Establish an Online Government Employment System for the Kingdom of Saudi Arabia

SELP 695 - Systems Engineering Integrative Project

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Introduction

- The Kingdom of Saudi Arabia is a very young country
- The employment and education are important foundations
- The population has been increasing especially the growing younger generation
- King Abdullah has invested significantly in education, about 25% of GDP (about 213 billion SR = $58 billion). (1)

The Expected Total Population in KSA for Saudis (2010 - 2020) (2)

1) source: http://english.alarabiya.net/en/perspective/features/2014/04/26/Nine-years-a-King.html
2) source: http://www.stats.gov.sa/ar/0/2025m
Introduction

- King Abdullah concentrated on developing Saudi youth of the country and creating a promising generation, who have skills and capabilities to take an active role in the development of all fields
- Under King Abdullah, KSA is witnessing unprecedented development in the education sector
- This resulted in having a better and more educational institutions and the introduction of the King Abdullah Scholarship Program
- The ultimate goal of an educated population is for citizens to sustain the economy, spread the benefits of a strong workforce to society, and lead the country towards a bright future
Background

- There has been a significant increase in the amount of students pursuing higher education in KSA
- In 2015, 133,833 Saudis graduated domestically, up 12.2% from 85,523 - (5 years ago.) (3)
- If this rate of growth continues, it will further worsen the Kingdom’s unemployment situation
- The limited amount of spaces in the universities has led to increased competition, which has prevented many students from enrolling

Background

- There is an increased interest in improving the quality of education, which allows Saudi Arabia to be more recognized in the international sphere.
- Many have taken the opportunity from King Abdullah Scholarships Program for higher education.
- Over 400,000 Saudi Arabians traveled overseas to one of the 23 countries. (4)
- More than 55,000 students graduated with a variety of majors have returned to KSA and seeking for a job. (5)

(5) source: http://www.alriyadh.com/1016043?print=1
Background

- It is important to understand cultural context behind unemployment. Currently, Saudis are most likely to find jobs through existing networks in Saudi Arabia
  - Example: international vs domestic education

- Jobs could be available, but not known about

- KSA, face the unique challenge of connecting it’s educated graduates and the young workforce with jobs

- The demand for jobs will be increasing, which will be placed pressure on KSA’s employment situation.
The Expected Unemployment Rate of Saudis Population (2011 - 2018)
Problem Statement

- The unemployment rate is expected to increase nationally and will increase every year because nothing is being done about it.
- The unemployment situation is an important issue in KSA, and it is in the best interest of the government to address this.
- The job seeker continues to rely on old methods, to find employment.
- The real underlying issue is that many do not know how to search for the right job.
Project Objectives

- Provide a secure website for unemployed citizens of KSA to identify better opportunities of employment
- Provide job opportunities both from the public and private sectors
- Provide equal opportunity of employment for women
- Provide a way for users to judge their viability in the job market
- Provides encouragements in the form of government subsidies for both employers and employees
Interrogatives

**Who?** The citizens of KSA, who are seeking a full time job
The employment firms, who are looking to hire for a particular position

**What?** The system will:
- allow the job seeker to search job vacancies
- allow employment firms to post jobs and looking for employee
- allow communication between both users
- assign users a match rating for individual jobs
- encourage job seekers and employers through subsidies

**When?** End of 2017

**Where?** In Kingdom of Saudi Arabia

**Why?** This system is needed to reduce of the unemployment rate in KSA
Current System

Job Search

- Volunteer
- Internships
- Networking (Relatives/Friends)
- Print Media
- Alumni Groups
- Job Fairs
- Conferences
- Contact Target Companies
- Contact Random Companies
Literature Review

**United Arab Emirates (UAE):**

- eJob considered the No.1 a government job portal in the UAE
- Free of charge
- Established in 2013
- Registered more than 514,616 users
- Employed over 50,000 per year
- Different portals exist in each city to make the search easier

**Qatar:**

- Hukoomi is a Qatari government website for Job Seekers
- Free of charge
- Established in 2014
- Registered more than 188,712 users
- Employed about 19,000
- Launching Hukoomi mobile application – 2015

Requirements

1. The system shall provide remote online access 24/7
2. The system shall support use of various personal devices and operating systems
3. The system shall include security features
4. The system shall store user information confidentially
5. The system shall update the database that houses the job listing information weekly
6. The system shall be operated by the Government’s Ministry of Labor
Measures of Effectiveness (MOE)

(MOE) are metrics that are used to quantify the performance of a system, that describe to what degree the real objective is achieved.

