Software Requirements Specification

Release 1.0

June 18th, 2012

Knowledge Management System

Çankaya University KMS Team

Submitted in partial fulfillment

of the requirements of

the SME-Empowering Project

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# Introduction

## Purpose

This subsection should

1. Delineate the purpose of the SRS;
2. Specify the intended audience for the SRS.

The purpose of this document is to present a detailed description of the Knowledge Management System (KMS, the System) for Small and Medium Enterprises (SMEs) and Clusters that these SMEs, together with the public institutions, non-government organizations and Universities (all of them are referred as the Stakeholders) within the scope of the SME-Empowering Project (the Project). It will explain the purpose and features of the system, the interfaces of the system, what the system will do, the constraints under which it must operate and how the system will react to external stimuli. This document is intended for both the stakeholders and the developers of the system and will be submitted to the Ministry of Economy of Turkey (the Beneficiary) and the Technical Assistance Team (the TAT) for their approval.

## Scope of Project

This subsection should

1. Identify the software product(s) to be produced by name (e.g., Host DBMS, Report Generator, etc.);
2. Explain what the software product(s) will, and, if necessary, will not do;
3. Describe the application of the software being specified, including relevant benefits, objectives, and goals;
4. Be consistent with similar statements in higher-level specifications (e.g., the system requirements specifications), if they exist.

This software system will be a Knowledge Management System for the SMEs, Clusters, the TAT and the Beneficiary. As stated in the Inception Report [1], the objective of establishing an online knowledge management system is twofold. The system will have to:

* collect, accumulate, and index the information needed by SMEs and ensure easy access of the SMEs to the system,
* facilitate improvement of networking and cooperation among and even within clusters.

As an overarching objective the need is pinpointed to develop the KMS in the most user-friendly way, avoiding an interface that is too sophisticated. This will allow easy access to the system to SMEs and other stakeholders, which will have positive impact on its sustainable use in the future.

More specifically, the system will consist of 4 layers of activity, content and underlying proposals.

* Level 1: the General Section – with content, general market intelligence, Forum, etc.
* Level 2: Data on the SMEs and Cluster organizations to be established within the scope of the project, and in general on the SMEs and Clusters in Turkey
* Level 3: In-depth Cluster Company data and specific “in-cluster” activities. Access specific to a Cluster and the TAT plus the Beneficiary.
* Level 4: Outputs and statistical analysis undertaken by the TAT and the STE. Access only to the TAT and the Beneficiary.

The minimum required functionality of the KMS includes:

* data gathering
* data storing
* data indexing
* data access
* facilitation of the improvement of networking and cooperation within clusters
* facilitation of the improvement of networking and cooperation between clusters.

The KMS will be designed and established in such a way that it will meet SMEs needs of information as determined after the Survey work carried out within the scope of the project, and the interviews made with the related organizations such as Ministry of Science, Industry and Technology, Ministry of Development, KOSGEB, TTGV, OSTIM OSB, so that once it is established they will be interested in using it. The KMS will also have to meet the ability of the potential users to actually use it. The KMS will be developed using also consultative techniques (working group, online survey, expert panel) right from the start. In deriving the requirements of the KMS, the existing and operational examples generated for the similar requirements and users are also taken into account.

## Glossary

This subsection should provide the definitions of all terms, acronyms, and abbreviations required to properly interpret the SRS. This information may be provided by reference to one or more appendixes in the SRS or by reference to other documents.

