



THE NATIONAL FREE AND OPEN SOURCE SOFTWARE (FOSS), AND OPEN STANDARDS STRATEGY

DRAFT

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1. Introduction

1.1 What is Free and Open Source Software (FOSS)

Free and Open source software (FOSS) is computer software with its source code made available and licensed with a license in which the copyright holder provides the rights to access, study, modify, and redistribute the software to anyone and for any purpose.

FOSS is different from proprietary software where the copyright-holder sets restrictions on its use, copying and distribution. Whereas proprietary software is outlined in a licensing agreement that typically does not allow the free distribution, modification or inspection of the software. FOSS is a product that is developed and improved through the collaborative efforts of volunteers within a community. FOSS offers an additional form of knowledge production based on peer collaboration and community-based innovation.

1.2 Why Free and Open Source Software (FOSS)

Adoption of FOSS offers solid economic and developmental benefits. Following are the benefits that reflect the philosophy of promoting FOSS in Uganda.

1.2.1 Equalization of Market Competition

FOSS offers different intellectual property rules that provide an alternate open source licensing model which enhances innovation and enables the improvement of software production. FOSS presents an alternative business model, one that depends more on identifying the differentiating factors for companies, and collaborating on the non-differentiating ones.

Profit remuneration comes through the technology that differentiates the company and hence sets a certain product apart. In the case of FOSS, this would be the customized product. As such, FOSS opens the door for new players to engage and proliferate, widening the market pie rather than taking over the slice of existing businesses. This allows for a larger software market and a broad based economic growth possibilities.

Adopting open source technologies on the large scale will not compete with the current ICT industry ecosystem based on the proprietary software. On the contrary, it will contribute to the growth of the overall ICT industry and establish a new developmental FOSS ecosystem, which will co-exist within the local ICT market. This will provide space for new businesses that bring efficiency, innovation and maximize the benefit for the public and private communities in Uganda. The gradual migration of existing ICT services to FOSS in co-existence within the current ICT market is recommended as the power of integrating multiple ecosystems in the local ICT market will create a new hybrid ICT models

which will reflect positively on the Ugandan ICT market and directly promote GDP growth and overall development.

A balanced ecosystem of a software industry, therefore, will involve the diversity of both open source and proprietary models. In acting as a catalyst, the government will ensure leveling the playing field for all product types that would encourage healthy competition and promote overall growth.

1.2.2 Total Cost of Ownership (TCO)

There have always been arguments for and against TCO being lower in the case of FOSS than it is for other options. This holds especially as the cost of and benefit from investing in software extend beyond the direct acquisition costs and financial returns to include factors such as non-acquisition related costs, training costs, and assessment of long term versus short term benefits, as well as individual, firm and societal returns. The components of costs and returns of investment in software vary depending on the type of software, the nature of the cost and the type and term of return.

Regardless of the net effect, the fact remains that FOSS allows savings from what would otherwise be payments for licenses and outsourced customization and problem solving services. FOSS always entails higher retention and internal distribution of funds. Returns on FOSS investments are also high in terms of self-learning and human capital development; only they are reaped in the long term, are hard to measure and do escape basic quantitative calculation of the total cost of ownership if seen as direct acquisition costs.

1.2.3 Human Capital Development (Self-Development & Learning)

FOSS can have a phenomenal potential of spearheading human capital development. Software developers engaging in open source development enhance their own capacity as they simultaneously develop their professional skills. This is especially useful for developing countries, as funds for training are limited, hence open source programmers can concurrently work freely on varied projects, gain multitude of skills and build experience through networking, learning and motivation.

Learning from FOSS can be extended from self-learning of the core group of software developers to entrepreneurs developing businesses around FOSS, as well as to the ultimate end user who learns to use an additional tool.

1.2.4 Localization

FOSS provides potential for localization, offering opportunities for customizing applications to suit the local business culture. Such localization will be beneficial for local capacity building and establishing a knowledge base grounded in indigenous resources that address local needs.

Along with the benefits of localization are advantages that come from widening the scope for the creation and use of Ugandan software. From an economic point of view, localization would expand the market for Ugandan software designers who would be able to sell and produce Ugandanized products not only to the local Ugandan markets but also to the overall Ugandan international clients. From a social perspective, expanding the use of specialized Ugandan content software would allow for a greater margin of knowledge accessibility to the region with implications on the educational, creative and human capital development. Such software would allow for the cataloguing and organization of Uganda based knowledge structures, creation and history that would allow to harness its own creative abilities for change and development.

