Annex 5 - Software Requirements Specifications

For TAK Citizen Relationship Management Modules (CRMM)

(this SRS will be subject to further development by the Sub-Contractor)

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1. Introduction

1.1 Purpose

This document presents a description of technical requirements for the Citizen Relationship Management Modules (CRMM) development for the Tax Administration of Kosovo (TAK).

The CRMM will automate the reporting, case flow and administration of cases involving fiscal evasion, corruption, or TAK officials exceeding or abusing their authority, allowing for the generation of data, reports, and feedback to the reportees as well as other interested parties. The CRMM is a composite e-Solution that contains two additional modules, the Interactive Tax Compliance Guide and the Tax Calculator, and a minor optimization for mobile first of the TAK's portal.

This document, and as it will be updated by the economic operator, will be an integral part of the implementation contract.

1.2 List of definitions and abbreviations

CRMM uses the following acronyms:

Abbreviation	Description
TAK	Tax Administration of Kosovo
TAK PSD	Tax Administration of Kosovo Professional Standards Division
MFLT	Ministry of Finance, Labor and Transfers|
KEGA	Kosovo Economic Governance Activity
OG	Official Gazette
AI	Administrative Instruction
WG	Working group assigned for CRMM project
Economic operator	The software company that will win the tender to proceed with the design and implementation of the CRMM system
CRMM	Citizen Relationship Management Modules
SRS	Software Requirements Specification
API	Application Programming Interfaces
CRUD	Create Read Update Delete

1.3 Intended Audience and Reading Suggestions

This document is generated for all stakeholders, including project sponsors and the development team (developers, designers, testers).

Section: Introduction

- This section offers a summary of the CRMM system, including purpose, document conventions, project scope, and references.

Section: Overall Description

- This section offers the product perspective, major product functions at a high level, users characteristics, operating environment, design and implementation constraints, user documentations, and assumptions and dependencies which are intended to be understandable for all users.

Section: External Interface Requirements

- This section discusses interfaces such as user interfaces, hardware, and software interfaces, communications interfaces.

Section: System features

- This section is more technical. It breaks down the requirements of major components of CRMM.

Section: Other nonfunctional requirements

- This section is more intended for developers. It covers the non-functional requirements to help make suitable design choices.

Section: Appendix A - UML Diagrams

- This section is fully technical and is more intended for engineers and developers. It provides a short version of the use case diagram, data flow diagrams, and swim lane diagrams. The detailed UML diagrams will be generated from the economic operator and once generated, the same will be approved by the sponsor of the project, KEGA, to proceed further with the design and implementation of CRMM.

Section: Appendix B - User Interfaces

- This section represents a set of User interfaces by providing a simple conceptual model that could be followed for developing the CRMM system.

Section: Appendix C - CRMM – EDI metadata

- This section represents the CRMM metadata in a short version and following by attributes of each entity. The CRMM Metadata standard needs to be followed by the economic operator to model the CRMM data related to Reportees, Case Coordinators, Chief Case Coordinator, Case, Case Results Publication.

1.4 Product Scope

The CRMM is a composite e-Solution comprised of three basic modules: Interactive Tax Compliance Guide, Tax Calculator, and Tax Evasion Reporting and Internal Case Management System.

The Interactive Tax Compliance Guide will provide online all information related to tax compliance in one place, utilizing a “smart” algorithm that tailors this information to the user profile and its interest/questions, thus avoiding redundancy, avoiding the need to search for this information in various sites, and the need to comb through many lengthy, interlinked documents. This module is an interactive-guided, answer-based, focused presentation of laws, AIs and regulations affecting the specific user as per their tax bracket profile

The Tax Calculator will provide a simple and user-friendly means to calculate the most basic tax dues based on the user profile and their taxable activities.

The **Tax Evasion Reporting and Internal Case Management System** represents the bulk of the system, and it will provide a complete case reporting and Management Information System for managing cases of fiscal evasion, corruption, or TAK authorities exceeding or abusing their powers. This CRMM module will be accessed through TAK’s online portal where citizens of Kosovo can report cases of fiscal evasion, corruption or TAK’s abuse of authorities to the TAK’s Division of Professional Standards. It will be able to report either by registering or anonymously. It will implement all security measures and legal requirements for end-to-end case processing, from initiation to completion: case instigation, case flow, documents flow and processing, management supervision and controls, alerts and reporting, anonymized feedback to the initiators, and archiving.

1.5 References

This SRS document is based on ISO/IEC/IEEE International Standard - Systems and software engineering, and by going through this standard accessed in the following link:

https://standards.ieee.org/standard/29148-2011.html

The conceptual model is based on:

High level overview and case flow mapping developed by the TAK business analysts and the developers team;

Discussions, observations and input from KEGA and TAK working group on Interactive Tax Compliance Guide and Tax Calculator;

Observation of the existing procedures employed by TAK and TAK's PSD.

Data Model is based on:

Input from TAK's IT and developers' team on the EDI reference data model.

Guidelines for CRMM Managers:

Law on Tax Administration and Procedures: (https://gzk.rks-gov.net/ActDetail.aspx?ActID=2689)

For visualization module:

Design and branding elements on the actual TAK's website at: https://www.atk-ks.org/ .

Additional references:

Law on Tax Administration and Procedures: (https://gzk.rks-gov.net/ActDetail.aspx?ActID=2689)

Law on Corporate Income Tax (https://gzk.rks-gov.net/ActDetail.aspx?ActID=20988)

Law on Personal Income Tax (https://gzk.rks-gov.net/ActDetail.aspx?ActID=11014)

Law on Value Added Tax (https://gzk.rks-gov.net/ActDetail.aspx?ActID=11015), and associated regulations.

2. Overall Description

2.1 Product Perspective

The CRMM is a management information system that supports the reporting, case flow and administration of cases involving fiscal evasion, corruption, or TAK officials exceeding or abusing their authority, allowing for the generation of data, reports, management oversight, and provision of feedback to the reportees as well as reports, statistics and open data to all interested parties.

The data format standards, datasets, and various publicly available statistics and reports will be developed jointly by the TAK and USAID's EGA Activity.

CRMM will be developed based on the existing manual case processing procedures[1] employed by the TAK's Professional Standards Division (TAK PSD). Furthermore, the system will enable streamlining of the existing processes, in a way that increases efficiency while at the same time increasing transparency and adherence to information security requirements. A detailed business process analysis during the system implementation will reveal process improvements opportunities that will be incorporated into the CRMM. The project stakeholders' group will be instigating and overseeing the drafting of new regulations TAK PSD Regulations or changes to the existing ones to ensure the backing for such process re-engineering.

[1] The existing case processing procedures employed by TAK PSD are implicit and not formally documented as a regulation or binding legal document. Subject to TAK's observation of the maturity of the proposed improvements and automation of the process during TERCMS project, if needed, TAK may enact legally binding regulations on tax evasion case processing procedures.

2.2 Product and its function

Initially, CRMM will include several functions that will serve user groups and scenarios related to all three of the CRMM modules:

Part 1. Interactive Tax Compliance Guide

Part 2: Tax Calculator

Part 3: Tax Evasion Reporting and Internal Case Management System

The economic operator will further expand and develop the SRS sections on all three modules, including detailed functionalities, features, stimulus-response sequences, functional requirements, use case diagrams, UML diagrams, etc.

2.2.1 Part 1: Interactive Tax Compliance Guide, contains:

a. Front end: web and mobile friendly presentation consistent with the TAK design language.

b. Back end: an interactive algorithm guided by the user answers that advances the scenario of information presentation. Can define in the future new questions and answers, and usage scenarios, that take into account varying variables feeding into the algorithm.

   i. List of relevant national regulations, laws and regulations by MFLT, TAK and TAK's PSD, and the links to the authoritative copies of the documents.

   ii. Provides answer information that can be customized, provides links to authoritative copies of the regulations' documents, and contains and provides copies of focused excerpts of regulations or custom defined answers as an endpoint of the algorithm.

   iii. Provides links to authoritative copies on the OG site for laws, AIs and other regulations that are already published on the OG.

   iv. Provides links to authoritative copies on the MFLT, TAK and TAK PSD sites for specific regulations published only on these sites.

   v. Presents documents maintaining the parent-child logic and representation, eg.: law - administrative instruction – internal TAK regulation similar to the logic and layout used by the Official Gazette of Kosovo (OG) (https://gzk.rks-gov.net/).

   vi. The focused excerpts are always provided in conjunction with the full reference, eg. name, date, section, and link to the authoritative copy of the document.

The economic operator will, in coordination with TAK and the Activity, further expand and develop the SRS sections relating to the Interactive Tax Compliance Guide module, including detailed functionalities, features, stimulus-response sequences, functional requirements, use case diagrams, UML diagrams, etc.

2.2.2 Part 2: Tax Calculator, contains:

a. Front end: web and mobile friendly presentation consistent with the TAK design language.

b. Back-end: can define in the future new calculations and usage scenarios that take into account input variables such as taxpayer profile bracket, varying tax percentages and other variables feeding into the calculation.

The economic operator will, in coordination with TAK and the Activity, further expand and develop the SRS sections relating to the Tax Calculator module, including detailed functionalities, features, stimulus-response sequences, functional requirements, use case diagrams, UML diagrams, etc.

2.2.3 Part 3: Tax Evasion Reporting and Internal Case Management System:

a. Employees: Case Coordinators users database. Can be synchronized with other TAK and TAK PSD systems.

b. Departments: TAK, TAK PSD, TAK regional departments, and MFLT departments.

c. Cases: case database, case tracking.

d. Reportees – external users database.

e. User profiles, incorporating the ability to change, delete or add new user profiles:

   i. Reportees as Anonymous Users – external users who do not wish to register on CRMM. Can use all features of Interactive Tax Compliance Guide and Tax Calculator, and can report anonymously cases through the Evasion Reporting System. Can check the case status only through the case number or link shown upon the initial case reporting.

   ii. Reportees as Registered Users – external users who opt-in to register on Evasion Reporting System. Can use all three CRMM modules same as Anonymous Users. Additionally, these users will receive feedback information on the cases they have reported by contact details (email) that they have provided. These users can view the status of the cases they have reported also by logging in and viewing the case status in the system.

   iii. User tax bracket profile - will be defined by type of entity, taxable activities, and other variables determining the tax bracket. This profile will be used by Interactive Tax Compliance Guide and Tax Calculator to tailor information and calculator options to the user needs. Nevertheless, providing tax bracket information is optional.

   iv. TAK and TAK PSD users – users within the institution. Defined by their role and corresponding level of privileges in the system: Case Coordinators, Chief Case Coordinators, Department/Institution Coordinators etc. Can access CRMM only within the institution network or by secure means approved by the institution.

2. Statistics & Reports generation.

3. Statistics and Visualization:

   a. Public reports: web, mobile friendly and also downloadable reports (in pdf) presenting in anonymized form system's usage statistics such as number of public users, number of cases reported, cases resolved and in the process, time to resolution, etc.

   b. Internal institutional reports: in addition to access and linkage to the public reports, also reports visualization of management data: time to process by case type, by user and by manager, various statistics of interest to overseeing the whole case flow and processing.

