EÖTVÖS LORÁND UNIVERSITY
FACULTY OF INFORMATICS

The IT modeling of an ERP human resource module for human resources on a methodological basis

Supervisor:  
Bálint Molnár  
Associate Professor

Author:  
Ali Dawood Salman  
Computer Science MSc
EÖTVÖS LORÁND UNIVERSITY
FACULTY OF INFORMATICS

THESIS TOPIC DECLARATION

Student:
Name: ALI DAWOOD SALMAN Code: FD2FAD
Type: full-time student Course: Computer Science MSc

Supervisor:
Name: Dr.Balint Molnar
Affiliation with address: ELTE Faculty of Informatics
Department of information system
1117 Budapest, Pázmány Péter sétány 1/C.

Status and qualification:

Title of the Thesis work:

Title: The IT modeling of an ERP human resource module for human resources on a methodological basis

Topic of the Thesis work:

methodology tools:
Process description;
Data structure;
Information architecture;
First  Description of the ERP module with the chosen methodology.  
Second  Analysis of the module's features based on the description  
Third  The possibilities of comparative analysis:
  a.  Other industry standard manufacturing ERP systems;  
  b.  Open Source Systems;  
  c.  Cloud-delivered ERP systems  

The topic proposal:

Develop some program then analyse it according to Design Science Research.

1. Compare various approaches of HR modules of big ERP vendors, as SAP, ORACLE, Open SOurce etc. The basis of the comparison can be data model, function model, and business process model.
2. Investigate the country specific features, the flexibility, the adaptation capability of different systems based on the literature.
3. An extensive literature research, comparing, analyzing various aspects of HR and ERP systems, using statistics, data mining, data science, creating prediction, and comparison.

I agree to be the supervisor:

..........................................................
(Signature of supervisor)

I hereby request the approval of the topic of my thesis work.

Budapest, 2018. December

..........................................................
(Signature of student)

The topic of the thesis work has been approved by ELTE Faculty of Informatics.

Budapest, 2018. December

..........................................................
(Signature of approving Department Leader)
Abstract

The HR module in the Enterprise Resource Planning (ERP) systems give us an efficient solution to access the user interface of the beneficiary employee. Nowadays, the majority of the companies and organizations all around the world are highly depend on the HR module of the ERP system as a tool for supporting the HR departments, making it flexible to access other departments' specific employee data. The purpose of this research is to conduct a comparative study of the HR modules' of 3 major ERP systems, in order to provide a scientific approach for choosing the best one by investigating all of the aspects of the HR module. This practical case-study is an attempt to investigate the choice factors of ERP system Human Resource module, while giving more focus on Payroll management part of it. All of that is based on a practical investigation of Missan Oil Company MOC, and then providing recommendations for future developing of specific parts of the HR module and the HR department itself in the Company.

Keywords: ERP Systems, HR Module, Payroll Management, Missan Oil Company MOC.

Contents

Chapter 1: Introduction about the topics, motivation for choosing this thesis and a description of this study.

Chapter 2: ERP and information systems and the related parts to human resources management (HRM).

Chapter 3: An investigation of the Ministry of Oil in Iraq - Missan oil Company specific features of human resources, requirements for HR department, analysis of the processes, especially the payroll system, then modeling of the system using UML modeling language, business process model and notation.
Chapter 4: Analyzing the differences between 3 major ERP HR module solutions and the selection criteria for choosing the best one.

Chapter 5: The realization and the implementation approach of the study on the Missan Oil Company HR system.

Chapter 6: The conclusion and the recommendations of the study.
Chapter 1
Introduction
1.1. Introduction

The purpose of this master thesis is to examine the practical criteria for choosing ERP-based HR module for the companies and, to improve the management vision of the human resources management and payroll system. This chapter will explain the motivation for choosing this topic for the thesis; followed by the summary of the research topic outline.

1.2. Motivation

The overall challenges of the current systems in Missan Oil Company, which it confronts are:

1. The system supervisor (admin) fails sometimes to control the data flow.

2. The design of the database of the application system is old-fashion most of the times, due to the development and strategy in business and information technology causing a large slow in the data management system.

3. Data sharing is not possible in some cases, that leads to a conflict with data when entering by the user because the work on a stand-alone computer, the inputs data cannot be matched unless collecting all data from the others data entry.

4. Sometimes many data is lost and damaged during the update process.

5. Occasionally, the system does not provide accuracy in details or it may require a very high effort by the supervisor when proper results are needed, resulting in a delayed transmission of the reports.

6. Sometimes, some errors making the user not able to access and benefit from data from anywhere on both mobile and Internet applications ....etc.

As it mentioned previously, the current applications in Missan Oil Company are not able to connect and share data effectively, in order to be improve the business efficiency, the company aims to improve the automation and optimize the internal management of the activities through the purchasing an new ERP solution and this practical research is to provide the choice criteria for the HR module which has the most focus in the company project.
1.3. CHALLENGES

The seven trends presented here set the stages for the development of concrete links between HR performance and organizational performance. Three important challenges are identified as following:

The human resources function should be integrated into the strategic planning and operational framework of the organization. It is essential that human resources become involved in the overall strategic direction of the organization. Also, it must be an active participant in the organization's operational planning. Otherwise, the important link between human resources and the organization's bottom line will not be clearly identified nor fully realized. It is no longer acceptable for organizations to develop strategic plans without considering all the ramifications of the employee costs or the potential contribution of employees to strategic initiatives. HR must be an integral part of the planning and not an add-on part of the process. The human resources staff must build relationships with other key managers in the organization, with a particular focus on the line organization. The line function has a responsibility for achieving major organizational goals, and it must have the support of the HR department to achieve those goals. In many cases, the extent of the combined contribution of the line organization and the HR staff depends on the quality of their relationship. The challenge is for the HR staff to refine and improve this relationship. The HR staff must improve techniques and processes in order to measure the effectiveness of the function. This important challenge is relatively new to the field. For too many years the cost of human resources has been recognized and not challenged. Employee contributions have been forced, not inspired, and organizations are now faced with the consequences. Programs have been added, but the return on the investment has not been developed. The HR staff must implement specific processes appropriate for the organization to measure the contribution. [2]

1.4. Research methodology

The main objectives of this research are to study the specific features and analysis the requirements, analysis the procedures, at the Iraqi Ministry of Oil - Missan Oil Company in the field of human resources hiring, transporting, evaluating of the employees, retirement, archiving the documents of the employee and the staff information, furthermore their Implementation in the software modules and payroll system.
The research attempts comparative analysis between the approaches adopted among many ERP solutions in this area and to select the closest solutions ERP matching the best model for working in this company, and later to develop, implement and design a module of payroll and human resource management conform to the company's requirements, using Odoo and SAP as a framework.