|  |  |
| --- | --- |
| **Term** | **Definition** |
| KMS - Knowledge Management System | An online system that satisfy the knowledge creation, capturing, sharing and application requirements of the SMEs, the Clusters, the Beneficiary, and the TAT, as defined in the Terms of Reference (ToR) document of the Project. KMS System is cited simply “The System”. |
| SME | Small and Medium size Enterprise (the company) |
| Ministry of Economy (MoE) | A Public Authority of the KMS System. The beneficiary of the Project. MoE will host and own the KMS System as delivered. MoE will use the system to capture, share, distribute and apply the information, and will benchmark the clusters with the others by getting proper information from the system. |
| Publish | Adding, creating, viewing, reading, changing, updating, removing and deleting the content |
| Editor | A member that examines a content submitted to the KMS system by a member, and has the ability to recommend approval of the content for publication or to request that changes be made in the content, and has the ability and the authority to publish the content. Normally, the KMS Coordinator is the Editor. |
| Software Requirements Specification | A document that completely describes all of the functions of a proposed system and the constraints under which it must operate. For example, this document. |
| Stakeholder | Any person with an interest in the project who is not a developer. |
|  |  |
|  |  |

## References

This subsection should

1. Provide a complete list of all documents referenced elsewhere in the SRS;
2. Identify each document by title, report number (if applicable), date, and publishing organization;
3. Specify the sources from which the references can be obtained.

This information may be provided by reference to an appendix or to another document.

1. IEEE. IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society, 1998.
2. SME-Empowering Project’s Inception Report, ECORYS.

## Overview of Document

This subsection should

1. Describe what the rest of the SRS contains;
2. Explain how the SRS is organized.

The next chapter, the Overall Description section, of this document gives an overview of the functionality of the KMS System. It describes the informal requirements and is used to establish a context for the technical requirements specification in the next chapter.

The third chapter, Requirements Specification section, of this document is written primarily for the developers and describes in technical terms the details of the functionality of the KMS System.

Both sections of the document describe the same software product in its entirety, but are intended for different audiences and thus use different language.

# Overall Description

This section of the SRS should describe the general factors that affect the product and its requirements. This section does not state specific requirements. Instead, it provides a background for those requirements, which are defined in detail in Section 3 of the SRS, and makes them easier to understand.

## Product Perspective

This subsection of the SRS should put the product into perspective with other related products. If the product is independent and totally self-contained, it should be so stated here. If the SRS defines a product that is a component of a larger system, as frequently occurs, then this subsection should relate the requirements of that larger system to functionality of the software and should identify interfaces between that system and the software. A block diagram showing the major components of the larger system, interconnections, and external interfaces can be helpful.

The KMS System is an Internet-based application executing on a Web server and connected to an enterprise database. As shown in Figure 2, the KMS System accepts and processes requests from cluster coordinators, public authorities, company representatives and KMS coordinators. The system is expected to have a Web user interface for visitors and an authorization based Web interface for registered members such as company representatives.

### Development Methodology

Due to the nature of the project, cyclic development methodology will be used. This methodology provides best results when there is multitude of users dispersed geographically. Other methodologies which require all the system specification to be known before starting implementation would require longer development periods and resources which cannot be afforded in this project.

In the cyclic development methodology multiple iterations are used, where software evolves with each iteration, until all the requirements are implemented. The project starts with a basic set of requirements. The system is designed and implemented for these requirements and shared with and tested by the user community (See ). In using the first version of the product, users provide additional requirements. The next iteration starts with updated design and product which is shared with the users again.

Using this methodology, instead of waiting until the whole product is finished, the end users of the KMS System are involved during each iteration and provide feedback to the development. The system evolves with users’ continuous contribution resulting in a more useable system.

Figure 1 Cyclic Development Methodology

### Release 1

Public Authority

Cluster Coordinator

Visitor

Company

Representative

KMS Coordinator

**KMS**

**System**

Figure 2 System Environment

Figure 2 shows the system environment (the users of the KMS System). The KMS System has five active actors (users): the Visitor, the Public Authority, the KMS Coordinator, the Cluster Coordinator, and the Company Representative. Any user that is registered into the system is called as the Member. The Public Authority, the KMS Coordinator, the Cluster Coordinator, and the Company Representative are the Members. The users normally interact with the system through the KMS Portal, which has also some links to the public organizations, such as Ministry of Economy (MoE), Ministry of Science, Industry and Technology (MoSIT), and Ministry of Development (MoD), and KOSGEB, and TÜBİTAK etc, as proper. The users have a hierarchy in accessing to the system in a layered approach, as defined in the Inception Report .