The following MOEs will be used to analyze the alternative solutions:

- Efficiency
- Timeliness
- Convenience
- Affordable
- Repairable
- Security
- Reliability
- Availability
# Measures of Effectiveness (MoEs)

<table>
<thead>
<tr>
<th>MOEs</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>The system should be capable of producing desired results without wasting materials, time, or effort</td>
</tr>
<tr>
<td>Timeliness</td>
<td>The system should take less time than the usual searching time for the unemployed to find a suitable job</td>
</tr>
<tr>
<td>Convenience</td>
<td>The system should require users to invest the least amount of effort</td>
</tr>
<tr>
<td>Affordable</td>
<td>The system should be free or at reasonable cost, within the means of any user, for all users</td>
</tr>
<tr>
<td>Repairable</td>
<td>The ability of the system to recover information in case of a system failure or error</td>
</tr>
<tr>
<td>Security</td>
<td>Providing the system with high-level security to prevent any theft or hacking of the users' personal information</td>
</tr>
<tr>
<td>Reliability</td>
<td>The ability of a system to consistently perform its intended or required function or mission, on demand without degradation or failure</td>
</tr>
<tr>
<td>Availability</td>
<td>The users should be able to use the system at any time</td>
</tr>
</tbody>
</table>
Analysis of Alternatives

- **Analysis of Alternatives (AoA)** is used to identify a best solution by an analytical comparison of the operational effectiveness, cost, and risks of proposed material solutions.

1. Identify the alternative solutions
2. Define the Measures of Effectiveness (MOEs)
3. Assess each alternative with the MOE's
4. Analyze the results
5. Select the best alternative
**Alt. 1**
Use the Current System

**Alt. 2**
Hire a Job Seeking Agency

**Alt. 3**
Establish an Online Government Employment System
Alternatives

1. Use the Current System:

- The job seeker can use one or more of the methods from a list of current job searching methods in KSA, as shown below:

  - Networking - Relatives/Friends
  - Contact Target Companies
  - Contact Random Companies
  - Conferences
  - Job Fairs
  - Alumni Groups
  - Social Media
  - Printed Media
  - Volunteer
  - Internships

- The order and timing for each method are different for each job seeker
- The cost and availability are different from one method to another
2. **Hire a Job Seeking Agency:**

- Hiring an Agency to search for possible jobs for the job seeker
- Users must pay a monthly or periodic fee to access their services
- The search will last only for the paid period
- Not grantees to find the right job
- Available only during working hours on the weekdays
Alternatives

3. Establish an Online Government Employment System:

- The system provides a view of the vacancies in the job markets in both the private and government sectors
- Free of charge for users
- Available 24/7 with a weekly update
- Connect the job seekers and employers
- Created to have a high-level security
- Attempt to rate and match users to different job postings based on their information
- Provide annual government subsidies for each successful hire through the system
## Analysis of Alternatives

<table>
<thead>
<tr>
<th>MOE's</th>
<th>Use the Current System</th>
<th>Hire A Job Seeking Agency</th>
<th>Establish an Online Government Employment System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Timeliness</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Convenience</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Affordable</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Repairable</td>
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<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Security</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Reliability</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Availability</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>
**Systems Architecture:** The fundamental and unifying system structure defined in terms of system elements, interfaces, processes, constraints, and behaviors

- High-Level Operational Concept Graphic Diagram (OV-1)
- Systems Functionality Description Diagram (SV-4)
- Data Flow Diagram (DFD)
High-Level Operational Concept Graphic Diagram (OV-1) for Alt. 1: Use the Current System.
Alternative 2

High-Level Operational Concept Graphic Diagram (OV-1) for Alt. 2: **Hire a Job Seeking Agency.**

[Diagram of the process]
Alternative 3

High-Level Operational Concept Graphic Diagram (OV-1) for Alt. 3: Establish an Online Government Employment System.
Systems Architecture

Systems Functionality Description Diagram (SV-4) for Alt. 3: Establish an Online Government Employment System.

