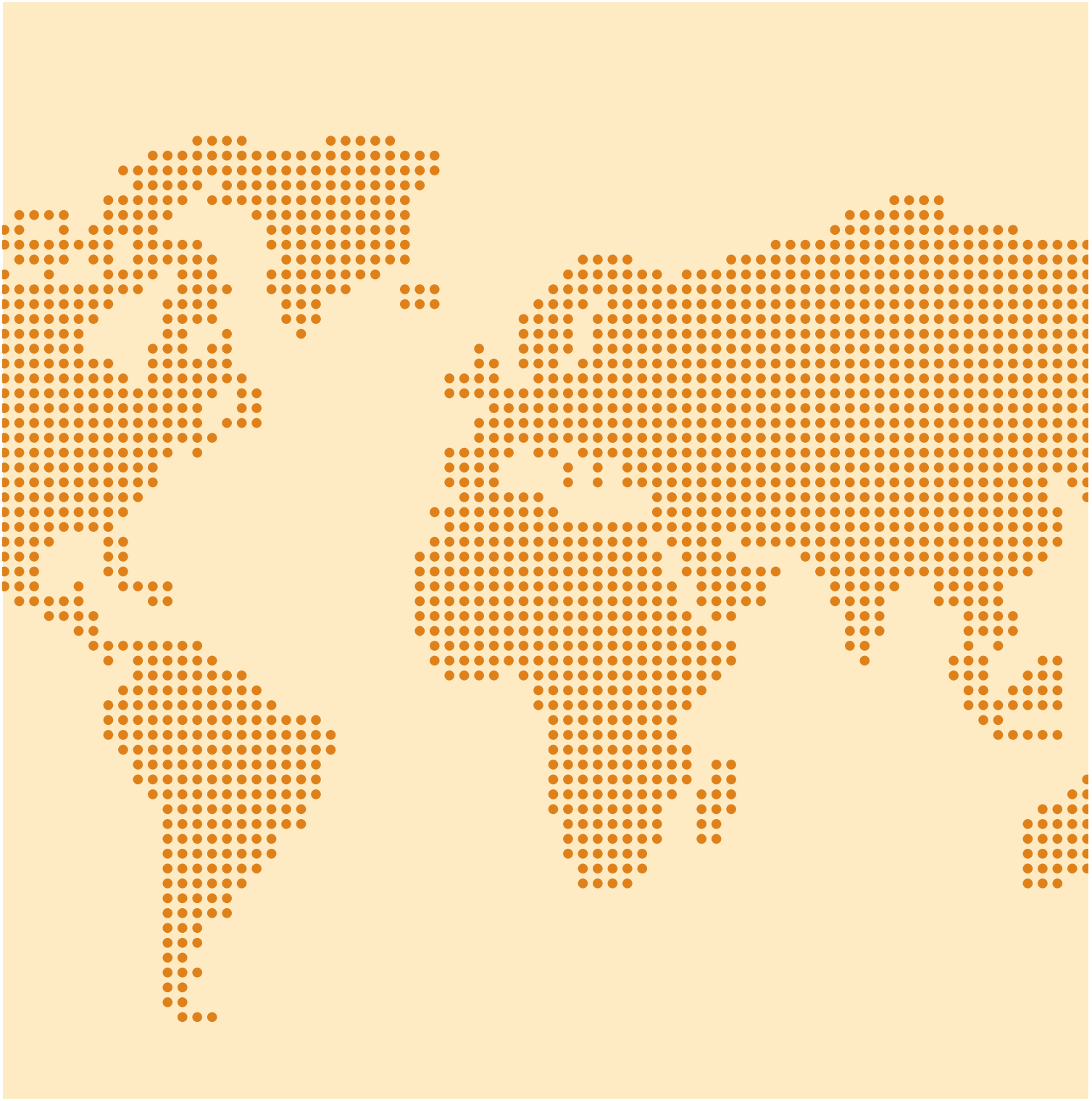

2010:02 Sida Review

FF Tusubira
Nora Mulira
Ali Ndwalana

External Assessment of the Sida Supported Research Cooperation Project

Information Communication Technology (ICT) at Universidad Mayor de San Andrés, UMSA, La Paz, Bolivia

Sida

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Authors: FF Tusubira, Nora Mulira, Ali Ndwalana.
The views and interpretations expressed in this report are the authors' and do not necessarily reflect those of the Swedish International Development Cooperation Agency, Sida.

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SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

Address: SE-105 25 Stockholm, Sweden.
Visiting address: Valhallavägen 199.
Phone: +46 (0)8-698 50 00. Fax: +46 (0)8-20 88 64.
www.sida.se sida@sida.se

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Finally we extend our gratitude to Sida for having availed us the opportunity to share the hands-on best practice and experience we have acquired through leading the deployment of ICT at Makerere University and other higher education institutions at the national, regional and international levels.

The UMSATIC project is a large and multi-faceted, in a large and old university with varied challenges. We, as far as possible validated our findings with all key actors. We take full responsibility for any missed details, errors and omissions in this report are still possible.

F.F. Tusubira Nora Mulira Ali Ndiwalana
Knowledge Consulting Ltd

Acronyms and Abbreviations

Term	Description
CEPIES	Centro Psicopedagogico y de Investigación en Educación Superior
CIDES	Postgrado en Ciencias del Desarrollo CIDES-UMSA
CLARA	Latin American Cooperation of Advanced Networks
DIPGIS	Departamento de Invetigación, Postgrado e Interacción Social (Department of Investigation, Graduate and Social Interaction)
DTIC	Departmento de Tecnologia de Informacion Comuncaciones (DTIC)
Gbps	Gigabits per second
ICT	Information & Communication Technology
Kbps	Kilobits per second
KOHA	Open Source Information Library System
LAN	Local Area Network
MARC	Library Catalogue System
Mbps	Megabits per second
SUI-UMSA	Information Unit at Mayor de San Andrés University
UMSA	Universidad Mayor de San Andrés
UMSATIC	Information of Technologies Implementation and Communication program in the Mayor de San Andrés University
UMSS	Universidad Mayor de San Simón

Executive Summary

1 Background

The Universidad Mayor de San Andres (UMSA) has a student population of 75,112 (47.1% female) and is the largest and most prestigious institution of higher education in Bolivia. The Swedish Agency for International Development (Sida) has been supporting UMSA in the implementation of its Information and Communication Technology (ICT) Project, UMSATIC, since 2003. SEK 20 million and SEK 10 million was approved for in the first and second phases respectively. While the funds for Phase 1 were fully disbursed by the end of 2006, actual implementation delayed and a lot of the activities were carried over to the Phase 2 period: indeed Lund University returned SEK 4,452,000 Phase 1 funds that had been disbursed through it to Sida. Approved Phase 2 funding was SEK 10 MSEK million, of which SEK 4,740,000 has been disbursed at the time of the evaluation. The evaluation presented in this report relied on an examination of documents related to the project, teleconferences with key players in Sweden, and face-to-face discussions during a one-week mission to UMSA.

2 The Evaluation

The evaluation examined progress and achievements within two frameworks. One framework looked at the output end of the intervention in terms of effectiveness, efficiency, impact, relevance, sustainability, and contribution to Sida programmes as well as higher education in Bolivia. The second framework looked at process issues around developing the ICT policy and master plan; creating awareness, ownership, and addressing mind set; developing general and specialist capacity; developing a sustainability strategy; project management; and implementing information systems and other university-wide applications.

3 Findings Relating to the Project Elements

3.1 The Policy and Master Plan

There are awareness gaps about both the first (2003) and the second (2009) ICT Policy and Master Plan. While Deans were consulted, the majority of the university and, more importantly, functional owners and end users of the systems and services implemented under UMSATIC were not consulted. The lack of inclusiveness in the policy consultation process undermines university wide awareness and ownership as well as the promotion of access and use of common network services. There is an urgent need to create a common knowledge of ICT and UMSATIC.

3.2 Data Communication Infrastructure and Internet/Intranet services

The data communication infrastructure consisting of 45km of optical fibre connecting campus buildings within La Paz along with the associated local area networks in different buildings has been easily the most successful component of UMSATIC. Most of the implementation started during 2007. Utilisation however remains a major challenge, apparently because the network still lacks the intranet content that would add value.

Central connectivity is only 2.8Mbps (in Europe, this total capacity would be considered barely sufficient for 14 connected PCs), but faculties individually have an additional total of about 21 Mbps paid for using faculty resources. There is urgent need to agree on and implement common network services and systems that should and can be provided by the university network so that the investment in its implementation can be justified.

3.3 The Library

It is evident that very significant success had been achieved in implementing the Library system. The Koha[1] library system, an open source system that could be locally adapted to the needs of UMSA was adopted. Out of 24 libraries, 18 had been networked and migrated to the Koha platform. The Library is now online, and there is ongoing training for both Librarians and users.

3.4 Administrative Information Systems

There was a plan to upgrade and/or develop the administrative information systems – Academic, Finance, and Human Resource management – that the university had started on before the beginning of UMSATIC. However UMSA did not have the budget for permanent programmers who would be needed for such a major undertaking in a large and complex institution. Projects like the finance system appear to have been shelved. The Academic management system also experienced major challenges: the decentralised nature and autonomy of faculties at UMSA made consensus difficult, with some faculties developing and using their own systems. The student registration system had been completed as a locally developed application. Administrative information systems face many challenges, but the biggest obstacle to realising effective use of the administrative information systems is integration and standardisation across faculties that are autonomous. It is also evident that, despite the best of intentions, efforts, and the high level of commitment, the development of information systems is being approached in a silo fashion that will hinder the required interoperability in the future. This appears to be due to a lack of appreciation of the challenges of, and good approaches to information system implementation in large organisations.

3.5 E-learning

The E-learning project began in 2008. A draft E-learning policy was put in place and a large training workshop for 90 teachers was conducted during November 2008. Apart from this, no other implementation activity has taken place – apparently due to the absence of a clear leadership and a champion. Some faculties, like the Faculty of Medicine have taken their own initiative to adopt faculty based E-learning.

3.6 ICT Support Unit

A very significant anomaly is that until 2006, the dedicated unit where expertise for Information Resource Management (IRM) resides had not been established. Reliance was put on external consultants for implementation, depriving UMSA of one of the most important phases of technical capacity building. Indeed, this can be said with certainty to be a major contributing factor to many of the delays and shortcomings observed. The current shift to reliance on internal human resource rather than consultants is a very positive change for continuity and sustainability of ICT. DTIC's utilisation of students in implementing network projects is a very important step in creating a sustainable pool of skilled human resource to fulfil its mandate. A very positive factor is the enthusiasm and commitment of the DTIC staff that, while recognising the challenges, appears competent and motivated towards providing technical support for both UMSATIC and the university.

3.7 Sustainability

To date, not enough attention has been focused on sustainability, making it an area where UMSA will require significant senior management attention. It was discussed by UMSA Management, SPIDER and Sida that UMSA has to take the lead in formulating sustainability policies in order for the project to grow beyond Sida funding.

3.8 Project Implementation Issues: Project Management and Procurement

Project management has been a challenge from the start due a combination of factors relating to: lack of the requisite skills; frequent changes in key players; the reporting hierarchy in UMSA that has had

[1] Koha is an open source library management system: http://www.koha.org/

instances of lack of clarity about lines of reporting and responsibility; communication and documentation gaps, with significant delays in communicating information that is critical to smooth project management; and a transient human resource. This is the result of an organisational culture where personnel in key positions are changed whenever the leadership changes.

The lack of continuity of key personnel during this major transformational undertaking was particularly disabling. While there were other challenges, we see these changes as the biggest contributing factor to the limited progress of UMSATIC especially from 2003–2006. Implementation started in an unclear framework, which had no clear path of responsibility and guidance.

Many respondents mentioned the bureaucracy of equipment procurement for this and other projects as a major barrier to timely implementation. This was later overcome by permitting the Swedish Cooperating Institution (now SPIDER) to handle the procurements and export the equipment to Bolivia. Such procurements include the recent acquisition of some network equipment and servers for the E-UMSA portal. It should however be noted that this is not a long-term solution: internal procedures that enable timely procurement have to be developed by UMSA.

4. Findings within a best practice framework

4.1 Awareness, mindset, and ownership

It was apparent that the awareness workshops so far conducted about UMSATIC did not involve the majority of critical stakeholders, based on the input from many of those interviewed. There is a need to develop awareness for ICT as a means of creating efficiency and cost-effectiveness. Formally organized awareness workshops with demonstrations also help a lot in addressing mindset problems. The awareness workshops will additionally provide opportunity for creating ownership if they are used to take into account feedback from the university community about the revised policy and master plan, the relevance of the proposed projects, the agreement on priorities in a resource-limited environment, and the agreement among autonomous faculties about areas of working with a common ICT agenda.

4.2 Commitment of Top Management

The active participation in this assessment as well as the stated and visible enthusiasm of the current Rector and Vice-Rector for the ICT project and appreciation of its potential for driving the university's core mandates is a good sign for taking up recommendations and reducing the bureaucratic red tape to resolve hurdles to project continuity, provided they take timely action.

4.3 Policy and Master Plan

UMSA's ICT project deployment has been implemented in a policy vacuum: while there was an ICT policy in 2003, now revised in the 2009 document, the UMSA Strategic Plan does not reflect ICT as a priority. Secondly, the Master Plan is a basis for seeking funding support from multiple development partners, since it is unlikely that any single partner would be able to fully fund such an expensive undertaking. The University Strategic Plan will have to be re-addressed to respond to the question: "Is ICT a strategic priority?" If it is not so reflected, mobilisation of funding will be very difficult.

