

**ELECTRONIC HUMAN RESOURCES
MANAGEMENT
ANALYSIS, DESIGN AND
IMPLEMENTATION**

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**ELECTRONIC HUMAN RESOURCES
MANAGEMENT
ANALYSIS, DESIGN AND
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By

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DEDICATION

To my loving parents and sister whose encouragement and support have always been the reason

I have pushed myself further. I am deeply grateful to them!

ABSTRACT

Faculty of Economics and Administrative Sciences

Advisor: Igli Hakrama

Information Technology is considered to have been playing the most influencing role in the way society perceives and reacts to situations since the beginning of the 20th century. Many processes have become much easier with the implementation of technology in fields which were hard to even imagine the possibility of such interaction. From applications that allow you to be updated with the latest news, to those that keep you in touch with friends and relatives living away, or those that help you keep track of personal finances. The range is so wide, it would take too much time to list them all, but what is important though, is the fact that users are now aware that without these features, their lives would be quite different.

As much important as individual users are, there is no doubt that the impact of large companies and governmental institutions is much higher. Knowing that the awareness is risen and moreover taking into consideration the fact a country in development as Albania is constantly carving for new approaches in the information technology field, I believe time has come to provide a model for institutions and companies.

My thesis will solely focus on the aforementioned structures by creating a web-based system under the name E-HRM (Electronic Human Resources Management). As the name itself suggests, this system will serve to upload, maintain, manipulate, manage, review, analyze and distribute information about the organization's human resources. With the influence and study

conducted on similar systems around the world, this system will be adapted and changed to meet the needs of Albanian market.

There is no dedicated platform for Human Resources department in Albanian institutions or organizations which makes it difficult for employees working in this department to keep track of newly employed people, their leaves, or reports. On the other hand, it is sometimes difficult for managers to be updated on real time about tasks given to respective employees.

E-HRM will not only be helpful, but also very easy to use considering that a company might have employees of different ages and computer usage knowledge.

Keywords: human resources management, information system, technology, Albania

ABSTRAKT

Fakulteti i Ekonomisë dhe Shkencave Administrative

Udhëheqës: Igli Hakrama

Teknologjia e informacionit konsiderohet si një ndër faktorët me ndikim më të madh në mënyrën sesi shoqëria e ka perceptuar dhe ka reaguar ndaj situatave dhe ngjarjeve që nga fillimi i shekullit të 20-të. Shumë procese janë lehtësuar nga implementimi i teknologjisë në fusha të cilat fillimisht ishte e vështirë të mendohej arritja e një qasje të tillë. Duke nisur nga aplikacione të cilat lejojnë përditësimin me lajmet më të fundit, te ato që lejojnë mbajtjen e kontakteve me shokë dhe të afërm që jetojnë larg, ose ato të cilat lejojnë mbajtjen e shpenzimeve personale. Hapësira është aq e madhe, saqë listimi i tyre do të merrte shumë kohë. I rëndësishëm është fakti që përdoruesit e këtyre aplikacioneve janë të ndërgjegjshëm se përditshmëria e tyre do ishte shumë ndryshe pa to.

Pa mohuar rëndësinë e përdoruesëve individual, padyshim që impakti i kompanive të mëdha dhe institucioneve shtetërore është më i madh. Duke ditur që ndërgjegjësimi është rritur dhe për më tepër duke marrë në konsideratë faktin që një vend në zhvillim si Shqipëria është vazhdimisht në kërkim të qasjeve të reja në fushën e teknologjisë së informacionit, e them me bindje që ka ardhur koha për t'i ofruar kompanive dhe institucioneve një model të ri.

Teza ime përqendrohet tërësisht në ofrimin e një sistemi të ndërtuar në web, nën emrin E-HRM (Electronic Human Resources Management). Ashtu siç mund të kuptohet nga emri, sistemi do të shërbejë për të ngarkuar, mirëmbajtur, manipuluar, menaxhuar, analizuar dhe për të shpërndarë informacion lidhur me organizimin e burimeve njerëzore. Me ndikimin dhe studimin e sistemeve

të ngjashme në botë, sistemi do të përshtatet dhe ndryshohet për të arritur nevojat e tregut Shqiptar.

Mungesa e një platforme të dedikuar për departamentin e Burimeve Njerëzore në institucionet dhe organizatat shqiptare, e bën të vështirë për punonjësit e këtij departamenti të mbarëvijnë procesin e punonjësve të rinj, lejet e tyre, ose raportet. Nga ana tjetër, bëhet shpesh e vështirë edhe për menaxherët të përditësohen në kohë reale për detyrat e caktuara ndaj punonjësve.

E-HRM nuk do të jetë vetëm ndihmë për organizatat, apo institucionet, por gjithashtu do të jetë i lehtë në përdorim duke pasur parasysh nivelet e ndryshme të njohurive që mund të kenë punonjësit e departamentit.

Fjalë kyçe: menaxhim i burimeve njerëzore, sistem informacioni, teknologji, Shqipëria

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I take this opportunity to express my gratitude to Lea, my parents and grandparents, who bought me my first book, taught me how to read and for being the reason I aim higher each day.

Finally, a special thank goes to my friends, for being a source of motivation.

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Epoka University or other institutions.

Edlira Dede

June 2015

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LIST OF ABBREVIATIONS

E-HRM	Electronic Human Resources Management
HRIS	Human Resources Information System
IT	Information Technology
IS	Information Systems
PC	Personal Computer
UI	User Interface
OS	Operating System
MySQL	My Structured Query Language
HTML	Hyper Text Markup Language
CSS	Cascading Style Sheet
PHP	HyperText PreProcessor
FPDF	Free Portable Document Format
XML	Extensible Markup Language
UML	Unified Modeling Language
HR	Human Resources
HRM	Human Resources Management
HRD	Human Resources Department
MIS	Management Information Systems
Admin	Administrator

EIS	Employee Information System
LMS	Leave Management System
TMS	Task Management System
ERS	Employee Recruitment System
SME	Small Medium Enterprises

CHAPTER 1

INTRODUCTION

As a student of the field I know in how many ways information technology affects and touches my everyday life. During an ordinary day, the interaction with technology is so frequent, that it is sometimes hard to imagine a substitute for a certain device, or system. However I know it could have much more effect if society we are living in knew how to use it to facilitate the everyday processes of work, study, or even take better care of themselves. Business, education, and even healthcare have all been redesigned thanks to information technology [1].

Focusing on business, for it is the sector that most influences the creation of this platform, it is clear that with the development of technology, it has significantly changed. Creation of software and applications for businesses has facilitated the process of inner and outer interactions, saving thus time and resources. According to the latest statistics, the demand for applications coming in hand to businesses is higher than you might think. In March 2015, business apps were the second-most popular category, with a share of 10.14% of all apps being business apps (Figure 1) [2].

This figure, once more stresses the fact that engaging technology to business is the right thing to do in terms of facilitating work, but also managing better all the resources.

Countries like ours, unfortunately lack experts of interdisciplinary fields that would translate the business needs into programming languages and provide the organizations with the needed application. This is the reason why many of the current systems and platforms in use are either bought, or adapted to fit the local market as it should.

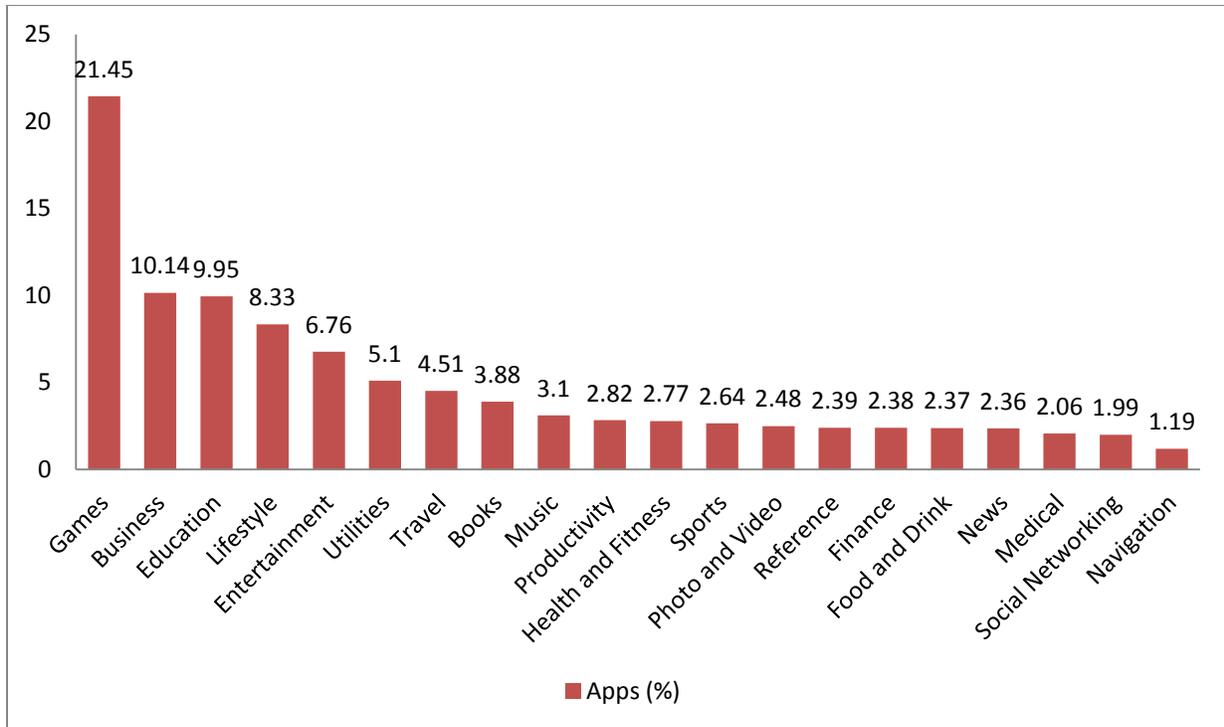


Figure 1: Share of active apps

Why E-HRM?

Human Resources department is one of the most important departments in an institution or organization. The department is in charge of managing the organization’s employees, commonly referred to as human resources.

Throughout the history, HR has developed significantly, following the trend of the society, which is in continuous change. From the times when society only dealt with agriculture, to modern days when agriculture is just a small part of the economy’s sectors, dynamics have changed. An important event in industrial revolution was growth of Labor Union [3]. A group of people were emerged to deal with politics and diplomacy, assuring the fairness of treatment during work hours.

HRD today doesn't have to deal with basic operations strictly related to employees' wages and salaries, or record maintenance, or health care. HR specialists have to go through a series of steps before saying that their job is done.

After identifying the vacancy at the organization or institution they work at, they should conduct an evaluation of need. This means that they have to prepare a job analysis and before recruiting, decide whether there should be any change to the position in terms of responsibility, or expertise.

Then, after preparing a job description, they should decide how to conduct the recruitment. Usually, companies look within their employees to fill a vacant position, because they believe that it would be easier for the employee to adapt to the new position, and also they have a guarantee on the loyalty of the employee. However there's not always someone that works already for the company to fill the position, this is why the HR has to develop a plan for outer recruitment.

A search committee has to be selected and then the position has to be posted for people to apply for that position. After implementing the recruitment plan, HRD has to review the applicants, select those appropriate in a shortened list, and notify them for an upcoming interview.

The interviews are conducted and after the selection is made, the recruitment is considered finalized.

All the aforementioned steps are part of staffing step, which recruits and selects the prospective employees. HRD though, has many more responsibilities.

Employees selected and hired have to be trained in order to be fully compatible with the position they now hold, but also in regards of the company's policies. Assuring thus a fair process of job,

by not expecting more than the employees' abilities, or by not requiring more than stated in the beginning.

Before compensation the employees and deciding on giving bonuses for them, besides the salary, HRD has to conduct a performance appraisal. Performance appraisal is crucial in terms of giving everyone credit for what they actually do. Methods used to conduct this step are various and different organizations use different methods. The most popular methods are rating scales and checklists, which respectively rate the employees and check tasks and characteristics that employees have.