1.2.5 Decentralization and Democratization of Knowledge

One of the foremost benefits of FOSS is its platform as a source of knowledge liberalization and democratization. At the heart of FOSS is the concept of building new ideas through knowledge sharing. The participatory aspect of FOSS allows the democratization of knowledge, as more users are given the opportunity to equally contribute to knowledge production. In this way, FOSS provides the potential for developing local businesses built around this pool of shared knowledge to generate revenue in return for value added through services such as customization. FOSS also has the potential of eliminating software piracy as it offers an affordable legal alternative, providing prevention as means of saving resources directed to fighting piracy. Moreover, FOSS provides a strong potential for control over data ownership and management, which provides national users better control over their own knowledge.

1.2.6 Information Security

Openness is essential for the security of software systems. This is particularly true from the point of view of users of technology who are allowed the ability to perform independent examination of each and every software system they use. In such circumstances, open source systems offer an unparalleled opportunity for collaborating on scrutinizing systems and improving their security and quality. Furthermore, when adopting FOSS, an organization is more able to comprehend software related

security aspects and to participate in the maintenance of its security by incorporating its own security processes.

The above holds despite the concern that scrutiny enabled by openness might be abused by malicious users, as they would have the opportunity to find and exploit weaknesses in such an open system. However, many experts have observed that the long-term effect of public scrutiny, offered by open source systems, results in improved information security.

1.2.7 Economic Development

FOSS promises a positive contribution to the software ecosystem of developing countries who are keen on expanding their markets, diversifying their technology base and developing their indigenous capacity and local human capital. The human development, economic growth and social development promised by FOSS would greatly benefit a developing country like Uganda in both its short terms goals (such as its national information security and cost efficiency aims) while at same time help it reach its longer-term aim: economic growth and development. Developing a healthy eco-system for software allows the use of both FOSS and proprietary software in the market to ensure healthy competition and positive contribution of all products.

1.2.8 Success Stories from other Countries

There are lessons to be learned from the experience of other developing countries that have promoted FOSS in their respective software ecosystems and managed to achieve success stories.

For example, through promoting FOSS, Malaysia was able to reduce costs significantly by 80% on licensing fees, 58% in development and consultancy efforts and 7% on software support services totaling an overall cost reduction of 30.5% in 2006. It was also able to proliferate a knowledge society on a large scale through engaging with civil society, providing training and support that was not only technical but also business oriented, carefully choosing pilot projects to hedge the community and mobilize its forces for larger scale production.

Other countries with successes include India, where the localization of IT solutions and programs brought knowledge and general education platforms to the disenfranchised poor in the country's 22 different languages. There have also been successes realized by developed countries such as the United States of America (USA), the United Kingdom (UK) and Australia.

Nevertheless, implementing FOSS has not gone without challenges, and successes of countries like Brazil and South Africa were not as pronounced. The summary of the experience of selected developed and developing countries are provided in .

2. Vision, Mission and Strategic Objectives

Basing on the philosophy of FOSS derived above, the Vision, Mission, Strategic Objectives and Enablers are derived.

2.1 Vision

The Vision of the FOSS Strategy is:

“Building a knowledge-based society that benefits from the adoption of a holistic and focused Open Source Software Eco-System”.

2.2 Mission

The Mission is to:

“To facilitate and promote the development and adoption of high quality open source software based solutions and services as one fundamental pillar of the knowledge society so as to raise productivity, improve competitiveness, and enhance the overall economic and social well-being of citizens of Uganda.”

2.3 Strategic Objectives

The proposed objectives are identified based on different sources: (i) information collected specific to the national context; (ii) FOSS initiatives of a number of developed and developing countries; and (iii) generic research in Information and Communication Technology (ICT) with a special focus on FOSS adoption.