4.4 Planning for Sustainability

UMSA is yet to devise and implement a responsive approach to the challenge of sustainability. It is important that the policy addresses the specifics of how sufficient funding will be raised to sustain services and systems. *UMSA has to stop looking at UMSATIC as a Sida-funded project and actively seek additional funding from other sources to support a well-developed Master Plan that also reflects the strategic priorities of the university.* It must be realised that reliance on one development partner is a major risk.

There is also a need to focus on increasing internal resource allocation so that, in the fairly short term, UMSA covers all recurrent costs related to ICT services and systems. The guiding principle that should

be followed is that while development partners can be asked to support the initial capital costs, they should never be asked to support recurrent costs, unless it is in the very short term.

4.5 Capacity building

There have been some efforts at both End-User Training, without which the resources would not be gainfully exploited, and within DTIC, without which the availability of the resources would not be assured. Both have however been limited by a rather ad hoc approach for the former, and the use of transient staff and consultants for the latter.

There is a need for DTIC staff to develop people, public relations, and conceptual skills. Best practice shows that IRM leaders need to combine the normal IRM technical skills with a high level of organizational knowledge, conceptual ability, and a pioneering spirit.

4.6 Implementing Information Systems

UMSA urgently requires value addition of relevant and shared information systems on top of the network infrastructure in order to create university institutional efficiency. Information systems always pose the biggest implementation challenge and are the most likely area of failure. The Deans need to come together to agree on applications that will enable common benefit: the current practice of using the autonomy of the faculties to hinder cooperation will compromise UMSA's strategic relevance in the 21st century.

5. Specific Responses to Issues raised by Sida

5.1 Effectiveness and Efficiency

Key outputs to-date are the data infrastructure consisting of the backbone, LANs, and active devices; the library system; an established support unit, DTIC, along with the initial core personnel; connectivity to the internet, albeit still with a limited bandwidth; and a basic operational network. This has however taken three times the initially planned time to achieve, pointing to a low efficiency of delivery. The planned outputs that can be grouped as the "creation of an effective intranet" have not yet been fully achieved. E-learning implementation also remains outstanding.

It is clear that since SPIDER became the collaborating institution all efforts have been made to get maximum benefit from available funding, including procurement through SPIDER. There are however two reservations: SEK 508,000 expended by Lund before SPIDER took over for institutional overheads when they did not deliver on the commitments and indeed returned the major project funds (SEK 4,452,000) to Sida; and the extensive use of consultants external to UMSA. The latter one is not so much about the funds utilised as the opportunities for capacity building for UMSA's own staff that have been lost: such capacity will have to be built at additional cost.

5.2 Impact

Objective assessment of impact requires monitoring over time and cannot be established from the evaluation snapshot. We had to rely on a subjective and anecdotal approach. There is increased awareness of the benefits of integrating ICT into the research, learning, administration and management. There is also a growing number of people who rely on ICT services and systems in their day-to-day activities. In the fast adapting faculties like medicine (which has implemented the recommended Faculty ICT Committee), there is a visible impact on the methods of work, research, and instruction. This however does not extend university-wide.

5.3 Relevance

Campus networks and Internet connectivity are key elements of research infrastructure. There can therefore be no question about the relevance of the intervention to the promotion of research and research collaboration. This also applies to the Library project, including access to online resources.

The creation of an ICT-enabled education and research environment challenges those involved in all university processes to acquire the necessary skills, and therefore drives people to become more competent. From the discussions held with the people with whom we interacted at UMSA, there is agreement that this is happening at UMSA, both through formal training and self-led learning. UMSA has also been working on the registration system (using internal resources), and this, while not yet a comprehensive system, has eased the burden of fully manual operations.

5.4 Sustainability

This is an outstanding challenge for UMSA. Some progress has now been made through the institutionalisation of DTIC and the reduction of reliance on external consultants, but a comprehensive sustainability strategy still has to be addressed.

5.5 Contribution to Sida (Support to Research Programmes) and Higher Education

The generation of an increasingly ICT literate population will have a positive impact on the national economy and national development. This is an important element among the wider objectives of Sida's support to Bolivia. The initiative of UMSA to work with the other large university, Universidad Mayor de San Simón (UMSS) is a positive step in extending the benefits of Sida support. It has been however already noted that serious implementation did not start until 2007: it is still too early for impact to be felt outside UMSA.

5.6 Future Projects and Continuing Support by Sida

The importance of developing a comprehensive policy and master plan that is owned by the UMSA community has been emphasized.

There is no doubt that there have been a lot of challenges in the implementation of UMSATIC. We would however argue that most of these are environmental, a proper examination of which, at the outset of the project, would have enabled the correct prediction of the challenges that arose later. The question arises: why was this not done? The assumption would have been that the expert guidance from the collaborating institution in Sweden is there specifically to give guidance about these very issues: there was failure in this.

The pros for continuing support include: the fact that UMSA is the major human resource provider in Bolivia and support to it has national impact; the reality that implementation in real terms started only three years ago, too short a time to achieve all that is expected, especially considering the environmental challenges; and DTIC has just been formalised as a unit that still needs a lot of capacity development is the major investment is not to be wasted.

It is our strong view that the pros for continuing support outweigh the cons, and that Sida should continue providing support to future ICT projects at UMSA. We however qualify this by recommending that any such support should depend on UMSA taking the necessary steps to address the strategic positioning of ICT in the university plans; to develop and implement a sustainability strategy; to engage other development partners; to have buy-in from the autonomous faculties evidenced by formal agreement; and implement an effective oversight and reporting structure with assurance of the elimination of frequent changes.

1 Introduction

1.1 Background

The Swedish Agency for International Development (Sida), has been supporting the Universidad Mayor de San Andres (UMSA) in the implementation of its ICT Project, UMSATIC, since 2003. The first phase of the project (UMSATIC I) initiated in collaboration with Lund University (later replaced by SPIDER) and running from 2003–March 2007 was followed by Phase 2 (UMSATIC II), running from April 2007 to December 2010. UMSATIC I was projected to cost SEK 20 million, the bulk of which was meant for infrastructure provision, while UMSATIC II (that also included elements of UMSATIC 1 that were never implemented) was estimated to cost SEK 10 million. While the funds for Phase 1 were fully disbursed by the end of 2006, actual implementation delayed and a lot of the activities were carried over to the Phase 2 period. Lund University actually returned SEK 4,452,000 Phase 1 funds that had been disbursed through it to Sida. Of the approved Phase 2 funding, SEK 4,740,000 had been disbursed at the time of the evaluation.

One of the agreed activities of UMSATIC 2 (the current phase) was to be an external evaluation of the project to guide both corrective action where required and to provide Sida with an external view of the progress and possibilities of the programme they have supported. This report captures the background, the methodology, the findings, and the recommendations of the external evaluators. The evaluation, including the onsite assessment, was carried out during the period February to April 2009.

1.2 Objectives of the Evaluation

The evaluation, covering the period 2002 to 2009, was aimed at addressing the following issues with respect to Sida support to UMSATIC:

1.2.1 Effectiveness and Efficiency

This examines the extent to which the original goals have been achieved, and identifies causes where goals have not been met. It also examines efficiency of utilization of funding, and whether or not results match and therefore justify the cost.

A related issue is complementarities with support by other donors. It looks into the question of whether or not donor support from multiple sources is used to address different elements of a coordinated overall plan.

1.2.2 Impact

Impact focuses on how investment in ICT has affected the core activities of the university, namely research, training/education, as well as library functions and administration. This includes the human resource, technical and financial aspects. It also examines intended and unintended, positive and negative effects of ICT support to UMSA in terms of Internet connectivity, capacity, awareness, demand and policy.

1.2.3 Relevance

Relevance is determined by the extent to which the ICT project conforms to the needs of the university community and their research activities in particular, and also to the needs of training/education, administration and library functions. Relevance will specifically address effects on computer literacy, library services, and administrative functions.

1.2.4 Sustainability

Sustainability is related to matters of institutionalization, feasibility of securing further funding and broader issues of institutional commitment and support.

ICT is both capital-intensive and maintenance driven, making sustainability key to successful implementation and long-term exploitation. It addresses the continuing availability of ICT enabled resource – human, technical, and financial – to assure that services are maintained through proper management, control, and maintenance practice. It specifically relates to the availability of sufficient and technically competent staff; resources for perfective, preventive, and corrective maintenance; resources for assuring sufficient international bandwidth; resources for maintaining valid software licenses; and resources for addressing obsolescence as well as gradual expansion. It also includes strategies for raising funds and internal income generation.

1.2.5 Contribution to Sida Research Support Programmes

The motivation for Sida's support to ICT is the recognition that without ICT, research and research collaboration become very inefficient and therefore ineffective. ICT, with intra and internal connectivity, is therefore a key element of research infrastructure. The impact of ICT on the research programmes supported by Sida at UMSA is also discussed

1.2.6 Contribution to Higher Education

UMSA is a leader in Bolivia, and other institutions of higher learning would emulate positive developments at UMSA. The evaluation then also responds to the question: "To what extent has the ICT programme at UMSA been emulated by others, and how has it enabled opportunities for inter-university collaborations?"

1.2.7 Future Projects

This is an examination of future ICT projects at UMSA including funding options that UMSA needs to pursue after the end of Sida support; and, for Sida, an examination of the merits and demerits of providing funding still available under UMSATIC II.

1.3 Evaluation within a Best Practice Framework

In addition to the specific evaluation question raised by Sida, we extended the evaluation to include what we have developed, based on our experience, as a best practice framework for the implementation of ICT projects[2] in volatile environments, where volatility is defined in the sense used by Nora Mulira[3]. There are eight key elements that, in our experience, create success:

1 Creating organisation-wide awareness, and addressing *mindset challenges* both as precursors and as ongoing components of definition and implementation. Lack of awareness and mind-set are major barriers to success

2 Getting *top-level buy-in, commitment, and leadership,* without which the likelihood of failure is very high.

3 Ensuring that ICT implementation is *driven by, and is responsive to, organisational vision, mission, and strategic direction.*

4 Ensuring *ownership* by all stakeholders through continuous involvement and acceptance of their input as critical.

[2] F F Tusubira and N Mulira *"Integration of ICT in organisations: Challenges and best practice recommendations based on the experience of Makerere University and other organizations"* Presented to Conference on "Universities: Taking a leading role in ICT enabled human development", 6–8 September 2004, Kampala, Uganda

[3] Nora K. Mulira, (2007). Implementing inter-organisational service Systems: An approach for emerging networks in volatile contexts. TUDelft

5 Developing *a systematic method of implementation – the Master Plan* – that takes full cognisance of the opportunities, limitations, and resources (human and financial).

6 Addressing *sustainability strategies* from the outset (policy stage) as a key element.

7 Developing the *requisite capacity* of both users (end-user training) and the personnel responsible for ICT support functions.

8 Full understanding of all the *aspects and ramifications of information system implementation,* the commonest area of implementation failure.

1.4 The Universidad Mayor de San Andres (UMSA)

The 180 years old Universidad Mayor de San Andres (UMSA), located in La Paz, the capital city of Bolivia, is the largest and most prestigious institution of higher education in Bolivia. It is a national public university. The University has an enrolment of 75,112 students (47.1% female) of whom 71,643 are undergraduate students. There are 1,927 professors running 54 programmes in 13 faculties. The percentage of female students is 47.1. UMSA has been accredited nationally and internationally in 83% of its programs. Its history, size, reputation and location (in the capital La Paz) make it the leading institution of higher learning in Bolivia and therefore a key pressure point for creating national change.

2 The UMSA ICT project (UMSATIC) and Sida Support

2.1 Introduction

The UMSA ICT Project (UMSATIC) was first developed during 2000–2002, motivated by the need to improve research infrastructure in order to increase the efficiency and effectiveness of research and research linkages. Funding totalling SEK20 million was sought from and approved by Sida, with the first disbursement of SEK8 million being made in June 2003. This chapter discusses the UMSATIC Project objectives and details, and also gives a narrative presentation of the changes and challenges that occurred during implementation.

2.2 UMSATIC Phase 1

UMSATIC Phase 1 had the primary objectives of:

1 Implementing a high-speed data backbone interconnecting all university buildings, in each of which a local area network would also be set up, with common access to the Internet.

2 Integrating the main library operations, and supporting UMSA's endeavour to incorporate ICT in academic and administrative functions

3 Building technical and managerial capacity in information technology at all levels; and specifically to enable the necessary human resources to implement, develop, manage and sustain the UMSATIC project.

The higher-level objective was the *fostering of research cooperation and improving the academic, research and administrative efficiency of UMSA.*

2.3 Project Details

The specific components supported by Sida included the campus backbone network, building Local Area Networks (LANs), E-mail/intranet infrastructure, staff infrastructure (both administrative and technical), end-user training, electronic access to library resources and current research literature, and strengthening of Library and ICT staff resources. All technical aspects of this project included specialised staff training.

2.3.1 Network Infrastructure Project

This project started in 2005, involving the implementation of a 31km optical fibre backbone set up as two rings with 20 connection points, and running at 1Gbps. Related components were setting up LANs in buildings to provide 140 connection points per faculty (a total of 1,820 points); and connection of the entire network to intranet and Internet services.

2.3.2 Human Resource Training

Human Resource Training was aimed at creating the necessary human capacity to implement, develop, manage and sustain the UMSATIC project.

