eBusiness
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Case Studies

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European eBusiness Case Studies

1. Current Legal Issues for eBusiness

Legislation to support the development and implementation of new Information and Communication Technology (ICT) and reduce barriers to the adoption of eBusiness is an important indicator for economic success. While the EU's legal and regulatory framework in this regard has only been gradually developed over the last years, there are valuable lessons learnt which can be leveraged in the implementation of a legislative environment to support the adoption of eBusiness in African States.

Reflecting research carried out under the Legal-IST project, which was funded under the European Commission IST Programme, this case study addresses four recently studied issues determined to be of high importance for eBusiness adoption in Europe. The objectives was to identify, address and study legal research areas to define research and development needs for short, medium and long-term focus (with regard to technology, methods, organisational and human issues, business relationship and working groups, national legal entities and codes) as well as to initiate and co-ordinate the analysis of specific issues of relevance for ICT-businesses and to provide recommendations on each research area studied, suitable for being used and adopted by policy-makers at EC level in order to evolve current legal framework. This research was based on questionnaire-based feedback received from legal experts, SMEs, policy makers and NGOs across Europe.

The four key legal issues for eBusiness in Europe identified are:

- Legal issues related to RFID
- Liability of information society service providers
- Self regulation on B2B internet trading platforms
- Business registry.

1.1.1 RFID

Radio Frequency Identification (RFID) Technology uses radio waves to identify objects or people wearing RFID tags automatically and wirelessly. RFID has two parts: a tag containing an identification number and reader that triggers the tag to broadcast its identification number. RFID is of considerable interest in retail, consumer packaged goods and manufacturing supply chains in terms of potential efficiency.

Hospitals also plan to deploy RFID to identify patients, call up records, reduce medical errors and improve overall productivity. For instance, a pilot project has started in July 2005 in the clinical centre of Saarbrücken in cooperation with companies such as Intel, Siemens Business Services and Fujitsu-Siemens. The study also points out other fields of application including the use of RFID in passports (in November 2005 Germany introduced the first European e-passport, equipped with biometric data stored on a RFID tag) and banknotes, use in libraries and even in the tracking of people (like for example in prisons).
The key legal implications are related to RFID tags that directly store personal data such as name, age, nationality etc. The most prominent current legal issue is the one related with the protection of privacy and data protection. The study examines which European directives apply in relation to different categories of RFID tags, some of which only include product reference numbers, while others can provide access to

personal data only in conjunction with a backend database. Issues related to obligations of the data controller are also considered.

1.1.2 Liability of Information Society Service Providers

The background to this issue goes back to the adoption of the EU E-Commerce Directive, and whether there should be stronger protection for the fundamental rights and freedoms of all internet users, or whether the directive should facilitate hunting down individual internet users who broke the law by for example, sharing files and breaching copyright in music. The original intention was facilitate the establishment of Internet Service Providers (ISPs) as a business model and not hamper its establishment through liability risks.

The study aims to provide a diagnosis of current liability problems as there is a general lack of regulation at the European Community level of a specific system of liability. The study points out four fields of interest: The question of the liability of providers of Hyperlinks and Location Tools (where there is a general lack of European case law); liability for the provision of AdWords; claims for information; and problems concerning injunctions.

The main problems detected to date in relation to Hyperlinks and Location Tools are that linking may give rise to a range of unlawful acts such as libel, intrusion of privacy, IPR infringements, trademark infringements, misleading advertising, unfair competition and breach of contract. A large number of the complaints are brought for practical reasons: economic precariousness or lack of knowledge of the identity of the infringing party.

In light of applicable legislation and available case law, the potential problems concerning Adwords (where suppliers pay a premium for their goods or services to be highlighted if certain words are used in a search engine for example) are related to the legal definition of the concepts “keyword” and “metatag” and the legal nature of the “Adwords System”.

The potential problems in relation to issue of claims for information are the lack of harmonised legislation on the obligation for the ISP to retain traffic data and the lack of harmonised legislation related to claims for information.

With regard to injunctions the study considers problems related to intellectual property infringements, and specifically some specific responsibilities of the intermediary.

