

COSO Framework for Warehouse Management Internal Control Evaluation: Enabling Smart Warehouse Systems

Ratna Sari

Information Systems Department,
School of Information Systems,
Bina Nusantara University,
Jakarta 11480, Indonesia

Computer Science Department, BINUS
Graduate Program – Doctor of
Computer Science, Bina Nusantara
University, Jakarta, Indonesia 11480
rasari@binus.edu

Raymond Kosala

Computer Science Department, BINUS
Graduate Program – Doctor of
Computer Science, Bina Nusantara
University, Jakarta, Indonesia 11480
rkosala@binus.edu

Benny Ranti

Faculty of Computer Science,
Universitas Indonesia,
Depok 16424, Indonesia
ranti@ui.ac.id

Suhono Harso Supangkat

Sekolah Teknik Elektro dan
Informatika,
Institut Teknologi Bandung,
Bandung, Indonesia
suhono@lpik.itb.ac.id

Abstract— There are many ways for the company to improve its performance, one of them is optimizing the internal control of the company's activities. Internal control is intended to evaluate company activities and operations. This study took a case study at PT. XYZ related to the evaluation of internal controls in warehouse management using the COSO framework approach. From 5 elements and 17 Principle, study found, there are 2 principles that have not been applied in PT. XYZ; enforced accountability and control over technology. The recommendation given is system improvement as intended the inventory system to be more accurate and reliable to enable smart warehouse systems inside organizations.

Keywords: *internal control, COSO framework, warehouse management, evaluation*

I. INTRODUCTION

There are many ways for the company to improve its performance, one of them is optimizing the internal control of the company's activities and also implementation of the new system to increase efficiency and effectiveness in all business process activities [4]. Internal control is a process undertaken by company management to assist the achievement of operations, reporting and in accordance with the compliance [9]. The internal optimization is needed because it describes the overall rules and procedures used by management to improve management effectiveness in the business and identify lack of internal control in the business processes that it can make the organization vulnerable and possible risks occurs, eventually all these risks can have an impact on a company's financial performance [2].

In warehouse management, internal controls devoted to optimizing the functions, including the process of finished goods inventory, and it useful to organize the distribution process to the market. According to Rita Makumbi (2013) [6] the function of the warehouse management is one of a service that can help the company's operational functions run smoothly as a store of raw material, unfinished goods, until stock the finished goods or inventory. One of the

problem in warehouse management is high production of manufacture, company must pay attention to the process from the beginning of production, to the process of goods delivery, and inventory calculations.

One of famous approach for warehouse management control is using COSO framework. COSO framework is one of tools to maintain the effectiveness and efficiency of inventory process in organizations [12]. COSO framework also known as integrated framework that can help company to:(1) warehouse operation process more effective and efficient; (2) accountable and reliable of inventory stock calculation; (3) compliances with government law and regulations [8].

This research took case study from PT. XYZ as one of company who implemented the warehouse management. Based on observing in PT. XYZ, we found that company still difficulty to balance the production and inventory storage in warehouse which impact to lack of inventory control.

II. LITERATURE REVIEW

Early definition of internal control is the plan of organization to coordinate methods and measure all the element in process business safe, accurate, reliable, encourage the prescribed managerial policies [10]. Another definition of internal control is philosophy of risk alignment, risk management, ethics, policies, resources, tasks and responsibilities according to organizational capacity to manage risk [12].

In warehousing planning and control, company produces various product, company needs good control over its inventory which two main objectives such as (1) warehouse inventory planning and control; (2) reliable inventory report to support financial statements [11]

Related to COSO framework, basic concepts of internal control are:(a) internal control is an integrated process and a tool that can be used to achieve organization goals; (b) Internal control is not only limited to policies and procedures but should include all levels within the organization; (c) Internal control can only provide a reasonable guarantee, not an absolute guarantee, because

there are limitations that can obstruct the absoluteness of the internal control itself; (d) Internal Control will ultimately result in achievement of goals in categories of financial statements, compliance, operational activities [13].

Using COSO framework for evaluating the internal control helps company to calculate the probability of risk which can occur adversely [2]. However COSO can maintain and support the company to maintain risk which known can give positive feedback nor negative [12].

COSO framework is consist of five: (1) Control environment; (2) Risk assessment; (3) Control activities; (4) Information & Communication; (5) Monitoring activities [7].



