the system enhancement.
- 4) Scheme data purification and cleansing from the conversion of systems between the two.
- 5) Evaluate the potential impacts caused by the conversion of the system on current implementations of other applications such as Hyperion, Agile, and People Soft and so forth.
- 6) Evaluate and determine if the way of system conversion is to completely upgrade, parts replacement, or crucial enhancement.

- 7) Scheme complete testing and training plans for super-users throughout the world for the enhanced system as a whole.
- 8) Kick-off meetings for implementation timetable and roadmap framework (as shown in Figure 5).

C. THE IMPLEMENTATION OF SOX

This paragraph describes the implementation of SOX by the case company. Achieving compliance is a highly interdependent, business-oriented endeavor. To have any hope of successfully navigating the compliance and control objectives detailed here, the case company aligned itself with the business goals of the organization in developing a proper roadmap with steps as follows.

- a. Planning and scoping
- b. Performing a risk assessment
- c. Identifying significant accounts and controls
- d. Formalizing and documenting control design
- e. Evaluating the control design
- f. Testing the control design for effectiveness
- g. Identifying and remediating control deficiencies
- h. Documenting process and results
- i. Building sustainability

Although the immediate concern was to be compliant within the timelines given at the early stage of SOX implementation, all work had been still mapped into the longer-term objective of creating a risk management culture for the company. The following Table 1 presents the predefined procedures of SOX implementation of the case company, which was developed from the published roadmap and guidelines as the above mentioned.

According to COSO internal controls framework, the case company developed the architecture of SOX compliance (as shown in Table 1) to correspond to the COSO framework in aspects of control environment, risk assessment, control activities, information & communication, and monitoring.

V. ANALYSIS OF RESULTS

A. ANALYSIS OF ACCOUNTS PAYABLES MODULE

This paragraph elaborates on the accounts payables (AP) module of the case company by special topics on hold payment mechanism and Return Material Authorization (RMA) mechanism. A brief introduction of AP settlement processing regarding the original design manufacturer (ODM) will be given as an example to be acquainted with the AP module of the case company as a whole.

As a leading multinational corporation, the case company itself develops a very sophisticated accounts payables processing since its global entities disperse throughout the world. As a result, ODM AP settlement processing (as shown in Figure 6) will be taken as an example to be familiarized with the AP module of the case company.

The sourcing and commodity team of the case company are responsible for seeking necessary resources (e.g. material, components parts, packaging) and qualified suppliers for

TABLE 1. The procedures of SOX implementation of the case company.

Theme	detailed
Planning	a. Scope the locations, accounts and processes of the company
	b. Assessment the business risk and identify prioritization of processes
	c. Design the documentation plan and identify the recourse in each region.
	d. Planning and scoping the IT resource.
	e. Define and find out the company control level.
	f. Review the scoping and prioritization by the Audit Firm.
Documentation	a. Training the documenter to family with the SOX documentation
	b. Training the documenter the interview skill.
	c. Training the documenter to identify the business risk and deficiencies of each subprocess.
Testing & remediation	a. Perform walk through test
	b. Identify and remediate the deficiencies
	c. Initial testing by audit firm
	d. Remediate the deficiencies that the audit firm raised
	e. Perform the update testing
	f. Final test by Audit firm.

further mass production of the launched projects by comprehensive evaluations of suppliers’ characteristics, business expertise, capabilities, financial outcomes, goodwill, operational performance and so forth. After a qualified supplier is sourced and phased-in, the planning team of case company will accumulate the demand forecast placed by distribution centers (DCs) in each region, extract marketing forecast from demand master database, and then convert into purchase requisitions in the system. At the same time, the sourcing and commodity teams will take several rounds of negotiation with the qualified suppliers to determine the final purchase order (PO) price. After the PO price is finalized, the sourcing team will sign off the global price agreement (GPA) with suppliers and upload the GPAs into the system.

The purchase requisitions auto-generated by the system will trigger the GPA of each item number in the GPA list database and then will be converted into POs automatically. Subsequently, this auto-generated POs will be placed to the awarded ODM suppliers for further tooling release and mass production (MP).

Once the awarded supplier finishes MP, she will arrange shipments to the designated destination requested by each DC with issuing related invoices to the finance department of the case company for billing.

