

**TERMS OF REFERENCE**

**FOR**

**DESIGN, DEVELOPMENT AND IMPLEMENTATION OF AN ONLINE MARKET**

# **INTRODUCTION**

The Common Market for Eastern and Southern Africa (COMESA) is a Regional Economic Community comprising 21 member states and its Secretariat is hosted by the Government of the Republic of Zambia in Lusaka, Zambia. COMESA was founded in 1994 as a successor to the Preferential Trade Area (PTA). COMESA's objectives include sustainable economic development through economic and social regional integration. The current 21 member states of COMESA namely are: Burundi, Comoros, the Democratic Republic of Congo (DRC), Djibouti, Egypt, Eritrea, Kingdom of Eswatini, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Somalia, Sudan, Tunisia, Uganda, Zambia, and Zimbabwe. Through its regional integration agenda one of COMESA’s main focus is on the establishment of a large economic and trading block that will facilitate intra-COMESA trade and enhance economic development in order to improve the livelihoods of its citizens.

# **OBJECTIVES**

The COMESA Secretariat intends to develop an online platform to facilitate regional electronic trade for its 21 Member States. The system will be a fully-fledged e-business solution in the COMESA region and beyond. The system is intended to bring over 580 million people to a new virtual market to help residents of COMESA Member States and the rest of the world to buy, sell, market, insure, deliver and receive products and services, wherever they are, in real time at a lower cost and to contribute to poverty reduction. The online market is also expected to take advantage of the COMESA Trade Facilitation instruments developed to ease doing business in the region.

# **THE PURPOSE OF THE ASSIGNMENT**

The purpose of the consultancy is to design, develop and implement a new virtual market to help residents of COMESA Member States and the rest of the world to buy, sell, insure, deliver and receive products and services, wherever they are, in real time duty free quota free within COMESA member states to contribute to poverty reduction.

The system will be designed to facilitate the following;

1. Traders including SMEs and customer linkages
2. B2C business model
3. Ability to submit one Request for Quotation and receive multiple quotations from different vendors
4. Customer loyalty programmes management
5. Anti-counterfeit campaigns and buyer protection
6. e Payment gateway and e payment channels integration
7. Transport and other shipping logistics management
8. Interfacing of similar official sites for member states to the main COMESA online market
9. Statistical and reporting Module with data analytical tool

The following are key modules and functions: Business Directory, Orders fulfilment, Transport, Tracking, One Request-Multiple Quotations, Customer profiling, Stock management, Security Module, e payment gateway and e-Payments channels,data analytical tool.

# **SPECIFIC TASKS**

The firm will primarily be responsible for design & development of the online marketplace, installation, testing, preparation of online user manual and training of COMESA staff on how to maintain the online portal which will be hosted by COMESA Secretariat. The firm will work with COMESA staff members to ensure implementation, efficient performance and delivery of the expected results. The detailed scopes of the work are specified in below.

## USER REQUIREMENT ASSESSMENT

The requirement provided as part of this TOR are very generic requirements. The firm, as part of project deliverable shall study comprehensive assessments and come out with detailed requirement in the form of Software Requirement Specification (SRS) for an online marketplace.

## SYSTEM ANALYSIS AND DESIGN

### THE BASELINE ARCHITECTURE

The architecture must stand the test of time as the user base grows and customer requirements change or increase. A baseline architecture must be developed and maintained for the system, so that further extensions and enhancements can be performed without reconstructing the architecture. Modularity and pluggability are two key aspects for a future-proof baseline architecture. A pluggable architecture allows development and integration of new modules as required in the future. In order to avail the pluggable architecture, development of new modules according to the plugin system guideline will be required. Turning on/off any module must not affect anything else in the system. Key artifacts and building blocks must be identified so that they could be re/used to design the system. Must be developed following micro services architecture.