The Website

1. Log In/Out
   1.1 Job Seeker
   1.2 Employer

2. Search
   2.1 Filter
   2.2 Categories
   2.3 Keywords

3. Match
   3.1 Multiple Choice
   3.2 Numbers
   3.3 Keywords
   3.4 Confidence Level

4. Contact
   4.1 Job Seeker/Employer
   4.2 Job Seeker/Gov.
   4.3 Employer/Gov.

5. Listing
   5.1 Jobs
   5.2 Timeline
   5.3 Salaries Range
   5.4 Benefits

6. Download
   6.1 Job Seeker Resume
   6.2 Employment firms Vacancies
Data Flow Diagram (DFD) for Alt. 3: Establish an Online Government Employment System.
Heuristic Approach

1. Systems need to be built to tolerate change and expansion beyond current stakeholder needs

2. Don’t ever try to build it all at once

3. Manage the details through focus on high-level measurable objectives, not through bureaucracy

4. Contractors will deliver better value for money, if paid only for value delivered, not for work completed

5. Risks are impossible to detail completely and correctly, but can be controlled by frequent and early numeric feedback and change


The portal provides a fully electronic mechanism for dealing with job applications for the users of both genders.
Website Home Page - Job Seeker
# Website - Available Jobs Page - Job Seeker

## Kingdom of Saudi Arabia

e-Government Employment System

### Available Jobs

<table>
<thead>
<tr>
<th>Jobs</th>
<th>Job Title</th>
<th>Sector</th>
<th>Employment name</th>
<th>Posted Date</th>
<th>Start dates</th>
<th>Interview dates</th>
<th>Job Desc.</th>
<th>Apr. Salay</th>
<th>Benefits</th>
<th>Contact Info.</th>
<th>Con. Lvl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AAA</td>
<td>Gov.</td>
<td>Ministry of ...</td>
<td>April 18, 2016</td>
<td>Jan 2018</td>
<td>Dec. 2017</td>
<td>aaaaa</td>
<td>HERE</td>
<td>HERE</td>
<td>HERE</td>
<td>65%</td>
</tr>
<tr>
<td>3</td>
<td>...</td>
<td>......</td>
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<td>....</td>
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<td>.....</td>
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<td>.....</td>
<td>%%</td>
<td>%%</td>
</tr>
</tbody>
</table>
Quality

- Ishikawa (Fishbone) Diagram for the Current Unemployment Situation in Saudi Arabia:

  - Cultural
    - Traditional Job Searching
    - Cultural View
    - Family Intervention
  - People
    - Inexperienced in Searching
    - Specific Job Outside their Scopes
    - Depends on Networking
    - Wasting Time
  - Methods
    - Random Searching
    - Unorganized Planning
    - Poor Managing Time
  - Measurements
    - Searching Time
    - Job Satisfaction
  - Materials
    - Not Enough
    - Limited Resources

Increasing the Unemployment Rate in KSA

The Online Government Employment System should help to decrease the unemployment rate and increase the Employment of Saudis in Saudi Arabia
Quality

- **Proposed Remedy:**
  - The Online Government Employment System addresses this problem successfully.
  - Its efficiency can lower search time and mitigate frustrations.
  - Potentially increasing job satisfaction.
  - This process will also teach new graduates and job seekers how to look for jobs independently.
Quality

- **Methodology for Implementing the Remedy:**
  - The government monitors the website to secure the users information and prevents any controlling authority.
  - Users register with their National ID number as a job seeker or with the Commercial Registration number as an employment firm.
  - The flexibility for job seekers to use their Smartphones, personal tablets, and computers to register, search, and apply for a job.
Quality