Level 1

Access : all

Level 2

Access : all

Level 3

Access : the Members

Level 4

Access : Public

Authority, Cluster Coordinator, KMS Coordinator

**General, market data, sectors**

**Cluster map, Clusters (Turkey), key data**

**Clusters, SME data, B2B Requests**

**Cluster Specific information , and Project outputs**

Public Authority,

Cluster Coordinator

KMS Coordinator

Public Authority,

Cluster Coordinator

KMS Coordinator

SMEs, Public Authority, Cluster Coordinator, KMS Coordinator

Public Authority, Cluster Coordinator, KMS Coordinator

Input (contents)

Figure 3 The levels of access and data provision to the KMS System

The KMS system mainly has 6 components, the Central sub-system and 5 regional systems (There is a local system in each region, which is at the disposal of the Cluster Coordinator and his/her staff. In the Project there are 5 regions where the clusters will be developed of certain sector.)



Figure 4 The components of the KMS

All components of the KMS are connected to each other through internet.

## Product Functions

This subsection of the SRS should provide a summary of the major functions that the software will perform. For example, an SRS for an accounting program may use this part to address customer account maintenance, customer statement, and invoice preparation without mentioning the vast amount of detail that each of those functions requires. Sometimes the function summary that is necessary for this part can be taken directly from the section of the higher-level specification (if one exists) that allocates particular functions to the software product. Note that for the sake of clarity

1. The functions should be organized in a way that makes the list of functions understandable to the customer or to anyone else reading the document for the first time.
2. Textual or graphical methods can be used to show the different functions and their relationships.

Such a diagram is not intended to show a design of a product, but simply shows the logical relationships among variables.

The initial release (Release 1 of the KMS System) will have four major functions as described in the subsections below.

### Company Management

This function will provide information about the companies (SMEs) in each cluster. After a company registers in a cluster, various information about the company will be entered into the system. Some information can be updated by the company representative, however most information will be in control of the Cluster Coordinator of that company. This functionality will allow each company to display information about the company in order to facilitate cooperation among companies.

### Announcement Management

This function will provide information to all the users about various announcements. Announcements are categorized as:

1. Events such as meetings, symposiums, fairs,
2. New Laws, Rules, and Regulations
3. Government programs such as incentives, loans, credits, funds,

The announcement information will be entered by the KMS and/or Cluster coordinators and will be available to different users.

### User Management

This function will allow the creation of users with specific permissions. This function will also allow visitors to register to the KMS System. Each type of users will have different permissions and capabilities, as illustrated in Figure 3.

### Link Management

This function will provide a list of useful links to be managed. The links found to be useful by different authorities will be added to this list and links that are no longer useful will be removed from this list by the KMS Coordinator.

## User Characteristics

This subsection of the SRS should describe those general characteristics of the intended users of the product including educational level, experience, and technical expertise. It should not be used to state specific requirements, but rather should provide the reasons why certain specific requirements are later specified in Section 3 of the SRS.

Users who can access the system can be grouped into two categories: Members and non-members. Non-member users are just visitors who are browsing KMS portal and member users are users with more capabilities. The type of users and their capabilities are described below.

### Member Users

#### KMS Coordinator

This user manages all of the KMS System by approving the membership applications, changing them. KMS Coordinator is the highest authority in the KMS System who makes final decisions on the system and content management issues. S/he has the authority to input, change, delete, and modify the contents that can be put into the system. In this role S/he is the Editor of the system.

#### Cluster Coordinators

They are the managers of the Clusters that are established in the regions as defined in the SME-Empowering Project “The Project”. They can input, and delete contents to the system to the extent that is determined by the KMS Coordinator.

#### Public Authority Users

These users belong to a government/public institution and are a member of the KMS System. These will use the system for capturing information from the system and to provide information to the system.

