HUMAN RESOURCE MANAGEMENT FUNCTIONS
APPLIED TO HEALTHCARE SYSTEM IN DEVELOPING COUNTRIES

Funktionalitet för "Human Resource Management" applicerat på hälsovårdssystem i utvecklingsländer

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ABSTRACT

Ill-health has been identified as the cause and consequence of poverty in Uganda. In April, 2009 the ICT4MPOWER project was launched in order to improve health care delivery in the rural communities of Uganda using Information and Communication Technology. One of the aspects considered, was the development of a human resource management system. Studying quality literature, interviewing possible stakeholders and investigating the current healthcare management information system led to the finding of both tactical and strategic functions for the development of human resources. Mock up interfaces was designed to support the needs of the organization. Flowcharts, use cases, and instruction films were made to clarify and to see the process from different end user. We have identified a need for a more strategic approach towards human resource management, but it must begin with establishing the hard foundation.

SAMMANFATTNING

Dålig hälsa har identifierats som the största orsaken, och konsekvensen, till fattigdom i Uganda. I april 2009 sjösattes projektet ICT4MPOWER i syfte att förbättra sjukvården på landsbygden med hjälp av Informations- och Kommunikationsteknik. En del av projektet innefattar utvecklandet av ett "human resource management" system. Genom kvalitativ litteratur studie, intervjuer med möjliga intressenter och utvärdering av det nuvarande sjukvårdssystemet har vi hittat både taktiska och strategiska funktioner ämnade för utvecklandet av organisationens humana kapital. Funktionerna blev grafiskt designade med ett prototyp verktyg. Flödesscheman, användarfalls diagram och instruktionsfilmer gjordes i förklarande syfte och visualisering av olika användares interaktion med systemet. Det finns behov av en mer strategisk syn på utvecklandet av det humana kapitalet men först måste implementeringen och säkerställandet av den hårda grunden ske.

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1. INTRODUCTION

This is an introduction for both the ICT4MPOWER project and this thesis work. This section of the report will give you better understanding about this thesis work and how the main project was governed.

In order to introduce you to the subject of HRM the authors have conducted a small summary of key abbreviations used throughout the report.

Acronym	Full name	Description
	Back end system	The server in Client/Server
BED	Biomedical Engineering Department	A department within KUH
DHO	District Health Officer	Approved staff within the HMIS
CAO	Chief Administration Officer	Approved staff within the HMIS
DSDM	Dynamic System Development Method	A method used for designing GUIs
GUI	Graphical User Interfaces	Visualization of end user interacting with the system
HMIS	Healthcare Management Information System	Old healthcare system used in Uganda.
ICT	Information and Communication Technology	
ICT4MPOWER	ICT for Medical Empowerment	Name of main project
	Mock Up	Partly functional and designed prototype of a system
JIMP	Justinmind prototyper	GUI developing tool
KI	Karolinska Institute	
KPI	Key Performance Indicator	Measure performance of an organizations main activities
KUH	Karolinska University Hospital	
MOH	Ministry of Health	Highest level of healthcare authority
P4P	Pay for Performance	Linking compensation to measured performance
RAD	Rapid Application	Project management

	Development	method
SDLC	System Development Life Cycle	Process of creating or altering systems
SPIDER	The Swedish Program for ICT in Dev. Regions	A resource center which supports the use of ICT for development and poverty reduction

TABEL 1: ABBREVIATIONS AND TERMS

1.1. BACKGROUND

This thesis work is a part of a larger project titled; Information and Communication Technology for Medical Community Empowerment (ICT4MPOWER). Their mission is to improve the effectiveness of health system and empowerment of healthcare communities in Uganda. The purpose is to gain better health outcomes for the rural population using information and communication technology, focus is set on the Isingiro district in the Mbarara region. The project owner is the Ministry of Health in Uganda and other stakeholders from Uganda include local governments and universities. Sweden is represented by SPIDER, which is a research center for ICT development (ICT4D), their aim is to use ICT for development and poverty reduction. Some of the specific project objectives includes putting in place the necessary E-infrastructure, implementing an effective health record management system, create a unique patient ID system, establishing an electronic patient referral and feedback system, establish a mechanism for Tele-consultation support, establishing a system for human resource development and to create opportunities for networking with various stakeholders.

Karolinska University Hospital has more than 20 years of experience in implementing and managing healthcare information systems. During recent years biomedical engineers has involved in other projects to implement e-health services in developing regions. In the ICT4MPOWER project, Karolinska University Hospital and the Biomedical Engineering Department will act as a project coordinator and a focal point of sharing expertise [1].

To fully understand the difference between these three similar expressions, and how they are connected to each other, please read the following compilation:

- Human Resource (HR) – This is an organization's human capital. It consists of many parts, but the most common are: strategy over the organizations human capital, recruitment, organizational policy and organizational structure. This part is most commonly managed by the upper-management or the board of directors, not the HR-department.
- Human Resource Management (HRM) – This is the management of HR. Here an organization manages the strategies they made clear, and take care of day-to-day business. The HRM is often done by the HR-department, but

also lower management could be involved in the HRM. It is common to combine HR and HRM, but it is important to understand the differences. The upper management makes the HR strategy and the HR-department or lower management tries to fulfill the strategy in HRM.

- Human Resource Management System (HRMS) – This is the system which has the same objectives as all system in organizations, help the employees to increase their performance. The HRMS is used to help the HR-department or the lower management to make a better job practicing HRM [2].

1.2. PURPOSE

In January 2009 three project members from Sweden visited Uganda. As a result of the visit several areas of actions were fund, one includes Human Resource Development as a priority. *"Since all health care is ultimately delivered by and to people, a strong understanding of the human resources management issues is required to ensure the success of any health care program"* (M. Kabene et al, 2006, "Human resource for health", volume 4, p. 15). The purpose of this thesis work is to take an innovative and unconditional approach towards developing a HRMS that could enable a more efficient healthcare and to improve the quality.

1.3. PROJECT GOALS

The project goal is to identify HRM activities that could improve the effectiveness of the health system and enable empowerment amongst its human resources.

The project will rest on some core values. These values are set in order to develop human resources and to foster an organizational culture. The result of the HRMS should be based on:

- Customer Value.
- Knowledge.
- Openness.
- Team Spirit.
- Innovation.

1.4. DELIVERABLES

Project deliverables, apart from the final report, are:

- Identify how other HRM and HRMS works and what functions could be applied to developing countries.

- Investigate if HRM activities and systems from other industries could be applied at the healthcare.

- Identify goals with HRMS for the organization.

- Develop GUIs for the HRMS from the functions discovered.

1.5. DELIMITATIONS

Performing this project in such an innovative and unconditional way will make it difficult to set delimitations. Due to the limited time available for this thesis work some broad scopes will be set and focus should mainly be to perform qualitative studies rather than quantitative.

Time consuming activities and activities not relevant for achieving the project goals are two reasons for setting constrains.

The initial guidelines was set to:

- The patient is considered to be the customer.
- Focus should mainly be on Uganda, but will be scalable in order to be applied at other developing countries.
- GUIs supporting the main functionalities and processes.
- This project will based on some core values:
    - Innovation.
    - Team Spirit.
    - Customer Value.
    - Knowledge.
    - Openness.

The authors will try to set as little constrain as possible on this project in order to be flexible and innovative. Some areas which are excluded from the start in order to reach the project goals in time are:

- The GUI design will merely take the form of mock ups and thus no back end system will be considered.
    - Design will not be a priority since it has to be similar to other modules of the joint system within the ICT4MPOWER project.
- Interesting areas that will not be drawn as GUIs might still be discussed in the report and maybe suggested as further research.

This project is a part of a larger project so this project is therefore obligated to consider that projects recommendation and suggestions.

2. INITIAL ANALYSIS

To fully understand the magnitude of this project the authors have done an initial analysis in order to determine the present situation, knowledgebase and circumstances regarding the project. The analysis started by identifying individuals and groups that will, in some way, be affected by the result.

2.1. STAKEHOLDERS

Some of the project stakeholders are identified and analyzed to further understand their impact and how to manage them.

Stakeholders	Role in project	What stakeholder wants	Stakeholder importance 1-5	Management of stakeholder
ICT4MPOWER	Customer	Potential HRMS	3	Receiving useful results
ICT4MPOWER (Sweden)	Colleagues	Innovative HRMS and feedback	5	Weekly meetings and sharing of documentation
Rustam Nabiev	Project Coordinator (Sweden) and our Supervisor	Involvement in the development of the HRMS	5	Weekly meetings and constant information exchange
KI Managers	Source of information and potential end user	Involvement in HRMS development. Managers perspective on HRM	4	Interview
KI HR department	Source of information and potential end user	Involvement in HRMS development. HR department perspective on HRM	4	Interview

| KI Employees | Source of information and potential end user | Involvement in HRMS development. Employees perspective on HRM | 4 | Interview |
| Anders Sjögren | Examiner | Final thesis report and presentation | 4 | Meetings according to thesis work procedure |

TABEL 2: STAKEHOLDERS

2.2. RISKS

Being an innovative project concerning an area in which the authors had little knowledge and experience, a thorough risk analysis was performed. Risks were identified, assessed and proactive actions were taken to minimize the impact. This was an important stage in the project. When taken such explorative approach, risk assessment and proactive actions is vital to insure some kind of structured way of working when problems occur.

Risks are identified and assessed and a more thorough description can be seen in Appendix A, where proactive actions are described and taken.

