

Policy and Change Management Implications in Building a Continental-wide eHealth Network in Africa: What Can We Learn from NEPAD e-Schools Programme?

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Abstract: This paper focuses on how to ensure the sustainability of an African-wide eHealth Network as envisioned by Africa Union Commission in its development strategic plans. A network of this magnitude is expected to improve health service sector in Africa. Three externally driven initiatives that have been proposed as a response to this challenge are thus introduced and, a European Union backed one is then adopted as a case study for furthering this paper's objective. This case is then explored as a mirror for other proposed initiatives for their due consideration of factors mediating eHealth and ICT projects' sustainability in Africa. Evaluation findings from extant NEPAD e-Schools and national e-Government projects diffusion are then employed for devising African-derived lessons for influencing the sustainability of these proposed initiatives. These lessons classified under *institutional, human capital and infrastructural* factors are thus presented to concerned policy makers and AeHI programmes leaders and implementers on the continent.

Keywords: Sustainability, eHealth implementation, policy and change management factors, policy makers, private implementers, Africa.

1. Introduction

The use of Information and Communication Technologies (ICTs) in health has been termed as eHealth by the World Health Organisation (WHO) [1]. The WHO's eHealth objective is being influenced by the globally developed Millennium Development Goals' (MDGs) agenda of deploying ICTs for development (ICT4D) especially in developing regions of the world [1, 2].

However, there is a need to link this global agenda with realities at the local African level for the sake of sustainable development. Locally in Africa, eHealth has also been on the agenda even before the MDGs-driven impetus. For example the African Development Forum (ADF) of the United Nations Economic Commission for Africa (UNECA) in 1999 situated the eHealth agenda within the continent's developmental goals [3]. But this did not seem to catch the attention of mainstream policy and decision makers at national levels and collectively at the continental level. However, this nonchalant attitude has since been replaced by a new proactive change at the continental policy making level in Africa.

This policy making shift is exemplified by the African Union New Partnership for Africa's Development (NEPAD) agenda. NEPAD, influenced by these aforementioned

global drivers, in particular the MDGs' ICT4D agenda, has made eHealth development a strategic priority. The NEPAD Health Strategy [4], in lamenting the poor state of health systems in Africa, argued for the use of affordable and appropriate ICTs for building Africa's health systems.

This poor state of African health system is exemplified by the challenges of combating the triple burden of chronic and infectious diseases facing their populations on the continent [5]. Scarce financial resources, coupled with the massive brain drain that has led to the loss of mostly high and medium level health workers [6], has further coloured this picture. The major burdens on the health system in Africa are the diseases highlighted in the UN's Millennium Development Goals (MDGs) [2]. These diseases put national health systems under severe strain and have impacted on the fabric of society [5]. For example, HIV/AIDS accounted for 2.4 million deaths in 2002, and malaria-related mortality is not far behind with one million deaths (mostly children) recorded yearly [4].

1.1 NEPAD's eHealth Initiative

The NEPAD strategy also recognises the potentials of eHealth for improving patients' care, and for inducing health human resource and health system performance improvement. Further, NEPAD's Strategy on Health Sector [7] supports eHealth development to be facilitated by collaborative alliance with the telecommunication sector. In particular, the plan to build an Africa-wide eHealth infrastructure (AeHI) is the totem of this intended alliance.

As a consequence, NEPAD in collaboration with international bodies have started been developing plans on making this vision of an AeHI to come into fruition. These proposed projects include the World Health Organisation (WHO) led Africa Health Infoway (AHI) [8], the Indian Government backed Pan Africa e-Network [9] and the Telemed Task Force (TFF) initiated and European Union (EU) backed eHealth for Africa project [10]. Generally, these projects are in their early planning stages except for the Indian led one which has commenced pilots in Ethiopia [11]. They all propose to build an AeHI mostly based on satellite networks. Proof of concepts is proposed to be evaluated in pilot projects through private implementers. These are generally laudable ideas and initiatives that must be nurtured and supported for the benefits of Africa's public health sector development.

