FRAMEWORK FOR EVALUATION OF PURCHASING PROCESS IN ERP SYSTEMS IN TERMS OF INTERNAL CONTROL RISKS

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FRAMEWORK FOR EVALUATION OF PURCHASING PROCESS IN ERP SYSTEMS IN TERMS OF INTERNAL CONTROL RISKS

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Framework for Evaluation of

Purchasing Process in ERP Systems in terms of Internal Control Risks

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Thesis Abstract

Derya Acar, “Framework for Evaluation of Purchasing Process in ERP Systems in terms of Internal Control Risks”

The companies have made major investments for their ERP systems. On the other hand, as a result of many financial scandals and frauds, internal control structures of the companies have been one of the hot topic issues. Many standards and requirements are published for the internal control structures of the companies. Implementing or upgrading the ERP systems have hidden many internal control risks under the automated environment. Most of the companies including the medium or large sized and multinational or local companies have major weaknesses in their internal control structures. In this thesis, the frameworks developed for specific ERP packages and generic frameworks are investigated and then a consolidated framework has been developed for assessing the internal control risks in the ERP systems for the purchasing process. The framework consists of the risks, internal controls, and control procedures. The usability of the framework has been verified by the interviews with the specialists. With the developed framework, different companies are evaluated and compared in terms of internal control structures.

Tez Özeti

Derya Acar, “ERP Sistemlerinde Satınalma Süreçlerinin İç Kontrol Riskleri Bakımından Değerlendirilmesine Yönelik Bir Model Oluşturulması”

Şirketler ERP sistemlerinin kurulması için çok ciddi yatırımlar yapmaktadır. Diğer taraftan, birçok mali skandalın ve suistimalin farkına varılması sonucunda şirketlerin iç kontrol yapısı en önemli konulardan biri durumuna gelmiştir. Şirketlerin iç kontrol yapılarına yönelik birçok standart ve gereksinim yayınlanmıştır. ERP sistemlerinin kurulması veya sürümlerinin yükseltilmesi ile birlikte iç kontrol riskleri dijital ortama saklanma fırsatı bulmuştur. Büyük ya da orta ölçekli, yerel ya da çok uluslu birçok şirketin iç kontrol yapılarında önemli zayıflıklar bulunmaktadır. Bu çalışmada, ERP sistemine özel geliştirilen modeller ile her ERP sistemine uygulanabilen modeller incelenmiş ve satınalma süreci için ERP sistemlerindeki iç kontrol risklerinin değerlendirmesine yönelik konsolide bir model geliştirilmiştir. Bu model, iç kontrol riskleri, iç kontroller ve kontrol prosedürleri içermektedir. Modelin kullanılabilirliği uzmanlarla yapılan görüşmelerle doğrulanmıştır. Modele göre, farklı ERP firmaları iç kontrol yapıları bakımından değerlendirilmiş ve birbirlerine göre kıyaslanmıştır.

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Additionally, I would like to express my gratitude to my colleagues in PricewaterhouseCoopers, especially to Tumin Gültekin, Fusun Kurtdereli, Işıl Kırdı, Mehmet Zeki Önal and Erkan Sertoğlu, for their interest, suggestions and continuous supervision.

I would like to thank the companies that have participated in the evaluation part of my thesis.

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ABBREVIATIONS

Abbreviation	Definition
A	Automated
AICPA	American Institute of Certified Public Accountants
API	Application Programming Interface
APS	Advanced Planning and Scheduling
C	Corrective
CFO	Chief Financial Officer
CIA	Certified Internal Auditor
CISA	Certified Information Systems Auditor
COSO	Committee of Sponsoring Organizations
CMM	Capability Maturity Model
CRM	Customer Relationship Management
D	Detective
DBMS	Database Management System
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
FI	Financial Accounting
G/L	General Ledger
GDN	Goods Dispatch Note
IP	Information Processing
ISA	International Standards of Auditing
IT	Information Technology
M	Manual
MES	Manufacturing Execution System
MM	Materials Management
MRP	Material Requirements Planning
P	Preventive
PAC	Production Activity Control
PC	Physical Control
PCAOB	Public Company Accounting Oversight Board
PLM	Product Life-Cycle Management
PO	Purchase Order
PR	Performance Review

Abbreviation	Definition
SAS	Statement on Auditing Standards
SME	Small and Medium Sized Enterprise
SoD	Segregation of Duties
SOX	Sarbanes Oxley
WIP	Work in Process
Y2K	Year 2000

PREFACE

I have written this master's thesis as a result of the study I have conducted in the period between September 2006 and December 2009 in combination with my working experience at the Systems and Process Assurance Department in PricewaterhouseCoopers Turkey.

I have graduated from the Department of Industrial Engineering at Istanbul Technical University in 2005 and I have been familiar with the concept of business processes. I liked to improve my talents regarding to management of information technologies and to gain the experience of Boğaziçi University. As a result of these, I have attended the master's program at the Department of Management Information Systems in Boğaziçi University.

Moreover, my dynamic working conditions stimulated my curiosity because I have attended lots of audit or consultancy projects related to ERP systems and internal controls and I decided to combine my academic career and working experience where the results of my study can be used effectively.

Although I got many obstacles while writing this thesis, it was a real pleasure for me to meet valuable lecturers, to build new friendships and to get a degree of Master of Arts in Management Information Systems.

CHAPTER 1

INTRODUCTION

Major scandals and frauds that have been revealed in United States and Europe have highlighted the necessity of the internal control structures in the companies. The internal control structure of a company is correlated with the management structure to oversee the activities of the company. Therefore, after the financial scandals such as Enron and Worldcom, United States has set a law widely known as “Sarbanes Oxley” which has obliged the managements to take the accountability of the internal control mechanism in their companies. According to the International Standards of Auditing (ISA) 315, the internal control auditors have been given the responsibility of understanding of the company and its environment and assessing the internal controls in terms of major misstatements over financial statements.

Today the business environment is getting more complex and technologically sophisticated. Recently, complex ERP (Enterprise Resource Planning) packages were implemented by multinational and big-sized companies which have several locations. However, today even small-sized organizations have adopted ERP systems in order to integrate their business processes both vertically and horizontally. Despite the fact that the ERP

systems have considerable costs, the companies take the efficiency factor into consideration.

Implementing a new ERP system has a major effect on the company's working style and corresponding internal controls. Recently, when the complex ERP systems are not in use, the companies have used many manual internal controls in order to ensure that the business processes are operating efficiently. In spite of the efficiency that ERP systems have provided to the companies, today the companies face with more risks as a result of the complex structure of the ERP systems.

As the ERP systems have become more and more popular, the Statement on Auditing Standards (SAS) 94 has requested from the auditors to take the computerized procedures that have effects on the financial statements of the company into consideration beginning with the year 2001.

Traditionally, purchasing was regarded as service to production and the managements of the companies did not pay adequate attention to the problems of their purchasing cycles. But as the competition has been accelerated globally in 1980s, the companies have realized the value of the purchasing process as a key strategy (Wisner, Tan and Leong, 2008). On the other hand, according to the Institute of Internal Auditors (2009) several opportunities that are related to the purchasing process can result in both internal as well as external fraud. Not only the fraud risk but also major misstatements over accounts payable in financial statements may occur as a result of internal control risks over purchasing process.

The aim of this thesis is to develop a framework for the purchasing process in terms of internal control risks based on the literature survey and interviews with the experts. The framework is used for the internal control structure comparison of three different companies that are using ERP systems by conducting meetings with the management of these companies. The outline of the thesis is described in the following paragraphs.

In the background chapter, the ERP systems and the internal control concept have been defined. The general definitions of the ERP systems, the reasons for adopting ERP packages, the evaluation of the ERP systems, the main functionalities of ERP system are analyzed. The ERP evaluations from different perspectives are studied and the main ERP vendors which are SAP, Oracle, Peoplesoft, Baan and JD Edwards are discussed. After that the internal control structure is investigated and COSO cube which includes control environment, risk assessment, control activities, information and communication and monitoring steps are defined. The control activities part is further discussed in the literature survey chapter.

In the literature survey chapter, the articles for the control activities part of COSO cube have been analyzed by integrating the ERP risks with the business processes. First the risks and exposures of ERP systems are investigated then the control risks are selected from the ERP risks and further researched in the following sections. After that, the internal controls for avoiding the ERP risks are discussed in detail and categorized in terms of manual / automated, preventive / detective / corrective, business performance

review / physical controls, information processing / segregation of duties. Finally, the frameworks for evaluating the purchasing internal controls are investigated and summarized.

In the methodology chapter, the development of the framework is described. In order to develop the framework, the frameworks which are described under literature survey chapter are analyzed and consolidated. After the consolidation of the frameworks, three interviews are conducted with the specialists in order to verify the usability of this new designed framework and to add necessary risks and internal controls if needed. Regarding the literature survey and interviews, a final evaluation framework is developed for which the contents are explained in detail in this methodology chapter and full version is given in Appendix A. Finally, Capability Maturity Model (CMM) grading approach and scoring technique which are used for assessing the companies are also discussed in this chapter.

In the evaluation and results section, the selected three companies that use ERP packages are introduced and their purchasing processes are explained according to the sub processes described under the framework section. These selected companies have rated their internal controls according to the developed framework. After that, the results are evaluated in terms of the sub processes of the purchasing process, type of the internal controls, and categorization of the internal controls. Finally, the companies are compared according to their strength in their internal control structures.

In the conclusion section, the summary of the evaluation is discussed. The three companies that are studied in the evaluation section are compared. Finally, the proposed future studies are introduced.

CHAPTER 2

BACKGROUND

Overview of ERP Systems

Through global economy and the wide spread of information technology and electronic commerce, industrial economy era has turned to the era of knowledge economy. Significant changes have occurred in the business environment in this transformation stage such as the fast change of customers' demands, acceleration of the speed of technological innovations, shorter product life cycles and more competitive market. Among these changes, there are three major factors that affect the development and endurance of a modern enterprise. These are:

- Customer
- Competition
- Change

The business management style that relies on mainly MRP II is no longer applicable in today's environment. In order to become accustomed to the external conditions and taking customer, competition and change into consideration, companies should manage the change in the daily operations,

re-engineer business process, and adopt managerial reforms (Zhang and Li, 2006).

During the 1990s, most of the big industrial companies have implemented ERP systems which are the massive computer systems that permit a business to manage its all operations including finance, material requirements planning, human resources, and order fulfillment based on a single, integrated set of company data. ERP has provided gigantic efficiency improvements such as decreasing the time between order and payments, reducing the back-office staff necessities, sustaining lower inventory and improved customer service (Hans, 2004).

ERP systems or enterprise systems can be defined as the software systems developed for business management, surrounded by modules sustaining functional areas like planning, production, sales, marketing, delivery, accounting, finance, human resource management, project management, inventory management, service and maintenance, transportation and electronic business. The software architecture performs the clear module integration by sustaining information flow between the different functions in the company in a consistently visible way. Corporate computing with ERPs has allowed companies to implement a single integrated system by replacing or re-engineering their mostly incompatible legacy information systems. The concept of the ERP system can be illustrated with the diagram in Figure 1 (Rashid et al, 2002).

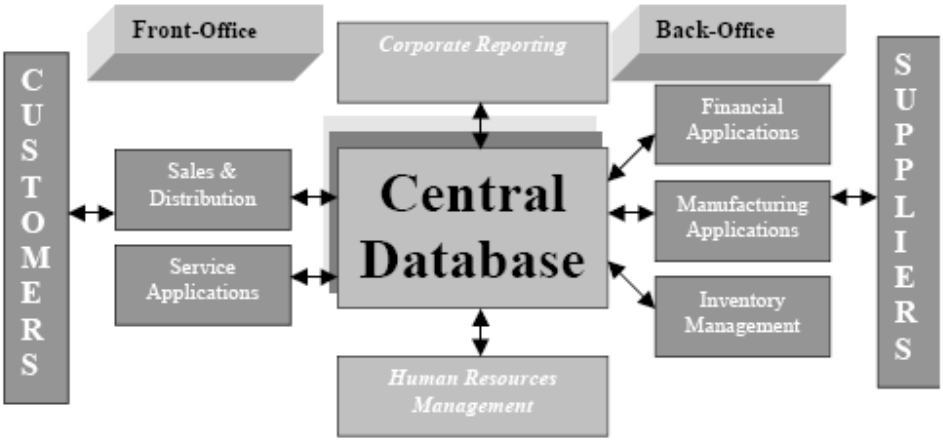

Fig. 1 ERP concept

Evolution of ERP systems

ERP has been evolved from Manufacturing Requirements Planning (MRP) II. From business viewpoint, ERP has extended from the synchronization of manufacturing processes to the integration of company-wide backend processes. From technological perspective, ERP has grown from legacy implementation to more flexible client-server architecture (*History and Evolution of ERP*, 2005).

The history of ERP is summarized by Levi (2006) as below:

- 1960s: The quantity, location and status of inventory as well as the related shipping, receiving, picking and put away processes have been monitored by the Inventory Control which is an integrated package of software and hardware used in warehouse operations.

- 1970s: Material Requirements Planning (MRP) is a software based on production planning and inventory control system that has been used for managing manufacturing processes. An MRP system has been intended to meet three main objectives continuously:
    - Ensure that adequate level of materials and products are available for production and distribution.
    - Provide the lowest possible inventory level.
    - Plan manufacturing activities, delivery schedules and purchasing activities.
- 1980s: Manufacturing Resources Planning (MRP II) is defined as a method for the effective planning of all resources of a manufacturing company. Ideally, it addresses operational planning in units, financial planning, and has a simulation capability to answer "what-if" questions (Levi, 2006).
- 1990s ERP: According to Zhag and Li (2006), ERP is a system with system features such as completeness, holistic properties, structure, boundary and functions. The most important feature has been the holistic properties (Zhang and Li, 2006).

ERP System Architecture

ERP systems are the evolved information technology of MRP II models. The technology changes between MRP II and ERP have included the relational

database management systems (RDBMS), the use of a graphical user interface (GUI), open systems and a client/server architecture.

One of the features of this architecture has been the ability to locate presentation, reporting, logic and database in different platforms and/or machines in a configurable manner as presented in Figure 2. It enables the reduction of network traffic and enhances the system flexibility as well (Ng and Ip, 1999).

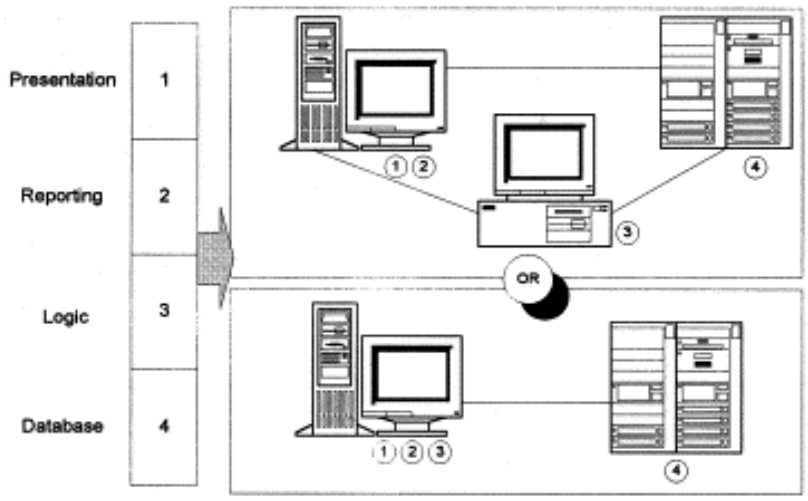

Fig. 2 Configurable system architecture for ERP system

ERP systems should generate correct, absolute, and authorized information which is supportable and timely. In the digital environment, this information can be achieved by the arrangement of both the controls in the ERP systems and the controls on the environment on which the ERP system operates. Controls have been divided into two controls as general and application controls. General controls can be further divided into management

and environmental controls. Management controls deal with organizations, policies, procedures, planning, and so on.

According to Musaji (2002);

"Environmental controls are the operational controls administered through the computer center/computer operations group and the built in operating system controls. ERP systems are only as critical as the financial and/or operational sensitivity of the data they process and store. The security of the ERP systems can be thought of as a pyramid." (Figure 3)

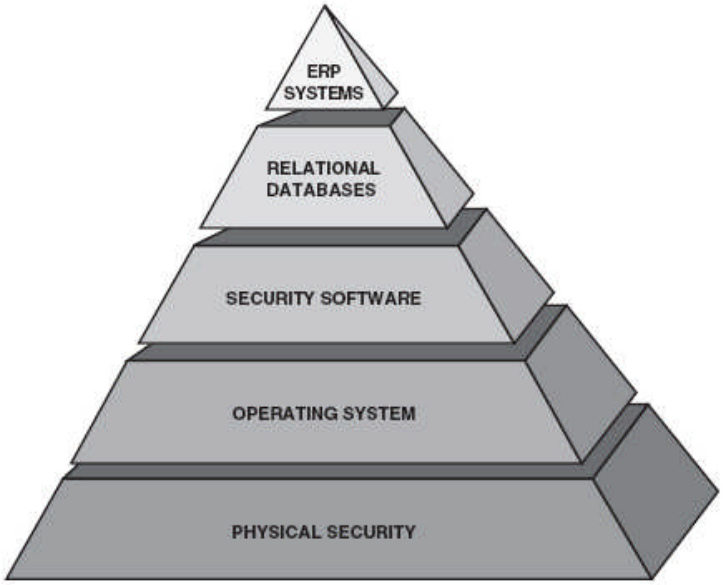

Fig. 3 ERP system architecture

The layers of Figure 3 are explained below:

- The first layer of the pyramid has been the physical security of the hardware such as the machine, the databases, and the off-line storage media.
- The second layer has been the operating system such as Unix.

- The third layer has focused on the security software. This factor should be included in a mainframe environment by installing a security product like ACF2 or Top Secret, or the component may be built-in in the operating system such as in the UNIX or AS/400 environment.
- The fourth layer has been the relational database which is a set of tables containing data in predefined groups. Each table (which can be sometimes called as a relation) has included one or more data categories in the columns. Each row has hold a specific data for the groups that are determined by the columns.
- ERP stands on the top of the pyramid. ERP is the broad set of activities supported by multi-module application software that helps any business to direct the vital parts of its business, including product planning, parts purchasing, maintaining inventories, interacting with suppliers, providing customer service and tracking orders (*ERP System Implementation Overview*, 2002).

According to Thao (2002) the following points are the list of different elements or modules that are contained in most of today's ERP systems:

- Business and Strategic Planning Module
- Resource Planning Module
- Executive Decision Support Module
- Sales and Operations Planning Module
- Forecasting Module
- Customer Relationship Management (CRM) Module

- Order Entry, Quoting, and Product Configurator Modules
- Master Production Schedule Module
- Rough Cut Capacity Planning Module
- Material Requirements Planning (MRP) Module
- Detailed Capacity Planning Module
- Production Activity Control (PAC) Module
- Manufacturing Execution System (MES) Module
- Issuing Material to Jobs Module
- Advanced Planning and Scheduling (APS) Module
- Finance Module
- Costing Modules
- Engineering Modules
- Human Resource Modules
- E-Commerce Modules

General Features of ERP Systems

ERP systems have been offered by various vendors that are specialized in this segment of the software market. Main ERP vendors in this market are Baan, JD Edwards, Microsoft Dynamics AX, Oracle, PeopleSoft and SAP R/3.

This ERP market is important. ERP software is highly configurable to contain miscellaneous needs of the users among most of the economy sectors.

As a result, currently ERP software exists as: generic, preconfigured, and installed forms:

- The most comprehensive form is the generic form of the software which targets a range of industries and should have been configured before it can be used efficiently.
- Packaged, pre-configured templates have been originated from the inclusive software. These templates have been customized according to the specific needs of the industry sectors (e.g., automotive, retail) or the size of the companies (e.g. SME).
- For most users, ERP software has presented itself as the operational installation after the generic or pre-configured package has been individualized according to the related companies' requirements on site (Klaus et al, 2000).

According to Chakoian et al (2000), the functionality of ERP systems can be summarized as below. The functionality has been represented in Figure 4.

- Finance
- Human Resources
- E-Business
- Transaction Engine
- Data Analysis
- Supply Chain Management
- Customer Relationship Management.

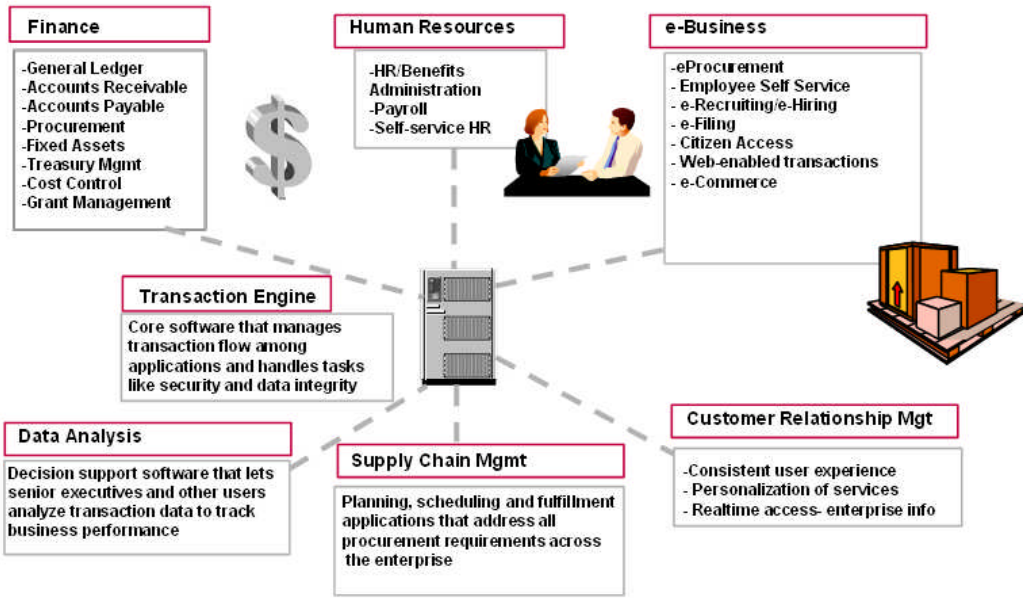

Fig. 4 Functionality of ERP systems

The features of the ERP systems have been explained as below (Chakoian et al, 2000):

- ERP systems have included business management software that integrates finance and human resources completely.
- ERP systems have provided high levels of integration across business functions and units.
- ERP systems have sustained extensive sharing of data from a single information repository.
- ERP systems have driven widespread business transformation and change management efforts.
- ERP systems have required high levels of implementation effort and support.

Implementing an ERP System

ERP system implementation means the whole procedure from buying the software to the live stage when the system is ready to use (Dahlen & Elfsson, 1999). It has been a significant investment which has enabled an organization to attain competitive advantage among its competitors. ERP systems help the organizations to integrate their departments within a comprehensive information technology.

On the other hand, if the ERP systems have not been implemented appropriately, the results can have very serious effects on the organizations. It may result in the ERP implementation failure (Wu et al, 2007). There is not an agreed definition for ERP success. ERP success can be defined from several aspects, including success viewed in technical, operations, people, economic, financial or strategic business terms. Among these dimensions, it has not been easy to use quantitative analysis to measure success from the perspectives of economic benefits and the adopter's customers, suppliers, and investors. Additionally, subjective user satisfaction has been used in the past to measure ERP implementation success as well (Ji and Min, 2005).

Main Reasons of ERP Implementation

The benefits of the ERP implementation can be recognized more easily from the companies who have been operating with ERP systems for a number of years. Some of the efficiencies and returns for the investment of time and

money have been significant. Benefits have been achieved in terms of reduced inventories, enhanced delivery schedules, better and more timely information, and quicker service response. The findings from the study of Mabert et al (2001) point to the following status of ERP:

- ERP systems can be implemented in all sizes of companies from the very small to the very large.
- The systems have been implemented for a variety of reasons. ERP has not generally seen only as an IT solution but also as a business solution.
- An ERP implementation is a key investment that tends to be costly. On the other hand, the costs have to be balanced against the benefits, both tangible and intangible.
- Most companies have been operating with their ERP systems for a short time. While many have realized some benefits, productivity has been expected to increase significantly as firms gain more experience with ERP.
- As the firms have gained experience with ERP, the cost reductions from ERP systems are being realized.
- A single ERP system does not provide an end-to-end solution as have been advertised by some vendors. Most companies have been using other systems for specialized functionalities or decision-making processes.

- ERP has simplified and standardized systems across the company, which makes it more uncomplicated to upgrade or add supplementary packages in the future.
- All ERP systems appear very stable. There is no evidence that there is no transaction processing need that they can not handle.
- ERP systems have significantly improved data accessibility and superiority, which makes the decision making more convenient. As the companies generate data warehouses and put in decision support systems, supplementary benefits will be recognized.

Additionally, Spathis and Constantinides (2003) have conducted a research in order to identify the ERP system adoption motives, ERP benefits, and problems encountered in ERP system implementations. A questionnaire has been prepared for the study and sent to 98 organizations. The results have been collected from approximately 45 organizations and according to the results, main reasons for ERP implementation have been listed as below:

- Increased demand for real time information
- Information generation for decision making
- Integration of implementation
- Business process reengineering
- Cost reduction
- Increase sales
- Application of new business plan
- Competition

- Development of new activities for new areas
- Internet development
- Integration of information systems
- Stock exchange problem
- Y2K (Year 2000) problem
- Government funding

Evaluation Criteria of ERP Systems

ERP selection process should be performed by defining the obligatory and desired features of the system and then evaluating a variety of products according to these necessities. On the other hand, these requirements can have only been undertaken if the organization has a definite and complete set of selection criteria and a comprehensible understanding of the offered products. Some examples of selection and evaluation criteria have been listed as below (Kenaroğlu, 2004).

- Improvement over present systems
- Customization
- User interfaces
- Optimum platform for the proposed product solution.
- Adequate Database Management System (DBMS) with the proposed solution.
- Integration with the organization's existing hardware architecture.

- Architecture of the proposed solution: client/server, two-tier, three-tier, or other.
- Capacity (minimum and maximum) of the proposed solution?
- Scalability of the system
- Training (in-house or external to the organization)
- Performance
- Security features
- Implementation

According to Kenaroğlu (2004), the evaluation process has consisted of three different areas of assessment such as vendor, functional and technical evaluation. As to the vendor evaluation process, it has been performed partly in the period of the market analysis and is ongoing all through the rest of the selection, assessment and business negotiations processes. Additionally, the criteria and strategies that have been established during the planning process are being used to implement functional and technical evaluations. Some of the vendor evaluation criteria can be listed as below.

- Ability to support the organizations with the implementation
- Association with or the availability of third party vendor or partners
- Vision (future plans and trends)
- Financial power
- Market share
- Annual growth rate
- Customer support

- Product acknowledgment
- Variety of products
- Ability to meet the future requirements
- Ability to offer references
- Reputation
- Strategic positioning of the vendor
- Durability of the vendor
- Experience, know-how, and success in providing solutions to the organizations of similar size, complexity and geographic scope
- Quality of the vendor's proposal
- Displaying the understanding of necessities, limitations and concerns
- Implementation plan that appropriately positions the proposed solution to attain the greatest level of business benefits
- Implementation services
- Implementation strategy
- Support services

In addition to the vendor selection criteria, functionality criteria are essential as well. The functionality criteria and the definitions have been given in Table 1 (Illa et al, 2000).

Table 1: Functionality Criteria

Criteria	Definition
Included functionality	Areas or functions of the company that the ERP has to serve. It is described how the ERP covers each function.
Main target	Functional area or areas for which the ERP is specially oriented or strong.
Adaptability	Possible level of customization in general and for the specific company.
Openness for - custom development - working with other systems	Level of openness to additional bespoke development (internal or external) and to other existing applications (for example, vertical applications, API, CRM, SCM, etc.).
Specific support	For example, Y2K (Year 2000), euro, ISO-9000, etc.

As mentioned by Illa et al (2000) the technical criteria have been listed in Table 2.

Table 2: Technical Criteria

Criteria	Definition
Platforms	Information technology platforms supported
Database management systems	DBMS or DBMSs used as base for the ERP.
Languages and development tools	Languages and development tools used to customize the ERP.
User management tools	Management capabilities: users, user groups, access levels, roles, authorizations, etc.
User documentation - Printed manual - Online help - Tutorials	Type of user documentation for training and helping to use the ERP.
Technical documentation - Database schema - Source code - Design	Technical documentation provided about internal structure of ERP master programs and data bases..
External connectivity - Internet/Web - Remote - EDI	Types of external connectivity supported.

Alanbay (2005) has emphasized some evaluation criteria in her study as well. According to Alanbay, the modules that an ERP offers have been the

most important selection motivation that has been different according to the requirements of the organization. Despite from ERP modules, there are some essential criteria for the ERP assessment as given in Figure 5 (Alanbey, 2005).

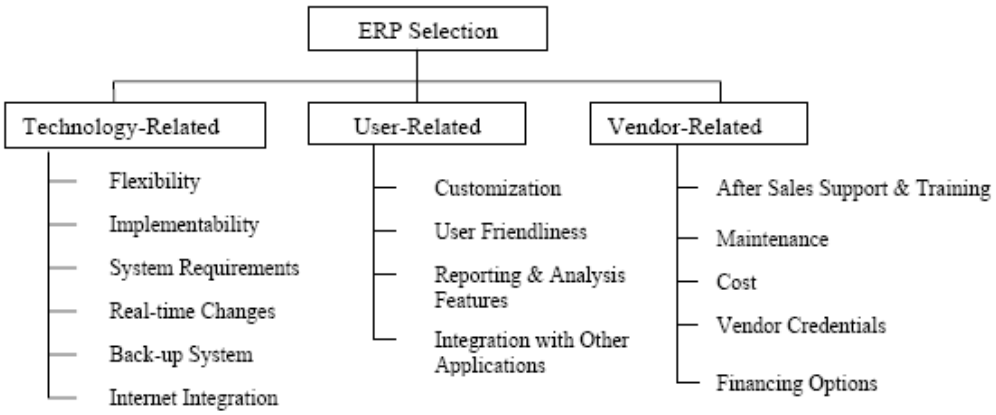

Fig. 5 ERP selection criteria

Alanbey (2005) has explained these criteria as follows:

- Technology related
    - Flexibility: Flexibility helps the business by providing new capabilities over its life time. As the requirements of the companies change, additional modules can be added to the ERP system. The ERP system should be convenient to the structure of the organizational culture and the business approach.
    - Implementability: Since the different ERP systems have different needs, selecting an implementable package is essential.