1.1.3 Self Regulation on B2B Internet Trading Platforms

While across Europe there is eCommerce related legislation at both a national and European Directive level, self-regulation is still an important facet of Internet regulation. The development of codes of conduct is actually encouraged by the Directive on Electronic Commerce (2000/31/EC - Article 16). Legal issues related to self-regulation are analyzed from the perspective of legal validity and enforcement, including different types of self-regulation such as codes of practice / codes of conduct, the use of trust marks and labelling, and best practice guidelines and their legal implications. There are valuable lessons to be learnt that can be considered for adoption in other jurisdictions outside Europe.

Because of rapid technical developments and the trans-national nature of Internet trading platforms, self-regulation was proposed as a solution to increase the

willingness of businesses to join a B2B trading platform. Part of the focus of this study is to develop a template for such a voluntary code of conduct, identifying the main features of self-regulatory mechanisms and discussing the opportunity to address the identified barriers of entry on the B2B Internet trading platforms through self-regulation rather than state intervention. It also outlines future research required into how efficient a tool self-regulation can be for those considering joining a B2B trading platform.

1.1.4 Business Registry

An electronic business registry (eBusiness registry) is a software system and infrastructure that enhances information channelling and interactions, required by eBusiness. It enables organisations to store information, select business partners and provide content for customers. However, information supplied by such a registry may raise issues related to data protection and liability issues, depending on the quality and standards of its service.

Using data warehousing techniques, allows analysis of data in a registry easy. However, depending on the methods used, information of varying quality can be produced. The study on business registry gives a clear overview over what business registries are as well as of legal issues regarding this sector. It ends with a summary of legislative recommendations.

Barriers to eBusiness

The B2B Expert Group identified a series of factors that might explain the reluctance of businesses (and especially SMEs) to fully engage in electronic trade. These include:

- lack of awareness regarding the risks and benefits of joining a trading platform,
- difficulties in identifying the most suitable platforms for them to join,
- incompatibilities between technical standards,
- insufficient information about the rules applicable to the marketplace transactions,
- financial barriers (costs of implementing a secured transaction protocol and maintaining IT systems and websites).

The study recommends:

a. The formulation of Guidelines on the procedures to be followed in drafting a code of conduct and in the involvement of relevant stakeholders

b. Studying the true effectiveness of the codes of conduct in modifying the behaviour of market players, or marketplace operators. Such a research should include concrete examples of market changes brought by the implementation of self regulatory measures

c. Carrying out legal research on the enforceability of the provisions of codes of conduct by business partners or by third parties and available dispute resolution mechanisms.

d. Carrying out legal research regarding trustmarks, what rules govern their activity and the extent of their certification obligations

Key Conclusions

For RFID, it is essential there is good coordination between technologists, regulators, legislators, and consumers to ensure that RFID can realize benefits to businesses and the wider society. Use of RFID requires serious consideration of data protection

and data security implications, which in turn requires re-examination of the traditional legal principles and instruments.

For Liability of ISPs, it is essential to review the liability regime, taking into account the special role of ISPs in the Information Society. Greater legal certainty can be achieved by providing a legal definition of the appropriate court and out-of-court action and procedures.

Technical rules for business registries should be standardized in order to protect privacy of communication and to assure integrity and security of communications.

Self-regulation including use of codes of conduct is essential for B2B Trading Platforms. The creation of guidelines to help in the drafting of codes of conducts would be very beneficial. However, research into the enforceability of codes of conduct is recommended.

Discussion

Are similar legal issues currently being faced in your country or region?
What relevance do you believe such legal related issues have for your region or country?
What cultural, legislative or other barriers exist to successful adoption of eBusiness in your country?

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ISBN: 1-58603-682-3

More information is available at www.legal-ist.org

2. eCommerce – Opportunities and Barriers in Poland

2.1 Introduction

The development of eCommerce is becoming a strategic factor for economic development for many countries. However, this requires regular monitoring and analysis of trends, dynamism and changes of direction. Poland, which recently joined the European Union, is an interesting case in illustrating some of the opportunities and the main barriers to the development of eCommerce based on national research.