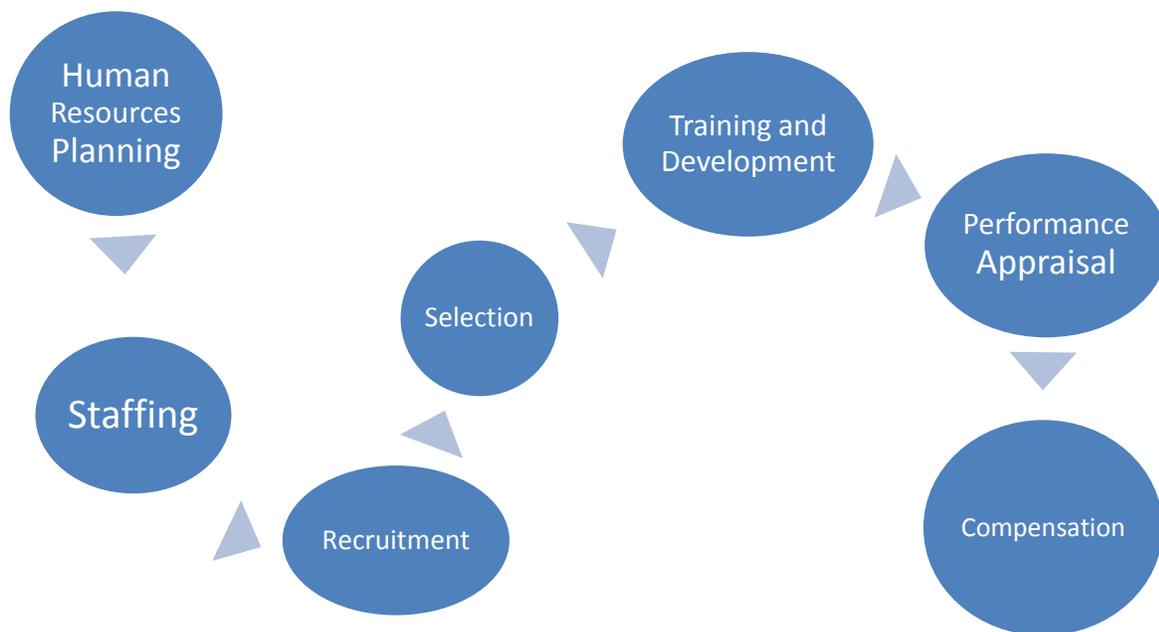


Figure 2: HR process [4]

I believe that the process which HRD goes through is very important, because it is related to human capital, which is the most valuable source of any company. The way that employees do

their job, is the way in which company is perceived from the outsiders. Employees are the mirror of the company they work for, thus all these steps should be taken cautiously.

Due to the fact that Albania lacks a platform to conduct everything online, I think that creating it would be the best approach to fill this gap that is existent.

E-HRM would come in hand to companies, by providing them assistance in dealing with HRM which would incorporate thoroughly IS. It aims to configure different interacting system that aim to generate and deliver HR functionalities showed above (Figure 2). E-HRM is beneficial because with it, HR operation processes are improved, quality of management is increased and there is an improvement of “employee satisfaction by delivering HR services more quickly and accurately” [5].

What is E-HRM?

E-HRM stands for electronic Human Resources Management. The scope of implementing this model is to facilitate the process of HRD routine. The functions of this department will be included in one platform and will be instantly reachable by administrators (which will represent HR specialist), managers and employees.

Admins are responsible for registering employees by entering their credentials, also their position, department and manager in charge. Employees receive their username and password from HRD and using them gives them access to their personal page.

Everyone can use Employee Information System (EIS), Leave Management System (LMS) and Task Management System (TMS), which respectively allow the user to manage their own page, manage their leave and lastly assigning tasks and giving feedback about the given tasks.

This platform would be especially helpful in cases when the manager needs to be notified in real time on any change in the progress of tasks assigned to employees in the department the manager is in charge of.

Employees on the other hand receive tasks and change the progress every time they finish a certain part of the task. The platform would serve also to make requests for leave during holidays, but not only. Each employee requests a leave period and it is up to the belonging manager to either approve or decline the request. This module serves as an indicator to performance appraisal and this is why it is also beneficial for the HRD.

The literature on E-HRM suggests that, overall, the three goals of E-HRM are cost reduction, improving HR services, and improving strategic orientation [6]. These three objectives are aimed to be reached with the platform.

CHAPTER 2

LITERATURE REVIEW

Growing need of using web applications and platforms suited for mobiles is definitely correlated with the approaches takes to simplify them and make them as user friendly, as possible.

In the business field this is a sensitive matter because the information that is to be uploaded, stored, analyzed and used should be within the borders of what is legal and ethical. Many businesses and institutions are skeptical because they fear that a system breakdown might result fatal in their company's image. Leaking information related to the financial transactions or personal data of employees should not occur.

Implementing a platform to help the process of HRD is not only a facilitator, but also assures security and preserves the data entered in the system. E-HRM is the right approach to use because along these years of development in different countries, the outcome has exceeded the expectations.

Studies have shown that E-HRM contributes to HRM effectiveness. This approach is a manner through which HRM functions and strategies are implemented using fully IT-based channels. The term implementation is broad, but it is mainly used to give the idea of having something to be realized. E-HRM, therefore, is a concept – a way of “doing” HRM [6].

Managing to provide this platform to the local market would make possible the achievement of the objective aforementioned, specifically cost reduction, improving HR services, and improving strategic orientation. It is clear though that putting things in practice is much more difficult than settling them in theory.

HRD deals with issues that hold a great social responsibility. This is related to keeping the privacy of employees, not favoring some employees over others, giving equal opportunities and being fair to evaluating skills and compensating.

Because of all these reasons and others which I will outline below, E-HRM would mostly be suitable for large companies and institutions. Every organization with a clear distinction of departments could benefit from this application. The reason why small enterprises wouldn't be suitable is because usually the manager of such businesses is also the owner and as it frequently happens, has also access to employees' data. This shouldn't happen as it influences the opinion and actions taken in regard to specific individual. However no restriction in use is defined, everything is left to be decided by the manager.

Reviewing the existing methods and applications is essential in deciding which path to follow to create your own. I have conducted a research in international market to define the common needs of HRD and deciding what to include in my application. The most powerful application in the field according to my research resulted to be Orange HRM, which was initially launched in 2005 [7].

Orange HRM- a whole range of functionalities

Developers of the platform consider Orange HRM a “new way to increasing the efficiency of your HR Department”. Among the approaches taken to be different in the competitive market, Orange HRM has chosen to implement a proper Employee Self-Service, through which there is a noticeable reduction on handoffs and increasing data integrity. Efficiency and control are enhanced and the decision making process is improved. HR professionals are available for more strategic work, which is crucial in achieving the objectives.

Open source solution

Orange HRM is an open source solution that has been fulfilling the needs of SMEs since 2005 by providing personnel information management, leave or personal time off, benefits, time management, performance evaluation, recruitment/applicant tracking and more.

Through the feedback received from the global user market, the system is updated and built. Orange HRM is supported by two OS: Windows and Linux, thus users are not restricted in terms of system compatibility. Even though the system provides a lot of facilities, there is also a drawback shading its success.

The biggest hurdle to Orange HRM, according to Jack Wallen, is that so many enterprises will see it labeled open source and turn away from it. This should not be a make or break defining point, but for many it will be. The ability to integrate into an accounting package would also make Orange HRM a seriously player in the enterprise world. Unfortunately, out of the box, there is no accounting integration [8].

Traditionally, E-HRM development was concentrated in companies operating in North America and Europe, therefore my aim is to focus in these two markets.

An American Perspective- E-HRM in USA

In 1995, a study suggested that from 700 publicly traded firms in the U.S., those that chose to implement HR practices, achieved an annual shareholder return of 9.4 percent (versus 6.5 percent for firms using fewer practices) and their gross rates of return on capital were more than 50 percent larger than firms that did not [9].

The definition of strategic HRM in North America tends to perceive the term in a broad vision. Researchers have come into the common ground of identifying four features that distinguish and

separate the function of HRM. To begin with, strategic HRM, as a macro-level concept requires further specifications when it comes to the concept of organization. It doesn't matter if the organization is a company, institution, business unit or corporate, the specifications should be defined for it. Secondly, the objective of strategic HRM stresses the need of match between horizontal and vertical alignment. Horizontal alignment is the concept of fitting practices of HRM, whereas vertical fit requires a match of HRM and other strategies of the organization. Mainly, the focus is on business strategy since the aim of the companies is to become as more influential in the competitive market as possible. Thirdly, strategic HRM focuses on HRM systems, a collection of practices and HR functions, which for different perspectives may vary in terms of characteristics. Finally, strategic HRM emphasizes organizational performance outcomes [10].

Considering all the characteristics and definition of strategic HRM, Americans have built a HRIS that would fit the needs of their market. In the USA, which is the model on which I have conducted the research there exists a general framework including all the functions required to have the appropriate design for an E-HRM application.

The framework evaluates seven different aspects that an application dealing with the management of the duties of HRD has to have. Starting with the measure of success, it is clear that different people in the organization have different metrics of measuring the success. It is not the same what a system user requires with what a decision maker need. American companies focus on setting a common, solid ground so that all the actors with defined roles in the company get what they need. Another important feature implemented in the American HRIS, is settling the type of design. Whether it is system or information related is just a general, basic categorization, left open to any change reflecting the nature of the organization [11, 12]. Another concern whilst

developing a system is the way of implementation. Usually, the approach taken is to create an easily implemented application that would also leave space for improvements as the company grows further. HRIS design characteristics may differ according to their level of validity [5]. Applications in the market are in between of being universally applicable and contingently designed.

In the last phases of creation, HRIS are evaluated for what they offer and in basis of including HRM functions.

type of success relevant to	decision maker	system developer	system implementer	system user	
type of design characteristic	system-related		information-related		
type of application target	development	implementation	improvement		
validity	universal		contingent		
method of elicitation	theory	literature review	use case	case study	Survey [...] combinatorial approaches
method of evaluation	non-empirical		empirical		combinatorial approaches
level of granularity	coarse-grained		medium-grained		fine-grained

Table 1: A General Research Framework of HRIS Design Characteristics[5].

To make the research easier, I focused on two most used E-HRM used by companies in the USA. There is no doubt in the inclusion of all the given design characteristics in both models, but what I noticed is that they were too different in terms of UI and what they offered to HRD, using the system.

The first model is named bambooHR[13] and it serves as an online spreadsheet to gather data of the employees at any time. Developers claim that this platform has the most powerful

spreadsheets, which can't compete with what the rest of the other models offer. With bambooHR all the data is secure, accessible by both the employer and employee and everything is in one place.

Along with the advantages that this platform offers, there are also drawbacks in the way it is created, which I believe make it difficult to be implemented in some organizations. This model offers a limited number of employees registered and the system might slow down when the number exceeds the limitation. Furthermore, it has no features that would provide an accounting touch because it has no incorporation of payroll methods.

On the other hand, the second application named Ascentis HRIS [14] is solely focused on providing financial and accounting assistance. It completely lacks the features that would include employees' interaction and for sure this is a huge disadvantage of the model.

As to conclude this representation of E-HRM in the USA, I would once again outline the outcomes of the research in this market. HRIS is fully functional and has every requirement in it, but the models do not provide all the functions of strategic HRM. Companies would have to purchase to applications for HRD to conduct all its tasks.

The second part of my research, is focused in Europe and below it is explained what were the findings and how they differ from American perspective.

Contribution of E-HRM to HRM effectiveness – a Dutch Experience

In this section, results of a research conducted by representatives of three Dutch universities trying to understand if the implementation of E-HRM affects HRM will be outlined [6].

Research was conducted in The Dutch Ministry of Internal Affairs and it was based in the collection of data through a survey in this governmental institution. It was 2002 when the ministry introduced the scheme named Emplaza, which was the model of E-HRM [15].

Emplaza offers standard support in fulfilling functions of HR. Namely, the support consists of salary check, trainings, configuration check, premium support and consultancy. Another feature was introduced to the system that would facilitate the overall process of HRD. This feature is known as HR check, which gives the green light to any process, before becoming official and posted in the ministry’s portal.

The scope of the survey was to evaluate three aspects of the model: assessment - specifically the job usefulness, quality of the application, and ease of use, HRM effectiveness and involvement.