- **Methodology for Making the Improvement Permanent:**
  - The government needs to promote and instill high levels of confidence in the online employment process.
  - Ensure a weekly update for the vacant jobs from the employment firms.
  - Ensure a monthly check for the current vacant jobs by the government employees.
  - Improve the website every six months by government developers.
Risk Management

**The Economic Risks:**
- The high cost of the government subsidy poses a risk to the online system

**Design and Test Risks:**
- The system may not be completed by the scheduled time
- External deadline pressures may tempt developers to skip important quality assurance tests in order to save time.
- The system may not work and perform as required
Risk Management

**The Security Risks:**
- The system could be hacked by hackers or infected by viruses
- The stored personal information of users could be stolen by identity thieves
- Breaching security could result in the spread of user information to the public

**Community Risks:**
- Lack of oversight from the government
- Lack of public support
- Some firms may choose to not join the system and decline posting their jobs on the website
<table>
<thead>
<tr>
<th>Risk</th>
<th>Type of Risk</th>
<th>Risk Description</th>
<th>Likelihood</th>
<th>Impact</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Economic Risk</td>
<td>The high cost of the government subsidy</td>
<td>3</td>
<td>4</td>
<td>Support from the Human Resources Development Fund, and investing in a type of insurance fund that will cover the cost of high demand</td>
</tr>
<tr>
<td>2</td>
<td>Design and Test Risk</td>
<td>The system may not be completed by the scheduled time</td>
<td>2</td>
<td>3</td>
<td>Establish a fixed schedule with milestones along the way. Review and adjust as needed</td>
</tr>
<tr>
<td>3</td>
<td>Design and Test Risk</td>
<td>External deadline pressures may tempt developers to skip important quality assurance tests in order to save time</td>
<td>3</td>
<td>5</td>
<td>Create a system of checks and balances to keep developers accountable, such as an expert reviewer</td>
</tr>
<tr>
<td>4</td>
<td>Design and Test Risk</td>
<td>The system may not work and perform as required</td>
<td>2</td>
<td>4</td>
<td>Hire an IT team, who will be able to maintain and repair the system</td>
</tr>
<tr>
<td>5</td>
<td>Security Risks</td>
<td>The system could be hacked by the hackers or infected by viruses</td>
<td>1</td>
<td>5</td>
<td>Assign an expert team to develop the security software and keep a record of suspicious Internet activity</td>
</tr>
</tbody>
</table>
## Risk Analysis

<table>
<thead>
<tr>
<th>Risk</th>
<th>Type of Risk</th>
<th>Risk Description</th>
<th>Likelihood</th>
<th>Impact</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Security Risks</td>
<td>The stored personal information of users could be stolen by identity thieves</td>
<td>1</td>
<td>5</td>
<td>Only the authorized personnel from the employment firms can check the applicant information</td>
</tr>
<tr>
<td>7</td>
<td>Security Risks</td>
<td>A security breach could result in the leak of user profile information to the public</td>
<td>1</td>
<td>5</td>
<td>Implementing harsh penalties for hacking and increase internet surveillance to catch hackers</td>
</tr>
<tr>
<td>8</td>
<td>Community Risks</td>
<td>Lack of oversight from the government</td>
<td>1</td>
<td>3</td>
<td>Provide a consultation group</td>
</tr>
<tr>
<td>9</td>
<td>Community Risks</td>
<td>Lack of public support</td>
<td>3</td>
<td>5</td>
<td>Advertise and popularize the online unemployment system. (Free, subsidy, and feature.)</td>
</tr>
<tr>
<td>10</td>
<td>Community Risks</td>
<td>Some firms may choose to not join the system and decline posting their jobs on the website</td>
<td>3</td>
<td>5</td>
<td>The Subsidy provides an incentive for firms to list their jobs</td>
</tr>
</tbody>
</table>
# Risk Assessment

## Risks Before Mitigation

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>(1)</td>
</tr>
<tr>
<td>2</td>
<td>(2)</td>
</tr>
<tr>
<td>1</td>
<td>(8)</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

## Risks After Mitigation

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>(1)</td>
</tr>
<tr>
<td>2</td>
<td>(2)</td>
</tr>
<tr>
<td>1</td>
<td>(8)</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
Project Management

- The funding will be only from the government to prevent any controlling authority and outside influences.
- The integrity of the system requires hiring dedicated IT staff to manage and control the system.
- The system requires contracting with an advanced computer technology corporation such as ORACLE.
- The government will fund the annual subsidies for the employee and employment firms.
Verification and Validation

- **Validation** confirms that the system, as built (or as it will be built), satisfies the stakeholders’ stated needs.