While exploitation of available infrastructure to develop eCommerce is dependent on necessary legislation and use of standards, the real impact is the appropriateness of services and applications used by the private sector and public administration to meet local, regional and national societal requirements. This case study is based on the results of national studies carried out by the Institute of Logistics and Warehousing, Central Statistical Office and Ministry of Science and Information Society Technologies and published in an annual report titled “Elektroniczna

gospodarka w Polsce – Raport 2004". The Institute works with the Ministry of Economy on the "Programme for 2003 – 2006 Creation of the mechanisms and structures of the e-Commerce development in Poland", which aims to improve economic competitiveness by adopting global e-Economy requirements.

This research should provide valuable ideas for issues that developing economies in Africa should consider in supporting wider adoption of eCommerce and eBusiness.

2.2 General Internet and eServices Adoption

Recent national initiatives and investment in infrastructure and education have started to have an impact in developing the information society in Poland. Internet access has increased by 10% since 2003 to 37%, with 2/3 of users under 35 years. While Poland is amongst the lowest ranking EU countries in this regard, the focus of initiatives has been on school children, and as such it will take time to see results.

Only 26% of households in Poland have Internet access. One of the barriers to lower Internet prices is the current de-facto monopoly of the one biggest Internet service provider in Poland is a main barrier to decreasing the price of the Internet. Only five EU countries have lower level of access, i.e.: Greece, Latvia, Hungary, Lithuania and Turkey. There is also differences between rural access (15%) and access in cities and towns (over 30%). This is mainly due to economic factors, with 80% of survey participants noting high hardware and telecommunications costs as the main barriers to using the Internet.

Despite this, the level of interest in Internet based services (eShops, services, eBanking) has doubled since 2003 and this trend seems certain to continue. Only 17% of Internet users bought goods online, spending 360 million PLN (about €90 million) annually. Main purchases were books, magazines, CDs, films, and education materials. The main reasons for the low level of Internet transactions include (a) lack of confidence in the safety of transaction realization and related privacy concerns, (b) lack of confidence of customer service in the event of a problem and (c) problems buying online (37% of respondents reported problems). A major challenge therefore is increasing public confidence in the security of online transactions, promoting the use of credit cards (which in Poland is still low) and better quality eShop services.

Only 14% of Polish Internet users use e-banking services, which is very low compared to EU leaders (Norway 73%, Finland 72%) according to Eurostat, and represent only 4% of those in the 16 – 74 year age group. However, this is expected to dramatically increase due to investment by banks in developing and advertising e-banking services. 11% of survey respondents plan to use e-banking in the next 12 months. There is lower interest in e-insurance services (4%), but this could be due to a lack of investment in the development of such services and lack of awareness as 38% of respondents have bought an insurance policy during last 12 months (mainly third-party and life insurance, but also property, household goods, travel and accident insurance. 63% of respondents were interested in life insurance. Despite the potential for e-insurance services, most initiatives in this area are driven by banks rather than insurance companies themselves.

2.3 Business to Business (B2B) Sector

The B2B market in Poland has grown significantly for five years, with less than 39% of Small and Medium Sized Enterprises (SMEs) having Internet access in 1999, to 85% by 2004. However, while at least half of SMEs have web pages, only a very small proportion offer online services. Almost 70% of companies now use Internet banking and another 20% plan to use such services in the next twelve months. Most

of the growth however, is from larger companies, with 17% ordering online and 4% paying online.

In general, the percentage of Polish companies involved in the B2B market (13%) is close to the European average of 14%. Major problems are international in nature - lack of standardization of data exchange and too many standards. There is also uncertainty in Poland in terms of the legal framework. The government"Programme for 2003-2004" developed three main components of eCommerce platforms in 2004 for SMEs: eCatalogue, electronic repository of eDocuments and offer system. The goal is to establsih a level playing field in Poland for SMEs.

2.4 Business to Consumer (B2C) Sector

Many B2C focused companies went bankrupt in Poland initially. Today there are 600-700 e-shops in Poland, most of which have relatively low turnover. According to e-Card (which authorises most Internet transactions in Poland, in 2004 10 websites accounted for 90% of Internet turnover (Wakacje.pl, Travel-planet.pl, Polish Travel Qua Vadis, Scan Holiday, Visit.pl, Bilety.pl, PLL LOT, Air-Polonia, Leclerc and Merlin.pl) (Source: E-handel: monopol dziesięciu, www.gazeta.pl, 13.10.2004).