Figure 1. The COSO Cube [3]

Table 1. Component of Internal Control in COSO [1]

Control Environment	<ul style="list-style-type: none"> Commitment of leadership and senior management to effective internal control, adherence to high ethical standards, oversight by those in governance, and support of competent employees.
Risk Assessment	<ul style="list-style-type: none"> Dynamic and iterative process for identifying and analyzing risks towards achieving the organization's objectives. Forms the basis for determining how risks should be managed. Identifies the areas where the greatest threat or risk of inaccuracies or loss exist, with the greatest risks receiving the greatest attention and control. Consideration given to dollar amounts, nature of the transactions and impact on organizational reputation.
Control Activities	<ul style="list-style-type: none"> Actions established by policies and procedures to help ensure management directives to mitigate risks to the achievement of objectives are carried out at all levels of the organization, at various stages of operating processes and over the technology environment.
Information and Communication	<ul style="list-style-type: none"> Information generated at operational levels and communicated across and up the organization to enhance decision-making. Policies and procedures communicated downward through the organization to support internal control functions. Information and communication to be fully integrated with the other components of the framework and includes communication with outside parties about internal control and accountability.
Monitoring and Review	<ul style="list-style-type: none"> Applies to all five components of internal control. Should fit the organization. Takes on increased importance as the organization recognizes the need for timely and effective monitoring that provides feedback on the operation of the other components, and extends beyond financial reporting to compliance and operations.

III. METHODOLOGY

With COSO framework approach this research starting with process business analysis as preliminary measurement and basic analysis in PT. XYZ then continue with internal control evaluation as follow:

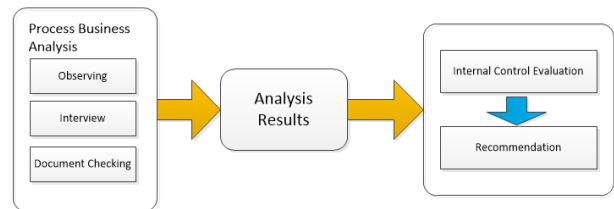


Figure 2. The Research Flow for Warehouse Management Evaluation in PT. XYZ

For detail performed as follows:

- 1) Meeting related to explaining flow of evaluation process.
- 2) Conducting interviews with stakeholders such as IS team leader operations, IS analyst, supervisor factory logistics, team leader factory logistics, warehouse staff, forklift drivers, internal control, and IPG (Information Protection & Governance) to observe and also learn detail about how the business process run, systems used and also the company's internal control procedures.
- 3) Documents checking related to the process of the finished goods inventory.
- 4) Doing directly observations in order to learn and understand more clearly about the working procedures associated with the process of finished goods inventory.

IV. ANALYSIS AND RESULT

A. FINDINGS

Based on the results of research and interviews as part of internal control evaluation, here are the results:

Based on the result above, total of 17 principles from COSO framework known as 2 principles is in red area for medium and high risk area, 6 principles is in yellow area which "not fully adapted" for medium and high risk area and green area for total 9 principles from low and high risk area.

For the red area, we conducted deeply investigation as high level evaluation for give the best recommendation. We found incorrect procedure during the process of inventory cycle in warehouse, due to goods receipt in warehouse is not loaded to the shelf directly and it put to wrong shelf. The impact, a lot of expired inventory due to incorrect process in goods issue. The inventory are stored in a multilevel shelf. During the good issue and shipment for delivery, it was taken randomly.

Another issued for the red area is control activities for control over technology. PT. XYZ not only use warehouse management but also already used one of the systems like robot machine systems for put the inventory during the goods receipt. The process starts when shipping case sent by the conveyor and the systems will create into one pallet by robot machine then the next step is data will be stored in the robot database, but once in while systems went down, there is no back up so the process will be stopped or create manually. The effect for this case is lack of control for goods receipt.