The objectives are congruent with the ICT Sector Strategy and Investment Plan (SIP), especially in the areas of;

- ICT Safety, Security and Standardization
- E-Services and Local Content Development
- ICT Skills and Human Capital Development
- Research, Innovation and Industrial Development
- Job Creation for the Youth

2.3.1 Improvement of Access to Knowledge by Citizens (Reduction of the Digital Divide)

FOSS movement empowers masses by facilitating access to sharing of a variety of local and global knowledge (cultural, political and scientific) in a convenient manner through the use of portable devices, such as, mobiles, tablets and laptops. It is also affordable as it does not necessitate payment of licence fees. In addition, FOSS enables knowledge management and building low cost sustainable institutional repositories. Every individual hence has the right to acquire tools, resources, and services for accessing, disseminating and developing knowledge and insight. Knowledge liberalization would ensure the inclusion of the poor and illiterate in the transition to a knowledge society, which in turn bridges the digital divide within Egyptian local communities. FOSS adoption enables shared ownership of intellectual resources, which in turn accelerates learning, innovation, entrepreneurship, as well as social and economic development.

2.3.2 Improve Efficiency and Transparency of the Public Sector

The Promotion of FOSS in the public sector enables the creation of an effective service delivery platform and allows for universal access to a single window that provides online government services through various media. Citizens would be able to have the option of accessing public services through alternative platforms, while the government would be able to provide such services in an efficient and cost effective manner. Furthermore, the availability of the source code expedites the process of detecting and eliminating security risks, bugs and errors, and increases confidence in the trustworthiness of such software. In addition, better safety of public and personal data is guaranteed, as well as operational security of information systems in state administration bodies.

In this context, adopting open standards will enable interoperability, which in turn facilitates knowledge exchange and information sharing, and ensures coherent and sustainable IT solutions.

FOSS, therefore, would be useful in decreasing the barriers of digitization across public sector agencies. This would increase the efficiency and quality of business processes in the public sector as it ensures reliable information and support for decision-making and better-targeted public policy.

Open public data is an important digital resource since it creates better and smarter public sector information and services. Ensuring free and reliable access to complete and timely public information content would strengthen the collaborative governance model, where building trust resonates with the

multi-stakeholder approach to policy development; an essential act reflecting a transparent and democratic government.

2.3.3 Enhance the development of the ICT Sector and Create a Competitive Environment

The software industry in Uganda is still young with a big growth potential. FOSS development could present an opportunity to stimulate this sector. Introducing open source software to the market as an additional player would increase the competitive landscape of the entire software industry in Uganda.

This improves quality and gives customers a better position in negotiating contractual terms.

The growing expertise of Ugandan software firms could also open opportunities to boost software exports and position Uganda's software industry as a foreign exchange earner. Moreover, since Uganda is among the countries that attract IT outsourcing, further revenues could be generated from open-source related services.

Introducing FOSS as alternative software systems would therefore increase efficiency and foster competitiveness of Uganda's software industry.

2.3.4 Reduction and Cost Efficiency in Spending on IT Solutions

Being that software acquisition is not the only cost item required for the implementation of any system; other issues should be equally considered, such as training, hardware, customer support, maintenance, future expansion, etc. In the case of FOSS, the financial resources saved as a result of the reduction of replication costs of IT solutions could be directed towards other projects, such as training IT staff in open source support and development. Further costs could also be saved as many FOSS programmes now depend on migrating to cloud computing. Therefore, the objective of FOSS adoption should not be to use FOSS because "it is cheaper"; rather, the aim is to ensure that budgeting and spending decisions are taken and executed in the most efficient and cost-minimizing way.

To conclude, public and private sector agencies should rationalize their resources and provide a proper explanation of why they chose to adopt a certain type of software. Particular attention, subsequently, should be given to: (i) the cost of maintenance, support, and training; (ii) the cost of needed storage, infrastructure, and deployment model (e.g., cloud, server based, etc.); and (iii) the cost of future expansion.

2.3.5 Promoting Technology Independence

Moving towards FOSS and open standards will alleviate the problem of vendor lock-in. Allowing for alternative forms of software platforms provides a robust business environment. It offers users the flexibility to switch at any time to another supplier or service provider without worrying about changing the software currently being used. Avoiding vendor lock-in would increase freedom of choice regarding software usage; companies would possess the freedom to select and compare between different systems and choose the one that best fits their necessities and requirements. They would ensure that their data and software can be accessed across different platforms.