1.5. The practical procedure:

In this thesis we will focus on a set of major points: first, collection of information, analysis of the requirements and details and the investigation of specific features of human resources in the Ministry of Oil Iraq – Missan Oil Company, solutions will be described through conceptual, logical and physical design using the Processing BPMN (Business Process Model and Notation) such as O-O design based on visual UML language, The implementation will be presented as proof of the concept, after that the study of two of the solutions of EPR systems I chosen SAP and Odoo, then analysis of the differences between EPR systems solutions in this area, Finally will focus on using a solution system that is closest to the framework that provides a development environment for business functions according to the analysis of the company's requirements.

1.6. Remark:

At the beginning of this chapter, we introduced the topic, the motivation for choosing this thesis with the challenges, and the topic research, as well as its remaining structure. In the next chapter, We will provide an overview of a detailed explanation of what ERP and information systems, with taking into the most important issues related to HRM.
Chapter 2:
Enterprise Resource Planning
& Information Systems
2.1. Introduction:

this chapter will include the general concepts information system (IS) with its components as well as the enterprise resource planning (ERP) and the software modules.

2.2. The Information System (IS):

Definition: An information system is systematic for the collection, regulation, storage and communication of information. [1]

Further, an information system is a group of a set of coherent entities which together act like a big entity.

The information system is needed for the operational capabilities of enterprises (for example payroll), for additional support of decisions in managerial circles informational systems, sum of procedures and activities which store, produce, operational duties of the enterprise.

" The five most important components that must be together in order to produce information system are:

1. Hardware: the term hardware refers to the physical technology that works with information. This category includes the computer itself, which almost referred to as the central processing unit (CPU), with the support supply.

2. Software: any hardware needs to know what to do and how the system function, with what the role of software, we can divide the software to two types: system software and application software, the system software can be the operating system, as for the application software is prepared for specific function tasks.

3. Databases and data warehouses: each organization has some information needs, different information according to the needs of the organization, a library keeps a list of members, the books, due dates, fines. A company needs to save information about employees, departments, salaries. these parts of information are called database.

4. procedures: every information system are needed to run the system and the procedures they follow so that the knowledge in the huge databases and data warehouses.
5. Human resources: the human element is the final component, and possibly most important, component of information systems is the human element: people who need the operation of the system and procedures that they follow so that knowledge can be converted in large databases and data stores in learning that can explain what happened in the past and guide future work these actions can be called (data mining). [1]

### 2.3. Enterprise Resource Planning (ERP):

Every organization needs to provide information from all operations in a way that ensures that it is a fully integrated system, a system that simplifies the flow of information and coordinates all resources and activities within them, the ERP as definition by the company Fitrix ERP stands for Enterprise Resource Planning. ERP is an enterprise-wide information system that facilitates the flow of information and coordinates all resources and activities within the business organization. Functions typically supported by the system include manufacturing, inventory, shipping, logistics, distribution, invoicing, and accounting. Some solutions now embed customer relationship management functionality, a wide variety of business activities including sales, marketing, billing, production, inventory management, human resource management, and quality control depend on these systems. The ERP system assists in managing the connections to outside stakeholders as well as enhancing performance management. It uses a centralized database and usually relies on a common computing platform. It provides the user with a unified, consistent, uniform environment. [3]

The original Enterprise Resource Planning (ERP) solutions, introduced in the 1990s, were primarily designed for and used by manufacturers. Today, ERP solutions have evolved and served as a tool to manage the project life cycle for professional services firms. These include firms involved in IT services, architectural and engineering, design and planning, system integration, and management consulting, to name a few. [4]

Figure 2.1: elicitation ERP.
Figure 2.1: elicitation ERP

the ERP helps the organization to improve the performance of its operations, making it more reliable and high quality and less expensive, and increases the speed of response and the ability to achieve the objectives, when using information from all activities within the organization is synchronized and available in real time and in a manner Easy and accurate.

The first step in choosing the ERP is to analysis with understanding the action of the organization and the industry or the field in which it operates in order to determine the general framework in which to choice ERP. There are three basic ways to select ERP solution which is appropriate to the organization:

1. Choosing a Ready System (Cloud Computing Services)
2. Choose a flexible (open source system)
3. Build a system from scratch

ERP consists of a standardized database that contains all the data for the software modules, including:

- Human Resource
- Finance & Accounting
- Inventory
- Sales & Marketing
- Production
- Purchase
- Customer Relationship Management(CRM)
Figure 2.2 shows the diagrammatic of General ERP system modules.

![ ERP System Modules Diagram ]

**Figure 2.2 : General ERP system modules .[5]**

**Benefits of ERP:**

ERP modules the following benefits for businesses:

A purpose-built ERP allows an organization to quickly and painlessly transition to a new, shared environment, while allowing Customer Relationship Management (CRM) data to seamlessly integrate into project planning and contract management, collaborative project management, and tracking tools (often referred to as front office applications) can work in tandem with back office applications such as accounting, ERPs facilitate the flow of information regarding the status of every project among all of the relevant people and business processes. Professional services firms experience the following benefits: [4]

- An executive-level view of project and company health
- Centralized, accessible information
- Increased efficiency through automation of core business practices
- Improved cost control with integrated time & expense reporting
- Shorter billing cycles, improved cash flow, and increased utilization levels
- Improved project management and delivery
• Greater marketing effectiveness
• Improved client relations
• Streamlined and more effective proposal development

Some companies can be provide ERP solutions:
Odoo
Microsoft
SAP
ORION

2.4. Remark:
In this chapter, we presented a review of IS and ERP approaches with their components. In the next chapter, we will provide the case study of the Ministry Of Oil in IRAQ - Missan Oil Company MOC and the features of the Human Resource system.
Chapter 3:
The investigation of the features of Human Resource System
of the Ministry of Oil in IRAQ - Missan Oil Company MOC
3.1. Introduction:

In this chapter, we will present a more detailed investigation of the specific features of the regulations of the HR and its payroll system in the Ministry of Oil in Iraq - Missan Oil Company. The chapter will start with detailed definitions of HR module as well as its payroll system, transporting and hiring. This is followed by modeling of the specific characteristics of existing HR regulations in Ministry of oil in Iraq - Missan Oil Company, using of BPMN (Business Process Model and Notation) and DFD (Data flow diagram) of HR system.

The information of the presented study was collected throw a meeting with the Human Resources manager and some staff who are working in Human Resource Department.

3.2 BPMN

WHAT IS BPMN?

"Business Process Model and Notation (BPMN) is a standard for business process modeling that provides a graphical notation for specifying business processes in a Business Process Diagram based on traditional flowcharting techniques. The objective of BPMN is to support business process modeling for both technical users and business users, by providing a notation that is intuitive to business users, yet able to represent complex process semantics. The BPMN 2.0 specification also provides execution semantics as well as the mapping between the graphics of the notation and other execution languages, particularly Business Process Execution Language (BPEL)." [11]

BPMN provides us to draw a notation and processes modeling to be a simple concept, that Benefits of using BPMN Many of them make The idea technical is understandable between the design and implementation of the procedure also reduces the time and gives us more control over the management.