- Systems Requirements: It is essential to select an ERP system that is not dependent of an hardware, operating system or database system. The ERP system design should not be in conflict with the business strategy of the organization.
- Real Time Changes: The modules should run with the online and batch abilities in real time and as a result of this there is no error that could happen because of not updating the system and information that is available to a department.
- Back-up System: In order to sustain the security and the ongoing operations of the business, just one network application is not enough. There should be a reliable back-up device which is capable of taking incremental and full backups. Beside these, the back-up device should have the restoring ability after the system is down.
- Internet Integration: The ERP system should permit the internet transactions such as e-commerce and EDI.

- User related
  - Customization: As the different organizations require different software, the organizations need to adapt the most available software in the market. In that case, customizations should not lead to difficulties in updating the future software releases.
  - User Friendliness: In many times, the end users of the ERP system are not very capable in IT and as a result of this; their

attitudes toward the system are very essential. The ERP systems shouldn't be very complicated or sophisticated for the end users.

- Reporting & Analysis Features: In addition to the standard reports, the organization should be able to design and prepare their own reports and analysis according to their needs.
- Integration with Other Software/Applications: The integration between the modules is vital and it should sustain the data flow between the other modules and helps to increase the transparency in the operations.

- Vendor related
  - Maintenance: The software should support multi-organization, multi-division and multi-currency environments. Any limitations to this type of environment should not exist. As a result, when an add-on procedure or a new patch is available, it can be updated immediately.
  - After Sales Support & Training: The ERP systems are considerable complex systems, thus a comprehensive training for each department and after sales support are very necessary and should be asked from the ERP vendor.
  - Cost: Cost is another essential fact for the implementation since the organization may not have necessary funds. ERP systems are usually composite systems that requires high price.

As a result, the software should be in the range of planned budget.

- Vendor Credentials: The assurance of the vendor that can be assessed by its market share, reputation, consultants, etc should be taken into consideration.
- Financing Options: Despite the fact that it is not a technical criterion, it is a major fact for a company to calculate return on investment.

ERP Market

In 2000s, the ERP market had a considerable growth especially by the Y2K crisis. ERP market consisting of SAP, Peoplesoft, Oracle, Baan, etc has increased the sales and as well the revenues. The revenue increase has been noted as approximately 20% (Nikolopoulos, 2004).

In 2006, it had been seen that the ERP market had an amazing year, with total revenue growing by 14% and license revenue increasing by 18% when compared to 2005. As the sales of traditional ERP applications were very well in 2006, many vendors have realized considerable revenue growth from the acquisition of other software companies as well. The key drivers for continuous ERP investment within large corporations have been the globalization, centralization and regulatory compliance. In the small and medium sized business segment which has a significant growth, organizations

have been buying new ERP systems in response to new customer needs and the desire to take part in the global market (Jacobson et al, 2007). ERP application revenue estimates are given in Figure 6 (Jacobson et al, 2007).

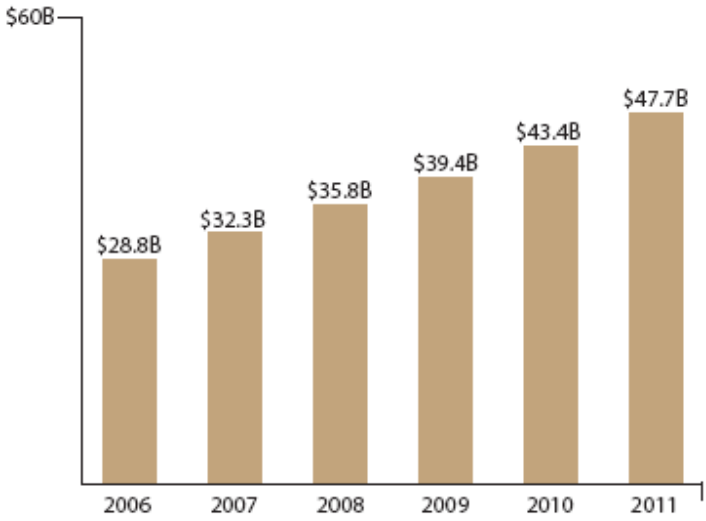

Fig. 6 ERP application revenue estimate 2006-2011

Here are some major trends from the 2006 ERP market (Jacobson et al, 2007):

- ERP vendors which had internally developed solutions have participated in the market with a larger portfolio that targets specific industries or departments.
- The market leaders are still Oracle and SAP which have considerable market shares. As the Small and Medium Sized Enterprise (SME) solutions increase, the competitors such as Infor, Sage Group, Microsoft, Lawson, and Epicor become important.

- New pricing and deployment models like “software as a service” and “enterprise licensing” are beginning to be accepted in the ERP market.
- Single-vendor, pre-integrated solutions have become extremely important in non-manufacturing markets like retail, financial services, and public sector.
- As ERP vendors buy and build the necessary industry functionality, their market expands rapidly.

Panaroma Consulting Group (2009) has conducted a research including 670 participants from manufacturing and distribution sectors in 2008. The research included the consumer products, telecommunications, energy, engineering, construction, transportation, food & beverage, retail, and metal-working organizations. According to the research, the majority of the participants have selected SAP R/3, Oracle and Microsoft Dynamics AX. The market shares as of 2008 are illustrated in Figure 7 (Panaroma Consulting Group, 2009).

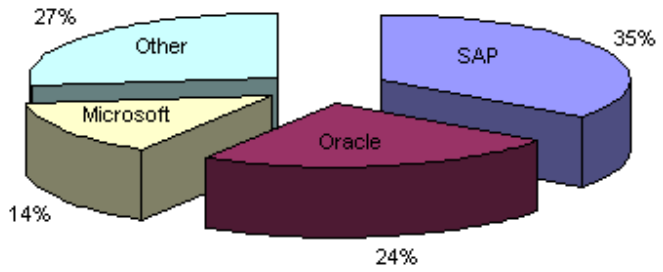

Fig. 7 ERP market share

In the following sections, some of the major ERP vendors will be discussed. The ERP vendors that will be discussed are as follows:

- Baan
- JD Edwards
- Microsoft Dynamics AX
- Oracle
- Peoplesoft
- SAP R/3

Baan

Baan is Dutch Company which has been a provider for financial and administrative consulting services. It has been founded in 1978 and commercialized its first information system in 1982. Until 1995, it has stayed behind as a medium sized organization. In 1995, they have made an agreement with Boing which had a significant effect on the revenue of Baan. Baan has become a member of big five in the ERP market (Dahlen and Elfsson, 1999).

On the other hand, the fall of the Baan Company has begun in 1998. The management has overstated the revenue of the company by booking the sales of software licenses that were in fact transferred to a third party distributor. The reveal of this revenue manipulation has led to a quick decrease of Baan's stock price at the end of 1998 (Baker, Spiro and Hamm,

2000). In June 2000, Baan has been acquired by Invensys at a price of 700 million USD. In June 2003, SSA Global Technologies has bought the Baan unit from Invensys for 135 million USD (Kotlarsky, 2005). Finally, in May 2006, Infor Global Solutions has acquired SSA Global (Wang, Hamerman, 2006).

Baan ERP Packages consist of three parts (Wagner, 2000):

- Application Administration: users, clients, database management, SQL queries, etc.
    - Maintain Companies: Maintain Companies have been defined by company number, name, currency and a package combination that associates the corresponding database schema with the company.
    - User Management: The name of a Baan user has been normally the same as the system login name.
    - Text Management: Internal texts that have to be edited with the built-in text editor.
    - Job Management: A job has consisted of a configurable sequence of print and processing programs which are being executed periodically.
    - Database Management
- User interface customization: version management, menus, forms, reports, sessions, etc.

- Menus: Menus have consisted of a list of choice options leading to application programs or to submenus.
- Labels: Labels have been named short texts used to label form fields and report columns.
- Reports: Reports have been defined by a number of layout elements and their data fields and labels.
- Forms: Forms have consisted of form fields for displaying and allowing modifying data, and of pull-down menus and push buttons to execute actions and call application programs.
- Messages and Questions: Messages and Questions have been named short texts used to display messages or ask questions during the execution of an application program.

- Programming
  - Program Scripts: Program scripts are being written in a Pascal-like procedural programming language, called `Baan 3GL'.
  - Functions: Functions are including modules allowing the re-using of variable declarations, functions and procedures.
  - Libraries: Libraries have allowed maintaining re-usable function and procedure code.

JD Edwards

J.D. Edwards has been founded more than 25 years ago and has become a provider of the new generation of collaborative commerce software solutions

which is also called ERP II products. The name of the package has been composed of the founders: Jack Thompson, Dan Gregory, and Ed McVaney. J.D. Edwards has been providing all-inclusive applications for ERP, supply chain management, knowledge management, customer relationship management (CRM) tools and services.

At the beginning, J.D. Edwards has started with financial software packages for small and medium sized organizations. According to Dalal, 2004:

> "By the mid-1980s, J.D. Edwards was being recognized as a leading supplier of applications software for the highly successful IBM AS/400 computer, a direct descendant of the System/38. In June 1996, the company introduced OneWorld, a GUI-based configurable enterprise solution. OneWorld combines a full range of platform-independent applications with an integrated toolset, which permits organizations to configure their systems and applications as their needs change. In addition, OneWorld integrates with WorldSoftware, allowing existing WorldSoftware customers to preserve their investment with an easy migration path to the advanced, open systems functionality of OneWorld."

In the 2000s, J.D. Edwards had a compound annual revenue growth of about 43% and revenue of $874 million. It had more than 6,000 customers in approximately 100 countries and over 5,000 employees worldwide. It had been one of the big five (which had the total market share of 70%) in the 100

ERP providers worldwide, SAP-AG, Oracle, J.D. Edwards, PeopleSoft, and Baan (Dalal, 2004).

In 2003 JD Edwards is acquired by PeopleSoft and the products have been re-branded. Under PeopleSoft, JDE WorldSoftware became PeopleSoft World and JDE OneWorld became PeopleSoft EnterpriseOne. In December 2004, Oracle has bought Peoplesoft and the names of the products have been changed to JD Edwards EnterpriseOne and JD Edwards World again (Fricano, 2006).

Microsoft Dynamics AX

Danish Company named Damgard A/S has implemented Axapta in March 1998 and released in Denmark and US. Axapta has become a part of the business solutions of Microsoft after the company has been acquired by Microsoft in 2002 (Mourao, Weiner, 2006).

Microsoft Business Solutions has been renamed as Microsoft Dynamics. Microsoft Dynamics is a business solution for four ERP packages and CRM application. These four ERP packages are Dynamics AX, Dynamics NAV, Dynamics SL and Dynamics GP. Brief descriptions of these ERP packages are as follows (Koop and Muris, 2007):

- Microsoft Dynamics AX: It is designed for midsize and large companies and supports many languages and currencies.

- Microsoft Dynamics NAV: It is designed for small and midsize companies and offers a cost effective business solution.
- Microsoft Dynamics SL: It is designed for specific business needs for project, service and distribution sectors.
- Microsoft Dynamics GP: It is designed for integrating many business processes such as finances, supply chains, e-commerce, project accounting, etc.

Microsoft Dynamics AX (Axapta) has more than 20 years of experience in business application improvement and developer efficiency (Greef et al, 2006). Key features of Microsoft Dynamics are listed by Microsoft Cooperation (2007) as follows

- Manufacturing
- Distribution
- Supply Chain Management
- Project Finance
- Financial Management
- Customer Relationship Management
- Human Resource Management
- Business Analysis
- Enterprise Portal, with Microsoft® Windows® SharePoint® Services integration
- Reporting Services with Microsoft SQL Server® 2005

- Web services and .NET interoperability with Microsoft Visual Studio® 2005
- Business document exchange and integration framework with Microsoft BizTalk® Server 2006

Oracle

Oracle has been founded in 1977 in the USA. It has been well known for its database software and related applications. Oracle has been the second largest software company in the world after Microsoft. After 1987, Oracle's enterprise software applications have begun to work with its database. In the ERP market, Oracle has become the second largest organization after SAP. Oracle has 5,000 customers in approximately 140 countries. Oracles ERP system has been known as Oracle Applications, having more than 50 different modules in six major categories (Rashid et al, 2002):

- Finance
- Accounts payable
- Human resources
- Manufacturing
- Supply chain
- Projects
- Front office

Oracle has integrated its ERP solutions with Internet and has published several applications in the electronic commerce and Internet based commerce areas as well (Rashid et al, 2002).

Oracle has been struggling for ERP market leadership at the high end of the market. Besides, it has started to make significant inroads in the small and medium sized market. Oracle has several solutions with 65,000 employees worldwide to support its diverse set of initiatives (Oracle, 2007).

Peoplesoft

Peoplesoft has been founded by Dave Duffield and Ken Morris in 1987, by developing the first human resources application of the organization. The solution has been built on a client-server architecture and provided flexibility and ease-of-use to the users. In a very short time, Peoplesoft has taken the leadership among the human resources management solutions in the industry. As a result of this success, Peoplesoft has continued its innovations and in 2000, Pure Internet Architecture has been introduced (*What is Peoplesoft,* 2007). In December 2004, Oracle has bought Peoplesoft (Fricano, 2006). Oracle has kept more than 90% of Peoplesoft product development and product support staff. The merged companies have been established to be a major competitive against SAP R/3 in the enterprise software market (*BBC News*, 2005.

Real time enterprise systems have been established with Peoplesoft and it has enabled the organizations to communicate directly with business processes via disintermediation (both inside and outside the organization). Additionally, Peoplesoft has provided efficiency and decreased the business costs.

Peoplesoft has been in a competitive position in many industries such as industrial manufacturing, consumer goods, financial services, healthcare, and public sector organizations. It has more than 12,200 customer organizations in the world including medium sized manufacturing companies to the largest service organizations in the private and public sectors (*What is Peoplesoft*, 2007.).

SAP R/3

SAP the acronym of Systemanalyse und Programmentwicklung was founded by IBM system engineers in 1972 in Germany. The main objective of SAP has been to sustain the integration of all business functions in an organization and as a result of the integration, when a change occurs; the change has been reflected to the other parts of the related processes (Lau, 2005).

SAP software has been implemented in almost every industry. SAP has a major strength in ERP solutions. Besides, in the last few years the Company has extended its product line by offering different components like Customer Relationship Management (CRM) and Product Life-Cycle

Management (PLM). With its name mySAP, the company has marketed products in almost every business area.

SAP is well established in the large enterprise market and many organizations have deployed its solutions. Like other ERP vendors, SAP has realized the importance of the mid-market and Small and Medium Sized Enterprises (SMEs) and has started to develop solutions tailored for the SME market. By the year 2004, SAP solutions had been implemented by more than 26,000 user organizations, in about 120 countries, with more than 88,700 installations (Sankar & Rau, 2006).

Internal Control

Picket (1998) has defined the general concept of "control" as follows;

- to command, direct or rule
- to check, limit, curb, or regulate; restrain
- to regulate or operate
- to verify by conducting a parallel experiment in which the variable is held constant or is compared with a standard
- to regulate financial affairs, to examine and verify accounts
- power to direct or determine: under control
- a means of regulation or restraint
- a device or mechanism for operating a car etc.
- a standard of comparison used in a statistical or scientific experiment;

- a device that regulates the operation of a machine
- a dynamic control is one that incorporates a governor so that it responds to the output of the machine it regulates

Recently, the “internal control” concept has been limited to internal check. In 1930s, the internal check has been defined as the synchronization of a system of accounts and related office work in such way that the work of one personnel checks the work of other personnel continuously in order to avoid the fraud risk. It has been known as the first definition that points out the significance of internal controls to detect or prevent fraud.

The definition of internal control has been widened by the American Institute of Certified Public Accountants (AICPA) in 1949. The new definition of internal control was “the plan of organization and all of the coordinate methods and measures adopted within a business to safeguard its assets check the accuracy and reliability of its accounting data promote operational efficiency and encourage adherence to prescribed managerial policies” (Noorve, 2006).

University of California has described internal control as a process designed to provide realistic assurance regarding the accomplishment of objectives in the below categories:

- Effectiveness and efficiency of operations
- Reliability of financial reporting
- Compliance with applicable laws and regulations

There are some important points regarding to this definition (*University of California*, 2009.):

- Internal control is affected by every people in the organization. Internal control is everyone's responsibility.
- Effective internal control helps an organization achieve its major objectives such as operations, financial reporting, and compliance. Internal control keeps an organization on course toward its objectives and the achievement of its mission, and minimizes surprises along the way. Internal control promotes effectiveness and efficiency of operations, reduces the risk of asset loss, and helps to ensure compliance with laws and regulations. Internal control also ensures the reliability of financial reporting.
- Internal control can provide only reasonable assurance - not absolute assurance - regarding the achievement of an organization's objectives. Effective internal control helps an organization to achieve its objectives; it does not ensure success.

According to Kelechi, N.J. (2007), the definition given for the internal control has made clear that the internal controls are basically different from the management controls, which have important parts of control such as planning, organizing, staffing and directing.

Kirsch (2004) has separated the internal controls either being formal or informal. The formal controls can be formally documented and initiated by management, whereas the informal controls have been unwritten and often

initiated by employees themselves (Kirsch, 2004). In addition to Kirsch, Mishra & Dhillon have described the formal and informal internal control concepts as well. According to Mishra & Dhillon; formal internal controls can be messages from all external parties are interpreted and communicated for effective operations of the organization, such as business strategies, corporate board, financial planning, human resources and marketing planning. Informal internal controls have been designed to support the formal systems such as subgroups formed within organizations, belief system of employees, implicit knowledge about work procedures, power and politics equation amongst groups (Mishra & Dhillon, 2008).

Committee of Sponsoring Organizations of the Treadway Commission (COSO) is originally formed in 1985 in order to sponsor the National Commission of Fradulent Financial Reporting. COSO is a voluntary private sector organization dedicated to develop the quality of financial reporting by taking business ethics, efficient internal controls and corporate governance into consideration. COSO has been paying attention to the internal controls for more than 20 years. In this time frame, the investigations of the committee resulted in “good quality internal control is an essential part of successful organizations and all organizations may attain efficient internal control structure”. COSO has consisted of five sponsoring organizations: the American Accounting Association (AAA), the American Institute of Certified Public Accountants (AICPA), the Financial Executive International (FEI), the

Institute of Management Accountants (IMA) and the Institute of Internal Auditors (IIA) (Morehead, 2007).

COSO has described internal control as (Bibi, 2005):

> "A process effected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding the achievements of objectives in the following categories"

The COSO model has divided the effective internal control into five components in order to sustain a successful internal control structure. These components are as follows:

- Control environment
- Risk Assessment
- Control Activities
- Information & Communication
- Monitoring

The components have been illustrated via COSO cube in Figure 8 (Akçıl, 2007).

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Fig. 8 COSO cube

All of the five internal control components have to be present and functioning efficiently to make sure that the internal control objectives will be attained. Certainly, there has been a direct relationship between control objectives and control components that should be in effect to achieve the objectives. Internal control policies and procedures that are established by management and monitored by internal auditors can provide multiple purposes and contribute to the effective functioning of all internal control components. These internal control components can be applied to an entity's entire internal control system or to the achievement of one or more categories of internal control objectives (Rezaee, 1995). Following sections will explain the components in detail.

Control Environment

The control environment component is the establishment that all other internal control components are based upon. With a well-built control environment, mostly in a smaller company setting can partially compensate for internal control deficiencies in other areas. It has been often observed synonymously via “tone at the top.” As COSO (2005) indicates, research goes on to supply evidence that companies perform better and live longer when a commitment to strong internal controls is made by members of top.

The personnel in relatively smaller organizations, unlike in the bigger organizations, are often being interacting with top management directly and being affected by management actions. Consequently, management may emphasize the fundamental values of the company more efficiently by how its members behave, especially with respect to policy. The personnel go behind their lead; and when there is discrepancy between words and actions, they are guided by their leaders’ actions (COSO, 2005).

The control environment includes the below points (PCAOB, 2004):

- Integrity and ethical values
- Commitment to competence
- Board of directors or audit committee participation
- Management's philosophy and operating style
- Organizational structure
- Assignment of authority and responsibility

- Human resource policies and procedures

The personal and professional integrity and ethical values of management and staff has been determining their preferences and value judgments, which have been translated into standards of behavior. A supportive approach should be demonstrated toward internal control during the lifecycle of the organization.

Every person involved in the organization—among managers and employees—has to maintain and demonstrate personal and professional integrity and ethical values and has to comply with the applicable codes of conduct at all times. For example, this can include the disclosure of personal financial interests, outside positions and gifts and reporting conflicts of interest (Vanstapel, 2005).

Competence can be defined as a characteristic of people who have the skill, knowledge and ability to perform a task. The organizations should make sure that the personnel own the knowledge, skills and ability necessary to do their jobs. Management has some responsibility over the competency of its personnel to establish appropriate human resource policies and practices. Such policies and practices should be committed to (Halstead & Grassi, 2005):

- Establishing levels of knowledge and skill required for every position;
- Verifying the qualifications of job candidates;
- Hiring and promoting only those with the required knowledge and skills

- Establishing training programs that help employees increase their knowledge and skills.

Additionally, the participation of the board of directors and the audit committee can be essential factors. The board should understand and practice oversight responsibility regarding to the internal control. Furthermore, the philosophy and the operating structure of the management should support attaining efficient internal control (COSO, 2006).

The structure of the organization needs to provide the general structure for planning, directing, and controlling activities for attaining the objectives. Additionally, the organizational structure needs to describe authority and responsibility within the organization clearly and to establish proper lines of reporting.

The organization needs to develop and adhere to written human resources policies and procedures that are in compliance with all laws. The policies and procedures should include (DHS, 1994):

- Recruiting, hiring, and promoting competent and trustworthy people
- Clearly communicating performance expectations of all agency staff and evaluating staff according to these expectations
- Providing the training necessary to ensure that all staff have sufficient skills to fulfill assigned duties.

Risk Assessment

According to Noorve (2006), the organizations face with a variety of internal and external risks that should be pointed and managed carefully. Risk assessment can be defined as the identification and investigation of the risks which are significant for the achievement of the objectives while establishing a basis for the determination of the management of the risks. As the conditions of economics, industry, regulations and operations have been changing the nature, the risks associated with the changes should not be bypassed (Noorve, 2006).

According to AICPA (2007) the risk assessment of an organization for financial reporting purposes can be the identification, analysis, and management of risks relevant to the preparation of financial statements that are fairly presented in compliance with generally accepted accounting principles. For instance, risk assessment may address how the organization considers the possibility of unrecorded transactions or identifies and analyzes major estimates recorded in the financial statements. Risks related to reliable financial reporting also relate to specific events or transactions. Risks relevant to financial reporting include external and internal events and circumstances that may occur and negatively affect an organization's ability to begin, record, process, and report financial data consistent with the assertions of management in the financial statements. Risks can arise or change due to circumstances such as the following:

- Changes in operating environment
- New personnel
- New or restored information systems
- Rapid growth
- New business models, products, or activities
- Corporate restructurings
- Expanded foreign operations
- New accounting pronouncements

The specific risks for the financial reporting have been located in the activity level. Five financial statement assertions which are described below are related with the achievement of the objectives in the financial statements Clikeman, 2004):

- Existence or Occurrence: whether assets or the liabilities occur at the date of the event and recorded in the appropriate period.
- Completeness: whether all the transactions are recorded.
- Valuation or allocation: whether the valuation of the assets and liabilities are valued correctly and the amounts are allocated properly.
- Rights and obligations: whether the transactions constitute the rights and obligations of the organization for the specific date.
- Presentation and disclosure: whether the transactions are recorded in the appropriate accounts.

Internal Control Activities

Internal control activities are the policies, procedures, and rules that sustain realistic assurance that internal control objectives have been preceded appropriately and risks have been managed efficiently. These internal control activities that has common characteristics have been divided into three categories of

- Operating controls
- Financial information controls
- Compliance controls

Operating control activities can be directed towards managing and monitoring the operations of the organization, and financial information control activities can be intended to ensure reliable financial reporting process and protection of the organization's assets. Compliance control activities may be geared towards both ensuring compliance with applicable laws and regulations and adherence to ethical guidelines and conduct (Rezaee, 1995).

Information and Communication

Information can be relevant when it tells the assessor something meaningful about the operation of the underlying internal controls or control component. For instance, reviewing résumés and training records can tell an assessor something about whether an accountant has the background to deal with

certain areas of complex accounting — the information contained in resumes and training records have been relevant to the internal controls regarding the financial competence of personnel.

Suitable information has been a broad concept which entails that the information is useful within the context for why it is proposed. In order to be suitable, information must be relevant, reliable, and timely. Sufficiency can be a measure of the quantity of information. The features of the information have been addressed in Figure 9.

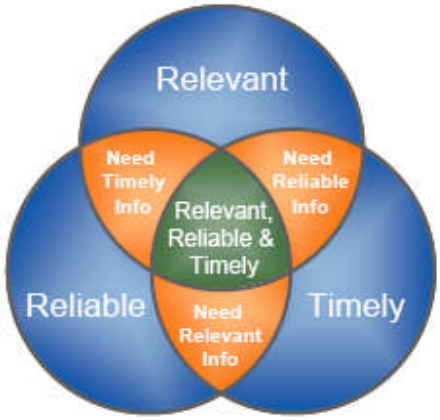

Fig. 9 Suitable information

Pertinent information should be identified, captured, and communicated in a form and time frame that enables people to perform their responsibilities. Information systems generate reports including operational, financial and compliance-related information which make it easy to operate and control the business. They do not deal only with internally produced data, but also with information about external events, activities and conditions

essential for notified business decisions and external reporting. Efficient communication should occur in a broader sense, flowing down, across, and up the organization as well. All personnel must have obtained a clear message from top management that control responsibilities must be undertaken seriously. The management should have understood its own role in the internal control system. Beside this, how the individual activities relate to the work of others should be considered. They must have a means of communicating important information upstream. Effective communication with external parties, such as customers, suppliers, regulators, and shareholders should be in place as well (Perry & Warner, 2005).

The information and communication component of COSO is being referred to this identification, capture, and communication of relevant information in an appropriate form and timeframe to accomplish the financial reporting objectives. Open channels of communication have also been necessary to allow information to flow throughout the entity and into the financial statements (Aldridge & Colbert, 1994). Information and communication has been forming an important part of the fraud risk management process. No process can be performed successfully if the vital information is not communicated to all appropriate and important parties. The process needs to be constantly updated with the latest information (Venter, 2007).

According to COSO (2005), the basic principles for the achievement of the control objectives at the information and communication level have been listed as below:

- Information Needs: Information has been identified, captured and used by all positions in a company to sustain the attainment of financial reporting objectives.
- Information Control: Information related to financial reporting has been identified, captured, processed, and distributed within the parameters established by the company's internal control processes to sustain the accomplishment of financial reporting objectives.
- Management Communication: All personnel, mainly those in roles that have an effect on financial reporting, have received a clear memo from top management that both internal control over financial reporting and individual control responsibilities must have been undertaken seriously.
- Upstream Communication: Company personnel have had an efficient and non-retributive method to speak about significant information upstream in a company.
- Board Communication: Communication has existed between management and the board of directors so that both have related information to perform their roles with respect to authority and to financial reporting objectives.

- Communication with Outside Parties: Matters affecting the attainment of financial reporting objectives have been communicated with outside parties.

Monitoring

Continuous monitoring activities rather than separate assessments have established an efficient structure. Continuous monitoring can be achieved by self control and assessment and traditional management for identifying the discrepancies and redundancies in the processes. Independent evaluation of the internal controls which can be performed by internal audit can provide new points of view (Duman, 2006).

Monitoring helps to get rid of the internal control deficiencies before these deficiencies start affecting the organization's core objectives. As an example, the monitoring activities reveal the errors before they are resulted in major misstatements in the financial statements. Monitoring has also operations objective, which is to discover and correct internal control deficiencies in operational processes such as manufacturing before the deficiencies are resulted in faulty products.

If the monitoring activities are well designed and performed, the internal control tasks of the organizations can be executed well. In order to get reliable information, well-designed planning is necessary for the monitoring activities.

On the contrary, if the monitoring mechanism is not effective at all, the internal control activities will start to weaken as the time passes. Monitoring activities should be designed in order to detect the changes that may occur in the other components of COSO cube as well. (COSO, 2008).

The basic principles of monitoring have been listed as below (COSO, 2005):

- Ongoing Monitoring: These processes allow the management to find out whether the internal controls for the financial statements exist and they are being performed.
- Separate Evaluations: These processes allow the management to assess the efficiency of the five internal control components of COSO over the financial reporting.
- Reporting Deficiencies: The deficiencies of the internal control activities are found out and informed to the related parties that take part in improving the situations in a time effective way.

In this thesis, the internal control structure of COSO methodology has been used since the authors who studied the internal controls have mostly used this approach.

CHAPTER 3

LITERATURE SURVEY

Internal Control Activities in Organizations

As noted in the previous chapter, ‘‘internal control activities’’ are the policies and procedures that an organization develops to help protect the assets of the firm (Savage, Norman, Lancaster, 2008).