4. System Administration, will operate in the backend to facilitate the create, read, update and delete (CRUD) procedures for all actors that operate at different levels of privileges in the CRMM Evasion Case Reporting Module, as well as to facilitate adjusting the logic, algorithm

and variables in CRMM Interactive Tax Compliance Guide Module and CRMM Tax Calculator Module.

The economic operator will, in coordination with TAK and the Activity, further expand and develop the SRS sections relating to the CRMM, including detailed functionalities, features, stimulus-response sequences, functional requirements, use case diagrams, UML diagrams, etc.

2.3 Product functions

- Registration of Reportees (optional, if opted to register):
  - Include minimal data required to identify the Reportee and send them a summary of the data they have provided on the case status: Name, ID, email address or phone number, date, type of report, case number assigned, text entered in text fields.
- Registration of TAK and TAK PSD users:
  - Include all relevant information, assign access level and privileges in the system.
  - See required input data (in Appendix C) on including attributes specified in existing TAK and TAK PSD regulations on user's registration requirements, access and privileges.
  - Alternatively, look into the possibility of authenticating users from other TAK and TAK PSD systems (such as EI) and granting them access to CRMM as per their role in CRMM.
- Integration of new, ongoing, and pre-existing TAK and TAK PSD manually processed data and cases onto Evasion Reporting system.
- Verification and validation of taxpayer entity reported against the TAK and TAK PSD existing taxpayers' database and systems (such as EDI).
- Inclusion of the Evasion Reporting case status and its resolution into the taxpayer's profile into the TAK and TAK PSD taxpayer database and systems.
- For each of the interfaces to other TAK systems operator will be offered detailed information regarding the API and the structure of data that could be exchanged.
- CRMM will offer open access, define and publish requirements including technical requirements, for all research outputs and other open databases.
- Searching, listing and filtering including multiple variable combination filters, for all CRMM data.
- Enable definition of new types of reports, and definition of new procedures for managing such reports, e.g. similar to the abolished procedure of collecting fiscal bills as reports and awarding vouchers to Reportees.

2.4 User Classes and Characteristics

CRMM users will be classified into different categories, depending on the privileges defined: Reportee, Case Coordinator, Chief Case Coordinator, Department/Institution Coordinator, Citizen - in relation to the Law on Access to Public Documents (https://gzk.rks-gov.net/ActDetail.aspx?ActID=20505), etc.

2.4.1 Reportee

Reportee Registration: The Reportee shall be able to create his/her account by accessing the registration page and providing the necessary information details as specified in the CRMM People entity (see Appendix C). Once the Reportee registers, an automatic email is sent to verify the account to the email provided during the registration.

Reportee Login: The Reportee shall be able to log in to CRMM by accessing the login page and providing his/her credentials once the account is verified. Once logged in, the user can access CRMM services. If the Reportee logs in for the first time, the system shall ask the user to take a few quick pieces of info (optional) to be familiarized with the system before being directed to the system's portal.

Password Recovery: If the Reportee has lost or forgotten his/her password, he/she should be able to recover it by accessing the password recovery page from the login page. The Reportee should provide his/her personal email that is associated with the account and the system shall send a link for the email change/reset password page.

Dashboard Customization: Reportee should be able to customize his/her dashboard according to his/her preferences. CRMM should provide the filtering and customization capabilities for profile, case list, case status, events: reached and coming milestones, and results in the dashboard.

Profile Management: The Reportee shall be able to manage his/her profile. Profile management includes creation, modification, deletion, and viewing of the information as specified in the CRMM people entity (see Appendix C).

Case Management: Reportee shall be able to manage his/her cases. Case management includes creation, modification, deletion, and viewing of a case that has been reported/created into the system by him/her. Once submitted, a copy of the case should be sent to the Reportee (to the email that is associated with the account), to the Case Coordinator (assigned to the case by the Chief Coordinator), and to the Administrative Office/Archive. The Reportee can modify cases by adding new information as specified in the CRMM Case entity (see Appendix C). Each case modification by the Reportee is logged into the system, and the change is sent to the Case Coordinator, if the Case Coordinator has been assigned already. Reportee should also be able to view his/her cases, case progress, and search through them. The case status will be updated based on the process that will follow as the case gets processed by the assigned Case Coordinator. The Case Coordinator(s) assigned to the case shall not be identifiable to the Reportee. Each case access, and modification by the Case Coordinator is logged into the system, however only major case milestones will be visible to the Reportee and only in anonymized form. The case status should be able to be viewed and extracted from the system in different formats (including PDF, DOC – to name a few).

Resource Management: Reportee should be able to manage their case including case documents. The system shall provide the ability for the Reportee to import and export materials either from the Reportee's local device or from other cloud-based services. The system logs each access and modification.

Statistics and Visual Management: Reportee shall be able to visualize and generate ad-hoc results. Reportee should be able to extract the visualization and results in different formats (including PDF, DOC, EXCEL, CSV, PNG, JPG – to name a few).

Browsing: Reportee shall be able to browse all publicly available information in CRMM. These include the case catalog, reports and statistics, and open datasets.

2.4.2 Case Coordinator

Case Coordinator Registration: Each Case Coordinator account in CRMM is authorized by Department/institution Coordinator and is created by the CRMM Administrator through the registration page and providing the necessary information details as specified in the CRMM People entity (see Appendix C). Once the account is created, an automatic email is sent to verify the account to the email provided during the registration. Alternatively, the Case Coordinators' accounts in CRMM can be created through integrating employee user accounts already defined in the TAK and

TAK PSD central information system, and by granting those accounts the privileges as per their role in CRMM.

Case Coordinator Login: The Case Coordinator shall be able to log in to the CRMM by accessing the login page and providing his/her credentials once the account has been created. Once logged in, the user can access CRMM services. If the Case Coordinator logs in for the first time, the system shall ask the user to take a few quick pieces of info (optional) to be familiarized with the system before being directed to the system's portal. Alternatively, if CRMM integration happens with other TAK or TAK PSD information systems, the Case Coordinators can log into and be authenticated by logging in onto their information system through which they will be granted access in CRMM as per their role in CRMM.

Password Recovery: If the Case Coordinator has lost or forgotten his/her password, he/she should be able to recover it by accessing the password recovery page from the login page similar to the password recovery scenario for the Reportee user. Alternatively, the Case Coordinator can request CRMM administrator to reset the password for them, by following TAK and TAK PSD procedures for password recovery.

Dashboard Customization: The Case Coordinator should be able to customize his/her dashboard according to his/her preferences. CRMM should provide filtering and customization capabilities for case list, observing case status, reached and coming milestones, actions performed by other users assigned to the case, messages, and comments on each event along the case flow in the system, etc.

Profile Management: The Case Coordinator shall be able to manage his/her profile. Profile management includes creation, modification, deletion, and viewing of the information as specified in the CRMM people entity (see Appendix C).

Case Management: The Case Coordinator shall be able to manage his/her cases. Case management includes creation, viewing and modification of a case that has been reported/created into the system.

The case is assigned to the Case Coordinator automatically by the system, on a rotation equal-load basis among the pool of case coordinators, or by the Department/Institution Coordinator. Case Coordinator should be able to view his/her cases, case progress, and search through cases. The Reportee initiating the case shall not be identifiable to the Case Coordinator. The Case Coordinator can modify cases by adding information on the actions performed by him/her, and new information as specified in the CRMM Case entity (see Appendix C). Case Coordinator can customize case list, observe case status for all cases assigned to him/her, insert data and actions, events: reached and coming milestones, invite other users to work on the case, forward case to another user, leave messages, and provide comments and findings on each event along the case flow in the system. Case Coordinator should be able to manage all aspects of the case assigned to them, barring changes and control indicators that occur automatically by the system, or those that are set for them by the Department/Institution Coordinator. Each case access and modification by the Case Coordinator is logged into the system.

The case status will be updated automatically based on the process that will follow as the case gets processed, starting from case initiation, to registering of all the actions performed by Case Coordinator, registering messages, comments and events, publishing results, and up to the final case archiving. When a case reaches predefined milestones, or when predefined timers are reached, the case status is updated, a notice is registered in the system, and it is sent to the Reportee and to the Department/Institution Coordinator. The case status and summary should be able to be viewed and extracted from the system in different formats (including PDF, DOC – to name a few).

Resource Management: The system shall provide the ability for the Case Coordinator to import and export materials either from the Case Coordinator's local device or from other cloud-based services.

Statistics and Visual Management: The Case Coordinator shall be able to visualize and generate ad-hoc results. Case Coordinator should be able to extract the visualization and results in different formats (including PDF, DOC, EXCEL, CSV, PNG, JPG – to name a few).

Browsing: The Case Coordinator shall be able to browse all publicly available information in CRMM. These include the case catalog, publication catalog, reports and statistics, and open datasets.

2.4.3 Department/Institution Coordinator

The Department/Institution Coordinator user class represents the TAK Institution's Department or Regional Coordinator. The Department/Institution Coordinator user class has all the characteristics as the Case Coordinator, plus additional access level and privileges as below:

Staff Management: The Department/institution Coordinator shall be able to manage their Case Coordinators profiles by creating, updating, deleting accounts related to their employees.

Case Management: Department/Institution Coordinator shall be able to manage assignment of cases to Case Coordinators, view case progress for all the cases assigned to Case Coordinators under his/her supervision, set case milestones, KPIs and reminders (to be defined in detail during the inception phase), approve case forwarding/collaboration among Case Coordinators, and initiate and respond to communication through the system with Case Coordinators.

Statistics and Visual Management: Department/Institution Coordinator should be able to visualize and generate results based on the Department/Institution Coordinator user class templates. Department/Institution Coordinator should be able to generate ad-hoc reports by combining variables and can make these reports open for everyone.

Browsing Catalogs: Department/Institution Coordinator shall be able to browse the following types of catalogs: people catalog, case catalog, results publications catalog: reports and statistics, financial catalog, and taxpayer catalog. Catalogs shall provide information about people, cases, case outcomes/results, data distilled into reports and statistics, financial outcomes of cases, and taxpayers and their history in CRMM and other TAK systems. The Department/Institution Coordinator should be able to view from catalogs other coordinators' profiles, their activities and actions in the case, and their KPI metrics.

2.4.4 TAK (and TAK PSD) Chief Coordinator

TAK has full privileges of the CRMM system and legally will be the owner of CRMM. TAK and TAK PSD Chief Coordinator will be able to, on behalf of TAK, create, read, update and delete Department/Institution Coordinators, Case Coordinators and all other users, cases, reports and data. TAK and TAK PSD Chief Coordinator has the ownership of the CRMM application and will have full access to code, database, and all related documentations that will be produced to use CRMM. TAK and TAK PSD can issue software code audit at any time including security vulnerabilities analysis, code quality check, performance and scalability check, potential maintenance issues detection.

The Chief Coordinator user class has all the characteristics as the Department/Institution Coordinator class, plus additional access level and privileges as below:

Staff Management: The Chief Coordinator shall be able to manage all employee user accounts, all Case Coordinators' including Department/Institution Coordinators' profiles, by creating, updating, deleting accounts related to their employees.

Case Management: Chief Coordinator shall receive all queries related to the Law on Access to Public Documents (https://gzk.rks-gov.net/ActDetail.aspx?ActID=20505) directly from CRMM, and can assign those tasks to respective department heads – Department/Institution Coordinators, or to Case Coordinators.