Risk	Cause	Probability 1-5	Impact 1-5
1. **Number of authors**	Three authors might be a risk as thesis work is usually done by two persons.	4	2
2. **Unclear objectives**	Communication failures and an innovative assignment could lead to unclear objective.	4	5
3. **Time limit**	The thesis work has a time limit of 10 weeks.	2	2
4. **Absence**	If a project member get sick or in other way gets untouchable.	3	1
5. **Requirement**	Requirements	3	4

	changes	might change anytime.		
6.	**Supervisor involvement**	If the supervisor gets involved in the project to much or too little.	4	3
7.	**Unclear definitions of concepts and terms**	Confusion from other project members can occur when not defining terms.	2	4
8.	**Lack of end user feedback**	Not enough or satisfying information from possible end users.	2	3
9.	**Incorrect documentations**	Confusing documentation from project members.	1	2
10.	**Lack of information collection**	Not enough, or wrong, information gathered.	3	3
11.	**New innovative work method**	Work method given to the project members by the tutor.	5	5

TABEL 3: RISK ANALYSIS

3. RESEARCH METHODOLOGY

During the project a lot of different methods were used in order to collect the right information and to get the best possible result out of the project. This section is dedicated to describe the methodologies and the resources from every part of the information gathering.

3.1. PREPARATIONS

The authors were told by the supervisor to use a method which focused on an innovative way of thinking and try to create functions without influence from other already existing HRMS.

In order to use a work method, that could support both the project approach and handle a lot of requirement changes, the authors chose to adapt the Rapid Application Developing (RAD) method.

3.2. PROJECT MANAGEMENT METHOD

When managing the project, the Rapid Application Development (RAD) method was used. It is a method primarily used when constructing software prototypes.

RAD is a method that is proven useful when conducing project were user requirements and other factors of production is constantly changed. It is an alternative approach, in contrast with System Development Life Cycle (SDLC), which enable result in much shorter time. The method allows quick adjustments and to handle changes while still having focus on the overall goals and objectives. The process could be seen in Figure 2.

The fundamentals of RAD is that it focuses initially on creating a prototype that looks and acts like the desired system, actively involve system users in the analysis, design, and development phases and accelerate collecting the business requirements through an interactive and iterative construction approach [3].

As seen in the Figure 3 a general analysis were made about HRM, several brainstorming sessions and interviews were performed which led to the creation of GUIs. Thereafter feedback was gathered from the ICT4MPOWER members and other stakeholders to perfect the prototype even further.

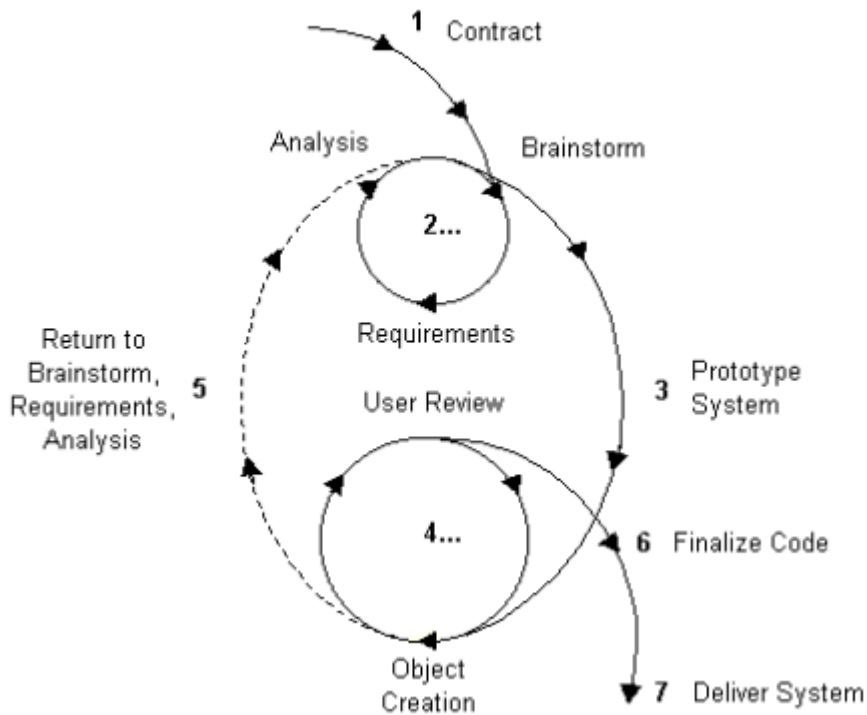**Rapid Application Development (RAD) Methodology**

FIGURE 1: RAPID APPLICATION DEVELOPMENT DIAGRAM [4]

One of the advantages of RAD is the ability to engage end user throughout the entire development cycle. RAD is also more suited to smaller organizations and teams.

The method has been adjusted fit towards the activities that were identified.
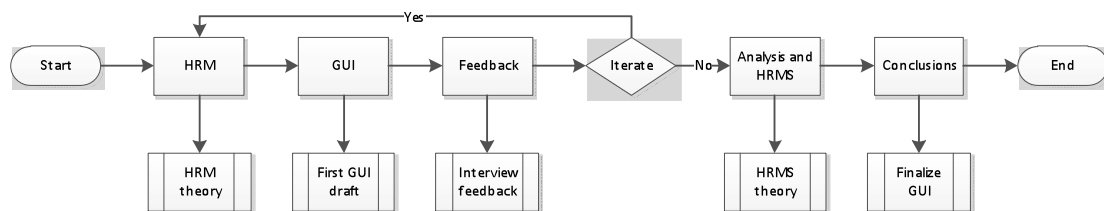
FIGURE 2: FLOWCHART OVER PROJECT MANAGEMENT

Description of Figure 3:

- Study literature and other theory within the area of HRM.
- Make the first draft of functions using a prototyping tool call Justinmind prototyper (JIMP).
- Receiving feedback from potential end users through interviews.
- Iterate.
- Analyze and investigate HRMS literature, especially within the healthcare industry.
- Draw conclusion and finalize function into GUI.

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The project management was supported by writing a diary with the intention to be able to consolidate it during the whole process. Also a dictionary will be written in order to avoid confusion between different word and terminology. Other support activities include scheduling, weekly progress report, project administration, weekly planning session, weekly feedback meetings with other members of the Swedish ICT4MPOWER team and brainstorming sessions.

3.3. INTERVIEW METHOD

This project is being conducted with several different end users in mind and thus different kind of stakeholder will be interviewed. In order to find persons with valuable information regarding the assignment some kind of methodology, for performing interviews, was needed. The Funnel Model was review and ultimately chosen as the method to use. The Funnel Model is a dynamic approach that could be applied in several situations [5].

The interview procedure is being explained in detail and can be seen in Appendix C.

3.4. BRAINSTORMING

In order to keep up the innovative thinking process several brainstorming sessions were conducted which has proven fruitful. The method which was chosen is not scientifically described but rather developed, by the authors, as a structured way of performing these meetings.

1. First off, objectives were pointed out for the session and which subject that will be handled.
2. Then a white board was used to build up mind maps with ideas concerning the subject.
3. Assessments and analysis were made of the mind maps with the purpose of extracting the most interesting details.
4. One person is than responsible for compiling the result, both visually and with notes.
5. These conclusions will then follow up at the next session.

3.5. USER INTERFACE DEVELOPMENT METHOD

When developing the GUI the decision was made to use a method that is similar to the method used when managing this project. After some research Dynamic System Development Method (DSDM) was found and could fit with the overall project approach.

DSDM is based upon RAD and is an iterative approach that emphasize continues end user involvement. Another principle of DSMD is to deliver something that is good enough rather that a perfect solution, which fit directly to the fact that mock ups are being made. All changes during development should be reversible and collaborative approach is other principles of DSDM. Since the initial idea was to design GUIs from three different perspectives (Managers, HR department and Employees), this is an important part [6].

3.5.1. JUSTINMIND

Justinmind prototyper, (JIMP) is a tool that is used to create a mock up for the system. With JIMP illustrations of the system became possible in a dynamic way and give the end users a clear visualization on how the system will work.

3.5.2. TECHSMITH, JING

Jing is a web tool that allows one to record movies or takes pictures of one's computer desktop. Jing is used to view the illustration made in JIMP.

3.5.3. UML

UML stands for Unified Modeling Language and is a language that uses graphical notations in a meta-model for describing and designing software systems. This language is an open standard controlled by the Object Management Group (OMG) [7]. UML is used when designing use cases to simplify the GUI development.

4. PROCEDURE

The research methodology resulted in a lot of information, not all of it is relevant for the end result but the most important will be presented here. During this section the most important information is summarized.

4.1. THEORY

4.1.1. PERFORMANCE MEASUREMENT

The book "Den nya ekonomistyrningen" (2009) identifies performance measurement and KPIs for customer satisfaction, human resource development, appraisal, working environment and processes as important. The purpose is to make follow-ups and to align short- and long-term strategies. Also to find potential for improvements and to direct actions towards identified problems. These KPIs could also be a source of different reward system.

Measuring this could be divided in to different categories:

- Customers – satisfaction via surveys, number repeated visits and the purpose of it. The time of every patient visit and also link this to purpose of visit and measure lead times and try to split it up finding ways to shorten them.
- Employees – measure how they feel, how happy they are with different aspects of their work for example salary, colleagues and ability to make a career. Also make company profiles with demographics and development of competence.
- Quality – hard to define but might be something customers expect it to be. Quality cost in organization is often large and there is important to keep track of them. To ensure internal quality proactive costs are the only one that creates customer value.
- The Balanced Scorecard – could be used to find alignment through different perspectives, finding cause-effect relations, identifying KPIs and other measurements. But also to take actions and ensure follow-ups.
- Appraisal systems should be develop in accordance with KPIs and should act as a motivation to the employees.

When it comes to processes, non-value adding activities should be eliminated, processes should be linked to KPIs in order to evaluate them and managers should be able to identify these activities if they have a good overview [8].

4.1.2. INSTRUMENTS OF CONTROLLING AN ORGANIZATION

When talking about instruments of controlling an organization financial situation there are three; formal, organizational and less formal instruments. Less formal instruments are also called soft instruments; these are becoming more and more important.