Cohen (2006) has claimed that the below points are the important factors in the concept of internal control activities:

- Policies and procedures that help to ensure that the management directives are performed.
    - Necessary actions are taken to make sure that the risks are figured out.
    - Occur in throughout the organization including all departments and functions.
- Internal control activities consist of a range of activities.
    - Approvals, authorizations, verifications, reconciliations, review of the performance of the operations, segregation of duties, etc.

Özeren (2006) has explained the major internal control activities as below:

- Devolution of authority and approval procedures: Devolution of authority can only be performed by the personnel who perform the activities regarding to his/her authorization. The devolution of authority should have been documented and informed to the organization.
- Segregation of duties: The significant activities of a process should not be performed by the same personnel or the team in order to avoid the failures, breaking of the rules or any kind of fraud risks. Instead of this, the cross check and balancing controls should be in place and distributed to the appropriate personnel. If the organization has not got the necessary number of the personnel to sustain segregation of duties, the monitoring controls should be developed.
- Access controls to the resources and records: The access controls over the resources and the records should be distributed effectively to provide appropriate personnel having “edit” or “display” accesses. When the access restrictions have been applied, the sensitivity and the confidentiality of the records should be considered.
- Confirmation: The significant activities should be confirmed and approved before and after the transactions. For instance, when the goods are delivered, the quantity should be checked with the order quantity and afterwards, when the invoice is issued, the delivered quantities are confirmed again. The inventory records can be verified as well.

- Reconciliations: Regular reconciliations should be performed with the records and the documents. For example, the bank accounts on the accounting records are reconciled with the bank extras.
- Performance review controls: The efficiency and effectiveness of the activities are evaluated regarding to predefined standards.
- Analysis towards the activities and processes: The activities should be evaluated regarding to the compliance with the related procedures.
- Review (assignment, review, approval, direction): Appropriate review helps to the achievement of the internal control objectiveness.

Risks of ERP Systems

Risks have been supposed to occur in the ordinary conduct of the business. The risks stand for the potential weaknesses that can cause loss. The risks can be tried to be reduced by implementing internal controls and safeguards. Unless the implemented internal controls are adequate, the organization may face with losses and may run the business inefficiently. Additionally, the IT systems and the ERP environments may help the organization to prevent the vulnerabilities and threats. According to Musaji (2002), the vulnerability may be defined as:

> "a weakness or a flaw in an IT-based system that may be exploited by a threat that can cause destruction or by misuse of the system's assets or resources".

On the other hand, the IT systems and the ERP environments have their own risks and related exposures. The risks and the exposures in an ERP environment have been represented in Figure 10 (Musaji, 2002)

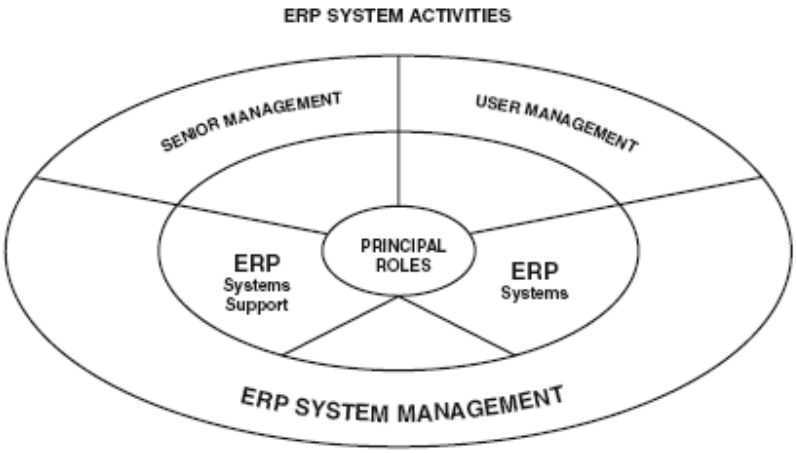

Fig. 10 Risks and exposures of ERP Systems

As the ERP systems have independent nature, the organizations may suffer from different business and audit risks when compared to the traditional computer systems. Particularly, the ERP systems may cause considerable facts about business interruption, security and process risks (Hunton & Wright, 2001).

Including the risks posed by ERP systems, the risks can be divided as (Hsu, Sylvestre & Sayed, 2006):

- Business Process Risks
- Internal Control Risks
- Security Risks
- System Risks

Following sections has explained these risks.

Business Process Risks

The business processes are frequently being changed by the information systems to decrease the costs. As the magnitude of the change increases, the risk which is involved in the change may increase as well. Major changes in the business processes may need the transformation of job descriptions, competencies, procedures, workflows and decision making. If the changes are effectively managed, the organization may gain efficiency and effectiveness. On the other hand, if the change is not adequate, it may harm the organization's well being (Smith et al, 2001). According to Swanson (2008), business process risk is defined as the risks which are mainly related with the goals and objectives of the organization. It is particularly the potential cost incurred if the business does not achieve its strategic plans.

Internal Control Risks

Internal control risk is defined by Romney & Steinbart (2000) as "the risk that a major misstatement will get through the internal control structure and into the financial statements. A company with weak internal controls has a higher internal control risk than one with strong controls. Internal control risk can be determined by reviewing the control environment and considering internal

control weaknesses identified in poor audits and evaluating how they have been rectified."

Another definition for internal control risk is that; internal control risk is the possibility to have errors in the internal control system. The procedural interruptions in a purchasing process or segregation of duties problem can be examples for internal control risks (Coşkun, 2000). Let's look these concepts in detail (Hsu, K., Sylvestre, J. & Sayed, E.N., 2006).

- Segregation of duties: Segregation of duties is designed for avoiding the users from making errors or submitting fraudulent activities through allocating the transaction's different parts to different users. The different parts of a transaction contain usually the approval, recording and custodial activities. Any internal control system should include an efficient segregation of duties. As a principle, the segregation of duties responsibilities should be indicated in the job responsibilities and should be monitored by the supervisor of the personnel. In an ERP system, the segregation of duties should be maintained accordingly, since the traditional methods may fail due to the hundreds or thousands of user size in the company.
- Inefficiency in operations: One of the most important aims of an internal control system is to improve the effectiveness of operations. At the implementation stage, ERP system may decrease the effectiveness. As the most significant purpose of implementing an ERP system is to enhance efficiency, the activities that have no value

should be eliminated to reduce the internal control risks as well (Hsu, K., Sylvestre, J. & Sayed, E.N., 2006).

Security Risks

Every situation in which the use of computers can affect something valuable (for example, human lives or health, privacy, economic assets, or national security) involves risks. Lindqvist & Jonsson (1998) have defined the security risk as

- The system, through human misuse, experiences loss of confidentiality, integrity, or availability for any of its resources; or
- The system, through misuse or by accident, experiences the introduction of security vulnerability.

In addition to the security definition above, Hsu, Sylvestre & Sayed (2006) have defined the security risk as the unauthorized access to the systems and equipments. The controls regarding to the security can be divided in two groups as physical controls and logical controls. Physical controls have been dealing with the restriction of the access to the ERP terminals and equipment to the authorized personnel. Logical controls include the restriction of access to the software and data warehouse such as passwords, encryption and firewalls.

In an ERP system, the security risks are being much more than the traditional systems. One reason for this security need is the bolt-ons. Bolt-on

is the customized software in the ERP system. When the same vendor designs the bolt-on, the security risks are being decreased since the authorizations are put in the software as a fundamental part of the control system.

Hunton, J., Wright, A. & Wright, S. (2001) have agreed the idea that the ERP systems have greater risk than the non-ERP systems due to automated workflow and relational database features. Since there is a tough control for the user passwords and authentication, there may not be a great system security risk in a ERP system. On the other hand, if a control weakness occurs, there may be a great risk for accessing the database of the whole enterprise. Therefore, if someone has found a way to overcome the system security controls, they can create a record unintentionally or may delete an audit trail.

System Risks

System risk can be defined as a risk that may cause a system does not function as it is built for. These risks consist of the risks that the controls over the system do not sustain sufficient protection for the errors, fraud or that the implemented system does not carry the functions of the business processes. The ERP systems are bought mostly from the ERP vendors such as SAP, Oracle, etc and the controls over the systems are mostly dependent on the vendors. Additionally, the IT personnel may not have the necessary skills and expertise to implement an ERP system, so that most companies depend on the ERP consultants. Choosing the incorrect ERP system or specialist may cause a

entire system failure or catastrophic consequences (Hsu, K., Sylvestre, J. & Sayed, E.N., 2006).

Systems risks are the risks which are built into the technology by engineers and system designers (Wright & Wright, 2002, p:101). As Hahn indicates, the systems have usually located on multiple computers. For the systems, a major challenge is the optimum coordination. In addition to the coordination, the reliability and availability of data especially for the effective use of reporting can be an essential consideration (Hahn, 1999).

A system risk model is illustrated in Figure 11 by Fletcher et al (1995).

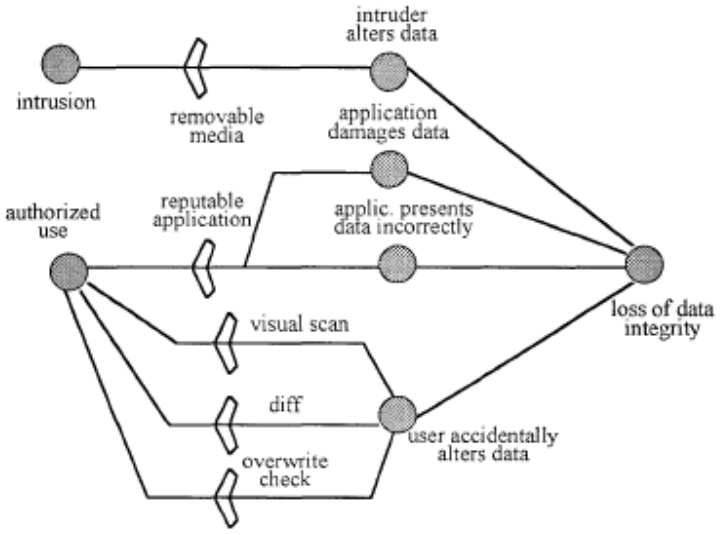

Fig. 11 System risk graph

According to the Figure 11, the elements of the system risk model are the system states or events, symbolized by circles; transitions, symbolized by lines linking the circles and the risk mitigators, symbolized by the barrier symbol along transitions. This figure represents how one mitigator (like using

a reputable application) can mitigate two transitions and how a range of mitigators (like visual scan, diff, overwrite check) can be taken into consideration for mitigating a single transition.

Internal Controls for Avoiding ERP Internal Control Risks

Acording to Ratliff, Reding & Fullmer (1998), the main purpose of the internal controls is to mitigate the risks that threaten the aims of the company and the strategies implemented to achieve those aims. In order to sustain a greater assurance, the internal controls should be set accordingly and the risks should be addressed.

As an example, a major aim of implementing such an internal control model is to attain a suitable balance between process controls and sustain a reasonable assurance from the process. Figure 12 indicates a sample process control chart for a payable process. The process has expensive and time consuming protective controls such as segregation of duties and physical access controls. It is obvious that the control mechanism varies from company to company. The leading companies mostly are aware of the significance of internal control issues and enhance the key processes with necessary amendments to the business process controls (Ratliff, Reding & Fullmer, 1998).

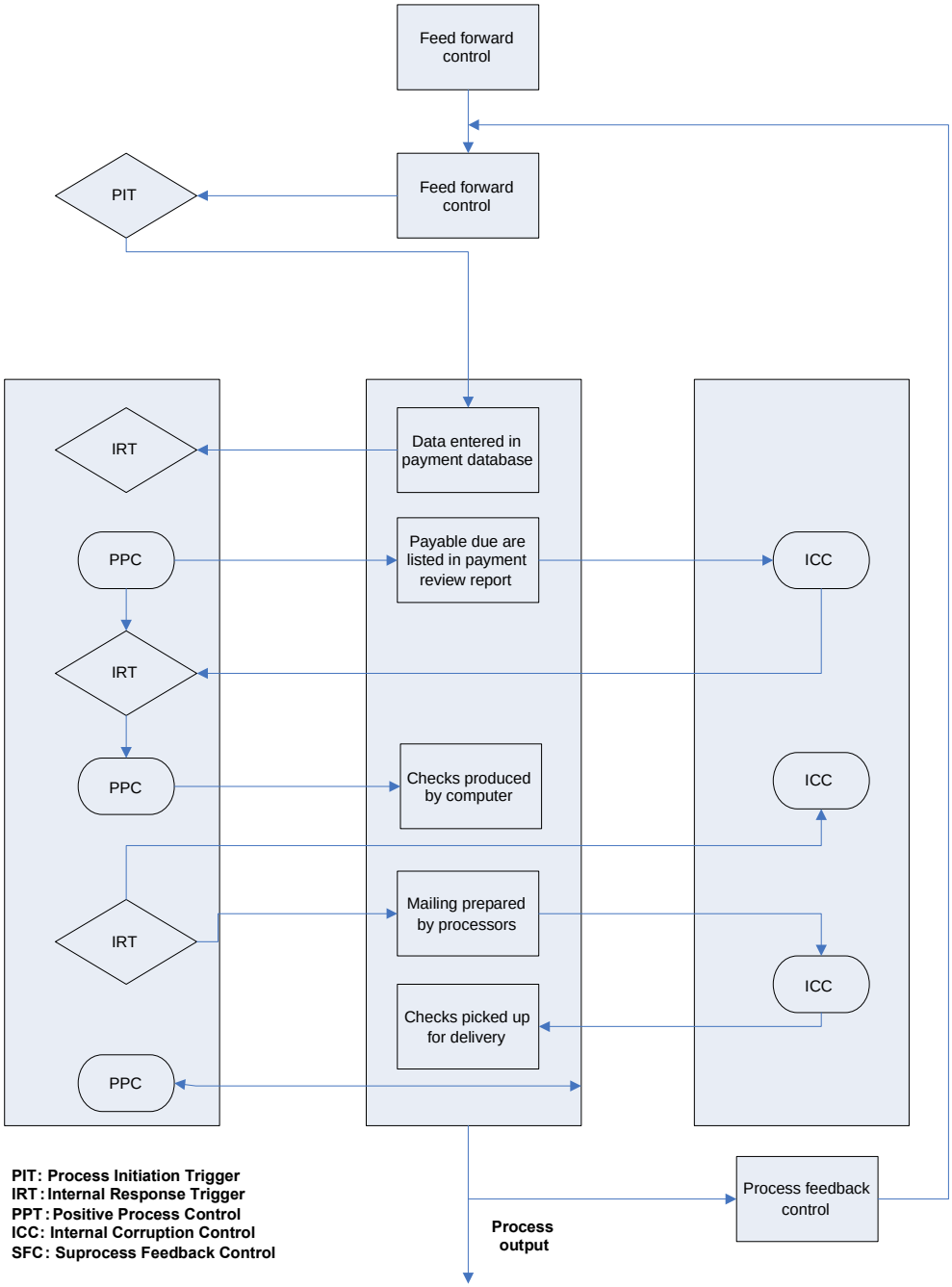

Fig. 12 An example - payable process

Additionally, the internal controls for protecting the assets are not limited to the prevention or detection of inappropriate situations. It helps to

prevent or detect the possible losses that may cause from unauthorized acquisition or use as well. According to GAO (1999), “Internal controls over safeguarding of assets against unauthorized acquisition, use, or disposition also relate to making available to management information it needs to carry out its responsibilities related to prevention or timely detection of such unauthorized activities, as well as mechanisms to enable management to monitor the continued effective operation of such internal controls.”

According to PwC (2008), unless the necessary internal controls built, the company may face with several internal control deficiencies as indicated in Figure 13.

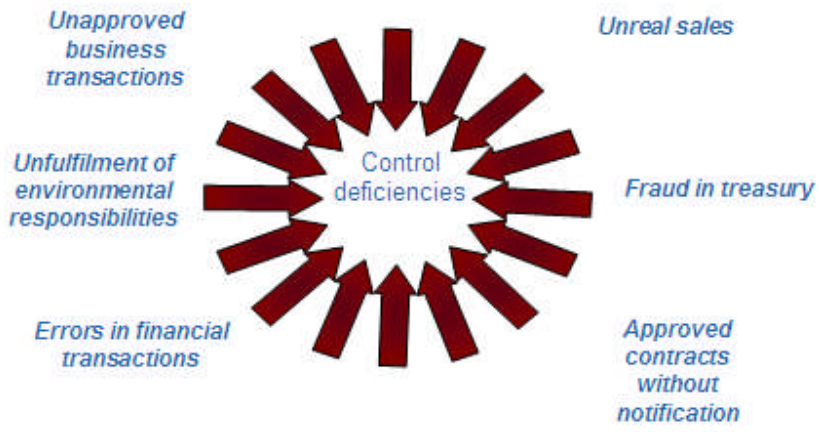

Fig. 13 Internal control deficiencies

There are different classifications of controls in the literature. The controls are mostly classified according to their types and natures.

According to Nigrini (2005), the internal controls are classified as:

- Preventive internal controls: The controls that are designed to avoid errors, omissions or security events.
- Detective internal controls: The internal controls that are designed to identify errors or incidents those escape from preventive internal controls.
- Corrective internal controls: The internal controls that are designed to correct errors, omissions or incidents after they have been noticed.

According to EAGLE (2006), the internal controls are classified as detective internal controls and preventive controls according to their types. Additionally, according to their nature, the controls are classified as in Figure 14;

- Manual internal control
  - (Purely) Manual internal control
  - IT-dependent manual internal controls
- Automated internal control
  - Application internal controls

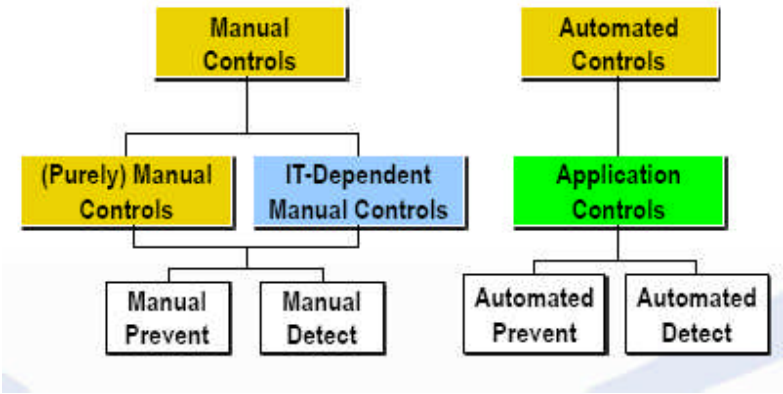

Fig. 14 Classification of controls

In following sub-sections categorization of the internal controls are explained in detail.

Types of Internal Controls for ERP Risks

Preventive Internal Controls

According to Panko (2008), the internal controls that are preventive try to keep deviations from happening. An example has been given by Panko (2008) as follows:

> "In movie theaters, for example, one person sells tickets but another collects them. This is the segregation of duties. Unless the two parties collude, the person accepting the money for tickets cannot collect money, pocket it, and then allow the moviegoer in without giving him or her a ticket."

Romney & Steinbart (2000) agreed that the preventive internal controls prevent the problems before they occur. The common examples are; hiring qualified accounting specialists, segregating the employee duties in an appropriate way and controlling the physical access to the assets.

Detective Internal Controls

Detective internal controls try to identify deviations after they take place, so that a related action can be taken. Periodic reconciliations between

independent processes make it likely that variations in one of the processes will be made known. As to continue with movie theaters case, the management may reconcile the number of tickets sold with the number of tickets gathered at the end of the day as a detective internal control (Panko, 2008).

According to ISACA (2007), the following points are the examples for detective internal controls:

- Review procedures including the non compliant situations and logging the activities of vendors, customers, regulators and auditors
- Logging and reviewing the activities of privileged accounts in the systems.
- Audit or quality assurance assessment of users, firewall configurations, alerts, etc.

Corrective Internal Controls

In addition to the preventive and detective internal controls, corrective internal controls should be in place to identify the main reason of the problem, make the necessary correction and change the system in order to avoid occurring again. For instance, when performing bank reconciliation, if a missing deposit is revealed, the corrective internal controls should set up a protocol for tracking down the missing asset and picking up if possible (Owens, 2002).

Corrective internal controls which are also called directive or recovery controls sustain a corrective action to be taken after an inappropriate incident

has been revealed. These internal controls take place after an inappropriate incident has happened. The main purpose of these internal controls is to undo the error or correct the failure.

It is better to design the system that has adequate preventive internal controls to prevent the "inappropriate" events from occurring. When an unacceptable action takes place, particularly in an online environment, that action affects before it can be prevented. In this situation, an audit trace is necessary to sustain the information needed to correct the mistake and improve the situation.

When designing the corrective internal controls, it is essential to make the relation between the internal control and the undesired event. The main reason of the failure should be targeted and the necessary feedback should be sustained for preventive internal controls (Chichakli, 2007).

Classification of Internal Controls for ERP Control Risks

Performance Review

The performance review internal control activities contain the risk assessments and reviews of real fiscal performance against budgets, forecasts, and prior period performance. When performing these reviews, there are various data sets including operational, risk related, or financial data (OCC, 2000). These data sets are used for investigation and correction such as a

comparison between internal data and external data, review of functional performance. A bank's consumer loan manager's review of reports by branch, region, and loan type for loan approvals and collections can be an example to the performance reviews (PwC, 2006).

Information Processing

The internal controls over information processing can be either automated or manual. These internal controls are designed to make sure that the necessary integrity of management information systems and related records are sustained. For example bank personnel record relevant information to the related systems and the proper personnel checks the information separately. This process should also be documented in order to assign responsibilities to the related personnel (OCC, 2001).

Physical Internal Controls

Physical internal controls include the assets' physical security such as appropriate safeguards over assets and records, authentication before the access to the information systems, database and periodic counts of cash, inventory etc (PwC, 2006).

Segregation of Duties

According to best internal control demands, any single employee should not be occupied with too much responsibility. The position of the employee should be avoided to have the possibility of fraud or unintentional error. The following duties should be separated according to the segregation of duties principle (Romney & Steinbart, 2000).

- Authorization: Approval of the transactions.
- Recording: Preparing the necessary documents or performing the reconciliations, performance reports.
- Protection: Managing the cash, receiving the cheques, writing the cheques on behalf of the organization etc.

Panko (2008) has explained the segregation of duties as the sensitive processes need to be performed by two or more personnel in order to reduce the risk of engaging in inappropriate activities. The segregation of duties principle is explained in Figure 15 by Romney & Steinbart (2000).

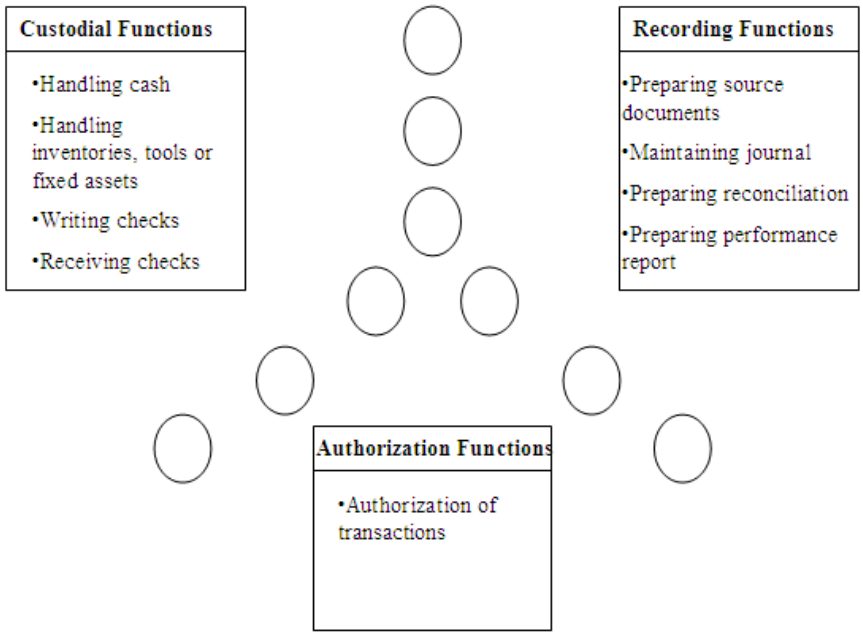

Fig. 15 Segregation of duties

Frameworks

There are several frameworks for assessing the internal controls of the purchasing process for sustaining the reliability of the financial statements. Some of the frameworks are specifically developed for a specific ERP package, whereas the others are generic frameworks that can be applied to all kinds of ERP packages as well. There are many general framework studies in the literature but there is no study for developing a framework specific for purchasing process. Therefore, the frameworks studied in this section are taken from the internal audit companies, auditors and the other companies that

have developed frameworks for their own use. The frameworks are listed in Table 3 and have been analyzed in the following paragraphs.

Table 3: Frameworks

No	ERP	Resource
1	Peoplesoft	PwC (2006)
2	Generic	E&Y (2006)
3	SAP	Bird, J (2001)
4	JDE	AuditNet (2009)
5	Generic	Bellino et al.(2007)
6	Generic	Warner (2009)
8	Generic	AuditNet (2009)
9	Oracle	PwC (2007)
10	Generic	AuditNet (2008)
11	Generic	AuditNet (2005)
12	Generic	AuditNet (2004)

PwC (2006) has developed a framework for addressing the internal control assessment of Peoplesoft. According to PwC (2006), PeopleSoft is a group of application modules that are entirely integrated with each module supporting a special business process. The PeopleSoft General Ledger module serves as the center of the PeopleSoft Financial Management System. The General Ledger module is where all financial information is stored. The framework has consisted of ordering, goods receipt, invoice processing,

adjustment & ledger maintenance and payment subsections. In the ordering part, main considerations are; entering the purchase orders accurately and in the proper period and investigating the long outstanding open purchase orders, if they exist. Additionally, the purchase orders are approved. In the goods receipt part, the points of focus are; receiving reports are input for processing completely and accurately, received goods are recorded in the proper period, long standing open receiving reports are investigated, postings to expense and/or inventory in the general ledger are complete, accurate and valid and goods received or services performed are ordered. In the invoice processing part, the main consideration is that all invoices are received for processing and all invoices are input for processing correctly. Some matching controls are available in PeopleSoft system. The journal vouchers are compared with invoices, purchase orders and goods receipt documents. Additionally, the invoices are prevented to be recorded duplicate. PeopleSoft duplicate invoice checking can be enabled to check for duplicates on some fields such as vendor ID, invoice number, invoice date, etc. In the payment subsection, payments are input for processing completely and performed for the correct invoice, the correct payee or vendor in correct amount. Additionally, the payments in foreign currency are accurately calculated and all payment input has been recorded in the proper period. The purchase discounts and translations are calculated accurately and the proper vendor accounts are selected. Also, duplicate payments are prevented. For each sub section, the authors emphasized the access rights and segregation of duties considerations as well.

Ernst&Young (2006) has not divided the process into sub processes and has defined some internal control considerations that address the whole process. Main risk areas that should be considered within the framework are:

- Receiving documents or records are not generated for all goods received or not generated in the proper period
- Receiving documents or records are generated for goods not received (fictitious or duplicate purchases are recorded)
- Coding of purchases are not correct
- Accruals for good received but not yet invoiced are not recorded
- Fictitious or duplicate invoices/accruals are recorded
- Invoices are not recorded
- Invoices or payables are not recorded in the proper period
- Invoices reflect incorrect prices, quantities or other information
- Invoices are posted to the wrong expense accounts
- Fictitious return invoices are recorded
- Disbursements made are not recorded
- Fictitious or duplicate cash disbursements are recorded
- Amount recorded as disbursements differs from amounts actually paid.
- Disbursements are recorded in the wrong period.
- Coding of disbursement is incorrect

Bird, J (2001) has published an internal control matrix for the purchasing process and named the process as accounts payable process. The internal control matrix has been developed specifically for SAP R/3 and

contains vendor master, invoice processing, invoice verification and disbursements sub processes. The matrix has been organized in such a way that the risk, result, internal control and audit step have been included in each row. In the vendor master section; the following risks have been considered; users may have unauthorized access to update vendor master files, creation or deletion of vendor master files may not be authorized or detected, inaccurate or incomplete vendor data may be entered, sensitive fields, such as alternative payees, may be inappropriately completed and not reviewed, duplicate vendor records may be created, unauthorized changes to vendor master data may go undetected. For the invoice processing sub-section, the author has taken following risks into consideration; the users that has access to invoice processing may not be authorized or the terminated employees may have still access to the system, any amount limitation of posting has not been set for the users, the invoices that has been entered may not be valid, proper approval mechanism has not been set for the invoices, the calculation of the invoices may not be accurate, three way match (matching between purchase order, goods receipt and invoice receipt can be bypassed, the parked invoices may not be cleared on a timely basis, the accounts of the vendors in the General Ledger [G/L]) may not be updated timely or the vendor accounts may not be accurate. In the invoice verification sub process, the previous risks has been enhanced and the internal control points have been investigated for the following risks; the invoice data may be incorrect or invalid, the tolerance limits for invoice verification procedures may be set too high, large

outstanding payable balances may not be considered. The risks of the disbursement sub process start with the access rights of the users as well. Additionally; cash disbursement details, inaccurate or incomplete payment of vendor invoices, not reviewing of large or unusual payments, duplicate payments for the same invoice, posting the payment to incorrect accounts, incorrect calculation of discounts, completeness and accuracy of cheques are taken into consideration as the risks of payments.

AuditNet (2009) has published a JDE accounts payable internal controls document on its website. The document has consisted of both the accounts payable internal controls and the general computer controls. The document has proposed some testing strategies for the accounts payable internal controls. Some of the proposed testing strategies are as follows; inquiry with the management about generating and reviewing the budget comparison, inquiry to ensure management is reviewing the standard JD Edwards or custom reports for the verification of the receipts, review a sample of invoices to ensure supporting documentation is provided, verify that management reviews and follows up the exception reports, inquiry with management as to the numbering process for goods receipt vouchers, interview with the management to determine goods returned note procedures, review some JDE reports such as proof report, bank reconciliation report, cleared not issued report, cleared before issued report, amounts not equal report, unreconciled items report.

