

SUPPORTING AFRICAN DIGITAL LIBRARY PROJECTS: EXPERIENCES FROM THE FIELD

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Abstract

This paper outlines the activities of the African Digital Library Support Network (ADLSN) in enhancing knowledge access by promoting and assisting the development of low-cost digital libraries in Africa. It aims to stimulate practical discussion on how digital library projects can be run in Africa in a collaborative way. It focuses on the milestones and challenges of the ADLSN, starting by narrating events leading to the formation of the network, its structure and its strategic directions. The notion of National Centres through which the Network grew is discussed and the financing of activities is addressed. The paper examines some of the barriers that must be taken into account when developing digital libraries and also makes recommendations for policies related to collaborative national and/or regional digital library projects.

The paper uses a qualitative approach and is based on the personal experiences and observations of the authors together with some informal interviews and document analysis.

Introduction

There is growing evidence that massive progress has been made in the last few years to improve access to the increasing quantities of electronic information resources in Africa (Rosenberg, 2006). This paper outlines the activities of the African Digital Library Support Network (ADLSN) in enhancing knowledge access by promoting and assisting the development of low-cost digital libraries in Africa.

What is a Digital Library?

Digital libraries can be defined in several ways. Some researchers say that they are probably too young to be defined in any permanent way (Seadle and Greifeneder,

2007). IFLA (2010) defines a digital library (DL) as “an online collection of digital objects, of assured quality, that are created or collected and managed according to internationally accepted principles for collection development and made accessible in a coherent and sustainable manner, supported by services necessary to allow users to retrieve and exploit the resources.” In this paper a DL is viewed “as an organized collection of information, a focused collection of digital objects, including text, video, and audio, along with methods for access and retrieval, and for selection, organisation, and maintenance of the collection.” (Witten and Bainbridge, 2003)

The need for digital libraries

The rapid growth and use of information and the extensive utilization of varied information sources characterise the emerging information society (Mutula, 2004). It has also been argued that the lack of adequate information has worsened social development problem in Africa (Kavulya, 2007). Digital libraries can assist in the creation of local content and promote availability and preservation of content. This can play an important role in dissemination of national and international information in civil society and by institutions in the fields of education, science and culture, making them a key technology especially in developing countries (Katsirikou and Skiadas, 2010). African countries, for example, can fill the information gaps in various sectors by putting in place DLs to facilitate better information gathering, processing, distribution, access and application (Kavulya, 2007). As such, national governments, intergovernmental organisations and sponsors are encouraged by IFLA (2011) to recognise the strategic importance of digital libraries and to actively support their development. World governments have pledged to harness the new opportunities of the information age to create equitable societies through better access to information by means of UNESCO’s Information For All Programme (IFAP), one objective of which is to “promote and widen access to information in the public domain through the organisation, digitization and preservation of information” (UNESCO, n.d.).

Digital library software: Greenstone

Greenstone is an Open Source suite of software for building and distributing digital library collections (New Zealand Digital Library Project, n.d.). It was first developed at the University of Waikato in New Zealand in 1996 as part of the New Zealand Digital Library Project and has continued to be maintained and enhanced since then. The aim of the software is to empower users in universities, libraries, archives and other public service institutions to build their own digital libraries. UNESCO (Paris) promotes Greenstone under its IFAP mentioned above and the software is also distributed with the Food and Agricultural Organisation (FAO) *Information Management Resource Kit* (2005) through its Rome office.

As with much Open Source software, Greenstone also has a (virtual) community globally and, increasingly, regionally. There are at least three regional support groups for Greenstone, one each in Africa, South Asia and South America.

Formation of the Support Network

In 2004 Dynal Patel, then a senior student at the Computer Science Department of the University of Cape Town, South Africa, conceptualised a Greenstone support organisation for Africa (GSOA). The objectives of the proposed organisation were to:

1. Promote the use of Greenstone DL software;
2. Support African users in initiating, developing and sustaining DL projects;
3. Provide a permanent training resource facility to back up national training efforts;
4. Develop and maintain an African DL portal;
5. Encourage the availability of developmental content on the Internet and on removable media;
6. Collaborate with both local and international institutions;
7. Organise general promotional awareness-building activities on Free and Open Source Software (FOSS), seen as a vehicle for increasing collaboration and technical know-how, creating wealth and attracting foreign investment in Africa (Peters, 2006).