- Company culture – The way things gets done, how people behave, express their self and routines for handling disciplinary matters. It can also include stories myths and legends in order to express a certain feeling. Recruitment, appraisal and competence systems. Physical structures and architecture, values and norms. Defining an organizations culture is a important aspect in the lean concept and is seen an important area of improvement.
- Learning – This instrument is based on the idea of making the organization more flexible in order to more quickly handle market fluctuation. Instead of having a hierarchy and strict top-management controlled organization, the purpose is to engage all employees and that ideas should strive both up and down. To create learning organization is a vital part of this. An organizational learning could only be created by first letting individuals learn, they will pass the learning on to others. It could be defined as continues improvement, change and innovation. To create this culture there must be a positive view of employees and trust in their ability and will. There are several more ways to create a learning organization; mentorship, education, seminars and competence sharing. Learning by doing has the best effect especially when you strive for an organization that, when identifying problems and weaknesses, act in order to change, improve and innovate.
- Empowerment – Refers to an individual that are able to form his or her surroundings. It could be called a strategy in order to improve employee engagement. Democratizing of the working environment [9].

4.1.3. PROBLEMS WITH HRM IN DEVELOPING COUNTRY'S

Human resources are essential to any healthcare system and thus understanding HRM is crucial to improving it.

Migration of healthcare worker from developing countries to developed countries is a severe problem. Also the migration within the country causes problems, for example Nicaragua suffers a surplus in some areas and a huge deficit in others. Same problems could also be fund in other developing countries, such as Bangladesh where many of the health personnel is employed in metropolitan cities.

Salary, living condition, upgrade qualifications and gaining experience is listed as reasons for intending to leave the country. Salary, economic and health care decline is listed as reasons for leaving. In order to stay, Ugandans want better salary, fringe benefits, better working environment and a fairer workload.

Kebene et al (2006) also states that a reduced number of healthcare workers in a given area have a direct effect on the life expectancy of its residents [9].

4.1.4. PAY FOR PERFORMANCE

After discovering the problems with migrating healthcare workers examinations were made about the possibility of implementing some kind of bonus system. P4P is one idea that is being used within the healthcare sector. The article begins with the question of rewarding individuals or groups.

A mixed approach is optimal, combined with feedback. Sometimes huge bonuses have no effect while sometimes small incentives do have effect.

Key elements of common P4P programs:

- Individual vs. groups: accountability vs. risk sharing, investment in systems and tailor quality improvements.
- A failed system is often seen to be crux for quality problems.
- Paying the right amount
- Selecting high impact performance measures: structure (IT), patient satisfaction/ experience. Most uses clinical quality, cost efficiency.
- Making payment reward all high-quality care: reward significant improvement and threshold.
- Prioritizing quality improvement for underserved populations: system improvements and cultural competence.

Local measures is often used and developed with input from local clinics. Cost of data collection must also be taken in to consideration. The cost of improving quality must be lower than the incentives [10].

4.1.5. HARD AND SOFT HRM

A more or less common way of describing HRM through the literature studies was found. HRM consist of two major parts, hard and soft HRM. An author named Stuart D. Green describes the differences as:

"The hard model of HRM sees humans as a resource to be 'provided and deployed' as necessary to achieve organizational objectives. In contrast, the soft model of HRM treats human resources as valued assets who offer a source of competitive advantage."(Stuart D. Green, 2002 "The Human Resource Management Implications of Lean Construction: Critical Perspectives and Conceptual Chasms" page. 3)

Another description of HRM was also found from (1997) where Huselid, Jackson and Schuler define it as technical and strategic HRM. Technical HRM includes e.g. performance measuring, recruiting and training employees. Strategic HRM consists of e.g. employee empowerment, quality management and flexible workforces. [11]

A third description of HRM was made in the book Tactical to Strategic Transformation of HR by Mathias and Jackson (2006) where they describe it as tactical and strategic HRM. The differences between tactical and strategic HRM is shown beneath in figure from their book.

Tactical (Employee Focus)	VS	Strategic (Organizational Focus)
Reactive	⟷	Proactive
Collecting HR data	⟷	Measuring HR with metrics
Responding to goals and objectives set by executives	⟷	Setting strategic HR goals and objectives
Complying with laws, policies, and procedures	⟷	Developing and revising policies and procedures
Administering employee benefits programs	⟷	Evaluating benefits strategically
Designing training programs	⟷	Identifying organizational training needs
Staffing jobs by recruiting and selecting employees	⟷	HR planning and linking with external staffing resources
Administering base compensation plans	⟷	Developing compensation plans focusing on employee performance and retention.

FIGURE 3: TACTICAL HRM VS STRATEGIC HRM [12]

These three articles describes HRM in different terms, but the content of description is the same to summarize, hard HRM is about dealing with daily issues and soft HRM is about the future needs.

4.1.6. HRM AS A SOURCE OF COMPETITIVE ADVANTAGE

In the quote from Stuart D. Green he mentioned soft HRM as a source of competitive advantage. To be able to understand that description better an article was found by Rūta Kazlauskaite and Ilona Bučiūnienė (2008) where they have investigated HRM as a competitive advantage and their conclusion is:

- HRM is important to create competitive advantages.
- HRM is important to sustaining competitive advantages.

Because of the two reasons above, HRM should be seen as a strategic activity in order to get a competitive advantage from HRM.

What they mean with strategic activity is that the HRM should be soft in order to gain competitive advantages [13].

Kloot and Martin (2000) have written an article with focus on the importance of strategic management in general. Their point is that even if you reach the strategic

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objectives, the real challenge is set up the strategy. In the long-term they believe that working with setting up strategies, that will generate competitive advantage, is better than working towards achieving them. Achieving objectives is not the problem, but rather setting the right objectives [14].

4.1.7. FACTORS TO SUCCEED WITH SOFT HRM

Zhu, Chew and Spangler (2005) compare hard and soft HRM, as well as describe important factors in order to gain the most from soft HRM.

By their point of view, it is important to involve the whole organization in the strategic management in a way where everyone is supposed to take responsibility for reaching the objectives.

The activities of the strategic management should involve those who are performing the company's day-to-day activities. Their activities should reflect the work of the people planning and setting up objectives for the strategic management. It is important for the people planning the strategic management to give trust to the people working with the day-to-day activities, because that will lead to motivated and committed employees. The employees will feel that they have empowerment over the organization's strategic management and feel that their decisions and actions will affect the organization's overall performance [15].

Further on Delaney and Huselid (1996) states the importance of giving responsibilities to employees and getting them to feel empowered.

They concludes that it could be a competitive advantage to involve employees in strategic management, but in order to become a source competitive advantage the way of involving them should be well developed.

They mentioned a case where an organization wanted to involve employees in strategic management, with the purpose of increasing efficiency and to be able to produce more with the same organizational structure. The problem was that they had not informed the employees why they wanted to involve them in the efficiency work, and the employees felt like the reason for becoming more efficiency was to cut cost by reducing staff. Instead of getting the employees involved in the strategic management, the employees felt a worry for their jobs and therefore their involvement was not successful. This is a worst case scenario, but shows that the explanation and the understanding of the involvement could be as important as the actual involvement itself [16].

4.2. CUSTOMER SPECIFICATIONS/ REQUIREMENTS

The first introduction to the thesis work was given by Rustam Nabiev and could be described as taking an improvement and change approach towards healthcare and the final result should be presented as mock up GUIs from the functions found.

The first ideas formulated by the supervisor were that the project be should divide into different parts and lay focus on different stakeholder:

- Manager.
- HR Department.
- Employees.

To give some inspiration and suggestions of functions that could be used in the HRMS, Rustam Nabiev is sharing some of his ideas:

- Information about allocation of resources.
- Time consuming of each activity.
- Result of activity, measured toward the goal.
- Activities should be connected to goals of deliverables.
- Easy visualization of monthly and accumulated results.

When handing in the first draft of the project definition customer requirements changed. Instead of taken the normal approach towards finding functions which could be used in the HRMS, the project plan were forced to take new approach and design an innovative GUIs before performing interview with potential end users and looking at other HRM systems used in the healthcare industry.

One method of finding theses GUIs are found when discussing with Rustam Nabiev; the method starts by finding questions, find the functions which answers them, located the business processes related to them and finally design the interfaces to support them. One purpose with the HRMS is to foster the values set by the project members, Innovative, Knowledge, Openness, Team Spirit and Customer value.

During a presentation of the functions, which were found and was about to start get implemented, the impression was that it seemed to be too advanced. Rustam Nabiev had five ideas for functions that should be developed:

- Register new employee.
- Register competence.
- Register future competence.
- Register role and responsibility.
- Planning and KPIs for every stakeholder.

Rustam Nabiev specified what kind of functions he wanted in the HRMS. The new specifications could be divided in to: Register, view and searching employees and

facilities. These functions are similar to those already existing in the current Healthcare Management Information System (HMIS) [17].

4.2.1. SUMMARY OF REQUIREMENTS

Here is a summary of requirements from Rustam Nabiev, the customer, the project coordinator and manager for the Swedish section of ICT4MPOWER project. This was determined after the final meeting.

- The project report must be written in English, the final presentation must also be held in English. Since this thesis is a part of a larger project in which the project owner is the Ministry of Health, Uganda.
- The project should strive towards strengthen the core values, which are:
    - Customer Value.
    - Knowledge.
    - Openness.
    - Team Spirit.
    - Innovation.
- The HRMS will be used by practitioners in Uganda; hence they are the end users.
- The GUIs should support functions and don't have to consider back end systems, since the final result will be mock ups.
- Functions that must be supported by HRMS is:
    - register, searching and view of employees and facilities
- End users that interact with the system are identified from the HMIS.

4.3. INTERVIEWS

The purpose was to capture different stakeholder and their requirement in order to design a system that supports the whole organization. The initial approach was to find interview objects that correspond directly towards the three different stakeholders identified in the initial analysis; Managers, HR department and Employees.

The interview questions have overall been very similar. The purpose has been, as explained in the interview methodology, to ask open question and then use the funnel model to pin down answers. Frequently asked questions could be summarized as:

- Your current experience of HRM system, future expectation and what kind of activities that could be supported by implementing and improving HRMS.
- Your current experience in improvement and change projects, how it could work differently and how information technology could support it.
- How the three stakeholders are interacting and how improvements could be done.

Cecilia Nilsson is working as a HR consultant and she is mostly involved in "hard" HRM activities, including work environment, personnel administration and disciplinary actions.