#### Company Representative Users

These users are the representatives from companies (SMEs) which are registered to one of the clusters. These users manage the information about their companies.

#### Registered Users

These users are visitors who would like to see more information. These users can also choose to various information from KMS.

### Non-Member Users

#### Visitors

A Visitor is any user visiting the system portal who is not a registered member. This user does not have to login to the system, but has limited access. S/he can only view, read, and download the content permitted.

## Constraints

Constraints will be added later.

This subsection of the SRS should provide a general description of any other items that will limit the developer’s options. These include

1. Regulatory policies;
2. Hardware limitations (e.g., signal timing requirements);
3. Interfaces to other applications;
4. Parallel operation;
5. Audit functions;
6. Control functions;
7. Higher-order language requirements;
8. Signal handshake protocols (e.g., XON-XOFF, ACK-NACK);
9. Reliability requirements;
10. Criticality of the application;
11. Safety and security considerations

## Assumptions and Dependencies

Assumptions and dependencies will be added later.

This subsection of the SRS should list each of the factors that affect the requirements stated in the SRS. These factors are not design constraints on the software but are, rather, any changes to them that can affect the requirements in the SRS. For example, an assumption may be that a specific operating system will be available on the hardware designated for the software product. If, in fact, the operating system is not available, the SRS would then have to change accordingly.

# Requirements Specification

## External Interface Requirements

This should be a detailed description of all inputs into and outputs from the software system. It should complement the interface descriptions in section 2 and should not repeat information there. It should include both content and format as follows:

1. Name of item;
2. Description of purpose;
3. Source of input or destination of output;
4. Valid range, accuracy, and/or tolerance;
5. Units of measure;
6. Timing;
7. Relationships to other inputs/outputs;
8. Screen formats/organization;
9. Window formats/organization;
10. Data formats;
11. Command formats;
12. End messages.

### User interfaces

##### The system will allow access using web browsers. Most common browsers will be supported.

### Hardware interfaces

There are no external hardware interface requirements for KMS.

### Software interfaces

There are no external software interface requirements for KMS.

### Communications interfaces

There are no external communications interface requirements for KMS.

## Functional Requirements

Functional requirements should define the fundamental actions that must take place in the software in accepting and processing the inputs and in processing and generating the outputs. These are generally listed as “shall” statements starting with “The system shall …”

These include

1. Validity checks on the inputs
2. Exact sequence of operations
3. Responses to abnormal situations, including
	1. Overflow
	2. Communication facilities
	3. Error handling and recovery
4. Effect of parameters
5. Relationship of outputs to inputs, including
	1. Input/output sequences
	2. Formulas for input to output conversion

It may be appropriate to partition the functional requirements into subfunctions or subprocesses. This does not imply that the software design will also be partitioned that way.

### Company Management

#### Company Information

##### The system shall maintain at a minimum the information in .

|  |  |  |
| --- | --- | --- |
| Property | Mandatory | Explanation |
| Name | Yes | Can contain Turkish and International characters |
| Registration Number | Yes | Can contain numerical characters |
| E-mail | Yes | Can contain International characters |
| Phone | No | Can contain numerical characters |
| Address | No | Can contain text  |
| Product Category | Yes | NACE Codes |
| Web Page | No | Can contain International characters |
| Cluster(s) registered | Yes | Can contain Turkish and International characters, shows the clusters that the company is a member |
|  |  |  |
|  |  |  |