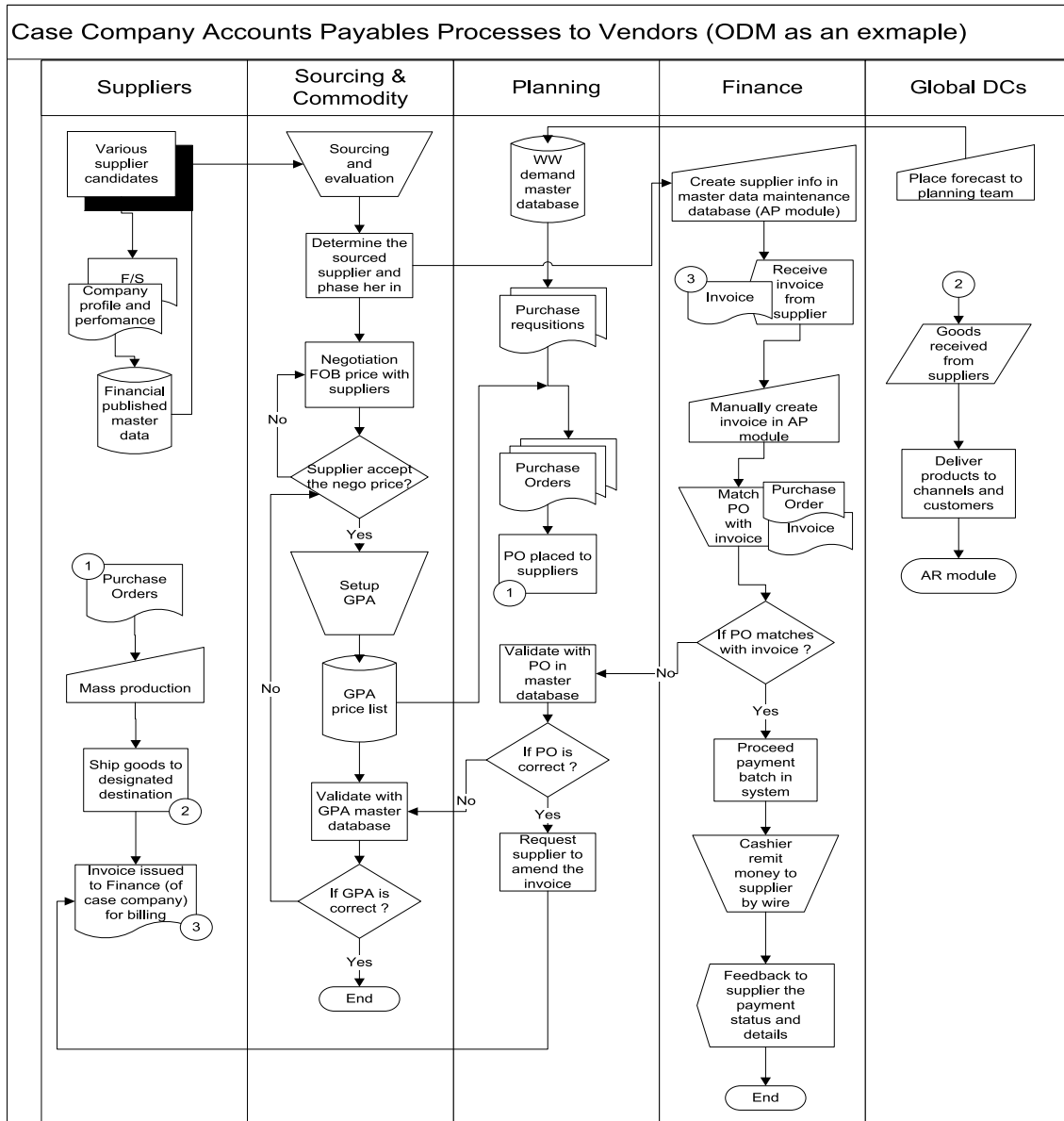


FIGURE 6. Case company accounts payables processes to vendors.

The invoices issued by suppliers will be manually entered into the system by an accountant once being received by the finance of the case company. Next, the AP accountant will match the invoice with PO placed by the planning with verification of all information shown on both before the invoice due and arrange the payment in the system. Any payment batch to be settled in cash out should go through all required approval workflow in advance and then remitted by the cashier. After the money remits, an automatic e-mail will be submitted by the system to related suppliers with payment details as an acknowledgment.

B. RMA MECHANISM

This paragraph addresses the AP processing regarding the RMA of the case company (as shown in Figure 7).

In current practice, whenever a certain customer receives defective shipments delivered from global DCs of the case company, the customer will return the shipments with quality issues and cause the case company to proceed RMA processing in the AP module. Once the RMA processing begins, the original sales orders in DCs’ system will auto-generate a set of RMA numbers and thus convert into an RMA ticket which will be subsequently submitted by e-mail to ODM suppliers as an acknowledgment.

Once receiving an RMA ticket from the case company, the relevant ODM supplier will manually issue a credit memo to the finance department of the case company to deduct receivables with regard to returned shipments. When the finance department of the case company receives the credit memo by the ODM supplier, the credit money will be