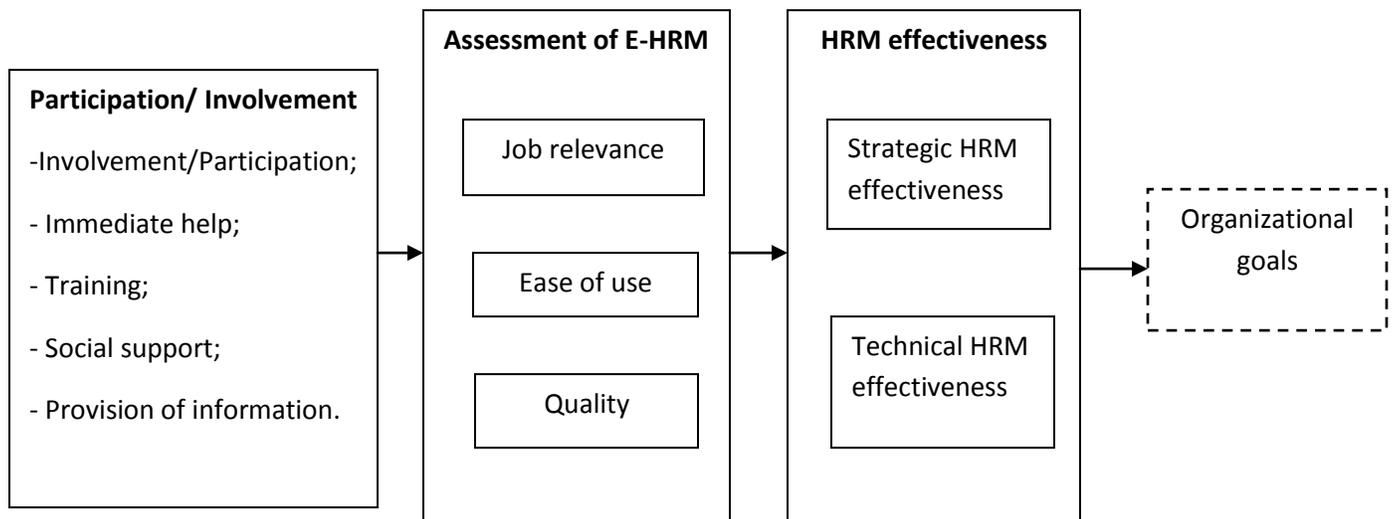


Figure 3: Research model: the link between E-HRM and HRM effectiveness [6].

The results show that one’s assessment of the quality of E-HRM applications in particular is positively related with technical and strategic HRM effectiveness. Specific outcomes of the study show that features of E-HRM applications are crucial in determining the effectiveness HRM.

Although there was no indication that employees linked the E-HRM applications in terms of facilitation their job and ease of use with the HRM effectiveness, results prove the contrary. However though, study has proven that both job relevance and ease of use, has a significant effect on the functionality of the HRM.

National Viewpoint: Case of Albania

There is absolutely no platform in Albanian market that is dedicated to HRD, which copes with functionalities of HR. After providing the examples of how two powerful countries use E-HRM in profiting the most out of it, I believe that time has come to develop such platform for the Albanian organizations, companies and institutions as well.

A developing country as ours, with a lot of capacity in terms of IT students and professionals should not be using Excel spreadsheet anymore to store data of the employees. HRD is a crucial department and its importance should be justified by providing the HR specialist with the right tools to perform their tasks.

Building an E-HRM platform requires a lot of work, because it should be secure and complete, yet it is not impossible to be reached. The fact that there is no similar, or even existent platform of such functionality, will make it very successful.

Starting with the first module, EIS and going until the last will be the struggle which HRD importance, completely justifies.

With the requirements specified in the HRIS model of the American perspective and with the assurance from the Dutch study, an E-HRM application for the Albania will be the platform which our country is lacking.

CHAPTER 3

BUSINESS ANALYSIS

In a certain organization or institution it is difficult to specify which the most important department that operates within it is. Each group of representatives will claim that the department they belong is the most important. Production department is the one from which the products outcome; however it is up to supply chain management department to support this production and between the two it has always been questioned the famous: “the chicken or the egg?” dilemma. Finance office would claim that it is because of the money they are in charge of everything happens. Marketing individuals, state that the whole processes would go in trash if it wasn’t for their directions, set to lead the company through success.

However if the company would lack the existence of HR department, it would have failed to combine all the above mentioned departments. Since the company is made up of individuals, the path these individuals follow to reach organizational goals and the quality of their work is completely in the hands of HRD [16].

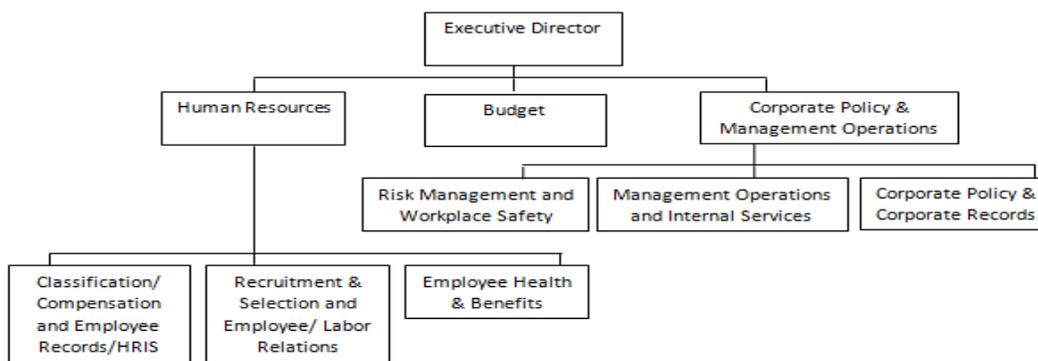


Figure 4: General Organizational Chart¹

¹ Chart of the general division of Albanian companies according to INSTAT

Without ignoring the separate importance each department of a company has, the effect of their job and people who work in them, HR is the bridge linking them internally and externally. Importance of this department lies under many different reasons. To begin with the value of human capital, having a HRD can increase the understanding of individuals to company's overall performance. This is especially beneficial for small businesses in which it is usual for employees to perform more than one task.

Another reason why this department is important is budget control. HRD develops and performs methods to make sure that there is a competitive and realistic wage setting. The specialists of the department have to conduct studies in the local market, take into consideration unemployment cycles and define then wages based on salary studies.

There is no doubt that training and development of employees' skills is the identifying characteristic of HRD job. Specialist conduct the assessment needs of employees to then provide them with trainings they need to do their job properly. Performing this approach is cost effective, because it is less expensive to train the existing employees rather than employing more skilled ones. This brings another point that defines importance of HRD: cost savings.

HRD is responsible to measure employee satisfaction, even though it required a lot of effort and often is difficult to come to a common ground to select some specific aspects into measuring their satisfaction. HR specialists have to prepare surveys with caution to be as close as possible to achieve the most accurate result. An intensive process which HRD implements are exit interviews in order to understand the parts which made the employee feel not at ease, asking to leave the position held in the company.

The outcome of exit interviews would serve to improve the performance, developing thus performance management systems which would allow employees to leave jobs they aren't comfortable with and experience new ones [17].

All these functionalities and responsibilities of HRD are facilitated with the implementation of e-HRM, which as explained in previous sections, stands for planning and implementing application of IT for networking and it supports a minimum number of two actors in HRD.

In the Albanian market, companies, organizations and institutions don't use a common tool to facilitate this process. It is quite often the phenomenon of coming across notices of owners of SMEs requesting for a similar application. Currently, the main tool used to keep track of HRM is Microsoft Office Excel, along with a new approach followed to use the Accounting Software for Small Business: QuickBooks [18, 19].

However as helpful as Microsoft Office Excel can be in cases when the data to enter is in small amounts, as difficult it can get to use it when there is a lot of data to be processed. On the other hand, QuickBooks are created for another market, with different requirements and constraints which do not meet the needs of local businesses, making it not very suitable for internal usage. Unless this application is modified to include Albanian laws and economic approaches, it is not helpful. Modification requires careful job, to reserve all the rights to the original developer, yet fulfilling the blank spaces which made it not appropriate in the beginning.

E-HRM implementation would be the solution in covering all the above mentioned aspects, correcting the misfit and providing the functionalities of HRD.

The main advantage of using this application is guaranteed increase of quality and efficiency in terms of services offered at a reduced time, saving thus much more resources. Usage of e-HRM

is beneficial for routine tasks, helping to be more accurate by eliminating human mistakes or bias.

The organization would be part of a dynamic environment, accelerating the process of globalization, crucial in a business environment. In cases when the organization plans to go global and have branches in different locations, this would be particularly useful. But even for institutions within a country, with branches in different cities.

Continuing the discussion of cost reduction, e-HRM would allow the processes of HRM to be carried out online, using web applications, without the need of hiring trainers, gathering a panel for interviews, printing loads of papers. Besides of technical facilitation, e-HRM assures the security and privacy of employees and also allows 24/7 availability for any question or remark.

Being well aware of the challenges that HRD is facing, e-HRM is a way to help overcome these challenges in no time. Costs to cover health-care benefits of employees, trainings and hiring process are only some of containing costs which could be reduced with the implementation of e-HRM.

Incorporation of technology is considered another challenge of HRD and with the implementation of e-HRM, as the name itself suggest, would fully cover this issue [20].

The graph below [Figure 5] is a representation of the percentage of cost each factor has in the total business cost. More than half of expenditure goes for staff recruitment, maintenance, training and development.

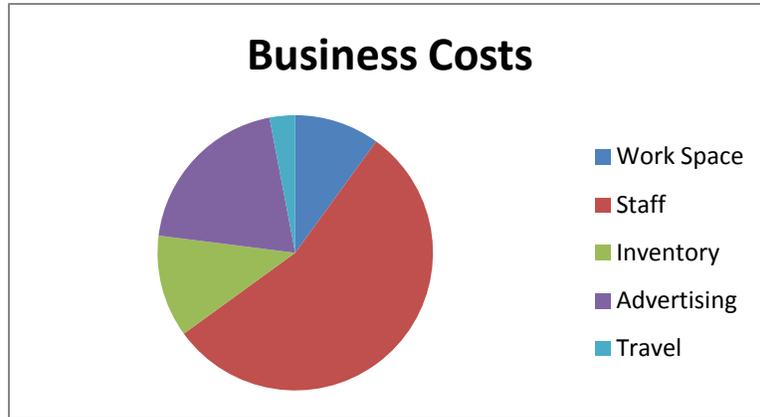


Figure 5: Top 5 Business Expenses [21]

With the effect that e-HRM implementation has on HRD functionalities, these costs would drastically be reduced, generating more profit for the company, but at the same time providing a smooth routine job for HRD.

All these benefits that come from e-HRM implementation, assure once more that providing such platform for the local market would be profitable for both the developer who develops it, and for the organization using the platform.

CHAPTER 4

SOFTWARE ANALYSIS AND DESIGN

4.1 System Analysis

This e-HRM system will serve to the company implementing it to maintain updated the rest of the company with HRD.

The system allows the HR specialists to register employees, managers and other administrators. Only employees of this department have access to register newly employed people by defining their generalities, previous experiences, the department in which they belong, the position they hold and most importantly assigning them a username and password. Using the username and password assigned, employees can access their own profiles in EIS.

Once the employees have access to their own account, they can manage it by changing the password, modifying the name in case there has been any mistake in registration and even set a profile picture to personalize the profile.

Another function that the system allows to perform is management of leave. This approach is similar to one of those offered in OrangeHRM [7]. This functionality will serve to connect faster and increase the quality of communication between the employee requesting for leave and the respective manager who receive the request and decides upon accepting or declining it.

LMS will allow the employee to define the period of leave, type of leave any add any other additional comments. The manager once receiving the request checks the number of leave days given already to the employee and then notifies the decision made regarding the request.

Another subsystem offered is TMS, which again would facilitate the process of employee-manager communication. Each manager gives a task to complete at a specific date, defining the requirements, team members, deadline and other specifications related to the task given. Once the employee(s) receive the details of task they have to perform, they have access to a page in which they can continuously update, providing feedback on the progress of task in charge.