70% of owners of e-shops were also selling in a more traditional way. Only 30% of e-shops had a mechanism for online payments, with 71% accepting bank transfers and 93% payment on delivery. This is significantly different to the European average ((credit cards - 89%, payments on delivery - 58%, bank transfer – 56%). Returns and complaints are major logistical challenges for e-shops compared to normal shops, with 14% of eShops having 5-10% returns compared to an average of 1.5% in normal shops. The main problems were technical defects (79%) and packing mistakes (24%). Only 15% of B2C companies in Poland have complete back-end systems, thus increasing costs, limiting potential orders.

2.5 eBanking

Polish banks have been collecting eCommerce experiences for 7 years. In 2004 61% of traditional banks in Poland provided e-banking services. There were also 3 Internet banks. e-Banking services were provided by six access channels: internet account (8%), electronic access to traditional account (63%), WAP (20%), phone-banking (58%), SMS (38%), TV (3%) and home-banking (73%). Most channels are available to both individual and corporate customers. Ideas for new products are usually based on traditional banking services adapted for new access channels.

e-Banking is still in the process of development and banks have now stopped using price as the main factor to persuade clients to move to e-banking. Since 2004, there are focusing on increasing the number of clients using such services, increasing the number of services offered and increasing the quality of such services. Polish banks are very positive about the opportunities and perceived benefits of rolling-out e-banking services to customers.

2.6 eAdministration

According to research carried out by the Polish Ministry of Science and Information Society Technologies. adaptation of IT in the Polish public sector accelerated in 2002 – 2003. However, despite introducing new legal regulations, there was not an even distribution of developments across the public sector. In October 2004 the Polish Customers Services started a pilot use of electronic signatures in the "Customs Gateway'' portal, which supports customs declarations, messages concerning transit in the framework of NCTS system, filling in INTRASTAT declarations and Electronic Data Interchange (EDI) with partners abroad. In 2004 the third edition of the ''Web-based survey on electronic public services" was carried out. Examination of 20 basic

public services, as defined by the European Commission, showed a considerable increase in scores for the ''Income-generating service'' cluster (increasing to 50% from 30% in 2003). This was mainly due to implementation of the ''Płatnik'' (Payer) programme that allows clearing accounts within the Social Insurance Institution.

''Registration'' cluster services scored 38%, ''Permits and Licenses'' cluster scored 33% and "Returns'' cluster scored 26%. However, the public services only achieved a 2% score on a new ''full service'' scale (number of services providing the full maintenance of administrative processes). The survey of Internet related attitudes in different departments showed that many departments are not guided by the real requirements of clients when planning and realising their activities, but rather what they need themselves. In this regard, local government seemed generally better at using the Internet to contact citizens than national government. The launch of the ''Gateway of Małopolska'' and ''Gateway of Podlasie'' should improve this situation in relation to registrations, and obtaining documents and permissions. The development of the network of Public Internet Access Points (in 40% of Polish communes in 2004) will increase access to e-government.

2.7 Infrastructure, Technology and Safety

While the Polish IT market constitutes more than 34% of the market of 10 New Member States, it is one of the less saturated with IT, with banks and financial institutions the main consumers of IT services. Research conducted by the Polish Agency for Enterprise Development indicated that the lack of computers was an essential barrier for SMEs, with only 47% having computers, usually one per company. In 2004, 60% of companies used analogue modems to access the Internet. Surveys showed that the awareness about security threads was not very high among SMEs, with most only protecting their data if a loss had already taken place, typically due to hacking or viruses.

In 2004 nearly all public administration offices had computers. 99,4% of departments had Internet access (48.9% analogue modem, 37.8% digital modem). About 20% of departments had IT systems for handling public orders. As a result, 87% of departments did not use authorization tools. Antivirus protection was common in departments but only 59% used firewalls to protect the security of personal and business data.