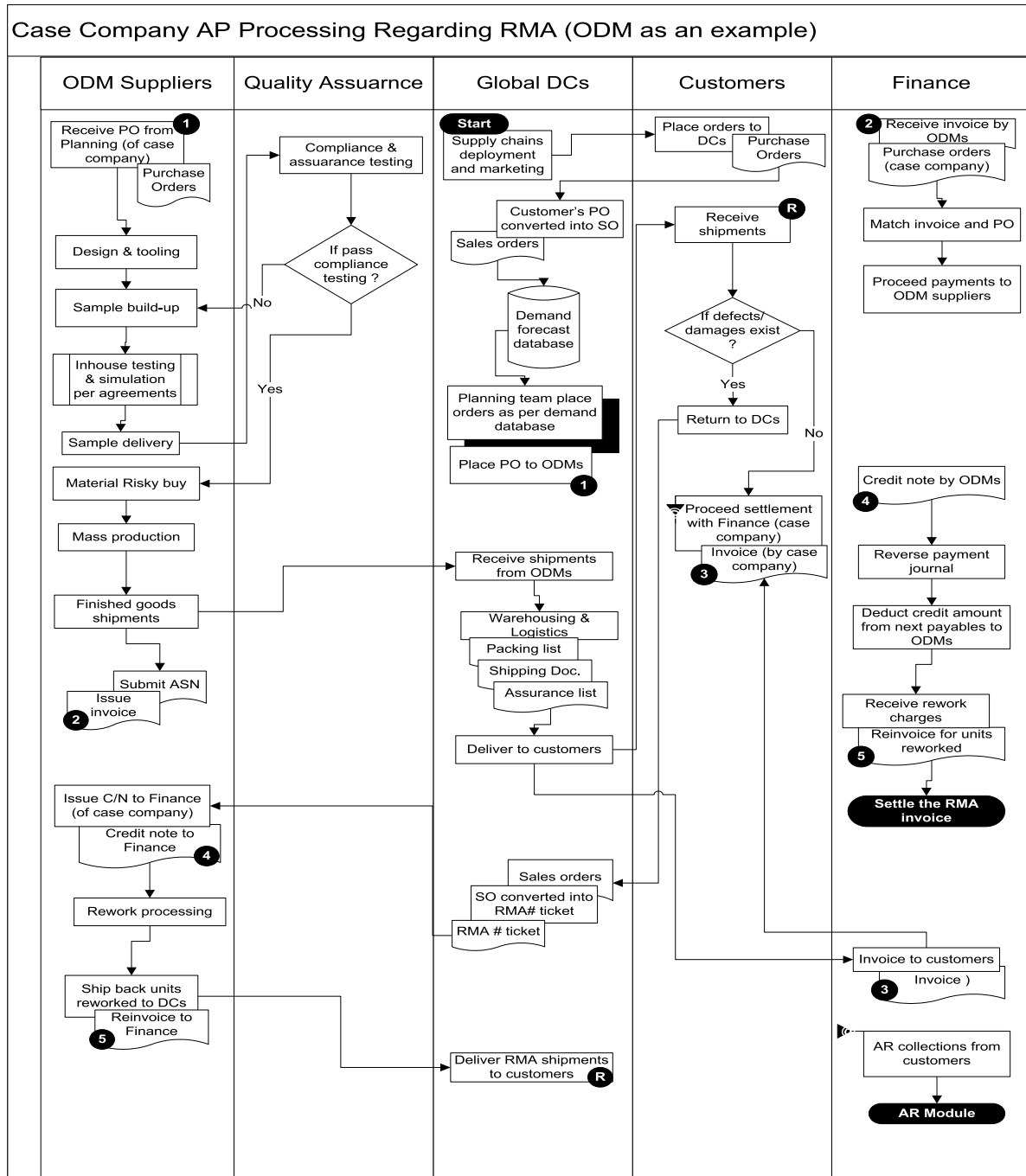


FIGURE 7. Current workflow for AP processing regarding RMA.

manually deducted from the next payment to the supplier by the cashier as well as the previous payment history will be voided with reversal of related booking by the AP accountant.

On the other hand, the project development team and quality assurance team of the case company will announce the project signals (project on-going, on-hold, or immediately canceled) and instruct the supplier what to do (to rework, liquidate, or scrap) for the next.

If rework were applied to this case, the supplier would re-issue an invoice to finance department of the case company

for goods reworked and shipped back to DCs. Once the RMA invoices were received, the case company would re-run the AP payment processing to end up with a settlement of invoices regarding RMA rework charges.

The case company used to rely on the ODM supplier to issue a credit memo to the finance itself to deduct receivables with regard to returned shipments. But there exists a lag of time between credit memo issued by the supplier and received by the finance of the case company. In the majority of the time, the credit memo will be manually issued and received

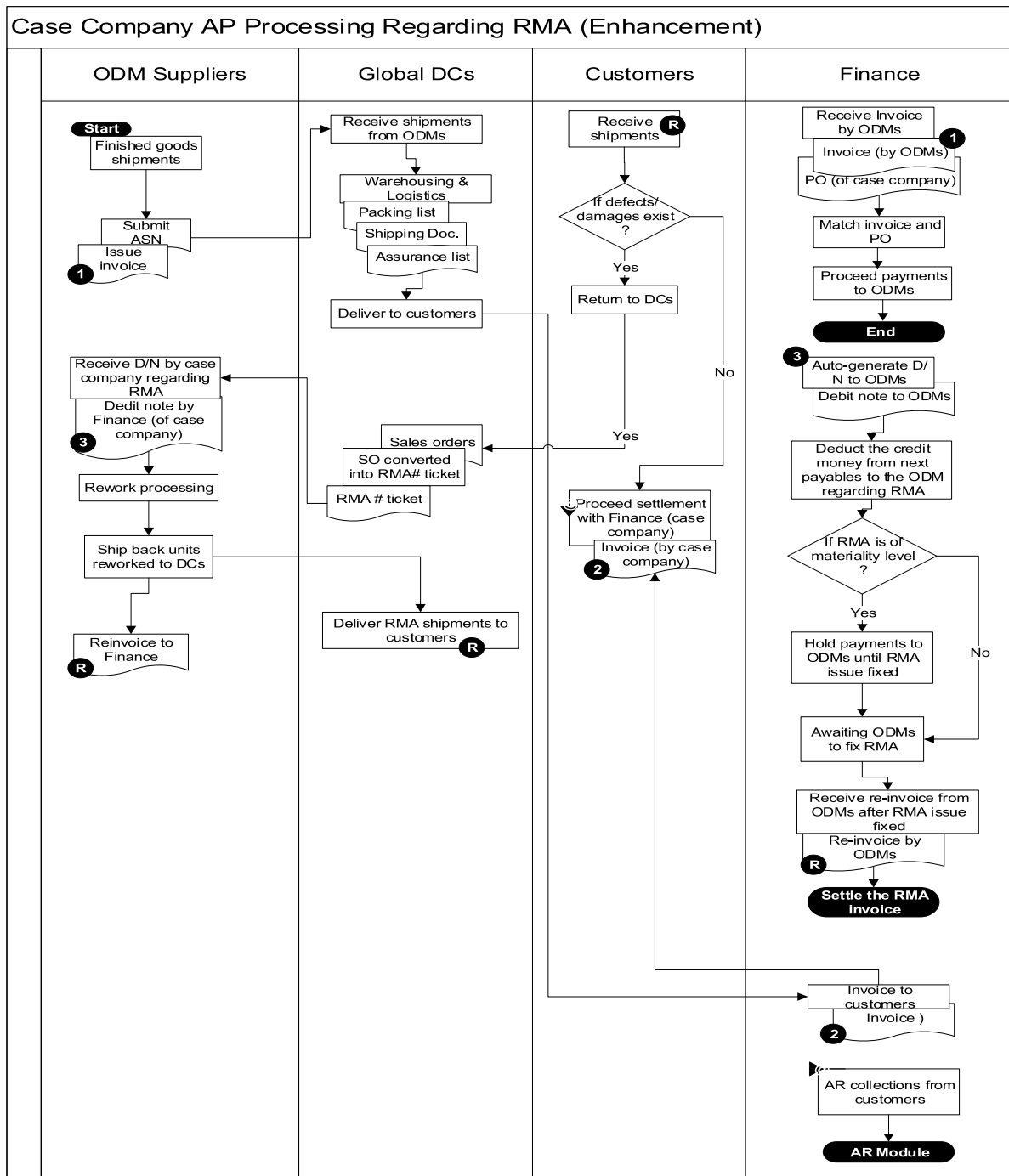


FIGURE 8. Enhanced workflow for AP processing regarding RMA.

after the invoice regarding defective shipments is settled by the finance of the case company. In that case, it would take duplicate efforts and time of the case company since the finance department must reverse the previous payment booking and void the payment history once receiving the postponed credit memo from the supplier.