Patel proposed three phases for realisation as shown in Table 1 below:

Table 1. Proposed phases for realisation of Greenstone Support Organisation for Africa (GSOA)

Phase	Description
One	A comprehensive feasibility study with the support of an advisory panel of African specialists
Two	Preparing facilities and resources
Three	Launch of services, start of monitoring, reaching sustainability

Following a UNESCO grant to the University of Waikato, the first phase, a feasibility study into establishing a digital library support organisation for Africa, was subcontracted, to Digital Innovation South Africa (DISA), and an Africa-wide survey was conducted in 2005. An extensive report was published the following year.

Some of the conclusions in the report were that:

- The study's outcome mandated a digital library support organisation for Africa to build a support infrastructure for the management of digital content.
- Over and above content building, a DL support organisation in Africa would have to give some attention to building human capacity that was clearly lacking in order to provide the necessary information services required.
- There is lack of management experience among digital library practitioners. This mandates a DL support organisation to address the need for a digital environment that is managed both strategically and operationally. The managed digital environment should also reflect a commitment to providing long-term access to electronic resources (Peters, 2006).

Peters' study came to the following conclusion:

There is now an urgent need to attract further funding to this GSOA initiative to support digital library development in Africa that will enable the creation and management of electronic information resources, to preserve the heritage of indigenous knowledge in a global information society, and strengthen the mechanisms and capacity of civil society (Peters, 2006:37).

Given these outcomes, Patel's second and third phases of realisation could then be undertaken. The Koha Foundation in the United States offered start-up funding and the recently established eIFL-FOSS program (eIFL FOSS, n.d.) took on the role of

executing agency at the start of the 2007-2008 pilot project for the Southern African region. This led to the formation of the Southern African Greenstone Support Network (SAGSN). Dr John Rose (Research Fellow with the University of Waikato and retired UNESCO staffer) served as international coordinator, assisted by an Advisory Committee that was made up of experts from within Africa and abroad.

At this time the University of Namibia (UNAM) Library, by virtue of its existing Greenstone experience, was chosen as the SAGSN Regional Centre. Three other National Centres were identified, namely, in Zimbabwe the National University of Science and Technology (NUST) Library, in Malawi the Bunda College of Agriculture and, in Lesotho, jointly the National University of Lesotho and the Lesotho College of Education.

In October 2007, a kick-off training workshop for trainers was held at UNAM. This was led by the Greenstone originator, Professor Ian Witten from the University of Waikato, and drew participants from the National Centres mentioned above. The “train the trainer” approach quickly had a spin-off: the Zimbabwean National Centre workshop facilitated by Amos Kujenga and Dr Elisha Chiware after the UNAM training led to their being engaged by UNESCO as facilitators for a regional workshop in the Seychelles in 2008, marking the start of a long-standing relationship between SAGSN/ADLSN and UNESCO initiatives in Africa.

Over the period of the pilot project, governance of the support initiative changed and new levels were introduced. Having started with only an international project coordinator, the new level of coordinating centre was introduced (the University of Namibia Library), followed by the level of National Centre (Zimbabwe, Malawi, and Lesotho), followed in turn by additional countries who were invited to join and build their own national centres (Zambia, Swaziland, Botswana, Mauritius, Tanzania and Mozambique). This governance structure and the different roles and responsibilities, such as decision making and end-responsibility, were subsequently discussed as needing the following:

- simplification, by taking out the top level of regional centre but keeping the national centres and knitting these loosely together;
- further clarification and definition of roles and responsibilities at the national level; and
- coaching, in order to best take up these roles and responsibilities, particularly in those countries on the brink of joining the support initiative

As a way of monitoring (Dynal Patel’s third phase), the UNAM Library issued an electronic survey that was aimed at obtaining a picture of the state of digital libraries in southern Africa. It focused on determining the user needs of institutions and

information professionals regarding training and support, and solicited feedback on SAGSN's future development and financing. The survey was carried out under the guidance of Dr John Rose assisted by Renate Morgenstern and Repke de Vries (ADLSN, 2009).

