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**Wireless Mesh Network Project Deployment in
Faculty of Communication and Information Sciences,
University of Ilorin, Ilorin, Kwara State, Nigeria**

<p>EVALUATION OF TECHNICAL AND FINANCIAL REPORTS (INTERIM & FINAL)</p>

To

AFRINIC Ltd.

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By

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EXECUTIVE SUMMARY

I. CONTEXT AND DESCRIPTION

FIRE is a Grant and Awards program designed by AFRINIC in order to support and encourage the development of solutions to information and communication needs in the Africa Region. It places particular emphasis on the role of the Internet in the social and economic development for the benefit of the African community.

Launched in May 2012, the program is partly funded by two donors: IDRC and SIDA International Development Agencies. In 2013, AFRINIC selected eleven grant recipients which received 10 000 USD each for their project.

The grantees are bound by several obligations, which are among other things:

- Implementation and use of the project funds solely to perform the objectives and activities of their project
- Use the funds in accordance with the budget set out in their application
- Submission of an Interim and a Final Report in accordance with AFRINIC's report guidelines outlined in the Memorandum of Grant Conditions.

II. PURPOSE AND EXPECTED USE

AFRINIC required this evaluation in order to confirm that the project is run in accordance with the following criteria:

- Quality and reliance of design
- Effectiveness
- Efficiency of implementation
- Impact and potential of sustainability
- Replicability

AFRINIC also requires this evaluation to be run on the basis of the Interim and Financial Reports sent by the project in accordance with their obligations.

III. OBJECTIVES

AFRINIC requires this evaluation to ensure of the following:

- The project meets identified objectives;
- Enhance the Design and the implementation of FIRE programme;
- Demonstrate and Improve the impact of the various projects on the local community;
- Develop recommendations to improve the implementation and the monitoring of future projects;
- Ensure that funds allocated to the various projects are used efficiently and within the initial identified scope.

IV. FINDINGS AND CONCLUSIONS

This evaluation, based on interim and final reports provided for the Wireless Mesh Network Project Deployment at the University of Ilorin, highlighted a well-organized, structured and methodological project implementation. Indeed, elements contained in both reports have been sufficient to ascertain that objectives of the project have been achieved and that conclusive results obtained.

V. KEY RECOMMENDATIONS

The quality of the interim and the final reports clearly shows that project team had a well-defined strategy and methodology. Implementation process was a success because of the quality of resources that form the team and the level of dedication and passion to the project.

As stated, the initial perimeter of implementation of the project was within the campus of Kwara Polytechnic. Administrative bottlenecks led to the change of site. This clearly shows that not all stakeholders fully adopted the project. In addition, approval for change of site was not received from donors.

We therefore recommend that FIRE programme manager:

- i. Ensures project team present in their reports, a clear timeline of achievement of objectives and goals;
- ii. Ensure that project team obtain approval of stakeholders for major changes on scope.

THE EVALUATION

1. BACKGROUND INFORMATION

1.1. PURPOSE

AFRINIC required this evaluation in order to confirm that the project is run in accordance with the following criteria:

- Quality and reliance of design
- Effectiveness
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AFRINIC requires this evaluation to ensure of the following:

- The project meets identified objectives;
- Enhance the Design and the implementation of FIRE programme;
- Demonstrate and Improve the impact of the various projects on the local community;
- Develop recommendations to improve the implementation and the monitoring of future projects;
- Ensure that funds allocated to the various projects are used efficiently and within the initial identified scope.

This evaluation is also required by AFRINIC in order to help the project in its implementation in accordance with the Memorandum of Grant Conditions.

1.2. AUDIENCE AND USE

The stakeholders who will make use of the evaluation reports are:

1. FIRE programme – AFRINIC
2. International Development Research Center (IDRC)
3. Swedish International Development Agency (SIDA)
4. The grantees
5. Prospective applicants to FIRE program

1.3. OBJECTIVES

AFRINIC requires this evaluation to ensure of the following:

- The project meets identified objectives;
- Enhance the Design and the implementation of FIRE programme;
- Demonstrate and Improve the impact of the various projects on the local community;
- Develop recommendations to improve the implementation and the monitoring of future projects;
- Ensure that funds allocated to the various projects are used efficiently and within the initial identified scope.

1.4. METHODOLOGY

The evaluation methodology is linked with the objectives, the evaluation questions and the type of evaluation.