However, the NEPAD e-School programme, similar in scope and scale to this AeHI vision has been recently evaluated of becoming another white elephant project in Africa [12]. This therefore means that implementing a project of this intended magnitude might not after all a stroll in a park. Hence, unravelling the *process* that might be involved in implementing a large-scale ICT-driven project in Africa is the aim of this paper. Also, as these proposed initiatives are still infantile in nature a policy framework on influencing their planned implementation is also required in order to ensure their sustainability.

Process here means noting, capturing and integrating relevant contextual environmental and organisational issues (macro-level) relevant to ICT-enabled service innovation (micro-level) within the African milieu. Understanding this *process* could also provide a means of ensuring that the goal of AeHI comes into fruition. Moreover, any ensued knowledge could also be used to influence these proposed pilot' implementations and their eventual planned replication. This could also be employed to influence policy development at the relevant levels within Africa. Perhaps, a better way of understanding *process* is to learn from extant initiatives of similar magnitude usually from the same environment. Evaluation outcomes of ICT implementations from Africa will henceforth be analysed and adopted for this purpose. Again, the NEPAD e-Schools programme is an extant one that fits this purpose.

Chijioke (2007) [13, 14] following a comprehensive comparative evaluation and review of this with other extant and successful e-Schools projects in Africa came up with some foods for thought. Policy and management strategy grounded in lessons accrued from these

extant projects was argued as an approach to have been taken by NEPAD before the commencement of its e-Schools programme. He further argued that the excessive focus on ICTs as an end for achieving the educational service innovation goal and failure to understand the roles of contextual organisational and environmental factors in service innovation and policy development were major identified foibles. He finally asserted that the long-term sustainability of ICTs-led service innovation programmes like the NEPAD e-Schools one would be better ensured by building on extant national physical and political infrastructures. Supporting this assertion is the finding of an evaluative study on e-Government initiatives diffusion in an African country by Ifinedo (2007) [15]. This work has further extended the sustainability discourse to include other factors classified under *institutional/organizational*, *human capital* and *infrastructural* themes. Consequently, findings from this work together with valuable “good practices” insights from the NEPAD e-Schools evaluation are structured under these themes for Africa’s policymakers and AeHI implementers’ benefits. In addition, these thematic focuses are further employed here to deepen the narratives of proposing policy and management strategy recommendations for ensuring the proposed AeHI’s sustainability.

This end is thus argued here as important to the inclusive and quality healthcare delivery policy of AU/NEPAD. Kifle et. al. (2008) [16] in an extensive scoping of African-based and Diaspora health stakeholders’ views on eHealth benefits came up with the following. That eHealth could enable cost-effective delivery of health services and efficient performance of health workers and improve health system productivity in Africa. These potential benefits, they reasoned are more relevant to essential health service delivery in rural Africa. Ensuring AeHI sustainability should therefore be strategic priority for policymakers and implementers in Africa. Hence, Chijioke’s policy development critique of an integrated macro-micro levels perspective is of relevance here and will set the tone for the remainder of this article.

2. Aim

The overall aim of this paper is to propose a framework for safeguarding the sustainability of the proposed AeHI projects based on knowledge derived from the evaluation of similar ICT projects implementation in Africa.

The rest of the paper is as follows: the next section will present and classify the NEPAD e-Schools and Ifinedo’s findings under three broad domains; policy implications and recommendations and key change management lessons from the NEPAD e-Schools in implementing a sustainable AeHI are then presented in the following sections respectively. The penultimate section is focussed on issues relevant to ensuring post-pilots sustainability of AeHI and finally the concluding section.

3. Introducing NEPAD e-Schools Programme

The NEPAD e-School is a recent attempt at building a continental-wide IT-led service infrastructure in Africa. The NEPAD e-School project is one of three main e-Africa Commission initiatives that were conceived in 2003 with the aim of building a networked continental-wide e-Education infrastructure in Africa [13]. Specifically, the aim was to employ satellite-telecommunication infrastructure for connecting together an estimated 600,000 African primary and secondary schools within Africa. Aside, insights from proposed pilot projects were hoped to provide valuable lessons into understanding the *process* of building an infrastructure of this gigantic nature. This objective has since been expressed in pilot projects by selected consortia made up of mostly global private organizations. Presently, 16 African countries since the year 2005 have hosted these pilot projects. The expectation duration of the pilots was set at one year. However, this set

timetable has become unachievable due to the involved actors' failure to learn from extant relevant knowledge and projects.