Survey outcomes and discussion at a 2008 National Centres face-to-face meeting stressed the importance of the Support Network's website¹ and discussion list² for remote assistance (by National Centre understanding of a library's local circumstances and availability for other forms of assistance); dissemination of information (sharing solutions and experiences); and promotion purposes.

Strengthening and extending the Support Network

This new phase was again funded by the Koha Foundation and ran as a project from 2009 to 2010 under the continuing eIFL-FOSS aegis. It had the following aims:

- To strengthen the existing National Centres and networks in Southern Africa through centre-specific investments and activities;
- To start longer term support of the use of Greenstone by other African countries through the expertise located in existing National Centres, through means ranging from remote assistance to on-site visits, as well as facilitating locally organised training;
- To extend the network by facilitating candidate National Centres in organising start-up training for their countries along with neighbouring ones, and setting up support;
- To actively seek the network's expertise and support for growing the numbers of operational Greenstone digital collections, to benefit both creation of and access to African local content;
- To work towards a self-reliant and self-sufficient network of National Centres in a broad landscape of libraries, archives and museums by 2010.

Cascading principle

The intention was to involve more countries and be open to other sectors interested in digital libraries, such as archives and museums. This phase not only pioneered training for, and followed up on, trainees coming from within a National Centre country and the more familiar library sector of a Centre, but also followed up on those coming from

¹ Website hosting, it was felt, should have a (southern) African domain name and express the Support Initiative's unique identity; UNAM Library spearheaded the SAGSN website in 2007, but after UNAM had to withdraw later the partnership with eIFL FOSS offered an alternative; a 2011 new partnership with KIT Library presently realises adlsn.org

² On this email list everyone participating in the Support Network shares anything related to digitisation and digital libraries and in particular Greenstone. The list is intended for both beginners and the more experienced, and for all professions that design, implement, maintain and market digital libraries as well as create its digital content: librarians, archivists, museum curators, IT departments etc.

neighbouring countries and other sectors. Trainees from countries new to the Network pioneered the double task of taking digital library first steps at their own institution and taking the lead at the national level. This proved the cascading principle to be both challenging and effective.

Repositioning the Support Network: from SAGSN to ADLSN

At the conclusion of the second project in 2010, another National Centres face-to-face meeting evaluated the full 2007-2010 period, initiated a name change for the Support Network, and refined some of its goals and objectives.

Under its new name, the African Digital Library Support Network (ADLSN) has the vision to “be a leading network in the development of digital content in Africa” and the mission to “facilitate access to local digital content in Africa by means of open source software”.

Among the Strategic Objectives for 2010–2013 is extending the network to other countries in Africa, the continued promotion of digital collections development, and providing technical support for Open Source DL (and related) applications as tools to build these collections. ADLSN will also seek to give advice on funding opportunities, sustainability and best practices in managing DLs. Extending the network will need strategic partnerships and some external funding. Sustainability of digital collections will need institutional budgeting and funded external hosting to bootstrap global access where relevant. Continuing the range of services provided by National Centres, mixed financing is sought after: fee-based services (such as training and consultancy), contributions and financial support from national or international funding.

In the same period (2010-2013) ADLSN will be legally established as a foundation with a corresponding governance model. To avoid introducing another level above that of the National Centres, there will be no physical offices. A core group of National Centre representatives has chief responsibility. An International Partnership Coordinator and a Regional Coordinator are liaison officers³.

In a sense both the name change and the repositioning take up elements of Dynal Patel’s original 2004 proposal and build on the 2005 GSOA Feasibility Study’s main conclusion mentioned earlier.