Evaluation criteria	Key Results Areas	Evaluation questions	Data sources
Design	Assess the extent to which the project responds to priority	• Are the project objectives	• Design

	issues and identified objectives.	<p>still valid?</p> <ul style="list-style-type: none"> • Has the project team put in place the appropriate strategies? • Are there major risks that have not been taken into account? 	<p>documentation.</p> <ul style="list-style-type: none"> • Project objectives. • Interim and final technical reports.
Effectiveness	Assess the project major key results.	<ul style="list-style-type: none"> • Are the obtained results aligned with planned objectives? • Are the results in acceptable both in terms of the quantity and their quality? 	<ul style="list-style-type: none"> • Interim and final technical reports. • Project management plan. • Result monitoring report.
Efficiency	<p>Assess the extent to which:</p> <ul style="list-style-type: none"> - Project plan has been followed; - Project reports are up to date. 	<ul style="list-style-type: none"> • To which percentage has project plan been achieved to date? • Are expenses aligned with established budget? • Have data collected archived for future use? 	<ul style="list-style-type: none"> • Project management plan. • Monitoring and control reports. • Financial reports. • Interim and final technical reports.
Impact	Assess to which extent the project will have a long-term positive impact on local community.	To which extent has the project's general objectives and final goals been achieved?	<ul style="list-style-type: none"> • Project objectives • Interim and final technical reports. • FIRE programme objectives
Sustainability	Assess to which extent the project has been socially and politically adopted by the local community.	<ul style="list-style-type: none"> • Will the project contribute to long-term benefits? • Would the long-term benefits be materialized by the implementation of 	<ul style="list-style-type: none"> • Project benefits report. • Project cost report. • Project monitoring report.

		<p>an organization?</p> <ul style="list-style-type: none"> • What are the costs implications for scaling up impact? • Are there savings that could be made without compromising delivery? 	
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1.5. TEAM

M. Kenneth SANVI, PMP, is a Canadian Consultant in International Development, specialized in all areas of project management. M. SANVI is a seasoned expert with many audits and evaluations projects in several countries in Africa. He is also a trainer in many areas among which, monitoring and evaluation.

Ms. Rebecca GIDEON, CISA will perform the evaluation of Information Technology aspects of the reports. Ms. Gideon is an experienced Information Technology professional with over seven years of diversified experience.

2. THE PROJECT

2.1. CONTEXT

Since the expansion of the Internet in the early 1990s, it has become customary for individuals to turn to the global information infrastructure whenever they need information and facts. The Internet is an un-suppressed repository of information and means of communication of all kinds.

The history of Internet expansion favours its serving mainly academic purposes of increasing the ease of knowledge dissemination. The infusion of the Internet into higher education has intensified across to archived information sources from various part of the world, thus it forms a first part of call for researchers, students and others when they seek information. As a result, institutions in Nigeria are investing much to exploit the advantages of the information infrastructure for the benefit of their staff and students.

Studies have been carried out to understand how students and staff of Nigeria universities and colleges of higher learning utilise the internet for teaching, learning and other purposes such as communication amongst which involves both voice and data. It has been found that majority of the usage in terms of communications are mainly text in the form of email chart. These are the results of the inability for the network infrastructure to support variety of multimedia services such as the Voice over Internet Protocol (VOIP) for the staff and students to utilise some sorts of applications like Skype to enable communications amongst the researchers, faculty, departments and other sections of the institution. This project aims to provide alternative, reliable and easy means of communication for staff and students of University of Ilorin. By exploiting the benefits for deploying wireless mesh networks.

At the end of the project, local and free means of communication in the campus would be provided also, the team will provide training for students, local technicians and staff members (anticipated up to 60 people) in aspects of the setup, installation and maintenance of the SECN (Small enterprise community network). A few of the trainees will receive more advanced training and actual employment.

2.2. UNDERLYNG RATIONALE

The project aims to provide alternative, reliable and easy means of communication for staff and students of Kwara State Polytechnic.

That means the completion of 10 initial nodes, upgrading the quality of the links to overcome interference problems, deploying software to enable fixing of problems and continuing the associated training of 8 students, 4 local technicians and 8 staff members from the institution.