The main elements of BPMN are classified into categories namely:

1. Swimlanes
2. Flow Objects
3. Connecting Objects
4. Artifacts.
are shown symbols of the elements. In addition shown category of the core elements shown in Table 1, there is a more extensive list of business process constructors in the BPMN notation.[12]

<table>
<thead>
<tr>
<th>Flow Objects</th>
<th>Connecting Objects</th>
<th>Swimlanes</th>
<th>Artifacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events</td>
<td>Sequence Flow</td>
<td>Pool</td>
<td>Data Objects</td>
</tr>
<tr>
<td>Activities</td>
<td>Message Flow</td>
<td>Lane</td>
<td>Groups</td>
</tr>
<tr>
<td>Gateways</td>
<td>Association</td>
<td></td>
<td>Text Annotation</td>
</tr>
</tbody>
</table>

Figure 3.1: the elements of BPMN

3.3 HRM module:

HR Management is defined as a set of integrated functions (target identification, planning, organization, direction, implementation, monitoring, and performance evaluation) and consistent use of available resources (human, financial, technical, information) to maximize the organization's objectives.

The methodology for dealing with human resources, based on the fact that this management is a strategic partner in the overall planning of the organization and on the basis of balancing the achievement of the objectives of the organization and the realization of the ambitions of individuals. Humans are the most important assets of any organization and the basis for its success.

Human resource management is the process of recruitment, selection, orientation, induction training and development of performance appraisal to make up the definition of human resources management human resource management recruitment process and staff development to become more efficient to the organization. [13]
A series of decisions on functional relationships affecting the effectiveness of the organization and the effectiveness of staff. Is the process of attracting and developing individuals and maintaining them within the framework of achieving the objectives of the organization and achieving the objectives of the employees. The success of management is to involve human resources management in the overall strategic planning of the organization. Priority is given to the fact that the human element is already an investment that must be managed and developed effectively and efficiently if the Organization is to achieve "long-term productivity and performance". the main objectives of human resources management are to achieve efficiency and equity.

Human resources strategies are the actual areas of operational practice in the area of human resources, which are in the form of detailed work plans that can be implemented day by day.

Goals and Benefits

Successful management of human resources:

- A homogeneous workforce: in terms of cultural, training, behavioral background.
- Productive workforce: Achieve production or service according to the specified standards on time.
- An effective workforce: The work is done in the best ways, the lowest cost and the shortest time.
- A stable workforce: The lower the turnover and the absence, the stronger the organization and its effectiveness.
- Developing the capacity of individuals: through training.
- Achieving belonging and loyalty: through the organization's keenness to satisfy the staff especially the most competent of them.

Currently, human resource management systems encompass [1]:

- Retaining
- Hiring
- Administration
- Managing Payroll
- HR planning
- Recruiting/Learning management
- Performance record
- Employee self-service
- Scheduling
- Absence management
- Analytics
- Employee Reassign module
- Grievance handling by following precedents
3.4 The Case Study:

As it was mentioned, the purpose of this study is to represent an investigation of specific properties of the existing regulations on HR in Ministry of Oil in Iraq in order to examine and to carry out specific criteria and factors which help in the selection of a better ERP system.

We aspire to proceed to the best ways to achieve The features of HRM of any software in Iraq enable all types of enterprises to streamline the core HR including personnel management, organizational management, training and event management, time management, payroll management, etc, anywhere, anytime at any device.

Oil organizations/companies are one of the largest industrial facilities and one of the most important vital facilities in the country. They have a great responsibility in the production of energy to meet the growing needs, which requires adopting the latest systems and methods and using modern technology to raise performance and reduce costs, especially as organizations cope with the changing external variables. To develop its system to cope with these variables and to conform to economic orientations that have the flexibility and ability to respond quickly and deal with those changes.

Our modern world has tremendous changes and developments, more companies are realizing that a traditional way of running a business is not so effective in the changing workforce so that exists today. There are many different ways in which these companies change their workforce and organizations to incorporate new ideas into human resources management.

The technological revolution in the world today supports the management Data stronger, security, authentication, controllable, and Standardization of data source.

One of the biggest problems of the company is that the routine procedures very large and boring when an employee needs to obtain the official signature from the Chief Director, they are series of routine causing the delay and exhaustion of working time.

In addition effort challenges with time and daily work pressure, also increase staff constantly leads to appear us a lot of problems and complications because of The management of the software systems and database which we work on it that dealing with huge data.

I have mentioned prior, Current software in Missan Oil Company are not able to connect and share with each other, to improve the business achievement, Our company aim to automate and optimize the internal management of their activities through the same information system using an Enterprise Resource Planning system known by the acronym ERP, In software solutions the ERP system is the Best for any information system For many reasons.
the HR management module should be basically deals with the functional departments that a company might have and by removing job titles and other physical barriers, like office walls. This kind of change helps the employees to grow and to think of their companies as their own. This is a very effective tool in the HR department as it keeps the employees at bay and also helps them to help the company grow further. The employees to be happier and thus their work is increasing productive and more efficient.

HRM plays a very important and strategic part for the success of any organization. HRM is integrating as a systematic, in particular, human resources activities and core operations with the IT field, while the programming of data processing systems have evolved into routines and standardized packages of ERP software.

It is important that the HR function of the organization is supported by IS to provide effective services and help improve processes.

The role of the HR function is supportive since no other business operations can be carried out without first input from HR.

The HR function can be defined as a function or organizational unit dealing with persons in recruitment, training, promotion, termination, record keeping and meeting other legal requirements.

### 3.5 BPMN with Zachman Framework

we can define the Zachman Framework is practice for conducting analysis, design, planning, and implementation, using a holistic approach logical at all times in order to implement the strategy.

John Zachman has published a different approach to system development elements More logically through rows and columns

The columns in the matrix consist of the organization's data that each person needs to form his or her own point of view, and the data are determined by answering the question (what?), The second column represents the functions or operations of the organization, which are determined by answering the question (how?), The third column represents the location or area where the operations are conducted and which is determined by answering the question (where?), The fourth column represents the persons and organizations associated with the
organization and are identified by answering the question (who?), The fifth column represents the time or events associated with operations that are determined by answering the question (when?), The last column represents the cause or motive for doing the work and is determined by answering the question (why?).