### FUNCTIONAL REQUIREMENTS

The proposed system is expected to have the following functions (Minimum but not limited to)

#### REQUIRED FUNCTIONAL FEATURES

The online marketplace is a real-time system which is potentially going to be used by millions of people in the COMESA region. It must demonstrate highest degree of resiliency, consistency and reliability, the architectural aspects of it is critical to the success of the overall endeavor. The System architecture, Infrastructure architecture, Security architecture and User Interface architecture must be included with the proposal. Some of the expectations on features, capabilities and general web layouts for the system are listed below and are not limited to:

1. Enable Traders including SMEs and customer linkages in the form of a business directory
2. B2C business model
3. Ability to submit one Request for Quotation and receive multiple quotations from different vendors with similar products.
4. Customer loyalty programmes management
5. Anti-counterfeit campaigns and buyer protection
6. E-Payment gateway and e payment channels integration
7. Transport and other shipping logistics management. Users should be able to track their online purchases virtually
8. Interfacing of similar official sites for member states to the main COMESA online market
9. The platform should have a statistical reporting anddata analytical Modules
10. The system should have a robust and inclusive content management system (CMS);
11. The system should provide discussion forums where buyers and sellers can interact with one another;
12. The system should take into account future scalability needs in place to accommodate any future requirements as far as possible;
13. The system should have embedded links that point to various social media such as Facebook, Twitter, YouTube etc.;
14. The system should have support for English, French and Arabic;
15. The system should have Search Engine optimization and ability to work well with search engines;

#### SECURITY ARCHITECTURE AND PRIVACY REQUIREMENTS

Security is of utmost importance in this project since users are logging into the portal to use the system. The authentication and authorization of the system need to be robust enough ensure highest level of security. The system prevents all standard web vulnerabilities and provides industry standard security measurements. With a very strong enterprise system’s regular security audit and careful implementation of various measures least but not limited to the following must be taken to prevent any kind of security breach:

##### 4.2.2.3 APPLICATION SECURITY

1. User’s system-based authentication should be implemented based on the requirements;
2. The system should be completely secure and guaranteed with incorporation of industry standard proven data encryption techniques and methodologies. Those encryption techniques should be audited in timely manner to detect gaps and updated with the latest patches, to ensure that the mechanisms are fitted with the latest security features;
3. User sessions and cookies should be uniquely re-generated and stored securely each time they log in;
4. URL restriction should be tight. The system should recognize a logged in user with proper rights and only present the part of the system that falls within his/her authorization scope. Furthermore, trying to access a URL by guessing should also be prohibited;
5. Configuration and other sensitive system-level artifacts should be securely stored;
6. The access control security function shall provide a facility for the system administrator to suspend an existing user’s access rights for a specified period or indefinitely.

##### 4.2.2.4 USER INTERFACE SECURITY

1. The system should work as “Single Sign On” approach. This means that a user must login only once to navigate into the entire applications architecture;
2. No system level file/information should be accessible throughout the web browser. The system should never allow executing direct files;
3. In case of any system failure or error condition, no sensitive information (eg: database credential) should be displayed on the site. All kinds of errors should be suppressed, logged, gracefully handled and should only be accessible by the administrators with proper rights;
4. SQL/XML/Code injection, Session hijacking/fixation, Output Escaping, Cross-Site Request Forgery, Cross-Site Scripting, Enforced Same Origin Policy, Parameter Tampering, Directory Traversal, Denial of Service etc. should be prevented, logged, and reported.

##### DATA SECURITY

1. No personally identifiable information may be exposed within and outside the system without proper authorization as privacy of the user data must be dealt with utmost priority;
2. Any attempt to breach the security will be recorded with all the relevant data;
3. If the system is accessed in the time not defined by the Administrator, eg. in the case of production deployment, all options will be locked and the user will not be able to use the system;

* Reports can be retrieved for all audit logs.

##### 4.2.2.5 NETWORK SECURITY

1. The system must communicate using Transport Layer Security (TLS) and Secure Socket Layer (SSL) certification;
2. Public-key encryption methods are used as part of SSL encryption and are expected to be part of the System.

#### ONLINE MARKET REQUIREMENTS

1. The platform should be developed in such a way that it requires low bandwidth;
2. The web enabled solution should support any operating system cross browser platforms (popular web-browsers such Mozilla Firefox, Opera, Chrome, Internet Explorer, etc.);
3. Should have ability to seamlessly integrate with future modules;
4. User friendly interface.
5. Availability of a user-friendly App

#### REPORT AND ANALYTICAL FUNCTION

1. A full suite of standard reports should be provided. firm should provide a comprehensive list of all relevant reports will be available in the system. All standard reports should be parameter driven and provide for range of data selection, grouping, aggregation, and sorting;
2. Access to a data analytic tool
3. This part should provide provisions for the system admin to generate different kinds of required analytics reports in tabular and graphical format for prompt decision making and performance improvement.