By comparison banks were quite advanced, with all having Internet access using wide band or wireless connections by 2004. Moreover, all of them had their own intranet systems. Most workers had access to IT infrastructure and to the Internet. All banks apply SSL coding protocol for the safety of transmission of data. Antivirus protection, firewalls and cryptography were also commonly applied. Although all institutions worked with advanced information technologies and collected personal data, only 25% admitted the actual or potential occurrence of security violations, mainly viruses. Institutions used 6 types of security. Most used anti-virus software and firewalls, with back-up coies of data stored off-site. 69% used digital signatures as an authorisation tool, with codes, passwords and use of encryption to assure confidentiality of data. Almost all regularly update security tools.

2.8 Conclusions

Comparing to most other European countries Poland still has a lot to do to support eCommerce and eBusiness, and e-services provided to citizens by public administration.

That having been said there continues to be a dramatic increase in the numbers enjoying Internet access (2000 – 19%, 2004 – 33%), with 61% of users using the

Internet every day or almost every day. The main challenge is relatively high Internet related costs. There is considerable economic potential in developing both the B2B and B2C sectors, as well as eGovernment related services to citizens. It is clear that government initiatives are making progress in supporting the development of B2B markets. Implementation of the EANIC e-catalogue for SMEs, creates a common language and helps to support data exchange between SMEs and should help drive down operating costs. While the B2C sector shows economic promise, 90% of current turnover is accounted for by the ten largest e-shops and in general, turnover in such e-shops is low. A key requirement for economic development however, is the development of back-office functionality.

While almost all Polish banks provide e-banking services for private individuals and companies, the public sector lags behind, with most services of mainly an information rather than interactive character. The government has much to do in this regard.

2.9 Discussion

Are similar issues currently being faced in your country or region?
What relevance do you believe such issues have for your region or country, particularly in relation to services to citizens and business by public administration?
What kind of gaps exist between e-services provided by national and regional or local government?
What cultural, legislative or other barriers exist to successful adoption of eBanking and eBusiness in your country?

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Paul Cunningham and Miriam Cunningham (Eds)
IOS Press, 2005 Amsterdam
ISBN: 1-58603-563-0

3. Leveraging GRID Technology in Africa

3.1 Introduction

Grid computing is a recently developed technology for distributed storage and processing of data, providing virtualised access to large scale computing resources for a variety of scientific and commercial applications. Europe is pioneering Grid development and deployment, and its applications in science, commerce and society in general. The work described in this case study is co-funded by the European Commission under FP6 though the EGEE project, contract number 508833. This case study presents current Grid work in Europe, and lessons & recommendations for the development of Grid computing in Africa.

As well as the need for raw computing power, storage and processing of very large and complex data sets, the Grid offers a number of other distinct advantages. It allows interest groups (at present mainly scientific communities) to collaborate in a secure environment, passing on and analysing shared data. Biomedical applications include drug discovery for malaria to protein sequence analysis. All the communities using the Grid also benefit from the remote access offered by Grid infrastructures. As scientific communities become more specialised, groups working on the same problems tend to become more dispersed. Already the Internet has had a massive

effect on these communities, making sharing of small electronic data sets a simple daily task. The Grid allows dispersed communities to share processing as well as storage resources, providing a virtual collaboration platform where all users can have equal access to the combined resources of the whole community.

Non-scientific use of Grid computing is of particular interest to the developing world, as it has scope to ease aspects of the digital divide through location-independent access to world class, large-scale computing resources. However, adopting Grid requires significant investment in the fabric underlying a workable Grid infrastructure, and reaching agreements with collaborators is time consuming process. This is one reason why Africa can benefit enormously from leveraging efforts from Europe.

Parts of the Mediterranean coast of Africa became connected to the pan-European GÉANT2 network infrastructure from December 2001 through the European Commission (EC) funded EUMedConnect project (www.eumedconnect.net), and the EC recently funded the EUMedGrid2 project. This will connect the nascent European Grid Infrastructure, pioneered by the Enabling Grids for E-sciencE (EGEE) project, to Egypt, Tunisia, Algeria and Morocco during 2006. Despite these beginnings, there are still many unexplored opportunities for Africa to learn from the European Grid experience.