Bellow the answer For our BPM with Zachman Framework:

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>What</td>
<td>Business data of current HR</td>
<td>Database management system (DBMS) type requirements constrained by logical data models</td>
</tr>
<tr>
<td>How</td>
<td>Function Investigation Enterprise HR procedure at Ministry Of Oil in IRAQ - Missan Oil Company specific features</td>
<td>Specifications of applications that operate on particular technology platforms, Development the HR with one Solutions of ERP Module</td>
</tr>
<tr>
<td>Where</td>
<td>the locations Pc HR Software work are separately</td>
<td>To be Specification of network devices and their relationships within a physical network</td>
</tr>
<tr>
<td>Who</td>
<td>Company Staff Design</td>
<td>Contract with Company for Solutions software, or use open source software solutions ERP</td>
</tr>
<tr>
<td>When</td>
<td>Timing definitions operating to sequence activities Since 2008 – 2019</td>
<td>The events begin 2019 – the first estimate until 2020</td>
</tr>
<tr>
<td>Why</td>
<td>Operating characteristics of specific technologies constrained are determined, There are more reasons, for the summary, the current program does not perform well to do the purpose</td>
<td>to improve business achievement, Our company aim to automate and optimize the internal management of their activities through the same information system using an Enterprise Resource Planning system known by the acronym ERP</td>
</tr>
</tbody>
</table>
3.6. Investigation of Ministry of Oil in IRAQ - Missan Oil Company  specific features of HR

Well, all the ministries, government companies and the private sector of the worlds have Human Resource management for controller and Staff management, Yes, most companies are similar in System Human Recourse, But there are more companies that differ in simple parts of the HRM, These Differences are according to the requirements of this Company.

The features of the HR management of MOC enable to Organize the core HR including Staff management, organizational management, training and event management, time management, payroll system, etc. Anywhere, anytime at any device Pce computer.

But till now the software of HRM is weak because all software is designed in the past and old, now we start first step to develop all company software To conform with the Revolution of the technological world, ERP, Electronic Government

I collected information and conducted a survey on the HR department of Missan Oil Company, I will explain the requirements of the workflow system.

The figure 3.1 it presents Data Flow Diagram of HRM in Missan Oil Company.
3.6.1 Hiring and Transporting

1. Hiring

When a company hiring, they need to ensure that they hire suitable employees. There are several steps involved in the hiring process.

At Hiring system the interviewing and hiring process, the department is requesting develops as a short list of candidates based data impairment by the HR department after that human resources department offers the Jobs required as a short list, thus creates a file to each candidate depending (the candidate completed submitted the application according to the requirement),
if the candidate matching to the requirements of hiring. The HR informs the candidate of the interview date, after the interview the HR updates candidate's file to indicate whether he or she is a possibility for hire, with the complete the Documents required, the finally the candidate can be starting for the job.

There are two types of offers jobs in the company Permanent Staff, Temporary Employs.

**I. Permanent Staff:** He is a permanent employee in the Iraqi Ministry of Oil, has all the rights provided by Iraqi law, Furthermore He has a pension after he is retired, must be informed (HR administrator) to add the new Employ in HR Database and Continue updates, figure 3.3 shows Business Process Model and Notation Hiring of permanent employee.

![Figure 3.3: BPMN-Hiring- permanent employee](image)

**II. Temporary Employs:** The Company / Ministry contracts with Many Employs to work with them temporarily, but the Employs Temporary He hasn't a pension when he is retired, Contract of The temporary employee ends every 1 year, and can renew the contract with the company another time, must be inform (HR administrator) to add the new Employ in HR database and continue updates, The figure 3.4 shows Business Process Model and Notation Hiring of Temporary Employs.
2. Transporting the Employ

Firstly, I would like to clarify that transporting Employ in IRAQ includes only the permanent staff.

That means the transfer of the employs from his Job place to another place, through a request submitted by the employs and provided that the approval of the Chief manager of his work. That is the Chief manager rejection the request that's mean the request is to be canceled and stay the employs in his current place, or when the Chief manager is approval, the Employ is transferring to a new place,

There are many types of transporting, the details are below:

1 - Transport inside the Ministry:

It's Means the transfer of the employs from his Job place to another Job place provided that he is inside the Ministry of Oil in Iraq.

Here We Have two approach to transport:

1 ) Transfer inside the employs company: from his department to another department, The employs should submit the transferring request to the Chief manager responsible for him, If the Chief manager is rejected the request that’s mean the request is to be canceled, or when the Chief manager is approval, the transferring order shall be issued from his Job place of work to the new department Job and the employee is entitled shall Keep all his rights and
salary, the HR manager adjusts the employee information record and transfers it from one department to another.

II) The second transferring, the employs can be transferred to another company: from the company where the employs works to another company, the employs shall submit the transferring request to his Chief manager. If the Chief manager is rejected the request that’s mean the request is to be canceled, or when the Chief manager is approval, the transferring order shall be issued from his Job place of work To another company and The employs is entitled shall keep all his rights and salary, the HR Manager closes the employee record.

2 - Transferring to another Ministry

From the Ministry of Oil in Iraq to another Ministry, The employs submit the transfer request to the Chief manager responsible for him. If the request is refused, the employs will remain in his Ministry and company place of work.

Or when the Chief manager is approval, The request shall be submitted continue to the Minister of the Ministry Of Oil, The transferring order shall be issued from the Ministry of Oil to the Ministry to the other ministry that transfer request has been submitted, the HR Manager closes the employee record.

3.6.2 Payroll System

Generally, The payroll is the wage paid by the Ministry, Company, office or From the where the job works, whether the work is in the government sector or the private sector.

Payroll vary from state to state, where the state economy plays an important role in the strength and weakness of payroll. As well as companies and institutions operating in a country, subject to the economy and strength.

The payroll is paid to employees in the public and private sectors after thirty days.

But there are Few countries provide their employees with salaries on a daily or weekly basis.

In most countries, the employee's income (salary) increases each year and the salary also increases when the employee is promoted to the rank after his salary.

The payroll system is an integral part and an entitlement that is integrated for all employees in all companies, All financial implications of transactions recorded during the month are automatically Through equation payroll.

27
The calculation of the payroll equation for the employee in the MOC consists of the following parts:

1. Staff Information

All Ministries, Companies, Organization, has records and data of employee information, at past the employee records and information were paperwork, but with technological development became collection and store the staff information records in databases to accessed electronically. The real consequence of the management information systems is to provide different levels of solutions of management in an organization to helps the decision makers to make the right decision. Management Information Systems is a way to bring the information up to date in the readable form of the General Director, using the reports. The importance of staff information is easy to search and query and reporting accurately and systematically, the main objective of management information systems is to give unlimited benefit from the established use of data and to assist in the provision of information, management in the organization,

for example there are Periodical Reports are reports issued every time period, such as monthly, semi-annually, or annually, and special purpose reports - reports that the general director requests from the system at the time of need for making a particular decision or reports requested by the manager urgently, As well as the payroll, need import the staff data to do equation payroll process a monthly,

at Missan Oil Company the Information System contains basic data:

i. ID number: Each employee has own number.

ii. Employee full name: His name with parent and family name.

iii. Bank account.

iv. Department of Employee.

v. Job position.

vi. Date of Birth.

vii. Career Level: The new employee starts on the eighth level, the level changes every 4 years, for each level has differed salaries.

viii. Career stage: Each career level includes 4 stages, each stage is one year for each stage has differed salaries.

ix. Marital status: Every married employee is allocated an increase of funds.


xi. Full address.
xii. **communication information**: Email, phone number.

xiii. **Certificate**: The employee hiring is assigned to his / her certificate, any employee can obtain a certificate higher than his / her previous certificate during the period of his / her job, for Each Certificate has differed salaries.

also, there are employees they do not have a certificate.