An essential component of the plan was to create an organizational unit to be responsible for overseeing the increasingly large and complex UMSA infrastructure. This unit, the DTIC, would provide professional-calibre services ensuring the appropriate design, procurement, ongoing management and maintenance of the central ICT infrastructure; a second-level help desk (serving technical support staff within other units); as well as providing coordination of the various decentralized aspects of ICT infrastructure. The medium term goal was to develop on-site expertise to minimize the requirement for using external contractors for ongoing tasks.

2.3.3 Strengthening Libraries and Documentation Centres (SUI-UMSA)

UMSA has thirteen libraries, one in each of the faculties, all operating as autonomous libraries coordinated by the central library. While recognising the autonomy, it was necessary to ensure that all UMSA library resources were available to the entire academic and research community within and outside UMSA. This project was therefore aimed at the provision of an adequate on-line information system for the libraries and documentation centres connected to the main university network so as to cater for the growing demand of information and services.

The specific project objectives were:

- Implementation of a library information system based on the MARC 21 catalogue format.
- Full migration from the former library system to the new one.
- Enabling online access through virtual libraries and content networks.
- Training of 22 members of library staff.
- Installation of 60 computers in each of 23 libraries and the Central Library, to support the Library Information System

2.3.4 Information Systems

Conducting the management and administration of a large university like UMSA without the use of information systems inevitably leads to inefficiency, high cost, lack of effectiveness and, at the management level, incorrect tactical or strategic decision due to lack of accurate management information. This project was therefore aimed at providing information systems, Internet, and intranet services to the University in order to improve academic and administrative processes as well as the research quality. The specific focus was on the Academic, the Finance, and the Human Resource information systems.

2.4 Phase 1 Implementation Challenges

Phase 1 suffered from serious delays during the initial years (2002–2004) due to a combination of largely organisational factors that revolved around challenges within UMSA that are discussed later in this report. There also appears to have been a match failure between UMSA and Lund University, the first Swedish Cooperating Institution. This led to a request by UMSA to change to the Swedish Programme for ICT in Developing Regions (SPIDER): We were unable to obtain specific insight into why this failure occurred that can be authoritatively used in a report of this nature.

After the initial slow period, the Swedish Cooperating Institution was changed from Lund University to SPIDER. A project leader, Mr Zambrana, was contracted, enabling the project to gain momentum during 2005 and 2006. Towards the end of 2006, Mr Zambrana's contract ended and was not renewed (due to organisational procedures and requirements within UMSA). During the same year, UMSA sought new funding from Sida for a second phase through the UMSATIC project proposal 2007–2010, which outlined a continuation of Phase I, although only in brief. Sida required UMSA to submit a new comprehensive proposal and gave as a fundamental prerequisite for support of the project the presence of a clear and stable project leadership, this having been noted as a key cause of lack of progress in Phase 1.

2.5 Phase 2 Application

In August 2007, UMSA-ICT revised the application and contracted a full time coordinator, Jorge Teran, who, working along with Enrico Pelletta from SPIDER, prepared the proposal that was presented at the Annual Consolidation Meeting held during November 2007 in Stockholm.

Phase 2 was approved, noting though that it was Sida's stated intention to phase out the support to the ICT infrastructure and hardware implementation/strengthening project after 2010, with any possible extension of the project after 2010 addressing only maintenance of the ICT systems.

The following were agreed as key principles for Phase 2. UMSA should:

1 Develop and implement a university-wide ICT policy including the business plan;

2 Develop and implement a sustainability strategy;

3 Internalise competence created during the project and stop relying on external consultants;

4 Avoid unnecessary duplication of equipment (for example video conferencing facilities)

It was also agreed that there would be an external evaluation of the project during 2009, the findings of which would guide both corrective action where required and provide Sida with an external view of the progress and possibilities of the programme they have supported, and indeed whether or not to continue disbursements under Phase 2.

2.6 UMSATIC Phase 2

UMSATIC Phase 2 had the following components:

- Development of an ICT Policy and Master Plan
- Promotion of E-learning
- eUMSA e-Library
- ICT Infrastructure and common services.

The planned outputs for each of these are outlined in this section.

1 ICT Policy and Master Plan

The first ICT Policy and Master Plan had been developed during 2000–2002. This document had some key gaps in terms of the elements of a comprehensive ICT policy that provides a clear framework for implementation and ongoing operations. The development of a new ICT Policy was therefore planned as a component of Phase 2. This lays the foundation for the Master Plan, the Business Plan, and the Sustainability strategy.

2 Promotion of E-learning

The E-learning Project had several components: The establishment of an E-learning Unit to support e-learning; provision of training and upgrading activities; selection and implementation of an e-learning platform; establishment and support a specialized digital library for eLearning support; implementation of an e-learning portal; and implementation of multi-media laboratories.

3 e-UMSA e-Library

The goal was to establish a virtual library system accessible from the eUMSA portal where UMSA publications and materials (bulletins, thesis, journal, etc...), permitted full text digital books, as well as links and information about external free digital libraries and PERI program libraries would be available. This would involve development of specifications for the e-library system, improvement of the catalogue software solution (KOHA-UMSA), setting up the library digitisation unit, and production of the e-Library publication.

4 ICT Infrastructure and Common Services

The key elements of this project were the implementation of data storage systems (server farms) and new radio links; and the implementation of new services, specifically the IP-phone and the directory system.

3 The Evaluation

3.1 Introduction

Effective evaluation requires the right combination of knowledge, experience, and positive engagement to elicit the correct picture about any project. The lowest level of evaluation looks at outputs – tangible and quantifiable results that demonstrate that activities were carried out and outputs obtained.
The next level is at the outcomes level, relating to a summative change in the state of an organisation due to a set of coordinated activities that were conceived to have that outcome. The highest, and actually the most important level, is the impact level, where change in the behaviour of individuals – planned to be positive – demonstrates sustainable change in the organisation due to the intervention. Introduction of email services, for example, enables people to communicate more cheaply and faster, enabling the faster dissemination of information in an organisation, faster responses, and greater organisational efficiency: this is an outcome. The fact that communication is faster creates pressure on people to respond promptly, and also increases their expectation of faster responses to the communication – where it was acceptable for them to get a response in a week, they demand response in a day: this is a change in attitude and behaviour that not only turbo-charges but also sustains organisational efficiency. There leads to sustainable impact.

The integration of ICT in a university is expected to increase the volume of intellectual output as an outcome, and to change the attitude and behaviour of researchers at the impact level. It is the changes in attitude and behaviour that enables the sustaining of (and indeed increase in) the intellectual output.

It is evident that while outputs can be measured without prior planning, outcomes and impact require initiation at the start of any project. Baselines must be established, indicators agreed, and changes in state (through both objective and subjective inquiry) monitored with the agreed periodicity.

Unfortunately, while evaluation was agreed as necessary at the start of Phase 2, the foundation for it was not put in place right away. This means that while we have been able to examine the output level, evaluation at the outcome and impact level has to rely purely on the subjective views of stakeholders. We have therefore put more weight on process: were the methodologies of formulation and implementation of the ICT project such that they followed best practices that are most likely to lead to success? We have relied on our own experience of implementing ICT services and systems at the institutional, national, and regional levels.

3.2 Methodology

We used the appreciative inquiry approach in carrying out the evaluation. This is based on an appreciation that in any undertaking, there are always elements of success. This then provides a positive starting point during interactions by focusing on what is good. It is then much easier for respondents to point out what they believe went wrong or could be improved. It makes the evaluator part of the team in planning the way forward. While we were responding to the evaluation issues raised by Sida on the one hand, we were therefore also working on the issues from a UMSA perspective: *Regardless of the decision by Sida about whether or not to renew support, what is the best of way of ensuring long term success?*

The actual evaluation was based on:

- An examination of reports and briefs received from Sida, SPIDER and UMSA to get an understanding of the details of the project and any documented successes and challenges;
- Verbal interviews, some face to face and other by tele-conference, based on a semi-structured instrument;
- On site work for one week, involving face to face meetings and visits to facilities.

3.2.1 Document Review

The evaluation team was provided with all the documents related to the project to get a full understanding of the project, including what has been achieved and challenges faced. This also facilitated the decision on whom to interview and the formulation of a draft programme for the visit. The documents included policies, original and revised proposals as well as annual reports and plans, and specific briefs from key players. They were also given access to documents related to prior related projects and those related to forthcoming project phases (2009– 2010). A list of the documents examined is given in Appendix 7.4.

3.2.2 Interviews

The Evaluation Terms of Reference included a list of people to consider for interviews. This list was modified and augmented after studying the documents as well as initial communication with the key players, generating the final list of individuals interviewed (Appendices 7.2 and 7.3). The interviews, both face to face and via teleconference, were recorded with the knowledge of the respondents partly to enable smooth discussion without too much notes taking, and partly to ensure an accurate and verifiable record of raw data.

The on-site mission started with a workshop-style brief of the direct players and a section of stakeholders so that the constructive intent of the mission was understood. The UMSA team also presented the

key highlights of UMSATIC as background. The mission concluded with a de-brief to the same team that attended the fist workshop and created opportunity for validating the key findings and recommendations directed at UMSA.

3.2.3 Analysis and Report

The analysis of the data and information obtained from the reports and the interviews was the key value addition element of the evaluators. This made reference to the planned project outputs and outcomes as well as the best practice framework.

4 Achievements and Challenges

4.1 Introduction

This section addresses how well the original project targets (as described in section 1.3) were met. As discussed in Section 3, the focus is largely on output: where outcomes and impact are considered, the statements are more anecdotal than assertions based on rigorous evaluation because the framework for the latter was not laid at the start of implementation.

In the discussion below, the projects are identified by logical project elements, even if some of them were grouped under the same project in the application.

4.2 The ICT Policy and Master Plan

The first ICT Master Plan for UMSA was formulated in 2003. This involved wide consultation in terms of agreeing and defining the main ICT projects. This was unfortunately not bedded in clear policy that takes into account the agreed strategic priorities of the university. The challenges around Phase 1 of UMSATIC also meant that this first plan was never really implemented. Indeed the lack of a clear policy basis for the plan was most likely one of the contributing factor to the failure to implement the first plan.

Under UMSATIC Phase 2, the formulation of an ICT Policy and Master Plan was included as one of the activities. At the time of the evaluation, this was in its final form and, as we were informed, due to be approved by the University Council, UMSA's highest policy organ. It must be observed though that from the mission report by Dr. Ana Gren, this was also the status during October 2008. This is a more comprehensive document that, if adopted and fully implemented, should better guide implementation. TU Delft consultants have led the development of this document complimented by a local consultant. We found it anomalous that after six years of implementation, the formulation of such an important document still had to be led by external consultants – intervention and support normally only expected the first time round. Given similar initial assistance, UMSA should have built and retained capacity for subsequent ICT policy review and formulation.

In a SPIDER report of November 2008, the then project supervisor, Enrico Pelleta, suggests that the delay in the ICT Policy and Master plan was a result of lack of coordination between SPIDER and TU Delft (consultant). This further underscores the missed opportunity in capacity building for policy development, which could have expedited the internal policy review and completion.

While the document itself is good, we did note many awareness gaps during interactions with the various respondents, indicating that while there was some consultation, it needs to be a lot wider if success is to be achieved. The policy consultations while done at a very wide level, especially in Phase 1, focused

on Deans and Heads of Department as the leadership of the university. The majority of the university and more importantly, functional owners and end users of the systems and services implemented under UMSATIC were not consulted. The lack of inclusiveness in the policy consultation process undermines the university wide awareness and the promotion of access and use of common network services. There is an urgent need to create a common knowledge of the UMSATIC project at UMSA.

4.3 Network Infrastructure

The data communication infrastructure consisting of 45km of optical fibre connecting campus buildings within La Paz along with the associated local area networks in different buildings has been easily the most successful component of UMSATIC. Most of the infrastructure implementation started in 2007, but utilisation remains a major challenge. This is apparently because the network still lacks both the intranet content that would give it the added value of common systems and services, and the sufficient international Internet bandwidth to promote its use as the main avenue of communication. There is also a general attitude – expected in any university environment starved of external connectivity – that the data network is supposed to serve the main purpose of external connectivity rather than being a platform for internal learning, research, collaboration, administration, and management. Since external bandwidth is still very limited (currently 2.8Mbps over 7 ADSL links for the central network), there is an unfulfilled vacuum of expectation. There is clear urgent need to agree on and implement common network services and systems that should and can be provided by the university network so that the investment in its implementation can be justified.

The backbone has two self-healing fibre rings with connections at 20 points. The planned operating capacity is 1Gbps. The LANs in each of the thirteen faculties was allocated 140 access points. The initial target was 2,500 access points on the LANs, which was achieved. This has been revised to 5,000 access points.

Many respondents mentioned the bureaucracy of equipment procurement for this and other projects as a major barrier to timely implementation. This was later overcome by permitting the Swedish cooperating institution (now SPIDER) to handle the procurements and export the equipment to Bolivia. While this has worked well, it has also generated opposition from within the University due a perception that control of funds granted by Sida to UMSA has been lost. This is also at best only a short-term solution: The only long term solution is for UMSA to develop a system that conforms with the law while permitting fast procurement of ICT equipment whose industry standard changes fast.