For the sake of enhancement, the case company could reengineer the original RMA AP processing in a more systematic and automatic framework (as shown in Figure 8)

since the latest AP module of Oracle could support functionality to automatically create debit memo from any return transaction.

Whenever RMA processing begins due to defective shipments returned by a certain customer, the original sales orders in DCs' system will auto-generate a set of RMA number and thus convert into an RMA ticket which will be subsequently submitted by e-mail to ODM suppliers as an acknowledgment. At the same time, the system would auto-generate a

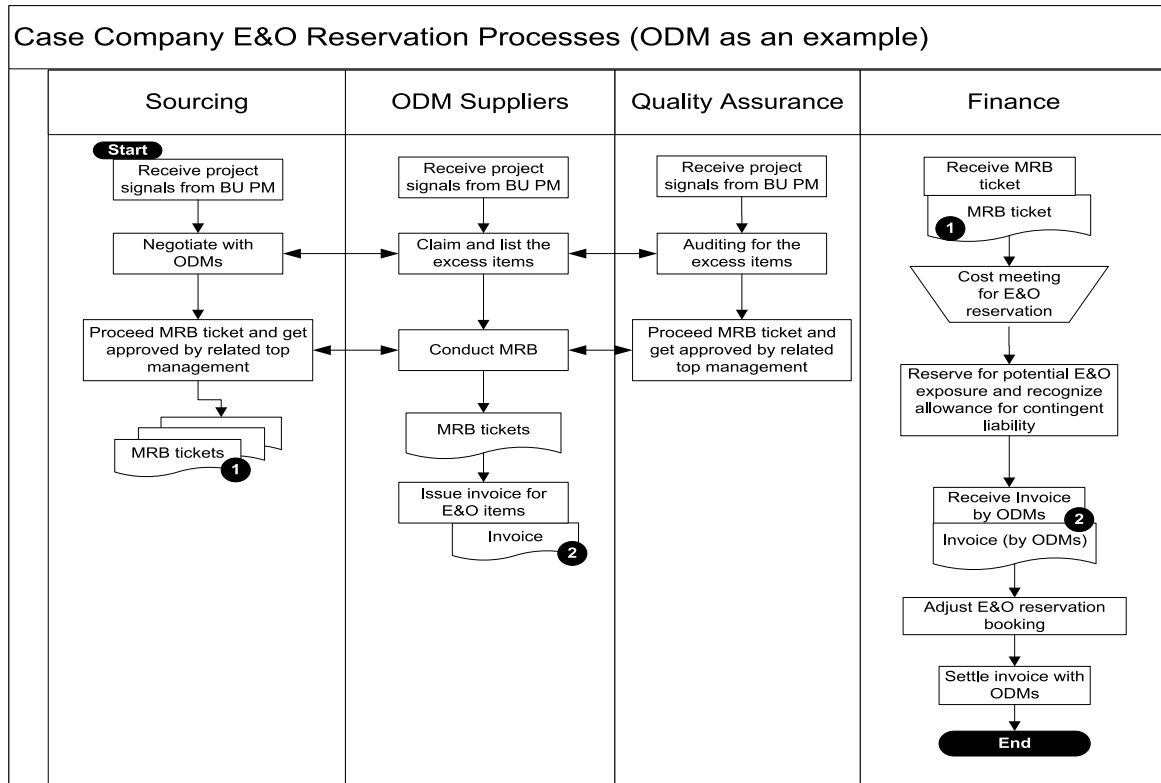


FIGURE 9. Current workflow of E&O reservation processes.

debit memo to the related supplier to offset with the invoice previously issued by the supplier for billing the shipments or deduct the credit money from the next payment to the supplier. Moreover, if the RMA amount outweighs the materiality level, the system will automatically hold the payments to the related supplier as default setup and will not release the hold payment until RMA issues are fixed. Once the supplier repairs the defective goods and returns the shipments back to the destination designated by DCs, a renewed invoice will be issued by the supplier to the finance department of the case company for billing the shipment reworked.

This reengineering of RMA process in automation could diminish the lag of time between manual issuance of credit memo by the supplier and receipt of that credit memo by finance (of case company). As a result, finance of the case company could be promptly informed of any RMA issue and therefore would not arrange any payment for the RMA invoice from the beginning so as to avoid duplicate efforts to reverse the previous payment booking and history in the system manually. Furthermore, the system could automatically hold the payment to any supplier with RMA issues which may outweigh the materiality level of the case company and will not release the hold payment until the RMA issues are repaired. In terms of SOX compliance, the reengineering of the RMA process could fortify the preventive controls over inappropriate payments to products with quality issues, reduce manual efforts for credit memo issuance and receipt, and also lower manual errors committed during reversal of

incorrect payables liability recognition concerning inappropriate RMA invoice settlements.

C. ANALYSIS OF COSTING MODULE

This paragraph addresses the E&O reservation processing of the case company. A brief introduction of current E&O reservation flows would be given in the former while an enhanced system processing will be proposed latter with elaborating internal controls strength fortified and refilled due to this enhancement.