Table 2. Coso Matrix Performance in PT. XYZ

Criteria		High Risk Area	Medium Risk Area	Low Risk Area
<i>Control Environment</i>				
1	Commitment to integrity and ethical values			Fully Adapted
2	Exercise oversight responsibility			Fully Adapted
3	Establish structure, authority and responsibility			Fully Adapted
4	Commitment to competence			Fully Adapted
5	Enforces accountability	Not Adapted		
<i>Risk Assessment</i>				
1	Specifies suitable objective			Fully Adapted
2	Identify and analyzes risk		Not Fully Adapted	
3	Assesses fraud risk		Not Fully Adapted	
4	Identify and analyzes significant change		Not Fully Adapted	
<i>Control Activities</i>				
1	Select and develop control activities			Fully Adapted
2	Control over technology		Not Adapted	
3	Deploy through policies and procedures			Fully Adapted
<i>Information and Communication</i>				
1	Uses relevant information		Not Fully Adapted	
2	Communicate internally			Fully Adapted
3	Communicate externally		Not Fully Adapted	
<i>Monitoring activities</i>				
1	Ongoing monitoring	Not Fully Adapted		
2	Reporting deficiencies	Fully Adapted		

B. RECOMMENDATION

After we found the fact findings about internal control evaluation for warehouse management in PT. XYZ, the recommendation is as follow:

- Conducting customization through warehouse management system at PT. XYZ.
- Change business processes related to system requirements.

The recommendation above expected, will support and improved the process in PT. XYZ such as:(1) Eliminate the manual process; (2) Provide reliable information about location of inventory stored and retrieved; (3) Trackable inventory; (4) Provide real-time information related to inventory in the warehouse.

The recommendation of design architecture for warehouse management customization is using *Three-Tier Architecture*. While the warehouse management will integrated with robot machine and the application will store into one single application server. This design purpose with benefit: (1) optimized the server for storage, data process and retrieving database; (2) Reduce data duplication [5].

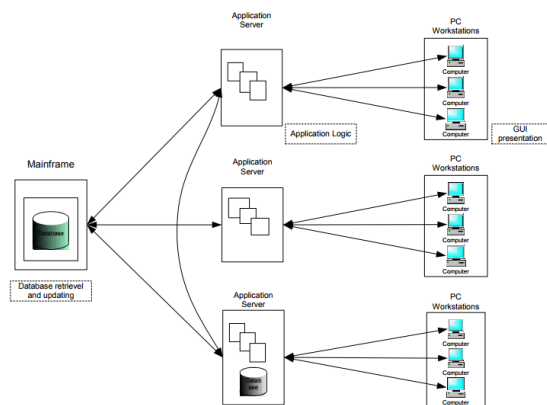


Figure 3. Three-Tier Architecture [5]

The business process changes purposed as follow:

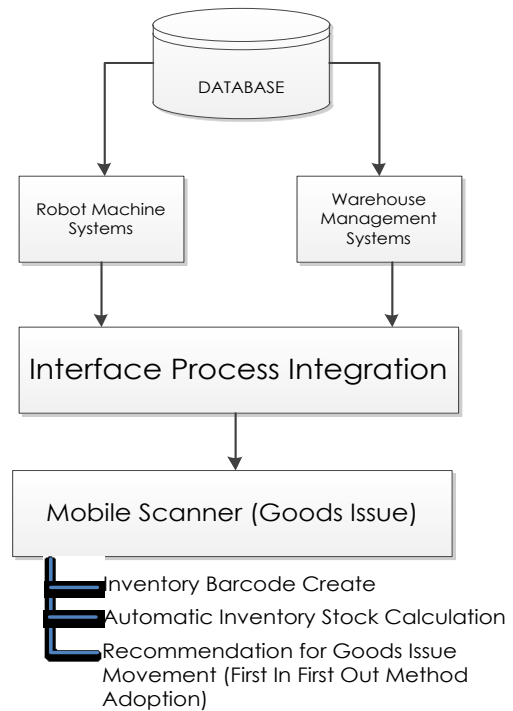


Figure 4. System Design

System design from figure 4, describes about additional interface process integration as bridging between warehouse management systems and robot machine systems which all data from the systems will save into single database. Otherwise the process will improve since the inventory movement will follow with FEFO (First Expired First Out), like picture describe in figure 5.