A comprehensive work in progress evaluation report has recently been released by the influential and reputable Commonwealth of Learning and InfoDev/World Bank organisations. The report released in May 2007 [12] reviews the *process* of implementation of pilot projects in six selected African countries. Employing case study analysis, valuable insights into the inherent complexity of how an initiative of the proposed AeHI magnitude could turn out to be even at the level of few pilot projects. It can therefore be deduced from this analysis that building a continental-wide infrastructure is a task of momentous magnitude.

Fortuitously, the valuable insightful findings from the evaluation report could form a basis for developing a policy and management framework for the AeHI proposed implementation. As these findings were presented in an unstructured manner unfit for easy grasp, the Ifinedo (2007) [15] constructs will then be employed for bridging this gap. The constructs developed based on reviewing and evaluating the emerging e-Government projects in Nigeria is proposed here as an extant nationally derived e-Governance model. This approach also concurs with the TTF willingness of learning from extant model from the continent.

The constructs classified as *institutional or organisational; human capacity and infrastructural support* factors identifies and captures *structures* that either enables or constrains e-Government projects' diffusion in Nigeria. The combination of the findings from NEPAD's e-School report with these classified constructs will thus be employed for the purpose of developing a policy and management recommendations. Findings from these two studies are henceforth presented below in Table 1 for the benefits of interested policy makers and even implementers. It is hoped that these findings will be considered as guidelines for influencing policy developments on sustainable AeHI programme implementers and other ICT-driven ones.

It can be observed from Table 1 that the findings from the two studies are alike in many aspects. However, a cursory look reveals that their level of observation of the issue at hand is binary. The Ifinedo findings [15] on the left side of table 1 seem more of a macro-level observation while the NEPAD e-School evaluation could be likened to micro-level observation. That is-the e-School evaluation could be seen as a microscopic view of an extant programme while Ifinedo's could mostly be described as in telescopic nature. These two dichotomous yet complementary views could however be regarded as snapshots of factors that could either constrain or enable IT implementation sustainability and in Africa [17, 18]. Moreover, developing ICT for development policy based on integrating these views is a of recommended "good practice" in developing countries [18].

Table 1: A summary of the evaluation findings of the NEPAD e-School and Nigeria e-Government evaluation studies both classified under the Ifinedo (2007) constructs

Ifinedo findings	NEPAD e-School evaluation findings
<p>Institutional/Organisational factors</p> <ol style="list-style-type: none"> 1. The importance of favourable national ICT, regional economic and e-governance policy frameworks development 2. The centrality of political will and leadership especially at the national and local government level to IT project diffusion 3. The influence of policy and decision makers capacity building on sustainable policy development and IT diffusion 4. The management impacts of competent technocrat and national coordinating body on IT diffusion 5. The creation of an enabling multi-stakeholder environment 6. The contributory impact of enabling legal and regulatory framework in telecommunication sector development 7. The relevance of both local and global public-private partnerships (PPPs) 	<p>Institutional/Organisational factors</p> <ol style="list-style-type: none"> 1. The importance of efficient project management infrastructure including project leadership for IT project implementation 2. The importance of committed continental and national leadership and coordination for project implementation 3. The importance of effective communication between stakeholders 4. The need to learn from extant and similar initiatives before implementation 5. The importance of national readiness for project implementation 6. The importance of success expectation moderation and management 7. The need to carry out prior needs assessment within the service system 8. The contextualization of central implementation model to local realities due to wide socio-economic and cultural diversity of Africa
<p>Human capital factors</p> <ol style="list-style-type: none"> 1. The development of the required and relevant human resources skills and knowledge 2. The alleviation of poverty in the general population for improving and enabling their purchasing power and participation respectively <p>The relevance of sustainable foreign technical expertise transfer</p>	<p>Human capital factors</p> <ol style="list-style-type: none"> 1. The importance relevant skilled workforce for project implementation 2. The importance of intended end-users' cooperation and buy-in into the project's objectives
<p>Infrastructural provision factors</p> <ol style="list-style-type: none"> 1. The centrality of nationally-led telecommunication structure development 2. The provision of broadband telecommunication infrastructure access points (Fiber-optics) 3. The relevance of locally made IT components such as computers for improving accessibility 4. The centrality of sustainable power and energy generation to IT diffusion 5. The relevance of promoting regional telecommunication agglomeration 6. The importance of financial infrastructure especially locally sourced finances and foreign direct investment 	<p>Infrastructural provision factors</p> <ol style="list-style-type: none"> 1. The importance of adequate financial resources for effective project management leadership 2. The importance of local partnerships with extant organised civil societies, community based organisations and businesses 3. The availability and development of contextually relevant contents for the network