EGEE is the flagship Grid Infrastructure project of FP6 and the largest multi-science Grid in the world. Launched in 2004, EGEE following on from the successful DataGrid (EDG) project (http://eu-datagrid.web.cern.ch/eu-datagrid/). Its goal is to combine existing regional and thematic European Grid initiatives into a production-quality infrastructure. After testing Grid in projects such as EDG and DataTAG (http://datatag.web.cern.ch/datatag/) under FP5, EGEE was the first European attempt to build the end product of Grid technology: a functioning, distributed, well provisioned, user orientated Grid infrastructure. EGEE began with about 70 contracting partners and six distinct user communities.

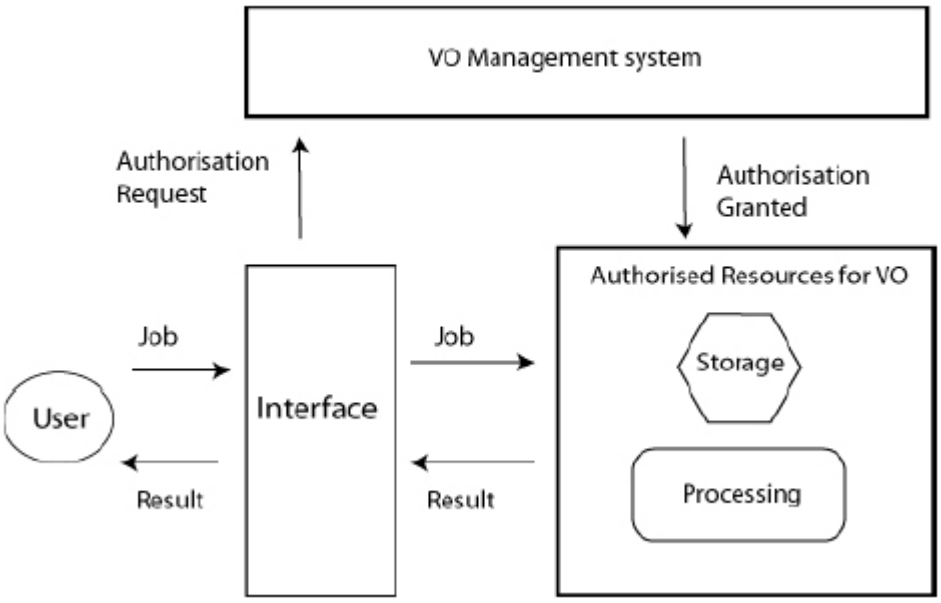
The EGEE infrastructure is of interest to Africa not only as its nearest major Grid infrastructure, but also because its connections to the continent through the EUMedConnect and EUMedGrid projects. These links open the way for organic growth into Africa with low economic and organisational barriers and quickest Return on Investment (ROI).

3.2 Considering Grid from Different Points of View

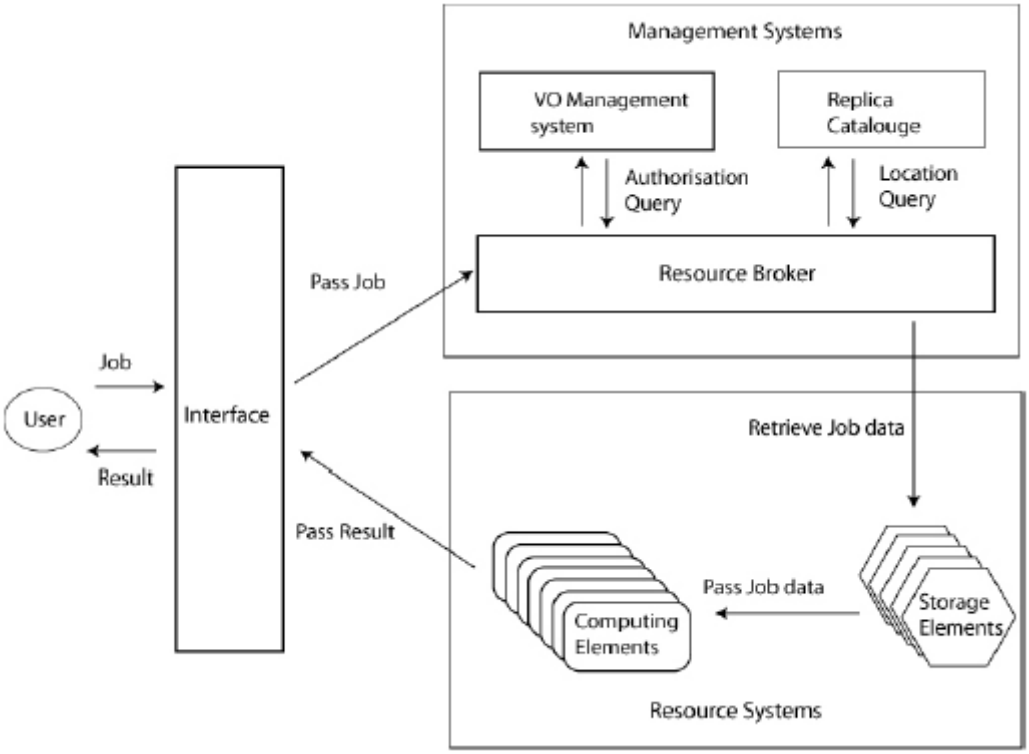
Grid can be considered from three perspectives: what the user sees; how the group relates to their Virtual Organisation (a group of users sharing requirements, resources and in some cases, datasets); and how the user's job is processed on the infrastructure.