Her interactions with systems include recruitment, which is constructed to simplify the recruitment processes so it supports the organizations overall policies. She is also handling environmental questions and statistical questions through different systems. The main problem with the current system is the lack of integration between the different modules, this illustrates clearly by large differences in design. The only information going back to her is performance review, which is conducted by employees and review by HR consultants.

Cecilia Nilsson's responsibility is to support managers in their work, and since managers is the one responsible for the development of employees, her role touches on the strategic level of "soft" HRM, but not nearly enough based on her knowledge. Simple processes, on which she is currently handling, could be performed by low grade workers while she could be more involved in the strategic HRM.

Functions wise, pop-up reminders are one thing that Cecilia wants. When receiving a reminder she could evaluate it and act accordingly. This could for example be reminder popping up when a person is repeatedly late for work.

The question of encouraging high performers cannot be solved by bonuses, since this is regulated by law, but more recognition awards is needed.

Karin Runström is a biomedical engineer and should be considered an employee in this research. She is quite satisfied with the culture that has been established within her department, but there is no system that supports feedback and follow-ups when handling machine repairs. This exceptional culture was created through good leadership and many years of collaboration within the BED.

One thing that is surprising is that the there is no quality assurance performed towards the customer, rarely no cooperation and sharing of experience is being done with other departments.

Workplace meetings are conducted every month but any follow-up activities is not that common, but there are weekly BED meeting which are somewhat better.

Karin Runström is also pro recognition and that awards can go to people who spreads happiness amongst its co-workers.

Karin would also like a system that enables sharing of experience and knowledge; in this case she would also like to involve the machine suppliers.

Jan-Erik Ahlström is also a biomedical engineer with similar system interaction as Karin Runström, but is working in smaller team with well know team mates. He said

that a certificate of competence will soon be establish, this means that managers has better chance of placing people with the right competence in the right place.

Jan-Erik Ahlström is requesting more interdepartmental cooperation and sharing, the outside perspective could improve the organization a lot. This sharing tool could also be extended to suppliers and customers.

In order to get a managers perspective, Lars Carlsson, head of BED, gave some interesting information.

From his view there are problems with follow-up during improvement meetings. He explained the "competence cover" system that is under implementation and the benefits which managers could draw from it.

He admitted problems with interdepartmental collaboration, even at managerial level. Karolinska University Hospital consists of more than 80 departments and approximately 16 000 employees.

His vision is to transform BED to a learning organization. He will try to do this by expanding the forum structure that is used in the biomedical engineering association, were he also acts as manager [18].

4.3.1. SUMMARY OF INTERVIEWS

Here comes a short summary from the interview performed. The three different stakeholders were asked to reveal weaknesses in the systems related to HRM. Different activities were also examined, within the area of HRM that could be supported by the system.

- The cultural different between Uganda and Sweden. This should be regarded in every aspect, for example the expectation from patients.
- HR specialist should act more strategically. Staff satisfaction should be reported by employee but the strategic reaction towards the result should be handled by a HR representative.
- A broad sharing and caring tools is needed. Sharing of experience and knowledge will improve every organization, the difficulties lies in implementing it and rewarding people who uses it.
- Better follow-ups from different improvement meeting and more information flowing bottom-up could be done through system improvements.
- Similar functionalities and design patterns when handling different systems.

4.4. BRAINSTORMING

During the project there were six brainstorming sessions, equally divided in two different periods of the project. Under the first period each session were focused to look from a specific, or the given stakeholders, perspective. The aim was to find out

what each of the stakeholders could use in a HRMS. Mind maps were created over the different aspects for the three stakeholders in order to structure and visualize what information that could be necessary to involve in a HRMS.

From these mind maps, along with literature studies, the questions for the interviews were created.

After performing the interviews there were three more sessions where questions were created and functions found to answer them. From the literature, the mind maps and the interviews the authors started off by creating relevant questions for each stakeholder. During the last brainstorming session, questions were compared between the different stakeholders, and a similarity between them was found.

Therefore questions were created that could be relevant for every stakeholder and also connected to the values of the organization. The questions that the functions were created from were:

- How can I increase customer value?
- How can I increase innovation for the organization?
- How can I increase knowledge throughout the organization?
- How can I increase openness in the organization?
- How can I contribute to increasing the team spirit in the organization? [19].

5. RESULTS

From all the information gathered in the procedure, the results are presented in this section. The functions is designed and described as mock ups and can act as a real system when integrated with other ICT4MPOWER modules and back end systems.

5.1. HRMS DESCRIPTION

The system consists of four parts, view, registration, strategic planning and action reporting. Some of the parts consist of several functions.

- Registration – you are able to register employees and facilities.
- View – you can search, view and edit employees and facilities that have been registered.
- The strategic planning – function is made in order to create a tool that could help the organization to plan the strategies and align them throughout the entire organization.
- Action reporting – is reporting of day-day action which is connected to the strategy.

5.1.1. END USERS INTERACTING WITH THE HRMS
- Administrator – all permissions granted.
- Ministry of Health (MoH) – Nation level.
- Chief Administrative Officer (CAO) – District level.
- District Health Officer (DHO) – District level.
- In-Charge – Of Health Unit.
- Employees – Approved cadre from HMIS.

5.2. EMPLOYEE MANAGEMENT

5.2.1. PURPOSE
- Register new employee.
- Search, view and edit employee.

5.2.2. BENEFITS
This function will enable better employee management and will replace the current system of handling staff at health units. The current way of working did not include any electronic usage. Staff listings were performed every 6 months and hard copies were stored physically at a few key managers office.

This made employee records inaccurate, did not allow historical data to be stored and forced new listings of staffs every 6 months.

When employee information is stored in the system, it will enable a lot functionality that was difficult to perform during the current way of storing staff records.
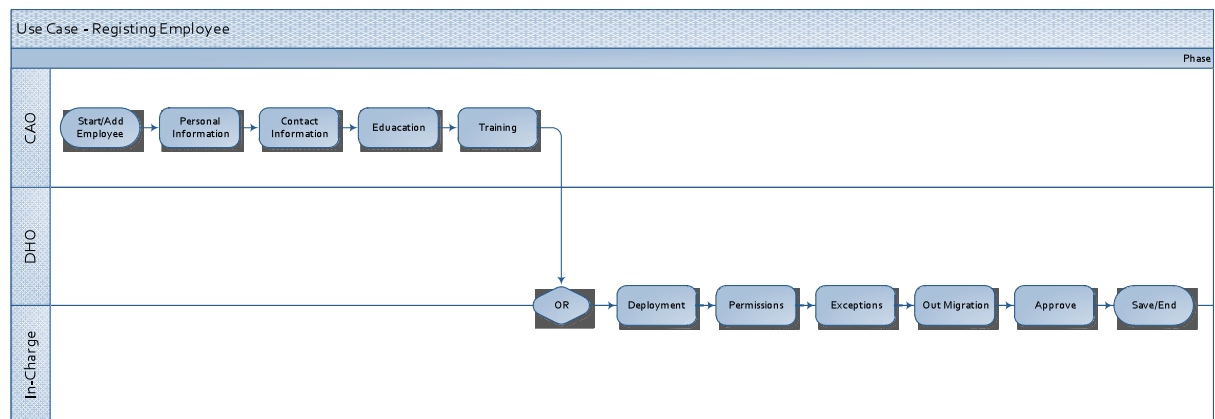
5.2.3. FLOWCHART – REGISTER EMPLOYEE

FIGURE 4: REGISTER EMPLOYEE

The figure above demonstrates which end user is performing each step in the process of registering employees. The activities from entering deployment information to approving out migration could be done by either the In-Charge manager or the District Health Officer (DHO).

5.3. FACILITY MANAGEMENT

5.3.1. PURPOSE
- Register new facility.
- Search, view and edit facility.

5.3.2. BENEFITS
The facility management is similar to employee management and they are connected since employees are working at a facility. The new management of facilities will result in better management, updated information and the possibility to further improve the health system.
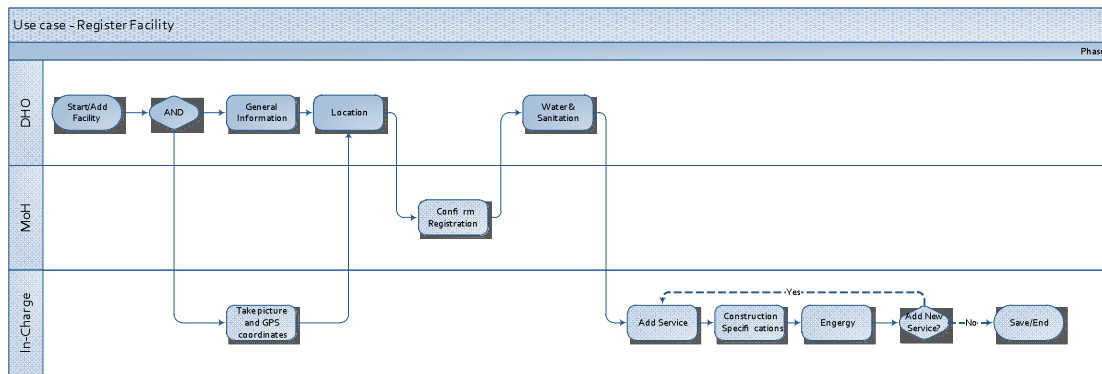
5.3.3. Flowchart – Register Facility

FIGURE 5: REGISTER FACILITY

The registration of a facility must be confirmed by a person from the Ministry of Health in order to avoid ghost centers that collect money without existing.

5.4. Strategic Planning

5.4.1. Purpose

This is made to show how the different goals are connected and to get an understanding throughout the organization that the small actions that are made in the day-to-day activities effects the result of the long-term strategies.

5.4.2. Benefits

To provide the best possible health care

Long-term strategies

Customer Value, Innovation, Knowledge, Team Spirit and Openness

Short-term goals

Metrics

Day-to-day activities

FIGURE: 7 STRATEGIC TRIANGLE [20]

Long-term strategy derived from the values (Innovation, Openness, Customer Value, Team Spirit and Knowledge) of the organization. Strategies will be placed by top level managers, for example Ministry of Health or, at a regional level, the District Heath Officer.