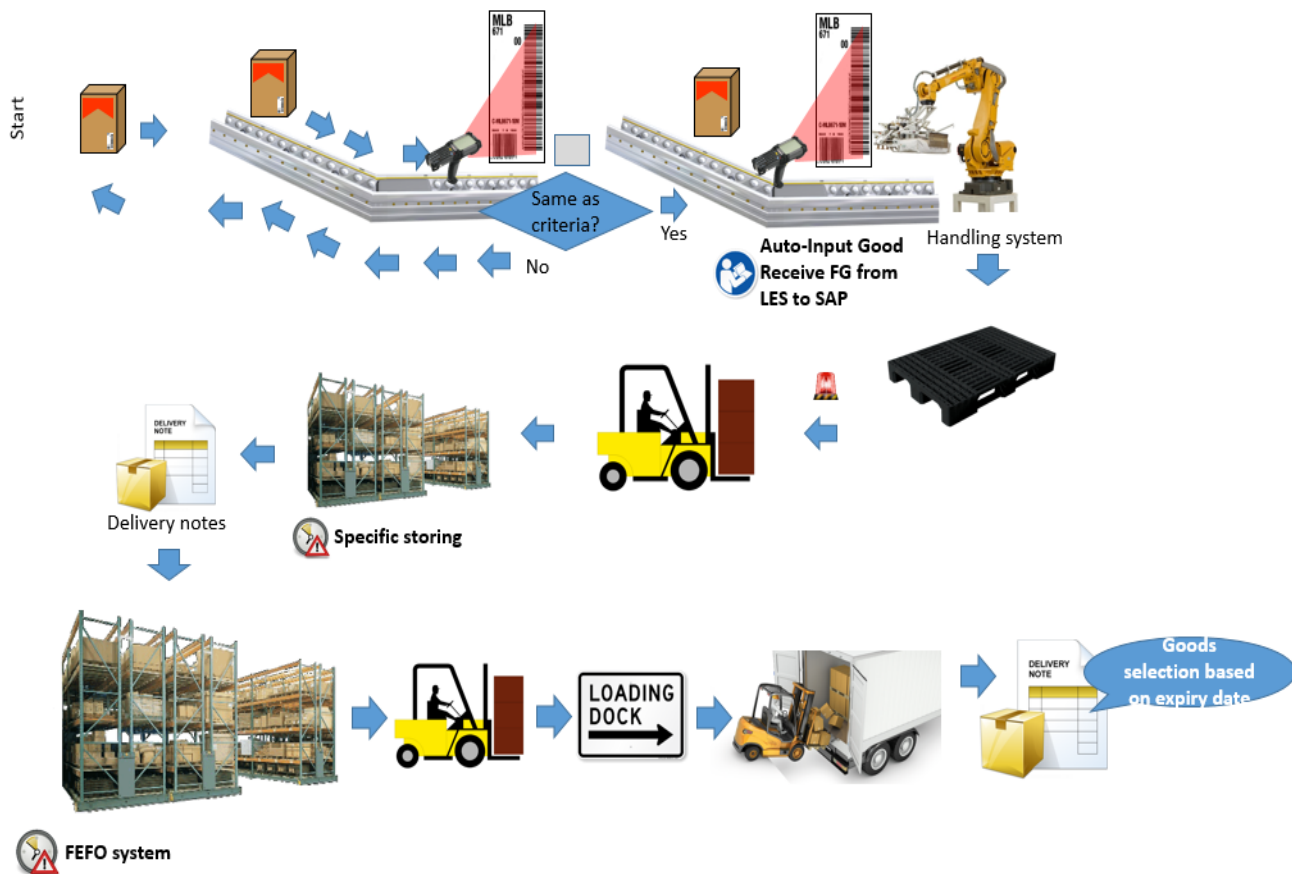


Figure 5 – The Process of Inventory Movement

In the figure 5 shown the inventory movement while systems automatically will scan and check the criteria. If the criteria of the product proper the next step systems will input into inventory systems and robot systems will take the product into the pallet specifically based on criteria and create delivery notes, afterwards the inventory staff will put into shelf storing. For the next process, PT. XYZ move the process of inventory into FEFO System (First Expired First Out): the systems will create the delivery note (inventory selection based on expired date) and show which the inventory should out and help the inventory staff find the correct inventory.

V. CONCLUSION

COSO framework not only providing better internal control but also measurement of compliance risk due to reviewing the organization operational as well. COSO framework can support the risk mitigation, which can give recommendation and also solution to the company.

Through 5 elements and 17 principles, it will help company reach the objective nor goal of effectiveness and efficiency company operation. Another opinion COSO framework is likely common audit that enables controls not the business operations but also all personnel inside of company.

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