The Support Network’s National Centres

³ The International Partnership Coordinator and Regional Coordinator can be contacted at info@adlsn.org



Figure 1. ADLSN National Centres

Each ADLSN National Centre

- has a leading national position in associations, consortia, and any other networks promoting and supporting digital library activity at both policy and implementation levels;
- has the position, intention and facilities to organise digital library and digitization training events with trainees being drawn nationally and from neighbouring countries;
- has the position, intention and facilities to follow up and support trainees in building digital library applications or undertaking digitization at their respective library or archive; and
- commits itself institutionally to seek and maintain active ADLSN membership.

Support through training

One of the Network's major activities has been and continues to be training, mainly through workshops at various levels (national and regional), as well as on-demand and through internships as recommended in Rosenberg's study (Rosenburg, 2006). From workshop evaluations, reports and discussions among National Centre representatives, the following lessons have been learned:

1. Workshop content and planning: an ideal format takes 4 to 5 days and has to cover broader digital library issues plus hands-on activities such as learning to actually apply software (such as Greenstone or OCR) and learning how to perform digitization basics; training workshop content has to be different for

librarians and for IT staff; higher management advocacy needs an entirely different approach and should precede staff training.

2. Differences in background and expertise: librarians (archivists) and IT people do not mix easily. This is an issue that needs to be addressed both in training and in workplace collaboration, since DLs need the expertise of both these two groups; another observation comments on the wide differences in general computer skills and levels of automation at the home institutions of trainees.
3. Alternatives to centralised workshop teaching are an important additional training instrument: site visits, one-on-one assistance (Zimbabwe experienced this); internships where those (one or more) new to digital libraries stay for some time at a more experienced institution (experienced in Lesotho where staff were sent to DISA in South Africa).

A valuable training resource is the Digital Librarian's Toolbox. This Greenstone-based DVD containing resources on Greenstone and on digital libraries in general was developed within ADLSN. The resources include grey literature in the form of documents, presentations, and multimedia material on DLs. The tool has a twofold purpose:

- It acts as a training tool and helps learners to understand what Greenstone can do. The ability to develop CDRom-, DVD- or USB stick-distributable collections is one of Greenstone's unique and strongest features.
- It acts as a source of documentation that learners can use after initial training.

Other Support

Technical follow-up support is given in a number of ways, including on-site visits, emails (shared through the mailing list or one-on-one off-list), chat facilities and also via telephone.

The Support Network's Partnerships

ADLSN has strong roots in the international Greenstone community whose base is at the University of Waikato's Computer Science Department. From these roots ADLSN has branched off new partnerships.

- **eIFL.net Partnership**

This is mainly through the eIFL-FOSS programme, which seeks to raise awareness of and advocate for the use of Free and Open Source (FOSS) software in libraries in developing and transition countries, to maximise access to knowledge. As mentioned earlier, ADLSN was conceived through this programme and to date it continues to enjoy coverage at eIFL-FOSS events. The eIFL-OA programme is a partner too, particularly in the promotion of Institutional Repositories as tools for supporting Open Access. This resonates well with the words of Ezema (2011) who recently identified the building of institutional open archives repositories as a new

way of disseminating research findings in many developed countries, yet African countries had not made much use of it.

In addition, many of the institutions engaged in ADLSN activities participate in the eIFL consortia, which have been established in a number of African countries.

- **UNESCO Partnership**

Libraries are encouraged by IFLA to “collaborate with other cultural and scientific heritage institutions to provide rich and diverse digital resources that support education and research, tourism and the creative industries” (IFLA, 2011). ADLSN has worked closely with UNESCO since 2008. The collaboration has been in the form of ADLSN facilitating UNESCO-sponsored training workshops and on-site implementation of projects. To date collaborative work has been done in Kenya, Tanzania, Eritrea, Seychelles, Mauritius, and Zambia. This has resulted in about 170 people from 10 countries being trained. Some of the activities are described briefly in Table 2 overleaf.