In addition, users could have a wider support options from the OSS community, where many people are willing to help and assist at any implementation stage. Furthermore, the availability of the source code enables developers to customize the software as desired to ensure its compatibility with laws, regulations, business processes and procedures specific to each business or to the entire national context: a key move towards content localization.

2.3.6 Build a Sustainable FOSS Community (Users and Developers) and Infrastructure

Human resource development through FOSS would narrow the gap between Uganda's industry development and that of more advanced countries. Self-learning and local IT skills development could be further enhanced through sharing ideas and mutual experiences with international developers. Building and sustaining a local FOSS community would also expand the horizon for mutual benefits within the regional and internationally with regards to sharing and collaborating in FOSS initiatives and research. The open nature of the FOSS movement would also foster collaboration among firms, improve further human capital building and enhance project management skills.

The development of Competence Centers to support the development of FOSS is a target object to develop infrastructure to support FOSS implementation.

2.3.7 Encourage and support Small and Medium Enterprises (SMEs) in the utilization of ICT

It is important to build an FOSS ecosystem to maintain comprehensive exchange of information and best practices in business and entrepreneurship. FOSS could be of special interest to entrepreneurs and small businesses, particularly those that have limited capital. This would contribute to the strengthening of the national economy and sustainable development in two ways: it would support SMEs to increasingly rely on information in conducting their business processes, and it would create a nascent infant industry that serves local needs and is able to export its products. Promoting SME's based on

FOSS is seen as part of a national commitment to promote entrepreneurship and SMEs in the ICT sector, and indeed in the whole country.

2.3.8 Improve Public Awareness about Open Source Solutions

Raising awareness about the benefits and uses of FOSS is seen as part of furthering the understanding about ICTs, knowledge and development, and creating a culture of flexibility and openness to alternatives. This includes raising awareness about issues related to intellectual property, types of license agreements, digital content, scientific and media publishing, among others. This would specifically target resistance to change, and acceptance of a wider pool of options open to the market and to society.

The government will play a pivotal role in facilitating this process, in partnership with the civil society, academia, the public sector, computer software organizations, FOSS advocates, the private sector, and development partners. Promoting FOSS practices could also take place through frequent reports on FOSS-related material in formal government publications, as well as through conducting relevant meetings and conferences at local, regional and international levels.

3. Enablers

The successful development and utilization of FOSS requires a conducive environment. A review of different FOSS strategies in a number of developed and developing countries highlights the following areas;

- Developing countries should focus on establishing an enabling foundation that includes: building an FOSS oriented human capacity and shaping relevant legal policies
- Developed countries (being relatively more developed in this regard) should emphasize further advanced issues such as, migration strategies, and new procurement and coexistence issues.
- The formulation of a responsible body to provide oversight in the early phases of FOSS adoption projects. This would ensure a single point of reference for coordinating and facilitating FOSS development and implementation.

The enablers identified below are based on case studies in several benchmarked countries, the initial national FOSS strategy draft, and interviews conducted with key players in software adoption in Uganda in both private and public sectors. These enablers attempt to address both demand and supply in FOSS adoption in Uganda.

It is essential to identify a leadership body to act as “Uganda's Governmental Single Point of Reference for FOSS”. This body would play an active role especially at the early stages of fostering FOSS adoption in order to create an ecosystem that advocates for an open source culture.

3.1 High Level Leadership and Coordination

The strategy adoption should be supported by a key leadership role; acting as a focal point, as well as also in orchestrating the strategy among all stakeholders and ensuring its smooth implementation; specifically the focal point will be in charge of:

- Ensuring that all FOSS initiatives are directed towards a common goal
- Ensuring consistency and standardization among all initiatives;
- Creating and managing a center of excellence to provide consultation and support;
- Developing and promoting a set of key performance indicators (KPIs) for FOSS adoption;
- Shaping public-private partnership strategies based on win-win business models;
- Addressing challenges that could arise at any stage of implementation;
- Conducting regular monitoring and evaluation of the strategy application;
- Performing updates and corrections whenever and wherever it is required;
- Documenting and disseminating best practices;
- Coordinate initiatives and activities regionally and internationally.