Bellino et al (2007) have published the accounts payable risk and internal control matrix in five sub sections; purchase requisition processing, purchase order processing, goods receipt processing, invoice processing, process payments. The sub sections have been organized as control objective, risk, control activities. Additionally, the related COSO component, control activity and the control classification have been included. The purchase requisition processing section has included the access to create purchase requisition and review of the created purchase requisitions. The purchase order processing has been prepared like purchase requisition processing and included the access and the review concerns. The goods receipt processing sub section has addressed the goods received but not invoiced are reconciled on a monthly basis and the unmatched purchase orders are reviewed monthly. In the invoice processing, the access of invoice entry without three way match is considered to be restricted only to the appropriate personnel. Additionally, the cheques have been taken into consideration and matching of the cheques to the supporting documents has told to be sustained. Also the general ledger balances and the accounts payable balances have been analyzed. In the last sub section (payments), the risks regarding to the payments which differ from the recorded amounts, inappropriate accesses to the check creation, three way match between purchase order, goods receipt and invoice are included.

Another study has been conducted by Warner (2009) regarding to detect the fraudulent activities in purchasing process. The author has proposed ten ways for the detection of fraud. These are:

- Duplicate payments: Duplicate payments in many cases may not be related to fraud, but continue to be a significant accounts payable leakage.
- Benford's law: states that if a number is selected randomly from a table of physical constants or statistical data, the probability that the first digit will be a "1" is about 0.301. If the normal frequency of digits is known, the digit frequencies that violate that normal behavior can be identified.
- Invoices that have rounded amounts
- Invoices just below approval amounts: For example, a supervisor may only be allowed to approve invoices of $3,000 or less. The invoices just below the approval limit should be taken into consideration.
- Check theft search: In many Accounts Payable departments, a reconciliation of Accounts Payable with the monthly Bank Statement are conducted to identify any discrepancies. This process can also be helpful in identifying check fraud. One simple way to spot potential check fraud is to identify missing check numbers or gaps in reconciled cheques numbers.
- Abnormal invoice volume activity: Monitoring vendor invoice volume is one way to alert the irregular behavior.
- Vendors with cancelled or returned cheques: Cancelled and returned cheques do take place in the course of a normal Accounts Payable

month. A vendor with many cancelled cheques or a regular pattern of cancelled cheques is more unusual.

- Above average payments per vendor: This algorithm discovers the invoices that are above usual amount for a specific vendor. For example, a vendor usually has invoices between $1,000 and $3,000 and an invoice comes for $25,000. These kinds of irregularities can be investigated.
- Vendor / employee cross-check: The vendor file and employee file can be cross checked regarding to the following variables such as address, tax ID number, phone number, bank account number, etc.
- Vendors with a mail drop as an address: This algorithm compares vendor addresses with mail box drop address such as mail boxes, etc.

The other framework has been developed for the generic accounts payable application controls of the ERP systems. The framework has only contained the application control objective and programmed system controls. The control objectives which are addressed in the framework are as below (AuditNet, 2009):

- Accounts payable amounts are accurately calculated and recorded.
- All amounts for goods received are input and processed to accounts payable.
- Credit notes and other adjustments are recorded in the appropriate period.
- Disbursements are only made for goods and services received.

- Disbursements are distributed to the appropriate suppliers.
- Disbursements are accurately calculated and recorded.
- All disbursements are recorded.
- Disbursements are recorded in the period in which they are issued.
- All invoices, credit notes, adjustments and payments are posted to general ledger in the period.
- Only valid changes are made to the supplier master file.
- Changes to the supplier master file are accurate.
- Changes to the supplier master file are processed in a timely manner.

PwC (2007) has developed a framework for the Oracle ERP package. The sub categories are suppliers, restricted access, requisition, receipt of goods, purchase orders, payment processing, payables transaction processing, payables accounting closing and master data. For each sub-process, the control objectives are stated, internal control descriptions are given and the business risks are explained. Additionally, the internal controls are classified as manual or automated, preventative or detective, inherent, access, configurable or manual. For the suppliers sub section, the control objectives determined by PwC are; vendor creation is monitored, vendor creation or modification is authorized and valid. For the restricted access, the abilities to perform key transactions are properly authorized. The main control objective for the requisitions is the completeness and validity of the requisitions. In the receipts of goods part, the control objectives are; goods receipt inputs are complete and accurate, only approved adjustments are input for processing,

the received goods or services were ordered, the goods or services received are recorded in the correct period. For the purchase orders sub process, the main control objectives are determined to be the review of long outstanding purchase orders, correct input of the purchase orders and the completeness of the physical stocks. In the payments part, the completeness, validity and the approval of the payments are emphasized as the control objectives. Additionally, for the payables transactions sub cycle, the completeness of the allocation, processing in the proper period, completeness and the accuracy of the invoices and the postings are mentioned.

The framework has been developed for Sarbanes Oxley (SOX) requirements. It has been prepared without sub-sectioning the purchasing process. The key internal controls of the purchasing process have been identified in the framework. Additionally, the testing procedures have been proposed in the framework. The key internal controls include, the approvals on the purchase orders, payments, vendor agreements, review of the accounts payable sub-ledger, long time outstanding items and the physical storage of the documents, cheques, etc (AuditNet, 2008)

Deloitte Touche Tohmatsu Research (2006) has identified the main risks and the key internal controls for SAP R/3 system. The authors have divided the process into four categories which are master data maintenance, purchasing, invoice processing and disbursement processing sub cycles and named the process as “expenditures” process. For each sub cycle, the risks and the key internal controls are defined. Additionally, the testing techniques are

given. For the master data maintenance, the main risks are explained as invalid, incomplete and / or inaccurate vendor master data and not remaining current and pertinent. For the purchasing sub cycle, the most significant risks are determined to be the invalid, incomplete and / or inaccurate purchase order entries and changes. Also the goods may be received without appropriate purchase orders. The risks related to the invoice processing are the risk of unauthorized payments due to the accounts payable postings that do not represent the goods or services received, the calculation of the accounts payable and the incomplete credit notes and adjustments. In the disbursement sub cycle, the main risks are considered to be the payment of unreceived goods or services and the unrestricted ability for unauthorized personnel to enter, change, cancel or release credit notes.

The purchasing framework implemented by the Account Planning Group and published on the internet includes 15 internal controls and risks. Main considerations are the security of the vendor master data, three way match between the purchase order, goods receipt & invoice receipt, authorization of the payments, review of the account balances, recording of the invoices and adequate DoA (Delegation of Authorities) (AuditNet, 2005).

One of the frameworks developed for the compliance with the Sarbanes Oxley includes purchasing, receiving, accounts payable, disbursement, financial reporting and information technology sub-sections. The framework has been established for every type of ERP systems. According to the framework, the main considerations are; the system

documents such as purchase orders are numerically controlled, authorizations are well segregated, backorders are followed, vendors are qualified, bidding process is active, goods are centrally received, three way match is sustained, physical access is managed, etc (AuditNet, 2004).

CHAPTER 4

METHODOLOGY

According to the literature surveys, companies face with various ERP internal control risks. Although the companies implement their ERP systems for an efficient business flow, they sometimes do not consider the internal controls that they can easily adapt to their ERP systems. These unconsidered ERP internal control risks may cause a revenue loss, major misstatements in financial statements and inefficiency in the business operations.

For assessing the ERP internal control risks, the audit companies have developed frameworks for the business processes. These frameworks aimed to reveal the ERP internal control risks that may lead to major misstatements as a result of purchasing activities. However, the frameworks differ from each other. The frameworks are investigated in the literature survey and in this chapter a consolidated framework is established based on the literature survey and the interviews made by experts in MS Excel 2003 environment.

Design and the Development of the Internal Controls Evaluation Framework Model

The framework design and development process can be described in three phases as described in Figure 16.

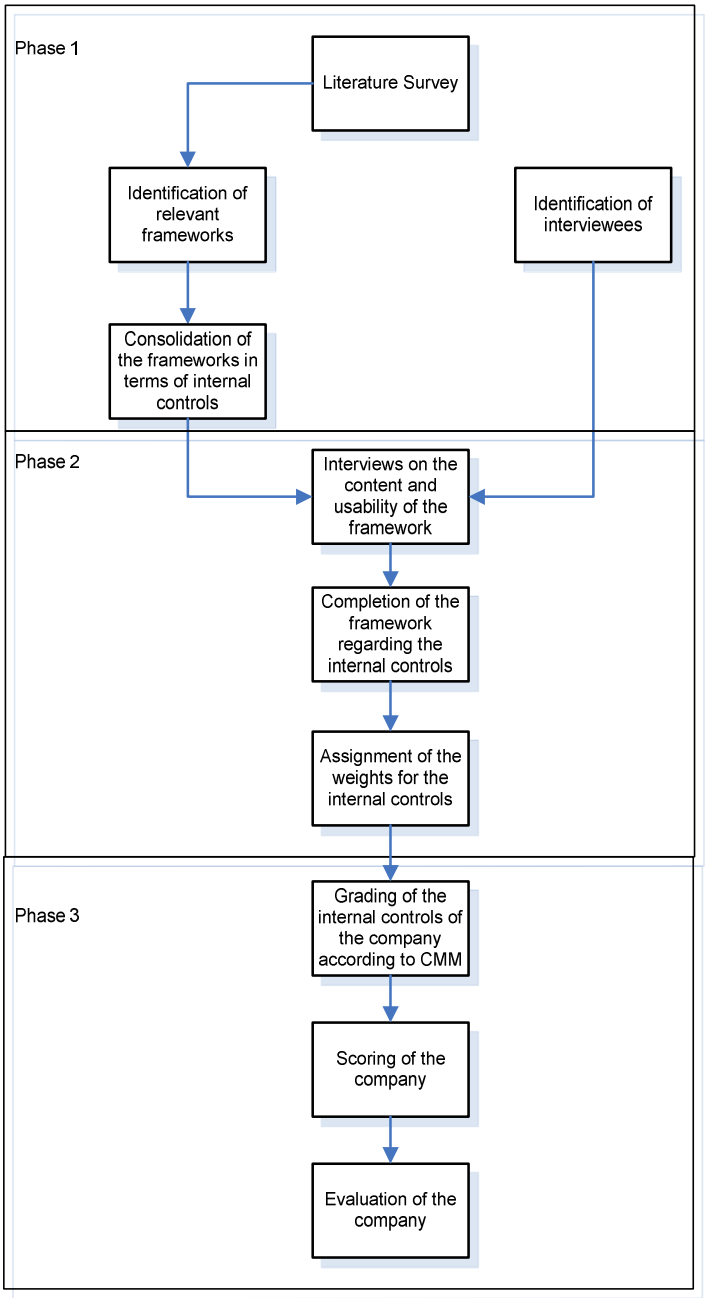

Fig. 16 Framework design process

Phase 1

In Phase 1, based on the previous research in the literature, the developed frameworks are identified. The identified frameworks which aimed to reveal the ERP internal control risks in purchasing process are consolidated in MS Excel 2003 environment. The frameworks did not have the same structure and columns, for this reason the consolidated framework had many incomplete cells. Meanwhile, the interviewees with whom the consolidated framework is going to be discussed are identified according to their experience. These interviewees are:

- Işıl Kırdı (*PricewaterhouseCoopers Manager*, CISA (Certified Information Systems Auditor), CIA (Certified Internal Auditor))
- Erkan Sertoğlu (*PricewaterhouseCoopers Assistant Manager,* CISA (Certified Information Systems Auditor))
- Duygu Şenen (ERP Senior Consultant)

Phase 2

In Phase 2, the interviews have been performed with these identified specialists in order to verify the content and the usability of the consolidated framework in Phase 1. The specialists are asked to complete the framework (such as the control procedures, internal control classifications and risks, etc if they are missing), combine the similar internal control activities that have the

same risk and control objective to condense the framework, add the necessary internal controls if they are missing, remove the unnecessary internal controls. Finally, the specialists have been asked to rate the internal control activities according to their significance. The weights of the internal control activities are given in Table 4.

Table 4: Internal Control Activities Weight

Rate	Significance
1	Very Low
2	Low
3	Medium
4	High
5	Very High

The framework consists of 12 parts as shown in Figure 17 in column headings and as listed below:

1. Sub Process: This part indicates the sub-process of the purchasing process.
2. Control objective: Control objective is defined as the declaration of the preferred incident to occur after developing relevant internal controls in a given process (IT Governance Institute, 2007)

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades						Total (Control Weight x Grade)
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5 NA	
1	Vendor Master	Vendors are authorised and valid and only authorised staff has access to the vendor master data maintenance.	Users may have unauthorized access to update vendor master files which may result in financial loss.	Appropriate transaction codes and other object authorizations should be assigned to authorized users. The following transactions need to be restricted: - Create, change and display master records. - Block and unblock master records. - Mark record for deletion.	5.0	X					X	X		a. Review user profile for reasonableness of access. b. Review the Vendor Master File for changes that have been made and verify that all of the users who made the changes have the appropriate Vendor Master Change profile. Review user profiles added for Accounts Payable Vendor Master, for authorized personnel approvals.	SAP							
2	Vendor Master	Vendor creation/modification is authorized.	Creation or deletion of vendor master files may not be authorised or detected.	Creation or deletion of a vendor master file requires a vendor coding form authorization by the appropriate users. The vendor coding form will be attached with source documents and the relevant authority approves it. Relevant authority checks for same name address, etc. when submitting or approving vendor master input form. Relevant authority signs off on vendor master input forms.	5.0	X			X				X	Select a sample of vendor master records created. Trace information to vendor coding form, and verify proper authorization. Verify relevant authority reviews list of modified/created vendors. Observe user creating a vendor master record, and verify the user checks for same name.	SAP General Oracle							
3	Vendor Master	Vendor creation/modification is authorized.	Inaccurate or incomplete vendor data may be entered.	Mandatory fields in the vendor master file are defined and required. Mandatory fields are as below: - customer name - tax id - phone number. - address The system displays an error / warning message whenever there is erroneous or omitted vendor data during data entry. Relevant authority checks any duplicated record by checking - customer name - tax id - phone number.	3.3	X			X			X		Observe a user creating a Vendor Master Record, and document mandatory fields are required for entry. If possible, check the technical configuration.	SAP Peoplesoft General							

Fig. 17 Framework

3. Risks: Risk has been defined as the possibility of not preventing or detecting the errors that result in intolerable loss or major misstatements (Kelechi, Nwankpa Joseph, 2007). Every kind of organizations face with the risk. There are different types of risks including financial statement risks, fraud risk, risks over reputation, ecological risk and strategic risk (Jeffrey, 2008). In this framework financial statement risks and fraud risks are taken into consideration.
4. Controls: "Control" is taken as "internal control" in this framework. Internal Control has been defined under the literature survey section. The following descriptions are taken for this thesis:

   "Internal Control is broadly defined as a process, affected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following categories:

   - Effectiveness and efficiency of operations.
   - Reliability of financial reporting.
   - Compliance with applicable laws and regulations" (Arimoto, Kudoh, Watanebe, & Futatsugi, 2008)

Internal control over financial reporting has been defined by the Ge, W. & McVay, S. (2005) as a procedure that is affected by the directors & management of the company and implemented by the executives of the company in order to sustain reasonable assurance for the financial statements.

5. Control Weight: This part is the calculated average of the interviewees' ratings.
6. Types of Controls
    a. Preventive
    b. Detective

The corrective internal controls which are defined in the literature survey are not included in the framework because any of the internal controls in the purchasing process is not classified as "corrective internal controls".

7. Classification
    a. Performance Review
    b. Information Processing
    c. Physical Control
    d. Segregation of Duties
8. Automated / Manual
    a. Automated
    b. Manual
9. Control Procedure: This part indicates how the control can be assessed.
10. System: This part includes the ERP systems that the internal controls are relevant. This section is composed of the ERP systems that are studied in the frameworks found in the literature and developed by the companies. Each internal control is relevant but not limited to the ERP system that is given under the "system" section.

11. Grades: Grades are assigned to the companies according to the CMM approach described in Phase 3 of this chapter.
12. Total: Total is the calculated result of grade multiplied by the control weight.

Phase 3

In Phase 3, the selected companies are evaluated in terms of their internal control risks in purchasing process using the framework developed. For the evaluation of the companies, CMM approach which was implemented by Carnegie Mellon University in 1980 (Schrock, 2006) is used.

Despite the fact that CMM is for software development, the five phases of the model have been maintained from the original CMM to evaluate the maturity of the business processes (Rendon, 2008). The companies have adapted process capability maturity models to evaluate, calculate, and enhance their major processes. Process capability has been described as the ability of a process to generate pre-planned results and maturity has been defined as a measure of effectiveness or competence in that process. With the help of CMM, the improvement paths of the organizations from initial practices to a state of continuous improvement can be observed easily. (Curtis, Hefley & Miller, 2009).

CMM consists of five conceptual levels as adapted for business processes. The capability levels are illustrated in Figure 18 (Lindstrom, 2008)

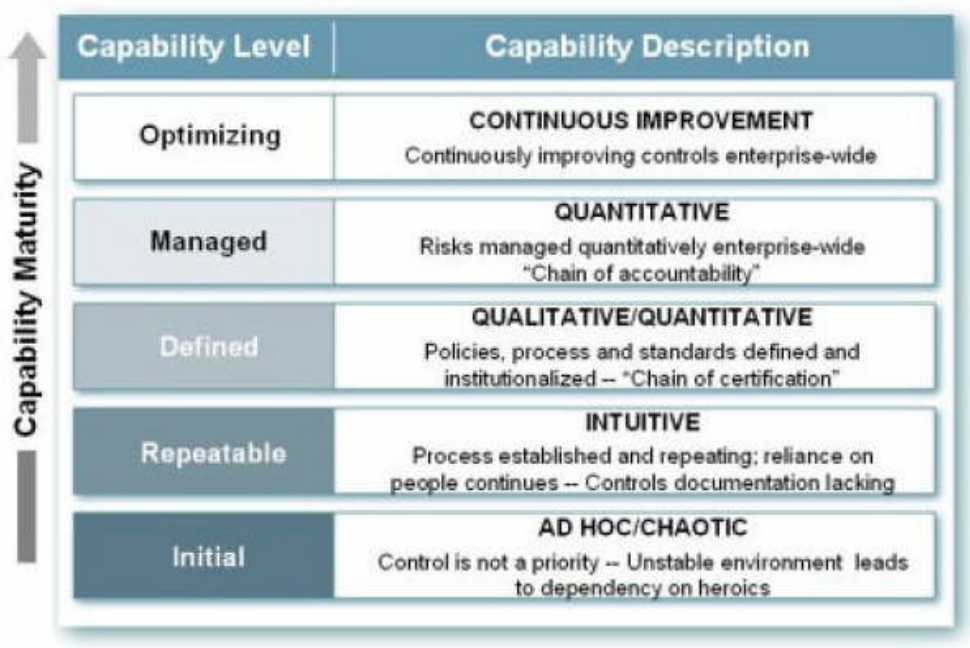

Fig. 18 Capability maturity model

The levels are explained as follows:

- Level 1 – Initial: The internal controls are dependent solely to the experience of the personnel. The operations and the internal controls are performed based on the skills and experience of the personnel (Scrock, 2006). The internal controls in this level are very poor and there are almost no automated internal controls. The accuracy of the internal controls is not monitored and the evidence of the internal controls are not retained (Lee, 2006).
- Level 2 – Repeatable: At this level, the reliance on the key personnel that performs the internal controls still exists. The documentation of the internal controls are not done or the documentation is not properly retained and can be reperformed (Lindstrom, 2008)

- Level 3 – Defined: At this level, policies and procedures are established for the internal controls and the consistency for the defined goals and expectations are sustained throughout the company. Key performance indicators and / or risk metrics are broadly defined (Scrock, 2006).
- Level 4 – Managed: At this level, the automated internal controls are running effectively (Lee, 2006). The key performance indicators and / or risk metrics are well defined and these metrics can be used to assess the efficiency of the processes (Scrock, 2006).
- Level 5 – Optimizing: At this level, the company is focused on the continuous improvement of the process and the internal control. The deficiencies of the internal controls are continuously analyzed to reveal the root causes, and the results are evaluated for the continuous improvement of the processes. Lessons are learned from these analyses and applied to the rest of the company (Scrock, 2006).

The assessments of the selected companies have been performed in the evaluation sessions that are organized individually by myself. In these sessions, the relevant personnel from the selected companies have attended, and the internal control activities are assessed according to the capability maturity model by those relevant personnel of the companies.

After the internal controls of the companies' are graded according to CMM, the scoring calculations are made. For the scoring of the internal control structures of the companies, a scoring model has been developed.

Scoring is based on the control weights according to the ratings of the interviewees and grades that the companies received according to CMM. Finally, the company is assessed through various analyses.

Quantification of the Internal Controls Evaluation Framework Model

The steps for the quantification of the evaluation model are explained below and are shown graphically in Figure 19. The variables and indices used are defined in Table 5 and 6.

- Assignment of internal control weights: The internal control weights (W_{ij}) are assigned in phase 2 by the interviewees according to the significance of the internal control as given in Table 4. The averages of these internal controls for different categories (CW_j) are calculated in Phase 2 where the categories are described in Table 4.
- Assignment of grades for the internal control activities: Grades (G_j) are assigned for each of the internal control activity by each individual company. For the assignment of the grades, CMM is used as it has been illustrated in Figure 18.
- Calculation of scores: Score (SC_j) of each individual internal control activity is calculated by multiplying the average weight of the internal control activity (CW_j) with the corresponding grade of the company (G_j) for that internal control activity. For the evaluation and the comparison of the companies, following evaluations based on the

categories of the internal control activities which are explained in detail in Figure 19, are performed:

- Total evaluation results (*TE*)
- Evaluation according to the sub processes
    - Vendor master (*VM*)
    - Ordering (*OR*)
    - Goods receipt (*GR*)
    - Invoice processing (*IP*)
    - Payments (*PY*)
    - Adjustments and ledger maintenance (*AL*)
    - General (*GN*)
    - Return (*RT*)
- Evaluation results according to the types of internal controls
    - Preventive (*PV*)
    - Detective (*DT*)
- Evaluation results according to the classification of internal controls
    - Performance review (*PR*)
    - Information processing (*IN*)
    - Physical control (*PC*)
    - Segregation of duties (*SD*)
- Evaluation results according to automated or manual internal controls

- Automated (*AT*)
- Manual (*MN*)

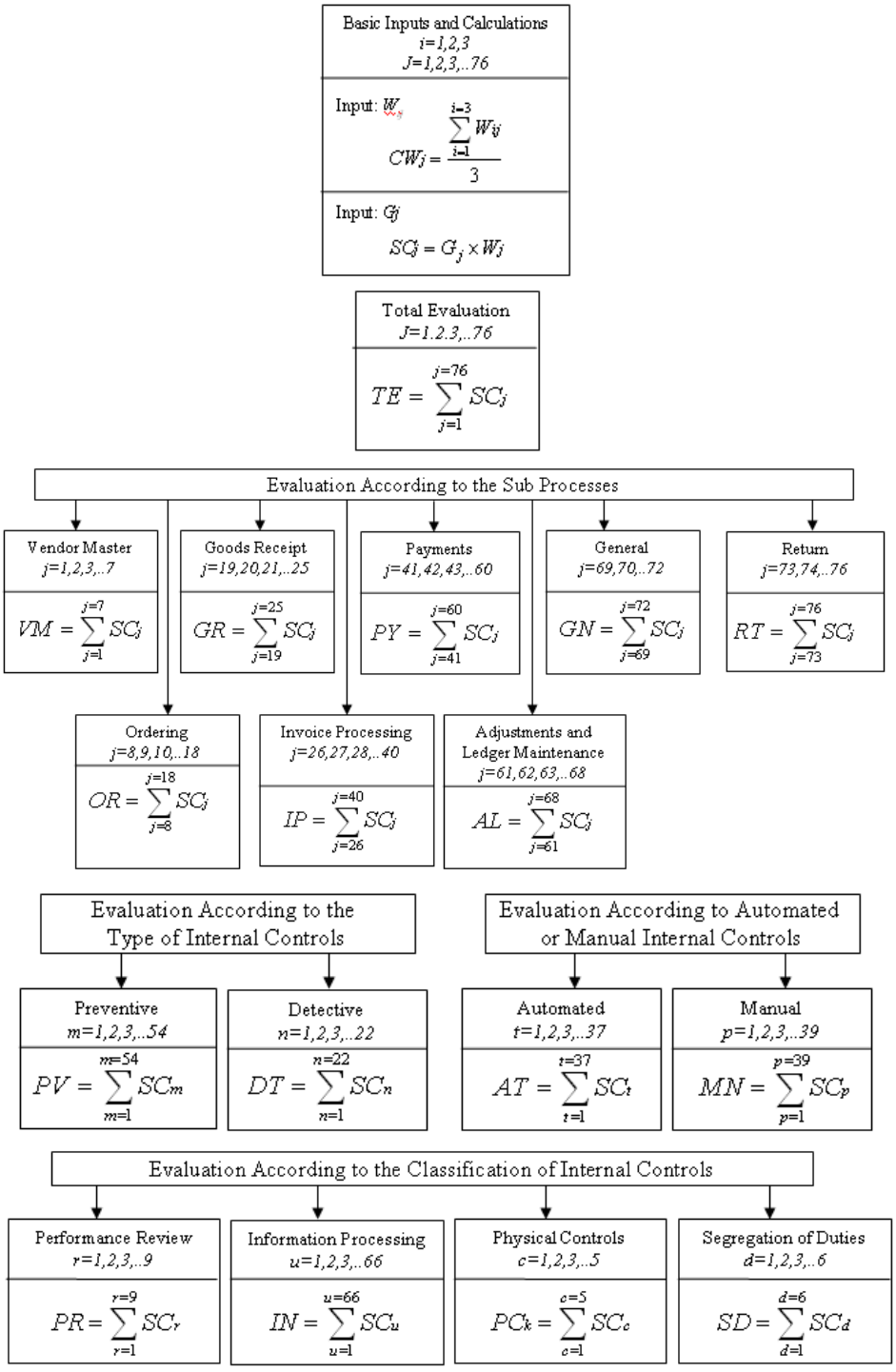

Fig. 19 Scoring of the Evaluation Framework

Table 5: Indexes Used for the Calculation in the Evaluation Framework

Index	Description
i; i=1,2,3	Interviewee index
j; j=1,2,..76	j= internal control number index j=1,2,3,..,7 vendor master internal control index j=8,9,10,..,18 ordering internal control index j=19,20,...,25 goods receipt internal control index j=26,27,...,40 invoice processing internal control index j=41,42,...,60 payment internal control index j=61,62,...,68 adjustments and ledger maintenance internal control index j=69,70,...,72 general internal control index j=73,74,...,76 return internal control index
m; m=1,2,..54	m= preventive internal control index after the internal controls are filtered for the preventive category
n; n=1,2,..22	n= detective internal control index after the internal controls are filtered for the detective category m+n=76
t; t=1,2,..37	t= automated internal control index after the internal controls are filtered for the automated category
p; p=1,2,..39	p= manual internal controls index after the internal controls are filtered for the category of manual t+p=76
r; r=1,2,..9	r= performance review internal control index after the internal controls are filtered for the performance review category
u; u=1,2,..66	u= information processing internal control index after the internal controls are filtered for the information processing category
c; c=1,2,..5	c= physical control index after the internal controls are filtered for the physical control category
d; d=1,2,..6	d= segregation of duties internal controls index after the internal controls are filtered for the segregation of duties category r+u+c+d > 76 (some of the internal controls are categorized in more than one category)

Table 6: Variables Used for the Calculation in the Evaluation Framework

Variable	Description
W_{ij}; $i=1,2,3$ $j=1,2,..76$	Weight of interviewee i for the internal control j
CW_j; $j=1,2,..76$	Average of internal control weights for the internal control j
G_j; $j=1,2,..76$	Grade of the internal control j
SC_j; $j=1,2,..76$	Score of each individual internal control activity j
SC_m; $m=1,2,..54$	Score of each individual preventive internal control activity m
SC_n; $n=1,2,..22$	Score of each individual detective internal control activity n
SC_t; $t=1,2,..37$	Score of each individual automated internal control activity t
SC_p; $p=1,2,..39$	Score of each individual manual internal control activity p
SC_r; $r=1,2,..9$	Score of each individual performance review internal control activity r
SC_u; $u=1,2,..66$	Score of each individual information processing internal control activity u
SC_c; $c=1,2,..5$	Score of each individual physical control activity c
SC_d; $d=1,2,..6$	Score of each individual segregation of duties internal control activity d

CHAPTER 5

EVALUATION AND RESULTS

The Profiles and the Purchasing Processes of the Companies

For the evaluation of the internal control structures of the companies, three companies have been selected. Two of the companies (Company A and Company B) are using SAP and the other company (Company C) is using Microsoft Dynamics AX as their ERP package. Below sub-sections briefly explain the companies that are evaluated.

Company A

Company A is an automotive spare part company that uses SAP system for the purchasing activities. The purchasing process is run through two different modules; material management (MM) and financial accounting (FI). The main purchasing sub-processes of Company A are as below:

- Vendor Master: The contracts are signed with the vendors by the purchasing department including the terms of conditions. After the contracts are prepared, the vendors are created centrally via transaction

code XK01. As stated by the Purchasing Specialist, the purchasing department and accounting department creates their own views. The vendor number is given automatically by the SAP system. Additionally, the system checks for duplicate names when creating the vendor. The company has configured different account types for grouping the vendors and according to the account groups, the mandatory fields, optional fields, number range are defined.