### NON-FUNCTIONAL REQUIREMENTS

#### SCALABILITY

Both horizontal scaling (scale out) and vertical scaling (scale up) should be possible so that in different situations the most logical steps can be taken. The system must provide with appropriate caching mechanism to handle very high traffic scalability and must be optimized to deliver content to the end-user within a short response time.

#### PERFORMANCE AND LOAD TESTING

* The system must support a million of concurrent users;
* Under ideal internet condition, the homepage must be loaded under two seconds, and any page/screen must be fully loaded within two seconds and any report must be generated in less than five seconds;
* A distributed database cluster must be designed such that the backend remains always available, horizontally scalable and fault-tolerant;
* The firm must conduct a load testing taking above factors into consideration and submit a load testing results;
* The database architecture should be such that the system is available to users 24 x 7 x 365 days a year without any unapproved down-time;
* The system should have a very high availability rate. There should be real-time monitoring of server health and in case of any trouble, backup servers should be available to continue providing services as needed;
* Round robin DNS or Load Balancer may be used to maximize response time from the servers;
* The proposed solution should be highly scalable to accommodate current and future requirements within the scope of the current program.

#### DATA BACKUP AND DISASTER RECOVERY

* Both full and incremental backup should be taken automatically;
* Data and the Operating system core component will be separated. A ghost image of the Operating system will always be available in case of rebuilding the server. All data can be restored in the data drive once the Operating System is restored;
* Off-site backup should be taken using tape or External Hard drive;
* System must check for the media and generate a report on backup with date time and details of backup;
* If a restoration fails for any reason, the system should prompt with proper error messages and suggest what has to be done to rectify the situation via on-screen, logs, email and text messages;
* System should maintain an automated recovery system and all versions of backup will be maintained. At any given point in time, the versions and incremental backup details can be retrieved from the system.

#### SYSTEM AUDIT

The system shall maintain an audit trail of any changes or updates made in any information that are considered vital and if made should maintain the audit log with information such as:

* Log the users who are accessing the system
* Audit trails of all login, logouts, errors (including form validation errors), warnings, actions and system-decisions;
* System start and restart procedures;
* Log the fields that are being modified;
* Log the results of these modifications;
* Log attempted breaches of access;
* Ability to generate system audit reports;
* Ensure an audit trail is kept for all transactions and all audit transactions logged are kept on the database.

#### USER INTERFACE (UI)

* Well-established, supported and lightweight UI framework must be used to design the user interface so that it follows widely used industry flow patterns;
* The system must not require client-side browser plug-ins (such as flash);
* User interface should be easily configurable if the changes are needed
* User interface can contain some user preference in cookies or local store. However, no critical information should be kept in the user device;
* Menu, content and navigation should be based on the user entitlements, roles and permissions.

#### LANGUAGE SUPPORT

The system interface will be in English, French and Arabic. The system should capture French, Arabic and English character fields so that the reporting could be generated in all languages. For instance, the system should have the provision to enter name in both French, Arabic and English.

#### CODING CONVENTION

Widely used industry best practices, coding styles, design patterns, DRY, SOLID, YAGNI, solution structures and organization, configuration management must be used. All possible automation must be incorporated. Well reputed framework/library must be reused as much as possible, and re-inventing the wheel be avoided.