3.2 Develop Policies that support FOSS as part of the ICT Sector Strategy & Investment Plan and the National Development Plan

An enabling environment is essential for all FOSS players. There is need for review of the current legal and regulatory regime for identification of overlaps and possible contradictions. The reviews should cover the laws, regulations and policies related to software adoption, procurement, usage and development. This necessitates a revision of some laws such as those concerning public bidding and auction, communication, freedom of information, intellectual property rights, and investments laws.

Hence, it is crucial to conduct a study investigating the effect of the current laws on implementing the current strategy. Such a study would also define the areas where new laws/regulations/policies are needed and whether amendments of some of the existing laws need to be made. An example is a scheme that provides no procedural barriers to the adoption of open source products and that considers different business models and supply chain relationships prevalent in the open source sector.

As well, the guidelines for FOSS implementation policies need to be clearly stated and published to foster competition and to facilitate leap-frogging into open-standard technologies.

3.3 Promote FOSS usage in Government MDAs

As a step towards diversification, the government could act as a consumer to drive demand for open source solutions. This could take place through a large-scale public procurement plan targeting the inclusion of FOSS-based solutions and services within the government choices. The selection of these solutions is to be based on the fulfillment of a number of predefined measures (e.g., functionality, total cost of ownership, risks, reuse, flexibility, stability, etc.). In-depth study of the different options – FOSS and otherwise, would result in well-informed choices. The selection of the new FOSS systems should also ensure their interoperability with existing proprietary systems, and consider the required changes in procedures and business processes paying particular regard to the different business models, as well as the relationships throughout the entire supply chain.

Managing change in the bureaucratic and static public sector atmosphere constitutes one of the main challenges in adopting open systems. Public agencies must be committed in educating and re-training their personnel to improve their FOSS competency.

Promoting open source practices to different sectors and agencies could be achieved through a careful selection of pilot projects to try out FOSS policy, and the introduction of FOSS to users who would likely be enthusiastic about trying new products. Other important factors in this vein are developing, publishing, and circulating FOSS implementation/migrations guidelines. This is in addition to hosting a number of workshops for government CIOs and FOSS civil society to discuss the FOSS strategy, implementation/migration guidelines, the national projects, infrastructure problems and others.

Embedding an open source culture of sharing, reuse and collaborative development across the government and its suppliers would definitely strengthen FOSS diffusion throughout governmental agencies. A Web-based FOSS assets library (Knowledge Bank) should be built for agencies implementing FOSS to register their initiatives, and for management to record predefined reuse policies and processes. The knowledge bank would also serve in providing technical and administrative guidance to governmental agencies that consider FOSS implementation, and in diffusing good practices throughout public administrations. In parallel, the government can build teams of interested personnel to play as advocates for any FOSS project, and encourage them to open collaboration channels with NGOs involved in FOSS practices in Uganda and in the regions to guarantee growth and sustainability of the sector.

3.4 Initiate and Sustain Education and Training to build Competitive FOSS Capacity

In order to encourage the adoption of FOSS in the public and private sectors, the government recommends paying more attention and allocating resources for FOSS R&D activities, as well as FOSS business entrepreneurs. Research Centres could contribute to developing nascent scientific and expert skills capable of creating domestic software - especially with regards to the youth - and expanding educational dimensions through Training of Trainers (TOT) workshops and courses (including educators of learning institutions that cover all educational levels). Intensive training sessions on FOSS business models could also be provided to ensure that trainers and developers attract additional capacity-building partners.

In addition, it is recommended to introduce structured FOSS programmes in school IT labs, equipped with various electronic media for relevant subjects and grades. This would be done for primary, secondary and tertiary education levels. The IT course of study needs to be implemented at a much more intense level avoiding lifelong vendor lock-in by teaching skills to students rather than limitation to specific applications.

For universities, it is important to include open source software in the curricula at the undergraduate and post-graduate levels. It will also be vital to establish an open source section in faculties of Software Engineering, Computer Science, Information Technology and Engineering, etc. Graduates could have necessary qualifications that meet market needs, emphasizing practical industry experience through organizing internships, sponsoring graduate projects and incubating some of them. Additional support could also be provided to rely on open source software products as tools for teaching/learning and research, and to encourage the exchange and sharing of materials and experiences among schools, universities and other educational institutions.