4. Policy Analysis and Change Management Recommendations

The view of integrated macro-micro levels presented in the previous section is also shared within the eHealth research and practice domains [19]. Therefore, these findings presented here as *institutional, human capital and infrastructural* factors in Table 1 should be seen as complementary with each others. Findings under the institutional factors are the importance of building on extant local national policy and regulatory infrastructures, engaging with key policy makers at different governmental are complementary to both levels of analysis. The

importance of technocrats' management to ICT initiatives success could also be complementary with IT project management.

The relevance of managerial and technical skilled and well trained workforce is complementary under the *human capital* factors. Finally, financial and telecommunication infrastructures were found to be pertinent to ICT sustainability at both micro and macro levels. Similar findings have also been implicated in eHealth projects in Africa [20]. High costs of end-user computers and positive regulation of telecommunication infrastructure development are commonly identified by Chijioke (2007) [13] and Ifinedo (2007) [15] as influencing ICT sustainability in Africa. However, high costs of end-user devices have been mitigated by competition provided by local production to foreign importation of computers in Nigeria [15]. Moreover, the local production and maintenance of equipments has been argued as central to the long-term sustainability of ICT projects in Africa [13].

Collectively, these factors have also been widely investigated to either enable or constrain eHealth projects' sustainability outcomes in Africa [21, 22].

Micro-level derived knowledge are usually regarded over macro level derived ones especially in an environment like Africa where dynamic and emergent elements could be major determinants of ICT projects' sustainability [18]. Therefore, a call is now being made to policy makers at national and continental levels in Africa to note the role of integrative micro-macro approach to ICT policy and strategy development. In addition, micro-level derived knowledge is also regarded as important to the effective management of implementing large-scale ICT projects in developing countries [18].

5. Key Change Management Lessons

The NEPAD e-School again provides some valuable management insights into this *process*. The first lesson to learn is that ambitious objectives would not play out as expected as a consequent of the negative influence of those previously listed micro-macro level factors. Prior notice of these factors during project planning *process* is recommended as central to sustainability of an ICT initiative of the AeHI magnitude. The next section will henceforth presents valuable change management insights from the NEPAD e-School evaluation.

5.1 Programme Leadership and Management

AeHI programme leaders should ensure that a robust project management package manned by competent workforce is put in place at the initial planning stage. This is to forestall the kind of implementation complexity that bedevils the conduct of the e-School programme [12]. Negotiating and securing the commitment of senior leadership at the continental, national and local levels of implementation before programme initiation is also important. A good practice is to promote and ensure collaborative leadership at these levels through the creation of coordination bodies and national resource persons. Further, AeHI leaders should expect their roles to be altered during and after the pilot stages, as it observed in e-Schools programme [12].

5.1.1 Choosing the Right Leadership Style

Generally, AeHI leaders should adopt a more proactive and directive approach in steering the ship of their AeHI programme. Any contrary leadership approach might be detrimental to achieving the set-out objectives. This managerial weakness was observed in the e-Schools programme as an issue [12].

5.2 Ensuring Essential Resources

Successful implementation of a programme of AeHI's magnitude depends on the availability of secured and adequate financial and competent human resources [12].