2.4.5 Citizen

This user class has all the characteristic as the Reportee, plus additional access level and privileges as below:

Case Management: Citizen shall be able view detailed reports and statistics on all cases, in **anonymized or aggregated forms**, in the CRMM system: cases completed, cases in the process and pending cases, results on completed cases, as well as have access and request open datasets from TAK and TAK PSD. Citizen can make specific requests for customized access and data which will be forwarded by the system directly to Chief Case Coordinator. This user profile is primarily to be used to initiate any communication and queries based on the FYI.

2.4.6 Others

Additional user classes may be created in CRMM by the Chief Case Coordinator or by the Systems Administrator.

2.5 Operating Environment

OE-1: The CRMM System must operate correctly with the following web browsers: Internet Explorer versions 7 and above; Microsoft Edge all versions; Firefox versions 12 and above (latest version); Google Chrome all versions; Apple Safari versions 4.0 and above (latest version).

OE-2: The CRMM System's software must run on the TAK or TAK PSD designated Data Center and infrastructure.

OE-3: Application Load Balancing services must be included to help with the distribution of incoming HTTP and TCP traffic across web and app servers.

OE-4: Cashing shall be used for caching services to remove load from the system and databases and lower latency for frequent requests.

Technical requirements of the server:

Physical[2]:

Processor	4 x Intel Xeon W-11955M 8-Core, 16 Threads, 3.30/5.0 GHz, 24MB cache
Memory	64 GB TruDDR4 PC4-1700 2133 MHz RAM, support for up to 1.5TB RAM
RAID controller	12Gb SAS/SATA controller, supported RAID levels 0, 1, 10, 5, 50,
Installed drives	8x16 TB 7,200 rpm 12 Gb SAS NL, expandable to 12 drives frontside
Network adapter	up to 10 Gb/s
Power supply	2 x 850 Watt, 80+ Platinum Certified
Fans	Hot-swap, redundant
Ports	VGA (1 front, 1 rear), USB, RJ-45 (system management), 3 x RJ-45 (10 Gb)
Case	2U, for 19“ rack, with sliding rails

The technology used for developing CRMM, but not only:

1. Client/server system
2. Database: SQL
3. On-the-fly JSX to JavaScript compilation via Babel
4. JSX to JavaScript compilation via popular minification/combination libraries:

[2] An example based on a similar software hosted

   a. ASP.NET Bundling and Minification
   b. Cassette
   c. Webpack
   d. MSBuild
5. Server-side component rendering to make your initial render super-fast, including support for:
   a. CSS-in-JS libraries
   b. React Router
   c. React Helmet
   d. Custom JS logic via implementing IRenderFunctions and passing to Html.React
6. Runs on Windows, OS X, and Linux via .NET Core and ChakraCore
7. Supports both ASP.NET 4.0/4.5 and ASP.NET Core

2.6 Design and Implementation Constraints

Constraints that will limit the options of design and implementations are:

CO-1. User Classes Metadata shall conform to the CRMM standard, plus the additional metadata that are necessary to enable CRMM to communicate with other systems interfaces.

CO-2. The system shall operate in such a way that avoids running out of resources when executing complex queries.

CO-3. CRMM system shall propose to users to fill-in the missing required fields to avoid any errors thrown during the interaction such as registration request, case status queries, searching for catalogs and other data in CRMM, etc.

CO-4. CRMM system for the Case Coordinators should be accessed only from the institution domain/network, and verification and password change should be possible only through institution domain emails.

3. Interface with other applications

The CRMM platform shall exchange information with the following institutions:

- TAK – EDI; and,
- other public institutions/ ministries as necessary.

The format of data exchange will be done through web services and will be determined during the application development phase.

4. System Features

4.1 Registration feature

4.1.1 Description and Priority

Chief Case Coordinator user profile is a ‘super admin’ user and has the highest level of user privileges in CRMM. Chief Case Coordinator user profile has administrative privileges over the user profiles of Department Coordinators, Case Coordinator and all other user profiles of employees down the institutional hierarchy structure.

Specific TAK and TAK PSD managers receive in CRMM a Department/Institution Coordinator profile which is verified by the Chief Case Coordinator. Department/Institution Coordinators are categorized as 'admins' and have administrative privileges over Case Coordinator profiles and all other user profiles of employees down the institutional hierarchy structure. Department/Institution Coordinators as 'admin' users will verify the Case Coordinators accounts. All the accounts will be created based on CRMM and TAK Metadata Standards (See Appendix C). All registration forms must go through the checkpoints based on the level of privileges.

Not all TAK and TAK PSD employees receive a CRMM account automatically. Department/ Institution Coordinators verify the accounts only for those employees' that are members of their departments, and that are assigned to work on case processing as Case Coordinators. Each of the employees in the respective departments needs to have an account so any action toward the systems needs to be trackable.

All registered users have a profile with an overview of their personal information, assigned cases and tasks, KPIs, etc. Activities and results are automatically linked to Case Coordinator's profile when they are assigned a case or tasks.

4.1.2 Stimulus/Response Sequences concerning registering the profiles

User accounts can be created using two general scenarios: administratively, by higher-up admins or by registration/application by the user and approval by the higher-up admins.

Stimulus: The user (Department/Institution Coordinator or Case Coordinator) fills in the registration form to get registered in the system.

Response: The system sends an email with the estimated time of profile verification to the next privilege level user profile (which can be Chief Case Coordinator or Department/ Institution Coordinator, respectively), and once the account is verified, the system sends an email to the user and suggests updating their profile with extra attributes requested by CRMM standard.

Stimulus: Department/Institution Coordinator registers the department/institution (central office, regional office, local office, etc.) in CRMM.

Response: The system sends an email with the estimated time of department/institution verification by Chief Case Coordinator (as a super admin account). If the department/institution gets verified successfully, an email will be sent with a username and password and a short message to the Department/Institution Coordinator to let them know that they are part of CRMM and that they can continue to update their department/institutional profile. If it is not completed successfully, the Department/Institution Coordinator gets an email with a rejection message.

Stimulus: The Department/Institution Coordinator registers Case Coordinators.

Response: The system sends an automatic email with the estimated time of the profile verification to the Case Coordinator being registered. If the user/Case Coordinator approves that he/she is part of this department/institution, the Department/Institution Coordinator gets an email that registration has been completed successfully. The Case Coordinator gets an email with username and password and a short message that lets the Case Coordinator know that they are part of CRMM and suggests updating their profiles with extra attributes as specified in Appendix C.

4.1.3 Functional Requirements

Registration Requirements are represented uniquely with a RRx tag, where RR stands for Registration Requirement and x represents the serial number.

RR1: The system must send a confirmation email whenever a user's profile has been verified successfully.

RR2: The system must send an email whenever a verified user account is created containing the username and the temporary password.

RR3: The system must redirect users to change their password after they log in for the first time.

RR4: The system must send an email with a specific code to verify the user's email.

RR5: The system must send a rejection email whenever a user's profile has not been verified successfully.

RR6: The system must allow users to log into their account by entering their email and password.

RR7: The system must not allow submission of the registration form if the user has not filled all required fields for the form that they are filling (including self-registration form, department/institution form, user profile form based on CRMM standard).

RR8: The system must allow users to reset their password by clicking on "I forgot my password" and receiving a link to their verified email address.

RR9: The system must send an email that requests user profile verification to the next higher up admin level: Department/Institution Coordinator or Chief Case Coordinator, when a user submits a registration form.

RR10: The system should send a reminder email to higher up admin: Department/Institution Coordinator or Chief Case Coordinator, if no specific user profile has been verified 48 hours after application for registration.

RR11: The system should update the queue list once the higher up admin verifies a user profile.

RR12: The system must provide four different views where higher up admins can create, read, update, or delete users.

RR13: The system must provide four different views where higher up admins can create, read, update, or delete departments/institutions.

RR14: The system must provide four different views where higher up admins can create, read, update, or delete cases. Case Coordinators can use only read and update views.

RR15: The system must provide four different views where higher up admins can create, read, update, or delete reports and statistics presentations. Case Coordinators can use only read and update views.

RR16: The system must provide four different views where higher up admins can create, read, update, or delete financial reports and statistics for the financial effects accrued through CRMM. Case Coordinators can use only read and update views.

RR17: The system must provide four different views where higher up admins can create, read, update, or delete open datasets. Case Coordinators can use only read and update views.

4.2 Results Publication feature

4.2.1 Description and Priority

Case processing and end results (anonymized) will be open and publicly accessible unless differently is written in TAK, TAK PSD regulations or other laws or AIs. When the Case Coordinators finish their work on a certain case, they must publish the results. The publications by Case Coordinator should go through the Department/institution Coordinator for verification. Correct and verified results are essential to be as useful. If this stage is passed and meets all evaluation criteria, then the results are published. The results include final resolution, investigation, findings and actions taken, date and time elapsed, financial effects, and other data of interest. The case results must be stored in the database and must be retrieved by title, Reportee, Case Coordinator, date, case status (e.g. accepted, in progress, completed, rejected, etc), keywords, case type, etc. and the anonymized version shall be available to anyone interested to reach them.

4.2.2 Stimulus/Response Sequences

Stimulus: Case Coordinator submits request to publish case results.

Response: System checks if all required information was given in the result publication form. The system sends a notification and an email confirming that the publication submission request has been received successfully.

Stimulus: The Department/Institution Coordinator receives, verifies and evaluates the publication of the case results.

Response: The system shows the publication information that was provided by the Case Coordinator sending publication request. The Department/Institution Coordinator verifies and evaluates if the results meet all required standards and requirements:

- If every aspect of the publication results is in order, then the publication of the results is authorized, the system publishes the results, and the case receives the status “completed”.
- The Department/Institution Coordinator may send the request back to the originating Case Coordinator or to another Case Coordinator for further work with a remark explaining the actions needed to be performed by the Case Coordinator.

Stimulus: The Case Coordinator wants to update the publication of case results.

Response: The system sends an email confirming that the publication updates have been received successfully. Then it sends a notification and an email to the Department/Institution Coordinator for re-evaluation. The same process as publishing results for the first time happens here.

4.2.3 Functional Requirements

Case Results Publication Requirements are represented uniquely with a RPRx tag, where RPR stands for (Case) Results Publication Requirement and x represents the serial number.

RPR1: The system must send a notification in the system and an email of confirmation, or must send an error, when the user submits the results publication request form.

RPR2: The system must provide a change/update option only for the author of the case results publications.

RPR3: The system must not apply change/updates before re-evaluation from the next level authority.

RPR4: The system must send a notification and an email to authority that has evaluated the initial/previous results publication request whenever there is a request for changes/updates for that result publication.

RPR5: The system must send a reminder after 48 hours if authorities have not evaluated a case results publication.

RPR6: The system must send a notification and email about new case results publication to all users/Case Coordinators working on the same case.

RPR7: The system must not allow a non-authorized user to view, change/update, verify or evaluate publications results of ongoing cases.

RPR8: The system must allow or provide forms for uploading of different types of files.

RPR9: The system must compress the files as to not exceed the upload size limit of the platform.