Furthermore, an educational action plan should identify the part that will be played by different categories of stakeholders, i.e. users, developers, researchers, trainers, education institutions, research Centre managers, and consultants. FOSS training could further expand to be embedded in the working environment of other professions in the society (journalists, public sector employees, medical experts, developers, management experts and others).

3.5 Develop a Capable Infrastructure for adoption of FOSS

As mentioned in the 2012 UNCTAD report: “(An) important general (FOSS implementation) enabler (is) the widespread use and adoption of the Internet and increasing bandwidth opportunities, coupled with the transition towards knowledge -based economies.”

It is important to evaluate the current status of IT and other related infrastructure capabilities in different public and private sectors, especially SMEs. Such assessment would take into account the volume and pattern of use, evaluate their readiness for the adoption of FOSS and identify gaps and needs. IT Infrastructure assessment encompasses different technology aspects, such as servers, operating systems, databases, software applications, and networking systems. A primary step in this regard is to investigate opportunities for the widespread use and adoption of the Internet and the increase of bandwidth and broadband services, coupled with the transition towards knowledge-based economies. Moreover, the possibility for content and software localization could be researched as well.

Further studies are also to be conducted to investigate the possibility of allocating one of the infrastructures running governmental cloud computing to be based on FOSS technologies over the three cloud service levels: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). Undoubtedly, in case of migration to cloud computing, information security should be a pivotal factor that requires specific considerations. Aligning broadband, cloud, and FOSS strategies would evidently increase the opportunities for the widespread use and adoption of FOSS.

The development of Competence Centres in already existing and upcoming institutions, facilities and initiatives to support enhanced implementation of FOSS solutions and sharing of

3.6 Identify and Maintain Funding to support the Strategy

Implementing the FOSS strategy requires the determining of a suitable funding plan. For the primary phase of implementation sufficient funding should be secured and appropriated for at least the first five years so that it adequately covers its many activities which include training, coordination, awareness raising, sponsoring national projects in the public sector, and monitoring and evaluation activities.

Funding schemes need to be researched and discovered for the strategy’s sustainability. Besides the main budget allocated from the government, funds could also be obtained from: ((i) Economic, scientific and cultural endowments; (ii) contribution and support from the private sector including multinational companies such as IBM, Google, Oracle, Intel, HP, etc.; and (iii) support from regional

and international organizations (e.g., European Commission, United Nations, International Development Research Centre(IDRC), etc.). Other sources could also be considered from providers of FOSS sales and support services, and revenues that could be generated from early FOSS adoption projects.

3.7 Empowerment of Small and Medium Enterprises (SMEs) in the ICT Industry

A Section of some Software Developers relies on FOSS components especially applications related to Web development. Nonetheless, such activities are still scattered and individually driven, which threatens their continuity and limits their expansion as a consistent industrial mainstream.

Therefore, in order to reach a sustainable development and use of FOSS on a national scale, it is very important to provide a motivating environment for SMEs that provides ICT solutions to offer their customers services based on open standards. A number of activities could be performed in this regard, e.g. provide a private sector and community registry platform, raise awareness about several FOSS aspects (e.g., value, possible business models that fit the Ugandan context, success stories, legal property rights and various licenses), stimulate SMEs to communicate and take part into the international movement of FOSS development, investigate the possibility of including SMEs FOSS providers in government procurement contracts, provide assistance and advisory in FOSS-related national projects, conduct competition with valuable rewards and build incubators for FOSS related development.

The government will play a moderating role through building committees that link entities in charge of ICT development with SMEs to initiate their support. Publishing periodically directed to SMEs could serve to inform SMEs of the different FOSS support services and motivating policies. Special interest is to be directed towards young Ugandan entrepreneurs, who are increasingly penetrating the market. These represent a promising opportunity for growing FOSS industry since they possess the knowledge and access to information, as well as the flexibility to change their business practices. It is important to include FOSS entrepreneurs within the activities of Ministry of ICT (MoICT) and Uganda National Council of Science and Technology (UNCST), etc.

3.8 Collaboration with the Civil Society

Collaborating with civil society can develop in two forms. First, there are few groups and NGOs that are already working in projects utilizing FOSS and promoting its adoption in Uganda. Second, civil society groups can serve as a source of demand for FOSS. Working in other fields of advocacy and not

necessarily access to knowledge, civil society represents an important market for businesses built around FOSS.