Another functionality of TMS is the provision of forms to be filled and report to the manager. On employees' account, they can only access the part of reporting, asking them type of report, and comments on it. The fields are not mandatory, meaning that if employees wish to remain anonymous, they can. On the other side, managers receive reports from the employees. If the name appears in the report, they can directly contact them and further discuss the issue.

Besides the internal users, there is an interaction possibility with external users as well. This occurs in cases when the company is in the process of recruitment.

HR specialist uploads a notice in the website of the company stating the position available, job specification, job requirements and deadline of application.

The notice is available to anyone visiting the page. There will be a form requiring generalities of the applicant, a CV, and motivation to work for the company. Once the applicant click the button Submit, the application form is stored in the database.

HRD can retrieve the application from the system once it is submitted. When the application period is over, HRD goes through the selection process. Each specialist can evaluate the application by giving points for each response given. The candidate with the highest points is selected and HRD communicates the decision to this candidate. Once the candidate confirms

availability, the process of training then takes place to shape their skills and make them appropriate for the position.

4.2 Functional Requirements

The set of operations and activities that the system is able to perform and show the services that the system provides and how it reacts to the inputs given and how it behaves in particular situations are called functional requirement [22].

- Administrator functionalities
 - Manages new employees
 - Adds new employee
 - Defines position and department
 - Updates information about employees
 - Manages account settings
 - Sends emails
 - Add new leave type
 - Updates leave balance
 - Updates leave rules
 - Inserts advertisement
 - Updates advertisement
 - Receives job applications
 - Selects applicant for position
- Employee functionalities
 - Updates profile
 - Changes password

- Sends mail
- Sends report
- Applies for leave
- Views assigned tasks
- Updates tasks
- Manager functionalities
 - Approves/Rejects leave requests
 - Monitors employees
 - Updates leave rules
 - Creates projects
 - Edits projects
 - Defines members of the project
- User functionalities
 - Reads advertisements
 - Applies for position

Every employee in the organization is identified by a unique username, which appears in the profile once the account is activated. As a web application, e-HRM is accessible through PCs and laptops.

4.2.1 Usability Requirements

- Interface elements have to be user friendly
- User documentation should be complete
- Manual is attached to the system to provide detailed explanation
- When some error happens during operation, the screen will show the way to proceed

- The screen layout should be attractive

4.2.2 Performance Requirements

- Response time should be short, between 0.1 and 1.0 second
- System should be able to support 10 000 users
- System should be able to process the sudden increase of capacity
- All the updates or new registrations should be quickly stored and reflected in the database of subsystems
- The application should be accessible at all time

4.2.3 Security Requirements

- Only HRD employees have access to register a new employee
- System is accessed by the rest of the staff by entering the username and password defined initially by HRD employees
- Every time someone desires to change the password by going to account settings the old password is required before entering the new one
- When a report is sent, a message appears in the screen notifying the operation

4.2.4 Interface Requirements

- Different views appear for different users
- Menus are also different for each subsystem and depend on the position that the user holds in the company

4.2.5 Functions

Main functions carried out by e-HRM are provided below at Table 2. These are the most used and the crucial ones to perform a routine job at HRD:

Log in	User is logged in the system
Log out	User can exit the system
Register employee	HRD specialists register new employees in the system
Update profile	Each user has access to account management section which allows them to personalize their page
Send mail	Send email to a colleague
Add task	Managers add tasks which they want to be fulfilled by the employees
Update task	Employees to whom the tasks have been assigned give updates on progress
Request leave	Employees apply for leave
Respond to leave request	Responsible manager decides on reply of leave request
Send report	Employee sends report to manager
Retrieve report	Managers read reports of employees
Add advertisement	HRD posts job vacancy
Apply for job	External users can apply for the position available

Table 2: E-HRM user functionalities

4.3 Non-Functional Requirements

The set of constraints placed on how the system will perform the activities are called non-functional requirements. These constraints may be timing constraints, development process constraints, and more [20].

4.3.1 Hardware Requirements

- In order to store the database, which will contain all the information regarding employees and their job accessible by respective managers and specialists of the HRD, a server is needed

4.3.2 Reliability Requirements

- System is volatile, meaning that everything is stored even if the device on which works has been done is switched off
- The system should be dynamic, because most of the requests need an instant feedback and latency cannot be tolerated
- Employees data has to be synchronized in the database

4.3.3 Supportability Requirements

- Everything is clear and easy to understand for all users of the system
- Manual will be integrated to explain how the system works
- In cases when a change is required, the code is easy to understand and accompanied by comments

4.3.4 Security Requirements

- Only authorized users can access the system
- Personal data of employees are secured in order to respect their privacy at workplace

4.3.5 Availability Requirements

- The system will be available at any hour, each day of the week, all the year
- Only in cases of overcapacity, the system might slow down

4.3.6 Compliance Requirements

- The system, being web based should be compliant to any device, regardless the OS used in these devices

4.4 System Requirements

- All employees are identified with a unique username and password
- After every registration, the assignment of employee in their departments is conducted
- Each employee is defined the manager, to whom should report and consult during work day
- Tasks are assigned to employees and once they are completed, the status changes
- Management of leaves is responsibility of HRD and managers
- For every job vacancy the notification is posted in company's website
- After every application HRD retrieve the data submitted
- Panel decides upon application
- Notification of result

4.5 UML Diagrams

This is the section in which all the Unified Modeling Language (UML) diagrams for e-HRM are provided. UML ² is a modeling language with a general purpose in software engineering. It is designed to be able to provide a visualization of the system in terms of design.

4.5.1 Behavioral Diagrams

4.5.1.1 Use Case Diagram

A use case diagram is in other words a representation of all interactions that the user has with the system. Diagram is a representation of the relationship among the user and various use cases which involve this user. The usage of this diagram simplifies the process of identifying not only the relationships, but also the implementation.

Below, you will find a use case diagram of e-HRM in which will be displayed how each actor is related to the others. In this case there are four actors, which are the ones interacting with the system and with other actors. These actors are namely: the administrator, which represents the HRD specialist, the employee, the manager and external user.

It is after the registration conducted by the HR specialist that the employee and manager have access in the system and are then allowed to make changes to the respective profiles and have dedicated tasks and requests set and done.

On the other hand the external users only have access to some part of the system allowing them to be informed whether the company has any vacancy, so that they could send an application.

² References of this chapter are made based on definitions of the terms [23].



Figure 6: Use Case Diagram

4.5.1.2 Activity Diagram

Activity diagrams are very important when it comes to describing dynamic aspects that the system has. What these diagrams consist of are flow charts which visually describe the process of passing from one activity to the other.

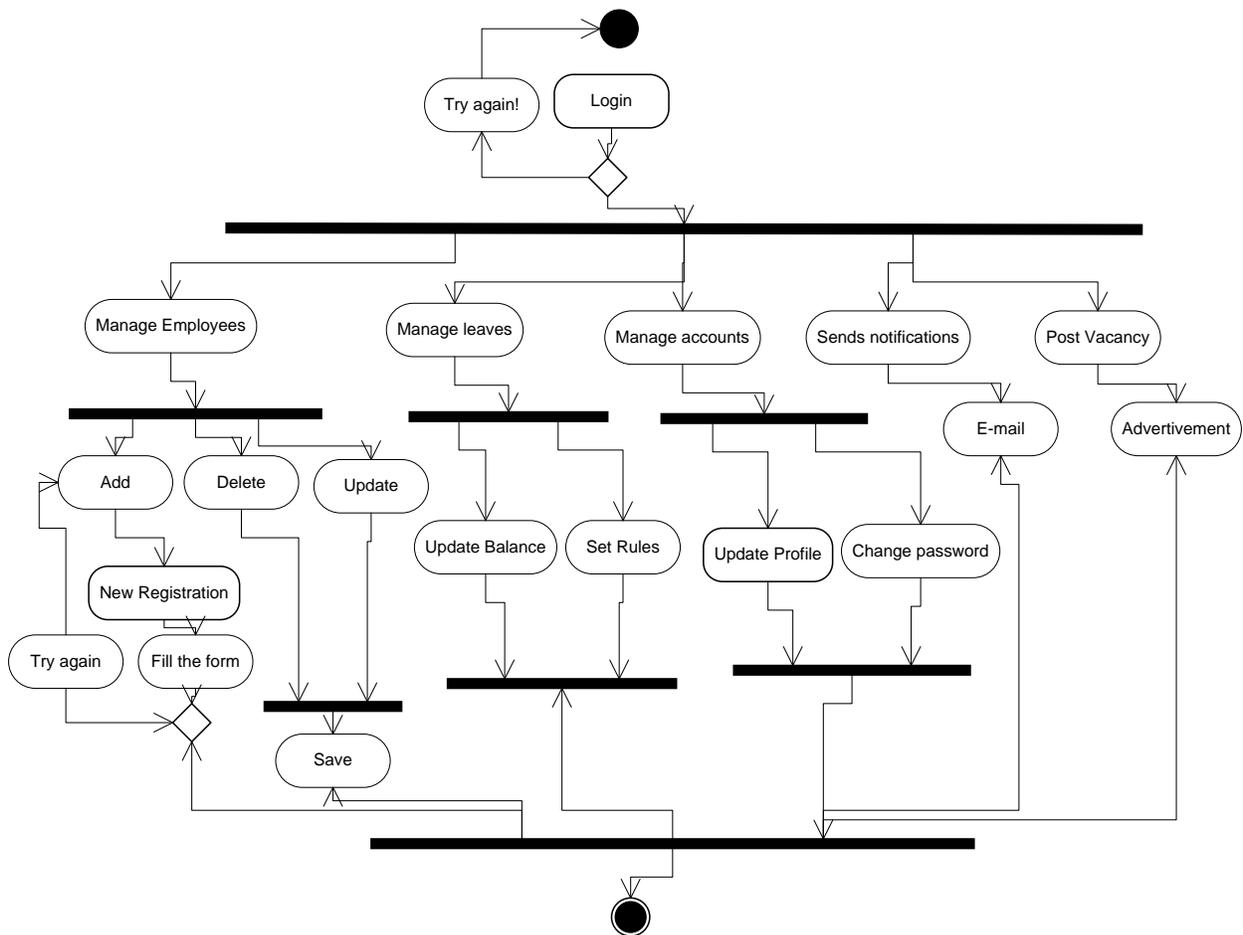


Figure 7: Activity Diagram: Administrator

The figure above of the administrator activity diagram is provided. This diagram describes the functions of the administrator of the system. HR specialists, being the administrators of the system can select to: manage members, manage leave requests, manage own account, send messages, or notify vacancy.

4.5.1.3 State Diagram

As the name suggests, this diagram is useful for describing states of particular components that belong in a system.

Below is a figure in which the states that the administrator of system goes through is described.

Initially the system is idle, meaning that nothing actually happens. Eventually the administrator logs in and starts interacting by choosing among the options provided to manage employees.

As soon as the administrator starts registering the new employee, system checks if all the data entered is valid. In cases when data is valid, the system returns to idle state, but if not, it requires reentering the data again.

If administrator chooses to delete or update an existing member, the system goes from idle to processing state.