RPR10: The system must link authors to the case and show the case results publication on their profiles under the Publications Section.

RPR11: The system must link the assigned Case Coordinator(s) to the case and show the case results publication on their profiles under the Publications Section.

RPR12: The system must store case results publications in the database.

RPR13: The system must offer open access to anonymized case results publications and other open/public data, reports and statistics to all users and non-users.

4.3 User Login

4.3.1 Description and Priority

Registered users must be able to log in into their accounts with the affiliation domain and sign out at any time that they want.

4.3.2 Stimulus/Response Sequences

Stimulus: The user accesses the login page and provides the required credentials, username and password, to log in into the system.

Response: The system verifies the user's credentials and approves the login request if the user has provided the correct credentials. If not, the system shows information to let the user know that the username or(and) password is incorrect.

4.3.3 Functional Requirements

User Login Requirements are represented uniquely with a ULrx tag, where ULr stands for User Login Requirement and x represents the serial number.

ULr1: System must allow the user to log in using his/her username and password.

ULr2: System must now show the original password while the user is providing credentials.

ULr3: System must redirect users to change their password after they log in for the first time.

ULr4: System must provide an option for the user to take a few quick pieces of information to be familiarized with the system if the user logs in for the first time.

ULr5: System must let the user know about the limit of login attempts. If the limit is reached, then the user must re-try to log in after a certain time.

ULr6: System must allow users to reset their password by clicking on "I forgot my password" and receiving a link to their verified email address.

ULr7: System must check the email format of the username. The User’s username must be the User’s email address.

4.4 Password Recovery

4.4.1 Description and Priority

Registered users must be able to recover their password in case they have forgotten it.

4.4.2 Stimulus/Response Sequences

Stimulus: The user accesses the password recovery page from the login page and provides the personal email that is linked to his/her account.

Response: The system sends a link to confirm password reset to the specified email. The link is to a recovery page in the system where the user can enter new password.

4.4.3 Functional Requirements

User Password Recovery Requirements are represented uniquely with a PRrx tag, where PRr stands for user Password Recovery Requirement and x represents the serial number.

PRr1: System must provide the option to recover the password and redirect the user to the recovery page through the login page.

PRr2: System must send a notification to the email associated with the user account that a password recovery attempt has occurred, if there has been an attempt to reset the user password from the login page.

PRr3: System must send confirmation to the email associated with the user account when the password has been reset successfully.

4.5 Dashboard Customization

4.5.1 Description and Priority

CRMM is designed to show information using dashboards. Users can personalize the dashboards by customizing all the features that are used to improve the efficiency of the system. Dashboards that are offered in CRMM are profiles, cases, case results, financials, reports and statistics, etc.

4.5.2 Stimulus/Response Sequences

Stimulus: The user accesses the customize dashboards page and clicks the customize button.

Response: The system provides options to drag or resize the dashboards.

4.5.3 Functional Requirements

Dashboard Customization Requirements are represented uniquely with a DCrx tag, where DCr stands for Dashboard Customization Requirement and x represents the serial number.

DCr1: System must provide the option to customize dashboards.

DCr2: System must take the approval of the user to submit the changes that have been provided.

DCr3: System must ask the user if he/she is sure to leave the page without submitting the new changes if the user requires to change the page.

4.6 Case Coordinator Case Management

4.6.1 Description and Priority

Case Coordinators can manage their cases which includes creation, viewing, modification, and deletion of cases. After the case has completed or there are results to be published, the user can create results for a specific case. If there are any changes to be made, the user can modify the case and its results.

4.6.2 Stimulus/Response Sequences

Stimulus: User creates a case.

Response: The system redirects the user to the case creation form. After the user provides all the required information, the system saves the case on the database. If there are any other Case Coordinators to be working on the case and the Case Coordinator that created the case has provided their email addresses, the system sends an email to notify the other coordinators about the case that has been created.

Stimulus: User modifies a case.

Response: The system redirects the user to the case update page. After the user provides all the new updates and submits the changes, the system updates the case content on the database. It also sets the update DateTime in the case timeline. The system sends a notification on the update and an email to other Case Coordinators that are registered to work in the case.

Stimulus: User deletes a case.

Response: The system asks the user if he/she is sure to continue with the deletion of the case. If the user confirms, the case status gets updated to deleted, and the case doesn't get deleted from the database. The case is not displayed any longer in the user's case list, the notification and email is sent to the user and all other users working on the case and to the Department/Institution Coordinator.

Stimulus: User views his/her case.

Response: The system shows the user his/her cases and allows the user to search through them and select a case to view.

4.6.3 Functional Requirements

Coordinator Case Management Requirements are represented uniquely with a CCMrx tag, where CCMr stands for Coordinator Case Management Requirement and x represents the serial number.

CCMr1: System must validate the provided information for a case before saving it into the database. If the given data is not correct, it should display a message telling the trace of the problem. If everything is correct, the system must save the case.

CCMr2: System must show the pre-existing information on the update case page so the user knows what he/she is changing and how it affects the case.

CCMr3: System must ask the user if he/she is sure to leave the create/update case page without submitting the new changes if the user requires to change the page.

CCMr4: System must validate the user's role in the case before showing the cases.

CCMr5: System must allow the user to search through his/her cases.

CCMr6: System must set the createdAt timestamp on case creation and updatedAt timestamp every time the case is updated.

CCMr7: System will allow deletion of a case only by the user who has created the case or has been assigned as the main case coordinator to work on the case.

CCMr8: System will stop showing the deleted case on the user's case list. System will store deleted cases in the database for archiving from where the deleted cases can be retrieved, viewed and reinstated. System will allow the Department/Institution Coordinator and

Chief Case Coordinator access to the deleted cases list, and allow them to retrieve, view and reinstate the deleted cases.

4.7 User Case Results Publication Management

4.7.1 Description and Priority

Users can manage their cases which includes creation, viewing, modification and deletion of cases. Case Coordinators can view and search through their case results publications. The user allowed to manage case results publication for a case is the main Case Coordinator assigned to work on the case.

4.7.2 Stimulus/Response Sequences

Stimulus: User creates a case results publication.

Response: The system redirects the user to the case results publication creation page through the case page. After the user provides all the required information, the system saves the case results publication on the database. If there are any other registered users currently working on the case, the system sends notification and an email to notify the other users about the case results publication that has been created.

Stimulus: User modifies a case results publication.

Response: The system redirects the user to the case results publication update page. After the user provides all the new updates and submits the changes, the system updates the case' results publication on the database. It also sets the update DateTime. The system sends notification and an email to the other users that are assigned to work on the case.

Stimulus: User deletes a case results publication.

Response: The system asks the user if he/she is sure to continue with the deletion of the case results publication. If the user confirms, the case results publication's status gets updated to deleted and it doesn't get deleted from the database because of the history.

Stimulus: User views his/her case results publication.

Response: The system shows the user his/her case results publications and allows the user to search through them.

4.7.3 Functional Requirements

User Case Results Publication Management Requirements are represented uniquely with a UCRPMrx tag, where UCRPMr stands for User Case Results Publication Management Requirement and x represents the serial number.

UCRPMr1: System must validate the provided information for a case results publication before saving it into the database. If the given data is not correct, it should display a message telling the trace of the problem. If everything is correct, the system must save the case results publication.

UCRPMr2: System must show the pre-existing information on the update case results publication page so the user knows what he/she is changing and how it affects the case results publication.

UCRPMr3: System must ask the user he/she is sure to leave the create/update case results publication page without submitting the new changes if the user requires to change the page.

UCRPMr4: System must validate the user's role and his/her case results publications before showing the user's case results publications.

UCRPMr5: System must allow the user to search through his/her case results publications.

UCRPMr6: System must set the createdAt timestamp on publication creation and updatedAt timestamp every time the publication is updated.

4.8 Management of User Collaboration on a Case

4.8.1 Description and Priority

Users shall be able to initiate collaboration on a case at (i) individual and (ii) department/institutional levels. Users should be able to apply for collaboration with other users to work on the case, and to forward tasks, and the case to other users.

(i) Case Coordinators shall be able to collaborate on a case. Collaboration includes viewing the case documents and case progress, and case update/modification until the case is completed and the case results are published. The case documents should be able to be uploaded to and extracted from the system in different formats (including PDF, DOC – to name a few).

(ii) Case Coordinator invites another Case Coordinator to collaborate in a case by sending an invitation with a specific description.

(iii) The Case Coordinator invites another Department/Institution to collaborate on a case by sending an invitation with a specific description.

(iv) Once submitted by the Case Coordinator, a copy of the collaboration invitation should be sent to the Case Coordinator's next level authority for approval, to the Department/ Institution Coordinator or to Chief Case Coordinator, and upon approval, to the other Case Coordinator or Department/Institution that has been invited.

4.8.2 Stimulus/Response Sequences

Stimulus: The user initiates a collaboration by sending an invitation to another user or to a user and its department/institution.

Response: The system offers the option for a user to invite another user or department/institution to collaborate with. If the user has provided all required information, then the system sends a notification and an email to the user's next level authority for approval, the Department/Institution Coordinator or the Chief Case Coordinator.

Stimulus: The next level authority, the Department/Institution Coordinator or the Chief Case Coordinator, approves the request for collaboration submitted by the user.

Response: The system sends the invitation for collaboration to the other user or department/institution.

Stimulus: The invited user or department/institution accepts the invitation for collaboration.

Response: The system assigns all the users that collaborate on the case and updates the case access accordingly.

4.8.3 Functional Requirements

User Case Collaboration Requirements are represented uniquely with a UCCrx tag, where UCCr stands for User Case Collaboration Requirement and x represents the serial number.

UCCr1: System must validate the provided data in the collaboration invitation form for data type and completeness.

UCCr2: System must send the collaboration invitation when the user submits the collaboration invitation form.

UCCr3: System must show all invitations submitted by the user and their status.

UCCr4: System must allow the user to modify, view, and delete the invitation.

UCCr5: System must notify the user about the other part of the collaboration invitation approval process: about sending copies to the next level authorities for approval and then to the invited users, and about the estimated time of being notified on the collaboration approval.

UCCr6: System must send a reminder notification to the next level authority and to the invited users when the deadlines have reached.

UCCr7: System must send a notification to all collaborators when the collaboration has been established in the system and all users have been granted access to work on the case.

4.9 Collaboration Invitation Management

4.9.1 Description and Priority

User shall be able to find potential collaborators by requesting the system's assistance. The call for collaboration feature shall let the user select a department/institution and a Case Coordinator in the department/institution and choose to invite by selecting a timeslot that could be allocated for the specific collaboration.

4.9.2 Stimulus/Response Sequences

Stimulus: User browses for potential collaborators.

Response: The system assists user to find potential collaborators where it shows collaborators with the required area of expertise, department located in the required geographical location, collaborator's availability, etc.

Stimulus: User invites collaborators for collaboration.

Response: The system shows the Invitation for Collaboration page to the user. User provides all the information such as collaboration specific description, time slots that they find more suitable, etc.

4.9.3 Functional Requirements

User Invitation for Collaboration Requirements are represented uniquely with a UICrx tag, where UICr stands for User Invitation for Collaboration Requirement and x represents the serial number.