Table 1 Company Information

#### Add/Create Operation

##### The company applies to the cluster coordinator to be added to the KMS.

##### After gathering all necessary information, the cluster coordinator forwards the request to the KMS coordinator.

##### The KMS coordinator adds the company to the system after getting all the needed permissions.

##### The company representative is also added to the system as a member user.

#### View Operation

##### Company names and addresses can be viewed by any user.

##### Clusters of the company also can be viewed by any user.

##### Some information of the company can only be viewed by the cluster members and the KMS coordinator.

##### Search using keywords is available.

#### Update Operation

##### The KMS coordinator can update and modify company information.

##### The company representative can also update and modify company information.

#### Delete Operation

##### Company representative shall apply to the cluster coordinator for leaving from the KMS system.

##### Cluster coordinator send removal information to the KMS coordinator.

##### The KMS coordinator shall delete company information after the leave procedure.

##### Company information can be deleted by only the KMS coordinator.

### Announcement Management

#### Announcement Information

##### The system shall maintain at a minimum the information in .

|  |  |  |
| --- | --- | --- |
| Property | Mandatory | Explanation |
| Type | Yes | Meeting, Conference, Symposium, Training … |
| Begin Date | Yes | Date of Publication |
| Expire Date | Yes | Date of Expiration |
| Short  | Yes | Short announcement |
| Long | Yes | Long announcement |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Table 2 Announcement Information

#### Add/Create Operation

##### Announcements come to the KMS coordinator or cluster coordinator from various sources (Ministries, other governmental foundations, banks, chambers, etc.).

##### After obtaining the required permissions, the KMS coordinator or cluster coordinator adds the announcements to the system.

##### If cluster coordinator adds an announcement to the system, the KMS coordinator shall approve the announcement.

##### Before the approval, the announcement shall not be visible by the visitors or members.

##### There isn’t any approval procedure for the KMS coordinator’s announcements.

#### View Operation

##### All announcements can be viewed by all users.

##### Most recent floating announcements are displayed on the main page.

##### Explanation on short announcement is expanded on selection.

##### After expiration, announcements are archived. Archive lists all former announcements and can be searched using keywords.

#### Update Operation

##### KMS coordinators can update announcements.

##### Cluster coordinators can update announcements.

##### If cluster coordinator updated the announcement, the updated announcement shall not be visible to the visitors or members before the KMS coordinator’s approval procedure.

#### Delete Operation

##### Only KMS coordinators can delete announcements.

### User Management

#### User Information

##### The system shall keep at a minimum the information contained in .

|  |  |  |
| --- | --- | --- |
| Property | Mandatory | Explanation |
| Name | Yes | Can contain Turkish and International characters |
| Surname | Yes | Can contain Turkish and International characters |
| E-mail | Yes | Can contain International characters |
| Phone | No | Can contain numeric characters |
| Address | No | Can contain text |
| Company/Foundation Name | Yes | Can contain Turkish and International characters |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Table 3 User Information

##### Each user shall have the capabilities shown in .

|  |  |  |
| --- | --- | --- |
| User Type | Object | Operation |
| Add/Create | View | Update | Delete |
| Visitor | Company | [ ]  | [x]  | [ ]  | [ ]  |
| Announcement | [ ]  | [x]  | [ ]  | [ ]  |
| Link | [ ]  | [x]  | [ ]  | [ ]  |
| User | [ ]  | [ ]  | [ ]  | [ ]  |
| KMS Coordinator | Company | [x]  | [x]  | [x]  | [x]  |
| Announcement | [x]  | [x]  | [x]  | [x]  |
| Link | [x]  | [x]  | [x]  | [x]  |
| User | [x]  | [x]  | [x]  | [x]  |
| Cluster Coordinators | Company | [ ]  | [x]  | [ ]  | [ ]  |
| Announcement | [x]  | [x]  | [x]  | [ ]  |
| Link | [x]  | [x]  | [x]  | [x]  |
| User | [ ]  | [x]  | [x]  | [ ]  |
| Public Authority Users | Company | [ ]  | [x]  | [ ]  | [ ]  |
| Announcement | [x]  | [x]  | [x]  | [ ]  |
| Link | [ ]  | [x]  | [ ]  | [ ]  |
| User | [ ]  | [x]  | [ ]  | [ ]  |
| Company Users | Company | [ ]  | [x]  | [x]  | [ ]  |
| Announcement | [ ]  | [x]  | [ ]  | [ ]  |
| Link | [ ]  | [x]  | [ ]  | [ ]  |
| User | [ ]  | [x]  | [ ]  | [ ]  |
| Registered Users | Company | [ ]  | [x]  | [ ]  | [ ]  |
| Announcement | [ ]  | [x]  | [ ]  | [ ]  |
| Link | [ ]  | [x]  | [ ]  | [ ]  |
| User | [ ]  | [x]  | [ ]  | [ ]  |