4.4 Internet and Intranet Services

The planned key elements of this project are connection of Internet and Intranet services, and setting up Internet Rooms for common access by students and staff. Basic email and web services have been implemented, but penetration is still very limited, with only 3,200 PCs in the university to serve a population that is more than 70,000. The Intranet services as already noted have not been implemented, and Internet access capacity is still limited. Sufficiency of external Internet connectivity was an area of very high staff expectation. The fact that it has not been realised to date explains, to a large extent, some of the negative perceptions that are held about DTIC. There is however a current approved plan to increase capacity to 100Mbps. It was not possible to assess with certainty when this would be implemented.

A consequence of the limited Internet bandwidth is that many faculties have either maintained their old independent connections, or implemented new ones: Architecture (2.8Mbps), Engineering (2.8+2+0.512Mbps), Basic Courses Engineering (2Mbps), Medicine (2.8Mbps), Dentistry (1Mbps), CIDES (512kbps), CEPIES (2Mbps), Informatics (2Mbps), Postgraduate Informatics (1Mbps), Post-

graduate Ecology (1 Mbps), and Law (2 Mbps). This is one area where faculties need to agree to work together to achieve economies of scale and efficiency of deployment of bandwidth. The problem of inadequate bandwidth and slow access needs to be resolved in order to fully exploit the network resources and advantages. Other planned Internet and Intranet services include network file storage system, and FTP. The back-end services include DNS, WEB, as well as authentication and authorization systems.

Five Internet rooms with a total of 210 (typically 40 per room) computers are still being installed as evidenced by the visit to the Faculty of Medicine where two rooms were in the final stages of commissioning.

4.5 The Library Project (Strengthening the Library and Documentation Centre, SUI-UMSA)

UMSA has a total of 24 libraries: the main library, SUI-UMSA, and libraries in faculties and departments. Creating university-wide as well as international access to the resources held by the different libraries and a unified access system was therefore one of the major projects. Access to international resources was a priority especially since it addresses the higher motivation for Sida support: improving research and research linkages. SUI-UMSA sees itself as having the responsibility of research to generate, adapt, validate and disseminate knowledge to support the learning and research activities within faculties and departments.

Through a consultative process that involved upper and middle management, decisions were taken about immediate, short-term and medium-term activities to enable transformation. The process included:

1 Review of the current processes within the Library

2 Assessment of existing information systems

3 Identification of operating and development platforms

4 Taking a decision on whether to buy a proprietary Library information system or design and develop one to meet the Library requirements;

5 Linking to and/or access to external sources of information; and

6 Determination of the strategy to make the project sustainable in the future

The Koha[4] library system, an open source system that could be locally adapted to the needs of UMSA was adopted. Out of 24 libraries, 18 have been networked and migrated to the Koha platform. The rate of progress is really in the hands of the autonomous faculties where each library is independent. Some libraries are therefore much more advanced than others, notably those in Faculty of Medicine and the Faculty of Engineering.

The Library is now online[5] including 1747 on-line books. The MARC-21 standard was selected, and the library catalogue has been migrated to this standard. There is ongoing training for both Librarians and users. While the former group has been adequately trained, a lot still remains to be done to equip researchers with information literacy skills: the Library is working with the Vice-Rector to achieve this.

The Library also participates in the International Network for the Availability of Scientific Publication (INASP) PERI (Program for Strengthening of the Research Information) program, enabling access to online journals.

[4] Koha is an open source library management system: http://www.koha.org/
[5] URL: http://administración.biblio.umsa.bo

It is evident that very significant success has been achieved in implementing the Library system. Discussions with the Library team brought out some of the several underlying challenges in implementation and operations:

1 There were mixed views about whether or not DTIC support, vital for the customisation of Koha and related activities, was sufficient. The overall impression was that while DTIC provides competent support, they are over-stretched and are not always available when needed.

2 There was minimal involvement in systems analysis and system specification. There were also concerns that library staff had not been involved in the policy and master plan formulation, and were not aware of its content or implications. Only the Librarian had been involved in the process.

3 The Library system is yet to be interfaced with other information systems like the registration and academic systems.

4 The size and autonomy of UMSA faculties presents challenges of communication and working with the faculty libraries, blocking opportunities for building capacity and sharing library resources.

5 The electronic library is one of highest consumers of Bandwidth. Currently bandwidth is not sufficient and therefore more is required. The usual symptoms of bandwidth inadequacy were demonstrated by timing out of pages and long duration taken to open pages and down load files. The library is yet to estimate their capacity requirement.

The Librarians see continuing capacity building, completion of Koha implementation (now in its fourth year), getting all libraries on board, and subscription to a sufficient number of electronic journals as key areas that require continuing support.

4.6 Administrative Information Systems

There was a plan to upgrade and/or develop the administrative information systems – Academic, Finance, and Human Resource management – that the university had started on before the beginning of UMSATIC. However UMSA did not have the budget for permanent programmers who would be needed for such a major undertaking in a large and complex institution. Projects like the finance system were abandoned.

The Academic management system also experienced major challenges: the decentralised nature and autonomy of faculties at UMSA made consensus difficult, with some faculties developing and using their own systems. This attitude was compounded by low expectations of the majority from the implementing team: this attitude developed over the initial years of near inactivity in the project.
Despite these challenges, there has been progress in some of the specific areas highlighted below.
It should be noted that this has been included for both completeness, and, especially, to highlight some of the crosscutting challenges: these systems have been developed using internal resources, but call upon DTIC expertise.

4.6.1 The Student Registration System

The student registration system has been completed as a locally developed application, with a database of 181,649 students registered since 1990. Students are now given a unique number that is used throughout their stay at UMSA. This has helped to solve many problems with identification and registration.

4.6.2 The Academic Registration System

The main objective of the Academic Registration System is to facilitate the monitoring of academic progress up to graduation. The system captures and provides all the information relating to the student and the progressive and final academic transcript for the duration of the course. This system supports

54 programmes. Implementation started with three faculties: Architecture, Political Science and Engineering, where coverage in terms of comprehensive data capture is 100%, 70%, and 100% respectively. Implementation has moved on to other faculties and subject areas.

UMSA has continued working on Academic Registration System using its own resources. The team is now working on integration into a common centralised database. This task currently faces many challenges: The lack of trained academic personnel to help with the processes and regulation of documents and information is an issue, but the biggest obstacle to realising effective use of the administrative information systems, is integration and standardisation across the autonomous faculties. Until this is addressed, efforts will remain isolated leading a multiplicity of standalone and different systems, blocking the benefits of university-wide computerisation based on common standards.

It is also evident that, despite the best of intentions and efforts, the development of information systems is being approached in a silo fashion that will compromise the required interoperability to achieve administrative efficiency and effectiveness in the future. This can be directly attributed partly to the lack of an agreed and unifying policy defining information systems, where the autonomous faculties would have achieved prior agreement on common functionalities, standards, and interface requirements; and partly to the lack of knowledge and experience about the challenges of implementing information systems in large organisations. This is a critical and urgent area of action.

4.7 The E-learning Project

The E-learning project began in 2008 as a complimentary project to E-UMSA *(E-library, virtual library services and portal for digital production)* aimed at expanding and strengthening UMSA's ICT supported education and research. A draft E-learning policy was put in place and a large training workshop for 90 teachers was conducted during November 2008. Apart from this, no other implementation activity has taken place. Some faculties, like the Faculty of Medicine have taken their own initiative to adopt faculty based E-learning funded from internal resources (fees from private graduate students).

4.8 The Information Resource Management Unit (DTIC)

An essential component of the plan was to create an organizational unit that would be responsible for overseeing the increasingly large and complex UMSA infrastructure. A very significant anomaly is that until 2006, the dedicated unit where expertise for Information Resource Management (IRM) resides had not been established. Reliance was put on external consultants for implementation, depriving UMSA of one of the most important phases of technical capacity building. Indeed, this can be said with certainty to be a major contributing factor to many of the delays and shortcomings observed.

The formation of DTIC in 2006 was therefore a necessary – though very late – step in ensuring the availability of human resource for effective planning, implementation, management, and sustenance of ICT resources efficiently both at both project and exploitation levels. Apart from the line responsibilities of implementation and IRM, DTIC was charged with the responsibilities of publishing the ICT Bulletin and training stakeholders to create the requisite levels of ICT literacy and/or technical competence. Provision was made in the project for capacity the building of DTIC staff capacity through graduate level training.

The expectation is that DTIC will be fully staffed by the end of May 2009. UMSA is fortunate because salaries for technical staff are very competitive: university salary levels are better than those in the private sector. The continuing challenge will therefore be investment in training to bring DTIC staff to the skills level required to ensure a high level of availability of the network and network resources. Such capacity building needs to go beyond the technical to other soft skills that support successful implementation of major projects, for example change management.

The current shift to reliance on internal human resource rather than consultants is a very positive change for continuity and sustainability of ICT. By institutionalising sustainable human resource for information resource management, UMSA can sustain ICT beyond the project phase. During the planning and implementation phases, the university has faltered but has continued to move ahead with the project with visible achievements, which is another positive sign. This is reinforced by the current university leadership's commitment and their planned policy provisions to ensure that there is continuity in the offices responsible for leading project implementation, and that change in personnel should not change the direction of the project.

DTIC's utilisation of students in implementing network projects is a very important step in creating a sustainable pool of skilled human resource to fulfil its mandate.

4.9 Sustainability

Sustainability is a multi-faceted challenge involving policy, strategy, impact, funding, and skills. Policy gives a clear statement of intention and operating boundaries based on which sustainability strategies can be developed. Impact – relating to whether or not an intervention creates behaviour change and therefore provides motivation for continuing allocation of resources by an organisation calls for an integrated plan for monitoring and evaluation so that evidence based arguments can be used in organisational resource sharing.

Sustainable funding, from both internal and external resources, is another key element. The expectation is that any organisation, in the medium term, should as a minimum fund all recurrent and modest growth costs, with development partner funding being sought only for major capital developments. Lastly, skills as a component of sustainability relates to both adequacy of skills and the continuing availability of human resource to provide such skills. In this, we explicitly recognise that competent people, especially in ICT, always want to move on at some point in time. Sustainability in this case is not about blocking their exit persuasively or coercively, but ensuring a steady inflow of people who can be taken on as trainees: universities like UMSA provide the ideal environment for this.

Successful planning for sustainable initiative starts at the inception stage, which in UMSA's case should have been during 2000/2001. A sustainability plan developed at inception actually impacts on the level of investment because along with the planned investment will be the questions: "What resources will be required to sustain the initiative after implementation? How will those resources be obtained and sustained?"

To date, not enough attention has been focused on sustainability, making it an area where UMSA will require significant senior management attention. It was widely agreed by UMSA Management, SPIDER and Sida that UMSA has to take the lead in formulating sustainability policies in order for the project to grow beyond Sida funding. In the words of the Rector, *"The education here/everything here is from the government. We generate our own resources but they are not enough"*.

The following need to be addressed as part of the formulation of a sustainability strategy:

1 Strategic Importance and Positioning of ICT in the University. The previous and current University Strategic Plans do not recognise ICT as a strategic priority. This undermines the entire programme in many ways. UMSATIC, with its major cost implications, should go ahead only if it has recognised strategic relevance to UMSA. It must be noted that both government and potential development partners will use UMSA's Strategic Plan to decide whether or not any requested support is relevant to UMSA's strategic direction.

2 There must be major commitment to create awareness about the new ICT Policy and Master Plan, including modifying it if stakeholders feel it is necessary, so that it is owned.

3 The formal strategy for sustaining services and systems needs to be given urgent attention through university-wide consultations.

4 The management, maintenance and control of ICT services and systems needs to be recognised as an independent budget line to enable the operations of DTIC, and to be mainstreamed in the budgets of all faculties, to enable operations and maintenance of resources under the direct control of faculties. In this, the Deans must meet and agree on common resources where it is more cost-effective to have centralised rather than decentralised ownership and management. This is a policy issue. One obvious element is Internet bandwidth, where economies of scale dictate single procurement. There is a reported approved plan to procure 100Mbps (at $200 per Mbps per month) though it was not clear whether the funding expected from government is guaranteed: we are therefore unable to assess the level of assurance about this.

4.10 Project Management

Project management has been a challenge from the start due a combination of factors relating to: lack of the requisite skills; frequent changes in key players; the reporting hierarchy in UMSA that has had instances of lack of clarity about lines of reporting and responsibility; communication and documentation gaps, with significant delays in communicating information that is critical to smooth project management; and a transient human resource in critical implementation roles.

4.10.1 Lack of Project Management Capacity

The lack of adequate Project Management capacity was noted by both Sida and SPIDER evaluation and acknowledged by UMSA implementers. The SPIDER Nov 2008 report underscored the key problems as *"UMSA project management capacity and administrative transparency, in particular with respect to Sida cooperation."* The lack of monitoring and evaluation plans that has already been discussed is also a project management capacity issue. As a minimum, there should have been M&E at the output level.

4.10.2 Lack of Continuity

The lack of continuity of key personnel during this major transformational undertaking was particularly disabling. The Rectors have changed twice, the Vice Rectors have changed thrice, and there have been some acting Vice Rectors in between. The Vice-Rector is responsible for oversight and direction of UMSATIC, and there has been a practice that whenever the Rector changes, a new UMSATIC leader must be appointed. The UMSATIC Coordinators (themselves until recently external consultants) have changed four times, and Directors of DIPGIS where the Co-ordinators are based have changed about 5 times. The Swedish collaborating institution changed from Lund to SPIDER (where there have been three different coordinators to-date) and there have been three different Desk Officers at Sida We can contrast this situation with the Makerere University ICT Project where, from 2000–2007, the Project Leader, the Collaborating Institution and contact therein, and the Sida Desk Officer did not change. The Vice-Chancellor was also the same from 2000–2005.