- Ordering: Before the purchase orders are created, the purchase requisition is created and the requisition is subject to an approval strategy. For all types of orders, the purchase requisition is created. The purchase orders which are proposed by the production planning are also created manually by the purchasing department. According to the approval strategy, when a department creates a purchase requisition, first of all, the department manager approves, then the Assistant General Manager approves and final approval is given by the General Manager. After the purchase requisition is completed, the purchase orders are created with reference to the purchase requisition. The purchase orders have an approval strategy as well. The purchase orders for raw material, assembly, packaging and direct materials are approved and released by the Purchasing Manager. For the other purchase orders (for WIP (Work in process) materials, service orders, indirect materials, etc), general manager is the final approver. When creating the purchase requisition, the material price is taken

automatically from the purchase info record documents. However, the price is editable by the person who creates the requisition. The Company does not review the purchase orders that the prices are overwritten. On the other hand, all of the purchase orders are subject to release strategy.

- Goods Receipt: The goods are received in the company's premises and the goods are checked as if the Goods Dispatch Note (GDN) matches with the physical goods. The warehouse personnel approve the GDN in order to verify the received goods against the GDN. After that, the GDN is entered to the system by a different warehouse responsible.
- Invoice Processing: After the invoices are received, the Finance Specialist enters the name of the vendor and the goods receipt entries are listed on the screen. When the Finance Specialist enters the total invoice amount, the system shows if the balance is consistent with the goods receipt total (goods receipt total = the goods receipt quantities * purchase order unit prices). If there is any difference, the invoice can not be posted. In this case, the Finance Specialist checks each item and changes the price of the item on the invoice entry. The system accepts price changes on the invoice level and accepts the price variance up to 5%. The invoices that are related to the goods that are not inventoried are entered through FI module. These invoices are mostly related to business trip, insurance, hotel, accommodation, cleaning, dinner, logistics, carrier, electricity, water, heating, telephone and security.

These are entered to the system via FI module. Before the invoices are entered to the system, the General Manager or the Assistant General Manager reviews the invoice and signs with his initials.

- Payments: The payments are done via bank orders. Every Monday, the payment list is taken from the system. The blocked invoices can not be released during payment order and only the list of the due invoices is extracted. The payment list is sent to the Assistant General Manager for approval. After the Assistant General Manager checks the preliminary list, the bank order is prepared and the bank order is signed by the Assistant General Manager and General Manager. The bank order is sent to the bank both by fax and e-mail.
- Adjustments and Ledger Maintenance: For all invoices, the journal vouchers are extracted from the system and approved manually by the Assistant General Manager and / or General Manager. At the end of each month, GR/IR accounts are reviewed. At the end of the period, the trial balance is extracted from the system and the accounts are checked one by one. Additionally, the reconciliations are performed periodically with the vendors.
- Return: The returns are performed with the notification of the quality control department.

Company B

Company B is a plastic company that uses SAP for its business operations. The sub-processes of the purchasing process are as follows:

- Vendor master: vendor master data is created by the purchasing and accounting departments. The departments enter the relevant information for the vendor. Purchasing department enters the purchasing related information such as name, address, contact person, order currency, etc. Accounting department enters the accounting related data such as reconciliation account, payment details, due date, etc. The change requests for the vendors are transferred formally and the changes on the master data are reviewed continuously.
- Ordering: The ordering starts with the purchase requisition functionality on SAP. The purchase requisition is approved by the purchasing department if the goods are below the adequate levels in the warehouse. If the goods are purchased for the cost centers, the purchase requisition is approved by the related department. Afterwards, the purchase order is created with reference to the purchase requisition. The purchase order contains the necessary information about the material, quantity, unit price, related vendor, related warehouse, etc. The open purchase orders are reviewed continuously in order to check as if there is any purchase order that is not received yet.

- Goods receipt: Goods receipt is performed by the warehouse personnel based on the received quantities. The stock entry is done on the SAP system when the goods are entered to the SAP system. The receiving documents are signed off by the warehouse responsible when the goods are physically checked. Then the GDNs are matched with the purchase order. There is a tolerance limit between the goods entry amount and the purchase order amount. If the tolerance is exceeded, the goods receipt is not accepted by the SAP system.
- Invoice Processing: The system performs a three way match between purchase order, goods receipt and invoice amounts. The invoice entry is done by the accounting department. The tolerance limits used to check on the three way match process are set according to the policies and standards. If the invoice amount is higher or lower than the systematically designed tolerance control, the SAP system blocks the invoice for payment. On the other hand, if the purchase is a service purchase, the invoice is approved by the related department manager. When the goods receipt and the invoice receipt activities are done on the system, these amounts are recorded to a reconciliation account which is used to identify if there is any difference between goods receipt and invoice receipt. This account is usually checked at the end of each month.
- Payments: Payment data is generated based on the invoices and the due dates of the vendors. First of all, the planned payment list is

extracted from the SAP system and this payment list is checked by the Finance Manager. If the payment list is approved, then the actual payment list is extracted from the system as a text file. The text file is sent to the bank. After that the payment order is printed and approved based on the limits of the top management.

- Adjustments & Ledger Maintenance: At the end of each month, the subledgers are checked with the general ledger and valuations are controlled. The aging reports are prepared and vendor reconciliations are prepared bi-annually.
- Return: The purchasing department approves the return and based on the approval, the accounting department issues the return invoice to the vendor.

Company C

Company C is a retail company which has more than 10 markets in Turkey. The Company uses Microsoft Dynamics AX for its business operations. The sub-processes of the purchasing process are as follows:

- Vendor Master: The company has formal agreements with its vendors, which are being determined by product director and category managers. These agreements are signed with the suppliers and consist of several premium types such as: on the shelf placement premiums, endorsement premiums and stock saving conditions. Payment due

dates of purchased goods are being determined on agreements and are entered to system by the operation chief. The company does not review the changes on the vendor master data on a periodic basis since the system does not allow extracting the changes on the vendor master data fields.

- Ordering: The process starts with creating the purchase order since the system does not have purchase requisition ability. When purchase orders are being prepared, due dates appear on screen by default. But these fields can be modified by the person who creates the purchase order. All the purchasing department personnel have access to create purchase order and there is no limit assigned to the personnel. There is an option on the system for sending purchase orders to the vendors as a MS Excel 2003 format. In addition, purchase order status is being notified to the vendors every week. Administrative purchases for stores are conducted either by competitive bidding or applying market research. For several purchases, suppliers make their offers and best offer is being accepted by approval of three authorities; General Manager, Accounting Manager and Administrative Department Manager.
- Goods Receipt: Goods received from vendors are being accepted by warehouse responsible if information of goods written on GDN can be traced and matched with one of relevant purchase orders opened by purchase department personnel on system. Following this, warehouse

responsible counts received goods physically in order to ensure accurateness of quantities written on GDN. After this process completed, goods are being placed inside of warehouse and put into their shelves after their barcodes are controlled. Following this, warehouse responsible makes actual stock entrance (do not have any financial impact) of goods receipt via using "madde varışı [receive of materials]" tool on Microsoft Dynamics AX. Via using this tool goods are being recorded to actual stock module on the system. Stock entrance to actual stock module can not be executed without all required data entered into system. Received goods are being booked to stock account on general ledger by accounting department with receipt of relevant invoice. Goods are being booked to general ledger concerning their invoice dates rather than their physical receipt day.

- Invoice Processing: Invoices of goods received are being sent to accounting department. If the invoice price is not the same as the purchase order price, the invoice is sent to purchasing department for verification. According to the business case, the price is either approved by the purchasing department and the purchase order price is updated on the system or a difference invoice is issued to the vendor. Following this, accounting clerk makes three way match between GDN, invoice and purchase order opened on system in order to ensure accuracy and completeness of data to be entered into system. Then the relevant invoice is being posted to general ledger via entering invoice

data into system manually via considering relevant purchase order and goods received. Accounting Clerk enters date, invoice number and quantity into system. Moreover, system prevents duplicate recording of invoices via notifying user about details of primary recordings.

- Payment: The payments are being processed two times each month. At least 5 days before payment dates, a special report, formed on SQL and integrated with Microsoft Dynamics AX, is being executed for listing matured payments. The payments are matured according to the due dates of the vendors recorded on the system. This list is being exported to a MS Excel 2003 format and sent to purchasing department for payable amount controlling. Following this, purchase department controls payment amounts and records accurate amounts to be paid on particular MS Excel sheet. After this process is completed, particular MS Excel 2003 sheet with corrections is being sent back to finance clerk. Afterwards, one of the clerks in finance department receives the payment order and enters to the Bank's system after the order is approved by Chief Finance Officer (CFO).
- Adjustments and Ledger Maintenance: After the payments, the finance clerk makes relevant bank account posting to general ledger manually. At the end of every month, accounting manager compares bank account balances on general ledger with month end balances on relevant bank statements. Additionally, vendor reconciliations are performed quarterly with the vendors.

- Return: Returns are done by the stores and headquarter of the company. The stores return the goods to the main warehouse via inventory movements. The headquarter can decide to fix the goods or return to the vendor of the goods. If the headquarter decides to return these goods to the vendor, a return invoice is issued and the goods are sent to the vendors.

The Evaluation of the Companies Based on the Evaluation Results

Internal controls evaluations of the companies are performed as described in Phase 3 of the methodology. The meetings for the assessments of the companies' are organized on the following dates:

- Company A: June 2009
- Company B: July 2009
- Company C: August 2009

Relevant personnel who are interested in purchasing process, internal controls and related responsibles for those controls from these selected companies have attended to the meetings. First of all, these personnel have been informed about CMM and asked to grade their internal control activities that are included in the evaluation framework. Some of the internal controls have been decided as not applicable to the companies. These internal controls have been assessed as not applicable in two situations;

- The internal control activity was not relevant to the company as a result of business structures of the company.
- The ERP system of the company could not provide that functionality in the current situation.

Not applicable internal controls are not included in the total score but the total score that could be achieved if those internal controls were applicable and graded with 5 points are shown in the figures as plotted areas.

After grading of the companies, the scoring and the evaluation sections of the companies are processed. For the scoring of the internal controls of the companies, the scoring model described in the methodology is used. The evaluation research of the companies based on the developed framework is given in Appendix B.

The comparison of the companies is done for the following categories by adding up the relevant scores according to the evaluation criteria:

- Total evaluation results
- Evaluation results according to the sub-processes
    - Vendor master
    - Ordering
    - Goods receipt
    - Invoice processing
    - Payments
    - Adjustments and ledger maintenance
    - General

- Return

- Evaluation results according to the types of internal controls
  - Preventive
  - Detective
- Evaluation results according to the classification of internal controls
  - Performance review
  - Information processing
  - Physical control
  - Segregation of duties
- Evaluation results according to automated or manual internal controls
  - Automated
  - Manual

Total Evaluation Results

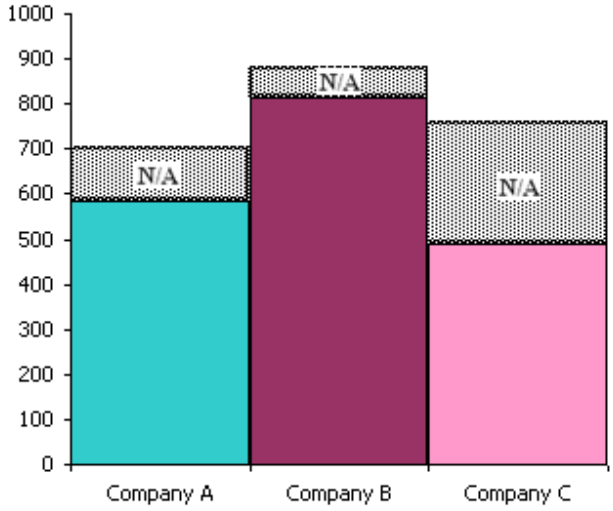

Fig. 20 Total

Total evaluation is the evaluation of all internal control activities in the framework. The internal controls evaluation framework includes 76 proposed internal controls. The total of the companies (TE_k) are compared in this section. The results are illustrated in Figure 20. According to the results; Company B has the highest score for the internal controls evaluation. Company B has got 813.6 points. The second company is Company A and has received 583.4. Company C has the lowest score for the total evaluation of internal controls and has got 489.7 points. The upper grey part indicates the points that the companies may have received if they have got the maximum points (5 points) for all their not applicable internal controls. The companies that use SAP has the highest scores but there is a considerable difference between these companies as well. On the other hand, Company C has received 489.7 which is very low when compared to Company B. The difference between Company A and Company C is not very high even though the companies use different ERP systems. Even if Company C had received the highest points for its not applicable internal controls, the company would have 757.2 points and Company C would still not be the first company among these three companies. As a result, the SAP system provides better internal controls when compared to Microsoft Dynamics AX. Many internal controls are not applicable to Microsoft Dynamics AX. On the other hand, considering the fact that the results of Company A and Company C are similar to each other, the companies can manage their internal controls in terms of ERP risks by setting more applicable internal controls which are mostly detective internal controls.

Evaluation Results according to the Sub-Processes

Vendor Master

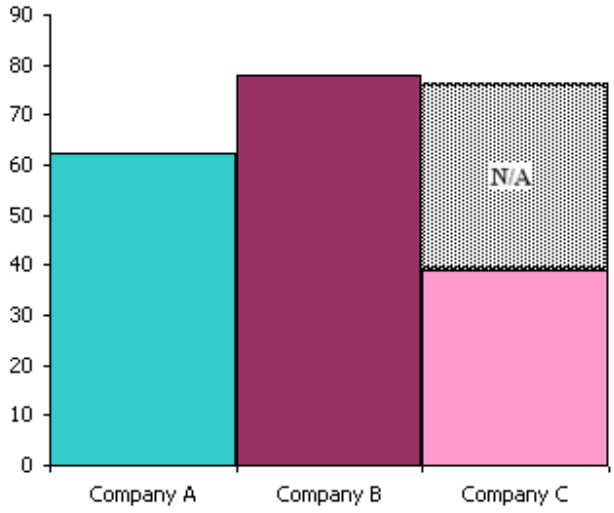

Fig. 21 Vendor master

There are 7 internal controls under the vendor master sub-process of purchasing process. The internal controls in vendor master sub process include the internal controls over the creation and the changes of the vendor master data in the ERP system. According to Figure 21, Company B has the highest score in this sub process and received 78 points. Company A has the second highest points and received 62.2 points. Company C has the lowest points and received 38.8 points. The internal controls in vendor master sub process are applicable to Company A and Company B. Two of the internal controls (control no: 3 and control no: 5) are not applicable to Company C. The companies that use SAP system as their ERP packages have stronger internal control structure in vendor master sub process. The vendor master score of Company C is less than the half of the Company B's score. If these

not applicable internal controls had been applicable to Company C and Company C had received highest points for these internal controls, its score would not have exceeded the score of Company A and would have been very similar to Company B. According to the results, the internal controls in vendor master sub-process are more effective in SAP system. Furthermore, Company C has not paid adequate attention to its internal controls over vendor master sub-process and has not implemented adequate internal controls such as the qualification of the vendors (control no: 7) and the authorization of vendor master changes (control no: 2) although these internal controls are applicable to its ERP system and business structure.

Ordering

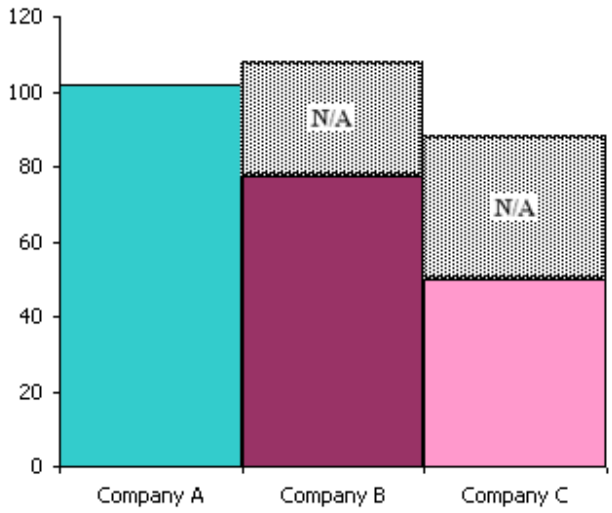

Fig. 22 Ordering

The ordering sub-process includes 11 internal controls. These internal controls include the internal controls over purchase requisitions, purchase orders and contracts with vendors. According to Figure 22, Company A has received 101.6, Company B has received 77.3 and Company C has received 49.8 points. Company A and Company B have the highest scores but the ranking of the companies is different than the ranking of the vendor master sub process. For the ordering sup process internal controls, Company A has a higher score when compared to Company B. The most important reason is that, Company B is a plastic company and the suppliers are always the same. As a result, Company B does not review the contracts and rebate agreements. Additionally, Company B does not focus on the purchase order approval hierarchies due to the fact that the purchases are standard and not subject to frequent amendments. Company C has not developed stronger internal controls over ordering sub process. The Company does not have any internal controls over the purchase order reviews and approval hierarchies. As a result of their selected ERP system, Company C is not able to implement any further internal controls for the automated purchase order approvals and vendor lead time analysis and customer forecasts. There are 2 not applicable internal controls for both Company B and Company C. If these companies had received the highest points for these internal controls, the ranking could have changed and Company B could have the highest score.

Goods Receipt

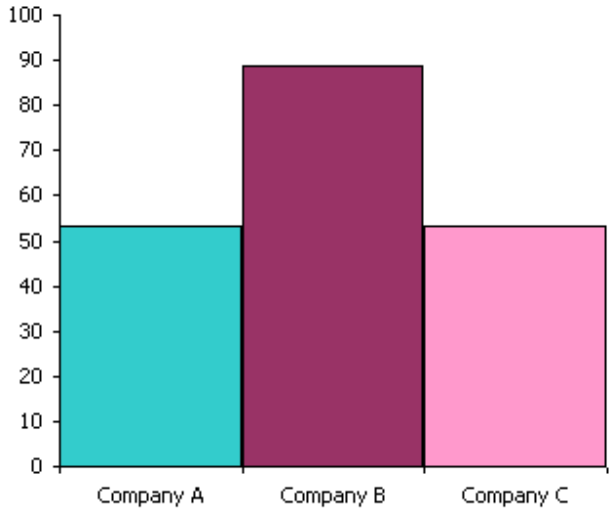

Fig. 23 Goods Receipt

The goods receipt sub process has got 7 internal controls. This part includes the internal controls over the received goods including the physical checks of the received goods, entering of the quantities of the goods into the ERP system, physical security of the storage locations and review of outstanding purchase orders that are waiting for goods receipt etc. According to the Figure 23, Company B has the highest score which is 88.7 and Company A and Company C have received the same score which is 53.4. Every internal control activity of this sub process has been determined as applicable to these companies. Company B has significant high scores for the internal controls over long outstanding purchase order reviews, system tolerances between the goods receipt amount and purchase order amount. Company A and Company C mostly have the same internal control

competence for the goods receipt sub process although the two companies use different ERP systems. In the goods receipt process there are 3 internal controls which are evaluated exactly the same in these three companies. These internal controls are the safeguarding of the receiving documents, adequate storage of the goods in the storage location and approval of the incoming service purchases by the related departments. According to the results, despite the fact that the companies (Company A and Company B) use the same ERP system, the internal control structures can be very different from each other regarding to the internal control approach of the companies. Furthermore, if the ERP systems are competent enough to provide the adequate internal controls and the companies are willing to apply those internal controls in their internal control structures, the companies can receive the same scores (such as Company A and Company C).

Invoice Processing

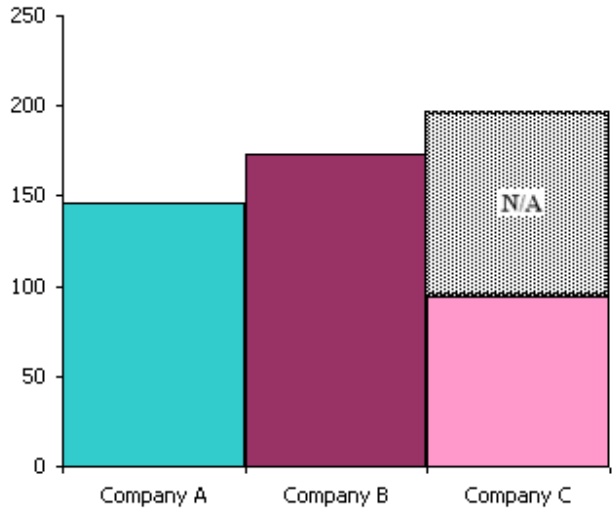

Fig. 24 Invoice Processing

Invoice processing sub process includes 15 internal controls. Invoice processing sub process includes internal controls over reviews of incoming invoices, recording of invoices into the ERP system, duplicate recording of the invoices, etc. According to Figure 24, Company B has the strongest internal controls in this sub process again. Company B has received 173.5 points. Company A has got 145.6 points. Company C has received only 94 points since some of the internal controls are not applicable because of their selected ERP systems. For the internal control "users cannot define an exchange rate when entering invoices or payments", Company C has not implemented an internal control. But for the internal controls over the reconciliation between goods receipt and invoice receipt and warning message in case the business area is not compatible are not applicable for Company C because of its ERP system. If the internal controls had been possible by Microsoft Dynamics AX and Company C had got the highest points for its not applicable internal controls, the ranking would have changed and even Company C could have the highest score. For the internal control of using the general ledger date for recording the invoices, all of the companies have received the same point. In addition to these, none of these three companies has implemented adequate internal controls for the risk of duplicate recording of invoices. Company A and Company B do not review the duplicate invoices report although it is provided by their ERP system. Company C does not review the report since its ERP system does not have this functionality.

Payments

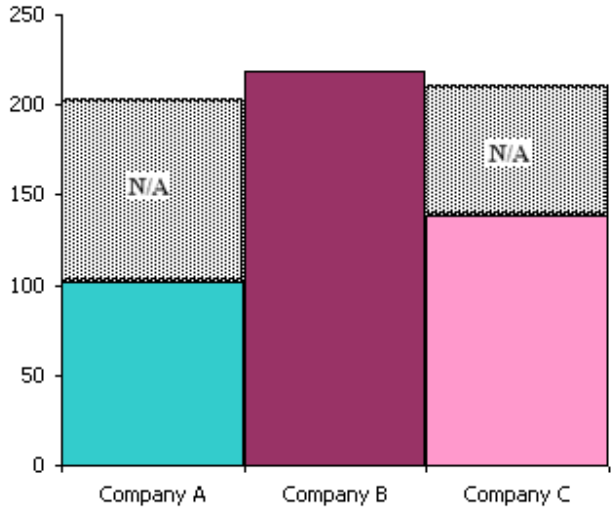

Fig. 25 Payments

Payments sub section has got the majority of internal controls in this framework. There are 20 internal controls in this sub process. This sub process includes the internal controls over cheques, duplicate processing of the payments, matching of the payments with the invoices, discounts, etc. According to Figure 25, Company B has the highest score which is 218.7, Company C has got 138.3 points and Company A has received 101.2 points. One of the payment internal controls “review of the exception list before the payment run”, has not been applicable to Company C but although it is applicable to the companies that have implemented SAP, Company A and Company B have not implemented this internal control. For the internal control of reviewing the significant discounts and prevention of the negative

payments, all of the companies have received the same points which are “1” and “4” respectively. In this sub process, Company B has the highest score. Different from the previous sub processes, Company C has received the second best score. The score of Company A is less than the half of Company B’s score. Main reason for this result is that; payment section includes 6 internal controls for the cheques but Company A does not use cheques and these internal controls are not applicable. If Company A and Company C have received the highest points for their not applicable internal controls, the scores of the companies would be very close to each other. Main reason for this result is that the companies pay more attention to their internal controls for their payment processes since this sub process manages the cash flow of the companies. As a result of this, the ERP systems have implemented these internal controls in their systems. Furthermore, the detective internal controls (review of payments, etc) in this sub process are more effective.

Adjustments and Ledger Maintenance

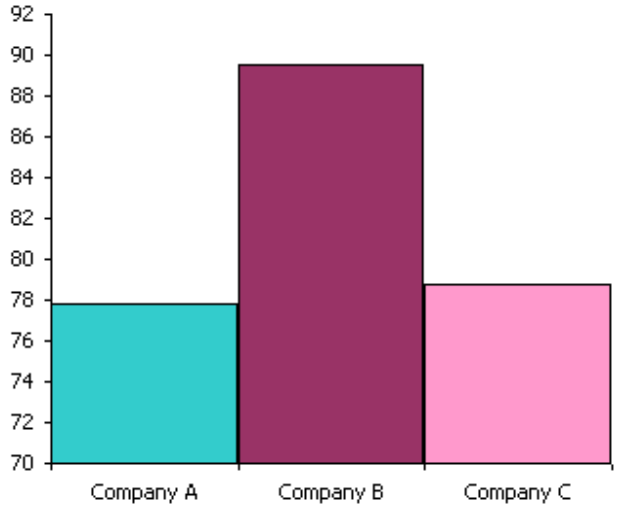

Fig. 26 Adjustments & ledger maintenance

Adjustments and ledger maintenance sub process includes 8 internal controls. These internal controls are mostly related with the accounting internal controls over the accounts that are affected after the transactions are completed for the purchasing process. Additionally, this section has got the internal controls for the month end procedures of the companies. According to Figure 26, the companies have received similar scores. Company B has got the best score which is 89.5 and Company C has received 78.8 points. Company A is the third Company in this evaluation and received 77.8 points. Different from the previous sub processes, the internal controls listed under this section are all manual controls and they are all applicable to these evaluated companies. Each of these companies has implemented strong or weak controls for each of the Adjustments and ledger maintenance internal controls. As a result of this, the evaluation results of the companies are very similar to each other.

General

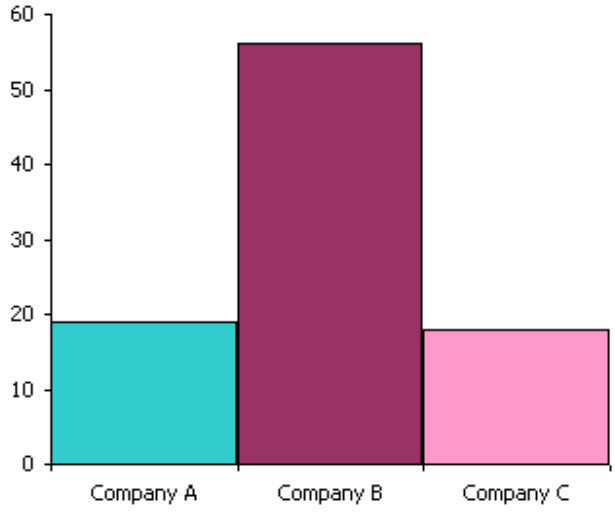

Fig. 27 General

This section includes the internal controls over the access rights and the procedures for the sub processes of the purchasing process. There are 4 internal controls in this section. Although there are only 4 internal controls, the average of the internal control weight is very high since the risks are very significant in these internal controls. All of the internal controls are applicable to these evaluated companies. According to Figure 27, Company B has received 56, Company A has received 19 and Company C has received 18 points. The results of this section indicate that Company B has focused on the access rights and segregation of duties more than the other companies. Company B has received 56 points and the total of Company A and Company C is even less than the score of Company B.

Return

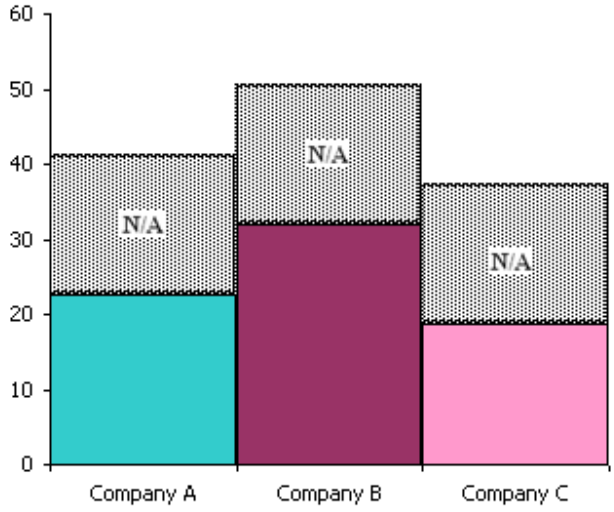

Fig. 28 Return

Return sub process includes 4 internal controls which have the objective of sustaining the return process valid and accurate. The return process internal controls are all classified as information processing internal controls. There are 2 automated and 2 manual internal controls in this sub process. According to Figure 28, Company B has received the highest score which is 31.9. Company A has received 22.6 and Company C has received 18.6 points which is very similar to the score of Company A. One of the internal controls about negative goods receipt notes was not applicable to any of these companies and the plotted area indicates the new version of the graphic as if the companies have received any points for the not applicable question. According to the results, the differences between these companies are resulted from the last question which is the verification of the goods receipt process before the reversal entries. Mostly, the manual internal controls are applicable to most of the ERP systems and implemented by the companies if they are interested in the effectiveness of their internal controls. However, the automated internal controls are more dependent on the companies rather than the ERP systems. In this return sub process, the difference has been resulted from an automated internal control.

Evaluation Results According to the Types of Internal Controls

Preventive

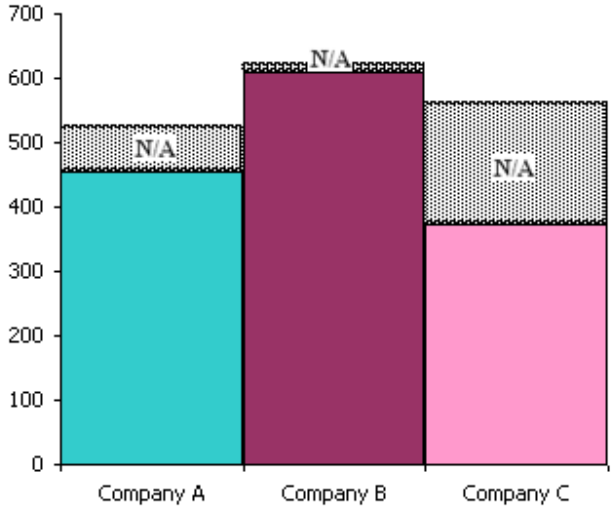

Fig. 29 Preventive

Preventive internal controls include the internal controls that are designed to avoid any errors or bad results that a company can face before those errors occur. 54 out of 76 internal controls in this framework are defined as preventive internal controls. Every sub process of the purchasing process includes at least one preventive internal control. According to Figure 29, Company B has the highest score which is 608.6. Company A is the second and has got 453.3 points. Company C has received only 371.8 points. This is mostly resulted from the fact that 10 out of 54 preventive internal controls are not applicable to Company C since the ERP program does not have those functionalities including alternative payee settings, purchase order approval

hierarchies, vendor evaluations, duplicate invoice checks, payment exception reports, etc. On the other hand, there are 4 internal controls for Company A and 2 internal controls for Company B which are not applicable due to their business structure. If those internal controls had been applicable to Company C, the ranking of Company B would have been the same but the ranking of Company A and Company C would have been different. Due to the fact that the not applicable internal controls for Company B and Company A result from their business structures, these companies could not have received any more points.