Below types of certificates:

- Just reading (none Degree).
- Primary certificate.
- Secondary certificate.
- Preparatory Certificate.
- Bachelor.
- Master.
- Doctorate.

![Figure 3.5: Percentage of certification Employees in the company](image)

**2. Motivation System**: When the company's petrol production is increased by more than two million barrels per month, it is considered an achievement for employees and a monthly incentive is paid to them.

**3. Rewards System**: An employee who performs an extra effort in his job furthermore (S)he works with enthusiasm is rewarded with an amount of money on his salary, for example, in our staff we have an employee ‘E1’ he spent a 10 days to complete a project and another
employee ‘E2’ completed the same project in 2 days. ‘E2’ performed better in that project. therefore the ‘E2’ worth the reward.

4. Timesheets:

A timesheet is a day of the amount of time an employee has spent at the work, in a particular project, or working for a particular client. This information can be recorded on paper, spreadsheet, or in the cloud software system such as our Timesheet module. By tracking the time at which the employee starts work and finishes work, and any breaks they have made, a timesheet can be used to calculate the employee's salary for a day, week, or month. Since project-based work is becoming more common, timesheets aren't only used to calculate the payroll. Projector client timesheets are providing more detailed records that show how much time each project or client takes, which means that they can be used for billing purposes and to help manage the project. These types of timesheets are also useful for HR staff to analyze the activities being carried out and the amount of time taken that can help in planning the work. [9]

The days an employee has spent at work, the employee can be to take a vacation for a period of 3 days maximum monthly, otherwise, more than 3 days is considered a deduction from the salary of the employee, Figure 3.4 below the Business Process Model and Notation for payroll process in the company.
Figure 3.6: BPMN - Payroll process

The Payroll solutions in ERP Human Resource will help the company save time and costs by reducing administrative work, reducing traditional methods and preparing documents to manually pay employees' salaries.
• Reduce administrative work in the preparation of checks and reports.
• Cost saving and time preparing monthly reconciliation reports and adjustments.
• Provide the highest levels of security.
• Save lost staff time during the traditional way of paying salaries.
• Provide Detailed customer reports on payments.
• Better control over the payments you deduct from it.
• Adjust timesheet for the attendance and leaves
• Adjust overtime: The system should enable the automatic to calculate of monthly overtime benefits according to the rules established in this regard, as well as the financial impact solution for all types of vacations, taking into account the actual direct dates of the holiday.
• Check the results of the final salary calculation.
• Close account salary monthly, that's mean process after the payroll.
• Print payrolls and monthly wages.
• Issuing bank reports, payment requests, and accounts.
• Print salary alerts or sends them as SMS or another way for the staff.

3.6.3 Retirement

Retirement is General system In all countries of the world, that means the retreat from one’s position work or occupation or from one's active working life. [1]

A retired person is a person who deserves pension, retirement reward or lump sum for his service in accordance with the provisions of the law, Article (1) of Article (61) and Article (III) of Article (73) of the Iraqi Law of 2014. [10]

There is the obligation to refer the employee to retirement in one of the following cases:

First, when (S) he is (63) years of age, which is the legal age for retirement, regardless of the length of his service, unless the law provides otherwise.

Second, (S)he suffers from bad health condition or disability if the competent medical committee decides not to serve because of his or her health condition
Third: Death

Fourth: A personal demand in which he wants to retire on the condition that he completes a professional service for more than 15.

The pension is calculated according to the following equation

The average salary multiplied by the number of years of pension service multiplied by the cumulative rate of 2.5% divided by 100

\[
Pension = \text{Basic Salary Rate} \times 2.5 \times \left(\frac{\text{Number of Months of Service}}{12}\right) / 100
\]

as well The pension shall not exceed (100%) of the final salary paid by the employee in the professional service.

The main role of the HR system is to calculate the employee's cumulative service at months and years, and print reports to officials (from the employee who is eligible for retirement),

As well as the closure of the registration of retired employee after retirement and then transfer the information from the Ministry of Oil to the General Office of Retirement.

3.6.4 Archive Documents Employees

One of the most important department of the HR system, which is subject to several responsibilities, the most important of which is the annual statistical doing for all staff in the company, which contain on age, gender and the degree of functional classification of statistics, for example there are report compulsory The company report to the ministry contains statistical the staff who will be retired from the year To 5 years for the company is equipped to fill the vacuum left by these retirees.

In addition, management of documents, where the archive of all incoming and outgoing documents of human resources, the supervision followed by this department is to enter the information of the document as the statement subject and statement number and date, as well the search process is the easiest possible through searching for statement subject or statement number.
3.7. Survey

we did survey with many employees from the different department about convert into e-government as the below (300 – Employees):

1- Do you agree with applied E-Government in Missan Oil Company ? (300 Employees)

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
<th>other</th>
</tr>
</thead>
<tbody>
<tr>
<td>224</td>
<td>51</td>
<td>25</td>
</tr>
</tbody>
</table>

2- If E-government is applied in Missan Oil Company, Does this will reduce the bribery?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>191</td>
<td>80</td>
<td>29</td>
</tr>
</tbody>
</table>

3- Which the department prefer to convert into e-department?

<table>
<thead>
<tr>
<th>HR</th>
<th>Finical</th>
<th>Materials</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>173</td>
<td>86</td>
<td>22</td>
<td>19</td>
</tr>
</tbody>
</table>

4- Do you expect HR ‘s performance will be increasing if convert into E-Department?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>211</td>
<td>78</td>
<td>11</td>
</tr>
</tbody>
</table>

5- Do you think that convert HR into E-department will affect positively on other department and company?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>I don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>166</td>
<td>93</td>
<td>41</td>
</tr>
</tbody>
</table>

3.8 Remark:

In this chapter, we presented a review of HRM and BPMN with Investigation of Ministry Of Oil in IRAQ - Missan Oil Company and specific features of HR with the components and presented the resulting survey with many employees. In the next chapter, we will present the ERP solutions and Compare of these features, and select which is to be the best with our company according to the previous Investigation features.
Chapter 4:
ERP Selection
4.1. Introduction:

In this chapter, we will present the ERP solutions With a definition of each one and Compare between its features according to requirements in Missan Oil Company, then choose the suitable solution.