UICr1: System must assist the user when user is inviting for collaborators through offering list of users matching the required profile such as area of expertise, geographical location of the department/institution, availability for the suggested time slot, etc.

UICr2: System must validate the provided data for collaboration before storing it into the database and sending notifications to the collaborators that the user has decided to invite.

4.10 User Case Results Management

4.10.1 Description and Priority

Users should be able to manage their case results including dataset materials. This includes performing CRUD operations on their cases.

4.10.2 Stimulus/Response Sequences

Stimulus: The Case Coordinator creates a case result.

Response: The system redirects the Case Coordinator to the case result publication creation page through the case page. After the coordinator provides all the required information, the system saves the case results publication on the database. If there are any other registered coordinators currently working on the case, the system sends a notification and an email to notify the other coordinators about the case results publication that has been created. The system sends a notification and an email to the Department/Institution Coordinator to validate and approve case results publication.

Stimulus: The Case Coordinator modifies a case results publication.

Response: The system redirects the Case Coordinator to the case results publication update page. After the coordinator provides all the new updates and submits the changes, the system updates the case's results publication on the database. It also sets the update DateTime. The system sends an email to the other coordinators that are registered in the case and to the Department/Institution Coordinator.

Stimulus: Case Coordinator deletes a case results publication.

Response: The system asks the Case Coordinator if he/she is sure to continue with the deletion of the case results publication. If the user confirms, the case results publication's status gets updated to deleted and it doesn't get deleted from the database because of the history. The system sends a notification and an email to other coordinators assigned to work on the case and to the Department/Institution Coordinator.

Stimulus: Case Coordinator manages their case results.

Response: The system provides the ability for the user to import and export materials from the local device or other cloud-based devices.

Stimulus: Case Coordinator views or searches through his/her case results publications.

Response: The system shows the user case results publications of cases handled by the user and allows the user to search through them.

4.10.3 Functional Requirements

User Case Results Publication Management Requirements are represented uniquely with an UCRPMrx tag, where UCRPMr stands for User Case Results Publication Management Requirement and x represents the serial number.

UCRPMr1: System must validate the coordinator's role and his/her case results publications before showing the case results publications.

UCRPMr2: System must allow the coordinator to search through his/her case results publications in the institution.

UCRPMr3: System must validate the provided information for a case results publication before saving it into the database. If the given data is not correct, it should display a message telling the trace of the problem. If everything is correct, the system must save the publication.

UCRPMr4: System must show the pre-existing information on the update case results publication page so the coordinator knows what he/she is changing and how it affects the publication.

UCRPMr5: System must ask the coordinator if he/she is sure to leave the create/update case results publication page without submitting the new changes if the coordinator requires to change the page.

UCRPMr6: System must set the createdAt timestamp on case results publication creation and updatedAt timestamp every time the case results publication is updated.

UCRMMr7: System must offer options for import from the user's device or other cloud-based system devices.

4.11 User Statistics and Visual Management

4.11.1 Description and Priority

Users should be able to visualize and generate ad-hoc results. Users should be able to extract the visualization and result in different formats (including PDF, DOC, EXCEL, CSV, PNG, JPG – to name a few).

4.11.2 Stimulus/Response Sequences

Stimulus: Users visualize or generate ad-hoc results.

Response: The system provides the ability for the user to visualize and generate ad-hoc results. The results can be extracted in different templates and formats (PDF, DOC, EXCEL, CSV, PNG, JPG, etc.).

4.11.3 Functional Requirements

User Statistics and Visual Management Requirements are represented uniquely with a USVMrx tag, where USVMr stands for User Statistics and Visual Management Requirement and x represents the serial number.

USVMr1: System must offer case result visualization in different formats.

USVMr2: System must offer statistical results in specific templates (as requested from different stakeholders).

USVMr3: System must offer the ability to drag-and-drop the variables, establish correlation using a set of methods, and visualise in different formats.

USVMr4: System must offer ad-hoc result generation in different formats, such as PDF, DOC, EXCEL, CSV, PNG, JPG, etc.

4.12 User Browsing Catalogs

4.12.1 Description and Priority

Users shall be able to browse three types of catalogs. These include the people and institutions catalog, cases catalog, and case results publications catalog. Catalogs shall provide information about people/institutions, cases, and case results. Users should be able to view other user profiles, cases, and cases results from catalogs.

4.12.2 Stimulus/Response Sequences

Stimulus: Users browse catalogs.

Response: The system provides three types of catalogs: people/institution catalog, cases catalog, and case results catalog. All catalogs provide further information about people/institutions, cases, and case results which allows users to view all that information.

4.12.3 Functional Requirements

User Browsing Catalogs Requirements are represented uniquely with a UBCrx tag, where UBCr stands for User Browsing Catalogs Requirement and x represents the serial number.

UBCr1: System must offer three different catalogs for people/institutions, cases, and case results.

UBCr2: System provides access to cases catalog that is, ongoing cases, only to next level authority users, to Department/Institution Coordinator or Chief Case Coordinator.

UBCr3: System must offer all needed information for users to view on these catalogs.

4.13 Institution Registration feature

4.13.1 Description and Priority

Department/Institution authorities receive a profile when they are registered in CRMM. These users perform functions higher than Case Coordinators. Case coordinators should register to provide the required info in the registration form. All registration forms must go through the next level authorities, Department/Institution Coordinators or Chief Case Coordinator, so that they can be verified. Department/institutional coordinators can register the department/institution that they are part of, including its users and department units, where the next level authorities must verify both the users and the department units. All registered users have a profile with an overview of their personal information, case assignments, and case results.

4.13.2 Stimulus/Response Sequences

Stimulus: The Department/Institution Coordinator registers the department/institution.

Response: The system sends a notification and an email with the estimated time of institution verification by next level authority. If the department/institution gets verified successfully, a notification and an email will be sent with a short message that lets the Department/Institution Coordinator know that the institution has been registered in CRMM. If it is not completed successfully, the user gets a notification and an email with a rejection message.

Stimulus: Department/Institution Coordinator or Chief Case Coordinator verifies the lower-level department/institution under his/her jurisdiction.

Response: The system shows the registration form that was filled by the user. The Department/Institution Coordinator or Chief Case Coordinator verifies and validates the department/institution. If verified successfully, the system sends a notification and an email. If not verified, the system shows an option to send an automatic email with a rejection message.

Stimulus: The Department/Institution Coordinator registers users.

Response: The system sends an automatic notification and an email with the estimated time of the user's profile verification by the next level authority. If the user is verified, the institution coordinator gets a notification and an email that registration has been completed successfully. The user gets an email with a username and password and a short message that lets the user know that they are part of CRMM. If not verified, the system shows an option to send an automatic email with a rejection message.

4.13.3 Functional Requirements

Institution Registration Requirements are represented uniquely with a IRrx tag, where IRr stands for Institution Registration Requirement and x represents the serial number.

IRr1: The system must provide four different views where Chief Case Coordinators can create/read/update/delete users, including department/institutional user accounts.

IRr2: The system must provide four different views where Department/Institution Coordinators can create/read/update/delete users in the department/institution.

IRr3: The system must not allow submission of the registration form if the user has not filled in all required fields for the form that they are filling in (including self-registration form, institution form, user profile form).

IRr4: The system must send an email that requests user profile verification to next level authority, TAK or TAK PSD Chief Case Coordinator, when an institution submits a registration form.

IRr5: The system should send a reminder email to TAK or TAK PSD Chief Case Coordinator if the user profile has not been verified 48 hours after application for registration.

IRr6: The system must send a confirmation email containing the username and the temporary password whenever a user's profile, including an institutional user account profile, has been created/verified successfully.

IRr7: The system must send a rejection email whenever a user's profile has not been created/verified successfully.

IRr8: The system must allow users to log into their account by entering their email and password.

IRr9: The system must redirect users to change their password after they log in for the first time.

IRr10: The system must allow users to reset their password by clicking on "I forgot my password" and receiving a link to their verified email address.

4.14 Institution Staff Management

4.14.1 Description and Priority

Institution Authority (Department/Institution Coordinator) shall be able to manage their users' profile in the department/institution by creating, updating, deleting accounts related to the employees in the department/institution. The Department/Institution Coordinator shall be able to add staff assignments and collaboration with other Case Coordinators and departments/institutions. The staff collaboration can be entered by users and approved by the institutional coordinator.

4.14.2 Stimulus/Response Sequences

Stimulus: Department/Institution Coordinator manages user' profiles.

Response: The system allows Department/Institution Coordinator to manage users' profiles by verifying user account creation requests or by directly creating, updating, or deleting user accounts. It can also allow staff collaboration with other Case Coordinators and departments/institutions.

4.14.3 Functional Requirements

Institution Staff Management Requirements are represented uniquely with an ISMrx tag, where ISMr stands for Institution Staff Management Requirement and x represents the serial number.

ISMr1: The system allows institution authority (Department/Institution Coordinator) to verify users' profiles.

ISMr2: The system allows institution authority (Department/Institution Coordinator) to create/modify or delete users' profiles.

ISMr3: System must allow Department/Institution Coordinator to add staff collaboration with other Case Coordinators and departments/ institutions.

ISMr4: System must allow Case Coordinators to request collaboration and add other Case Coordinators and departments/ institutions to work on the case. The request is approved by the Department/Institution Coordinator.

4.15 Institution Case Management

4.15.1 Description and Priority

Institution management account, which can be Department/Institution Coordinator or Chief Case Coordinator, has higher access rights than a Case Coordinator. That is, institution management account has the right to access the cases of the institution as well as authority to assign cases to work on to users who are part of the institution.

4.15.2 Stimulus/Response Sequences

Stimulus: Institution management user creates a case.

Response: The system redirects the user to the case creation form. After the user provides all the required information, the system saves the case on the database. The system sends a notification and an email to notify coordinators that they are assigned to work on the case that has been created by the institution authority.

Stimulus: Institution management user modifies a case.

Response: The system redirects the user to the case update page. After the user provides all the new updates and submits the changes, the system updates the case's content on the database. It also sets the update DateTime. The system sends a notification and an email to the other coordinators that are registered to work on the case.

Stimulus: Institution management user deletes a case.

Response: The system asks the user if he/she is sure to continue with the deletion of the case. If the user confirms, case's status gets updated to deleted and it doesn't get deleted from the database because of the history.

Stimulus: Institution management user views cases at the institution.

Response: The system shows the user cases and allows the user to search through them.

4.15.3 Functional Requirements

Institution Case Management Requirements are represented uniquely with an ICMrx tag, where ICMr stands for Institution Case Management requirement and x represents the serial number.

ICMr1: System must validate the user's role and his/her cases before showing the user's cases.

ICMr2: System must allow the user to search through his/her cases.

ICMr3: System must validate the provided information for a case before saving it into the database. If the given data is not correct, it should display a message telling the trace of the problem. If everything is correct, the system must save the case.

ICMr4: System must show the pre-existing information on the update case page so the user knows what he/she is changing and how it affects the case.

ICMr5: System must ask the user if he/she is sure to leave the create/update case page without submitting the new changes if the user requires to change the page.

ICMr6: System must set the createdAt timestamp on case creation and updatedAt timestamp every time the case is updated.