Detective

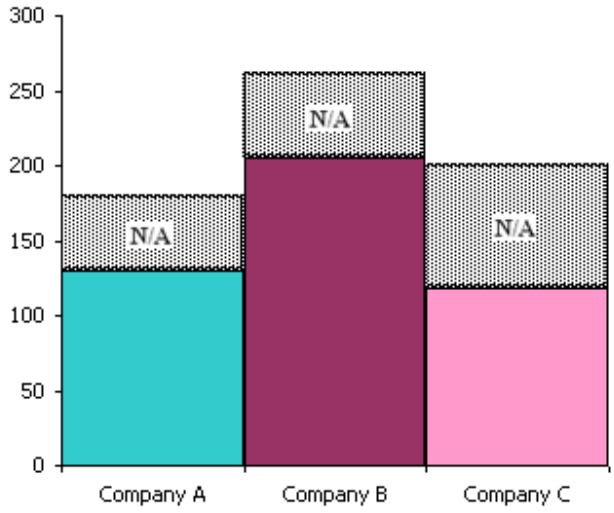

Fig. 30 Detective

Detective internal controls include the internal controls that are implemented to find the errors in the internal control structures. 22 out of 76

internal controls in the framework are categorized as detective internal controls. According to Figure 30, Company B has the highest score for the detective internal controls as well. Company B has received 205 points despite the fact that 4 out of 22 internal control descriptions are not applicable to Company B. Another 4 internal controls are not applicable to Company C but the Company has received only 117.9 points. Company A is the second and received 130.1 points and has got only 3 not applicable internal controls. Company C could have been the second company if it had received the highest points for its not applicable questions but those internal controls can not be applied to their ERP systems.

When compared to the preventive internal controls which are mostly automated internal controls and not subject to manual interpretations, the detective internal controls are mostly manual internal controls. The average of the companies ($APV = \frac{\sum_{m=1}^{m=54} SC_m}{54}$, $ADTk = \frac{\sum_{n=1}^{n=22} SC_n}{22}$) are calculated and compared to each other. The detective internal controls have a lower internal control evaluation average per internal control. The averages of the evaluation per internal control are given in Table 7.

Table 7: Average of the Preventive and Detective Internal Controls

	Company A	Company B	Company C
APVk	8.39	11.27	6.89
ADTk	5.91	9.32	5.36

According to Table 7, Company C has the lowest difference between internal control averages of preventive and detective internal controls. Company B has the second lowest difference. Company A has the highest difference (2.48). According to these results, Company C has paid similar attention to both its preventive and detective internal controls but as it is described under total evaluation section, Company C has received the lowest total score. Considering this fact, Company C should focus on its both preventive and detective internal controls. Company B has got the best averages for its preventive and detective internal controls. It is resulted from the stronger internal control structure of this company.

Evaluation Results According to the Classification of Internal Controls

Performance Review

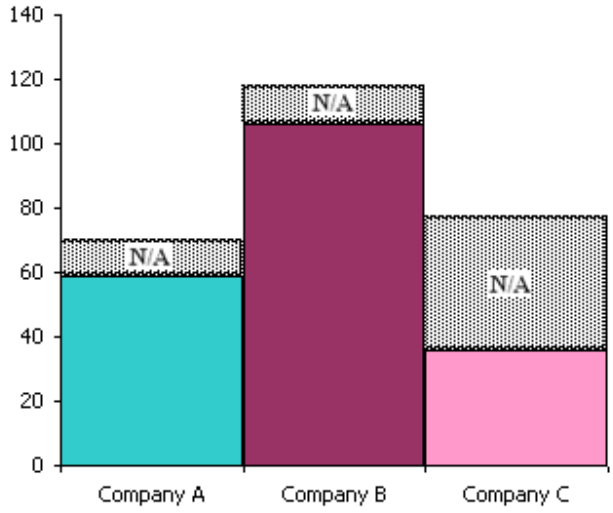

Fig. 31 Performance review

9 out of the 76 internal controls are classified as performance review internal controls. These internal controls are all categorized as manual internal controls and include the internal controls such as procedures, reviews over long outstanding orders, vendor capabilities, cheques that have significant amounts, month end closing activities, etc. According to Figure 31, Company B has received 106 points, Company A has the second highest score and received 58.5 points and Company C has the lowest score within these three companies and received 35.5 points. There is only one internal control that is not applicable to both Company A and Company B because of their business structures. On the other hand, there are 2 internal controls that are not applicable to Company C and one of them results from its business structure, and the other results from its ERP system. If Company C has received the highest score in both of its not applicable questions, the ranking of the companies would be different. Internal controls that are classified as performance review are all manual internal controls and can be applied to most of the ERP systems. Furthermore, these internal controls are generic controls that satisfy the efficiency of the overall process. As a result of this, the company (Company B) that pays more attention to its internal control structure can be easily identified in this category. Furthermore, some of the companies (Company A and Company C) do not emphasize on the internal controls that the ERP systems can provide for them.

Information Processing

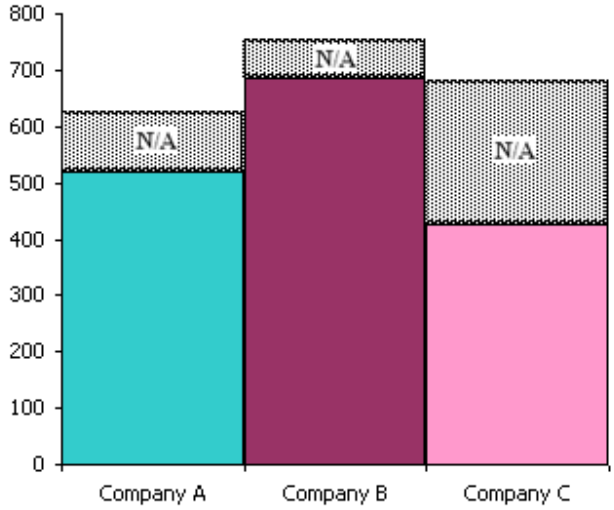

Fig. 32 Information processing

Most of the questions in the framework are classified as information processing internal controls. There are 66 internal controls in this section. These internal controls include the system generated reports and automated internal controls embedded in the ERP systems. 35 out of these 66 internal controls are automated internal controls and the rest of the internal controls are manual internal controls. According to Figure 32, Company B has got the highest score which is 685.7. Company A is the second and got 518.8 points. Company C has received only 427.7 points. As it is the same as many other sections (such as automated, manual sections), the main reason of the lowest score of Company C is the not applicable internal controls due to its ERP system. However, even if Company C or Company B has received the highest points for their not applicable questions, they would not have received the

highest score in this subsection. Because the internal control structure of Company B is much stronger than the other evaluated companies.

Physical Controls

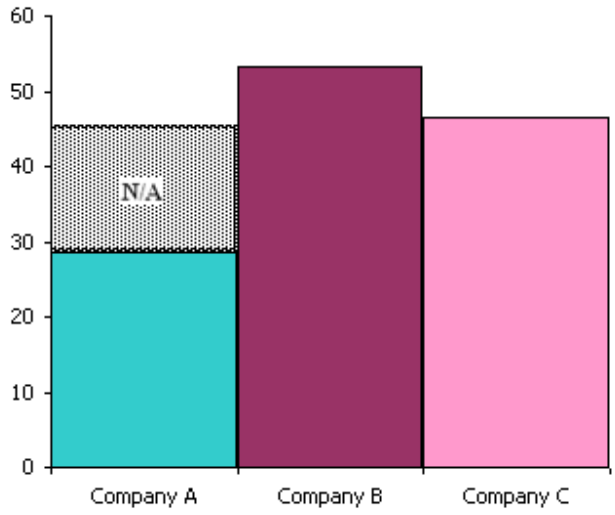

Fig. 33 Physical controls

There are 5 internal controls that are classified as physical controls. All of the physical controls are manual internal controls including the security of the documents and received goods. Physical controls exist in the goods receipt, payments and adjustments and ledger maintenance sub processes. According to Figure 33, Company B has the highest score which is 53.2 like in the previous sections but the second highest score belongs to Company C and Company C has received 46.5 points. Company A has received the lowest score which is 28.6. There is only one not applicable internal control for Company A as a result of its business structure and payment methods. If

Company B has received the highest score for this internal control, its score would be very similar to Company C.

Segregation of Duties

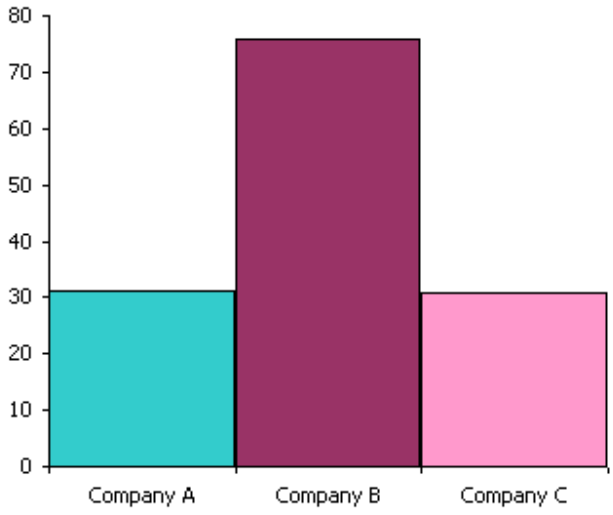

Fig. 34 Segregation of duties

There are 6 internal controls classified as segregation of duties. This section includes the automated internal controls for the conflicting access rights, the manual internal controls that are the reviews of the access rights and the procedures that identify the segregation of duties internal controls. According to Figure 34, Company B's score is higher than the sum of the scores of Company A and Company C. Company B has received 75.9 points. Company A has received only 0.4 points more than Company C. Company A has got 31.3 points and Company C has got 30.9 points. All of these internal controls are applicable to these three evaluated companies. Even though Company A and Company B use the same ERP system, they have a considerable difference in their scores. Furthermore, despite the fact that

Company A and Company C use different ERP system, their scores are very similar for the segregation of duties internal controls. Main reason is that the access controls are sustained by all ERP systems even though they can have weak or strong characters. The companies (Company A and Company C) could have received higher grades even if they had paid more attention to their access controls.

Evaluation Results According to Automated or Manual Internal Controls

Automated (A)

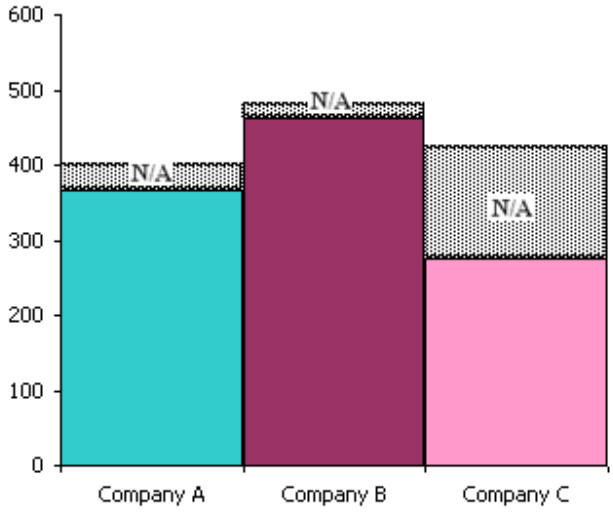

Fig. 35 Automated

The internal controls evaluation framework for the purchasing process includes 37 automated internal controls which are generated as a result of the ERP systems' functionalities. According to Figure 35, Company B has received 461.7 points, Company A has received 365.8 points and Company C has received only 275.1 points. 8 out of these 37 automated internal controls

are not applicable to Company C because its ERP system does not provide these internal controls (such as alternative payees, purchase order approval strategies, duplicate invoice checks, etc). The internal controls that are not applicable to Company A and Company B are 2 and 1 respectively and these internal controls are not applicable due to their business structures. One of the automated internal controls that is not applicable to Company A is about the cheques which are not used due to the payment procedures of the Company. The automated internal control that is not applicable to Company B is about the return GDNs and this internal control is not applicable in these evaluated three companies. If the ERP system of Company C had been more competent, the ranking of the companies could have been different than its current status.

Manual (M)

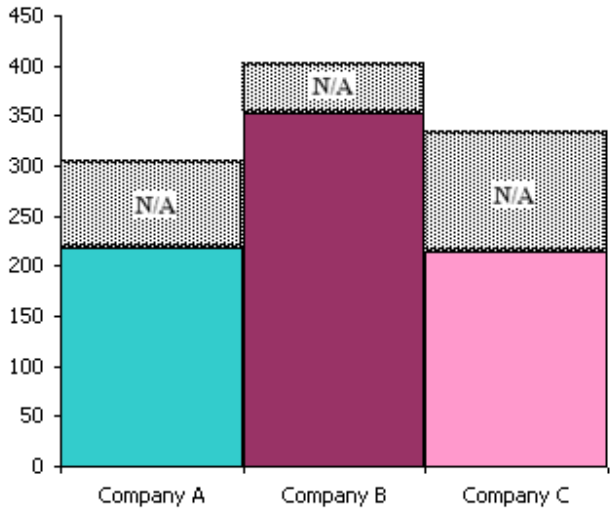

Fig. 36 Manual

The number of the manual internal controls in the framework is 39. According to Figure 36, Company B has the highest. Company B has received 351.9 points. Company A has the second highest score but the results of Company A and Company C are very similar to each other. Company A has got 217.6 and Company C has received 214.6 points. There are 6 manual internal controls which are not applicable to Company C, there are 5 manual internal controls which are not applicable to Company A and there are 3 manual internal controls which are not applicable to Company B. Most of the not applicable internal controls of Company A results from payment sub process because the company does not have cheque payment process. The not applicable internal controls of Company B result from the business structure of the company as well. On the other side, the ERP system of Company C does not provide some kind of reports (such as modifications on the vendor master data, duplicate invoices, exception reports for invoices, etc) and most of the not applicable internal controls result from these deficiencies.

The average ($AAT = \frac{\sum_{t=1}^{t=37} SC_t}{37}$, $AMN = \frac{\sum_{p=1}^{p=39} SC_p}{39}$) of the companies are calculated and compared to each other. The manual internal controls have a lower internal control evaluation average per internal control. The averages of the evaluation per internal control are given in Table 8.

Table 8: Average of the Automated and Manual Internal Controls

	Company A	Company B	Company C
Automated	9.89	12.48	7.44
Manual	5.58	9.02	5.50

According to Table 8, Company C has the lowest difference between internal control averages of automated and manual internal controls. Company B has the second lowest difference. Company A has the highest difference (4.31). According to these results, the average of automated internal controls is higher than the manual internal controls in all these three companies. Company C has the lowest averages due to the fact that the company has received the lowest total score. Company B has got the best averages for its automated and manual internal controls. It is resulted from the stronger internal control structure of this company.

CHAPTER 6

CONCLUSION

Most of the companies including the mid-sized or big-sized and multinational or local companies have many weaknesses in their internal control structures. Even though these companies have implemented ERP systems, many of them do not emphasize on the internal controls that the ERP systems can provide for them.

There are various approaches used for the internal control assessment of the companies in different organizations and internal audit companies. In this thesis, different approaches for the assessment of a selected business process (purchasing process) are taken into account and a comprehensive framework is developed. The framework is validated and the internal controls are rated by the interviewees who are the internal auditors and ERP experts.

Afterwards; using the framework, three companies have been evaluated according to CMM in terms of internal control risks of their ERP systems which is explained in the methodology. Two of the companies (Company A and Company B) have implemented SAP and the other Company (Company C) has implemented Microsoft Dynamics AX as their

ERP systems. The summary of the evaluation of the companies is illustrated in Table 9.

Table 9: Summary of the Evaluation of the Companies

	Evaluation category	Total number of the internal controls	Highest score	Company A	Company B	Company C
	Total	76	1334	583.4	813.6	489.7
Sub processes	Vendor Master	7	135	62.2	78	38.8
	Ordering	11	186.5	101.6	77.3	49.8
	Goods Receipt	7	119	53.4	88.7	53.4
	Invoice Processing	15	272.5	145.6	173.5	94
	Payments	20	332.5	101.2	218.7	138.3
	Adjustments & Ledger Maintenance	8	148.5	77.8	89.5	78.8
	General	4	75	19	56	18
	Return	4	65	22.6	31.9	18.6
Types of Internal Controls	Preventive	54	958.5	453.3	608.6	371.8
	Detective	22	375.5	130.1	205	117.9
Automated or Manual	Automated	37	686.5	365.8	461.7	275.1
	Manual	39	647.5	217.6	351.9	214.6
Classification of Internal Controls	Performance Review	9	156	58.5	106	35.5
	Information Processing	66	1167.5	518.8	685.7	427.7
	Physical Controls	5	66.5	28.6	53.2	46.5
	Segregation of Duties	6	101.5	31.3	75.9	30.9

The framework has consisted of 76 internal controls. According to the internal control weights which are calculated as the average of the interviewees' responses, the total of the internal control score is 1334 if all

internal controls have been graded with 5 points. Company B has received the highest score which is only 813.6. According to this result, even the best companies have many internal control risks in their ERP systems.

According to the Table 9, despite the fact that both Company A and Company B have implemented SAP, they have considerable differences in the internal control assessment of their purchasing processes. Company B has received the highest score in almost every section. This can be the result of the management's overview of the internal controls and the familiarity to the ERP system. Company B has implemented SAP in 2000 but Company A has implemented SAP in 2008. As the familiarity increases, the companies feel more confident to enhance their ERP systems in terms of the internal control risks. Furthermore, it can be stated that most of the internal control weaknesses result from the human factor.

Company A has received the second highest score in most of the sections. However, in some of the sections Company C has been the second Company out of these three companies. The difference between Company C and Company A is the highest at the "physical controls" section. The scores of Company C and Company A are more or less the same for the "manual" section. According to the result, even though the ERP system is not competent enough for some of the internal controls, the companies can develop manual internal controls in order to mitigate their internal control risks. It can be concluded that if better internal controls are applied, the risks are going to be reduced and the impact is going to be decreased.

Furthermore, the companies that are evaluated in this study have not received any 5 point grade which is described as “optimizing” in the methodology. The reason is that, the selected companies are not focused on the continuous improvement of their purchasing process and the relevant internal controls. As it can be seen from Table 10, the companies have graded their internal controls mostly 3 (defined) or 4 (managed). Company B has more internal controls that are graded as 4 which means that the key performance indicators are set for these internal controls. On the other hand, Company A and Company C have only defined most of their internal controls in their procedures but any key performance indicators or risk levels are not set. As a result of this, Company B has a better internal control structure when compared to Company A and Company C.

Table 10: Distribution of the Grades of the Companies

	0	1	2	3	4	5	N/A
Company A	9	10	10	29	11	0	7
Company B	3	6	6	18	39	0	4
Company C	8	10	14	19	11	0	14

The internal auditors and the management of the companies can use this study to evaluate the ERP system of the company in terms of internal control risks of the purchasing process. The CMM, combined with the scoring technique has provided an effective and efficient strategy for the evaluation of the internal controls in the purchasing process. By the help of this developed

framework, CMM and scoring technique, the companies should do their best to avoid below risks:

- Creation or deletion of vendor master files without authorization or detection.
- Duplication or missing purchase resulting in duplicate orders, missing orders or invalid transactions occurring.
- Fictitious invoices, payments and related supporting material.
- Financial statements that are not accurate, complete or valid. Unauthorized changes on the accounts. Wrong postings of the transactions.
- Inaccurate recording of goods received.
- Financial loss and misstated financial statements due to duplicate invoice postage.
- Sending of the payments to incorrect or invalid accounts.
- Inaccurate recording of the credits which may result in legal litigation.
- Purchases performed considering outdated or inaccurate estimates of expected material requirements.
- Purchases performed without competitive bidding.

For further research, at the first step other frameworks can also be prepared with the same methodology for other business processes which affect the financial statements directly. These processes can be the followings:

- Period-end financial reporting
- Production and inventory management

- Fixed assets
- Sales
- Payroll and human resources
- Taxes
- Treasury and investments
- Information systems

Additionally, the frameworks can be customized according to the needs of different sectors. If the frameworks are done according to the needs of the sectors, the not applicable questions can be decreased as well. These sectors can be the following:

- Automotive
- Banking and capital markets
- Energy and mining
- Entertainment, media and communications
- Healthcare
- Insurance
- Investment management
- Manufacturing
- Pharmaceuticals
- Private equity
- Real estate
- Retail and consumer
- Technology

- Utilities

After the frameworks are ready, they can be finalized via interviews, focus groups or workshops. Finally, a comprehensive decision support tool can be developed and implemented so that the companies can use this tool to assess their internal control risks in terms of their ERP packages.