Specific, Measurable, Achievable, Relevant and Time-bound, (SMART) objectives will be set in order to accomplish the strategy, there could be several objectives associated with one strategy. The objectives have a shorter timeframe and the responsible is often a middle manager, for example DHO or In-Charge of a health unit.

Several actions could be set in order to achieve the objectives and ultimately the strategy. Actions are weekly or day-to-day activities, performed by employees, with the purpose of enabling the short-term objective.

5.4.3. FLOWCHART – STRATEGIC PLANNING
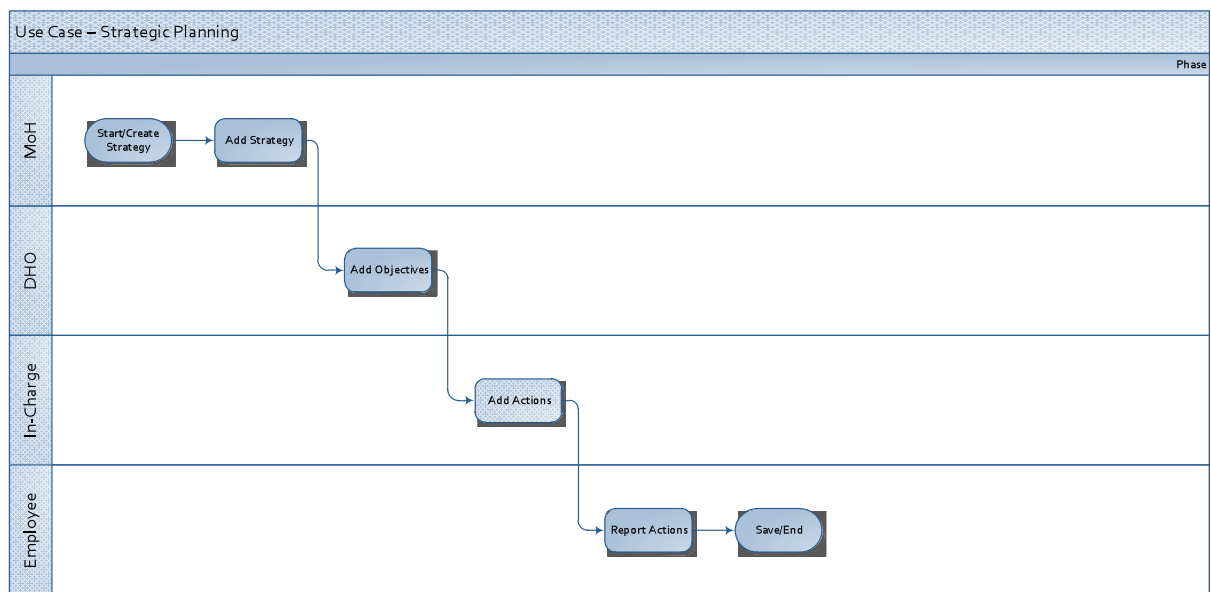
FIGURE 7: STRATEGIC PLANNING

5.5. GUIs

5.5.1. AFTER LOGIN

After logging in to the system the end user will see the value wheel and possible actions that could be taken in this stage.

For increasing the employee's knowledge about the organizations values, a figure was created called the "value wheel". The "value wheel" is modified from the book "Strategic Supply Management" (2008) and shows the organizations values and also show how they are connected and that they are dependent of each other [21]. For instance if you change the knowledge, it could also affect the innovation or the openness. It also shows that everything the organization does have an effect on the customer value, which in this case is the most important value of the organization.

FIGURE 8: GUI - AFTER LOG IN

This screenshot shows all possible action available after logging in to the system.

5.5.2. REGISTER A FACILITY

This is the function for adding a new facility. Press Register then Add Facility.

FIGURE 9: GUI - REGISTER A FACILITY

The end user fills in all this information about the facility and then click continue to go add information about water and sanitation conditions. Finally services available in the facility are added.

5.5.3. VIEWING AN EMPLOYEE

This is the view function for an employee.

FIGURE 10: GUI - VIEWING AN EMPLOYEE

From here the end user can see, in this case, the education for the employee. By clicking on the edit button the end user can edit or add a new education for the employee. By clicking on "cancel" all the changes that have been made will be withdrawn. The cancel button is placed far from the other buttons in order to avoid clicking on cancel by mistake. The view of the other tabs for the employee follows this principle with edit, save and cancel in the bottom of the screen.

5.5.4. ADDING A STRATEGY

FIGURE 11: GUI - ADDING A STRATEGY

This is the screen for adding a strategy. The end user starts by choosing which value the strategy will be connected too, this is made in order to make sure that every strategy is relevant for the organization. Then the rest is filled in. The procedure is the same for objective and action, but in those cases the end user connected every objective to one strategy and every action to one objective.

5.5.5. VIEWING A STRATEGY

FIGURE 12: GUI - VIEWING A STRATEGY

Under viewing a strategy the end user can see all the information that has been filled in about the strategy and how many objectives that are connected to that strategy and how many actions that are connected to that strategy. By clicking on either "sum of objectives" or "sum of actions" the end user gets to the view of objectives or actions.
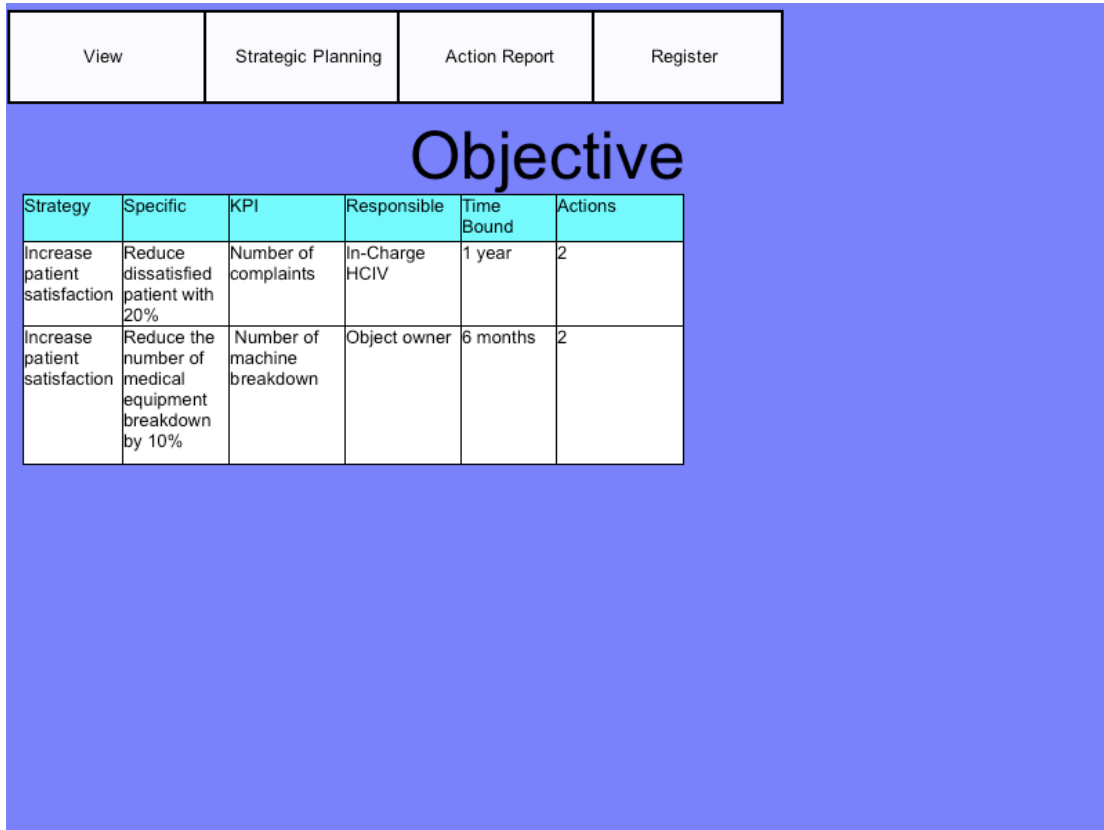
5.5.6. VIEWING OBJECTIVES

FIGURE 13: GUI - VIEWING OBJECTIVES

This is the view of objectives. The end user can see all the information about the objective that has been filled in and also how many actions that are mad to fulfill the objective. There is also shown which strategy the objective is connected to. By clicking on strategy or "sum of actions" the end user will come to that view.

5.5.7. VIEWING ACTIONS

FIGURE 14: GUI - VIEWING ACTIONS

This is the view of actions. Here the end user can see all the information that has been filled in and which strategy and which objective the action is connected to. By clicking on either of them the end user will came to that view. The column to the right is by default set to "Not Reported". In order to change the status the end user must make an action report.

5.5.8. ACTION REPORTING

FIGURE 15: GUI - ACTION REPORTING

To make an action report the end user start by choosing which action to report, then choose the status of the action, "succeeded" or "failed". Then the end user fills in by who the action report is reported by. Then the end user click on the button "report" and the status under action view will be changed.

The cause of an objective not achieved could now be derived from the reported actions associated with it.

5.6. DEMONSTRATION OF FUNCTIONALITIES

Films have been produced to further illustrate how the system work and the primary functions are described in detail. The different end users performing the different steps are shown in the Use Cases above.