Table 2. ADLSN collaboration with UNESCO: activities by country

Country	Comments
Eritrea	A national workshop was held in 2010, drawing participants mainly from government institutions around the country.
Kenya	At least three workshops have been conducted since 2008 using ADLSN expertise. These in part included initial setting up of systems.
Mauritius	A workshop was conducted in 2009, drawing participants from Madagascar and Comoros islands. Another one was held in April 2011 as part of a larger project to establish an information sharing platform for the Indian Ocean Island Countries and also drew participants from Seychelles and Madagascar. UNESCO also provided equipment for the project and helped secure a hosting service.
Seychelles	One regional workshop was conducted in 2008. The foreign participants were from Mauritius and Madagascar.
Tanzania	Two workshops were conducted in 2010 as part of a joint UNESCO-UN project to set up digital libraries for the sharing of information on the environment by various stakeholders in Tanzania. UNESCO provided some equipment for the project. ADLSN expertise also assisted with on-site technical support and initial project implementation.
Zambia	A workshop was held in Lusaka in 2011 for countries in the Great Lakes Region. Foreign participants were from Kenya, Tanzania, Uganda, and Angola. These were then referred to local experts for post-workshop assistance. The event was part of a larger project to build a digital library to diffuse resources and publications on gender and peace-building throughout the region (UNESCO, n.d.). Another workshop was later held in Kinshasa for the French-speaking members of the same region.

▪ **KIT Library Partnership**

A recent collaboration is that between ADLSN and the Dutch Royal Tropical Institute (KIT) ICT for Development Program at KIT Library. One area of this collaboration is the Institutional Repository Communication Platform for Africa (KIT, n.d.) , one of the outcomes of the Open Access Repositories Capacity Strengthening Programme (OA-IRCP), a joint initiative of the Association of African Universities (AAU) headquartered in Ghana, and KIT. Another is KIT Library support for some of the ADLSN technical infrastructure.

Challenges

In the light of information needs for developing countries, access to knowledge can help to create stronger social, economic and technical infrastructures that are crucial in the development process (Chan and Costa, 2005). One of the ultimate aims of digitization and building digital libraries or repositories is access: bringing information and user together. To get to this stage and make the digital library sustainable, resources and skills are needed. These resources and skills very much depend on:

- The characteristics of the main user group and facilities available to them: how computer literate they are and which type of PC equipment and connectivity is available; how dispersed the user group is: are they in the same building, on the same campus or is the audience international or even global?
- The type of information: digitizing text differs from digitizing audio, still images, video; information could be in born-digital form; access demands for text and multi-media differ;
- The subject matter: this comprises a broad range, from past exam papers to information on health, to cultural heritage, to African academic research output;
- The life cycle stage of the digital library: is it being conceptualised, planned, implemented or is it operational, needing to be sustained?

On the ground, very different challenges are therefore presented.

In 2009 eIFL.net did case studies into Low Cost Digitization projects to answer the question of how libraries in eIFL countries can manage digitization projects given the cost and policy requirements (Vries and Hirshon, 2009). Through its training workshops, insight in institutional digitization plans and post-training follow-up activities, ADLSN too identified a few common, major challenges that can only be met through collaborative projects and programmes and not resolved at the level of the single institution alone. At the same time however, and at that institutional level, higher management should make clear, informed and strategic choices for electronic information access and publishing.

Challenges include:

- Choosing between applications: at the very beginning of the digital library life cycle, strategic decisions are taken and deciding for one Free and Open Source "access to information" software solution and FOSS community or another, is one such decision. Many in ADLSN participating institutions have been caught in the middle, failing to decide which software to use for their digitization projects as a result of the availability of different FOSS software applications. To manage the situation, ADLSN suggested the development of a "choice matrix" to assist institutions in deciding which application is best suited for their

particular needs. Confusion was frequently experienced in deciding between major players like Greenstone and DSpace when building different types of digital libraries. This area of decision-making will continue to need significant attention, the more so as new solutions such as INVENIO (INVENIO, n.d.) arise, especially in Francophone Africa. INVENIO is a joint project between UNESCO and CERN (the European organization for nuclear research), which aims to promote the development of DLs in Africa.