In current E&O reservation processing of the case company (as shown in Figure 9), whenever the launched projects have any defective quality or design weakness issue, the BU project development management will lead as ahead to announce in public to the sourcing and QA team of further project signals (e.g. project on-going, rework, on-hold, or cancellation). Once receiving the formal project signals, the related ODM supplier has to claim and list all excess and obsolete material items in stock. Concurrently, the sourcing team of the case company will take several rounds of keen negotiations with the supplier for mutual liability distinctions while the QA team, at the same time, has to audit the E&O items claimed by the supplier and double validate if those E&O items could be sold to other tiers of sources or could be consumed by other existing projects. Once done, the sourcing and QA teams will conduct material review board (MRB) proceeding to collect all required approvals by top management in a predefined document, say “MRB ticket”, which

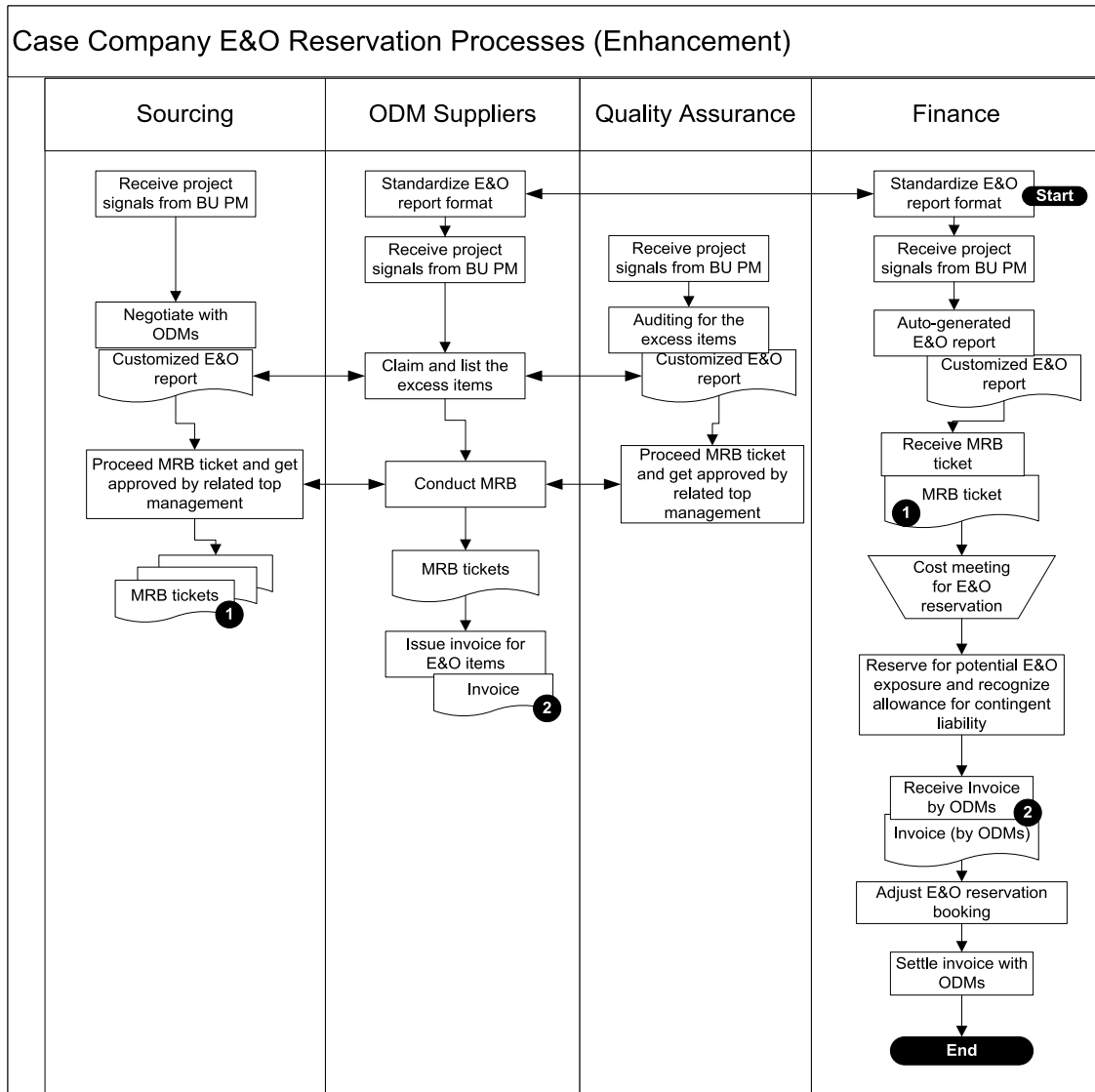


FIGURE 10. Enhanced workflow of E&O reservation processes.

stands for the eventual conclusions reached among the sourcing, QA, and the ODM supplier. The related supplier will in turn to issue an invoice concerning the E&O issue to the finance of the case company for further settlement. Subsequently, the finance of the case company will reserve for potential E&O exposure claimed by the supplier as shown in the approved MRB ticket and recognize the contingent liability. Once receiving the invoice from the related supplier, the finance will adjust the previous journal regarding E&O reservation and proceed payments with the supplier to have it settled.

For the sake of enhancement (as shown in Figure 10), the case company could standardize a formal E&O report format with ODM suppliers in advance as a bridge for data exchange and sharing and then request supports from Oracle existing functionality to customize a program in order to auto-generate the E&O report with inputs of suppliers' E&O

items if any. Once BU project development management informs the sourcing, QA, and finance teams of further project signals (e.g. project on-going, rework, on-hold, or cancellation), the system could automatically provide the latest E&O report consistent with that claimed by the related supplier.

With this automatic customized E&O report reconciled with suppliers, in terms of SOX compliance, the finance of case company could disclose the potential excess items in advance for further E&O reservation and recognize the contingent liability in an earlier stage of business risk exposure. This improvement could comply with SOX requirements of a healthy financial reporting in conservativeness, completeness, accuracy, and timeliness. Furthermore, it fortified the preventive controls over financial risks potentially threatened by a sudden contingent liability concerning E&O issues.