While there were other challenges, these changes are, in our assessment, the biggest contributing factor to the limited progress of UMSATIC especially from 2003–2006. To illustrate the challenge of this instability, we compare the impact on the project as would the impact on a large aeroplane taking off while simultaneously changing the pilot, the flight engineer, and the controller in the control tower.

4.10.3 Reporting Hierarchy

Implementation started in an unclear framework, which had no clear path of responsibility and guidance. These statements come from individuals within the university.

"They agreed there was to be consultation which was then lost."

"The Committee of Areas was set up to oversee the project but the project went beyond the faculties and created some resentment because some people felt sidelined, as they didn't know why individuals were taking decisions on their behalf"

The reporting hierarchy has been a challenge for project management. The offices/committees responsible for policy oversight and coordination include the Vice-Rector; The Committee of Areas (later abolished and replaced by the Committee of Deans); DIPGIS and the Coordinator UMSATIC who reports to that office. More recently, the Director of DTIC, under whom the Project Coordinator administratively falls, has been put in place. The Project Coordinator is therefore simultaneously responsible to the Director of DTIC and the Vice-Rector. Since the Director of DTIC is administratively lower than the Vice-Rector, this creates an unhealthy reporting bypass and inevitable tension between key positions that need to work very closely together if success is to be achieved. The Project Coordinator also answers, for purposes of policy oversight, to the Committee of Areas, and must also report to the UMSATIC Coordinator as well as DIPGIS for purposes of liaison with Sida. Different individuals who are responsible for implementation, indicated that at some time they did not know who to report to or whom they were responsible. In the words of the Coordinator:

"Yes, I am the Coordinator and I am supposed to report to be the controller of the ICT projects, which at one time was the Committee of Deans. DIPGIS is supposed to be coordinating the project, and I also report to the Vice Rector of the University. DTIC is also coming in place. I am sure that the communication channels can be set up so that it remains clear that the Coordinator reports to the Director of DTIC who reports to the Vice Rector, the one who chairs the Committee of Deans as an Advisory and Monitoring Committee".

In addition to establishing DTIC, which has now been done, UMSA should rationalise through policy, the relevant functional units/persons that manage ICT at both project and policy oversight, and post project level. These should ideally include a Council ICT committee at the highest level, with representation from all stakeholders, to work as a forum for consensus on common approaches among the autonomous faculties; and a User Forum (currently the Committee of Deans) that articulates changing ICT user-requirements. It was agreed at the start of the project that Faculty ICT Committees should be set up, and it is noteworthy that the Faculty of Medicine, for example, has used this very effectively to achieve remarkable progress. The long term solution to this challenge that inevitably impacts all areas of university operation would be a full organisational structure audit that would lead to balancing between centralised and decentralised authority in order to achieve better organisational effectiveness.

4.10.4 Communication

There have often been major communication gaps, we believe a symptom of the negative impact of an unclear reporting hierarchy and frequent changes in personnel. For example, it took about two years for it to be clear to Sida that there was hardly any progress during Phase 1, something that should have emerged within at most one year (or less if there was effective communication between Sida and Lund).

The challenge of communication goes along with the challenge of documentation that has been also acknowledged by SPIDER as weak point of the project. The SPIDER visit report of Nov 2008 notes: *"There is no evidence or concrete suspect of any relevant misusage of resources but UMSATIC failed to present appropriate plans and reports" …*

4.10.5 The Transient Human Resource

While it is impossible to guarantee full retention, a major project like UMSATIC must be supported by a reasonably stable human resource to ensure complete and effective change management. Outside the frequent changes in Coordinator, an additional constraint was that UMSATIC employees were not properly recruited by the university. Afterwards, due to ongoing circumstances and problems, the project had 13 individuals remaining out of 100: this created a major problem because it was very difficult for the remaining staff to complete the goals that had been planned. It is indeed amazing and

noteworthy that the small group of people has been able to achieve so much in the circumstances. A new recruitment process has been started to address the major gaps in human resource available for project implementation.

4.11 Impact on Research and Education Networking in Bolivia

UMSA is strategically positioned due to reputation, size, academic capacity and distribution of campuses, to provide services to the external community and to specifically spearhead research and education networking in Bolivia. The nascent collaboration with Universidad Mayor de San Simon (UMSS), the second largest Bolivian University, should be developed to become a basis for the formation of a national research and education network (NREN). The NREN would plan and lobby for connectivity among research and education institutions in Bolivia, seek for sufficient and affordable international connectivity, and therefore enable research collaboration both at the international level. This would also create opportunities for sharing ICT resources and the scarce expertise.

A negative note with regard to opportunities in research and education collaboration, is that Bolivia is one of the only two countries in South America that are not connected to CLARA[6], the Southern America regional research and education network. RED CLARA interconnects universities and research institutions within South America and to the rest of the world.

While UMSA is an independent government-owned university, there is need to seek opportunities for collaboration with the Ministry of Education and the Vice-President's office: the former is responsible for setting up a network connecting educational institutions, and the latter is responsible for setting up national fibre infrastructure. In our meeting with him, The Minister, a former RECTOR of UMSA at the start of the UMSATIC, expressed the hope that there could be closer collaboration.

5 Analysis and Recommendations within the Best Practice Framework

5.1 Introduction

In this section, we apply what we have established as a best practice framework to analyse UMSATIC and its implementation, and also use best practice as a basis for recommendations about addressing the different challenges.

5.2 Lack of awareness and mindset, and creating ownership

A key to addressing awareness and mindset while at the same time creating ownership, is full stakeholder involvement in the process. We find that University wide awareness and appreciation of ICT is by far the greatest barrier to UMSATIC, and it is the first challenge that must be dealt with. A clear symptom of this is that UMSATIC is still perceived as a Sida funded project (without life outside Sida funding): UMSATIC must be seen by UMSA as a major university project that has received significant funding from Sida.

It was apparent that the awareness workshops so far conducted about UMSATIC did not involve the majority of critical stakeholders. There is a need to develop awareness for ICT as a means of creating

[6] CLARA was established with funding support from the European Union

efficiency and cost-effectiveness. Formally organized awareness workshops with demonstrations also help a lot in addressing awareness and mindset problems.

The majority of the interviewees are ICT literate and appreciate the potential of technological innovation but mindset challenges still prevail with regard to rigid university hierarchies and reporting structures. There needs to be appreciation developed that it is possible to be flexible about these for purposes of common benefit if future success is to be assured, without necessarily eroding the autonomy of the faculties. The representation of librarians and functional system owners like the Academic Registrar and University Finance manager at the Committee of Deans is still a point of contention. The administrative information systems and library are core to the university mandate and therefore their functional heads should be empowered to contribute at the highest level and make decisions. These do not have to be formally members if this contradicts statutes, but they can always be invited to be in attendance when ICT implementation is being discussed so that the Committee makes informed decisions.

The awareness workshops will also provide opportunity for creating ownership. They should be all inclusive rather than exclusive for just the top academics. They should be used to get and consider feedback from the university community about the revised policy and master plan, the relevance of the proposed projects, the agreement on priorities in a resource-limited environment, and the agreement among autonomous faculties about areas of working from a common basis. The awareness workshops should in other words generate feedback that is seen to lead to changes in the revised policy and master plan: this is the first critical step in creating ownership.

5.3 Lack of Top Level Commitment

One of the biggest incentives for real change and progress of the UMSATIC project would be the top level commitment and participation involving the highest offices: the Rector, Vice rector and the majority of Deans. The frequent changes of Rector and project leadership in general have been some of the biggest impediments to the progress of UMSATIC. The Rector and Vice-Rector have demonstrated a positive change in leadership commitment through active participation in this ICT project assessment, visible enthusiasm for the ICT project, and informed appreciation of the strategic potential of ICT to drive the university's core mandate. This is indicative that recommendations to resolve hurdles for project continuity will be adopted with minimal bureaucratic red tape (which also underscores the urgency of setting new direction before the term of the current leadership expires).

ICT is a university wide requirement which would transform the entire university, and in such transformation, there are policy barriers, procedural barriers, and barriers of tradition. Only top offices – the Rector and the Vice Rector – are positioned to deal with those challenges. Major organizational transformation, like that inevitable when ICT is integrated in organizational functions, requires the ongoing commitment and involvement of the chief executives and their teams.

5.4 Making ICT responsive to the organization's vision and mission.

UMSA's ICT project has to date been implemented in a policy vacuum: the first policy was not widely disseminated and, with changes in leadership, appears to have been forgotten. This indicates a lack of clear and shared vision and procedures for ICT. Similarly UMSA's current Strategic Plan does not list ICT as a strategic priority for achieving its strategic objectives. It is additionally noted that, even with the revised ICT policy, UMSA is yet to achieve a clear and stakeholder owned definition of vision, mission and strategic objectives. It is recommended that even after the approval of the new ICT policy, an all inclusive awareness strategy must be adopted.

5.5 Developing a systemic method of implementation

We noted that while it was developed in a policy vacuum, the first Master Plan covered a lot of ground. The documentation however does not give clear insight about how the projects were agreed, or what was agreed as priorities. This makes implementation ad hoc. Secondly, the Master Plan is a basis for seeking funding support from multiple development partners, since it is unlikely that any single partner would be able to fully fund such an expensive undertaking.

The new policy comes along with a set of projects to be implemented. These need to be validated by both the University's Strategic Plan and stakeholders' workshops. The University Strategic Plan will have to respond to the question: "Is ICT a strategic priority?" If it is not so reflected, mobilisation of funding will be very difficult. The stakeholders need to respond to the question: "Are these the agreed priorities to which we must allocate resources?" This latter is particularly important, considering the autonomous nature of the faculties.

5.6 Sustainability

UMSA is yet to devise and implement a responsive approach to the challenge of sustainability. It is important that the policy addresses the specifics of how sufficient funding will be raised to sustain services and systems.

The key recurrent cost elements that should be considered include:

1 Cost of bandwidth – which is remains high for UMSA at the cost of $200 per Mbps per month;

2 Cost of maintenance of equipment and applications which is still unknown;

3 Recurrent cost of software licenses (application for the main information systems, specialized applications, database platforms, and desktop applications);

4 Cost of replacement of equipment like computers, servers, and switches;

5 Emoluments for ICT professionals.

Sida is the only development partner funding the UMSATIC project but the pivotal role of ICT in promoting ongoing and new research collaborations was noted by all faculties. UMSA has to stop looking at UMSATIC as a Sida-funded project and actively seek additional funding from other sources to support a well-developed Master Plan that also reflects the strategic priorities of UMSA. It must be realised that reliance on one development partner is a major risk, made even greater by the current international financial crisis.

There is also need to focus on increasing internal resource allocation so that, in the fairly short term, UMSA covers all recurrent costs related to ICT services and systems. Such allocation demands adoption of common services and eliminating duplication to minimise investment and running costs.

The guiding principle remains that while development partners can be asked to support the initial capital costs, they should never be asked to support recurrent costs, unless it is in the very short term.

5.7 Capacity Development

There have been some efforts at both End-User Training, without which the resources would not be gainfully exploited, and within DTIC, without which the availability of the resources would not be assured. Both have however been limited by a rather ad hoc approach for the former, and the use of transient staff and consultants for the latter.

The enthusiasm and commitment of the current DTIC staff, working to achieve change in the face of overwhelming odds, must be commended. There is satisfaction within DTIC that the network project is now implemented. This however should not lead to complacency because infrastructure is the smaller part of the challenge to full ICT integration. The real test will come when use of the network builds up, university-wide information systems and applications like e-learning are brought on line, and ICT resource availability becomes mission-critical. The planned training at Master's level is a medium to long term measure that will have to be supplemented by short intensive capacity building opportunities through both attachments and secondments. The core team also needs to be taken through a short course on information resource management to get a better appreciation of their responsibilities, and the challenges they will face, as a basis for planning preparedness.

There is a need for DTIC staff to develop people, public relations, and conceptual skills. Best practice shows that IRM leaders need to combine the normal IRM leadership skills with a high level of organizational knowledge, conceptual ability, and a pioneering spirit.

5.8 Appreciating Critical Stages in Information Systems Implementation

UMSA urgently requires value addition of relevant and shared Information systems (IS) on top of the network infrastructure in order to create institutional efficiency. Information systems also pose the biggest challenge and are the most likely area of failure. Current hurdles in implementing an integrated central administrative system are caused mainly by lack of inclusiveness in defining requirements and specifications of systems. What people in the organization think must be taken on board: in implementing information systems, perception is often more important than reality.

The Deans need to come together to agree on applications that will have common benefit: the current practice of using the autonomy of the faculties to hinder cooperation will hold UMSA back in the 20th century.

The following two stages are critical for the successful implantation of IS, but they are unfortunately often mishandled.

Making requirements statements

Requirements statements stipulate what the information system should be able to do. They eventually lead to the Request for Proposals document. UMSA should not use consultants to define their system requirements because this is a recipe for failure. It is very important for ownership and success that it is the people who work in the organization who should be guided in generating requirements statements.