Table 4 User Permission Table

#### Add/Create Operation

##### It is not needed to register visitors, since they can only view some definite pages and information.

##### KMS Coordinator: Is added to the system by the System Administrator.

##### Cluster Coordinator: Is added by the KMS Administrator.

##### User can register to the system by clicking the “Register” link on the main page and filling out the form with the required information.

##### Company Representative is defined during the “Add Company” process and is added to the system as a user.

#### View Operation

##### Each user type is able to view parts of the system for which s/he is authorized.

#### Update Operation

##### Every user can update his/her own information

##### KMS coordinator can update all users’ information.

#### Delete Operation

##### Only KMS coordinator can delete user’s information.

### Link Management

##### The system shall allow authorized users to enter related links to be viewed by all the users

##### Links can be entered to the system by the KMS coordinator or cluster coordinator.

##### Obsolete links are deleted from the system again by the KMS coordinator.

## Performance Requirements

This subsection should specify both the static and the dynamic numerical requirements placed on the software or on human interaction with the software as a whole. Static numerical requirements may include the following:

1. The number of terminals to be supported;
2. The number of simultaneous users to be supported;
3. Amount and type of information to be handled.

Static numerical requirements are sometimes identified under a separate section entitled Capacity.

Dynamic numerical requirements may include, for example, the numbers of transactions and tasks and the amount of data to be processed within certain time periods for both normal and peak workload conditions.

All of these requirements should be stated in measurable terms.

For example,

*95% of the transactions shall be processed in less than 1 s.*

rather than,

*An operator shall not have to wait for the transaction to complete.*

NOTE: Numerical limits applied to one specific function are normally specified as part of the processing subparagraph description of that function.

There are no performance requirements.

## Design constraints

This should specify design constraints that can be imposed by other standards, hardware limitations, etc.

### Standards compliance

This subsection should specify the requirements derived from existing standards or regulations. They may include the following:

1. Report format;
2. Data naming;
3. Accounting procedures;
4. Audit tracing.

For example, this could specify the requirement for software to trace processing activity. Such traces are needed for some applications to meet minimum regulatory or financial standards. An audit trace requirement may, for example, state that all changes to a payroll database must be recorded in a trace file with before and after values.

## Software system attributes

There are a number of attributes of software that can serve as requirements. It is important that required attributes be specified so that their achievement can be objectively verified. Subclauses 3.5.1 through 3.5.5 provide a partial list of examples.

### Reliability

This should specify the factors required to establish the required reliability of the software system at time of delivery.

### Availability

This should specify the factors required to guarantee a defined availability level for the entire system such as checkpoint, recovery, and restart.

### Security

This should specify the factors that protect the software from accidental or malicious access, use, modification, destruction, or disclosure. Specific requirements in this area could include the need to

1. Utilize certain cryptographical techniques;
2. Keep specific log or history data sets;
3. Assign certain functions to different modules;
4. Restrict communications between some areas of the program;
5. Check data integrity for critical variables.

### Maintainability

This should specify attributes of software that relate to the ease of maintenance of the software itself. There may be some requirement for certain modularity, interfaces, complexity, etc. Requirements should not be placed here just because they are thought to be good design practices.

### Portability

This should specify attributes of software that relate to the ease of porting the software to other host machines and/or operating systems. This may include the following:

1. Percentage of components with host-dependent code;
2. Percentage of code that is host dependent;
3. Use of a proven portable language;
4. Use of a particular compiler or language subset;
5. Use of a particular operating system.

## Other Requirements