4. Key Performance Indicators (KPIs)

In order to actualize the FOSS Strategy, the following Key Performance Indicators (KPIs) have been identified to ensure proper implementation of the Strategy.

No.	Key Performance Indicator	Target	Periodicity/Frequency of Collection	Source of Information
1. High Level of Leadership and Coordination				
A	Identification of the Single Point of Reference for FOSS			
B	Number of FOSS advocacy/awareness events/meetings			
C	Number of FOSS strategy implementation reports			
D	Number of partnerships/relationships with reputable, worldwide FOSS entities			
2. Develop Policies that support FOSS as part of the ICT Sector Strategy & Investment Plan and the National Development Plan				
A	Number of FOSS implementation and /or migrations guidelines/best practices to be circulated in the Ugandan ICT Community			
3. Promote FOSS usage in Government MDAs				
A	Number of national public procurements targeting development of FOSS-based solutions and services based on market needs			
B	Size of Uganda's web-based FOSS assets			

	library			
C	Number of workshops for Government CIOs and FOSS civil society to discuss the FOSS strategy, the national projects, infrastructure problems, etc.			
4. Initiate and Sustain Education and Training to build Competitive FOSS Capacity				
A	Number of institutes/training providers delivering FOSS-related educational/training courses			
B	Number of FOSS-related educational/training courses/tracks			
C	Number of FOSS trainees			
5. Develop a Capable Infrastructure for adoption of FOSS				
A	Size of governmental IT infrastructure dedicated to running FOSS			
B	Number of running FOSS enterprise application software			
6. Identify and Maintain Funding to support the Strategy				
A	Budget size			
B	Number of sponsors			
7. Empowerment of Small and Medium Enterprises (SMEs) in the ICT Industry				

A	Number of SMEs utilizing FOSS			
B	Number of national programmes to assist and advise the ICT industry on the development of FOSS-based solutions and services based on market needs			
8. Collaboration with the Civil Society				
A	Number of NGOs involved in FOSS			
B	Number of NGOs collaborations			

5. High Level Action Plan

Action Plan (Short Term)												
Action	Mon 1	Mon 2	Mon 3	Mon 4	Mon 5	Mon 6	Mon 7	Mon 8	Mon 9	Mon 10	Mon 11	Mon 12
High Level of Leadership and Coordination												
Identify the Government FOSS focal point												
Determine the main responsibilities of each, and specific goals related to time, communication and reporting protocols												
Organize events/meetings with government, public, and private stakeholders to advocate for FOSS strategy												
Develop a quarterly status report about FOSS strategy implementation												
Establish and maintain partnerships/relationships with												

reputable worldwide FOSS entities experienced in the identified FOSS potential areas in Uganda													
Develop Policies that support FOSS as part of the ICT Sector Strategy & Investment Plan and the National Development Plan													
Revise current ICT policies and related law relevant to FOSS adoption (e.g., laws related to competition, IP, Procurement, etc.) and study implications													
Develop an FOSS policy													
Create and publish FOSS implementation/migrations guidelines/best practices to be circulated in the Ugandan ICT Community													
Promote FOSS usage in Government MDAs													
Issue and supervise the implementation of national public procurements targeting the development of FOSS-based solutions and services based on market needs													

Establish and maintain Uganda's web-based FOSS assets library													
Conduct an assessment of the goals of pre-selected pilot projects and the resources required for accomplishing them. Based on this assessment, further decisions are to be taken (e.g., project's budget and scope, software and hardware selection, people involved, possibility of local language content, etc.)													
Publicize piloted projects													
Develop a clear plan for each pilot project													
Conduct a periodic evaluation on each project's progress													
Initiate and Sustain Education and Training to build Competitive FOSS Capacity													
Identify and evaluate institutions that could provide different FOSS training and skills development													
Determine skills gaps and courses													

to be offered in schools, universities, and other sectors												
Perform a study to conclude capacity and quality of training courses, and to match courses with institutions according to pre-set policies												
Decide on the business models to be shaped with the Industry to promote FOSS use in Research Projects at Training Institutions/Universities/.etc.												
Develop a Capable Infrastructure for adoption of FOSS												
Evaluate the current status of IT infrastructure in Uganda to assess readiness for the adoption of FOSS in the public and private sectors as well as for individuals												
Conduct feasibility, design and implement FOSS Competence Centers												
Investigate opportunities for the widespread use and adoption of												

the Internet and increasing bandwidth													
Identify infrastructure requirements for FOSS implementation													
Research the possibility for content and software localization													
Study the ability to develop FOSS through Cloud computing over the three cloud service levels: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS)													
In case of migration to cloud computing, investigate and research on information security and decide on specific considerations													
Identify and Maintain Funding to support the Strategy													
Conduct a study to estimate the budget for the primary phase of implementation													