System Analysis and Business Process Redesign

UMSATIC documentation for information system development lacks the two components of a comprehensive systems analysis; and business process redesign. These are two mandatory steps that must be incorporated to ensure relevant and efficient systems for users. Business process redesign faces the barrier of culture and attitudes of the autonomous faculties: this is a major risk that will need to be managed. It is also an inevitable outcome that in an organization that has been structurally static for a long time like UMSA, system analysis and business process redesign must necessarily lead to some organizational restructuring.

5.9 Developing a Common Approach

This element has been taken for granted in our best practice framework: it becomes important in an environment like UMSA where there is a combination of tradition and legislation that establishes the autonomy of the faculties to the extent that the Rector can exercise only minimal authority over the deans.

"There are 13 faculties however it seems as though there are 13 universities! The university is one but the faculties have many objectives. This way of working isn't going to yield any results." (Javier Reyes UMSATIC coordinator 2001).

A critical part of the success of UMSATIC begins with developing a common inclusive approach in recognition of UMSA's size, decentralised nature, and autonomy of faculties. A common approach will help all stakeholders to appreciate the benefits of the ICT in their functional context and define shared systems that will add value to the common network infrastructure.

"We now have the infrastructure installed however we need to show a new image through better management of the UMSATIC project". (Roberto Zambarana UMSATIC coordinator 2003–2006.)

Faculties need to understand the value of university wide systems in improving efficiency without fear of having their autonomy undermined. There is evidence of "super" faculties like Medicine that have effectively invested in ICT for academic and administrative purposes. Such early success stories can be used as models for ICT propagation throughout UMSA.

Tradition and culture are also challenges. UMSA is 180 years old and steeped in governance traditions that seem very hard to change in order to support ICT integration. There is need to create attitude changes in top leadership and around structures to ensure continuity in UMSATIC personnel and inclusive consultation which involves everyone in the university. The hierarchy should not negatively affect decision making. The organisational audit and reform recommended earlier in this report would address this.

6 Analysis and Recommendations within the Sida Evaluation Framework

6.1 Effectiveness and Efficiency

As discussed earlier, we can assess effectiveness and efficiency only at the outputs level. Specific statistics about changes in infrastructure are given in Section 7.6.

Key outputs to-date are the data infrastructure consisting of the backbone, LANs, and active devices; the library system; an established support unit, DTIC along with the initial core personnel; connectivity to the internet, albeit still with a limited bandwidth; and a basic operational network. This level of completion has however taken three times the initially planned time to achieve, pointing to a low efficiency of delivery. Causes that led to this have been given and discussed in the earlier chapters. The planned outputs that can be grouped as the "creation of an effective intranet" have not yet been fully achieved. E-learning implementation also remains outstanding.

It is clear that, since SPIDER became the collaborating institution all efforts have been made to get maximum benefit from available funding, including procurement through the Swedish cooperating institution, SPIDER. There are however two reservations:

- SEK508,000 expended by Lund for institutional overheads (before SPIDER took over) when they did not deliver on the commitments and indeed returned the major project funds (SEK4,452,000) to Sida;
- and the extensive use of consultants external to UMSA.

The latter one is not so much about the funds utilised as the opportunities for capacity building for UMSA's own staff that have been lost: such capacity will have to be built at additional cost.

It is also noted that from the information received in response to direct requests, no other development partner has supported the project.

6.2 Impact

Objective assessment of impact requires monitoring over time and cannot be established from the evaluation snapshot. We can only rely on a subjective and anecdotal approach. There is increased awareness of the benefits of integrating ICT into the research, learning, administration and management. There is also a growing percentage of people who rely on ICT services and systems in their day to day activities. In the fast adapting faculties like medicine, there is a visible impact on the methods of work, research, and instruction. This however has not yet extended university-wide.

It is certain that, once the challenges around information systems and implementing and effective intranet are sorted out, the data network will provide a lot of value beyond Sida's main motivation for support.

6.3 Relevance

Campus networks and Internet connectivity are key elements of research infrastructure. There can therefore be no question about the relevance of the intervention to the promotion of research and research collaboration. This also applies to the Library project, including access to online resources.

The creation of an ICT-enabled education and research environment challenges those involved in all university processes to acquire the necessary skills, and therefore drives people to become more competent. From the discussions held with interviewees, this is happening at UMSA, both through formal training and self-led learning.

UMSA has also been working on the registration system (using internal resources), and this, while not yet a comprehensive system, has eased the burden of fully manual operations. Library services were a component of Sida support, and the progress of this has been discussed.

6.4 Sustainability

This is an outstanding challenge for UMSA. Some progress has now been made through the institutionalisation of DTIC and the reduction of reliance on external consultants, but a comprehensive sustainability strategy still has to be developed.

6.5 Contribution to Sida supported Research Cooperation Programmes

Researchers and research cooperation have benefited in two key aspects:

1 The intranet now enables researchers to access library resources more easily.

2 Access to the Internet by the majority of users is still through direct faculty connections to service providers rather than through the university network. However, the end-users access even the direct faculty connectivity through the LANs that have been implemented with Sida support.

6.6 Contribution to Higher Education

The initiative of UMSA to work with UMSS is a positive step in extending the benefits of Sida support to the rest of Bolivia. It has however already been noted that serious implementation did not start until 2007: it is still too early for impact to be felt outside UMSA.

"This project if successful has the possibility of providing a tremendous public service to the university and the students at the national level. In addition, it has the possibility of providing a platform for a national ICT network if this is taken to the national government for the proper financial support that it requires, which goes beyond the UMSAs capacities."
Ana M. Gren, Ph.D. Research Advisor, Operations – Bolivia Team & Policy – Sida, Sida

6.7 Future Projects and Continuing Support by Sida

UMSA needs to evaluate and take on board the findings and recommendations in this report to create and implement a full owned ICT project. Key among these are:

1 Creating awareness and addressing mindset challenges as a basis for implementing the ICT project.

2 Developing an owned ICT Policy and Master Plan and using these as a basis for mobilising funds both internally and from external development partners. The sustainability strategy should be one of the elements in this plan.

3 Carrying out an organisational audit and reform so that the impediments to university–wide implementation of projects (for example ICT) can be addressed.

4 Reviewing and approaching information systems implementation in a holistic fashion.

5 As a precursor to all activities, convening a forum of Deans where they can freely discuss UMSATIC and agree on areas where central control or management achieves common benefit. It should be accepted as reality that not all the faculties will come on board at once: the early adapters should lead the way and set an example for the rest.

Should Sida continue disbursement of funds under UMSATIC Phase 2 (i.e., into 2009–10)?

There is no doubt that there have been a lot of challenges in the implementation of UMSATIC. We would however argue that most of these are environmental, a proper examination of which, at the outset of the project, would have enabled the correct prediction of the challenges that arose later. The question arises: why was this not done? Given the project management arrangement, the assumption is that the expert guidance from the collaborating institution in Sweden (initially Lund University and later SPIDER) is there specifically to give guidance about these very issues.

It is impressive that some measure of success has been achieved with the data infrastructure as well as the Library system, especially under the implementation environment discussed and the acutely low staffing levels of DTIC. The enthusiasm and commitment of the DTIC and the Library teams is one of the most positive factors in the environment, a critical element of success if the environment was right.

There are pros and cons. Among the pros:

1 UMSA contributes 80% of human resource in Bolivia, and the quality and level of ICT awareness and literacy therefore impacts directly on the Bolivian economy and national development. Support to UMSA is therefore support to the country. In the words of one of the managers, without support from Sida, *"it would have taken more than 20 years to develop and if the support is terminated prematurely research will suffer terminally"*

"In terms of education very few are supporting higher education. We hope to join hands with other universities in order to apply several programmes."

There are also direct development opportunities created through the availability of connectivity, especially distance education.

2 *In reality, implementation of UMSATIC started three years ago,* and cannot be assessed as having run since 2002. Even then, the environmental challenges have militated against success: what has been achieved is despite such challenges. UMSA needs continuing support, not only to complete key elements of implementation, but also to consolidate what has been achieved.

3 A positive factor is the growing, albeit still limited, awareness, and the enthusiasm of the Rector. As one of the stakeholders pointed out, *"We have many internal difficulties however there are people who are starting to understand the service and its development. It's very interesting to keep on going forward."*

4 DTIC has now been formally established as a unit with permanent staff able to ensure the availability of competent technical guidance and support. In addition the university will pay ICT technical personnel in each faculty. (To put a reality check on this assertion by the top university authorities, we must observe that this same assurance has been given to earlier missions to UMSA (2007), and yet frequent changes in the Project Coordinator position have continued).

The cons include:

1 The strategic positioning of ICT in the university plans is very low, which denotes low strategic importance to anyone who reads the UMSA Strategic Plan.

2 UMSA has not developed a sustainability strategy, has not yet invested anticipated internal resources for implementation, and has not sought support from any other development partners.

3 There is no demonstration that the faculties are willing to work together for the common good, evidenced say by agreed areas where centralised implementation and operation add value and create efficiency.

4 There is no documented evidence giving assurance of a new and effective reporting structure for management of ICT project implementation, with lines of reporting that are not conflicting, and the elimination of frequent changes that have in many ways disabled this project.

It is therefore the recommendation of the evaluators that continuing support to UMSA for their UMSATIC II to its conclusion is critical, but that support without dealing with the issues identified under the cons would lead to inefficient and largely ineffective use of resources. Addressing these issues then becomes a recommended pre-condition to our strong recommendation for continuing support.

In addition to this, we would make a strong recommendation to Sida – even if it is outside the scope of the assignment – to consider support beyond the current phase targeted at those faculties and units that have been early adapters and need support to continue being an example to the rest. We believe it would be counter-productive to address institution-wide change against the backdrop of the current governance systems and governance culture.

Annex 1 Terms of Reference

Consultancy Services for external assessment ICT Networks at Universidad Mayor de San Andres, UMSA, Sida's Supported Research Cooperation Project within Information Communication Technologies ICT

Assessment purpose

- The assessment purpose is to assess the support by the Swedish Development Cooperation Agency, Research Secretariat/Bolivia Country Team to the UMSA – ICT project within the bilateral research cooperation to Universidad Mayor de San Andres, UMSA located in La Paz, Bolivia.
- The assessment is commissioned in the context of an overall assessment by Sida to be carried anytime between Jan–March 2009. (The consultancy should not be three months long; the time indicates when this consultancy could be conducted).
- The assessment shall provide an independent view on ICT support within bilateral research cooperation to UMSA to be used both as an input to the overall assessment research support activities in this project at UMSA, and to draw conclusions as well as give recommendations for continued support in this area to UMSA.
- The focus of the assessment should be on the impact of ICT support at UMSA and their research activities in particular, but also in training/education, administration and library functions.
- The extent to which the ICT support to UMSA also had an impact on the local introduction and development of Internet access, on local development of ICT skills and expertise, and on local demand for and use of on-line resources, e-learning, etc. should also be discussed.

Background Research Support to ICT project at UMSA

Since 2002, Sida provides support to the phase I of the project, which was aimed at building up an ICT network, that mainly includes interconnection of all UMSA's spread out faculties, libraries and administrative buildings with high-speed optic fibres. The project suffered from serious delays during the first years. After having changed the initial Swedish partner, Lund University, to SPIDER and recruitment of new project staff, the project gained good momentum in its implementation of phase I during 2005 and 2006. However, towards the end of 2006, the project encountered new problems of administrative character and was consequently delayed (the contract for the technical project leader, Zambrana, was not renewed by UMSA). In 2006 the project requested for funding for a second phase.

The UMSATIC project proposal 2007–2010, outlined a continuation of phase I, although only in brief, and it was therefore requested that the project submit a detailed and full scale project proposal, to be approved by Sida, for support of the project. Of highest importance and a further fundamental prerequisite for support of the project is that UMSA shall have guaranteed a fully satisfactory and stable project leading, as the situation at the time was unclear.

In August 2007, UMSA-ICT revised the application and contracted a full time coordinator of this project (Jorge Teran). The application work and planning was done in a joint manner with their selected partner (SPIDER) lead by Enrico Pelletta. A presentation of this project was done at the Annual Consolidation Meeting held in Stockholm, November 2007, to which UMSA authorities and Sida authorities attended. The project which was approved, includes in principle the three main components:

1 Information and library services,

2 E-learning and

3 ICT strengthening.

All the three components are relevant, but it is important that the components are up-to-date and based on modern methods and knowledge; this should be secured through the collaborating institution that should involve relevant Swedish expertise in respective areas. Sida's intention is to phase out the support to ICT infrastructure and hardware, implementing/strengthening project after 2010, and possible extension of the project after 2010 is intended to be aimed at maintenance of the ICT systems. An important issue for the project is thus the long-term sustainability. *Therefore, it was noted that it is important for UMSA to develop and put a sustainability strategy, a university wide ICT policy including business plan, into practice.* As a part of the strategy, UMSA should internalise the competence created in the project and not only rely on external consultants. It is also recommended that the project prioritise and focus on the use and maintenance of the ICT systems. *Unnecessary duplication of equipment*, such as video conference facilities, shall be avoided. The project will be externally evaluated during 2009 and its findings will feed into Sida's decision process for possible further support after 2010.

The assessment shall focus on the period of support from 2002 to 2010, and if possible provide some long-term suggestions.

Assessment focus

Effectiveness

- To what extent has the ICT support to UMSA achieved its objectives at project and broader levels?
- What are the reasons for achievement or non-achievement of objectives?

Impact

- What are intended and unintended, positive and negative effects of ICT support to UMSA?
- Internet connectivity, capacity, awareness, demand and policy should be discussed.
- Special attention should be given to effects on research, training/education, and administration and library functions, including the human resources, technical and financial aspects.