- **Verification** addresses whether the system, its elements, and its interfaces satisfy their requirements.

- **Methods used in Verification are:**

  ![Diagram showing verification methods: Analysis, Inspection, Demonstration, Test]
# Verification Methods

<table>
<thead>
<tr>
<th>No.</th>
<th>Requirements</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The system shall provide remote online access 24/7</td>
<td><strong>Test and Demonstration</strong> (To test, hire an IT team, who will be able to log in and access to the system on different times and various locations and measure connectivity. Demonstration, would see if connected)</td>
</tr>
<tr>
<td>2</td>
<td>The system shall support a use of various personal devices and operating systems; accessible from any smartphone, tablet, and computer system</td>
<td><strong>Demonstration</strong> (Hiring an IT team or testers to access to the website by using different types of software and devices)</td>
</tr>
<tr>
<td>3</td>
<td>The system shall include security features</td>
<td><strong>Demonstration</strong> (Use computer experts to install security features. Attempt to exploit security features)</td>
</tr>
<tr>
<td>4</td>
<td>The system shall store user information confidentially</td>
<td><strong>Demonstration</strong> (Create a specific security protocol to handle sensitive information)</td>
</tr>
<tr>
<td>5</td>
<td>The system shall update the database that houses the job listing information weekly at the very least</td>
<td><strong>Inspection</strong> (The verification of the job listings stored (by time and date) will be checked by the government employees.)</td>
</tr>
<tr>
<td>6</td>
<td>The system shall be operated by the Government's Ministry of Labor</td>
<td><strong>Demonstration</strong> (Assign particular government employees to control the website and provide a monthly reports)</td>
</tr>
</tbody>
</table>
Engineering Ethics

- Engineers must act ethically in accordance to a code of ethics
- Engineers have an obligation to conduct their best work
- Ensure this system provides the best kind of service possible
- Identifying all the possible risks to prevent the failure of the system
- Engineers have an ethical responsibility to improve the ability of the website to enhance employment chances for the users and society
The Four Ethical Lenses

- **Right:** All members of society have the right to work in a suitable and satisfying job.

- **Justice:** All members of society are equal and providing a fair and equitable website to find a job opens opportunities for all.

- **Utility:** The website is useful and will provide the best results for both the job seeker and employment firms. Reducing the unemployment rate.

- **Virtue:** Assist the job seekers to find an efficient source of job listings where they can apply for a job. The system will improve the quality of life for those who do not work and try to provided them with a better future.
In Conclusion

- It is in the best interest of the KSA to address the growing unemployment problem it currently faces.

- The Online Government Employment System is an elegant solution for everyone.

- The system will provide a means for both those who traveled abroad to gain a quality, global education as well as job seekers who have completed their education domestically.

- The system's key features of job match ratings will help the user search and find a suitable job more easily and faster than the current searching time.
In Conclusion

- Cultural customs, such as over reliance on networking, can be supplemented by the Online Government Employment System

- By addressing these issues, the government of KSA can ensure a brighter future for its citizens, reduce the unemployment rate, and ensure that its domestic education policies complete their intended aims
Lessons Learned

- Systems Engineering taught me how to look at a project from all angles and aspects
- In any project, thinking of the scope of the problem is more important than thinking of a solution
- Clearly stated requirements are the foundation for a project to be successful
- Risk management is a good way of reducing the possibility of failure
- The security of a system must continually be updated, to prevent any breach of confidentiality
- The best instructors in LMU taught me about Systems Engineering, and I'm grateful and proud
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• Thank you.

• Any Questions?