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APPENDICES

A. Internal Controls Evaluation Framework

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
1	Vendor Master	Vendors are authorized and valid and only authorized staff has access to the vendor master data maintenance.	Users may have unauthorized access to update vendor master files which may result in financial loss.	Appropriate transaction codes and other object authorizations should be assigned to authorized users. The following transactions need to be restricted: - Create, change and display master records. - Block and unblock master records. - Mark record for deletion.	5.0	X					X	X		a. Review user profile for reasonableness of access. b. Review the Vendor Master File for changes that have been made and verify that all of the users who made the changes have the appropriate Vendor Master Change profile. Review user profiles added for Accounts Payable Vendor Master, for authorized personnel approvals.	SAP								
2	Vendor Master	Vendor creation/modification is authorized.	Creation or deletion of vendor master files may not be authorized or detected.	Creation or deletion of a vendor master file requires a vendor coding form authorization by the appropriate users. The vendor coding form will be attached with source documents and the relevant authority approves it. Relevant authority checks for same name address, etc. when submitting or approving vendor master input form. Relevant authority signs off on vendor master input forms.	5.0	X			X				X	Select a sample of vendor master records created. Trace information to vendor coding form, and verify proper authorization. Verify relevant authority reviews list of modified/created vendors. Observe user creating a vendor master record, and verify the user checks for same name.	SAP General Oracle								
3	Vendor Master	Vendor creation/modification is authorized.	Inaccurate or incomplete vendor data may be entered.	Mandatory fields in the vendor master file are defined and required. Mandatory fields are as below: - customer name - tax id - phone number. - address The system displays an error / warning message whenever there is erroneous or omitted vendor data during data entry. Relevant authority checks any duplicated record by checking - customer name - tax id - phone number.	3.3	X			X			X		Observe a user creating a Vendor Master Record, and document mandatory fields are required for entry. If possible, check the technical configuration.	SAP Peoplesoft General								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
4	Vendor Master	Vendors are authorized and valid and payment is done to the correct vendor. Access to bank accounts is restricted.	Inappropriate payee may be selected for the payment.	Alternative payees cannot be set up in the vendor master record without proper authorization. The creation or modification of alternative payee is subject to the same requirements as setting up or changing a vendor master record. All changes to payee information (banks accounts, etc.) are subject to system based approvals.	3.7	X			X			X		Obtain the list of payee changes Verify all payee changes are approved by appropriate level of the management. Discuss the changes applied to the payee information with the management to ensure all changes are approved prior to the change.	SAP								
5	Vendor Master	Vendor creation/modification is valid & authorized.	Duplicate vendor records may be created which may result in financial loss.	Standard naming conventions are used to reduce the possibility of duplicate vendor names. Each vendor should have a single, unique vendor number. If a vendor name changes, the previous vendor name and number should be deleted & updated appropriately. The system should not allow duplicate vendors.	4.3	X			X			X		Observe creation of vendor names and verify naming conventions are used. Test vendor master file for duplicate records. Obtain vendor master file and review for duplicate vendor names.	SAP Oracle General								
6	Vendor Master	Vendor creation/modification is authorized.	Creation or deletion of vendor master files may not be authorized or detected.	The relevant authority who can not create vendor reviews the list for the modified vendors or new vendors periodically. A sample of new/changed vendors is agreed to the vendor coding form.	3.7		X		X				X	Inspect a sample of the Vendors Report and ensure they have been properly reviewed.	SAP Peoplesoft Oracle								
7	Vendor Master	Purchases are made from the vendors that meet the company's requirements.	Purchases may be made from unqualified suppliers resulting in poor quality and increased costs	Vendors are qualified by the related departments (e.g. Quality Control) prior to the agreements with the vendors. Purchase orders can only be established for vendors included in the purchasing vendor master file. Performance metrics such as goods quality, lead time etc are maintained for key vendors at the year end or suppliers with increasing quality concerns to ensure that appropriate remedial action is taken.	2.0		X	X					X	Select a sample from vendors and investigate whether any initial quality and periodical assessments are performed.	General								
8	Ordering	Controls provide reasonable assurance that purchase requisitions are created by authorized personnel completely and accurately	Due to the lack of appropriate segregation of duties a user is able to create, approve, assign and convert a purchase requisition, resulting in the inappropriate rewarding of business to suppliers, overpayments and excessive inventory levels.	Controls are such that access is granted on those individuals with a business purpose for creating / changing purchase orders.	4.7	X			X			X		Obtain and review the granted access privileges and respective data owner authorizations for the period.	General SAP Oracle								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
9	Ordering	Controls provide reasonable assurance that purchase requisitions are created by authorized personnel completely and accurately	Due to the lack of appropriate segregation of duties a user is able to create, approve, assign and convert a purchase requisition, resulting in the inappropriate rewarding of business to suppliers, overpayments and excessive inventory levels.	Purchase requisitions and/or purchase orders are reviewed on a monthly basis to detect any unauthorized or excessive purchase requisitions.	3.0		X		X				X	Randomly select n month and obtain the reviews conducted for the respective month.	General Oracle								
10	Ordering	Unauthorized orders may be given.	Configuration of purchases is not correct Unauthorized changes to transactions may occur resulting in unauthorized orders.	Document types are configured so that documents and approval hierarchies cannot be overridden during document approval process.	4.3	X			X			X		Review the technical configuration of the purchase orders. Obtain the configuration log that contains the changes applied to the approval mechanism. Verify that each change is approved by the management.	General Oracle								
11	Ordering	Valid purchase orders are input for processing completely and accurately.	Incomplete purchase orders can be given and the deadlines may not be met.	Key data fields such as order quantity, valid vendor, stock name, deadline etc are required for purchase orders.	3.0	X			X			X		Review the technical configuration of the purchase orders or observe a user creating an Order Record, and compare the mandatory fields	Peoplesoft								
12	Ordering	Valid purchase orders are input for processing completely and accurately.	Duplicate or missing purchase orders are not detected, resulting in duplicate orders, missing orders or invalid transactions occurring.	Purchase orders are sequentially numbered to prevent duplicate invoices.	2.0	X			X			X		Review the technical configuration of the purchase orders or verify that all orders are sequentially numbered.	Peoplesoft General Oracle								
13	Ordering	Purchase transactions are approved. Goods received or services performed were ordered.	Unauthorized POs may exist and it may result in financial loss.	A purchase order should exist and created regarding to a valid agreement. All POs should be approved by the relevant authority before it is dispatched. The approval date of the PO should be prior to the dispatch date. Prior to approving purchase orders, the purchasing manager reviews vendor selection and pricing for reasonableness and review vendor selection support as considered necessary to ensure that required vendor selection procedures were appropriately followed.	4.0	X			X			X		Select a sample from PO list and investigate whether they are approved by a relevant authority and the PO approval date is prior to the dispatch date.	Peoplesoft								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
14	Ordering	Purchase transactions are approved.	The agreements may not sustain the local requirements and the Company's priorities. Fictitious vendors may be created.	Contracts and rebate agreements are reviewed and approved by legal department and finance department to ensure that terms and conditions are adequate and appropriately identified to protect the company's best interests. The master data for the contracts should be restricted.	3.7		X		X				X	Select a sample of significant purchasing contracts. Determine if the contracts are approved by the relevant authorities.	Peoplesoft General								
15	Ordering	Purchase transactions are approved.	Unauthorized POs may exist and it may result in financial loss.	All changes to purchase orders require formal approval from management.	3.7	X			X				X	Obtain report listing changes made to existing purchase orders. Determine if changes made were reviewed by authorized individual and proper supporting documentation exists.	Peoplesoft General Oracle								
16	Ordering	Purchase transactions are approved.	Orders may be approved by inappropriate level of the management. Unauthorized POs may exist and it may result in financial loss.	Authority limits are established. Approved purchase orders are reviewed by appropriate management to ensure that they comply with the authority limits.	3.3	X			X			X		Review the approved authorization limits. Determine if this has been approved within the current year. Consider reasonableness of limits assigned.	Peoplesoft General SAP Oracle								
17	Ordering	Valid purchase orders are input for processing completely and accurately.	Purchases decisions are made considerate of outdated or inaccurate estimates of expected material requirements or are purchased with inaccurately identified economic order quantities and vendor lead-times	Material requirements are determined based on regularly updated orders and customer forecasts. Vendor lead-times and established economic order quantities are regularly reviewed and updated in the system. Access to MRP settings is restricted to purchasing department staff to prevent unauthorized changes to settings.	3.3	X		X					X	Check the controls over MRP.	General								
18	Ordering	Goods are purchased from the vendors who sustain best quality & price.	Significant goods or services purchases are purchased without competitive bidding, resulting in goods not being purchased from the lowest cost supplier providing goods or serves of equal quality	Written procurement procedures identify competitive bidding requirements for various purchase thresholds.	2.3	X		X	X				X	Obtained the list of the vendors with an approved order for the period. Reviewed the selection process to ensure that the vendors are selected according to the relevant selection process.	General								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
19	Goods receipts	Long outstanding open receiving reports are investigated and resolved timely with respect to the requirements.	Large outstanding payable balances may build up and not be reviewed on a regular basis. Open purchase orders may indicate long outstanding deliveries, which may delay manufacturing or other business processes. Open PO report could help identify potential unrecorded liabilities. Goods receipts are not recorded appropriately	Related personnel reviews monthly for long outstanding, open items, and makes the appropriate corrections. Mismatched purchase orders and receiving reports are investigated by the related personnel and explanation of the differences is noted on the reports.	4.0		X	X					X	Review of the related g/l account. Observe as if the long outstanding orders are reviewed on a monthly basis.	SAP Peoplesoft General								
20	Goods receipts	Goods received or services performed were ordered or in line with business needs & specifications.	Receiving documents/records are generated for goods not received (fictitious/duplicate purchases are recorded)	Receiving procedures will not allow the receipt of goods not supported by an approved open purchase order and should be in line with the content of the relevant PO. The receiving note should be sequential in the system and the system should not allow duplicate goods receipt numbers. When the goods are received, there should be mandatory fields such as quantity, location, etc.	4.0	X			X			X		Obtain and review the product receiving procedure. Obtain the list of received products and randomly select n sample. Verify the receiving procedures were applied for the selected samples.	General Oracle								
21	Goods Receipts	Goods received or services performed were ordered or in line with business needs & specifications.	Vendors may over-ship and as a result, invalid or inaccurate invoices may be paid, resulting in misstatements in the liability.	The system will not accept a quantity entered that is outside of the quantity tolerances (number and percentage) defined for each item.	4.0		X		X			X		Try to perform a goods receipt that is too low or much when compared to PO. Observe the technical configuration is possible.	Peoplesoft General Oracle								
22	Goods Receipts	Receiving reports are input for processing completely and accurately.	Goods received are not accurately recorded	Signed goods received notes and system records are in line.	3.3	X			X	X			X	Select a sample from the receiving notes and observe as if they are approved by both the sender & receiver.	Peoplesoft General								
23	Goods Receipts	Goods receipts inputs are complete and accurate.	Purchasing personnel may be able to create or manipulate receiving authorizations to affect payment on goods or services not received.	Receiving documents/authorizations are properly safeguarded and numerically controlled by the receiving department to prevent or detect unauthorized use.	3.0	X			X			X		Investigate the numbering process for goods receipt vouchers.	JD Edwards General Oracle								
24	Goods Receipts	Receipts are routed to the correct destination and the goods are only received at the ship-to location.	Goods are received at the incorrect location, resulting in delays and further costs in moving goods.	Goods are stored in the appropriate physical location	2.0	X				X			X	Observe a goods receipt process.	Oracle								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
25	Goods Receipts	Goods receipts inputs are complete and accurate.	The goods may not sustain the Company's requirements which may result in financial loss.	The service purchases should be approved by the department who received the service.	3.5	X			X				X	Select a sample of service purchases and investigate whether they are approved by the relevant department	General								
26	Invoice Processing	Invoices are input for processing completely and accurately.	Inaccurate or invalid data could be input when record first entered into the system	The system requires entry of the following mandatory fields' information upon entry of the invoice such as purchase order number, document date, invoice number, total invoice amount, supplier, supplier number, site, invoice currency and payment currency. All invoices are recorded in relationship with a goods receipt and the vouchers should match with the actual invoice. Any exceptions are tracked and investigated.	4.3	X			X			X		Observe the entry of invoices, and the system controls for mandatory and intelligent fields. Select a sample of invoice documents and verify supervisor and AP staff approval, and agree to source document.	SAP Oracle								
27	Invoice Processing	Invoices are input for processing completely and accurately.	The tolerance limits for invoice verification procedures may be set too high and the purchases that are not in line with the agreed term may result in unauthorized large payments.	The application performs a three way match between the purchase order line item, the receiver and the invoice when AP invoices are processed. The tolerance limits used to check on the three way match process are set according to the policies and standards.	3.7	X			X			X		Observe the entry of invoices and verify the warning message and the related personnel's action. Select a sample of invoices that have been processed for payment. Ensure invoice amounts agree with approved purchase order and receiving document If difference exists between the purchase orders, receiving document and/or invoice determine how such items are resolved. Obtain a current list of such unmatched items and determine if any long-time outstanding documents remain. Obtain explanations for any such items. Run the tolerance limit report if exists, by transaction key, and compare the limits to the standards.	SAP General Oracle								
28	Invoice Processing	Purchasing and payables transactions are recorded in the proper period.	Invoices/payables are not recorded in the proper period.	GL Accounting date used for recording invoices complies with the company's accounting policy.	4.0	X			X			X		Verify that the record date is received from the system and cannot manually be changed	General Oracle								
29	Invoice Processing	All invoices received are input for processing. All accounting entries are made timely & accurately.	Invoices are not recorded	The system requires a unique voucher ID to be assigned to each voucher entered in the system. If the system allows parking the invoice first and then posting to the general ledger, all parked items should be posted after relevant approval before the payment run.	3.3		X		X			X		Observe the technical configuration if possible. If not, observe an invoice processing.	Peoplesoft General								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
30	Invoice Processing	Duplicate recording of invoices are prevented.	Invoice is posted into the system more than once which may result in financial loss and misstated financial statements.	System does not allow duplicate invoices upon invoice entry if the invoice number, vendor number and invoice date are the same.	4.7	X			X			X		Enter an invoice twice, and verify that the system does not allow duplicate invoice numbers.	Peoplesoft SAP General								
31	Adjustments & Ledger Maintenance	Postings to expense and/or inventory in the general ledger are complete, accurate and valid. Entries to incorrect vendor accounts are detected.	Invoices are posted to the wrong accounts.	Invoices released for payment are reviewed and compared to the accounts payable sub-ledger for completeness and accuracy.	4.0	X			X				X	Select a sample from payments and observe the relevant invoices. Check as if the invoices are reconciled to the related subledger.	Peoplesoft General								
32	Invoice Processing	Only valid exchange rates are used.	Incorrect foreign exchange rates may be entered resulting in inaccurate and invalid foreign denominated transactions.	Users cannot define an exchange rate when entering invoices or payments.	3.0	X			X		X	X		Verify that users cannot define an exchange rate when entering invoices or payments.	Oracle								
33	Invoice Processing	Duties and taxes on purchases are accounted for correctly.	Incorrect tax amounts are used, resulting in incorrect tax accruals and a tax liability.	Tax entered per invoice agrees to the tax codes defined in the system. Tax codes can not be overridden at purchase order level.	3.3	X			X			X		Try to change the tax code when processing an invoice / purchase order. Verify following - Tax entered per invoice agrees to the tax codes defined in the system. - Tax codes can not be overridden at purchase order level.	Oracle								
34	Invoice Processing	Accounts payable amounts are accurately calculated and recorded.	Inaccurate or invalid data could be input when record first entered into the system	Systems validates information at invoice entry time: - supplier must exist and is active - invoice date is within an acceptable period - payment date (if entered) is a future date - invoice reference doesn't already exist for this supplier - GL accounts for charges are valid and active - tax calculation is accurate and matches invoice amounts. - invoice total cannot be higher than a specific tolerance amount defined by business unit.	4.3	X			X			X		Observe an invoice entry and verify if the system validates the information related to the accuracy.	General Oracle								
35	Invoice Processing	Fraudulent accounts payable transactions may occur.	Terminated or employees on extended leave of absence may have access to the system.	Relevant supervisor completes a form to remove access to invoice processing when employees leave.	1.3	X			X		X		X	Compare user profiles for Invoicing to active employee list	SAP								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
36	General	Fraudulent accounts payable transactions may occur.	Terminated or employees on extended leave of absence may have access to the system.	Relevant authority sends out lists to departments twice a year identifying potential terminated employees	1.0		X		X		X		X	Verify IT Team sends out lists.	SAP								
37	Invoice Processing	Fraudulent accounts payable transactions may occur.	Invalid invoices may be entered	Original invoices are required as source document. Supervisors must approve paying on a fax or copy.	3.3	X			X				X	Select a sample of invoices and trace information to supporting document.	SAP General								
38	Invoice Processing	Duplicate recording of invoices are prevented.	Invoice is posted into the system more than once.	Finance staff reviews the duplicate invoice report daily. The report identifies all invoices with the same invoice number and the same amount.	4.0		X		X				X	Review copies of the duplicate invoice report to verify that Finance is reviewing the report and taking appropriate action.	SAP Oracle								
39	Invoice Processing	Duplicate recording of invoices are prevented.	Invoice is posted into the system more than once.	AP staff physically stamp “paid” on invoices after approval.	3.0	X			X				X	Select a sample of invoices and trace information to supporting document, and verify invoice is stamped “paid”.	SAP General								
40	Invoice Processing	Invoices are input for processing completely and accurately.	Invoice may be changed after it is posted	Payee or amount can not be changed once supervisor has released invoice.	4.3	X			X			X		Observe the related staff trying to change the payee or amount after the invoice is posted to verify system controls.	SAP								
41	Invoice Processing	Accounts payable amounts are accurately calculated and recorded.	Invoices may be incorrectly or inaccurately entered to the system, which would bypass the ‘three way match’ (PO, invoice and goods receipt) control to detect any errors.	Related department reconciles all outstanding open items in the related g/l account. Following points should be identified: • Goods Receipt without invoice • Invoice without Goods Receipt • Goods Receipt different from invoice, and vice versa	5.0		X	X	X				X	Review of the related general ledger account. Obtain listing of goods that have been received but not yet invoiced and ensure management has reviewed. Review listing for long-time outstanding items (greater than 90 days) and obtain explanation for any such items. Select a sample of receipts made just prior to and after period-end. Determine if they were properly included / excluded in the period's accrual.	SAP General Peoplesoft								
42	Invoice Processing	Posting is performed to the correct cost center.	Transactions may be posted to the wrong account / project / business area.	The system gives a warning message if posting information (such as Business Area /cost center) is not compatible.	3.0	X			X			X		Observe the system warning when Business Area and Cost Center are not compatible.	SAP								
43	Payments	Invoices with regard to a valid PO and goods receipt are input for processing timely, completely and accurately.	Cash disbursement details may be inaccurate and incomplete.	Disbursement data is based on information provided during invoice entry. The system is configured to propose invoices that are due for payment in the automatic payment run.	3.7	X			X			X		Run a report of all invoices due for a specific date, and compare that to the automatic payment run.	SAP JD Edwards								
44	Payments	The payments are accurate and complete.	Cash disbursement details may be inaccurate and incomplete.	Prior to the payment run, the system creates an exception report for invoices where mandatory fields are not populated, and for invoices blocked for payment. Verify that management reviews exception reports.	3.7	X			X				X	Observe the documentation existing to verify supervisory review of payment proposal list and exception list.	SAP JD Edwards								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
45	Payments	Check number is accurate.	Check number may not be indicated in the payment document during payment processing.	The system captures the check number in the document allocation fields, and automatically prints the number on the check. The system assigns a sequential check number to each check, and records it in the register	3.0	X			X			X		Select a sample of invoices and trace the check number back to the record.	SAP							
46	Payments	The payments are accurate and complete.	Large, duplicate or unusual payments may be performed.	All payments including petty cash, bank order, etc or specific payments over a predefined limit and all payments to one time vendors are approved by the relevant authorities set by procedures according to predefined limits.	3.7		X		X				X	Select a sample of payments above a predefined level or specific payments according to the procedures for cases such as: • large round-dollar payments • duplicate dollar amounts • suspicious	SAP General							
47	Payments	Duplicate payments are prevented.	Payments could be made more than once for an invoice.	The system automatically assigns a clearing document number and clearing date when payment is made for open invoice item. All payments are referenced to invoices and cleared. Cleared items can not be selected for payment again. The system prevents the processing of duplicate voucher payments. A series of processes must be completed to process a payment in the system. Each process is no longer available and visible to the user once it is completed.	4.7	X			X			X		Select a sample of paid invoices and verify they were assigned a clearing document number and clearing date.	SAP							
48	Payments	Controls provide reasonable assurance that vendor invoices are processed by authorized personnel completely, accurately and in a timely manner.	Incorrect invoice amounts are entered resulting in incorrect payments to vendors.	Checks are matched to supporting documents (invoice, check requests or expense reimbursements) based on a dollar threshold.	4.0	X			X				X	Select a sample from the checks and observe as if they are matched with the supporting documents.	General Oracle							
49	Payments	Discounts are accurate and calculated within the agreed terms.	The discount amount may be calculated incorrectly.	The system automatically calculates discounts.	3.0	X			X			X		Select a sample of invoices and verify that the appropriate discount was taken.	SAP General Oracle							
50	Payments	Discounts are accurate and calculated within the agreed terms.	The discount amount may be calculated incorrectly.	Significant discounts are reviewed by the management	3.0	X			X				X	Select a sample of invoices and verify that the appropriate discount was taken.	SAP General Oracle							
51	Payments	All checks are recorded in the system	Manual checks issued may not be recorded in the system.	The related personnel review the system check list prior to the release of manual checks. Manual check requests are reviewed and approved.	3.7		X		X				X	Document the related personnel requires system Check List prior to signing manual checks. Verify independent review of manual check log.	SAP Peoplesoft							

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
52	Payments	Access to blank and issued cheques is restricted.	Blank or Issued checks may be lost or stolen.	Blank check stock is secured. Issued checks kept for pick up are locked in the safe. Checks are given to the vendor immediately. Written checks kept for pick up are kept in a secretary's desk, and locked in the safe for the night.	3.3	X				X			X	Verify blank & issued checks are secure. Observe the physical controls over blank and written checks.	SAP Peoplesoft General								
53	Payments	Signature stamp is protected in a secure place	Signature stamp is used by an unauthorized person	The signature stamp is kept in a safe in Accounts Admin	1.7	X				X			X	Verify the signature stamp is secure.	SAP								
54	Payments	The checks are accurate.	Payment to vendor may be made when there is a large outstanding receivable from that company	All checks => $100,000 are reviewed by a relevant authority.	2.3		X	X	X				X	Verify that all checks => $100,000 are reviewed.	SAP								
55	Payments	Disbursement is for the correct invoice.	Payment details may be inaccurate and incomplete.	All vouchers must be in an approved status, prior to payment processing.	3.7	X			X			X		Verify that all vouchers are set to an approved status, prior to payment processing.	Peoplesoft								
56	Payments	Disbursement is for the correct invoice.	Incorrect invoice amounts are entered resulting in incorrect payments to vendors.	Invoices are compared with payment vouchers and approved. Approval should be performed according to the Delegation of Authorities.	4.0		X		X				X	Obtain the list of the payments performed during the period. Randomly select n sample payment from the list. Verify that invoices are compared with payment vouchers, and approved.	Peoplesoft								
57	Payments	Disbursement is to the correct payee and vendor.	Fictitious payments may be performed.	The system pulls vendor information from the vendor standing data files. Vendor must be in an "ACTIVE" status. System makes payments to the vendor's name and address recorded in the master file for the supplier on the invoice.	3.7	X			X			X		Obtain the list of the payments performed during the audit period. Randomly select n sample payment from the list. Verify that the system pulls vendor information from the vendor standing data files and vendors are in an "active" status for the samples.	Peoplesoft General Oracle								
58	Payments	Disbursement input is for the correct amount.	Payments may not be processed timely which may result in misstated financial statements.	Payment vouchers are posted to the GL in a timely manner.	3.3	X			X			X		Observe a payment processing. Verify that payment vouchers are posted to the GL in a timely manner.	Peoplesoft General								
59	Payments	Cash and electronic funds payments are approved.	Incorrect and inaccurate payments may be performed.	Manual checks, release of cheques for printing or EFT are approved.	4.0	X			X				X	Verify that manual checks and release of checks for printing or EFT is approved.	Peoplesoft								
60	Payments	Disbursements are accurately calculated and recorded.	Payments are sent to an incorrect or invalid address, which could increase the risk of	System prevents from issuing negative payments.	2.3	X			X			X		Verify that system prevents from issuing negative payments.	General								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
			unauthorized payments.																				
61	Payments	Disbursements are accurately calculated and recorded.	Inaccurate payment processing may occur.	System prevents and gives a warning if check or invoice amount is higher than a maximum amount defined by business group.	2.7	X			X			X		Observe a payment processing and figure out if the system gives a warning message when invoice amount is higher than the maximum amounts defined to the system.	General								
62	Payments	Disbursements are accurately calculated and recorded.	Legal liabilities may not be met.	System's generated payment pay all invoices due and all outstanding credit notes in the current accounting period.	3.0	X			X			X		Observe a payment processing and figure out if the system takes all invoices due. Check as if the system takes all outstanding items in the related period for payment.	General								
63	Adjustments & Ledger Maintenance	All invoices, credit notes, adjustments and payments are posted to general ledger in the period.	Large or unusual payments may not be blocked for management review. Payments may be sent to incorrect or invalid accounts.	Systems provide at month end closing: - a list of invoices for the month and a list of charges to compare totals. - A list of invoices paid for the month and a list of payments issued to compare totals. - A summary (control total) of all entries for the month to check against GL posting. - AP aging reports (detailed and summary by supplier) with AP total to balance with previous month total are compared. - Period end reconciliation of account payable ledger to general ledger and those cut-off errors are corrected on a timely basis. Accounts payable suspense accounts are included in the period end reconciliation process. These reports are periodically reviewed.	4.0		X	X						X	Observe the month end procedures performed & reviewed by the relevant authorities. Select a sample from the months and observe that the reviews are performed.	Peoplesoft General JD Edwards SAP Oracle								
64	Adjustments & Ledger Maintenance	Postings to the accounts payable and expense accounts in the general ledger are complete and accurate.	Financial statements may not be accurate, complete or valid. Unauthorized changes to books may not be noticed.	Procedures exist to ensure period end reconciliation of account payable ledger to general ledger and that cut-off errors are corrected on a timely basis. Reconciliation is reviewed by management including the below items: - Suspense account - Reverse entries - Manual entries - AP Reconciliation	4.3		X	X	X				X	Select a sample of accounts payable reconciliations. Ensure sub-ledger agrees with the general ledger and any reconciling items are properly supported. Determine if reconciliation was reviewed by an independent person. Review the accounts payable sub-ledger for debit balances that have been outstanding for a long period of time. Determine if management has performed follow-up procedures on these items.	Peoplesoft General JD Edwards								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
65	Adjustments & Ledger Maintenance	Postings to the accounts payable and expense accounts in the general ledger are complete and accurate.	Vendor accounts are not accurate and/or complete. Non reconciling items with the supplies may result in legal issues.	Reconciliations to vendor statements are performed regularly.	3.7		X		X				X	Select a sample from the suppliers and observe the reconciliations.	Peoplesoft								
66	Adjustments & Ledger Maintenance	Postings to the accounts payable and expense accounts in the general ledger are complete and accurate.	Financial statements may not be accurate, complete or valid. Unauthorized changes to books may not be noticed. Transactions may be posted to the wrong account / project / business area.	Vouchers subject to month end including all adjustments are approved prior to posting to ensure the completeness and accuracy of voucher information such as price, quantity, amount, and vendor.	4.0	X			X				X	Select a sample from the general ledger vouchers and observe as if they are approved.	Peoplesoft Oracle								
67	Adjustments & Ledger Maintenance	Credits for returned goods, allowances, and other adjustments are recorded and all legal liabilities are met.	Past due items may result in legal litigation and credits may not be accurately recorded.	Past due items and open credits are reviewed on regular basis.	3.0		X		X				X	Select a sample from open credits and past due items. Verify if they are reviewed by the related personnel.	Peoplesoft								
68	Adjustments & Ledger Maintenance	Postings are complete, accurate and valid.	The bank amount in the books may not agree with the amount at hand in bank.	An independent person reviews the bank reconciliation. The bank account is reconciled automatically daily, with exceptions cleared manually.	3.7		X		X				X	Document segregation of duties between disbursements and bank reconciliation. Select a sample of reconciliations and review unreconciled items. Ensure totals agree to the general ledger and reconciling items are properly supported and explain. Ensure calculations are in line with company policy. Ensure reconciliation is reviewed by an independent person	SAP Peoplesoft General								
69	Adjustments & Ledger Maintenance	All purchases are made for a valid reason.	Fictitious invoices and related supporting material may be inappropriately inserted into A/P files used to clear vendor invoices to affect inappropriate payments.	Physical access to accounts payable files, checks, documents, receiving files, and purchase order files used in managing the A/P and procurement processes are restricted	3.0	X				X			X	Observe the physical controls over accounts payable files.	General								
70	Return	Credits for returned goods, allowances, and other adjustments are recorded.	Credits may not be accurately recorded.	Goods returned memos are prenumbered and reviewed regularly.	2.3		X		X				X	Observe a goods return process and investigate as if the memos are prenumbered.	Peoplesoft								
71	Return	Returns, allowances, or other adjustments are approved.	Fictitious return invoices are recorded	Return approvals by the relevant authorities are required.	3.0		X		X				X	Select from the returns and observe as if they are approved by the relevant authority.	General Peoplesoft								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
72	Return	Return process is valid and accurate	Credits are not timely received from suppliers for returned goods	GDN (Goods Dispatch Note) for returned goods are recorded on the system via a return to vendor transaction that automatically relieves quantities from inventory and records a negative goods receipt note on the system. Negative goods receipt notes on the system are reviewed as part of goods received not invoiced reviews to ensure expected credits receive appropriate follow-up.	3.7		X		X			X		Observe a return process and investigate whether the return process is performed against a GDN	General								
73	Return	The original transaction is appropriately reversed out from the system.	The original transaction is inappropriately reversed out from the system.	The system will automatically verify the following, before a reversal entry is accepted: - no cleared items - original transaction was within the original posting module	4.0	X			X			X		Determine if the system or Finance Department checks for reversal entries.	SAP								
74	General	Duties are adequately segregated.	Users may have unauthorized access to the purchasing transactions which may result in financial loss.	The following duties should be segregated: - Create PO - Authorizing PO - Receiving goods - Prepare general ledger vouchers - Approves general ledger vouchers - Create / change to vendor master file - Counting inventory - Adjusting inventory - Invoice entry - Invoice posting capabilities are segregated from the following: Vendor/bank master file creation/change - Accounts payable approval/review	5.0	X					X	X		Review user profile for conflicting access.	SAP Peoplesoft General Oracle								

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grades							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total (Control Weight x Grade)
75	General	Access rights are provided to the authorized personnel.	Users may have unauthorized access to the purchasing transactions which may result in financial loss.	The following access rights should be restricted to the authorized personnel: - Create PO - Authorizing PO - Receiving goods - Prepare general ledger vouchers Approves general ledger vouchers Create / change to vendor master file - Counting inventory - Adjusting inventory - Invoice entry - Post, change, delete parked and 'normal' documents - Park and release parked documents - Block and unblock documents. - Non-purchase order invoice entry - Reverse documents - Access to the configuration settings such as posting approval, matching rules and duplicate invoice settings, tolerance limits etc. - Payment processing	5.0	X			X		X	X		Review user profile for the access rights.	General								
76	General	The controls are defined and documented.	The controls may not be performed which may result in unauthorized and/or inaccurate purchasing transactions.	Adequate procedures exist for purchasing processes including the following sub sections: - Ordering - Goods Receipt - Invoice Processing Payments - Adjustments & Ledger Maintenance - Return - Vendor Master Data - Competitive bidding	4.0	X		X	X				X	Observe if the procedures are prepared and published.	General								

B. Company Assessments by the Internal Controls Evaluation Framework

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grade								Company B Grade								Company C Grade							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
1	Vendor Master	Vendors are authorized and valid and only authorized staff has access to the vendor master data maintenance.	Users may have unauthorized access to update vendor master files which may result in financial loss.	Appropriate transaction codes and other object authorizations should be assigned to authorized users. The following transactions need to be restricted: - Create, change and display master records. - Block and unblock master records. - Mark record for deletion.	5.0	X					X	X		a. Review user profile for reasonableness of access. b. Review the Vendor Master File for changes that have been made and verify that all of the users who made the changes have the appropriate Vendor Master Change profile. Review user profiles added for Accounts Payable Vendor Master, for authorized personnel approvals.	SAP				3				15.0					4			20.0				3				15.0
2	Vendor Master	Vendor creation/modification is authorized.	Creation or deletion of vendor master files may not be authorized or detected.	Creation or deletion of a vendor master file requires a vendor coding form authorization by the appropriate users. The vendor coding form will be attached with source documents and the relevant authority approves it. Relevant authority checks for same name address, etc. when submitting or approving vendor master input form. Relevant authority signs off on vendor master input forms.	5.0	X			X				X	Select a sample of vendor master records created. Trace information to vendor coding form, and verify proper authorization. Verify relevant authority reviews list of modified/created vendors. Observe user creating a vendor master record, and verify the user checks for same name.	SAP General Oracle		1						5.0				3				15.0	0							0.0
3	Vendor Master	Vendor creation/modification is authorized.	Inaccurate or incomplete vendor data may be entered.	Mandatory fields in the vendor master file are defined and required. Mandatory fields are as below: - customer name - tax id - phone number. - address The system displays an error / warning message whenever there is erroneous or omitted vendor data during data entry. Relevant authority checks any duplicated record by checking - customer name - tax id - phone number.	3.3	X			X			X		Observe a user creating a Vendor Master Record, and document mandatory fields are required for entry. If possible, check the technical configuration.	SAP Peoplesoft General				3				9.9				3				9.9					4			13.2

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grade								Company B Grade								Company C Grade							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
4	Vendor Master	Vendors are authorized and valid and payment is done to the correct vendor. Access to bank accounts is restricted.	Inappropriate payee may be selected for the payment.	Alternative payees cannot be set up in the vendor master record without proper authorization. The creation or modification of alternative payee is subject to the same requirements as setting up or changing a vendor master record. All changes to payee information (banks accounts, etc.) are subject to system based approvals.	3.7	X			X			X		Obtain the list of payee changes Verify all payee changes are approved by appropriate level of the management. Discuss the changes applied to the payee information with the management to ensure all changes are approved prior to the change.	SAP				3			11.1				3			11.1							0	0.0
5	Vendor Master	Vendor creation/modification is valid & authorized.	Duplicate vendor records may be created which may result in financial loss.	Standard naming conventions are used to reduce the possibility of duplicate vendor names. Each vendor should have a single, unique vendor number. If a vendor name changes, the previous vendor name and number should be deleted & updated appropriately. The system should not allow duplicate vendors.	4.3	X			X			X		Observe creation of vendor names and verify naming conventions are used. Test vendor master file for duplicate records. Obtain vendor master file and review for duplicate vendor names.	SAP Oracle General				4			17.2			2				8.6			2				8.6
6	Vendor Master	Vendor creation/modification is authorized.	Creation or deletion of vendor master files may not be authorized or detected.	The relevant authority who can not create vendor reviews the list for the modified vendors or new vendors periodically. A sample of new/changed vendors is agreed to the vendor coding form.	3.7		X		X				X	Inspect a sample of the Vendors Report and ensure they have been properly reviewed.	SAP Peoplesoft Oracle	0							0.0			2				7.4						0	0.0
7	Vendor Master	Purchases are made from the vendors that meet the company's requirements.	Purchases may be made from unqualified suppliers resulting in poor quality and increased costs	Vendors are qualified by the related departments (e.g. Quality Control) prior to the agreements with the vendors. Purchase orders can only be established for vendors included in the purchasing vendor master file. Performance metrics such as goods quality, lead time etc are maintained for key vendors at the year end or suppliers with increasing quality concerns to ensure that appropriate remedial action is taken.	2.0		X	X					X	Select a sample from vendors and investigate whether any initial quality and periodical assessments are performed.	General			2				4.0			3				6.0		1					2.0

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grade								Company B Grade								Company C Grade							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
8	Ordering	Controls provide reasonable assurance that purchase requisitions are created by authorized personnel completely and accurately	Due to the lack of appropriate segregation of duties a user is able to create, approve, assign and convert a purchase requisition, resulting in the inappropriate rewarding of business to suppliers, overpayments and excessive inventory levels.	Controls are such that access is granted on those individuals with a business purpose for creating / changing purchase orders.	4.7	X			X			X		Obtain and review the granted access privileges and respective data owner authorizations for the period.	General SAP Oracle				3				14.1					4			18.8			2					9.4
9	Ordering	Controls provide reasonable assurance that purchase requisitions are created by authorized personnel completely and accurately	Due to the lack of appropriate segregation of duties a user is able to create, approve, assign and convert a purchase requisition, resulting in the inappropriate rewarding of business to suppliers, overpayments and excessive inventory levels.	Purchase requisitions and/or purchase orders are reviewed on a monthly basis to detect any unauthorized or excessive purchase requisitions.	3.0		X		X				X	Randomly select n month and obtain the reviews conducted for the respective month.	General Oracle		1						3.0			3				9.0	0							0.0
10	Ordering	Unauthorized orders may be given.	Configuration of purchases is not correct Unauthorized changes to transactions may occur resulting in unauthorized orders.	Document types are configured so that documents and approval hierarchies cannot be overridden during document approval process.	4.3	X			X			X		Review the technical configuration of the purchase orders. Obtain the configuration log that contains the changes applied to the approval mechanism. Verify that each change is approved by the management.	General Oracle				4				17.2			2					8.6							0	0.0
11	Ordering	Valid purchase orders are input for processing completely and accurately.	Incomplete purchase orders can be given and the deadlines may not be met.	Key data fields such as order quantity, valid vendor, stock name, deadline etc are required for purchase orders.	3.0	X			X			X		Review the technical configuration of the purchase orders or observe a user creating an Order Record, and compare the mandatory fields	Peoplesoft				3				9.0					4			12.0				3				9.0
12	Ordering	Valid purchase orders are input for processing completely and accurately.	Duplicate or missing purchase orders are not detected, resulting in duplicate orders, missing orders or invalid transactions occurring.	Purchase orders are sequentially numbered to prevent duplicate invoices.	2.0	X			X			X		Review the technical configuration of the purchase orders or verify that all orders are sequentially numbered.	Peoplesoft General Oracle				4				8.0					4			8.0			2					4.0