Relevance

- The extent to which the ICT projects conforms to the needs of the university and their research activities in particular, but also in training/education, administration and library functions.
- Is the ICT support to UMSA complementary with activities supported by other donors, is there any duplication?

Sustainability

- The issue of sustainability is taken to refer to whether the capacity that has been built within the programme is sustainable over time given existing resources and investment. The issue of sustainability is also related to matters of institutionalization, feasibility of securing further funding and broader issues of institutional commitment and support.
- Is the ICT support to UMSA sustainable with regard to capacity building and investments made in infrastructure?

- Are the effects of ICT capacity building, managerial and technical, satisfactory or are further capacity development needed? Has UMSA made available funds for operation (including cost for international connectivity), maintenance and depreciation of equipment acquired?

Efficiency

- To what extent can the costs of the ICT support to universities be justified by its results? What measures have been taken by UMSA during planning and implementation to ensure that resources are used efficiently?

Recommendations and lessons

- Continued ICT support to UMSA (for 2009–2010) within the work that they are doing now?
- What are the lessons learned and recommendations that can be given for continued ICT support to the current programme at UMSA?
- Are their alternatives for the current programme that could be considered in order for it to be more efficient?
- Any other recommendations that the consultants believe would be beneficial to creating sustainability and maximising the institutional benefit of the project

Methodology

The assessment will be largely based on analysis to be conducted by the consultant including:

- Off site study of related documents and reports to get a preliminary understanding of what has been done and challenges faced. This would also lead to the formulation of a draft programme for the visit.
- On site interaction with the direct players and the university community as a means of seeking clarity and internalising the progress and challenges. The on site work would start with a brief of the direct players and a section of stakeholders so that the constructive intent of the mission is understood.
- Preparation of draft report of analysis and recommendations about how implementation could be improved. These can be predeceased on site and bounced off the key people as above.
- Preparation of a report capturing the entire mission, including the recommendations.

The evaluator might also organise a small workshop bringing together representatives of selected individuals from UMSA. The workshop should draw on the active participation and input of these stakeholders.

The evaluator should use the documentation available about the ICT-projects by Sida or the institutions, project documents including project proposals, applications and progress reports as well as ICT policy for UMSA (the working version of this policy document should be made available to the consultant), plans and other project-related documents.

The evaluator is also expected to make interviews with selected persons that are directly or indirectly involved in the ICT projects (the involved UMSA faculties/departments, libraries, selected "sandwich" PhD students, counterpart (SPIDER) in Sweden, relevant desk officers at Sida and the Swedish Embassy), as well as have contacts with other institutions that have been involved in the projects. This type of contact may be conducted via telephone, e-mail discussions/surveys, etc.

Work plan and schedule

The assignment should be conducted during January 2009–June 2009. (The date shall be determined in joint manner by the selected consultant and the UMSA-ICT/DIPGIS coordination at UMSA, and UMSA Rector). The evaluators shall visit UMSA, La Paz, Bolivia.

Reporting

A draft report should be submitted electronically to Sida not later than April 15, 2009. Sida's comments on the draft report may require additional revisions/work by the consultant. A final version should be submitted as a paper copy as well as an electronic copy to Sida no later than May 15, 2009. The consultant should present the results at Sida or in Bolivia following the submission of the final report. The final report shall be in English, and not exceed 50 pages excluding annexes. Subject to Sida's decision the report may be published and distributed within the Sida Evaluation series.

The consultant should adhere to the terminological conventions of the OECD/DAC Glossary on Evaluation and Results-Based Management as far as possible.

The assessment report should also consider the report format presented in Appendix D and a completed Sida Evaluations Data Work Sheet Appendix F to be presented along with the report.

Assessment team

The assessment will be conducted by Dr. F.F. Tusubira, Knowledge Consulting Ltd. based in Kampala, Uganda.

Dr. F.F. Tusubira, at Knowledge Consulting Ltd. has extensive knowledge of all aspects of university environments and of the introduction of Internet technology into developing countries.

Suggested list of people to interview within the review:

To achieve the objectives, the reviewer should interview the people listed below, but not be limited to them. Additional people identified by the reviewer, Sida, the UMSA or KTH-SPIDER during the assignment may be included.

- UMSA Rector, Vice Rector, leadership, Selected Academic Deans.
- UMSA-TIC – all personnel and former Directors, Coordinators
- DIPGIS (UMSA Sida Research Cooperation Coordination office) – relevant personnel
- Relevant actors at the Vice Ministry of Science and Technology working with ICT related to library and e-learning efforts
- Selected UMSA PhD students if relevant
- UMSS – ICT (if possible)
- KTH-SPIDER
- National and International consultants contracted by SPIDER on behalf of the UMSA-ICT project.

Sida:

Stockholm: Research Advisor AG, Economist SW, Per-Einar Tröften, Hannah Akuffo, Tomas Kjellqvist, Sven Widerberg

La Paz Embassy, Country Director, NPO, Rebeca Borda

Annex 2 List of Respondents

UMSA

No.	Name	Designation
1.	Dr. Teresa Rescala Nemtala	Rector
2.	Eng. Juan David Castillo	Vice – Rector
3.	Dr. Carlos Calderón	General Secretary
4.	Lic. Oscar Heredia	Academic Secretary
5.	Dr. Tito Estévez	DIPGIS Director
6.	Lic. Ignacio Chirico	Asdi Coordinator
7.	Lic. Jose Maria Tapia	Head of DTIC
8.	Eng. Roberto Loza	UMSATIC Coordinator
9.	Eng. Jose Terceros	ICT Consultant
10.	Lic. Eliana de Asbun	Head of Division; Library Supervisors
11.	Lic. Teresa Rocabado Fuentes	Supervisor
12.	Lic. Pablo Ramos Quispe	Supervisor
13.	Lic. Marilin Sánchez Rada	Supervisor
14.	Lic. Armando Blacutt Villegas	Supervisor
15.	Dr. Enrique Udaeta	
16.	Eng. Mario Teran	
17.	Dra. Margareth Hurtado	
18.	Lic. Franz Cuevas	
19.	Dr. Tito Estévez	
20.	Dr. Gonzalo Taboada	Ex Rector Phase I, 2003
21.	Lic. Roberto Aguilar	Ex Rector at start oh Phase I, 2005)
22.	Ing. M.Sc. Ivan Irazoque	Ex Vice Rectors at start oh Phase I, 2003
23.	Dr. Jorge Ocampo	Ex Vice Rectors at start oh Phase I, 2005
24.	Dr. Tito Estévez	ICT Policy and Master Plan review UMSATIC II 2008
25.	Lic. Fernando Villazon	ICT Policy and Master Plan review UMSATIC II 2008
26.	Eloina Callejas	Ex Administrative Financial
27.	Lic. Angel Duran	Ex Administrative Financial – UMSATIC Committee 2003
28.	Blithz Lozada	Ex DIPGIS Directors
29.	Lic. Margarita Toro	Ex DIPGIS Directors
30.	Arq.Victor Ramos (ex DIPGIS Directors)	Ex DIPGIS Directors
31.	Lic. Paola Carrasco	Ex Program Coordinator
32.	Dr. Eduardo Palenque	Ex Program Coordinator
33.	Lic. Ignacio Chirico	Ex Program Coordinator
34.	Eng. Javier Lucero Bilbao la Vieja	Ex Dean of Engineering
35.	Dra. Vilma Strauss	Ex Dean of Pharmacy
36.	Dr. Jose Luis Montaño	(ex Dean of Engineering 2005 and Dean of Sciences
37.	Franz Cuevas	Dean of Sciences
38.	Dr. Jose Luis Montaño	Ex Dean of Engineering 2005
39.	Dr. Fernando Cajias de la Vega	Ex Deans of Humanities 2003
40.	M.Sc. Emilio Oros	Ex Deans of Humanities 2005
41.	Eng. Roberto Zambrana	UMSA – TIC

No.	Name	Designation
42.	Eng. Roberto Loza	UMSA – TIC
43.	Jorge Teran	UMSA – TIC)
44.	Lic. Javier Reyes	UMSA – TIC)
45.	Dr. Heriberto Cuevas	Dean of the Faculty of Medicine

Sida and SPIDER

No.	Name	Designation
1.	Dr. Afzal Sher	Director SPIDER
2.	Dr. Enrico Pelleta	Former Project coordinator SPIDER
3.	Daniel Berggren	Current Project Administrator SPIDER
4.	Dr. Rodolfo Candia	
5.	Rebecca Borda	
6.	Dr. Hannah Akuffo	
7.	Dr. Ana Gren	Research Advisor, Operations – Bolivia Team & Policy – Secretariat for Research Cooperation – Global Research , Swedish International Development Cooperation Agency, Sida

Annex 3 List of Documents Examined

	Brief	Author	File Name
1	ICT Policy and Master Plan Review and Updating Establish A Clear List of Priorities	UMSA	Appendix II III for Sida\Appendix II.doc
2	UMSATIC Ii – Budget 2009 Budget 2009 Details Strengthening of ICT Infrastructure Project	UMSA	Appendix II III for Sida\Appendix III.doc
3	Letter From UMSATIC to Sida Introducing Project and Activity Plan.	Roberto Loza	Appendix II III for Sida\Letter from UMSATIC.pdf
4	UMSATIC Phase-2 Project's Budget Distribution Between UMSA And SPIDER	UMSA/SPIDER	Background info for UMSA Evaluation\ Appendix II.pdf
5	E-Learning Meeting	SPIDER Meeting Minutes	Background info for UMSA Evaluation\E-learning UMSA SPIDER Meeting.doc
6	Travel Report Regarding UMSATIC	Roberto Zambrana (UMSATIC)	Background info for UMSA Evaluation\ Travel Report UMSATIC Bolivia.doc
7	Information and Communication Technologies at Universidad Mayor de San Andrés – Phase 2	Dra. Maria Teresa Rescala, Rector Dr. David Castillo Quispe, Pro-rector	Background info for UMSA Evaluation\ UMSATIC-2 application revised.pdf
8	Sida's Assessment and Approved Budgets of the Cooperation with Universidad Mayor de San Andrés, UMSA, La Paz For the Period 2007–2010	UMSA	Background info for UMSA Evaluation\ Updated 08 Assessment UMSA – 2007–2010 – AGr.pdf
9	SPIDER and Sida Contract 2005–2006 (UMSATIC I)	Sida	UMSATIC Program\Agreements and other Documents\ SPIDER and Sida Contract 2005–2006 (UMSATIC I).pdf
10	SPIDER and Sida Contract 2007–2008 (UMSATIC Ii)	Sida	UMSATIC Program\Agreements and other Documents \SPIDER and Sida Contract 2007–2008 (UMSATIC II).pdf
11	Co-Operation with Bolivia Appendix 1 Network Infrastructure Sub-Project	Eng. M.Sc. Javier Lucero Bilbao la Vieja Dean of Engineering Faculty	UMSATIC Program\Agreements and other Documents\UMSATIC I, Application-2003\ Appendix 1 version 2.doc
12	Co-Operation with Bolivia Appendix 2 Human Resources Training Sub-Project	Fernando Cajías de la Vega, Ph.D. Dean of Humanities Faculty	UMSATIC Program\Agreements and other Documents\UMSATIC I, Application-2003\ Appendix 2 version 2.doc
13	Co-Operation with Bolivia Appendix 3 Information Systems Sub-Project	Eng. M.Sc. Rolando Campuzano Dean of The Faculty Of Sciences	UMSATIC Program\Agreements and other Documents\UMSATIC I, Application-2003\ Appendix 3 version 2.doc
14	Co-Operation with Bolivia Appendix 4 Libraries and Documentation Centres Strengthening	Dr. Teresa Rescala Nemtala Dean of Biochemistry And Pharmacy	UMSATIC Program\Agreements and other Documents\UMSATIC I, Application-2003\ Appendix 4 version 2.doc