4.2. Investigation of criteria for selection of ERP Systems:

A requirement of MOC from ERP -Solution classified into two types as below:

4.2.1 IT -Department Requirements (technical requirement) :

i. Availability: Because the work in Missan Oil Company continues among all time, so the solution should available (especially server side) for all users with the high response even different links, in case take place any issue in the main server so the slave server running without stop the work.

ii. Integrity: MOC have a third-party devices like E-Gates, IP-Cameras and a few software (for document management, payment, vacations, leaves .. etc.), Rather than the ERP-Solution should integrate with those or immigrates the old data into the ERP-Solution.

iii. Centralizing: Administrating of the solution have to centralize by IT-Staff, and all data must store in one place with back-up in different places.

iv. Security: MOC focuses on protecting its data and employees privacy so the important information should encryption with limited access.

v. Simplicity: The users using the solution will different field so that the interface for the solution must simple without the complexity and support multi-language like Arabic, English and maybe Chinese language (because there are several China Company work there).

vi. Flexibility: The rules in Iraq (even MOC) are often modified so that the solution should accept any modification, and MOC perhaps extended or divided into sub-companies.

vii. Archiving: The solution must stores all old documents (over 10Millions document).

viii. Cost: One of the most important thing, the licensee of software and support should reasonable prices.

4.2.2 Human Resources Requirement :
the features they needed on ERP-Solution:

i. Organization Structure: The Organization Structure can be defined in ERP Solution especially in the Payroll section like Company, Departments, sub Departments, company's bank, currency, and employees bank details. as the following:
1. Company
2. Departments
3. Locations
4. Bank and Currency
5. City, Sectors

ii. Document and Contracts: Manage documents and track some critical document that depended on other documents either expires or unexpired date of employees, for Example (Nationality ID Card, Passport, Tax Card, Graduation Document, Contract hiring ... etc.).

iii. Vacations, Attendance and Overtime: Vacation and Leave Calendar Holidays for a period can be generated with Weekly Off marked and Holidays during the period can be defined. This is used in calculating the leave days during leave application entry. The system maintains the types pre-defined leave types and for each leave type, multiple codes can be defined. For each Leave Code, the leave days accrual and leave days calculation can be defined.

iv. Attendance and Overtime: The timesheet is very important for the Payroll and the information is captured in this module. For Monthly Employees, Absent Days are captured and for Hourly Employee, Hours Worked details are captured. The electronic gate system manages attendance and departure by registering fingerprint or ID card. In different cases, you may need to capture the days absent or days worked to last month for which either payment was made or not made. This can be entered through the Attendance Entry – Previous Month option. Overtime hours worked details are captured through third-party device attendance.
   • Attendance
   • Overtime

v. Position and jobs: There are various employee Career Levels or (Career degrees) used in the Organization are defined here and for each Career Level (the new employee starts on the eighth Level. The Level changes every 4 years), There are various employee Career stages (Each Career Level includes 4 stages, Each stage is one year. Each stage has differed salaries), The actual hiring date of employees is defined by job titles and the placement types can be defined to group similar job titles.
   • Type Position
   • level
   • Stage

vi. Reports: the reports in Human resources are one of the most important fundamentals of application. It is an integral component for managing the business effectively activities and departments of your business. also, It also gives you the ability to decision making processes and partners, investors, investors, and stakeholders can
gain insights into the organization. thus the current accelerated rate of digital technologies increasing human resources operations, it is important that businesses benefit from modern digital reporting methods Reports are a summary of what we do, results are ordered, Speed, accuracy, and efficiency of comparisons, flexibility in obtaining results. [16]

For example, show the figure 4.1 below about Employee Annual Report Form on Human Resources

![Employee performance HR Annual Report Template](image)

Figure 4.1 : Employee performance HR Annual Report Template [16]

4-2-3: The Reports Required:

The most important reports that need in MOC

- Attendance Report Daily, Weekly, Monthly, Year
- Company Budget for Monthly payment payroll
- Salary Employee Report Monthly
- Bank Letter
- The report confirmed Employee during Period
- Annual Leave
- Motivation system Report
- Report monthly for Rewards
- Summary of monthly (Div/Dept)
- Position Status Report
- List of Employees new hiring during a month
- List of Employees Resigned during a month.
4.3 ERP solution

As we know there are a lot of ERP-solution in the world but we chose the below solution for several reasons.

1. SAP

SAP is the most famous ERP solution. Especially a lot of oil companies in the region (Middle East) using SAP, for example, (Aramco KSA "the Saudi Arabian Oil Company" [wiki]). So that I choose SAP in my comparison.

SAP: A 46-year history of success

Building on a track record of innovation. In 1972, five entrepreneurs in Germany had a vision for the business potential of technology. Starting with one customer and a handful of
employees, SAP set out on a path that would not only transform the world of information technology but also forever alter the way companies do business. Now 46 years and more than 404,000 customers stronger, more than ever, SAP is fueled by the pioneering spirit that inspired its founders to continually transform the IT industry. [14]

The "SAP" is the name of a company, that provide solutions systems, Applications and Products in Data Processing (Systems, Applications, and Products),

50,000 customers
190 countries
670 partners worldwide
650,000 users. [15]

2. Odoo

One of the most powerful ERP solutions, I have chosen it because of an open-source suite of business apps. It is built on a modular structure in which each app covers one business function and each app is installed as needed. Odoo is available to be installed on-premises as well as in the cloud. Odoo recently released a new version of its manufacturing app suite, adding quality, maintenance, PLM, and expanded MRP and MES functionality. In this document, we will compare the on-premises configuration of the latest release, version 10.

2+ million users
120+ countries
730 partners
7,300 apps in Odoo Apps. [15]

3. Microsoft Dynamics AX

Generally In Iraq and the company, in particular, rely on Microsoft products (operating systems, MS Office, etc...), and this will provide case of use, management, and integration.

Microsoft Dynamics AX is the most feature-rich of the five products in the Microsoft Dynamics ERP line. AX was originally released as a collaboration between IBM and Daamgard Data (as IBM Axapta) in 1998 before being acquired by Microsoft in 2002 and re-branded under its current name.

19,000 companies
30 countries
12,000 user group members
25 languages. [15]

4-4: Comparison between SAP, Odoo, and Dynamic- AX :

4.4.1. Multi-Warehouse, Multi Storage Locations, Multi Language, Multi Currency, and Departments

The information data must be divided and storage in Multi-Warehouse and deferent Storage Locations, And should support Multi-Language for example Arabic, English, Chinese. As it is known the MOC have Investment contracts with multi-international companies that deals financially in dollars and dinar Iraqi (Multi-
Currency), for prediction, probably in the future that will create a new sub companies and departments at Missan Oil Company.

<table>
<thead>
<tr>
<th>Features Comparison</th>
<th>SAP B1</th>
<th>Odoo Enterprise V10</th>
<th>Microsoft Dynamics AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Warehouse</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Storage Locations</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Multi-Language</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Multi-Currency</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Multi-Company</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cloud</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

4.4.2 Support EDI (Electronic Data Interchange), QR Code Support, RFID Support, Electronic Signature

We have mentioned in the previous chapter the ERP should support mobile devices, and third-party system (electronic gate).