Therefore, these two resources should be well accounted for before implementing any AeHI proposal. Financial insecurity also weakened the NEPAD's leadership control in influencing the programme's trajectory and its position in commissioning work on post pilot replication business plan development [12]. It is therefore recommended that AeHI leaders should ensure that funds are well resourced and securely for meeting these ends before programme initiation. For to-be AeHI's implementers, the possibility of an extra-budgetary spending could be an inevitable one. For example, a member of the e-Schools private consortium reported spending beyond its initially allocated budget and with an output incommensurable with its investments

5.3 Ensuring Intra-National Collaborative Workings

National leadership should ensure collaborative working between primary responsible ministry and secondary ones. For example a Ministry of Health should collaborate with Telecommunications and Science and Technology ones. Ministries, aside from the primary one are to be brought on-board for effective programme implementation. Most importantly, developing cooperative partnership with Ministries of Finance is required to ensure smooth procurement process during programme implementation [12].

5.4 Ensuring Effective Communication and Information Exchange

The lack of an enabling and capable platform for supporting communication and information exchange amongst the different and distributed project partners could result in project timetable slippage [12]. Effective communication is even more important during projects' implementation as set objectives are modified by circumstances. Therefore, AeHI programme leaders should ensure that any alteration in objectives must duly and promptly negotiated with and communicated to relevant stakeholders for prosperity sake.

5.5 Maintaining Control on Programme Objectives

If any project AeHI leadership intends to invite and commission consortia in implementing the proposed pilots, these key lessons must be heeded. Firstly, expected outcomes must be clearly presented and communicated to the consortia. Developing and maintaining and monitoring of standards with competing consortia must be ensured during pilot implementations is a second one. Thirdly, developing collaborative partnerships with local and national coordinating bodies in ensuring strict adherence to these standards is a good practice [12]. However, centrally-defined standard must be flexible to extant local and national policies and programmes. Therefore, the AeHI leadership should that ensure that pilot projects are amenable to extant local and national political and economic infrastructures in order to safeguard post-pilot local ownership and sustainability.

5.6 Choosing Appropriate Telecommunication Infrastructures

The sole choice of satellite telecommunication infrastructure (SIT) for providing connectivity was observed to be unsustainable in the NEPAD e-Schools programme [12]. This- was put to prohibitive costs of internet access subscription. Building on and encouraging competition amongst extant and emerging terrestrial wireless/mobile telecommunication infrastructures is recommended alternative [13]. Experience from the MuTI Telehealth pilot project [20] also supports this.. In addition, internet access and backhaul services can be obtained from the increasingly available fibre-optics cables on the continent.

5.7 Building and Managing Collaborative Partnerships

If any AeHI project leadership intends to invite and commission private consortia in implementing the proposed pilots, managing their relationship with public health organizations could be a complex task. Managing the power imbalances and conflict of interests between private consortia and public agencies on programme implementation trajectories could be a complex task. Private consortia with their financial muscle might want to fashion the programme to suit their own business interests. The following are suggested antidotes. Firstly, AeHI leadership must ensure that pre-implementation collective agenda are set, strictly adhered to and any changes effectively communicated to all partners. Secondly, strong leadership is required to ensure that private consortia comply and integrate with extant public ministerial and policy infrastructures. For example, AeHI consortia must comply with extant national and regional health policies and ministries of health regulations. Finally, it must be borne in mind that sustainable PPP requires time and patience to gel and work.

5.8 Learning from Local Experience

AeHI leaders must ensure that their programme objectives are developed based on lessons learnt from past and extant eHealth projects on the continent. In hindsight, this was identified as a blind spot in the NEPAD e-School implementation [12]. In addition, leaders and implementers alike must expect that any set objectives will be challenged by contingent local conditions during the implementation. eHealth best practices from other developing regions of the world should also be considered.

5.9 Managing Dashed Hopes

Any AeHI leader that is looking towards their commissioned private consortia to come up with a service model that could be replicated elsewhere after an initial pilot phase, must have rethink. Insights from the e-Schools pilot evaluation reveals that this might not play out as expected [12]. Implementers' hopes can also be dashed- most private consortia also accepted that their experience from the pilots were not worth replicating elsewhere. Again, an effective e project management strategy will go a long way in forestalling this happenstance.