	Brief	Author	File Name
15	Co-Operation with Bolivia Proposal to Obtain Sida-SAREC Support Application Form For Period 2003–2005	Dr. Gonzalo Taboada López, RECTOR	UMSATIC Program\Agreements and other Documents\UMSATIC I, Application-2003\ Application Form UMSATIC version 2.doc
16	Network Infrastructure Sub-Project	Dr. José Luis Montaño Dean of Engineering Faculty	UMSATIC Program\Agreements and other Documents\UMSATIC I, Applica-tion-2005–2006\ Appendix 1 v.20050426. doc
17	Human Resources Training Sub-Project	M.Sc. Lic. Emilio Oros Méndez Dean of Humanities Faculty	UMSATIC Program\Agreements and other Documents\UMSATIC I, Applica-tion-2005–2006\ Appendix 2 v.20050426. doc
18	Information Systems Sub-Project	M.Sc. Franz Cuevas Dean of The Faculty Of Sciences	UMSATIC Program\Agreements and other Documents\UMSATIC I, Applica-tion-2005–2006\ Appendix 3 v.20050426. doc
19	Libraries and Documentation Centres Strengthening	Dr. Teresa Rescala Nemtala Dean of Biochemistry And Pharmacy	UMSATIC Program\Agreements and other Documents\UMSATIC I, Applica-tion-2005–2006\ Appendix 4 v.20050426. doc
20	Earlier Submitted Documents	UMSATIC	UMSATIC Program\Agreements and other Documents\UMSATIC I, Applica-tion-2005–2006\ Appendix 5 v.20050426. doc
21	Application For Period 2005–2006 ICT At UMSA	Lic. Roberto Aguilar Gómez, RECTOR	UMSATIC Program\Agreements and other Documents\UMSATIC I, Applica-tion-2005–2006\ Application Form UMSATIC v.20050426.doc
22	Total Budget	UMSA	UMSATIC Program\Agreements and other Documents\UMSATIC I, Applica-tion-2005–2006\ TOTAL BUDG-ETv20050426.xls
23	Appendix I General Comments	UMSA	UMSATIC Program\Agreements and other Documents\UMSATIC II, Application 2007\ APPENDIX I.doc
24	Appendix Ii Project's Budget Distribution Between UMSA and SPIDER	UMSA/SPIDER	UMSATIC Program\Agreements and other Documents\UMSATIC II, Application 2007\ APPENDIX II.doc
25	UMSATIC Phase-2: Details of Budget 2007–2010	UMSATIC	UMSATIC Program\Agreements and other Documents\UMSATIC II, Application 2007\ DetailOfEquipment-Clarifications.xls
26	Information and Communication Technologies at Universidad Mayor de San Andrés – Phase 2	UMSATIC	UMSATIC Program\Agreements and other Documents\UMSATIC II, Application 2007\ UMSATIC-2 Applicatin Final DRAFT ver 3.doc
27	UMSATIC Budget	UMSATIC	UMSATIC Program\Agreements and other Documents\UMSATIC II, Application 2007\ UMSATIC-2 Budget Final DRAFT ver3.xls
28	Sida/SAREC Project, SPIDER Support Status December 2006	UMSATIC	UMSATIC Program\Presentations\ UMSATIC I, Sida-SAREC Dec 06\ UMSATIC Status Dec. 2006.ppt
29	WSIS Poster	UMSATIC	UMSATIC Program\Presentations\ UMSATIC I, WSIS Nov 05\ WSIS poster A3.pdf

	Brief	Author	File Name
30	Meeting with Bolivians	UMSA/SPIDER/Sida	UMSATIC Program\Presentations\ UMSATIC I, Meeting at SPIDER October 2005\ Meeting with Bolivians 21st Oct.doc
31	UMSATIC Visit Conclusions	UMSA/DTIC.-SPIDER	UMSATIC Program\Presentations\ UMSATIC II Meeting at SPIDER, November 2007\ UMSATIC Visit Conclusions.doc
32	DTIC Network – Network Situation	Javier Reyes Pacheco – UMSA	UMSATIC Program\Presentations\ UMSATIC II, Status August 2008 (Mr. Reyes presentations)\ DTIC network – ENG.ppt
33	Status UMSATIC I	Javier Reyes Pacheco – UMSA	UMSATIC Program\Presentations\ UMSATIC II, Status August 2008 (Mr. Reyes presentations)\ UMSATIC I – ENG.ppt
34	UMSATIC Ii: Project Description	Javier Reyes Pacheco – UMSA	UMSATIC Program\Presentations\ UMSATIC II, Status August 2008 (Mr. Reyes presentations)\ UMSATIC II – ENG.ppt
35	Annual Progress Report 2005–2006	M.Sc. Roberto Zambrana	UMSATIC Program\Progress Reports\2005\ progr.report.to Sida UMSATIC.doc
36	Final Progress Report Project Extension Time April–September 2007	Dra. Maria Teresa Rescala, Rector	D:\KCL\Projects\UMSATIC Program\ Progress Reports\2007\UMSATIC I\ Progress report 2007 extension (Apr–Sep).doc
37	Project Highlights First Quarter 2008	Dra. Maria Teresa Rescala, Rector	UMSATIC Program\Progress Reports\2007\UMSATIC II\highlights first quarter 2008.doc
38	Annual Progress Report Draft 2	Dra. Maria Teresa Rescala, Rector	UMSATIC Program\Progress Reports\2007\UMSATIC II\ Progress report 2007.doc
39	Report of the Activities of SPIDER April–August 2008	M.Sc Enrico Pelletta,	UMSATIC Program\Progress Reports\2008\Progress-Report SPIDER April–August 2008\UMSATIC2 SPIDER activities report April August 2008.pdf
40	SPIDER Financial Status	UMSATIC	UMSATIC Program\Progress Reports\2008\Progress-Report SPIDER April–August 2008\UMSATIC2 SPIDER financial status August 2008.pdf
41	Final Report Front Page	Jorge Terán Pomier, M.Sc M.Sc Enrico Pelletta,	UMSATIC Program\Progress Reports\ Final Report UMSATIC I\Frontpage.doc
42	Final Report	Teresa Rescala Nemtala, Dra. Rector	UMSATIC Program\Progress Reports\ Final Report UMSATIC I\Finalreport.doc
43	Status of the ICT Program at the Universidad Mayor de San Andrés (UMSATIC), La Paz Bolivia	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC I 2005–03\Status of the ICT Program at the Universidad Mayor de San Andrés.doc
44	Work Agenda SPIDER Delegation UMSATIC Project	Eng. M.Sc. Roberto Zambrana Flores UMSATIC Project Leader	UMSATIC Program\Visit Reports\UMSATIC I 2005–10\ agenda-REV4.doc
45	La Paz Visit October 1st–15th 2005 Conclusions	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC I 2005–10\ La Paz Visit October 1st, conclusions.doc
46	SPIDER Project Coordinator Visit at UMSA, October 1st, October 15th 2005	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC I 2005–10\ Visit Report.doc

	Brief	Author	File Name
47	Work Agenda Swedish Delegation UMSATIC Project	Eng. M.Sc. Roberto Zambrana Flores UMSATIC Project Leader	UMSATIC Program\Visit Reports\UMSATIC I 2006–04\agenda-SidaSpider.doc
48	Visit Report One Year After the Beginning of the Cooperation Between UMSATIC Program and SPIDER	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC I 2006–04\Visit report May06 FINAL, CONFIDENTIAL.doc
49	Action Plan For ICT Strengthening Sub-Project	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC II 2008–04\ ICT project plan – Appendix A -Report Vist to UMSA April 2008.docx
50	UMSA ICT Project (UMSATIC) Phase 2: Visit Report Draft 1	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC II 2008–04\ Report Vist to UMSA April 2008.docx
51	UMSATIC Phase-2 Project: SPIDER Visit Report, September 15th to 19th, 2008	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC II 2008–09\ SPIDER-UMSA Visit Report Sep 2008.docx
52	Conclusions	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC II 2008–11\Conclusions.pptx
53	SPIDER-UMSA Visit Report Nov 2008	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC II 2008–11\SPIDER-UMSA Visit Report Nov 2008.docx
54	UMSATIC Projects Workshop	M.Sc Enrico Pelletta	UMSATIC Program\Visit Reports\UMSATIC II 2008–11\UMSATIC Projects Workshop.pptx
55	UMSATIC Projects	UMSATIC	UMSATIC Program\Visit Reports\UMSATIC II 2008–11\ UMSATIC Projects.pptx
56	Terms of Reference	Sida	App B- UMSA ICT DRAFT TOR.doc
57	Budget (Draft)	UMSA	ICT eval budget sugested.xls
58	New Leaders/Resignations	UMSATIC	Docs_UMSATIC_new_leaders.pdf
59	Sida Makerere	Alan Greenberg Gerrit Versluis	TZICT evaluation[1].pdf
60	Notes About UMSATIC Projects	Enrico Pelletta	UMSATIC project notes.pdf

Annex 4 Quick Scan Instrument

Introduction

Under UMSATIC Project Phase 1 2003 and 2005–2006, UMSA developed a university-wide infrastructure with the stated objective:

"To provide the necessary network infrastructure and equipment to satisfy requirements of high information and communication technologies".

The expected results were:

2003

- Physical implementation of network infrastructure into thirteen faculties with 140 access points per faculty with a total of 1,820 access points to the network with a capacity of 100 Mbps.
- University backbone composed of 20 connection points in two optic fiber rings. 31 Km of optic fiber will transport information to 1 Giga bps.

2005–06

- University backbone composed of 20 connection points in two optic fiber rings. 45 Km of optic fiber will transport information at 1 Gbps.
- Physical implementation of the network infrastructure (LAN) into thirteen faculties with 140 access points per faculty with a capacity of 100 Mbps.
- Connection to the Internet services provider with a bandwidth capacity of at least 10 Mbps.
- Implementation of intranet and Internet services as DNS, WEB, email, FTP, network file system, authentication and authorization systems, etc.
- Five Internet rooms with computers for forty students each, and a total of 210 computers.

This summary is aimed at giving a quick overview of the status at the start of 2003 and at the end of 2008.

Infrastructure element	Status at start of project	Current status
1. Network facilities		
1.1 Campus networks (include schematic drawing)	Annex 1	Annex 2
1.1.1 Type of connectivity:	10 Mbps	1 Gbps
1.1.2 Bandwidth capacity		
1.2 Inter–site networking		
1.2.1 Type of connectivity	10 Mbps	1 Gbps
Bandwidth capacity		
1.3 LANS at individual buildings **(please include physical and logical topology diagrams)**		Annex 3, Annex 4
1.3.1 connection points	170	4397
1.3.2 capacities	10 Mbps	100 Mbps
1.3.3 technology used	ethernet	ethernet
1.3.3 IP addressing scheme	192.168.1.0/24 10.10.1.0/24	200.7.160.0/20 (Annex 5)
1.3.4 LAN growth		
1.4 Connection to Internet/E-mail (Describe link types, capacities and technology used)	1 dedicated link 128kbps. umsanet Multiple faculties' links and other units ADSL of 128 to 512kbps.	7 links ADSL 2.8 Mbps – DTIC, central service Several faculty links and units of 256 to 2.8 Mbps: Architecture (2.8), Engineering (2.8+2+512), Basic Courses Engineering (2 Mbps), Medicine (2.8), Dentistry (1 Mbps), CIDES (512), CEPIES (2 Mbps), Informatics (2 Mbps), Postgraduate Informatics (1 Mbps), Postgraduate Ecology (1 Mbps), Law (2 Mbps),
1.5 Internet facilities for common use	E-mail Web ftp	E-mail Instant Messaging Web
2. Major Information systems		
2.1 Types of information systems and estimated number of users	Financial System in each faculty. Variety of Academics systems in carrers and Faculties	Financial System Academic System in 32 carrers SICOAS – personal control POA system Administrative Kardex Mi WAyka – Monitoring Procedures 1139 users
2.2 Number of PCs in:		
Faculties:	838	2130
Library:	120	207
Administration:	350	905
2.3 Average condition of Pcs (Indicate % older than 3 years)	50%	30%
3. Power		

Infrastructure element	Status at start of project	Current status
3.1 Condition of electricity power supply Reliability: Frequency of outage: Restoration duration:	No information is available	Reliable in most areas, in recent years were made general repairs in electrical systems in several buildings. Necessary use of stabilizers and UPSs. Maintenance just for weekends.
3.2 Protection and backup strategies	No strategies	Only in the nucleo there are UPS. Faculties should implement in their centres these systems.
4. Operational issues		
4.1 User comments on functionality and availability of LAN		The comments are varied. It should be noted that the implementation of the nucleus was performed in December 2008, this configuration gave a lot of stability to the network, the network previously had many problems because used a different configuration.
4.2 User support strategies		Support Group since management 2006 (help desk), it supports the central area (mainly Monoblock and Edif Hoy) with 4 people. The TIC administrators dealing to support the connectivity of the buildings by fiber. The faculties and careers recruit staff to give them support in the computer area and some in networking; the staff is assisted by ICT managers in the work of networks, although there is no formal organization to support this work.
4.3 Communication costs Local: International	No information is available	Only the central management about 2900 USD per month for 7 ADSL links

Annex 5 Plans for further Expansion of ICT Infrastructure

Are there any plans (proposals, technical designs, other) for expanding the current ICT infrastructure spanning the whole (or parts of) UMSA? If the answer is yes, can these plans be made available to the consultants?

Immediate plans:

– Expansion of fiber to antenna of El Alto, the design must be used according to availability of infrastructure company ELECTROPAZ, approximately 6 km track. The project and installation should be done this year.

– Links to areas outside the city of La Paz, were selected two locations, the mountain Chacaltaya (research center of high-energy particles, Physics) and the city of Viacha at a distance of 20 km with Agronomy career. Projects and facilities should be made this year. (With consultants)

In the medium term

– Establishment of interchange point, its effectiveness should be evaluated according to requirements to be defined

– Creating the education network, medicine, government, university network.

– UMSA wireless network, creating hotspots. (With consultants)

Long term

– International connection to Internet 2 with other institutions of education and research. (With consultants.)

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External Assessment of the Sida Supported Research Cooperation Project within Information Communication Technology (ICT) at Universidad Mayor de San Andrés, UMSA, La Paz, Bolivia

The report provides an independent analysis of the UMSA-ICT program which has been supported by Sida's bilateral research cooperation with Bolivia since 2003. The assessment and findings presented in this report include among other; the overall impact of the ICT program at an institutional level, the impact to the UMSA research community, training and education, administration, and library functions. Furthermore, the report includes a discussion of the manner in which this program has influenced the local introduction and development of Internet access at the university, the local development of ICT technical expertise, as well as the local demand for and use of on-line resources and e-learning.

SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
Address: SE-105 25 Stockholm, Sweden.
Visiting address: Valhallavägen 199.
Phone: +46 (0)8-698 50 00. Fax: +46 (0)8-20 88 64.
www.sida.se sida@sida.se

Sida