<table>
<thead>
<tr>
<th>Features Comparison</th>
<th>SAP B1</th>
<th>Odoo Enterprise V10</th>
<th>Microsoft Dynamics AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDI *</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>BarCode **</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>RFID</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Electronic Signature</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Hint: * EDI is available in third-party software
** Odoo can be reading the QR code, but third-party software is required to print them.

4.4.3 Schedule Management, Attendance, Timesheets, Overtime, Vacation /Injury, Payroll, Recruitment, Retirement.

<table>
<thead>
<tr>
<th>Features Comparison</th>
<th>SAP B1</th>
<th>Odoo Enterprise V10</th>
<th>Microsoft Dynamics AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule Management</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Timesheets</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Attendance</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>------------</td>
<td>-----</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>Overtime</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Vacation / Injury</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Payroll solution and Staff information</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Recruitment / Hiring</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Retirement</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>VoIP * (Voice Over Internet Protocol)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Hint:** *"Voice over Internet Protocol (also the voice over IP, VoIP or IP telephony) is a methodology and group of technologies for the delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet."* [1]

**4.4.4 Reporting Work Time, Production Costs Analysis, Analytic Accounting, CSV Export, Save Custom Reports, Special Report.**

<table>
<thead>
<tr>
<th>Features Comparison</th>
<th>SAP B1</th>
<th>Odoo Enterprise V10</th>
<th>Microsoft Dynamics AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Time</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Production Costs Analysis</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Analytic Accounting</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>CSV Export</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Save Custom Reports</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>ABC Analysis</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Reports Flexibility</td>
<td>★★★★★</td>
<td>★★★★☆</td>
<td>★★★☆☆</td>
</tr>
</tbody>
</table>

**4.4.5 Statistical Planning Production Calendar, Multiple Scheduling Plans, Kanban Planning**

<table>
<thead>
<tr>
<th>Features Comparison</th>
<th>SAP B1</th>
<th>Odoo Enterprise V10</th>
<th>Microsoft Dynamics AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Scheduling Plans</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Production Calendar</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Kanban Planning</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

43
4.4.6 User Interface, Full Web Interface, Responsive Mobile UI, Android Native App, iOS Native App

<table>
<thead>
<tr>
<th>Features Comparison</th>
<th>SAP B1</th>
<th>Odoo Enterprise V10</th>
<th>Microsoft Dynamics AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Web Interface</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Responsive Mobile UI</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Android Native App</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>iOS Native App</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>User Interface, Simplicity *</td>
<td>5 / 5</td>
<td>3/5</td>
<td>5 / 5</td>
</tr>
</tbody>
</table>

Hint: * User Interface, Simplicity: According to HR workers opinion at the MOC.

4.4.7 Pricing

like most companies, Missan Oil Company, interested in getting the best offers to cost as much as you want to get all the matching features, Odoo Enterprise V10 is open source, with case of development, support and training there are additional funds, also SAP Business one cost with support and development that is relatively good with price offer Range.

<table>
<thead>
<tr>
<th>Features Comparison</th>
<th>SAP B1</th>
<th>Odoo Enterprise V10</th>
<th>Microsoft Dynamics AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>price offer Range</td>
<td>Suitable</td>
<td>Suitable</td>
<td>Expensive</td>
</tr>
</tbody>
</table>

4.5 Remark:

In this chapter, we presented the ERP solutions and Compare of these features, criteria for selection of ERP systems, in next chapter we will present a detailed about the Human Resource for Ministry of Oil in Iraq - Missan Oil Company, using different UML diagrams including use cases.
Chapter 5: Realization
5.1 Introduction:

In this chapter, we will present in details about the Human Resource system of Ministry of Oil in Iraq - Missan Oil Company, using different UML diagrams including use cases, class and sequence diagrams, and development part of HR according to the requirement of Missan Oil Company.

5.2. Human Resource services:

we mentioned in chapter 3 and 4, the HR system will include managing all operations and events on the staff, Payroll system, recruitment (Hiring), transporting, retirement, staff information, company positions.

5.2.1 UML diagrams:

General class diagram:

The diagram below (diagram 5.1) represents the necessary classes to ensure the proper functioning of the Human resource with the Payroll system to be used to implement.

Data specific classes, data type, and relationships with other classes, the Primary key to the main class of staff is the ID number (emp_ID) that represent the unique number, each employee held a different ID number, the maximum length of the ID number is 7 numbers.

one of the most important attributes in employee record is the Emp_flag, that refers to (employee flag), that takes signs:

N: initial state of an employee record

A: use with update record of the employee, for example, the employee has bachelor certification and he/she complete the master degree.

D: when deleting the employee record because of retirement or death

C: when the closed record of the employee, an employee transfer to another place out the company

thus the payroll system takes data from all other classes to implement the salary equation data from Staff information, Motivation System, Rewards System, timesheet for attendance monthly, to prepare payslip for whole employees.
Figure 5.1: HR class diagram

5.3. Use Case Diagram

5.3.1 Manage User and role Case
The main purpose of the status charts design is to understand the different ways of dealing the employee with the ERP system. Thus we will have an important summary of all user details, works, tasks on the system (interaction with the system), especially scenarios dealing with employees, departments or other software modules with the ERP. As well as set the goals to be achieved in the system, and know all the details of the system and focus on them for further development later.

**Administrator:** a person has high-level permissions in the administration of the system with management of administrative operations (create a user, alter user, delete a user, grant permissions).

**The goal in context:** Create a new user and give (him/her) permissions.

In this chart, we display a use case created by the administrator (the creation of a user must be limited to the administrator and an employee cannot create a user with another employee), administrator can also create roles, Where he will be classified according to these roles depending on the employee's role as a manager or an ordinary employee or official financial reports or character .... etc.

**Actor (s):** Manager (Administrator).

**Success End Condition:** User (authenticated) can manage all the system configurations Within level permissions given.

**Failed End Condition:** User cannot be able to authentication and login.

**Authentication:** identifying actors, based on a username and password. this is part of security systems, which is the process of grant individuals access permissions to the system based on their identity.

The schema diagram 5.2 below represents the System administrations and role use cases.
5.3.2 HR functionalities Management Use Cases

The goal in context: the HR staff is Managing all HR functions, with let the user access the HR System with high-level permissions.

Actor(s): Manager (Administrator).
**Success End Condition:** User able to manage all the HR functions, All departments system, with high-level permissions to add a new employee,

**Failed End Condition:** HR Staff cannot manage configured.

**Description:** edit employee record, update staff information,

Implementation the salary equation, preparation the required reports, manage retirement, tracing the age of the employee to be referred to.

manage motivation system: the number of oil exports monthly to apply the monthly motivation system when the number of oil exports great than 2 million barrels per month.

manage reward system, manage the timesheet and attendance monthly with the leaves, manage the overtime hours.