Research other funding opportunities from different resources (consider expected amounts and preferable projects)												
Write proposals for funding opportunities from international donors												
Analyze ways for joining regional and international initiatives and projects												
Participate in regional and international forums and conferences												
Empowerment of Small and Medium Enterprises (SMEs) in the ICT Industry												
Develop and inventory of ICT SMEs utilizing FOSS												
Establish national programmes to assist and advise the ICT industry on the development of FOSS-based solutions and services based basing on market needs												
Develop periodic publications directed to SMEs to inform them												

about different FOSS support services and motivating policies													
Identify market needs in the Egyptian ICT market where FOSS-based solutions and services can be leveraged													
Collaboration with the Civil Society													
Identify NGOs involved in FOSS practices in Uganda, regionally and internationally													
Indicate means of collaboration with them and shed light on promoting and building on their successful initiatives													

6. Challenges and Proposed Mitigations

The implementation of FOSS in Uganda is still in its infancy and is subsequently faced with challenges, the most critical challenges include amongst others; the market, awareness, education, training and business know-how for FOSS start-up companies.

No.	Challenge	Proposed Mitigation
1	<p>Market</p> <p>Lack of enabling business environment that provides stronger market presence within the existing eco-system.</p>	<ul style="list-style-type: none"> • Incentives • Preferential treatment
2	<p>Awareness</p> <p>Insufficient awareness of the FOSS and its benefits</p>	<ul style="list-style-type: none"> • Public awareness campaigns that are targeted towards various audiences (detailing benefits) – National, Business and Personal levels • Harmonization of FOSS in the national primary and secondary curriculum will ensure that they are embraced by future generations. • Fostering stronger links between FOSS companies, universities, IT and non-IT companies and civil society to ensure maximum awareness building through networking.
3	<p>Human Capital</p> <p>Limited pool of adequate FOSS developers with the necessary skill level to harness the potential that FOSS has to offer as a catalyst for development</p>	<ul style="list-style-type: none"> • Expansion of the exposure of FOSS within the entire educational system at all levels • Business Skills development
4	<p>Migration Resistance</p> <ul style="list-style-type: none"> • Switching cost (mainly training) • Psychological barriers • Infrastructure (interoperability/alignment with other systems) 	<ul style="list-style-type: none"> • Standardization

Annex 1. Summary of Experience of FOSS in other countries

The following is a list summarizing lessons learned from the experience of other countries (Malaysia, South Africa, United Kingdom, Australia, Brazil, India, United States of America, etc.)

- Orchestrating a successful strategic plan involves three stages: planning, trial (pilot phase), and realization
- Gradual implementation of strategic plan to iron out any mishaps or loose ends before full implementation phase
- Lower success rates in countries like South Africa can be attested to inadequate planning and lack of preparedness with a detailed implementation plan, as employees found many things left unanswered and were thus unsure of how to go about doing that
- Creation of a virtual “Knowledge Sharing Bank” by which different institutions, departments and ministerial branches can share their experiences dealing with FOSS and proprietary platforms so as to have an governmental based archive and reference for future procurement instances
- Clarity in procurement procedures is a must
- Publishing detailed brochures and documents explaining reasons and benefits behind FOSS acquisition creating well-informed employees and reducing uncertainty and confusion
- Transparency regarding acceptance of contracts, as opaqueness, blocks the ability to assess contract fairness and cost reduction impact
- The “re-use” policy of licensing is a practical principal
- Establishment of “open standards” as a necessary means of ensuring interoperability
- Ensuring adequate coordination between relevant institutions is important to minimize problems
- Harboring an open and competitive market will allow FOSS to thrive
- Emphasizing the philosophy of using ICT to empower and uplift the marginalized is important for a developing country like Uganda

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