5.6.1. REGISTER FACILITY

Video demonstration: http://screencast.com/t/EU1tIDqLr

Use case:

1. DHO: Fill in General information
2. MOS: Photograph and set coordinates
3. DHO: Specifies the Location
4. MoH: Confirm registration
5. DHO: Fill in water and sanitation information
6. MOS: Adds services
7. MOS: Fill in construction specification
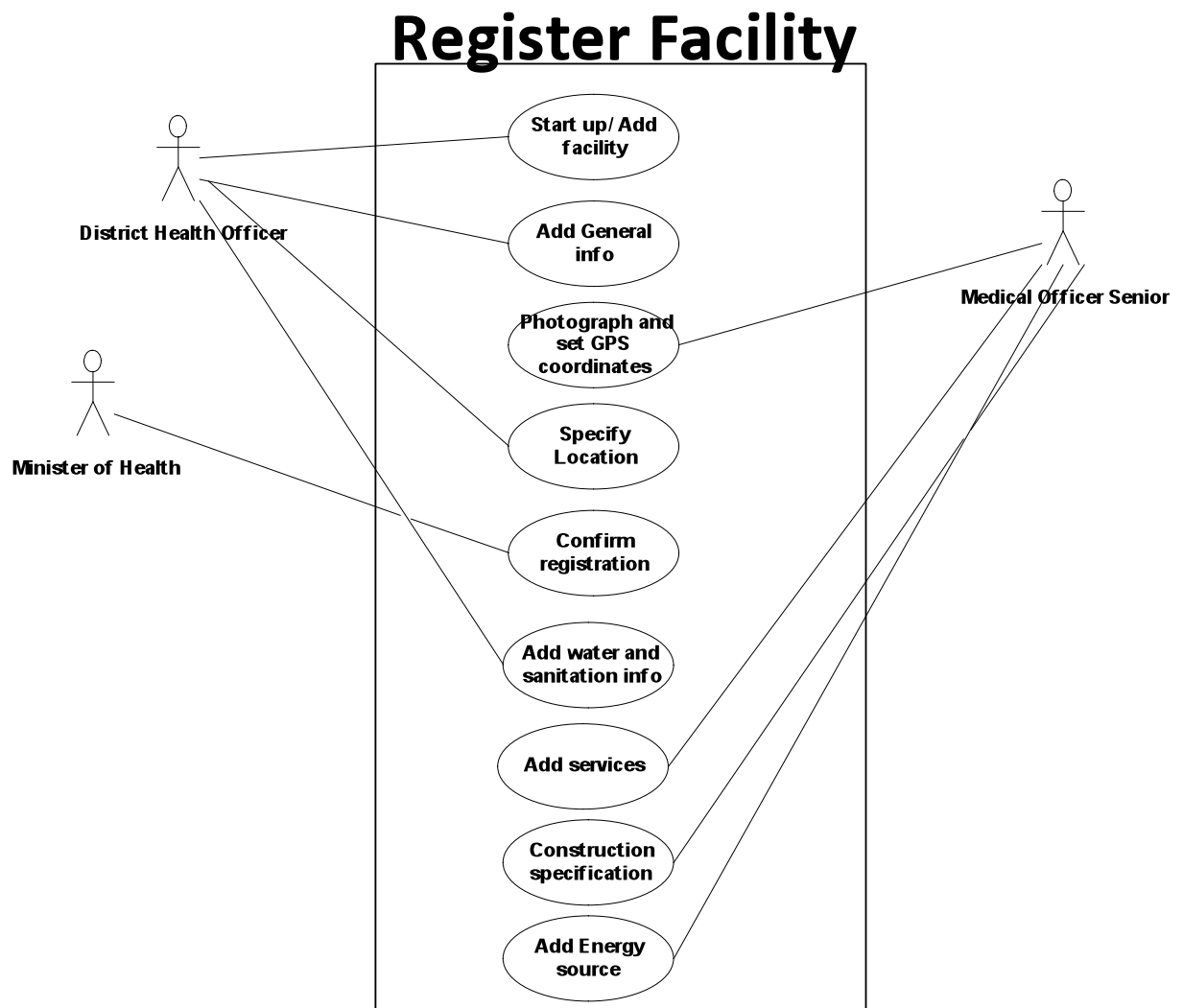8. MOS: Choose energy source

FIGURE 16: USE CASE - REGISTER A FACILITY

5.6.2. SEARCH AND EDIT EMPLOYEE

Video demonstration: http://screencast.com/t/OjTRO75vE

Use case:

1. DoH, MOS, Employee: Start edit mode
2. DoH, MOS, Employee: Search employee
3. DoH, MOS, Employee: Change personal information
4. DoH, MOS, Employee: Change contact information
5. DoH, MOS: Change education
6. DoH, MOS: Change training
7. DoH: Change deployment
8. DoH: Change permission
9. DoH: Change out migration

Search and Edit Employee
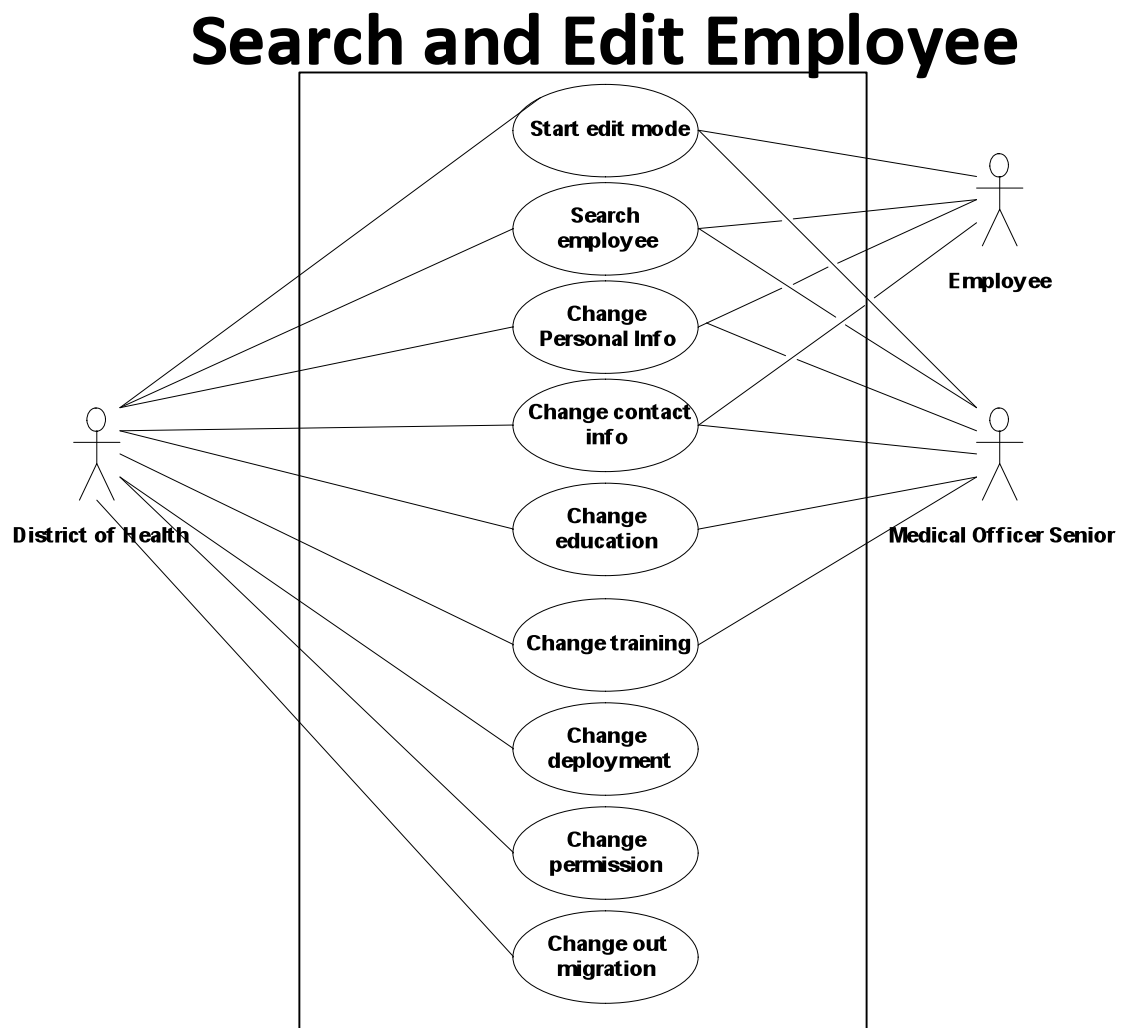
FIGURE 17: USE CASE - SEARCH AND EDIT EMPLOYEE

5.6.3. ADD STRATEGIC PLANNING

Video demonstration: http://screencast.com/t/CVixy9yy

Use case:

1. MoH: Start Strategy planning
2. MoH: Add strategy
3. DHO: Add objective
4. MOS: Add action
5. Employee: Report Action

Add strategic planning

5.6.4. VIEW STRATEGY AND REPORT ACTION:

Video demonstration: http://screencast.com/t/Xru18rEg

Use case:

1. DHO, MOS, Employee: View strategy
2. Employee: Report action

Report acti on

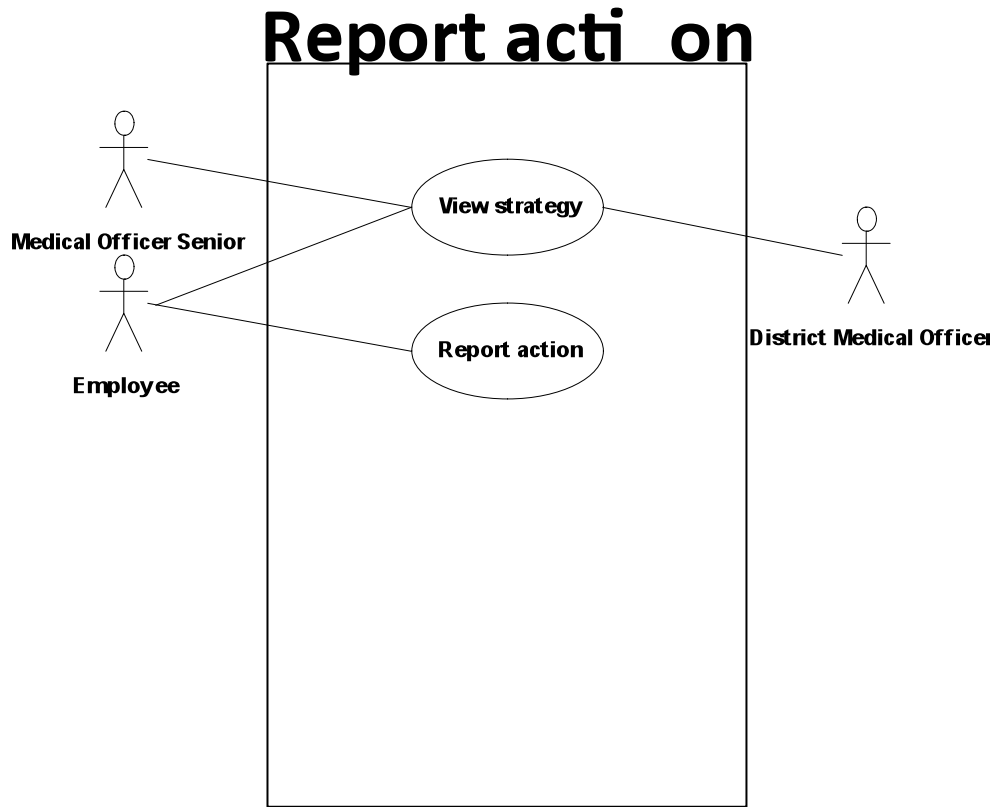**FIGURE 19: USE CASE - REPORT ACTION**

6. DISCUSSION

This section is includes general discussion regarding the project, the result and the future.