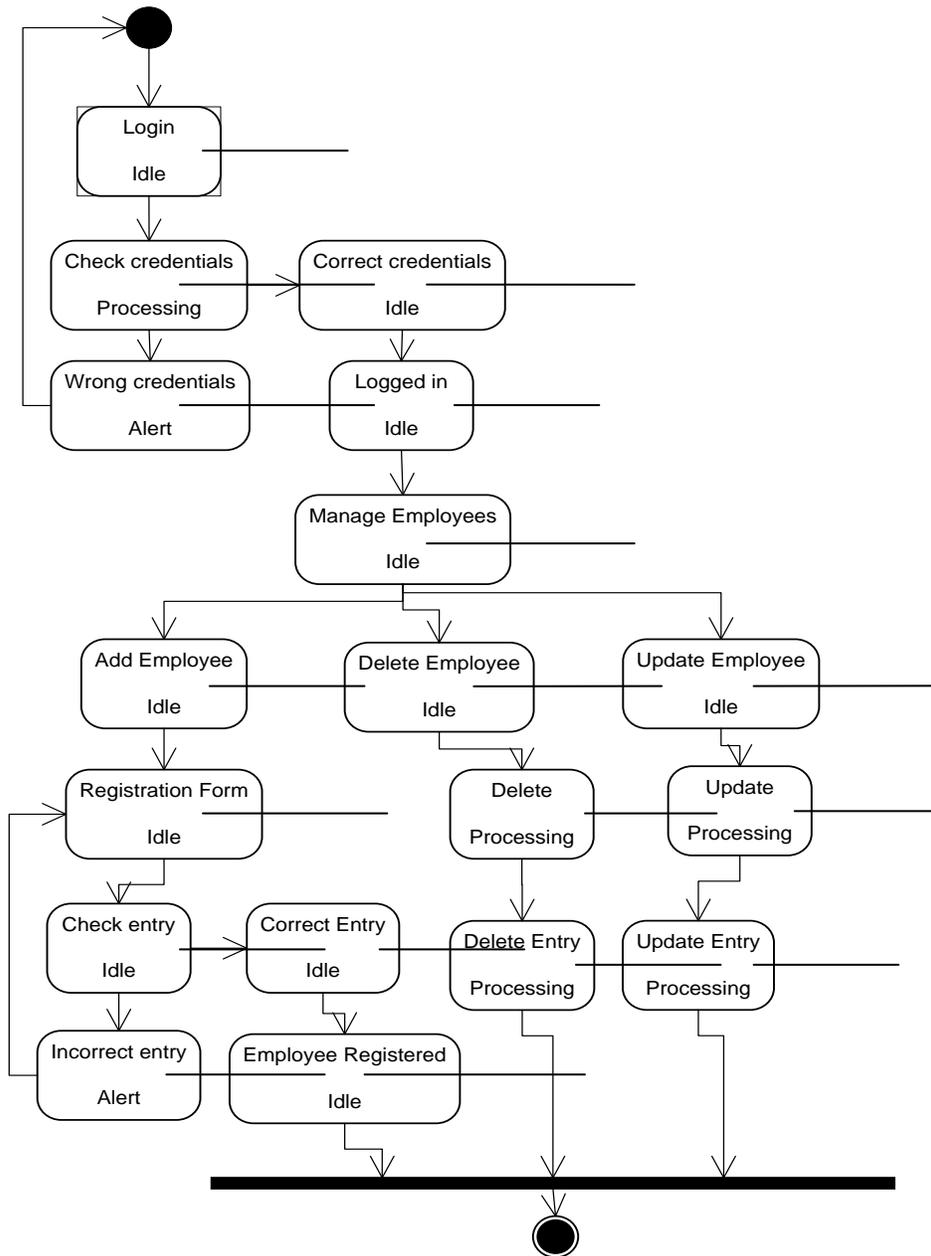


Figure 8: State Diagram: Administrator

4.5.1.4 Sequence Diagram

Sequence diagrams are helpful in the process of representing the sequence of actions with the intention of finishing a task. The figure below will show the interactions of the administrator and the system to achieve needed aims.

In order to make it easier to understand, I provided the sequences of the basic operation that the administrator conducts: employee registration.

The sequence is as follows: administrator enters the username and password in the system, which immediately checks in the database whether these data entered, is valid. If there is a match in the database, administrator accesses the system.

At this point the administrator has the possibility to register a new employee. Firstly the information is entered and if there is no incorrect data, the registration is completed and stored in the database.

After these operations, each employee can access the belonging pages by entering the username and password defined by the administrator while registering the employee.

If the credentials entered are correct, then access is permitted into the profiles, otherwise an error message will be shown.

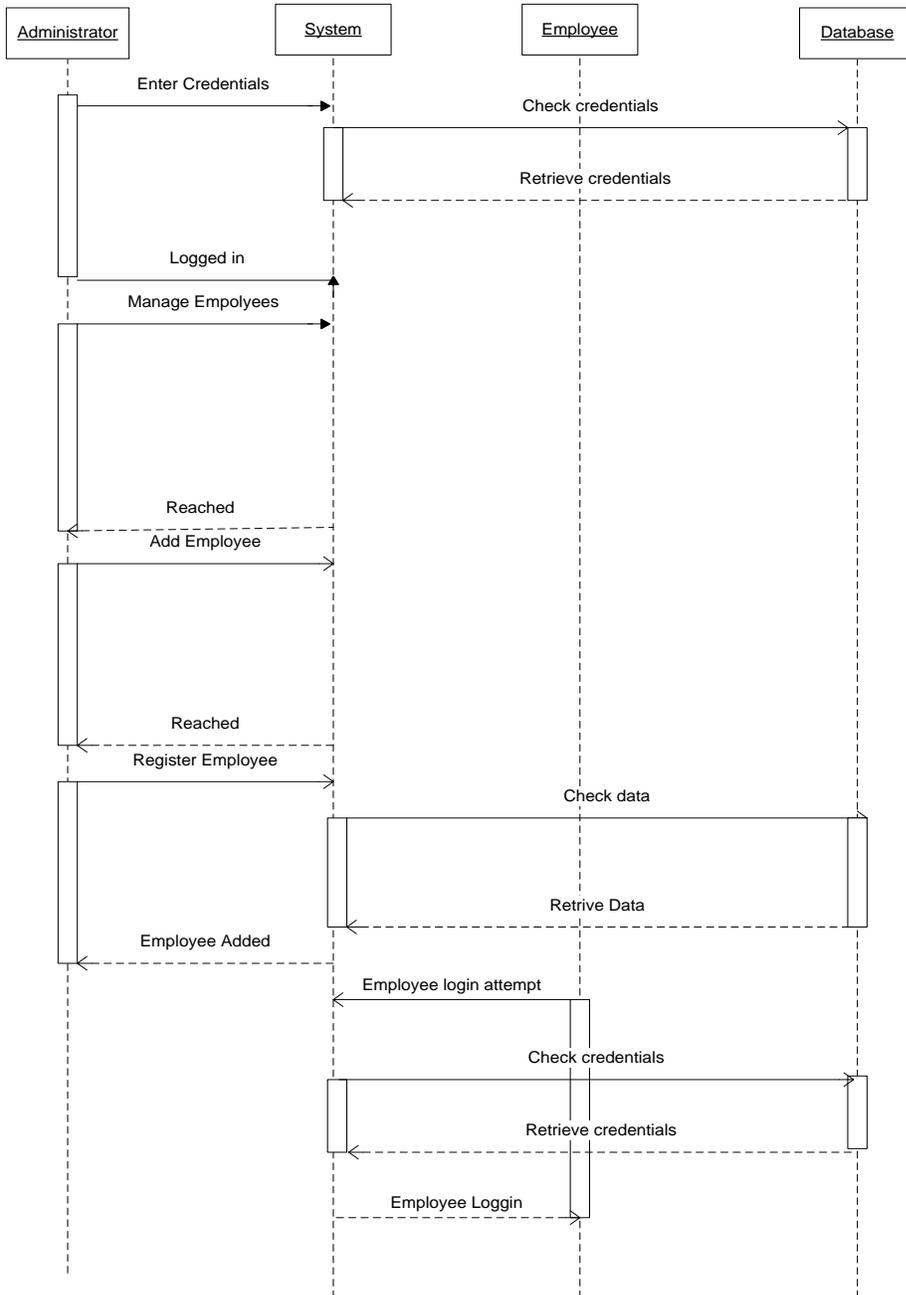


Figure 9: Sequence Diagram: Employee Registration

4.5.2 Structural Diagrams

4.5.2.1 Class Diagram

In order to have a structural relationship of the system and operations that this system provides, class diagrams come in hand. The figure below shows the relationship between the operations of the admin, employee and manager.

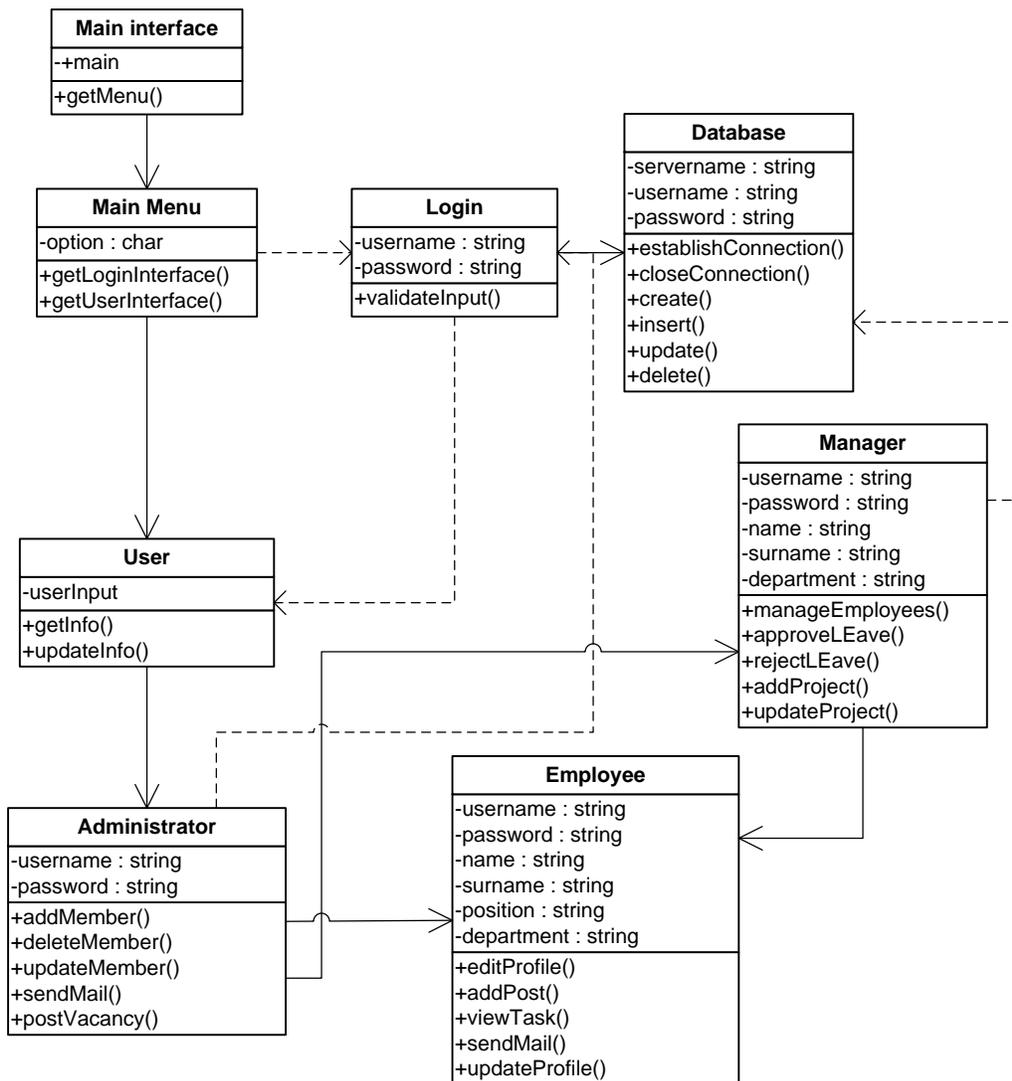


Figure 10: Class Diagram

Besides the classes, the respective attributes and methods are included, showing the independencies that they have on one another.

4.5.2.2 Component Diagram

This type of UML diagram describes how the components of a system are connected together. Generally the usage of component diagrams is referred as an indication of system complexity.