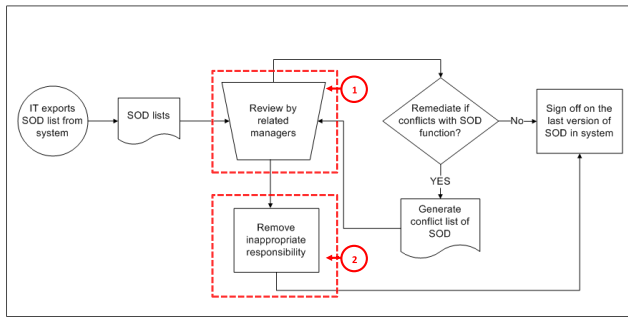


FIGURE 11. Current workflow for segregation of duties.

D. ANALYSIS OF GENERAL LEDGER MODULE

1) MECHANISM OVER SEGREGATION OF DUTIES

Segregation of duties (SOD) is a crucial internal control process in compliance of SOX since an inexplicit job responsibility will easily increase the business risk of fraud and thus cause the failure of internal controls. For instance, an accountant who is responsible for invoice creation and accounting booking in the system cannot take charge of proceeding payments as what a cashier should do. Otherwise, a potential fraud may be committed through a deliberate intention in pursuit of individual and illegal profits and therefore damages the organizational benefits.

The case company employs a manual and partially system-supportive mechanism to review and remediate the SOD conflicts issues (as shown in Figure 11). To begin with, IT department exports the SOD list from the system in a specific period, say a monthly basis, for related managers of finance to manually review if any SOD conflict issue exists. If yes, the manager would manually summarize a list of SOD conflict issues and request the IT department to remove the inappropriate responsibilities grant for the related system users. Not until all the improper responsibilities are completely removed would the manager sign off the last version of SOD in the system. This SOD conflict review process will be repeated on a monthly or quarterly basis.

For the sake of enhancement (as shown in Figure 12), however, Oracle could support a standard program to track and list any change of system value for each field in a customized report format. Such a standard program could compare the user names whoever changed the value for a field in a specific period with those shown in the defaulted name list. If any user whoever changed the value of a certain field were excluded from the default name list, the system would highlight as a record in the customized report and alert the related management in finance and IT by automatic emails for further review and remediation in the system. The manager, in turn, could request IT to remove any inappropriate responsibility grant to the user with SOD conflict issue easily by press the “approval button” for removal in the system. Subsequently, the system would go snapshot the approval workflow as an acknowledgment for further auditing purposes.

This automatic assistance by system against SOD conflict issues as the above proposed could enhance the efficacy for

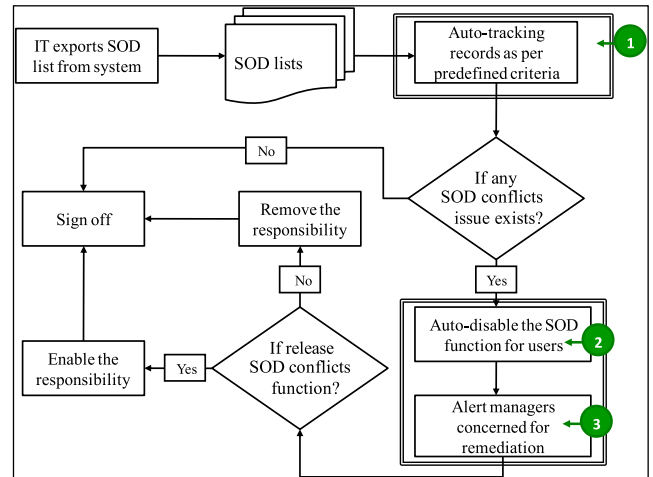


FIGURE 12. Enhanced workflow for segregation of duties.

management concerned of the case company in order to provide a reasonable security for information system and prevent the potential and unexpected frauds arisen by a deliberate user with harms for the organization so as to meet the requirements of SOX over preventive and detective controls over financial system.

2) STANDARDIZATION OF FINANCIAL CLOSING PROCESSING

Prior to SOX implementation, the case company had not set up standardized processing for monthly, quarterly, or yearly financial closing. The financial closing checking lists used to be reviewed and controlled by regional finance controllers to ensure all required journals and adjustments to be entered in the system timely and accurately. Any exceptional adjusting or reclassified journals have to be manually approved by the management concerned before being entered in the system and posted in general ledger.

However, as a multinational corporation with subsidiaries and branches throughout the world, the business transactions of the case company are getting more and more sophisticated on account of stricter governmental regulations imposed and SOX compliance issues. The case company, post to SOX implementation, has already defined standardized processing for financial closing as follows to enhance the efficiency of manual errors and reduce probable manual errors or omissions made.

- 1) Reverse the accrued journals in the appropriate month;
- 2) Ensure the essential journals of each month booked in time;
- 3) Ensure the allocation process to be performed accurately;
- 4) Ensure the accrued items and figures to be well booked in time;
- 5) Ensure the inter-company transactions to be accurate and balanced;
- 6) Ensure the total amount of sub-ledger details are equal to those in general ledger;

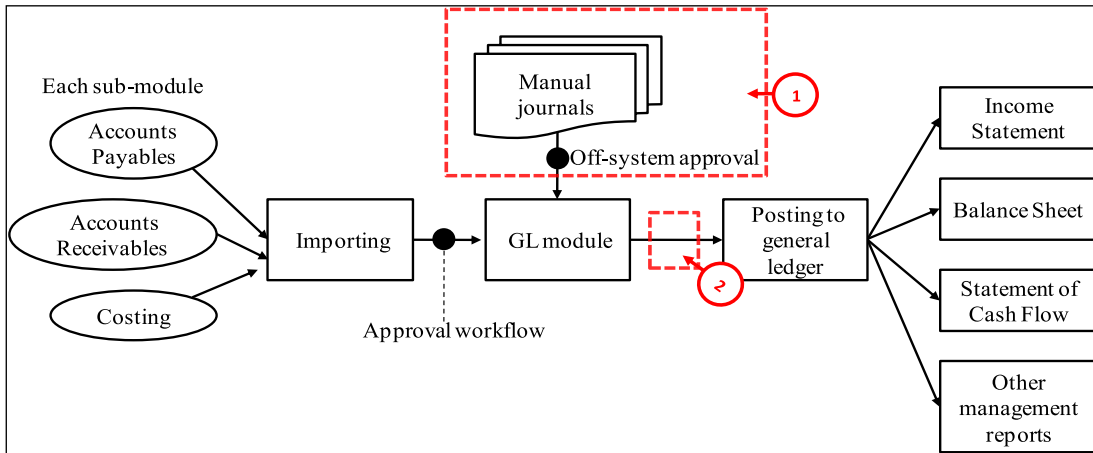


FIGURE 13. Current GL approval workflow of case company.