- Lack of technical infrastructure: though many if not most software needs can be met with FOSS solutions, equipment (hardware) is a different story. Digitization cannot be carried out without a scanner, and a digital library or repository has to run on a suitable server computer. This challenge proves relatively easy to meet with one-time funding, as ADLSN has done in the past few years. UNESCO has contributed in similar fashion by providing equipment, for example, in Tanzania (UN Joint Programme on the Environment) and in Mauritius (for the Indian Ocean Islands). The Support Network also piloted a national lending scheme of equipment acquired by National Centres.
- Low technical skills levels: as indicated by Dynal Patel's findings and also highlighted by other researchers, the technical skills levels in many African information centres are generally low. ADLSN has contributed positively to the improvement of technical skills levels through facilitation of training workshops that typically involve librarians and information technology practitioners. Site visits have also proved to be an effective way to minimise the effects of this problem: technical issues that remained unresolved after attempts via remote assistance were tackled face-to-face. Internships are another way to mediate the skills issue and in such cases one or two persons from one institution were sent to another more experienced centre where they worked for around two weeks and received on-the-job training in processes such as scanning.
- Poor connectivity: for those DLs that are online, poor Internet connectivity, leading to low visibility and/or usage levels, can affect access. However, the installation of the Seacom undersea fibre-optic cable has greatly eased the problem of low Internet speeds in many parts of the continent. Costs in some areas however remain prohibitive.
- Hosting: if the subject matter has potential beyond local usage and audiences are potentially global, but local technical and infrastructural resources are limited, external hosting solutions are needed to make information accessible over the web. As an example, the Indian Ocean Islands DL is externally hosted courtesy of UNESCO, and some of the Senegalese ADLSN National Centre Greenstone collections are hosted at BEEP (Luigi, n.d.), an IRD initiative in

France. A large scale African hosting initiative seems to be a very welcome collaborative project, to complement and in the long term to replace international kick-start solutions.

- Copyright ownership and copyright clearance: first indications are that with an increase of African digital libraries that open themselves to global access on the web, these two issues will become more and more of a stumbling block. Timely measures are needed to remedy issues of ownership in particular. At many African universities for example, ownership of research output is with the authors, not with the university. Copyright clearance therefore has to be negotiated individually and cannot be centrally arranged by, for example, applying one of the Creative Commons copy left licenses collectively.
- Sustainability: however large or small, locally or globally used the digital library service may be, the user expects continuity and today's service to be there tomorrow. The service has to be sustained and as budgets currently tend to be cut, issues to do with sustainability become more and more crucial. This is not only financial but also involves, for example, the retention of human resources. In the extreme case of Zimbabwe, most of the technical people trained during the first national workshop soon left their institutions without having achieved much. This was at a time when the national economy was in tatters. Generally speaking, institutional commitment initiated by supportive higher management and in turn supported by commitment at the national level, is very important for underpinning of sustainability.
- Low skills levels amongst information professionals: African Library Schools are generally lagging behind in training librarians for the digital age (Chware, 2007). Rosenberg (2006) has highlighted the fact that LIS school leavers lack the necessary ICT-related knowledge and skills as a result of outdated curricula in the ICT area. Overall, there is a general lack of appreciation of what is required when establishing DLs, leading to projects receiving low priorities institutionally. To improve the situation, ADLSN-facilitated workshops have evolved to include, for example, group exercises on planning for DLs. Starting in 2010 and through collaboration with ADLSN, Greenstone became part of the curriculum at the School of Library, Archives, and Documentation Studies (SLADS) in Bagamoyo, Tanzania. The school has over 200 students and this move should bear some positive results. Advocacy workshops targeting top managers have been another strategy employed to tackle the problem.

Recommendations

ADLSN recommends that:

- Programmes should be demand driven and results-oriented, and should start with advocacy, targeting top management and policy makers in participating institutions;
- Projects should include provision of collaborative hosting solutions to ensure global access to African knowledge produced in local digital libraries;
- Training initiatives should target the right people;
- Library schools must be engaged and encouraged to align their curricula to incorporate emerging technologies.

Conclusion

Digital libraries can play a significant part in helping to develop the African continent. However, top management in African institutions will need to support DL initiatives by giving them the institutional support they badly need in order to succeed.