The user goes to a website, logs on (by providing some proof of identity) and submits a job for processing. After processing, the user receives the results through the same interface.

Each user is also part of a group of users (Virtual Organisation - VO). From this perspective, any authorised user can log onto a Grid website, and by doing so is connected with the VO of which they are a member. This then provides them with access to relevant applications and resources that can be used to run their jobs.



From a resource-centric perspective, when a user submits a job to a Grid website, this is passed to a Resource Broker which assesses the computing resources required to fulfil the requested job and what resources are potentially available for use by that user through their VO. A Replica Catalogue is then used to find where the necessary data is stored. The Replica Catalogue keeps track of where all data on the Grid is stored. The relevant information is retrieved a Storage Element and passed to those Computing Elements selected by the Resource Broker to process the job. Results are then collated and passed back to the user through the interface.



The middleware software required to manage such a complex network generally comprises a suite of components featuring the range of functions necessary to operate a Grid infrastructure. There are currently a number of major middleware

development projects in operation, including Condor (www.cs.wisc.edu/condor) and the Globus Toolkit (GT), a suite of tools for building Grids provided by the Globus Alliance (www.globus.org). Examples of projects putting together components from other sources and packaging them, include Virtual Data Toolkit (VDT) (http://vdt.cs.wisc.edu/index.html) and the Open Middleware Infrastructure Institute (OMII) (www.omii.ac.uk).

The EGEE project re-engineered components developed in the EDG project with components from Condor and GT to create its lightweight gLite middleware (www.glite.org). This provides foundation services, the parts of middleware fundamental to the operation of any Grid. Provided under a business friendly open source license, gLite promotes interoperability between different Grid middleware solutions and uptake by the widest possible range of academic and industrial groups.

3.3 Implementation Issues in Africa

Taking an incremental model for Grid deployment across the African continent is possible by leveraging the investments already made in Europe. However, one key issue is the need for fibre network infrastructures to underlie any potential future African Grid. In Northern Africa this is being tackled through extension of the GÉANT network. While South Africa has some network infrastructure, this still leaves a large area currently there is no viable network. While challenging some solutions do exist, particularly if industry can be persuaded to leverage their own networks to provide the necessary underlying systems. For industry to consider this however, it is essential to provide concrete business benefits.

In Europe industrial involvement is in part limited by the acceptable use policies of the GÉANT network, so it is possible that European as well as African industry might be interested in becoming involved. While it is clear that the network infrastructure is not at present available in Africa, it is equally clear that the rest of the technology needed to build a grid is available. African academic institutes do have computing resources that, while limited, can certainly be connected to a Grid infrastructure. Such connections will allow data sharing even without local resources, and can also act as a testbed to prove the value of African access to Grid technology to national and international funding bodies.

Connection to a small number of pilot institutes would allow organic growth of Grid computing by minimising the initial resources necessary to bring Grid computing to Africa. Other issues for implementation of Grid Technology in Africa include the knowledge and personnel needs of such an initiative. For a successful African Grid, the continent must be able to mobilise its scientific and industrial communities so they can benefit from the Grid.