This e-HRM system will have three separations within it, which have different purposes. Below the diagram with the components is provided:

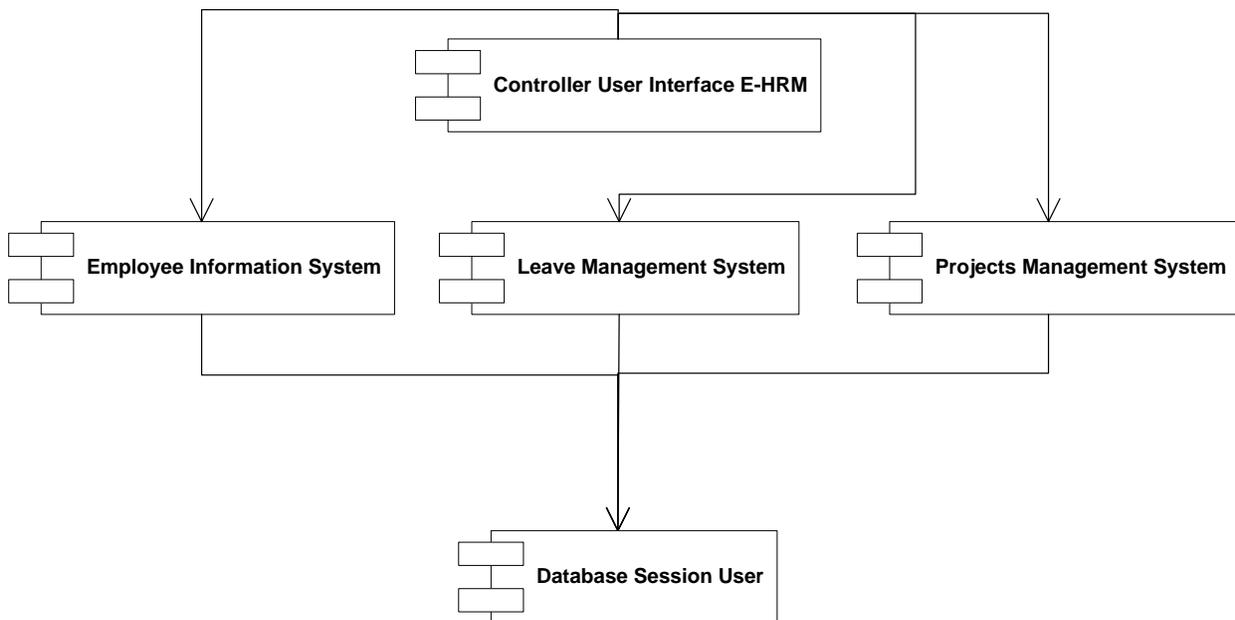


Figure 11: Component Diagram

4.5.2.3 Deployment Diagram

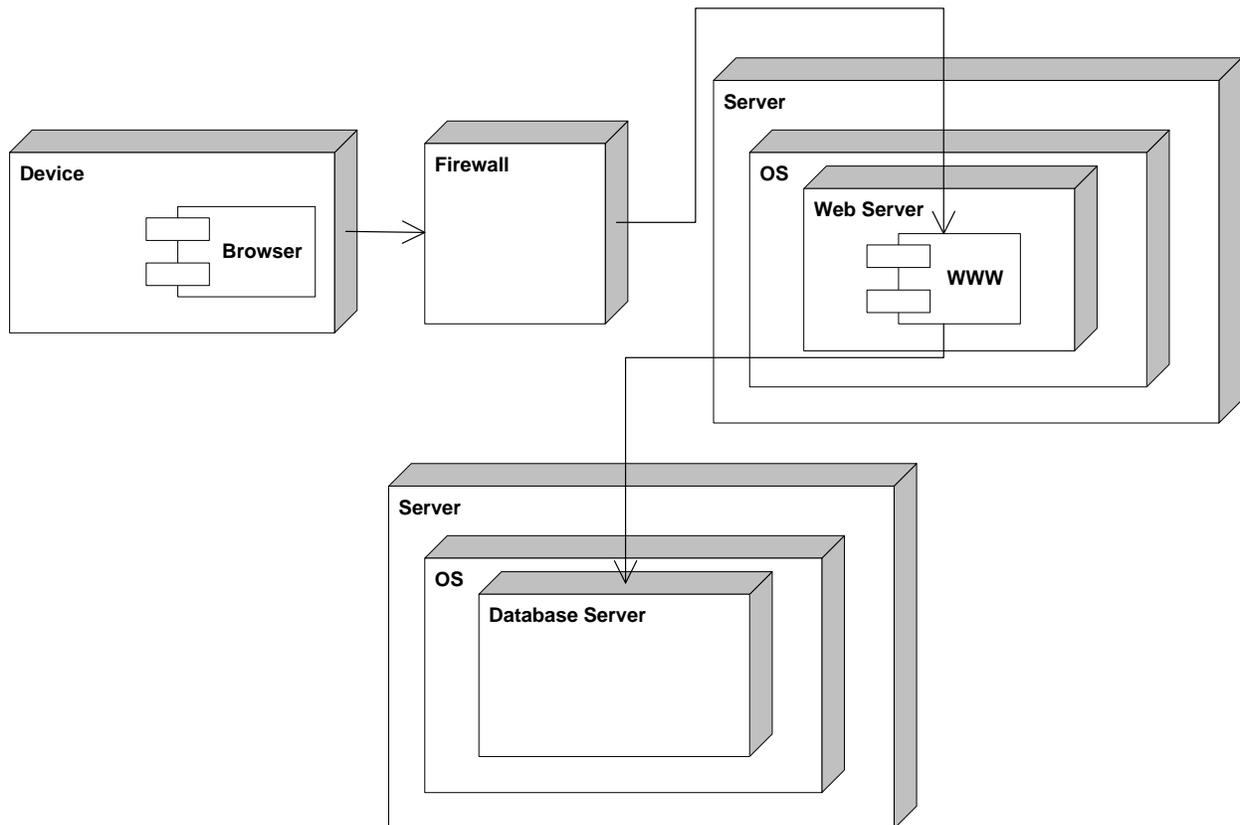


Figure 12: Deployment Diagram

Deployment diagram provided above shows the architecture of the system and how components are related among them. E-HRM has shown, has four nodes, with which access of the system is made possible. Using the device, the user sends to the server a HTTP and only after the system has finished its analysis can send a response from the database.

CHAPTER 5

IMPLEMENTATION

Technologies Used

E-HRM is a web application, which means that it is created to run in a web browser. It is fully relied to a web browser in order to be functional and this is made possible by including programming languages which support such operations. Combination of HTML, CSS, JavaScript and PHP made possible the implementation of this platform.

It is because of the HTML files that web browsers read and process web pages, making them thus visible and reachable by users. HTML more than a programming language is a markup language because it gives a description of the semantic of websites. Thanks to HTML inclusion of interactive forms is made possible as well.

However HTML alone cannot do much of the job. This is the part where JavaScript comes into the play. With this language writing scripts and embedding them in HTML affects the way how web pages behave.

CSS is incorporated in the code to make it visually friendly for the users. Designing and deciding the way that layout is set is all related to manipulations in CSS.

PHP as a server side language for scripting is designed to be used for web development. In this system PHP is very important because it manages to make the connection with database tables where all the information is stored.

PHP combined with HTML can be used in various developing frameworks, but in this case, everything is built from scratch.

Database Structuring

It is impossible to build a functional system without having a database to store the information and to keep track of individual or common activities occurring in a certain organization, institution or company.

Databases enable the user to retrieve all the information related to tasks that they perform and are directly connected with the unification of the system. Structuring a database is a very important process as it should be as carefully conducted as possible.

In order to store everything that will be used in the system I built a database with several tables, which have specific purposes. Creation of tables and specification of relationship among these tables is known as the process of Normalization. The aim of this process is not only to protect the data, but also to avoid redundancy. Elimination the redundancy leaves more disk space available and at the same time problems are easily managed if they occur.

For information storage, I have created a database named *test* which holds tables with different purposes and usage.

Below a figure indicating the tables within the database is shown.

Table	Action	Rows	Type	Collation	Size	Overhead
admins	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
contact	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
login	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
mail	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
news	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
posts	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
report	Browse Structure Search Insert Empty Drop	~1	InnoDB	latin1_swedish_ci	16 KiB	-
store	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
test	Browse Structure Search Insert Empty Drop	~7	InnoDB	latin1_swedish_ci	16 KiB	-
users	Browse Structure Search Insert Empty Drop	~0	InnoDB	latin1_swedish_ci	16 KiB	-
10 tables	Sum	8	InnoDB	latin1_swedish_ci	160 KiB	0 B

Check All With selected: ▼

Figure 13: Database test

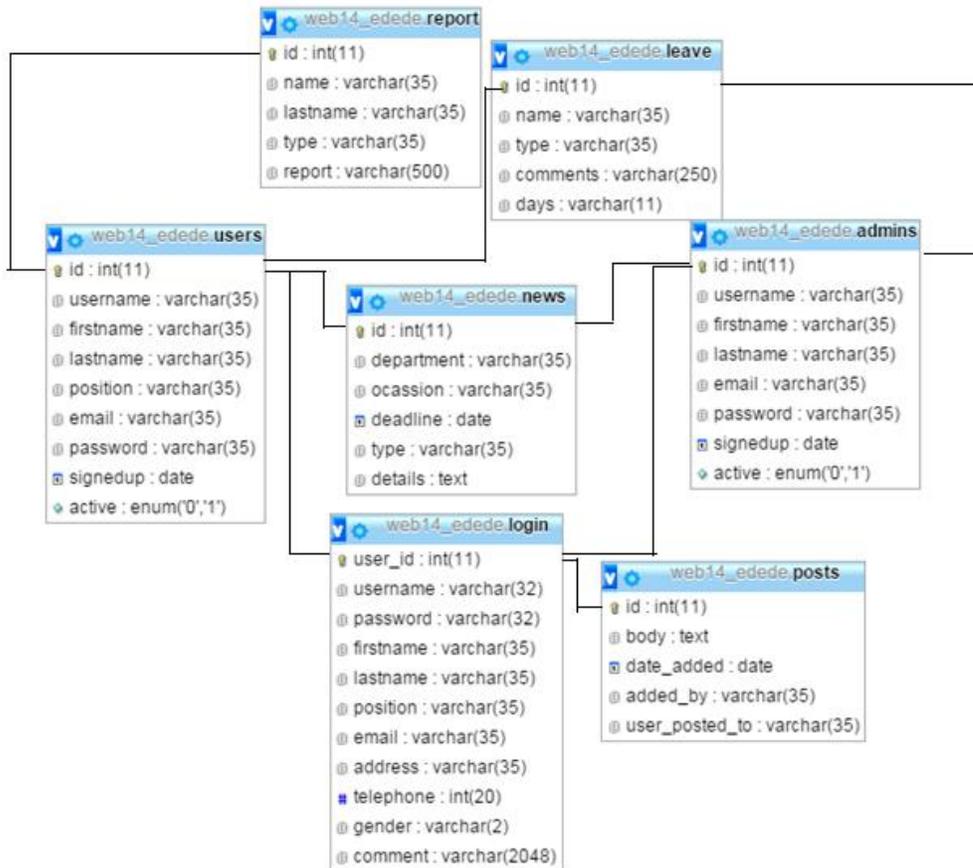


Figure 14: Relation of tables in database

Firstly I created a PHP file that will be included in every other page that needs access to the database. I named it *connect.inc.php*.

Code:

```
<?php
mysql_connect("localhost", "edede", "ed230ira")
    or die ("Impossible to connect");
mysql_select_db("web14_edede")
    or die ("Impossible to connect");

?>
```

Every time the administrator registers a new employee they will have to fill in the form and the information is stored in the database with a specific username and password.

It is important to provide a way of storing variables to use them whilst going from one page to the other. Therefore usage of sessions is crucial in achieving such objective, allowing thus to hold information of a specific user, making the information available to all the other pages in the system.

Below are provided two parts of PHP code, proving the necessity of sessions while logging in and out.

Code:

```
<?php
include("../include/connect.inc.php");
session_start();
if(isset($_SESSION["user_login"]))
{
    $username=$_SESSION["user_login"];
}
else
{
    $username="";
}
?>
```

This code serves to check if the username entered by the user is correct or not. If the user manages to login, then the session is set, otherwise it is not.

Sessions are destroyed if the user desired to leave the system by logging out.

Code:

```
<?php
session_start();
session_destroy();
header("Location:
index.php");
?>
```

The system redirects them to *index.php* page.

The next page begins with a part of code which I have used to prevent attacks of SQL injection in cases of unauthorized users attempting to enter the system. This approach makes the data much more reliable.

Code:

```
$username=mysql_real_escape_string($_GET['u']);//u after the URL

if ctype_alnum($username)//if the username contains alphanumeric
characters
{
    //check if user exists
    $check = mysql_query("SELECT username, firstname FROM test
WHERE username='$username'");
    if (mysql_num_rows($check)==1)
    {
        $get=mysql_fetch_assoc($check);
        $username=$get['username'];
        $firstname=$get['firstname'];
    }
    else
    {
        echo "<meta http-equiv=\"refresh\" content=\"0;
url=http://stud-proj.epoka.edu.al/~edede/web15/index.php\">";
        exit();
    }
}
```

As much as the coding part is important, it is thanks to the design a certain web page has that makes it attractive to people that have to deal with it. CSS is a style sheet language and as such it is used commonly to decide the way that a HTML document looks.