2.3. STAKEHOLDERS AND BENEFICIARIES

2.3.1. Stakeholders

- a) FIRE programme – AFRINIC
- b) Swedish International Development Agency (SIDA)
- c) The grantees
- d) Prospective applicants to FIRE program
- e) Staff in the faculty of communication and information Science University of Ilorin
- f) Students of the faculty
- g) Entire university of Ilorin
- h) Other universities
- i) Commercial domain

2.3.2. Users

The users of the WMN encompass the staff in the faculty of Communication and Information Science University of Ilorin, Nigeria. The students of the faculty are also direct beneficiaries of the project. With the successful deployment of the WMN, the outcome of the project could be extrapolated to the entire university.

Similar project could also be initiated in other universities, which sent participants to the workshops. With the participation of some professionals from the industry, there is the possibility of transferring the knowledge gained to the commercial domain as well.

2.3.3. Beneficiaries

- a) Staff in the faculty of communication and information Science University of Ilorin
- b) Students of the faculty
- c) Project team believes that this technology could also be extended to other universities.
- d) Last, but not least, the possibility of commercialising this technology to enable free or minimum cost communication to all.

2.4. CONCEPTUAL MODEL

2.4.1. Resources and activities

The project team was made of researchers in different areas of technology. Several university professors were co-opted to contribute by helping with the implementation of the network and offering lectures during the workshops. Despite the low budget available for the project, the team endeavoured to enlist the help of experts in order to be achieve identified goals. It is also to be noted the project team full dedication to seeing objectives met. A considerable amount of effort was also put in knowledge transfer with several workshops organized and surveys ran to collect feedbacks.

2.4.2. Expected results

Expected results from WMN are listed below:

1. 10 nodes of MPs in offices, public places and labs in the departments of Computer Science and Electrical Engineering and some executive management offices.
2. The MPs will be configured to provide Internet as access points.
3. Some services will be developed and run on some of MPs.
4. The 10 Mesh potatoes installed will be fully operational and providing a low cost local telephone network and IP backbone.
5. A team of students, local technicians and staff members will be trained in some aspects of the setup, installation and maintenance of the SECN.
6. Concise reports of progress against project plan will be prepared by the team
7. Training information in HTML form will be written and published under a Creative Commons license for others who are deploying same networks worldwide.
8. Operation feedback, software and hardware bug reports will be gathered for the village Telco project.
9. A final report

2.5. RESULT CHAIN AND LOGICAL FRAMEWORK

In an effort to get proper adoption of the technology being implemented, the project team organized an initial survey to measure the knowledge level of system users. Workshops were then put together for system users to have a thorough understanding of the Wireless Mesh Networks and subsequently, additional surveys organized to evaluate the participants' exit knowledge.

Usage statistics as well as survey reports clearly show that the methodology used was quite beneficial.

2.6. PROJECT MONITORING SYSTEM

A variety of tools were implemented to monitor the execution of the project. Among them is a portal <http://kwaraproject.ngportal.com>, which could be used to archive results data. Furthermore, many medias were used to promote the project and inform the university community of the results of the implementation. As such, the following medias were used:

- University of Ilorin Bulletin of July 22nd, 2013
- Unilorin FM radio
- Village Telco website
- Kristijan Fabina

In addition, a logbook was installed on each mobile station in order to collect statistics on usage.

2.7. EVALUATION FINDINGS

2.7.1. DESIGN

➤ Valid objectives

Project objectives remain valid despite a slight modification on the scope. In essence, as described in the project charter, the initial scope of the project was Kwara State Polytechnic. As stated,

“The main objective is to provide alternative, reliable and easy means of communication for staff and students of Kwara State Polytechnic”. Thus, ten nodes were to be installed as follow:

- 3 nodes in offices, Labs, Public Places of the Department of Computer Science of Kwara State Polytechnic
- 3 nodes in offices, Labs, Public Places of the Department of Electrical Engineering of Kwara State Polytechnic
- 3 nodes in the Executive Management offices of the Dean of Sciences and Engineering

- 1 node in the hall of residence of the institution.

Nevertheless, due to administrative bottlenecks encountered with Kwara Polytechnic, the decision to deploy the infrastructure at the University of Ilorin was taken. However, it is not clear how many nodes were deployed at the University of Ilorin. Efforts are being made to extend the infrastructure to Kwara Polytechnic at later stage.