- 7) Ensure all of the transactions to be posted into general ledger;
- 8) Compare and analyze the material accounts among inter-periodic fiscal accounting periods with necessary explanations given for the changes;
- 9) Ensure the revaluation of currency to be well performed;
- 10) Ensure all required schedules for consolidation to be compiled accurately and timely.

3) REENGINEERING FOR APPROVAL WORKFLOW

Prior to SOX implementation, the case company used to reply on a semi-manual and partially system-supportive approval workflow to import and post all transactions incurred in each sub-module (e.g AP, AR, costing modules) and all required manual journal entries to general ledger module (as shown in Figure 13).

The transactions incurred in each sub-module will be imported by each batch to general ledger module in advance and then posted to the general ledger after being approved by related managers in the system. However, the manual adjusting journals prepared by accountants used to be approved by the managers off-system in advance and then entered by the accountants into the general ledger module based on the hard copies of the approved journals as supporting documentation. After done, those manual adjusting journals will be directly posted by the accountants to general ledger without a duplicate approval in the system.

The current practice regarding approval workflow in general ledger module of case company may reside with a potential fraud that the actual journals entered by the accountant into the system could be inconsistent with those previously approved by the manager in hardcopies off-system since those manual journals failed to be duplicate approved before being posted to the general ledger.

To avoid the above potential frauds committed and comply with SOX, the case company could implement an automatic journal review and approval functionality provided by the latest Oracle general ledger module for manual journals

approval workflow setup (as shown in Figure 14). With this enhancement, any manual journal after entered by the preparer will go through the predefined approval workflow together with the transactions imported from each sub-module before being posted. Once approved, those manual journals along with all transactions from each sub-module will be posted to general ledger eventually. Once disapproved, those manual journals will be feed-backed to the original preparer with formal notification by email for further validation and then submitted again to approver until final approvals being granted (as shown in Figure 15).

This enhancement could strengthen the corrective controls to avoid potential frauds committed on account of lacking duplicate review by management concerned before posting manual journals to the general ledger. Even though most of ERP experts claim that there exists no such a system as to completely replace human efforts in performing accounting journal entries since the accuracy of a journal eventually relies on the human wisdom for judgment and amendment, this enhanced approval workflow could still ensure the consistency of journals between the preparer’s entry and reviewer’s approval as well as improve the completeness and timeliness of financial statements assertions.

VI. COMPARISON ANALYSIS BETWEEN CURRENT AND ENHANCED FINANCIAL MODULES

A. COMPARISON AND ANALYSIS

The following Table 2 demonstrates a comparison analysis between current and enhanced financial modules by dimensions of business risk exposure, internal controls efficacy, SOX compliance, and the proposed remediation proposal. According to the previous discussion of this chapter, the following business risk exposures are especially summarized to address the comparison analysis between the current system and the enhanced system as proposed.

Below recap the improvements rendered by each enhanced financial module in internal control strength, SOX compliance efficacy, and quality of financial reporting.

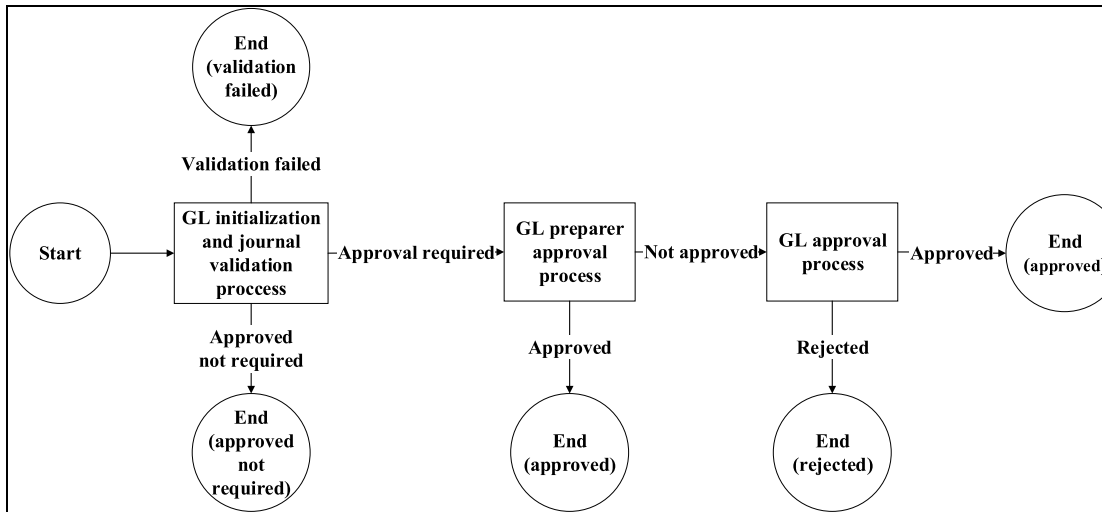


FIGURE 14. Standard approval workflow defaulted by oracle.