Below I will provide a small part of the CSS file named *style.css* related to the rest of the files so that it is easier to manage the designing and any change is computed there. Since there is more than one user entering the system, it is necessary to define the classes or assigning an id to any *div* or *table* to provide different views for different users.

Demonstration

When the main page is loaded, the only option available to the users is the login form. The system requests the username and the password in order to proceed.

Electronic Human Resource Management

Sign-In here

Figure 15: Demonstration: Login Interface

Once a user enters a valid username and password the respective profile is opened. In the case shown below the person who has logged in is an administrator and for him there is a dedicated menu above that allows him to check Admin Profile, enter EIS, go to settings or Logout.

Administrator can access the platform by entering the following credentials: *administrator* as a username and *test123* as a password once they paste in the URL this address: *http://stud-proj.epoka.edu.al/~edede/thesis/*

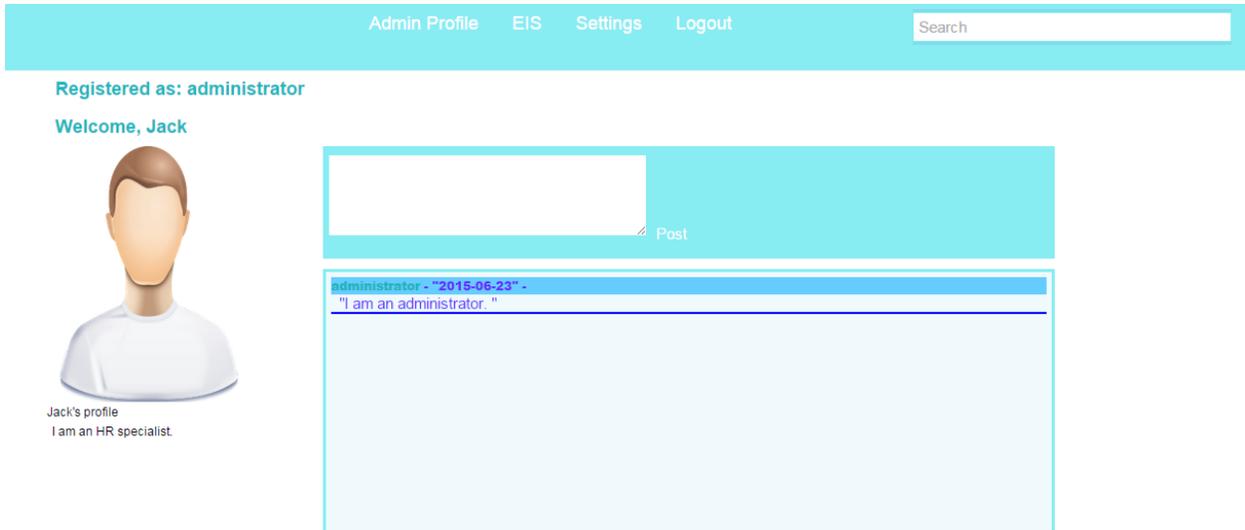


Figure 16: Demonstration: Administrator Profile

Administrator can manage his own profile, by either changing the password, or by adding a picture, posting something on the profile and so on.

To give an example, this is the attempt of the administrator to change the password. The system requires the old, existing password, then a new password to be entered twice. If the current password is entered correctly and at the same time the new password entered twice matches, administrator sees the notification of change in the screen.

Admin Profile EIS Settings Logout

You can edit your settings now

Upload your profile photo



Profile Picture

Choose File | No file chosen

Change your password

Success!

Current	<input type="text"/>	✓ Passwords match!	✓ Your password has been updated!
New	<input type="text"/>		
Retype new	<input type="text"/>		

Figure 17: Demonstration: Administrator Settings Management

Administrator by clicking on the button EIS, has the possibility to register a new employee by entering all the required fields and inserting the values in the database.

Registered as: administrator



I am an HR specialist.

Register here * required fields

First Name*

Last Name*

Admin Manager User

Enter your email*

Re-enter your email*

Choose your username:

Enter a password:

Re-enter your password:

Sign Up

Figure 18: Demonstration: Employee Registration

CHAPTER 6

CONCLUSIONS AND FUTURE WORK

Having provided a number of reasons why the HRD is very important in an organization, company or institution, it is clear that attempts made and approaches followed worldwide to facilitate the job of specialists make sense.

However Albania is lacking such system implementation in governmental institutions, let alone private companies or organizations, which being smaller have constraints in terms of financial capacity. Foreign experience and reviews of powerful companies around the world claim the investment in purchasing the platform is inconsiderable compared to the benefits that from it.

Implementation of such portal would be beneficial in many aspects of the organization welcoming it. Benefits would be in cost, because the processes of HRD like recruitment and training could be conducted online. Also, another benefit would be the storing information in a secure and reliable database avoiding problems faced when keeping the information in paper or in Microsoft Excel spreadsheets. Everything will be stored in sequence and the interaction among users is improved making the sets of interrelated tasks easier than ever. HRM efficiency is proved to have significantly been improved due to implementation of e-HRM and the job process was much more effective.

What I have been working on to provide a platform that would cover the aforementioned functions is a step towards creating a system that might even be competitive in the regional market. Functions covered by the platform include EIS, which complete all the specified functions mentioned throughout this documentation are only a part of what future premises are.

Objective of this work is to be developed further, but with a reference to a specific company, institution or organization. The disadvantage of implementing the system was the absence of a structure to base on. Most of the functions conducted by HRD are the same everywhere, especially in terms of following the steps of HRM. However different companies have their own specific characteristics.

The aim is to make a dedicated platform for HRD with the desire to expand it continuously until a common solid ground is set.