5.10 Embracing Local Engagement and Collaboration

The failure of the e-Schools implementers to actively engage and collaborate with local Civil Society Organization (CSOs) and non-governmental organizations (NGOs) contributed to its reported poor implementation outcomes [12]. Their experiential knowledge and expertise on e-Education implementations was thought could have altered positively the direction of the e-Schools programme. It is recommended that AeHI leaders and implementers should imbibe the spirit of collaborative and engagement with relevant local organizations.

5.11 Understanding the State of National eHealth Readiness

Unprepared participating countries were another major cause of slippage in overall timetable of the e-School pilot projects [12]. Therefore, countries' readiness to participate in multinational and multi-stakeholder project of the AeHI nature should be ascertained before programme initiation. Ascertaining the eHealth readiness of prospective health organization is also important.

6. Ensuring Post-pilots Sustainability

Ensuring that implementation sites have a sustainable financial model in place before pilots' termination is must for the AeHI leaders and to be implementers. It was observed that project sites could not cope with major and recurrent expenditure after the completion of the e-Schools' pilots [12]. The high costs of capital and recurrent expenditures on purchase and maintenance of equipment was the fingered culprit. Therefore, as a strategic import, AeHI leaders' are henceforth encouraged to include in their business plan financial models for post-pilot sustainability at the implementation sites.

The possibility of local sites adapting the implemented service model to their available financial resources and use requirements should also be expected by AeHI leaders and to-be implementers. For example, this unintended behaviour was observed in the e-Schools programme [12]. Regarding this behavioural shift as one with both a positive and negative outlook is a recommendation to the interested parties alike.

Positive in that it can be assumed that the model has been successfully owned by the specific organization to the extent that local customization is being attempted. Alternatively, the observed downsizing could also be seen as being forced by circumstances rather than by necessity. Further, this- could also diminish the ability of the end-users to maximally benefit from the intended objectives of the project. Take for example; an originally installed VSAT- supported real-time teleconsultation eHealth service between a rural health worker and an urban based specialist. Subscription cost of which was probably paid for by an implementer during a pilot phase might not be sustainable in the post-pilot phase as experience as previously shown in Africa [12]. Coupled with the known fact that Africa's health system are under--resourced, a possible shift towards an e-mail based store and forward model could be an inevitable outcome. This could however be a costly one, as in an instance of a medical emergency; this might be an appropriate option. As instant consultation cannot be initiated with an e-mail one, time lost could be impact negatively on patients' outcomes. Developing innovative pricing models in collaboration with telecom operators and embracing alternative cost-effective connectivity solutions are thus recommended for consideration.

The possibility of a post-pilots role change should also be noted by AeHI's leaders and implementers. Private pilot operators were observed to mutate from being implementers to business partners at the completion of their pilot projects [12]. This possible role shift from a philanthropic to that of commercial one should also make AeHI leaders to mutate from a "facilitator" to that of a "mediator".

7. Conclusions

Meeting Africa's health needs requires exploitation of innovative ideas as that of the AeHI concept. The successful achievement of this idea is argued to be dependent on the behavioural change of policy makers and implementers. That is their willingness to imbibe the habits of accommodating valuable insights from past and extant ICT projects evaluation in their new initiatives.

For any national and local policy makers and programme leaders hosting AeHI programme within their jurisdiction, considering the factors presented in Table 1 in their policy development dealings would go a long way in ensuring sustainable AeHI implementations. The need to ensure that externally driven programme (AeHi) conforms with extant financial and legal policies, providing programme leadership, building skilled human resources and providing affordable telecommunication infrastructure are major policy implications worthy of emulation. African policy makers should also ensure that collaboration and cooperation amongst the proposed three AeHI initiatives are promoted

and encouraged. This is to ensure that their limited resources and efforts are not fragmented but rather directed at building a sustainable AeHI for meeting Africa's health needs.

For to-be AeHI implementers, the change management lessons derived from the experience of NEPAD e-Schools implementers are recommended for emulation. Ensuring the optimal availability of financial and human resources, conforming to programme standards and yet flexible to local realities and implementing with affordable and locally available ICT infrastructure are factors relevant to post-pilots sustainability.

Finally, ensuring sustainability of these proposed AeHI is to be seen as integral to Africa's capability in meeting the set targets of the MDGs in a timely manner. Therefore, all hands should be on deck to make this a reality.

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