References

- ADLSN (2009) *Outcomes SAGreenstone Survey 2008*, [Online], Available: <http://adlsn.org/project-outcomes-2007-2008> [31 October 2011].
- Chan, L. and Costa, S. (2005). Participation in the global knowledge commons: challenges and opportunities for research dissemination in developing countries, *New Library World*, vol. 106, no. 1210/1211, pp. 141-163.
- Chigona, W. and Licker, P. (2008). Using diffusion of innovations framework to explain communal computing facilities adoption among the urban poor, *MIT Press*, vol. 4, no. 3, Spring/Summer, pp. 57-73.
- Chiware, E. (2007). Training librarians for the digital age in African university libraries, Pre-IFLA Satellite Meeting, Durban.
- DISA Digital Innovation South Africa, [Online], Available: <http://www.disa.ukzn.ac.za/>
- eIFL FOSS. eIFL-FOSS [Online], Available at <http://www.eifl.net/foss> [21 October 2011].
- Ezema, I. (2011). Building open access institutional repositories for global visibility of Nigerian scholarly publication. *Library Review*, vol. 60, no. 6, pp. 473-485.
- IFLA (2010) IFLA Manifesto for Digital Libraries. [Online], Available: <http://www.ifla.org/en/publications/ifla-manifesto-for-digital-libraries> [24 October 2011].
- INVENIO. INVENIO, [Online], Available: <http://invenio-software.org/> [30 October 2011].
- Katsirikou, A. and Skiadas, C. (2010). Qualitative and quantitative methods in libraries: theory and applications. Proceedings of the international conference on QQML2009, Singapore, 93.
- Kavulya, J. (2007). Digital libraries and development in sub-Saharan Africa: a review of challenges and strategies. *The Electronic Library*, vol. 25, no. 3, pp. 299-315.
- KIT Open Access repositories: capacity strengthening programme for Africa (OA - IRCSP), [Online], Available: <http://ir-africa.info/> [02 November 2011].
- Luigi, P. Electronic libraries in partnership: BEEP for Africa. [Online], Available: <http://www.nai.uu.se/ecas-4/panels/141-156/panel-145/Pier-Luigi-Rossi-full-paper.pdf> [28 October 2011].

- Missingham, R. (2006). Library and information science: skills for twenty-first century professionals. *Library Management*, vol. 27, no. 4/5, pp. 257-268.
- Mutula, S. (2004). IT diffusion in sub-Saharan Africa: implications for developing and managing digital libraries. *New Library World*, vol. 105, no. 1202/1203, pp. 281-289.
- New Zealand Digital Library Project *Greenstone*, [Online], Available: <http://www.greenstone.org/> [16 October 2011].
- Peters, D. (2006). Feasibility study on the establishment of a Greenstone support organization for Africa (GSOA), January. [Online], Available: <http://www.greenstone.org/docs/GSOA%20Feasibility%20Study.pdf> [21 October 2011].
- Peters, D. and Norbert Lossau, N. (2011). DRIVER: building a sustainable infrastructure for global repositories. *The Electronic Library*, vol. 29, no. 2, pp. 249-260.
- Rosenberg, D. (2006). Towards the digital library in Africa. *The Electronic Library*, vol. 24, no. 3, pp. 289-293.
- Seadle, M. and Greifeneder, E. (2007). Defining a digital library. *Library Hi Tech*, vol. 25, no. 2, pp. 169-173.
- UNESCO.(2007). Information for All Programme (IFAP), [Online], Available: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/mow/mow_3rd_international_conference_dietrich_schuller_ifap_en.pdf [02 November 2011].
- UNESCO. Regional Research and Documentation Centre for Women, Gender and Peace-building in Kinshasa, Democratic Republic of the Congo. [Online], Available: <http://www.unesco.org/new/en/social-and-human-sciences/themes/human-rights/gender-equality/gender-peace-and-conflict/regional-centre-great-lakes-region/> [24 October 2011].
- Vries, R. and Hirshon, A. (2009). eIFL case studies on low cost digitization projects: final report. [Online], Available: <http://www.eifl.net/news/case-studies-low-cost-digitization-projects> [30 October 2011].
- Witten, I. and Bainbridge, D. (2003). *How to build a digital library*, San Francisco: Morgan Kaufmann Publishers.