## SOFTWARE DEVELOPMENT AND IMPLEMENTATION

### DEVELOPMENT

The hired firm will be required to perform and complete the tasks identified below within the timeline specified in the Schedule section

* Develop and implement an action plan for the needs assessment, design, development, implementation and testing of system;
* Design and develop the online marketplace using open source technologies for hosting, managing and provision of products manufactured and supplied in the COMESA region
* Design and develop donor / fund / investor user interface and supporting statistical database and analytics components;
* Develop a user guide for the system, complete with the most common troubleshooting guidelines;
* Develop and implement Search Engines Optimization strategies to increase system visibility;
* Design and develop the statistical web database;
* Implement tracking software to produce user defined site log reports to help the system admin better understand and measure system visitor behavior and improve system performance and availability;
* Observe timelines and benchmarks for the system, track and evaluate their usability and performance;
* Provide constant system monitoring to ensure that the system is live and functioning;
* Monitor online processes & procedures, e.g. content generation, publishing etc. and provide suggestions for improvement;
* Make recommendations on the system enhancement and improvement of their functionality based on the gathered data from monitoring reports and its analysis.
* Perform other related duties as assigned.
  + 1. PROJECT MANAGEMENT APPROACH

Completing the project within specified time line maintaining expected quality to provide the expected deliverables, project management approach is very vital. The interested firm must describe about their project management approach in their proposal. This must include the major milestones, approaches and dependencies.

* + 1. SYSTEM DEVELOPMENT METHODOLOGY

The firm must provide detailed information about the development and implementation methodology application in terms of Standard Software Development Life Cycle (SDLC) in their proposal. The firm must describe each phase, steps and activities in their proposed methodology with deliverables. The major phases and components of the proposed methodology may include:

* System Requirement Study, SRS documentation review and discussion
* System Design, documentation review and discussion;
* System prototype demonstration (during system development);
* System installation, integration, configuration, customization, and testing;
* System user training and Implementation Support team;
* User testing/Operational acceptance testing/Go LIVE; and
* System warranty and maintenance support services
  + 1. TESTING

The firm shall conduct acceptance testing and stress testing with the designated countries users and appropriately designed use test cases where any problems encountered shall be resolved. The testing will include the following tests: system integration, usability, functional, user acceptance, load, recovery, and security tests.

The firm will submit the UAT plan in their proposal. After developing the system, the user must conduct an extensive UAT and should provide a feedback report. The firm must put up latest deployment to previously appointed locations well ahead of the release. stakeholder must approve the release by signing off after the system has been used and tested rigorously.

## TRAINING AND DOCUMENTATION

The firm will develop electronic and hardcopy documentation for all aspects of the system developed and provide appropriate training to manage the platform with the complete training manual for the client staffs. This will include on-the-job support and handholding (including in-person, telephone and on-line support), as well as formal courses at regular intervals throughout this assignment.

## SUPPORT AND MAINTENANCE

The firm should provide a period of one (1) year warranty and maintenance support. During the warranty period firm, must assign a focal point who will be responsible for coordination of all support and maintenance related issues. Some of the activities are:

* Support the COMESA IT staff in administering and maintaining the system;
* Support the implementation, regular updates and maintenance of the system;
* Solve/troubleshoot system functions as required;

A proposal for Service Level Agreement (SLA) draft should be provided by frim. Firm should provide their detailed maintenance and support plan in their technical proposal. This proposal may include the followings

* Methodology of Maintenance and support plan
* Resources to be used including HR
* Support team structure and capacity
* Activity and response Tier approach of support
* SLA format
* Dependencies
* Schedule for support
* Standards to be maintained for support

## HANDOVER

* The firm will do a proper handover of the COMESA online market to the COMESA staff before the end of the contract.

The firm will submit to COMESA a narrative final report with the description of the activities delivered.

# **EXPECTED DELIVERABLES AND KEY TIMELINES**

## 5.1. DELIVERABLE

The hired firm must provide detail project deliverables plan in their proposal describe the category, phases, deliverables title and description, dependencies etc. The key deliverable may include the following:

### PROJECT INCEPTION REPORT

Provides, at a minimum, firm’s overall plan for completing the project, describes the methodologies in which the firm’s team will work; provides a timeline for project execution including dates, resources, and dependencies; provides a plan for communications/issue resolution, and agreed technical requirements.

### SYSTEM REQUIREMENT SPECIFICATION (SRS)

Provides a detailed description of business processes and functionalities of the systems in line with the broad scope outlined in a consolidated document. The document should also include process/data flow diagram of the proposed system.

### SYSTEM DESIGN DOCUMENT (SDD)

Provides a detailed description of the underlying system architecture of the proposed systems including table structure, data dictionary, entity relationship diagram (ERD), object model etc.