➤ **Appropriate strategies**

The deployment strategy adopted by the project team was dictated by a clear and well-defined methodology. In effect, to ensure user adoption, the team first evaluated the knowledge level of stakeholders, reinforced it by organizing workshops on the technology implemented and monitored the use of the system. In addition, necessary steps were taken to ensure that the system was updated to the latest version of software so as to address possible bugs and malfunctions. Last but not least, appropriate actions were also taken to train staff entrusted with the maintenance of the system in order to ensure its reliability and sustainability.

Interim and Final reports clearly highlight the sequence of tasks as planned for in the strategy defined.

➤ **Major risks not accounted for**

Undeniably, the project has faced many risks that can be considered major during the course of its implementation. Indeed, one of the main concerns that have even led to a change in site deployment is the lack of cooperation of Kwara Polytechnic administrative officers.

Another major problems faced are related to energy supply for the nodes. Unavailability of batteries for the nodes could indeed be a concern factor for the sustainability of the project. Internet availability and limited access to funds are other risks the project faced.

The last risk that can be mentioned is related to funding is limited. . This has required the personal involvement of members of the project team. Should therefore pay particular attention to this fact so that the project is not dependent on what kind of constraint.

2.7.2. EFFECTIVENESS

➤ **Results aligned with planned objectives**

Project results are aligned with the initial planning. As highlighted in the project charter, the main objective of the project is to address the poor state and lack of telecommunication infrastructure available to most of Nigerian higher learning institutions by offering a reliable and easy means of communication for staff and students as well as knowledge transfer.

As depicted in the reports, results were clearly aligned with the objectives. An average of 115 calls were made per day using the system which demonstrate complete adoption of the project by

participants. In addition, 93% of participants who attended the workshops completed the survey questions with less than 4% of them admitting having any form of practical knowledge of the technology implemented. Subsequently to the workshops, more than 60% of them attested having accomplished the objectives of the workshop.

➤ Results acceptability

On the basis of obtained reports, we can confirm that results are acceptable in terms of quality. Indeed, there were many participants to the workshops and a great percentage of them responded to the surveys. In addition we could see great adoption of the project as many of them tested the system by making use of it.

2.7.3. EFFICIENCY OF PLANNING AND IMPLEMENTATION

➤ Percentage of achieved project plan

To date, based on interim and final reports, we could conclude that all aspects of the project plan were achieved. As stated in the reports, data collection is done via a logbook hence ensuring proper monitoring of project results.

➤ Expenses aligned with budget

It is important to ensure that financial reports reflect budget categories that were originally approved. It is also important when filling up the report, to indicate budgeted amounts as well as expenditures and display variances. Indeed, we can notice on the basis of reports submitted, the emergence of new categories of expenditure. Overall, regarding the purchase of equipment, the budget seems to have been respected. In addition, financial reports indicate that the change in deployment site seems to have resulted in additional expenses.

➤ Archive of collected data

In terms of archiving, considerable efforts were made to ensure efficiency. As shown in the reports, a portal was developed hence facilitating the archiving and the publication of collected data. Members of the community as well as researchers and interested participants could find via the portal valuable information on the project advancement and results. In addition to the portal, a logbook was implemented to track calls. It is thus capital to ensure that archiving processes are maintained in order for subsequent projects and or initiatives benefit from the results of this project.

2.7.4. IMPACT

➤ General objectives and final goals achieved

We would like to point out that results alone are not sufficient to evaluate the impact of a project. However, it should be noted that the project objectives could be formulated as a first step in achieving overall objectives.

The fact that participants from several organizations attended the workshop enables us to deduce that the emulation aroused may lead to a replication of the project in other institutions and it is only through this that the general objectives can be achieved. In addition, it is important to emphasize the benefits to gain and enlighten stakeholders so as to ensure complete adoption thus avoiding administrative bottlenecks such as occurred at Kwara State Polytechnic.

➤ Long-term benefits contribution

This project could contribute to long-term profits provided it is integrated into a much broader plan. In addition, it is important that adequate and additional funding be in place to support the sustainability of results. In a context where it would be considered an isolated action, it is clear that this project would not contribute to long-term benefits.

Technologically as well as academically, this project remains a great success but there are several improvements that could contribute to magnifying obtain results.

2.8. RECOMMENDATIONS

The quality of the interim and the final reports clearly shows that project team had a well-defined strategy and methodology. Implementation process was a success because of the quality of resources that form the team and the level of dedication and passion to the project.

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We therefore recommend that FIRE programme manager:

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