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grade								Company B Grade								Company C Grade							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
13	Ordering	Purchase transactions are approved. Goods received or services performed were ordered.	Unauthorized POs may exist and it may result in financial loss.	A purchase order should exist and created regarding to a valid agreement. All POs should be approved by the relevant authority before it is dispatched. The approval date of the PO should be prior to the dispatch date. Prior to approving purchase orders, the purchasing manager reviews vendor selection and pricing for reasonableness and review vendor selection support as considered necessary to ensure that required vendor selection procedures were appropriately followed.	4.0	X			X			X		Select a sample from PO list and investigate whether they are approved by a relevant authority and the PO approval date is prior to the dispatch date.	Peoplesoft				3			12.0		1					4.0			2				8.0
14	Ordering	Purchase transactions are approved.	The agreements may not sustain the local requirements and the Company's priorities. Fictitious vendors may be created.	Contracts and rebate agreements are reviewed and approved by legal department and finance department to ensure that terms and conditions are adequate and appropriately identified to protect the company’s best interests. The master data for the contracts should be restricted.	3.7		X		X				X	Select a sample of significant purchasing contracts. Determine if the contracts are approved by the relevant authorities.	Peoplesoft General			2					7.4							0	0.0			3					11.1
15	Ordering	Purchase transactions are approved.	Unauthorized POs may exist and it may result in financial loss.	All changes to purchase orders require formal approval from management.	3.7	X			X				X	Obtain report listing changes made to existing purchase orders. Determine if changes made were reviewed by authorized individual and proper supporting documentation exists.	Peoplesoft General Oracle				3			11.1		1					3.7		1					3.7
16	Ordering	Purchase transactions are approved.	Orders may be approved by inappropriate level of the management. Unauthorized POs may exist and it may result in financial loss.	Authority limits are established. Approved purchase orders are reviewed by appropriate management to ensure that they comply with the authority limits.	3.3	X			X			X		Review the approved authorization limits. Determine if this has been approved within the current year. Consider reasonableness of limits assigned.	Peoplesoft General SAP Oracle				3			9.9		1					3.3	0						0.0
17	Ordering	Valid purchase orders are input for processing completely and accurately.	Purchases decisions are made considerate of outdated or inaccurate estimates of expected material requirements or are purchased with inaccurately identified economic order quantities and vendor lead-times	Material requirements are determined based on regularly updated orders and customer forecasts. Vendor lead-times and established economic order quantities are regularly reviewed and updated in the system. Access to MRP settings is restricted to purchasing department staff to prevent unauthorized changes to settings.	3.3	X		X					X	Check the controls over MRP.	General				3			9.9			3				9.9						0	0.0

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grade								Company B Grade								Company C Grade							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
18	Ordering	Goods are purchased from the vendors who sustain best quality & price.	Significant goods or services purchases are purchased without competitive bidding, resulting in goods not being purchased from the lowest cost supplier providing goods or serves of equal quality	Written procurement procedures identify competitive bidding requirements for various purchase thresholds.	2.3	X		X	X				X	Obtained the list of the vendors with an approved order for the period. Reviewed the selection process to ensure that the vendors are selected according to the relevant selection process.	General	0							0.0							0	0.0			2				4.6
19	Goods receipts	Long outstanding open receiving reports are investigated and resolved timely with respect to the requirements.	Large outstanding payable balances may build up and not be reviewed on a regular basis. Open purchase orders may indicate long outstanding deliveries, which may delay manufacturing or other business processes. Open PO report could help identify potential unrecorded liabilities. Goods receipts are not recorded appropriately	Related personnel reviews monthly for long outstanding, open items, and makes the appropriate corrections. Mismatched purchase orders and receiving reports are investigated by the related personnel and explanation of the differences is noted on the reports.	4.0		X	X					X	Review of the related g/l account. Observe as if the long outstanding orders are reviewed on a monthly basis.	SAP Peoplesoft General		1						4.0				4			16.0	0							0.0
20	Goods receipts	Goods received or services performed were ordered or in line with business needs & specifications.	Receiving documents/records are generated for goods not received (fictitious/duplicate purchases are recorded)	Receiving procedures will not allow the receipt of goods not supported by an approved open purchase order and should be in line with the content of the relevant PO. The receiving note should be sequential in the system and the system should not allow duplicate goods receipt numbers. When the goods are received, there should be mandatory fields such as quantity, location, etc.	4.0	X			X			X		Obtain and review the product receiving procedure. Obtain the list of received products and randomly select n sample. Verify the receiving procedures were applied for the selected samples.	General Oracle				3				12.0				4			16.0				3				12.0
21	Goods Receipts	Goods received or services performed were ordered or in line with business needs & specifications.	Vendors may over-ship and as a result, invalid or inaccurate invoices may be paid, resulting in misstatements in the liability.	The system will not accept a quantity entered that is outside of the quantity tolerances (number and percentage) defined for each item.	4.0		X		X			X		Try to perform a goods receipt that is too low or much when compared to PO. Observe the technical configuration is possible.	Peoplesoft General Oracle	0							0.0				4			16.0		1						4.0
22	Goods Receipts	Receiving reports are input for processing completely and accurately.	Goods received are not accurately recorded	Signed goods received notes and system records are in line.	3.3	X			X	X			X	Select a sample from the receiving notes and observe as if they are approved by both the sender & receiver.	Peoplesoft General				3				9.9				4			13.2				3				9.9

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grade								Company B Grade								Company C Grade							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
23	Goods Receipts	Goods receipts inputs are complete and accurate.	Purchasing personnel may be able to create or manipulate receiving authorizations to affect payment on goods or services not received.	Receiving documents/authorizations are properly safeguarded and numerically controlled by the receiving department to prevent or detect unauthorized use.	3.0	X			X			X		Investigate the numbering process for goods receipt vouchers.	JD Edwards General Oracle				3				9.0				3				9.0				3				9.0
24	Goods Receipts	Receipts are routed to the correct destination and the goods are only received at the ship-to location.	Goods are received at the incorrect location, resulting in delays and further costs in moving goods.	Goods are stored in the appropriate physical location	2.0	X				X			X	Observe a goods receipt process.	Oracle					4			8.0					4			8.0					4			8.0
25	Goods Receipts	Goods receipts inputs are complete and accurate.	The goods may not sustain the Company's requirements which may result in financial loss.	The service purchases should be approved by the department who received the service.	3.5	X			X				X	Select a sample of service purchases and investigate whether they are approved by the relevant department	General				3				10.5				3				10.5				3				10.5
26	Invoice Processing	Invoices are input for processing completely and accurately.	Inaccurate or invalid data could be input when record first entered into the system	The system requires entry of the following mandatory fields' information upon entry of the invoice such as purchase order number, document date, invoice number, total invoice amount, supplier, supplier number, site, invoice currency and payment currency. All invoices are recorded in relationship with a goods receipt and the vouchers should match with the actual invoice. Any exceptions are tracked and investigated.	4.3	X			X			X		Observe the entry of invoices, and the system controls for mandatory and intelligent fields. Select a sample of invoice documents and verify supervisor and AP staff approval, and agree to source document.	SAP Oracle				3				12.9					4			17.2				3				12.9
27	Invoice Processing	Invoices are input for processing completely and accurately.	The tolerance limits for invoice verification procedures may be set too high and the purchases that are not in line with the agreed term may result in unauthorized large payments.	The application performs a three way match between the purchase order line item, the receiver and the invoice when AP invoices are processed. The tolerance limits used to check on the three way match process are set according to the policies and standards.	3.7	X			X			X		Observe the entry of invoices and verify the warning message and the related personnel's action. Select a sample of invoices that have been processed for payment. Ensure invoice amounts agree with approved purchase order and receiving document If difference exists between the purchase orders, receiving document and/or invoice determine how such items are resolved. Obtain a current list of such unmatched items and determine if any long-time outstanding documents remain. Obtain explanations for any such items. Run the tolerance limit report if exists, by transaction key, and compare the limits to the standards.	SAP General Oracle				3				11.1					4			14.8							0	0.0

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grade								Company B Grade								Company C Grade							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
28	Invoice Processing	Purchasing and payables transactions are recorded in the proper period.	Invoices/payables are not recorded in the proper period.	GL Accounting date used for recording invoices complies with the company's accounting policy.	4.0	X			X			X		Verify that the record date is received from the system and cannot manually be changed	General Oracle					4			16.0					4			16.0					4			16.0
29	Invoice Processing	All invoices received are input for processing. All accounting entries are made timely & accurately.	Invoices are not recorded	The system requires a unique voucher ID to be assigned to each voucher entered in the system. If the system allows parking the invoice first and then posting to the general ledger, all parked items should be posted after relevant approval before the payment run.	3.3		X		X			X		Observe the technical configuration if possible. If not, observe an invoice processing.	Peoplesoft General					4			13.2					4			13.2				3				9.9
30	Invoice Processing	Duplicate recording of invoices are prevented.	Invoice is posted into the system more than once which may result in financial loss and misstated financial statements.	System does not allow duplicate invoices upon invoice entry if the invoice number, vendor number and invoice date are the same.	4.7	X			X			X		Enter an invoice twice, and verify that the system does not allow duplicate invoice numbers.	Peoplesoft SAP General					4			18.8					4			18.8							0	0.0
31	Adjustments & Ledger Maintenance	Postings to expense and/or inventory in the general ledger are complete, accurate and valid. Entries to incorrect vendor accounts are detected.	Invoices are posted to the wrong accounts.	Invoices released for payment are reviewed and compared to the accounts payable sub-ledger for completeness and accuracy.	4.0	X			X				X	Select a sample from payments and observe the relevant invoices. Check as if the invoices are reconciled to the related subledger.	Peoplesoft General				3				12.0			2					8.0			2					8.0
32	Invoice Processing	Only valid exchange rates are used.	Incorrect foreign exchange rates may be entered resulting in inaccurate and invalid foreign denominated transactions.	Users cannot define an exchange rate when entering invoices or payments.	3.0	X			X		X	X		Verify that users cannot define an exchange rate when entering invoices or payments.	Oracle	0							0.0					4			12.0	0							0.0
33	Invoice Processing	Duties and taxes on purchases are accounted for correctly.	Incorrect tax amounts are used, resulting in incorrect tax accruals and a tax liability.	Tax entered per invoice agrees to the tax codes defined in the system. Tax codes can not be overridden at purchase order level.	3.3	X			X			X		Try to change the tax code when processing an invoice / purchase order. Verify following - Tax entered per invoice agrees to the tax codes defined in the system. - Tax codes can not be overridden at purchase order level.	Oracle				3				9.9				3				9.9				3				9.9

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grade								Company B Grade								Company C Grade							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
34	Invoice Processing	Accounts payable amounts are accurately calculated and recorded.	Inaccurate or invalid data could be input when record first entered into the system	Systems validates information at invoice entry time: - supplier must exist and is active - invoice date is within an acceptable period - payment date (if entered) is a future date - invoice reference doesn't already exist for this supplier - GL accounts for charges are valid and active - tax calculation is accurate and matches invoice amounts. - invoice total cannot be higher than a specific tolerance amount defined by business unit.	4.3	X			X			X		Observe an invoice entry and verify if the system validates the information related to the accuracy.	General Oracle					4			17.2			2					8.6					4			17.2
35	Invoice Processing	Fraudulent accounts payable transactions may occur.	Terminated or employees on extended leave of absence may have access to the system.	Relevant supervisor completes a form to remove access to invoice processing when employees leave.	1.3	X			X		X		X	Compare user profiles for Invoicing to active employee list	SAP		1						1.3				3				3.9		1						1.3
36	General	Fraudulent accounts payable transactions may occur.	Terminated or employees on extended leave of absence may have access to the system.	Relevant authority sends out lists to departments twice a year identifying potential terminated employees	1.0		X		X		X		X	Verify IT Team sends out lists.	SAP	0							0.0	0							0.0	0							0.0
37	Invoice Processing	Fraudulent accounts payable transactions may occur.	Invalid invoices may be entered	Original invoices are required as source document. Supervisors must approve paying on a fax or copy.	3.3	X			X				X	Select a sample of invoices and trace information to supporting document.	SAP General		1						3.3				3				9.9			2					6.6
38	Invoice Processing	Duplicate recording of invoices are prevented.	Invoice is posted into the system more than once.	Finance staff reviews the duplicate invoice report daily. The report identifies all invoices with the same invoice number and the same amount.	4.0		X		X				X	Review copies of the duplicate invoice report to verify that Finance is reviewing the report and taking appropriate action.	SAP Oracle	0							0.0	0							0.0							0	0.0
39	Invoice Processing	Duplicate recording of invoices are prevented.	Invoice is posted into the system more than once.	AP staff physically stamp “paid” on invoices after approval.	3.0	X			X				X	Select a sample of invoices and trace information to supporting document, and verify invoice is stamped “paid”.	SAP General	0							0.0		1						3.0		1						3.0
40	Invoice Processing	Invoices are input for processing completely and accurately.	Invoice may be changed after it is posted	Payee or amount can not be changed once supervisor has released invoice.	4.3	X			X			X		Observe the related staff trying to change the payee or amount after the invoice is posted to verify system controls.	SAP				3				12.9				4				17.2				4				17.2

No	Sub Process	Control objective	Risks	Controls	Control Weight	Types of Controls		Classification				A/M		Control Procedure	System	Company A Grade								Company B Grade								Company C Grade							
						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
41	Invoice Processing	Accounts payable amounts are accurately calculated and recorded.	Invoices may be incorrectly or inaccurately entered to the system, which would bypass the 'three way match' (PO, invoice and goods receipt) control to detect any errors.	Related department reconciles all outstanding open items in the related g/l account. Following points should be identified: • Goods Receipt without invoice • Invoice without Goods Receipt • Goods Receipt different from invoice, and vice versa	5.0		X	X	X				X	Review of the related general ledger account. Obtain listing of goods that have been received but not yet invoiced and ensure management has reviewed. Review listing for long-time outstanding items (greater than 90 days) and obtain explanation for any such items. Select a sample of receipts made just prior to and after period-end. Determine if they were properly included / excluded in the period's accrual.	SAP General Peoplesoft					4			20.0					4			20.0							0	0.0
42	Invoice Processing	Posting is performed to the correct cost center.	Transactions may be posted to the wrong account / project / business area.	The system gives a warning message if posting information (such as Business Area /cost center) is not compatible.	3.0	X			X			X		Observe the system warning when Business Area and Cost Center are not compatible.	SAP				3				9.0				3				9.0							0	0.0
43	Payments	Invoices with regard to a valid PO and goods receipt are input for processing timely, completely and accurately.	Cash disbursement details may be inaccurate and incomplete.	Disbursement data is based on information provided during invoice entry. The system is configured to propose invoices that are due for payment in the automatic payment run.	3.7	X			X			X		Run a report of all invoices due for a specific date, and compare that to the automatic payment run.	SAP JD Edwards			2					7.4					4			14.8				3				11.1
44	Payments	The payments are accurate and complete.	Cash disbursement details may be inaccurate and incomplete.	Prior to the payment run, the system creates an exception report for invoices where mandatory fields are not populated, and for invoices blocked for payment. Verify that management reviews exception reports.	3.7	X			X				X	Observe the documentation existing to verify supervisory review of payment proposal list and exception list.	SAP JD Edwards	0							0.0	0							0.0							0	0.0
45	Payments	Check number is accurate.	Check number may not be indicated in the payment document during payment processing.	The system captures the check number in the document allocation fields, and automatically prints the number on the check. The system assigns a sequential check number to each check, and records it in the register	3.0	X			X			X		Select a sample of invoices and trace the check number back to the record.	SAP						0	0.0					4			12.0							0	0.0
46	Payments	The payments are accurate and complete.	Large, duplicate or unusual payments may be performed.	All payments including petty cash, bank order, etc or specific payments over a predefined limit and all payments to one time vendors are approved by the relevant authorities set by procedures according to predefined limits.	3.7		X		X				X	Select a sample of payments above a predefined level or specific payments according to the procedures for cases such as: • large round-dollar payments • duplicate dollar amounts • suspicious	SAP General				3				11.1					4			14.8					4			14.8

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						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
47	Payments	Duplicate payments are prevented.	Payments could be made more than once for an invoice.	The system automatically assigns a clearing document number and clearing date when payment is made for open invoice item. All payments are referenced to invoices and cleared. Cleared items can not be selected for payment again. The system prevents the processing of duplicate voucher payments. A series of processes must be completed to process a payment in the system. Each process is no longer available and visible to the user once it is completed.	4.7	X			X			X		Select a sample of paid invoices and verify they were assigned a clearing document number and clearing date.	SAP				3			14.1					4			18.8					4			18.8
48	Payments	Controls provide reasonable assurance that vendor invoices are processed by authorized personnel completely, accurately and in a timely manner.	Incorrect invoice amounts are entered resulting in incorrect payments to vendors.	Checks are matched to supporting documents (invoice, check requests or expense reimbursements) based on a dollar threshold.	4.0	X			X				X	Select a sample from the checks and observe as if they are matched with the supporting documents.	General Oracle							0	0.0					4			16.0						0	0.0
49	Payments	Discounts are accurate and calculated within the agreed terms.	The discount amount may be calculated incorrectly.	The system automatically calculates discounts.	3.0	X			X			X		Select a sample of invoices and verify that the appropriate discount was taken.	SAP General Oracle					4			12.0				3				9.0					4			12.0
50	Payments	Discounts are accurate and calculated within the agreed terms.	The discount amount may be calculated incorrectly.	Significant discounts are reviewed by the management	3.0	X			X				X	Select a sample of invoices and verify that the appropriate discount was taken.	SAP General Oracle		1						3.0		1						3.0		1						3.0
51	Payments	All checks are recorded in the system	Manual checks issued may not be recorded in the system.	The related personnel review the system check list prior to the release of manual checks. Manual check requests are reviewed and approved.	3.7		X		X				X	Document the related personnel requires system Check List prior to signing manual checks. Verify independent review of manual check log.	SAP Peoplesoft							0	0.0						0	0.0		1						3.7
52	Payments	Access to blank and issued cheques is restricted.	Blank or Issued checks may be lost or stolen.	Blank check stock is secured. Issued checks kept for pick up are locked in the safe. Checks are given to the vendor immediately. Written checks kept for pick up are kept in a secretary's desk, and locked in the safe for the night.	3.3	X				X			X	Verify blank & issued checks are secure. Observe the physical controls over blank and written checks.	SAP Peoplesoft General							0	0.0					4			13.2				3				9.9
53	Payments	Signature stamp is protected in a secure place	Signature stamp is used by an unauthorized person	The signature stamp is kept in a safe in Accounts Admin	1.7	X				X			X	Verify the signature stamp is secure.	SAP		1						1.7					4			6.8				3				5.1

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						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
54	Payments	The checks are accurate.	Payment to vendor may be made when there is a large outstanding receivable from that company	All checks => $100,000 are reviewed by a relevant authority.	2.3		X	X	X				X	Verify that all checks => $100,000 are reviewed.	SAP						0	0.0					4		9.2	0							0.0
55	Payments	Disbursement is for the correct invoice.	Payment details may be inaccurate and incomplete.	All vouchers must be in an approved status, prior to payment processing.	3.7	X			X			X		Verify that all vouchers are set to an approved status, prior to payment processing.	Peoplesoft		1					3.7					4		14.8							0	0.0
56	Payments	Disbursement is for the correct invoice.	Incorrect invoice amounts are entered resulting in incorrect payments to vendors.	Invoices are compared with payment vouchers and approved. Approval should be performed according to the Delegation of Authorities.	4.0		X		X				X	Obtain the list of the payments performed during the period. Randomly select n sample payment from the list. Verify that invoices are compared with payment vouchers, and approved.	Peoplesoft				3			12.0					4		16.0				3			12.0
57	Payments	Disbursement is to the correct payee and vendor.	Fictitious payments may be performed.	The system pulls vendor information from the vendor standing data files. Vendor must be in an "ACTIVE" status. System makes payments to the vendor's name and address recorded in the master file for the supplier on the invoice.	3.7	X			X			X		Obtain the list of the payments performed during the audit period. Randomly select n sample payment from the list. Verify that the system pulls vendor information from the vendor standing data files and vendors are in an "active" status for the samples.	Peoplesoft General Oracle				3			11.1					4		14.8					4		14.8
58	Payments	Disbursement input is for the correct amount.	Payments may not be processed timely which may result in misstated financial statements.	Payment vouchers are posted to the GL in a timely manner.	3.3	X			X			X		Observe a payment processing. Verify that payment vouchers are posted to the GL in a timely manner.	Peoplesoft General				3			9.9					4		13.2				3			9.9
59	Payments	Cash and electronic funds payments are approved.	Incorrect and inaccurate payments may be performed.	Manual checks, release of cheques for printing or EFT are approved.	4.0	X			X				X	Verify that manual checks and release of checks for printing or EFT is approved.	Peoplesoft						0	0.0					4		16.0			2				8.0
60	Payments	Disbursements are accurately calculated and recorded.	Payments are sent to an incorrect or invalid address, which could increase the risk of unauthorized payments.	System prevents from issuing negative payments.	2.3	X			X			X		Verify that system prevents from issuing negative payments.	General					4		9.2					4		9.2					4		9.2
61	Payments	Disbursements are accurately calculated and recorded.	Inaccurate payment processing may occur.	System prevents and gives a warning if check or invoice amount is higher than a maximum amount defined by business group.	2.7	X			X			X		Observe a payment processing and figure out if the system gives a warning message when invoice amount is higher than the maximum amounts defined to the system.	General	0						0.0					3		8.1	0						0.0
62	Payments	Disbursements are accurately calculated and recorded.	Legal liabilities may not be met.	System's generated payment pay all invoices due and all outstanding credit notes in the current accounting period.	3.0	X			X			X		Observe a payment processing and figure out if the system takes all invoices due. Check as if the system takes all outstanding items in the related period for payment.	General			2				6.0					3		9.0			2				6.0

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						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
63	Adjustments & Ledger Maintenance	All invoices, credit notes, adjustments and payments are posted to general ledger in the period.	Large or unusual payments may not be blocked for management review. Payments may be sent to incorrect or invalid accounts.	Systems provide at month end closing: - a list of invoices for the month and a list of charges to compare totals. - A list of invoices paid for the month and a list of payments issued to compare totals. - A summary (control total) of all entries for the month to check against GL posting. - AP aging reports (detailed and summary by supplier) with AP total to balance with previous month total are compared. - Period end reconciliation of account payable ledger to general ledger and those cut-off errors are corrected on a timely basis. Accounts payable suspense accounts are included in the period end reconciliation process. These reports are periodically reviewed.	4.0		X	X					X	Observe the month end procedures performed & reviewed by the relevant authorities. Select a sample from the months and observe that the reviews are performed.	Peoplesoft General JD Edwards SAP Oracle			2				8.0				4			16.0			2				8.0
64	Adjustments & Ledger Maintenance	Postings to the accounts payable and expense accounts in the general ledger are complete and accurate.	Financial statements may not be accurate, complete or valid. Unauthorized changes to books may not be noticed.	Procedures exist to ensure period end reconciliation of account payable ledger to general ledger and that cut-off errors are corrected on a timely basis. Reconciliation is reviewed by management including the below items: - Suspense account - Reverse entries - Manual entries - AP Reconciliation	4.3		X	X	X				X	Select a sample of accounts payable reconciliations. Ensure sub-ledger agrees with the general ledger and any reconciling items are properly supported. Determine if reconciliation was reviewed by an independent person. Review the accounts payable sub-ledger for debit balances that have been outstanding for a long period of time. Determine if management has performed follow-up procedures on these items.	Peoplesoft General JD Edwards			2				8.6				3			12.9				3			12.9
65	Adjustments & Ledger Maintenance	Postings to the accounts payable and expense accounts in the general ledger are complete and accurate.	Vendor accounts are not accurate and/or complete. Non reconciling items with the supplies may result in legal issues.	Reconciliations to vendor statements are performed regularly.	3.7		X		X				X	Select a sample from the suppliers and observe the reconciliations.	Peoplesoft				3			11.1					4		14.8				3			11.1
66	Adjustments & Ledger Maintenance	Postings to the accounts payable and expense accounts in the general ledger are complete and accurate.	Financial statements may not be accurate, complete or valid. Unauthorized changes to books may not be noticed. Transactions may be posted to the wrong account / project / business area.	Vouchers subject to month end including all adjustments are approved prior to posting to ensure the completeness and accuracy of voucher information such as price, quantity, amount, and vendor.	4.0	X			X				X	Select a sample from the general ledger vouchers and observe as if they are approved.	Peoplesoft Oracle				3			12.0			2				8.0				3			12.0

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						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
67	Adjustments & Ledger Maintenance	Credits for returned goods, allowances, and other adjustments are recorded and all legal liabilities are met.	Past due items may result in legal litigation and credits may not be accurately recorded.	Past due items and open credits are reviewed on regular basis.	3.0		X		X				X	Select a sample from open credits and past due items. Verify if they are reviewed by the related personnel.	Peoplesoft			2				6.0		1					3.0		1					3.0
68	Adjustments & Ledger Maintenance	Postings are complete, accurate and valid.	The bank amount in the books may not agree with the amount at hand in bank.	An independent person reviews the bank reconciliation. The bank account is reconciled automatically daily, with exceptions cleared manually.	3.7		X		X				X	Document segregation of duties between disbursements and bank reconciliation. Select a sample of reconciliations and review unreconciled items. Ensure totals agree to the general ledger and reconciling items are properly supported and explain. Ensure calculations are in line with company policy. Ensure reconciliation is reviewed by an independent person	SAP Peoplesoft General				3			11.1				4			14.8					4			14.8
69	Adjustments & Ledger Maintenance	All purchases are made for a valid reason.	Fictitious invoices and related supporting material may be inappropriately inserted into A/P files used to clear vendor invoices to affect inappropriate payments.	Physical access to accounts payable files, checks, documents, receiving files, and purchase order files used in managing the A/P and procurement processes are restricted	3.0	X				X			X	Observe the physical controls over accounts payable files.	General				3			9.0				4			12.0				3				9.0
70	Return	Credits for returned goods, allowances, and other adjustments are recorded.	Credits may not be accurately recorded.	Goods returned memos are prenumbered and reviewed regularly.	2.3		X		X				X	Observe a goods return process and investigate as if the memos are prenumbered.	Peoplesoft			2				4.6				3			6.9			2					4.6
71	Return	Returns, allowances, or other adjustments are approved.	Fictitious return invoices are recorded	Return approvals by the relevant authorities are required.	3.0		X		X				X	Select from the returns and observe as if they are approved by the relevant authority.	General Peoplesoft			2				6.0				3			9.0			2					6.0
72	Return	Return process is valid and accurate	Credits are not timely received from suppliers for returned goods	GDN (Goods Dispatch Note) for returned goods are recorded on the system via a return to vendor transaction that automatically relieves quantities from inventory and records a negative goods receipt note on the system. Negative goods receipt notes on the system are reviewed as part of goods received not invoiced reviews to ensure expected credits receive appropriate follow-up.	3.7		X		X			X		Observe a return process and investigate whether the return process is performed against a GDN	General						0	0.0						0	0.0						0	0.0
73	Return	The original transaction is appropriately reversed out from the system.	The original transaction is inappropriately reversed out from the system.	The system will automatically verify the following, before a reversal entry is accepted: - no cleared items - original transaction was within the original posting module	4.0	X			X			X		Determine if the system or Finance Department checks for reversal entries.	SAP				3			12.0				4			16.0			2					8.0

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						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
74	General	Duties are adequately segregated.	Users may have unauthorized access to the purchasing transactions which may result in financial loss.	The following duties should be segregated: - Create PO - Authorizing PO - Receiving goods - Prepare general ledger vouchers - Approves general ledger vouchers - Create / change to vendor master file - Counting inventory - Adjusting inventory - Invoice entry - Invoice posting capabilities are segregated from the following: Vendor/bank master file creation/change - Accounts payable approval/review	5.0	X					X	X		Review user profile for conflicting access.	SAP Peoplesoft General Oracle		1						5.0				4			20.0		1						5.0
75	General	Access rights are provided to the authorized personnel.	Users may have unauthorized access to the purchasing transactions which may result in financial loss.	The following access rights should be restricted to the authorized personnel: - Create PO - Authorizing PO - Receiving goods - Prepare general ledger vouchers Approves general ledger vouchers Create / change to vendor master file - Counting inventory - Adjusting inventory - Invoice entry - Post, change, delete parked and ‘normal’ documents - Park and release parked documents - Block and unblock documents. - Non-purchase order invoice entry - Reverse documents - Access to the configuration settings such as posting approval, matching rules and duplicate invoice settings, tolerance limits etc. - Payment processing	5.0	X			X		X	X		Review user profile for the access rights.	General			2				10.0				4			20.0		1						5.0

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						P	D	PR	IP	PC	SoD	A	M			0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total	0	1	2	3	4	5	NA	Total
76	General	The controls are defined and documented.	The controls may not be performed which may result in unauthorized and/or inaccurate purchasing transactions.	Adequate procedures exist for purchasing processes including the following sub sections: - Ordering - Goods Receipt - Invoice Processing Payments - Adjustments & Ledger Maintenance - Return - Vendor Master Data - Competitive bidding	4.0	X		X	X				X	Observe if the procedures are prepared and published.	General		1						4.0					4			16.0			2					8.0