### COMPLETE SOURCE CODE

Provides a complete source code and file of the application software and any other related modified application software. The source code should be provided with detail code documentation.

### OPERATIONAL & ACCEPTANCE TEST PLAN

Provides a narrative of the approach that will be used to obtain user acceptance of the developed systems as well as test scripts that will be used to verify application operation.

### TECHNICAL DOCUMENTATION

Provides a description of the system architecture, module integration points, work flow engine, data dictionary, user manual etc. And any other technical material the technical team will need to understand and support the system in a longer run.

### TRAINING

The firm is required to provide the necessary training to the client staff on the management and administration of the system. This is to provide an understanding of the system, its database and infrastructure configurations used during the implementation of the system.

### TRAINING MATERIAL

Copies (and electronic) of handouts, manuals, power point slides and any other materials used prior to conducting training to staffs at various levels. All the documentation deliverables must comply the following:

* + 3 copies in three language (English, French and Arabic) in hard copy
  + 3 copies in CD/DVD media as softcopy

### FINAL REPORT

Final overview of activities, review of system use, user perspectives, issues, suggestions for improvement and sustainability.

## TIMING

The hired firm must provide detailed project development and implementation schedule in Gantt chart. The schedule may include the major phases of the development and implementation approach like System analysis and design, Software development, Software testing, Deployment and training, Post implementation review.

## **LOCATION AND DURATION**

* 1. LOCATION

Home-based

* + 1. DURATION OF THE PROJECT

The selected firm will need to work for the above-mentioned scope as per approved project schedule. The firm has to complete the defined work within the specified approved timeline. Total duration of the contract will be 6 months.

# **QUALIFICATIONS AND EXPERIENCE**

The firm will be evaluated based on a quality-cost based evaluation process using the following criteria.

## SPECIFIC EXPERIENCE OF THE CONSULTANCY FIRM RELATED TO THE ASSIGNMENT

* Compliance of the bidders to the requirements specification provided by the client;
* Company profile.
* The Company must have at least five years experience in delivering similar large projects
* Proven experience in implementation of at least 3 similar projects in the regional blocks & international;
* Referee’s view.

## ADEQUACY OF THE PROPOSED APPROACH, METHODOLOGY AND WORK PLAN

* Technical Approach and methodology;
* Work plan;
* Organization and staffing; and
* Responsiveness to ToRs
* Referee’s view.

## QUALIFICATIONS AND COMPETENCE OF THE KEY STAFF FOR THE ASSIGNMENT

* Relevant Qualifications of Personnel to be involved in the Assignment ;
* Availability of experienced and professional’s staffs;
* Relevant experience in Similar projects;(5 years)
* Specific experience in software development, design & implementation.
* Standard of technology to applied.

## TRAINING METHODOLOGY PROPOSAL

* User training;
* System administrator training.

# **REPORTING STRUCTURE AND OWNERSHIP**

## CONTRACT SUPERVISOR

The firm will work under the overall guidance of the project Coordinator with a dotted reporting line to the Director of Information and Networking.

For the duration of the assignment, the firm will report to the Director of Information and Networking. A final report will be submitted upon the completion. Both hard and soft copies of the report are required to be submitted to the project team.

* The draft reports should be submitted to the Director of Information and networking for review and feedback and recommendations. The final report should have the revision and recommendations incorporated.
* The firm shall submit six copies of each of the above reports to the Director of Information and networking and also soft copies in CDs (6 CDs). All primary data collected in printed and electronic form should be submitted to the Director of Information and networking along with the final report.
* The reports will be accepted subject to the approval by the Project coordinator, on the recommendation of the review committee.
* COMESA will be the absolute owner of the software and will have copyright ownership and the agency shall not replicate or reproduce or use any software developed or datasets used for this assignment without the consent of the owner.

## MONITORING

COMESA will regularly monitor performance of the firm and development of the platform. Regular weekly meetings will be conducted between COMESA and the frim to monitor the progress, consult necessary steps and provide advices in addition to activities. COMESA will be responsible for daily communication and weekly monitoring on the performance of the firm company.