4.16 Institution Case Results Publication Management

4.16.1 Description and Priority

The Institution management user, which can be Department/Institution Coordinator or Chief Case Coordinator, approves and manages all case results publications coming from case coordinators of the same institution. This includes performing CRUD operations on the cases.

The Institution management user can also be a case coordinator in any of the cases assigned to other case coordinators.

4.16.2 Stimulus/Response Sequences

Stimulus: The Institution management user views and searches through the case list of case results publications pending his/her approval.

Response: The system redirects the Institution management user to the case result publication list. The coordinator can search through the list and select the cases to view and approve.

Stimulus: The Institution management user approves the case results publication.

Response: The system updates the status of the case results publication to approved and sends a notification and an email to the Case Coordinator who sent the request for approval. If there were any other registered coordinators working on the case, the system sends a notification and an email to notify the other coordinators about the case results publication that has been approved.

4.16.3 Functional Requirements

Institution Case Results Publication Management Requirements are represented uniquely with an ICRPMrx tag, where ICRPMr stands for Institution Case Results Publication Management Requirement and x represents the serial number.

ICRPMr1: System must validate the provided information for a case results publication before saving it into the database. If the given data is not correct, it should display a message telling the trace of the problem. If everything is correct, the system must save the publication.

ICRPMr2: System must show the pre-existing information on the update case results publication page so the user knows what he/she is changing and how it affects the publication.

ICRPMr3: System must ask the user if he/she is sure to leave the create/update case results publication page without submitting the new changes if the user requires to change the page.

ICRPMr4: System must validate the user's role and his/her case results publications before showing the case results publications.

ICRPMr5: System must allow the user to search through his/her case results publications in the institution.

ICRPMr6: System must set the createdAt timestamp on case results publication creation and updatedAt timestamp every time the case results publication is updated.

4.17 Institution Collaboration Management

4.17.1 Description and Priority

The Institution management user, which can be Department/Institution Coordinator or Chief Case Coordinator, can approve or disapprove requests for collaborations that have been requested by case coordinators from other departments/institutions to connect case coordinators in his/her department/institution with coordinators who have requested collaboration.

4.17.2 Stimulus/Response Sequences

Stimulus: Institution management user approves/disapproves invitations for collaborations.

Response: The system allows the Institution management user to have access to all invitations for collaborations that were made to his/her institution's coordinators and to approve or disapprove them.

4.17.3 Functional Requirements

Institution Collaborations Management Requirements are represented uniquely with an ICMrx tag, where ICMr stands for Institution Collaborations Management Requirement and x represents the serial number.

ICMr1: System must provide Institution management user with access to the institution's coordinators profiles.

ICMr2: System must provide Institution management user with access to the invitation for collaborations that were made to the institution's case coordinators.

ICMr3 System must allow the Institution management user to approve or disapprove all invitations for collaboration that were made.

4.18 Institution Financial Case Management

4.18.1 Description and Priority

The Institution management user, which can be Department/Institution Coordinator or Chief Case Coordinator, has direct access to the institution's financial data related to case processing. It is the task of the case coordinators assigned to the cases to enter this data, update or delete it. When the case coordinator provides the financial data to the system, an automatic notification and an email is sent to Institution management user to verify the budget and implementation of further administrative collection procedures. The Institution management user has to approve generation of financial reports on financial data related to case proceedings.

4.18.2 Stimulus/Response Sequences

Stimulus: Case coordinator registers the case financial data related to a case.

Response: The system verifies if the case coordinator has provided all required information to register the case's financial outcome.

Stimulus: Case coordinator updates/deletes the case's financial data.

Response: The system allows the case coordinator to make changes or delete the case's financial data. An automatic email is sent to the Institution management user every time a change is submitted to the budget page.

Stimulus: Institution management user reviews financial data and approves publication of financial reports related to case proceedings.

Response: The system allows the Institution management user to view, approve or disapprove publication of financial data and reports related to case processed in the institution.

4.18.3 Functional Requirements

Institution Finance Management Requirements are represented uniquely with an IFMrx tag, where IFMr stands for Institution Finance Management Requirement and x represents the serial number.

IFMr1: System must send an automatic notification and an email to Institution management user every time there is a new or an update of case financial data.

IFMr2: The system allows Institution management user to view, approve or disapprove publication of case financial data and reports.

4.19 Institution Case Result Management

4.19.1 Description and Priority

The Institution management user, which can be Department/Institution Coordinator or Chief Case Coordinator, can manage the case results of its institution coordinators including dataset materials. The system shall provide the ability for the case coordinator to import and export materials either from the case coordinator's local device or other cloud-based system services.

4.19.2 Stimulus/Response Sequences

Stimulus: The Institution management user manages the institution's coordinators' case results publication.

Response: The system provides the ability for the users to import and export materials from the local device or other cloud-based devices.

4.19.3 Functional Requirements

Institution Case Result Management Requirements are represented uniquely with an ICRMMrx tag, where ICRMMr stands for Institution Case Result Management Requirement and x represents the serial number.

ICRMMx1: System must offer options of import/export from the user's device or other cloud-based system devices.

4.20 Institution Statistics and Visual Management

4.20.1 Description and Priority

Institution management user, which can be Department/Institution Coordinator or Chief Case Coordinator, should be able to visualize and generate results based on their templates. Institution management user should be able to generate ad-hoc reports by combining variables that will be open for everyone. The Institution management user should be able to extract the visualization and results in different formats (including PDF, DOC, EXCEL, CSV, PNG, JPG – to name a few).

4.20.2 Stimulus/Response Sequences

Stimulus: Institution management user visualize or generate ad-hoc results.

Response: The system provides the ability for the Institution management user to visualize and generate ad-hoc results. The results can be extracted in different formats (PDF, DOC, EXCEL, CSV, PNG, JPG, etc.).

4.20.3 Functional Requirements

Institution Statistics and Visual Management Requirements are represented uniquely with an ISVMrx tag, where ISVMr stands for Institution Statistics and Visual Management Requirement and x represents the serial number.

ISVMr1: System must offer result visualization in different formats.

ISVMr2: System must offer statistical results with different variables (different templates).

ISVMr3: System must offer ad-hoc result generation in different formats, such as PDF, DOC, EXCEL, CSV, PNG, JPG, etc.

ISVM4: System must offer access to everyone to the published results and data that are open to the public.

4.21 Institution Browsing Catalogs

4.21.1 Description and Priority

Institution management user, which can be Department/Institution Coordinator or Chief Case Coordinator, shall be able to browse four types of catalogs: people and institutions catalog, cases catalog, case results publications catalog, and financial catalog. Catalogs shall provide information about people/institutions, cases, and case results, and financial data related to case proceedings. Institution management user should be able to view other coordinators' profiles, cases, case results publications, and financial data from catalogs.

4.21.2 Stimulus/Response Sequences

Stimulus: Institution management user browses catalogs.

Response: The system provides four types of catalogs: people/institutions catalog, case catalog, case results publication catalog, and financial catalogs. All catalogs provide further information about people/institutions, cases, case results publications, and finances which allows the Institution management user to view all that information.

4.21.3 Functional Requirements

Institution Browsing Catalogs Requirements are represented uniquely with an IBCrx tag, where IBCr stands for Institution Browsing Catalogs Requirement and X represents the serial number.

IBCr1: System must offer four different catalogs for people/institutions, cases, case results, and financials.

IBCr2: System must offer all needed information for Institution management user to view on those catalogs.

4.22 CRMM People Management

4.22.1 Description and Priority

TAK and TAK PSD Chief Case Coordinator is the owner of CRMM, so it has high-level access to all the information in the system, except the personal information and credentials of registered users including Institution management users such as Department/Institution Case Coordinators. TAK and TAK PSD Chief Case Coordinator has the right to require a password reset for all users at certain times to provide a safer operating environment. TAK and TAK PSD Chief Case Coordinator can add, modify or delete user profiles. Institution management users such as Department/Institution Case Coordinators can add, modify or delete user profiles.

4.22.2 Stimulus/Response Sequences

Stimulus: TAK or TAK PSD Chief Case Coordinator creates/modifies or deletes a user profile.

Response: The system provides the TAK or TAK PSD Chief Case Coordinator the ability to add, modify or delete user profiles. When creating a new user profile, the system validates the provided data if it is correct. If the given data is correct, an email is sent to the user's email including all the information and a brief description about the system and how to use it. When the TAK and TAK PSD Chief Case Coordinator finishes modifying a user's profile, the system sends an automatic notification and an email with the changed fields of the user's profile. If the TAK and TAK PSD Chief Case Coordinator deletes a user profile, the user will receive an email with the reason for account deletion.

Stimulus: Institution management user creates/modifies or deletes a user profile.

Response: The system provides the Institution management user the ability to add, modify or delete user profiles. When creating a new user profile, the system validates the provided data if it is correct. If the given data is correct, an email is sent to the user's email including all the information and a brief description about the system and how to use it. When the Institution management user finishes modifying a user's profile, the system sends an automatic notification and an email with the changed fields of the user's profile. If the Institution management user deletes a user profile, the user will receive an email with the reason for account deletion.

4.22.3 Functional Requirements

CRMM People Management Requirements are represented uniquely with a TPMrx tag, where TPMX stands for CRMM People Management Requirement and x represents the serial number.

TPMr1: System must validate data before any changes have been made to users' profiles.

TPMr2: System must send a notification and an email that redirects the user to reset the password page when the Chief Case Coordinator/ Institution management user finishes setting up the user's profile.

4.23 Generation of reports

4.23.1 Description

Generation of results is a very important module within CRMM, and all actors of this system have their appropriate variables that are both feasible to collect, and that can provide the relevant indicators for management.

Since the application will communicate with:

- TAK – EDI, and
- And other public institutions / Ministries, as necessary.

- initially, from CRMM there will be generated standard reports for each of the actors, such as:

- Number of incoming cases reported in the system, disaggregated by time period (date/months), case type, department/institution or region, etc.
- Number of Case Coordinators in department/institution disaggregated by their specialty, e.g. personal tax income, corporate field assessment, auditing, SME guidance etc. (the staff specialty types will be defined jointly by the economic operator and TAK).
- Number of ongoing cases, disaggregated by date/months, case type, department/institution or region, financial outcomes etc.
- Number of completed cases, disaggregated by date/months, case type, department/institution or region, financial outcomes etc.
- Number of case assignments by Case Coordinator - case load, disaggregated by case type, time to completion, financial outcomes, etc.

The reports can be public or internal. Most reports will be both, however, the public version will be anonymized as to not include business or person identifiable data.

Other reports may be defined jointly by the economic operator and TAK and will be developed during the project implementation.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The system must be interactive and the delays that might happen must be low. In every action-response process, there are no immediate delays. In the case of submitting forms, uploading files, and saving settings there delays should be lower than 2 seconds. In the case of searching for information, the operation should be performed in less than 2 seconds, including searching, sorting, and computing information. When the user accesses the system on the browser the system should be opened in less than 1 second.

5.2 Security Requirements

The system must provide high data security. Two-Factor Authentication must be used when users log in and their passwords must be stored encrypted. Once a year, users will be redirected to generate a new OAuth for their account to continue using the system. Users should be managed according to their roles, where users who are not authorized to run specific functions, these functions should not be displayed. A network where CRMM will operate should be secure and the whole system including the database should be defended from external attacks. To be a platform that provides secure and accurate data, the system needs to have implemented the validation and sanitization of data before storing them into the database. The institutional users could access the CRMM system only from their respective institutions' domains.