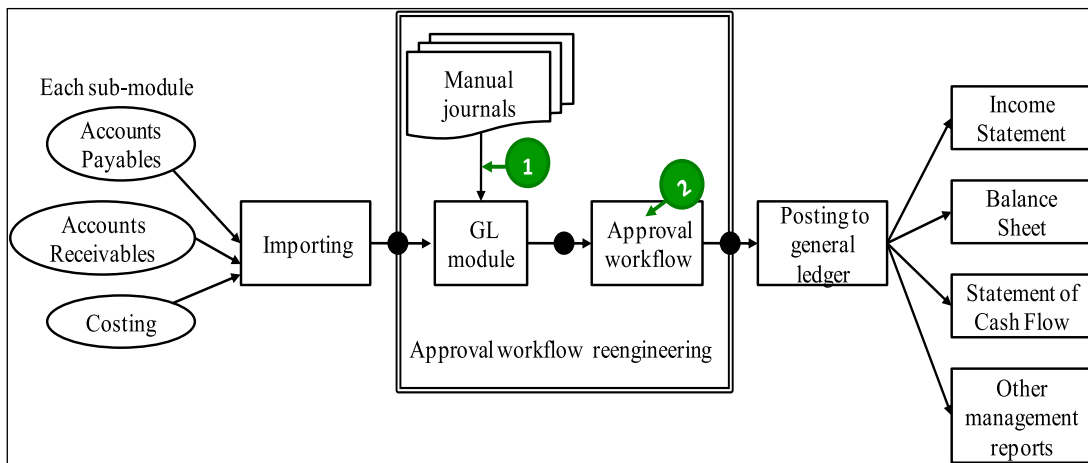


FIGURE 15. Reengineering of GL approval workflow.

1) RMA MECHANISM

The lag of time will be diminished between manual issuance of credit memos by the supplier and receipt of that credit memo by finance (of case company). Finance could be promptly informed of any RMA issue and therefore would not arrange any payment for the RMA invoice from the beginning so as to avoid duplicate efforts to reverse the previous payment booking and history in the system manually.

The reengineering of the RMA process could fortify the preventive controls over inappropriate payments to products with quality issues, reduce manual efforts for credit memo issuance and receipt, and also lower manual errors committed during the reversal of incorrect payables liability recognition concerning inappropriate RMA invoice settlements.

2) STANDARD COST UPDATE

The enhanced system flows of standard cost setup could replace plenty of manual efforts as previous in many aspects and thus lower manual errors probably committed involved. It could fortify the preventive controls over probably manual

errors committed by related parties concerned and strengthens the detective controls over the accuracy and completeness of the eventual cost information of finished goods through being embedded with a predefined formula for further verification.

3) E&O RESERVATION

With this automatic customized E&O report reconciled with suppliers', the finance of the case company could disclose the potential excess items in advance for further E&O reservation and recognize the contingent liability in an earlier stage of business risk exposure. This improvement could comply with SOX requirements of a healthy financial reporting in conservativeness, completeness, accuracy, and timeliness. It could also fortify the preventive controls over financial risks potentially threatened by a sudden contingent liability concerning E&O issues.

4) SEGREGATION OF DUTIES

This automatic assistance by system against SOD conflict issues as the above proposed could enhance the efficacy

TABLE 2. Comparison analysis between current system and enhanced system proposal.

Module Function	Financial modules of current system	Enhanced financial modules in compliance of SOX
RMA mechanism (AP)	a. Finance replies on suppliers' credit memo to deduct receivables regarding RMA returned shipments.	a. Finance leads a head to a issue debit memo to suppliers to deduct receivables regarding RMA returned shipments without duplicate reversal of journals.
	b. No mechanism exists to hold the payments to the supplier which provided the defective shipments.	b. If RMA is over materiality level, hold- payments mechanism will launch toward the related suppliers.
Standard cost setup (Costing)	a. Standard costs of FG are obtained by manual collection and roll-up.	a. Cost information could be automatically uploaded into the system and then automatically rolled up as finished goods.
	b. The quality of cost information is doubtful inaccuracy, completeness, and timeliness.	b. The enhanced system is embedded with a predefined formula to verify the accuracy of the eventual roll-up cost.
E&O reservation (Costing)	a. Finance failed to reserve the E&O contingent liability until Sourcing/QA finalize the negotiation and auditing with suppliers regarding the E&O claimed list.	a. A formal E&O report format is standardized for data exchange and customizes a program to sync E&O figures with suppliers in automation.
		b. A control point is added after the item list is auto-generated by the system.
Segregation of duties (GL)	a. SOD conflict issues are detected by subject judgments.	a. A standard program could support auto-tracking records as per predefined criteria.
	b. System could not remove any improper responsibility or accessibility once found.	b. If any SOD conflict issues incur, the system could invalidate the SOD function and alert managers for remediation.
Approval workflow (GL)	a. Adjusting or correcting journal entries just go through an off-system approval process.	a. Adjusting or correcting entries must go through approval workflow in the system together with other submodules.
	b. A duplicate review in system workflow is omitted.	b. Duplicate reviewed by managers in the system before posting.

for management concerned of the case company in order to provide a reasonable security for information system and prevent potential and unexpected frauds arisen by a malicious user so as to meet the requirements of SOX over preventive and detective controls over the financial system.

5) APPROVAL WORKFLOW

This enhancement could strengthen the corrective controls to avoid potential frauds committed on account of lacking duplicate review by management concerned before posting manual journals to the general ledger. What's even better, it could also ensure the consistency of journals between the preparer's entry and review's approval as well as improve the completeness and timeliness of financial statements assertions.

B. CONCLUSION AND FUTURE WORK

The purpose of this research is to design a set of intelligent ERP financial modules for multinational corporations that could improve financial office efficiency and increase the security of the financial processing process. Thus achieving intelligent management of the financial modules and intelligent prevention of the risks.

The case company relies on suppliers to issue a credit memo to finance to deduct receivables regarding RMA returned shipments and fails to establish a mechanism to hold the payments to the supplier that provided the defective shipments.

The functionality to “automatically create debit memo for any returned transactions” is proposed to implement by case company to diminish the lag of time between manual issuance of credit memo by the supplier and receipt of that credit memo by finance which could be promptly informed of any RMA issue and therefore would not arrange any payment for the RMA invoice from the beginning so as to avoid duplicate efforts to reverse the previous payment booking and history in system manually. We hope to achieve more intelligent, more reliable financial data processing services.

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