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APPENDIX A

UML Diagrams

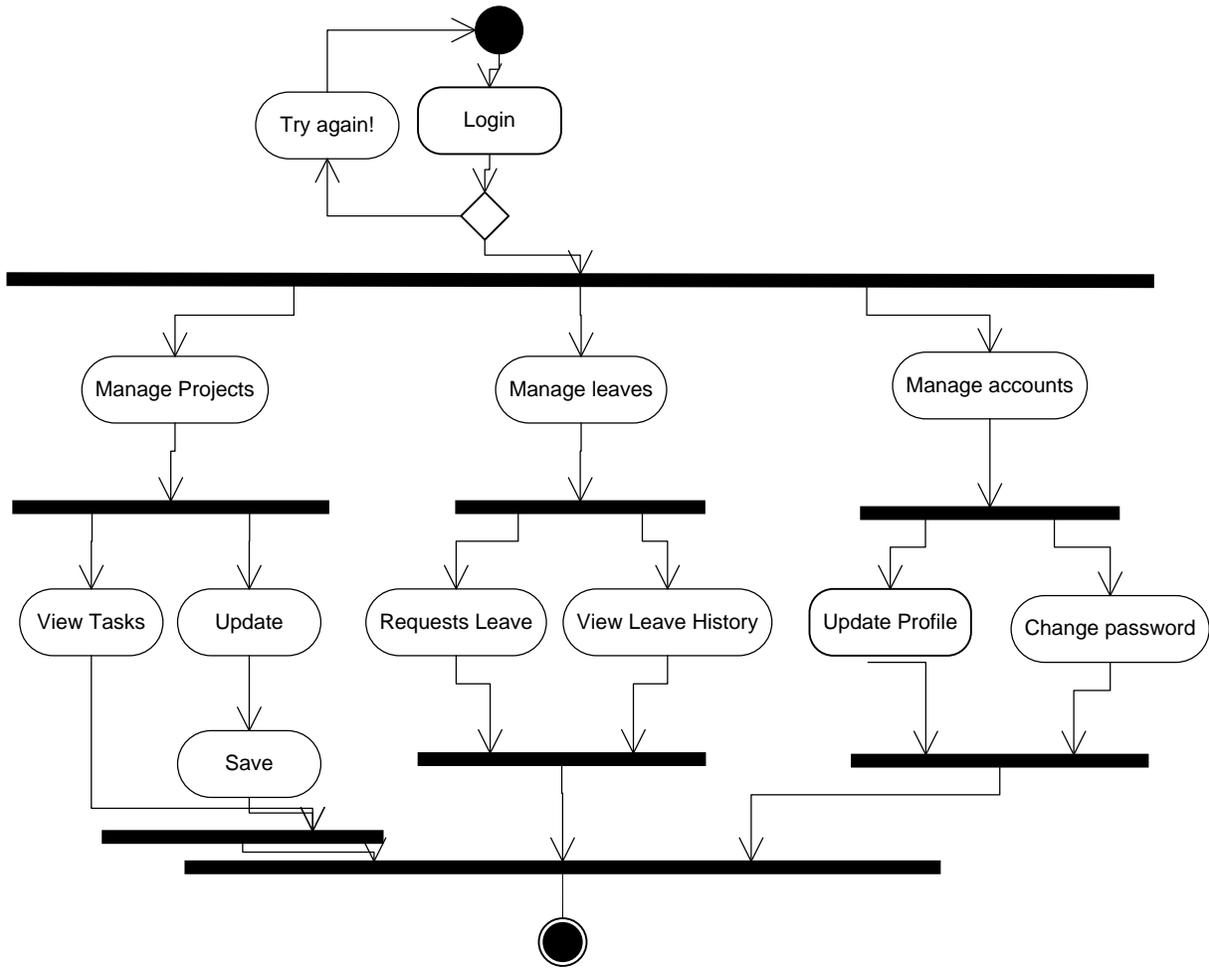


Figure 19: Activity Diagram: Employee

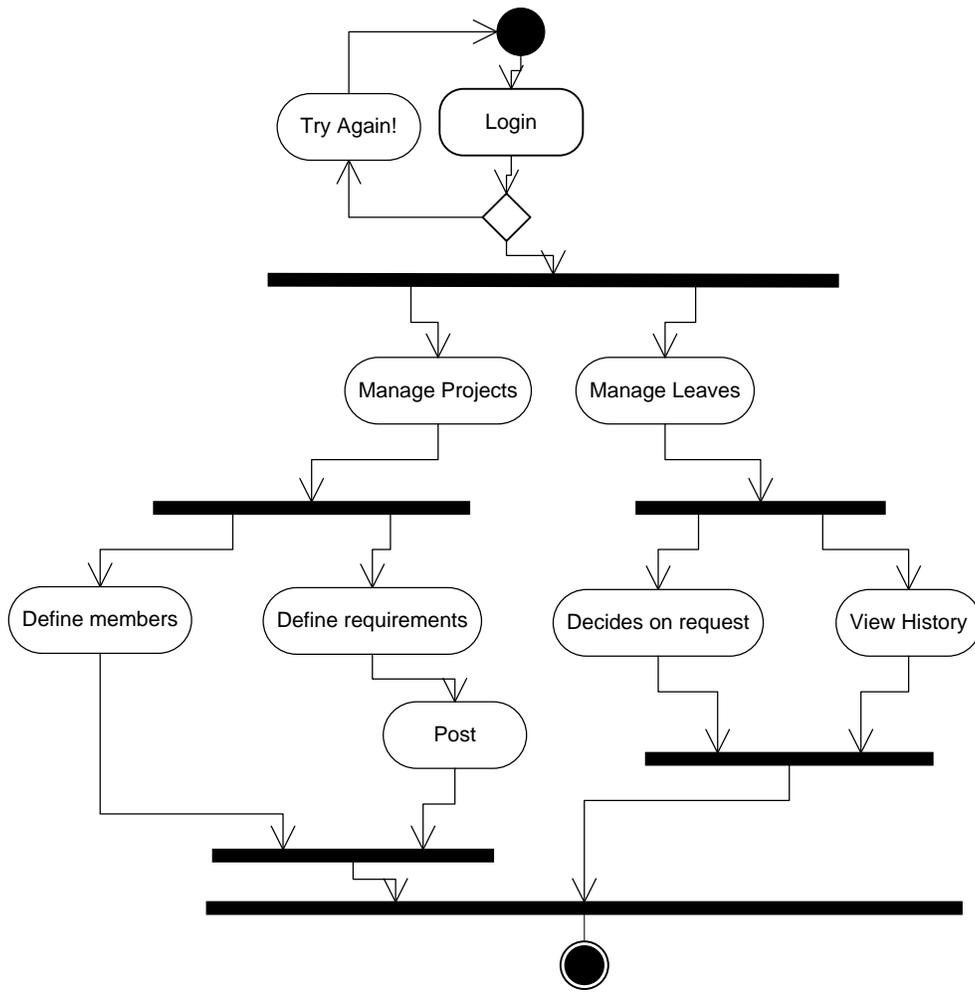


Figure 20: Activity Diagram: Manager

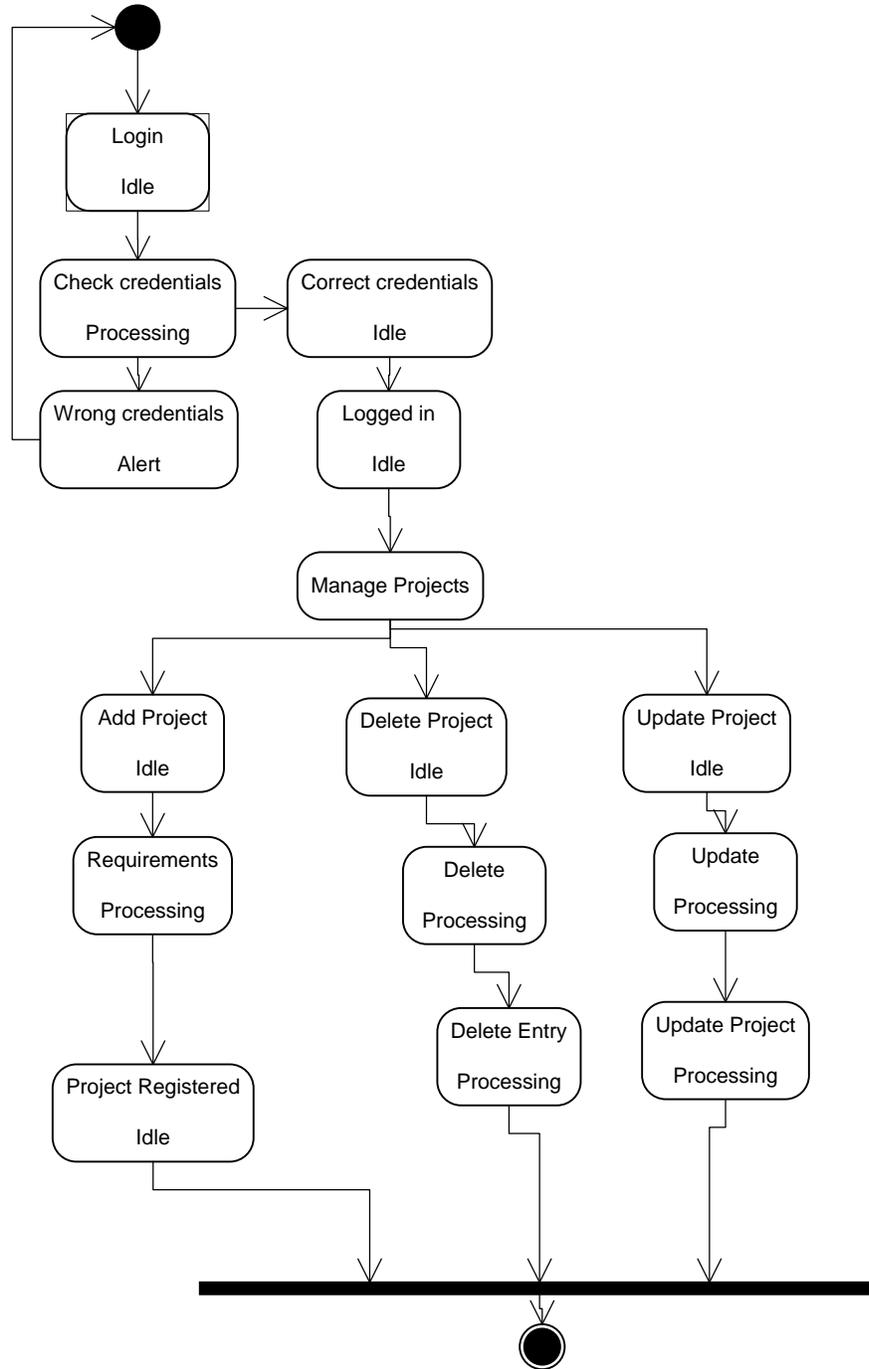


Figure 21: State Diagram: Manager

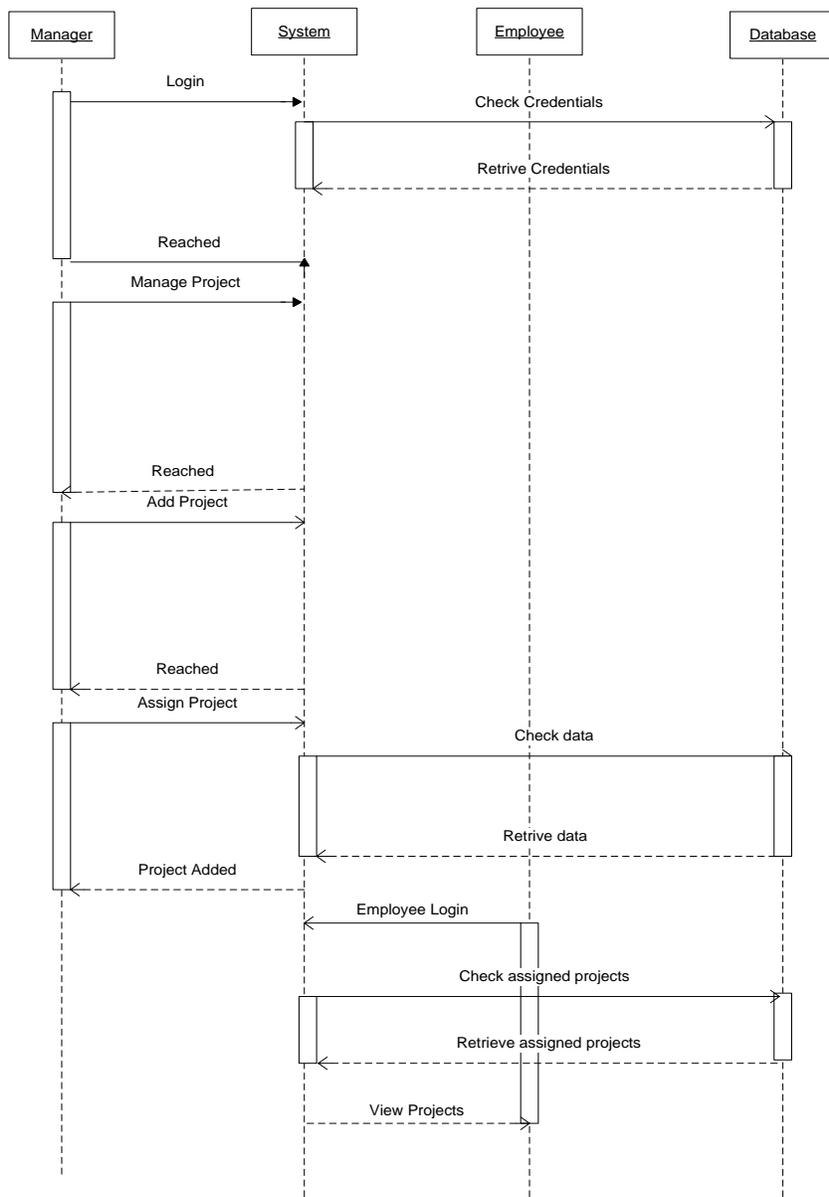


Figure 22: Sequence Diagram: Projects Assignment

APPENDIX B

Screenshots

The example will show the characteristics a menu holds and the changes it goes through if users are different.

Code:

```
#menu a {
    color: #FFFFFF;
    text-decoration:none;
    font-size:18px;
    background-color: #FF0066;
    background-repeat:no-repeat;
    padding-top: 19px;
    padding-bottom:22px;
    padding-left:15px;
    padding-right:15px;
}
#menu a:hover {
    background-color: #66CCFF;
    color: #FF0066;
}
```

```

#menuadmin a {
    color: white;
    text-decoration:none;
    font-size:18px;
    background-color: #FF0066;
    background-repeat:no-repeat;
    padding-top: 19px;
    padding-bottom:22px;
    padding-left:15px;
    padding-right:15px;
}

```

Among the many MySQL statements used in this system, I will provide sections which are either most used, or of a certain importance for the overall process.

Code:

```

if($firstname&&$lastname&&$pos&&$mail&&$mail2&&$uname&&$pass&&
$pass2)
{
    if($pass==$pass2)
        {
            if(strlen($uname)>25 || strlen($firstname)>25 ||
strlen($lastname)>25)
        {
            echo "Please enter a first name, last name and username
not longer than 25 characters"; }
        else {
            if(strlen($pass)<5 || strlen($pass)>25) {
                echo "Please enter a password between 5 and 25
characters";}
        }
    else {
        $pass=md5($pass);
        $pass2=md5($pass2);

        $query=mysql_query("INSERT INTO test VALUES ('','$uname',
'$firstname', '$lastname', '$pos', '$mail', '$pass', '$date',
'0', 'Write something about yourself.')");

        die ("<h2>Employee Registered to Electronic Human Resource
Management. </h2>");}
    }
}
}

```

This part of the code checks the registration conducted by the administrator. Firstly it makes sure that all the variables are entered. Then I checks initially if the passwords entered match and after this if the name, surname or username are longer than 25 characters. In this case an error message will be displayed. Secondly the code checks if password is within the length of 5 and 25 characters. Only after all the constraints are followed, the password is encrypted in the database and all the values are stored as well.

The administrator is notified that the registration was successful and the employee can proceed with the login.

Code:

```
while ($row=mysql_fetch_array($sql))
{
    $dbusername=$row['username'];
    $dbpassword=$row['password'];
}
if($user_login==$dbusername && $password_login_md5==
$dbpassword)
{
    session_start();
    $_SESSION['user_login'] = $user_login;
    echo "<meta http-equiv=\"refresh\" content=\"0;
url=http://stud-proj.epoka.edu.al/~edede/thesis/
$user_login\">";
}
```

JavaScript is also used in the process of code writing to provide a search bar for the users while searching for a function in the system. Through it the users will be able to search for functions provided by the system.

Code:

```
        <script>

            function showResult(str) {

                if (str.length==0) {

                    document.getElementById("livesearch").innerHTML="";
document.getElementById("livesearch").style.border="0px";

                    return;    }

                if (window.XMLHttpRequest) {

                    xmlhttp=new XMLHttpRequest();}

                else { xmlhttp=new ActiveXObject("Microsoft.XMLHTTP");}

                    xmlhttp.onreadystatechange=function() {

                        if (xmlhttp.readyState==4 && xmlhttp.status==200) {
document.getElementById("livesearch").innerHTML=xmlhttp.responseText;

                    document.getElementById("livesearch").style.border="1px solid
                        #A5ACB2";}}

                    xmlhttp.open("GET","livesearch.php?q="+str,true);

                    xmlhttp.send();}

        </script>
```

This is where you can report and provide feedback for your employer

Your report:

Name

Surname

What are you writing about?

Report

Figure 23: Appendix: Employee Report

This is where you can report and provide feedback for your employer

Your report:

Edlira

Dede

Request

Paper

Report

Figure 24: Appendix: Employee Report

You can also read the latest notices from the manager

Number	Department	Occasion	Deadline	Specification	Details
1	Finance	Press	2015-01-07	Compulsory	123

Figure 25: Appendix: Notification Retrieve

Manage reports from employers and post the latest news

Reports

Below you can find all the reports from employers:

There are: 2 reports

Number	Name	Lastname	Type of Report	Content
29	Edlira	De	complaint	1234
35	Katy	Ferry	complaint	The music is too loud

Do you want to delete any of these reports?

Number of report to remove:

Figure 26: Appendix: Manager Report Retrieval

Manage leave requests from employers

Leave Requests

Below you can find all the requests for leave from employees:

Figure 27: Appendix: Manager Leave Management