5.3 Software Quality Attributes

Additional system's quality characteristics that are important to the users and developers are:

Functional suitability:

- Represents the degree to which CRMM provides functions that meet stated and implied needs when used under specified conditions. It is composed of sub-characteristics that are important for the quality of the platform such as functional completeness, correctness, and appropriateness.

Reliability attribute:

- Represents the availability and recoverability of the system. CRMM is a system that should not crash or go down, but even when it does it should have a quick recovery. Availability is the ratio of the available system time to the total working time or uptime. CRMM availability ratio should be high and the downtime should be as low as possible.

Performance efficiency:

- CRMM must offer efficient performance by using resources rationally and having a large capacity for processing information. Delays in CRMM should be as rare as possible.

Usability and utility:

- These attributes guarantee the success of CRMM because if a platform does not have high usability, high utilization, and is not easy to learn then using the platform will not be easy and correct and people will leave. For CRMM to fulfill the utility attribute, it must provide the features that users need, and to fulfill the usability attribute its functions must be easy and pleasant to use.

6. Requirements for project management

6.1 Implementation requirements

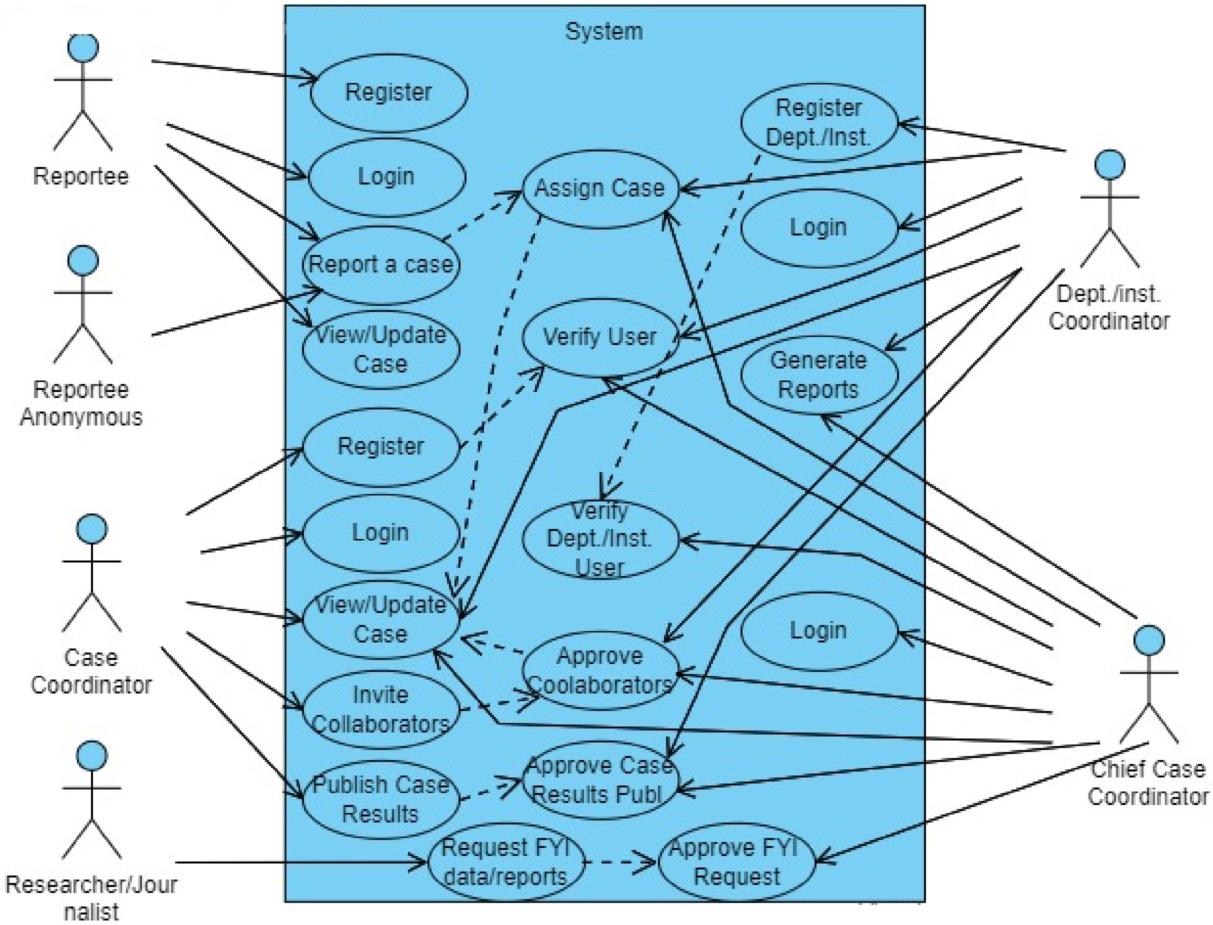
The CRMM software development project should be implemented only according to the requirements in this document. The document has passed the validation phase by being approved by the working group established by project sponsors KEGA, TAK and TAK PSD. The document will be used to verify the final CRMM system implementation, before the economic operator hands over the CRMM system to TAK and TAK PSD. Any deviation from the requirements in this document should be done only with the written approval from the project sponsor. The economic operator must also provide the dynamic plan for realization of the complete project as well as other specified documentation in tender dossier.

6.2 Admission conditions

The CRMM system will be considered accepted only after the successful completion of all test scenarios as an additional activity to V Model software testing that will be performed after each stage of the system development lifecycle. Each test will be recorded in the protocol book associated with the test case and the results achieved. The protocol book will be signed by the project manager.

7. Appendix A: UML Diagrams

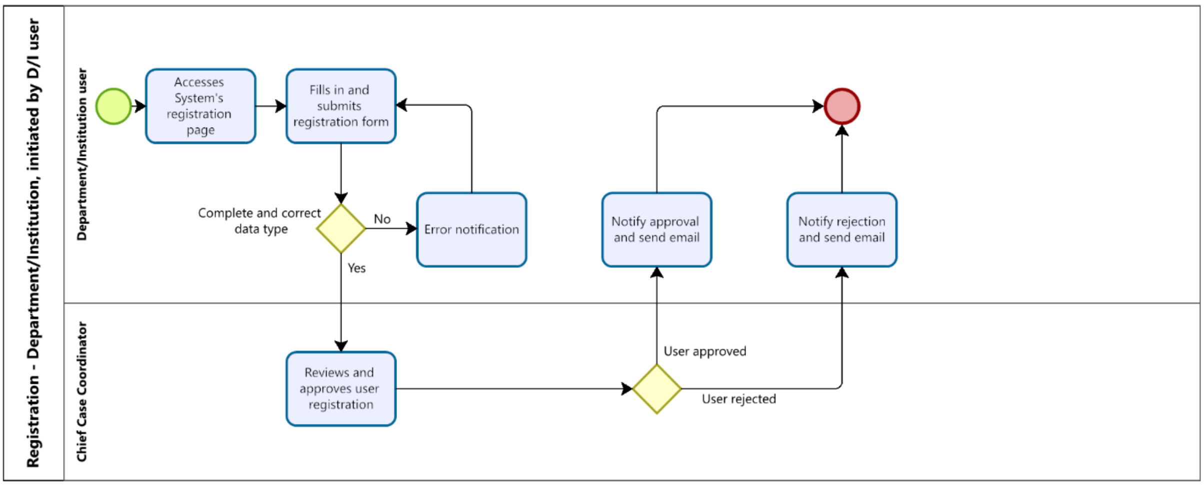
7.1 Use Case Diagram

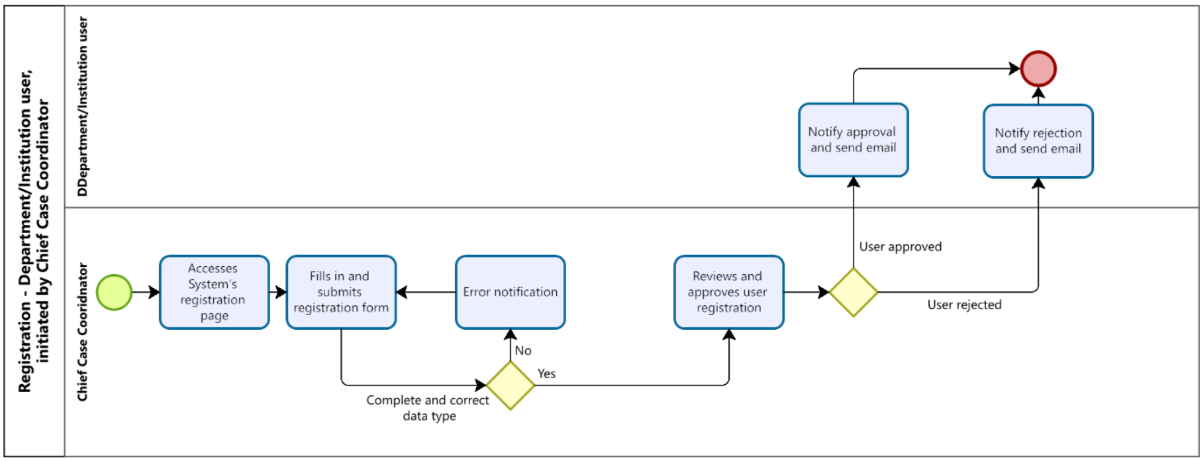


7.2 Swimlane Diagrams

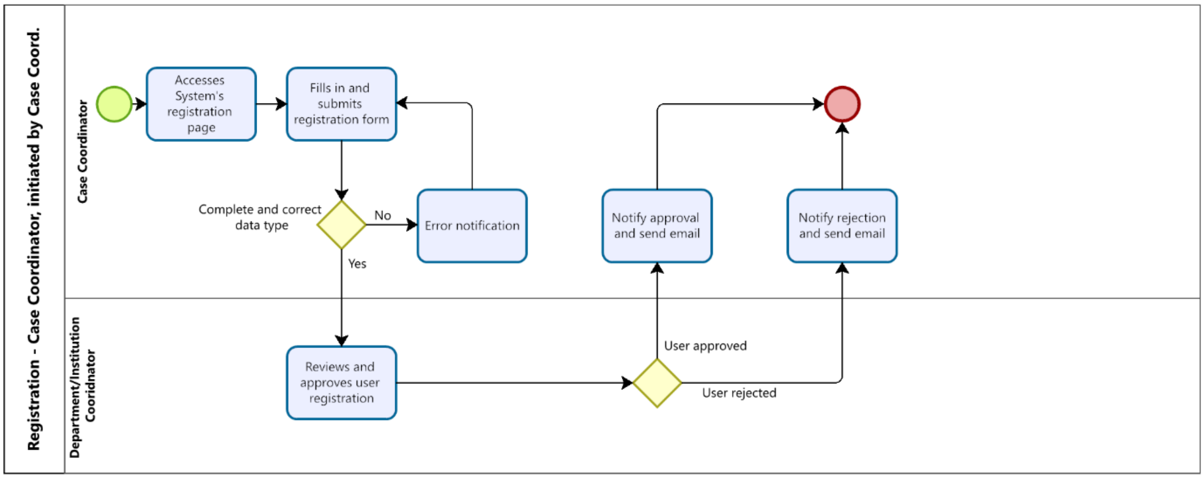
The economic operator will develop and update detailed swimlane diagrams in coordination with ATK and project sponsor, including developing additional use case scenarios and diagrams. Following are several simplified swimlane diagrams:

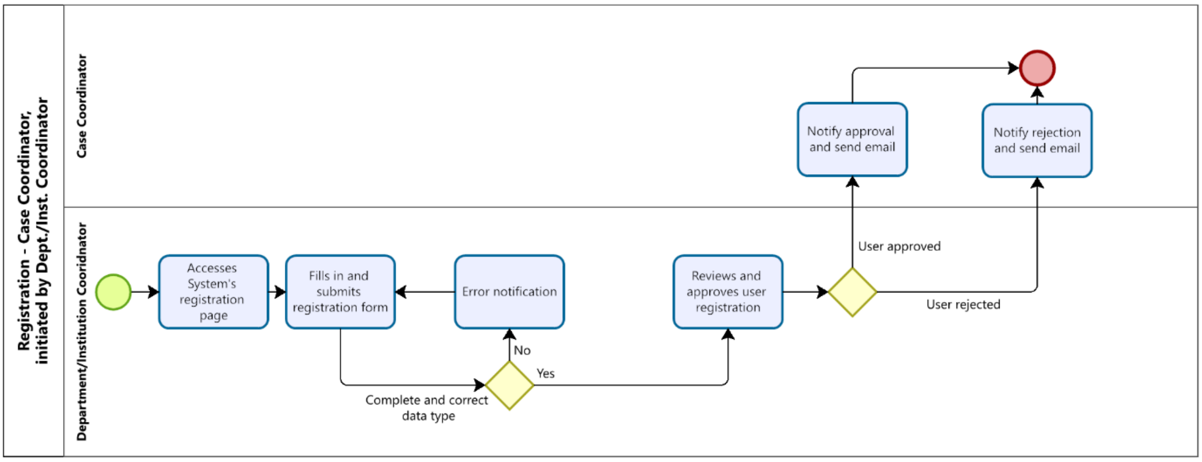
7.2.1 Registration of Department/Institution (admin) users



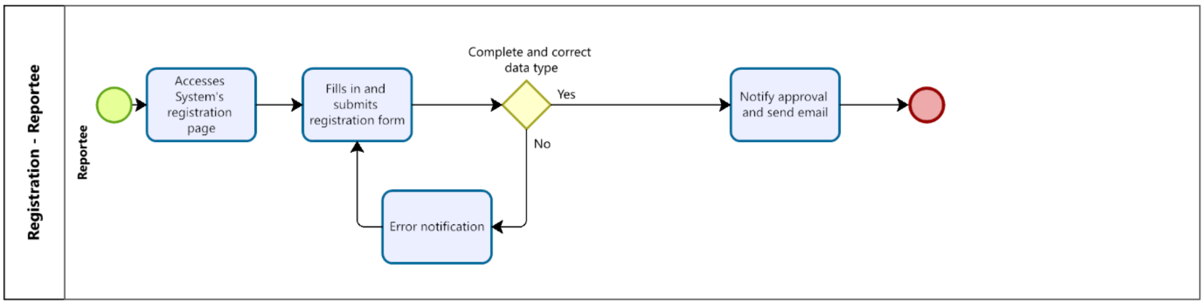


7.2.2 Registration of Case Coordinator users

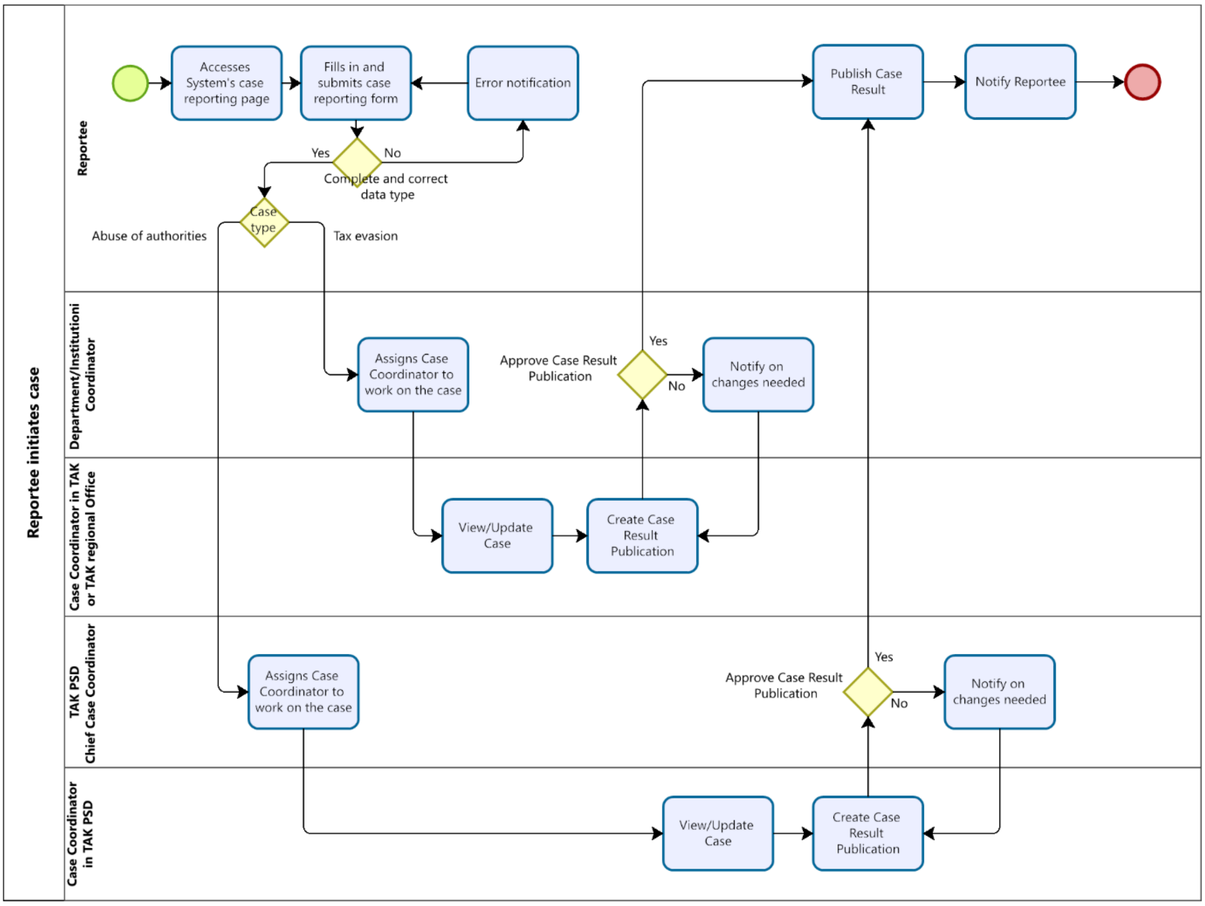




7.2.3 Registration of Reportee users



7.2.4 Initiating case: Reportee reports Fiscal evasion or Abuse of authorities



8. Appendix B: User Interfaces

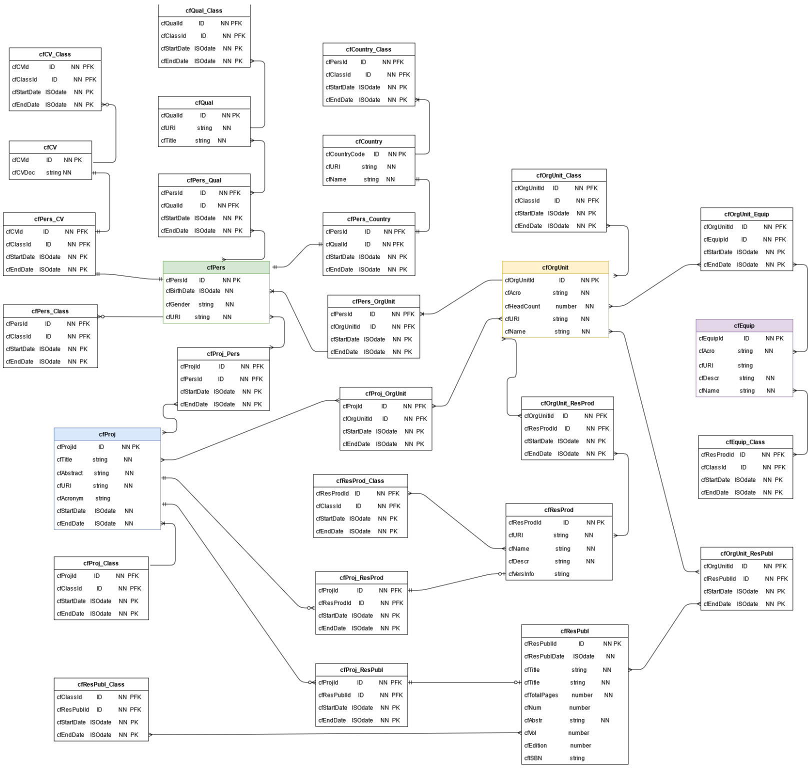
User interface, dashboard views, data entry forms etc. are to be developed by the economic operator during the implementation phase, in coordination with project sponsor and adhering to the existing branding elements used by TAK. (see https://www.atk-ks.org/).

9. Appendix C: CRMM – EDI metadata

9.1 Class Diagram

The EDI metadata is not a public document. It will be made available to the economic operator under nondisclosure terms set forth in the contract. The detailed version of CRMM metadata and class diagram will be developed by the economic operator during the implementation of the project.

Example:



9.2 CRMM main entities for data entry

9.2.1 Reportee - Person

PersonName	M (mandatory)
FamilyName	M
OtherNames	O
ReporteeID	M
PersonalNumberID	M
ElectronicAddress	M
Affiliation	O (optional)
Address	M
City	M

*Afiliation can be the Reportee's company or department/institution he/she works at.

9.2.2 Department/Institution – OrgUnit

Internal Identifier
Type
Name
Identifier
ElectronicAddress

PartOf
Region

9.2.3 Case

Internal Identifier
Type
Title
Identifier
StartDate
EndDate
ReporteeID
ChiefCaseCooridnatorID
CaseCoordinatorID1
Team (CaseCoordinatorID1, CaseCoordinatorID2, CaseCoordinatorID3, …)
Type (e.g.: fiscal evasion, abuse of authorities, …)
Subject
Keyword
Status
ActivityX, ActivityXDate
Result (e.g.: accepted, assigned, in the process, completed, etc.)
FinancialSum
PublicationStatus

9.2.4 Case Results Publication

Internal Identifier
Type
Title
Summary
Status
Result
EntityReported (taxpayerID, org-unitID, employeeID)
FinancialSum
OriginatesFrom (CaseCoordinatorID)
EvaluatedBy (ChiefCaseCoordinatorID)
PublicationDate
RevisionDate
RevisionSummary
RevisedBy (CoordinatorID)
RevisionApprovedBy (ChiefCaseCoordinatorID)