From the beginning, the purpose of the project was to find innovative functionalities for a HRMS. Differences between developed and developing countries, when searching for functions to use, were ignored. During the project the request from the customer changed to include functions that are supposed to simplify the work for the end users in Uganda. Fortunately the specification of these functions existed in the current Healthcare Management Information System (HMIS), but it was necessary to adapt them to the new situation.

The new function that were created, strategic planning and action reporting, was created to increase the soft parts of HRM and to simplify the strategic management. The literature studies showed that the soft part of HRM should be considered an opportunity to gain completive advantage, something that the hard part of HRM is not able to.

Originally there were three subtitles for this project, finding functions from three different stakeholder; Managers, HR department and Employees. This came to be the initial starting point but later on the idea was neglected.

- From theory, a need for a more consistently views of HRM was identified.
- From brainstorming sessions, many of the questions found were similar to all stakeholders.
- Finally the old HMIS were handling six different end users and these could not as be broadly categorized.

Receiving the HMIS so late the in the project resulted in less focus on designing of GUIs. This had both its advantages and disadvantages since there were more openness early in the project, but on the other hand did not have time to develop more functions with better design.

During the theory, advanced knowledge in the subject of HRM was gained. This lead to a lot of reading about strategy which did not directly affected the result. A lot of knowledge was gained about the importance of strategy when handling HRM. Due to customer requirement the authors were forced to neglect some of theory learned.

Regarding the risk analysis performed in the beginning of the project, the conclusion is that almost every risk did occur. For example those incidents described above, much of them was connected to requirement changes done by supervisor which, combined with some absence of project members, resulted in a shortage of time.

The skills using JIMP would have been better if the knowledge about JIMP occurred earlier in the project. The overall experienced is that it is a good tool when designing mock up interfaces and recommends it to others.

7. CONCLUSION

Here are the conclusions drawn from this thesis work.

This research has recognized the need of a more strategic approach towards HRM and that it is needed in both developing and developed countries. As the focus merely were on developing countries the aspects that we were able to lift forward was the use of a simple yet powerful tool for healthcare development. The goal was to find a way where all employees could feel that they were a part of the team, even in a large organization. In the solution there could be only one person between the Ministry of Health in Uganda, and a receptionist at a small hospital. Even the smallest actions are aligned with the organizations vision and values.

It also showed that to succeed with HRM, involvement of employees is the key to success and developing, both the organization and the employees. You should also notice that it is not enough to involve them in HRM; the reason must be explained or visualized.

In order to establish these soft parts of HRM, the hard foundation must be laid to be able to embrace the strategic approach which ultimately will improve the organization. The solution is both meant to lay the hard foundation and in the same obtain the benefits from a strategic approach.

8. FUTURE WORK

In this section suggestions will be made of several ways of conducting future work associated to this project.

8.1. HRMS

First of all, a better solution could be done in order to visualize how and when things must be approved by a witness or a person with certain permissions. This authorization could perhaps be visualized by some kind of "task to do" function for people with permissions.

Secondly the HRMS should be integrated with the statistical system made by other ICT4MPOWER member. This in order to follow up the strategy, objective and actions and in a good way of arranging the statistic in order to see the results of the human resource management work and to simplify which actions that should be done to improve the organizations performance. KPIs could be visualized in an understandable way.

Lastly the HRMS should be constantly evaluated and the information registered should firstly contain the most basics attributes and lather on be expanded to achieve a more strategic way of working with HRM.

8.2. ICT4MPOWER

This thesis work will help to achieve future functions and improve the result of ICT4MPOWER. Some of the functions enabled by this project are:

- Spatial coverage – Place facilities according in order to cover certain areas.
- Knowledge coverage – Place the right competence at the right place.
    o This could also be applied to the Inventory Management System.
- Sharing and caring tools – enable sharing of experience and knowledge amongst healthcare workers.

8.3. FURTHER READING

The authors would recommend future reading in form of literature studies concerning other parts of the healthcare sector, for example applying the lean concept or payment for performance.

If you are interested in more information regarding the thesis work there exists more documentation and is available upon request.

More information about the ICT4POWER project and the situation in Uganda could be reached through:

1. Ministry of Health, 2009, *ICT4MPOWER project proposal*, spidercenter.org
2. Annual Health Sector Performance Report from Uganda, 2009-2010

We would also recommend reading:

3. *Measurement of Patient Satisfaction Guidelines,* Health strategy implementation project 2003, The health board executives in Ireland

8.4. FURTHER RESEARCH

For future research recommendation are toward developing more functions that could support the soft part of HRM. The hopes are that results get measured and tested towards several different industries in order to see the effects.

REFERENCE

[1]   Ministry of Health, 2009, *ICT4MPOWER project proposal*, spidercenter.org

[2]   Bratton, J., Gold, J. 1999, *Human resource management: theory and practice*, MacMillan Press LTD

[3]   Phillips, B. 2008, *Business driven information systems*, McGraw-Hill/Irwin, p. 345-346

[4]   Figure2, http://wysterdesir.com/2008/09/28/using-rapid-application-development-for-your-software-project/ [Accessed May 5, 2011]

[5]   Course material, *ME2602 – Human Resource Management*, 2009, Instruction HR manager interview

[6]   Voigt, B. 2000, *Dynamic System Developing Method*, University of Zurich

[7]   Fowler, M. 2008, *UML distilled3rd edition*, Pearson Education

[8]   Ax, C., Johansson, C., and Kullvén, H. 2009, *Den nya ekonomistyrningen,* Liber AB

[9]   Kabene, S., Orchard, C., Howard, J., Soriano, A., Leduc, R. 2006, *The importance of human resource management in health care: a global context*, Human resource for health, volume 4

[10]   Rosenthal, M., Dudley, A. *Pay-for-Performance: Will the latest Payment Trend Improve Care?*, 2007, American medical association, Volume 297

[11]   Huselid, M., Jackson, S., Schuler, R. *Technical and strategic human resource management effectiveness as determination of firm performances*, 1997, Academy of Management Journal, vol. 40, no. 1, p 171-188

[12]   Figure 4, Mathias, R., Jackson, J. 2006, *Human Resource Management* 11th edition, p.17, South Western

[13]   Kazlauskait, R., Bučiūnien, I. 2008, *The Role of Human Resources and Their Management in the Establishment of Sustainable Competitive Advantage*, engineering economics, no. 5(60) p. 78-84

[14]   Kloot, L., Martin, J. 2000, *Strategic performance management: A balanced approach to performance management issues in local government,* Management Accounting Research, vol. 11, p. 231–251

[15]   Zhu, W., Chuw, I., Spangler, W. 2005, *CEO transformational leadership and organizational outcomes: The mediating role of human–capital-enhancing human resource management*, The Leadership Quarterly, vol. 16, p. 39 – 52

[16]   Delaney, J., Huselid, M. 1996, *The impact of human resource management practices on perceptions of organizational performance*, Academy of Management Journal, vol.,39,no. 4, p.949-969

[17]   Bogestedt, V., Johansson, V., Xanthos, K., *Customer requirement documentation*, classified, please contact authors for source.

[18]   Bogestedt, V., Johansson, V., Xanthos, K., *Interview documentation*, classified, please contact authors for source.

[19]   Bogestedt, V., Johansson, V., Xanthos, K., *Questions for functions*, please contact authors for source.

[20]   Figure 7, http://www.mindtools.com/pages/article/newTMM_87.htm, [Accessed May 20, 2011]

[21]   Cousin, P., Lamming, R., Lawson, B., Squire, B. 2008, *Strategic Supply Management.* Pearson Education

List of Quotes

LIST OF FIGURES

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9. Appendixes

Appendix A: Risk analysis

Risks identified are placed in the figure below in order to better visualize the impact and probability. In the red area risks which are likely to occur and have a huge impact on the project result I placed.