The schema below represents HR functionalities use cases diagram (diagram 5.3).
5.4. development part of HR according to the requirement of MOC

Retirement is general system in all countries of the world, that means the retreat from one's position work or occupation or from one's active working life. [1]

I mentioned a precedent in the case study, the retirement part is one of the most problems obverse a human resources employee. There are many employees that suffer from retirement procedures, deductions, human resources staff routines because the pension system doesn't
satisfaction for a reason the delay in the procedures may reach several months because there is no software system for retirement, where human resources staff depend on paper calculations to the process the retirement.

There is an obligation to refer the employee to retirement in one of the following cases:

First, when (S) he is (63) years of age, which is the legal age for retirement, regardless of the length of his service, unless the law provides otherwise.

Second, (S) he suffers from bad health condition or disability if the competent medical committee decides not to serve because of his or her health condition

Third: Death

Fourth: A personal demand in which he wants to retire on the condition that he completes a professional service for more than 15.

The pension is calculated according to the following equation

The average salary multiplied by the number of years of pension service multiplied by the cumulative rate of 2.5% divided by 100

\[
\text{Pension} = \text{Basic Salary Rate} \times 2.5 \times (\text{Number of Months of Service} / 12) \times \frac{100}{100}
\]

as well The pension shall not exceed (100%) of the final salary paid by the employee in the professional service.

The main role of the HR system is to calculate the employee's cumulative service at months and years, and print reports to officials (from the employee who is eligible for retirement),

5.4.1 The process of calculating the retirement equation with tables and attribute

According to the retirement with the rules and regulations in Iraq, the pension scheme composed the last nominal salary shall be 15% of the nominal salary plus 10% of the salary additional for the children, provided that the son is stated to be under 18 years or still student in case he is older, also the daughter under 18 years old or unmarried if she is older or still a student. the retirement equation Minus 5% of the nominal salary as taxes,

First: Has the employee worked at least 15 years

Second: the last of salary nominal completed before retirement

52
Thirdly: the children covered by parent retirement:

A) Boys are younger than 18 years old.
B) A boy student over the age of 18 are.
C) Daughters are under the age of 18.
D) A daughter not married over the age of 18.

Fourth: According to the Iraqi law there is an addition of 15% of the nominal salary.
Fifth: Taxes are calculated as a percentage based on the nominal salary.

Note: Iraqi law often changes many the system and the database they must be more flexible to accept any modification that may be made to the points above.

Diagram (5.4) below shows BPMN of retirement.

![Diagram of BPMN retirement](image)

Figure 5.4: BPMN retirement

that is a total rule for the equation of retirement monthly.

The retirement part includes several tables joined to each other, and each table contains a set of data related to the employee, Diagram (5.5) below shows tables and data types attribute, also Diagram (5.6) shows Entity relationship model between tables retirement.
Figure 5.5: Retirement Data flow diagram and data types attribute.

Figure 5.6: Retirement Entity relationship model.
5.4.2 Retirement Use Case Diagram

The goal in context, HR staff are managing process of calculating the retirement equation to each employee who they continuous in works for the purpose of monthly financial deductions, as well as employees referred to retirement.

The schema below represents retirement use cases diagram (diagram 5.7).

![Retirement Use Case Diagram](image)

Figure 5.7: retirement use cases diagram.

5.5 Remark:

In this chapter, we presented a detailed about the Human Resource for Missan Oil Company, using UML diagrams, use cases, class and sequence diagrams, and presented development part of HR retirement according requirement of Missan Oil Company. In the next chapter, we will present a general conclusion.
Chapter 6:
The General Conclusion
6.1. Preface:

Our modern world has tremendous changes and developments. ERP has become one of the most important tools. Most organizations want to improve their level of accuracy and efficiency. The HR module is on of the most important tools to achieving high competitive advantages to improve the future trends. As it can be seen, this study conducted a model that reflects the workflow and the processes of the Ministry of Oil in Iraq - Missan Oil Company by taking the advantage of meeting the human resources staff and gather information about the actual way of work.

In the previous chapters, we justified the research context including objectives and plain description of the thesis (chapter one), provided an overview of ERP and information systems with focus on all the issues related to HRM (chapter two), Investigation of the Ministry Of Oil in IRAQ - Missan Oil Company features of HR system (chapter three), analyzing the differences between several ERP systems, presenting the Iraqi's retirement services, its implementation and functionalities throughout screenshots (chapter five).

This chapter aims to conclude the overall research presented in this thesis and suggest further recommendations.
6.2. The Results

This case-based study on Missan oil company - that contains over 5000 employers - provided a detailed analysis of the HR system the HR modules of the major ERP systems in order to provide the ability to find the most proper choice.

The following diagram provide one of the results of this study which shows that SAP ERP system met the highest choice criteria.

<table>
<thead>
<tr>
<th>Reports Flexibility</th>
<th>SAP B1</th>
<th>Odoo Enterprise V10</th>
<th>Microsoft Dynamics AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>★★★★★</td>
<td>★★★☆☆</td>
<td>★★★☆☆</td>
</tr>
</tbody>
</table>

User Interface, Simplicity
According to HR workers opinion at the MOC : -

- SAP: 5 / 5
- Odoo: 3 / 5
- Microsoft: 5 / 5

Another important result - which concluded throw the previous detailed system analysis - is that the HR-Department in MOC needs to simplify multiple procedures which are: the
transfer of employer from one department to another which takes out about few weeks and when using of the SAP ERP, it will take quite less time.

As discussed in the fifth chapter, where discussed all the features needed in the HR like reports, documents management, overtime, attendances, Positions … etc. The SAP HR solution realize those features more with less time and processes.

In relation with the Payroll and retirement systems, employer's evaluation, change stage and level for employer The SAP system is more flexible for doing that and modifying it if it needed in the future.

Most of the HR employers are not the same level of certificates and different field (Economic, Accountancies, auditor ..etc. ) and with variant computer skills so the simplicity of the interface is extremely important for work, and SAP solution is the simplest in comparison with the others.

In MOC company there are over 10 million documents (+ 2M for HR ) which need heavy processing and SAP solution realize is the most efficient in this field according to the study.

6.3 Customization Conclusion:

The reason of the controversy around customization is to identify the complexity rate of the software with the development of some parts of the software to be suitable for Missan Oil Company, the risk of the implementation, the difficulty of the software upgrade in the future to determine whether the solution chosen will match or mismatch with the company’s requirements.

Odoo, as well as an open source solution but is not mature enough to handle custom and complicated services of large enterprises and the complication will rise up during the deployment and training of the employees, but Odoo could be a better alternative for SMEs who do not have much budget for customization but the heavy costs will appear in the customization and training phase due to the complexity.

6.4 Recommendation:

- SAP HR solution needs more customized retirement function in order the meet the case-study company requirements.

- MOC company need a refactoring of the data processing structure.

- MOC company need a special training for the staff of HR for using the HR module more efficiently.
References


[9] Naturalhr Transforming Business, Written by Natural HR, post, Apr 2017


[16] 3 Monthly And Annual HR Report Templates To Empower Your Business By Mona Lebied in Dashboarding, Jan 24th, 2018