List of risks:

1. Number of authors
2. Unclear objective
3. Time limit
4. Absence
5. Requirement changes
6. Supervisor involvement
7. Unclear definitions of concepts and terms
8. Lack of end user feedback
9. Incorrect documentation
10. Lack of information collection
11. New innovative work method
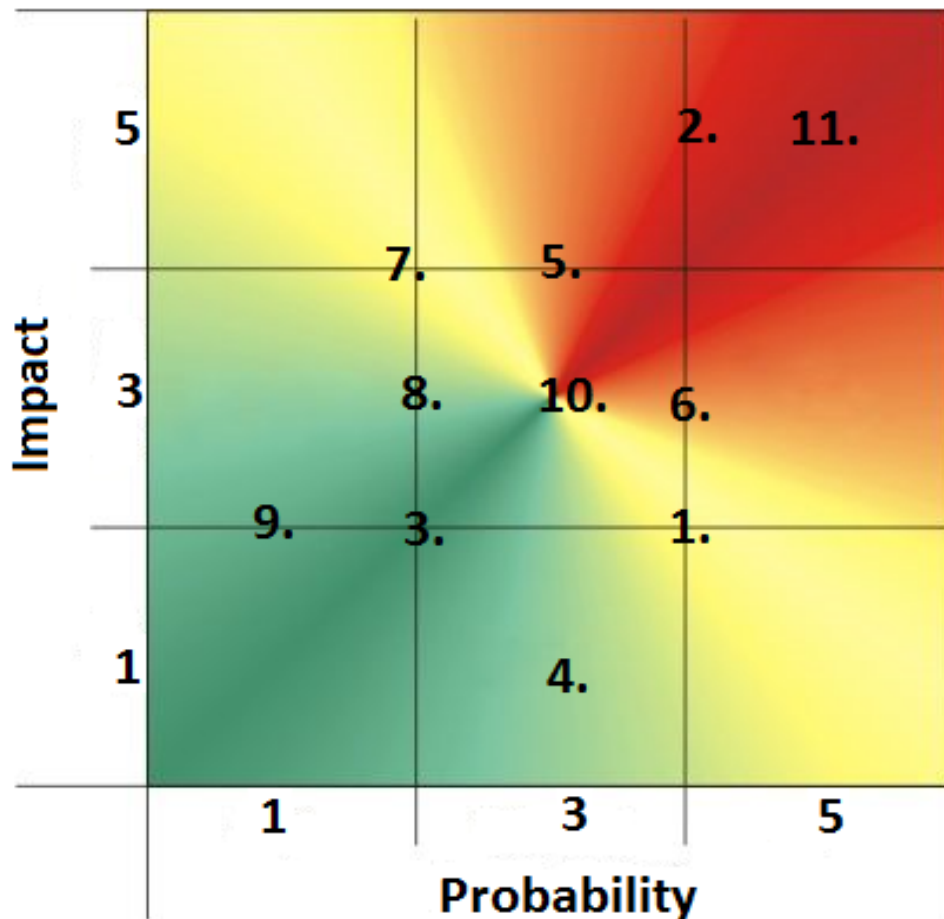
The risk, proactive action taken and the responsible:

1. **Numbers of authors**
   - Description: The numbers of authors will be a risk because sharing and dividing the work between the authors might be difficult, normally bachelor thesis work is being done in pars. Decision making might also be a problem when there are three persons involved.
   - Proactive Action: Make a thorough time plan and dived different activities between each other. Spreading team spirit and creating a positive work environment will help reduce the difficulties of being three persons.
   - Responsible: The authors, especially group leader Viktor Johansson.

2. **Unclear objectives**
   - Description: This being an innovative project and a new area of expertise for the authors establishing clear objectives is important in order to reach the goals.
   - Proactive action: Keep a god and honest communication inside the group as well as towards our supervisor.
   - Responsible: Rustam Nabiev, The authors.

3. **Time limit**

- Description: This bachelor thesis has to be finished before mid-summer and should include ten weeks of full-time labor.
- Proactive action: Make a detailed and reachable time plan, set delimitations and try to be a step ahead in order to tackle delays in schedule.
- Responsible: The authors

4. **Absence**
- Description: Sickness can happen to everyone and should be considered a risk. Other absence might be vacation, other school work and such.
- Proactive action: Keep fit, plan extra obligations and create a good working environment with openness and team spirit.
- Responsible: The authors

5. **Requirement changes**
- Description: This is a new area of expertise and requirement is subject change all time, also the innovative way of working will increase the risk of requirements to change.
- Proactive action: Always be ready to be tackle new demands and set your mind to it. Agile work will make it easier to change course in the work. To handle late changes in the project we will set some constrains and avoid finding ourselves in a stressful situation so close to the end.
- Responsible: The authors, clients and supervisor.

6. **Supervisor involvement**
- Description: The supervisor might get more or less involved in the project and steer the project in a way that might be confusing.
- Proactive action: Have good communication with Rustam in order to avoid confusion. Always be honest and try to meet with him once a week to discuss project progress. Write weekly progress reports, analysis it and learn from the conclusions.
- Responsible: Rustam Nabiev, The authors

7. **Unclear definitions of concepts and terms**
- Description: There will be some terms and definitions that will be new and might cause confusion among the project members. Our experience tells us to define terms and new word in order to avoid confusion. This is also important when performing interview, recent work has showed had many individuals use different terms within the organization.
- Proactive action: Identify the new words, discuss them and determine the meaning of them so everyone understand and are on the same level. A special dictionary will be created and constantly updated to minimize this risk. Clarify the meaning of key words in the same way when performing interviews.
- Responsible: The Authors

8. Lack of end user feedback

- Description: This risk will occur if the interview fails or in any other way we don't get enough information during the feedback phase.
- Proactive action: Make questions that are easy to understand and retrieve information that is relevant. Make preparations before every meeting. Develop a special method of interviewing and make constant evaluations.
- Responsible: The authors

9. Incorrect documentation

- Description: Incorrect documentation can happen if the wrong update are in our project folder and a project member update the wrong document.
- Proactive action: Early in the project determine were documents should be put, how they should be updated and who is responsible for it. We shall also keep a diary to ensure that every team member is fully updated even if they have been absent someday.
- Responsible: The authors

10. Lack of information collection

- Description: If the project members don't find enough or sufficient information about the subjects in the project there will be an error in the documentation and workflow.
- Proactive action: Begin the project by establishing contacts with persons that has knowledge within the area of HRM and let them help us in determine what information is valuable. Make an initial analysis on the literature covering the area and chose quality before quantity.
- Responsible: The authors

11. New innovative work method

- Description: We are not use to work in this way and this method will demand constant innovative thinking. More over a good plan and administration of the project is essential for success.
- Proactive action: Defining the method and believe it could succeed. Keep close contact with Rustam and let him inspire us. Be accurate when documenting the project and write in the diary every day to get a good overview.
- Responsible: The authors, Rustam Nabiev

APPENDIX B: AUTHOR PARTICIPATION

No	Task (in percentage)	Victor Bogestedt	Kristian Xanthos	Viktor Johansson
1	**Project managing**			
	Coordination	33	33	33
	Project Diary	90	5	5
	Teachers contacting	33	33	33
	Customer contacting	33	33	33
2	**Preparation**			
	Arranging interviews	100	0	0
	Questionnaire preparation	33	33	33
	Interviewing	33	23	44
	Interview Method	100	0	0
3	**Procedure**			
	Literature studies	40	20	40
	Brainstorming	33	33	33
	Interviewing	33	23	44
	Modeling use cases	45	45	10
	Video tutorials	10	10	80
	GUI	10	45	45
3	**Report general tasks**			
	Report structure	33	33	33
	Abstract	20	20	60
	Acknowledgment	33	33	33
	Table of contents	10	80	10
	Introduction	33	33	33
	Initial analysis	40	30	30
	Research Methodology	50	30	20
	Procedure	33	33	33
	Results	40	20	40
	Discussion	33	33	33
	Conclusion	20	40	40
	Further research	20	40	40
	Reference	0	50	50
	Report integration and formatting	20	60	20
5	**Presentation**			
	Slide preparation	20	40	40
	Slide formatting and correcting	20	60	20

	Presentation	33	33	33

APPENDIX C: INTERVIEW PROCEDURE

Since the Funnel Model is used when actually performing the interview other activities were forced to be set in order to have a solid method of finding, interviewing and drawing conclusion from stakeholder.

Interview procedure:

1. Identify: Find interesting persons that could contribute to the quality of the project. Using our supervisor Rustam, the Internet and other sources. Find persons that could be helpful to pin down important issues;
   a. Managers
   b. HR department
   c. Employees
2. Contact: establish contact to persons that were identified in the earlier stage. Document possible contact information in the contact list, this list should contain name, contact information and title. The contact list should also include a status report and possible a summary of the mail correspondent so that further encounters could be simplified.
3. Set up interview: During this stage we must decide if the person should be interviewed. Sometimes this is not possible due to external reasons and sometime an interview is not needed.
   a. Set up meeting: Decide to meet with the person, this should be done if the person is available to do an interview and we find him/her interesting. This should be done during the HRM faze so that we could schedule the interview.
   b. Collect information: If an interview is not necessary we could still use this person to collect interesting information and getting help without actually interviewing him/her. We could for instance be recommended to valuable articles, other interesting persons or consolidating during other fazes of the project. If we keep contact and more information is exchanged this will be included as an extending to the contact list.
4. Develop interview guidelines: in order to maximize the return on the interview. This method should include everything from formalities to constant improvements.
   a. Preparation
      i. Select an interview leader, preferably the one that are focused on the given stakeholder group.
      ii. Select a person responsible for taking notes. The notes should not contain on-the-spot analysis; they should be conducted within the group afterwards.

      iii. Define goals for the interview; this could be to get a better understanding of a certain process or just getting the outside perspective.

      iv. Prepare relevant questions.

      v. If necessary, send some background material to the person in advance to better prepare him/her.

  b. Implementation

      i. Use the Funnel model

        1. Warm up: Get familiar and present aim and background.

        2. Speak freely on the subject: Ask stimulation question in order to make the interview think.

        3. Pin down: Ask for examples, facts and put some demanding questions that will result in conclusions and statements.

        4. Further information: Round up the interview and give feedback.

        5. Closing: Conclude the interview and ask if they would like to add something.

      ii. Create a good atmosphere in order to achieve the goals.

      iii. Listen actively and give response, ask one question at a time.

      iv. Add questions.

      v. Ask questions that requires evaluation, make them explain it thoroughly.

  c. Summary

      i. Directly after the interview 10-15 minutes should be dedicated to summarize the interview. This activity should include comparing notes and reflecting different interpretations.

      ii. The leader should go home and write a formal protocol as soon as possible.

  d. Evaluate method

      i. The interviews

      ii. Guidelines

5. Perform interview: Performing the actual interview in accordance with the guidelines in the earlier stage. The interview should result in an interview protocol that should act as a reminder when using the information learned from the interview object.