While African scientific communities are dispersed, they do exist, and Grid technology may enable their cooperation and coordination in ways previously not possible. One method for building an African Grid community is building National Grid Initiatives for African states. This concept, currently being formalised in Europe to help facilitate the next stage in the development of the European Grid Infrastructure, helps unite the potential Grid community and provides points of contact and legal entities able to enter into international agreements.

Crucially, it could also help demonstrate to African governments that there is a desire for Grid technology within the scientific community, and so help build the political support necessary for a future African Grid. The annual IST-Africa Conference provides a forum that could facilitate building such consortia by bringing together

European and African academics. Apart from academic excellence, an African Grid will need personnel with strong competencies in both the IT systems that make up a Grid and the management skills necessary to effectively coordinate such distributed projects. To build a sustainable infrastructure, it is necessary to build regional competence through African participation in and interaction with European projects such as EGEE and EUMedGrid. These projects can help to train personnel and provide support in a way that would establish African technical and management competency in an internationally recognised manner.

3.4 Potential Benefits for Africa

The EGEE project currently manages some 20,000 CPUs and around 10 petabytes of storage capacity distributed over some 180 sites in 40 countries around the world. It currently supports 6 different application domains: HEP; biomedical science; computational chemistry; earth observation; geophysics; and astrophysics. The biomedical domain for example currently supports 12 applications.

Grid can also be used in collaborative and distributed learning (eLearning) in Africa, with systems such as AccessGrid (www.accessgrid.org) and VRVS (www.vrvs.org) allowing classes to be delivered remotely by video link. Distributed groups can share information and learning experiences, and teachers can service students across many countries.

Apart from the conventional advantages of Grids, such as providing very large pools of resources, the Grid offers users the ability to connect remote communities, be they scientific or social. This may prove extremely useful in Africa as technologically developed areas are dispersed over a very wide area. The Grid could function as a general platform for the African academic community to collaborate and interact, maximising the benefits of their work. Such access could act as an economic booster to the continent, supporting both scientific and industrial development. At present, access to European Grid resources is available at a very low cost, where contributors simply attach their own resources to the network and so gain access to large scale computing systems.

Such low cost access could be distinctly beneficial for future African involvement, as it requires only existing resources and enthusiastic personnel. These benefits may also improve the effectiveness of scientific research that requires large-scale equipment. In areas such as Physics, Africa has an active research community, but is often restricted to theoretical work that does not require large hardware investments. Use of the Grid may allow African scientists to participate in the analysis of data generated in other places, for instance the data coming from the LHC experiments. This in turn may help African scientists justify national and international investment in their scientific communities.

Benefits can also be reaped in application areas, by facilitating research into socially and economically debilitating diseases such as tuberculosis and HIV/AIDS. Perhaps the best current example of this is the WISDOM data challenge, testing the performance of the infrastructure when running a drug discovery application in search of potential new malaria drugs. In just over 5 weeks, the equivalent of 80 years of computer time was provided by a very small subset of the EGEE infrastructure (around 1000 machines in 15 countries). The drug discovery application is of particular interest to Africa as it promises to ease one of the largest medical burdens on the African continent, helping to find treatments for a disease that kills one million people per year and affects 300 million others.

The Grid community is eager to embrace applications which not only test the functioning of the Grid, but also have demonstrable effects on the wider world, highlighting the utility of the grid for applications rather than just the functioning of the underlying computing systems. The present situation, with the Grid as a relatively young technology keen to prove itself, might offer an opportunity for the African continent. By becoming the default region for demonstrating the social value of Grids, it could benefit from the Grid while simultaneously creating an African knowledge base in Grid computing that will allow Africans to rapidly adopt Grid technology as their economic situation improves.

3.5 Conclusions

An attractive model for extending Grid to less developed regions is affiliation with pre-existing, large-scale infrastructure efforts, gaining access to knowledge, technology and resources that would be difficult to achieve independently. This is a potential model for the African continent, as Africa can benefit from the success of Grids development in Europe and leverage Europe's GEANT network infrastructure as is already happening in Northern Africa, without incurring the enormous investment otherwise required.

Such a model offers simple access to Grid technology, valuable for African academia and industry, as well as helping bridge the digital divide by giving Africans access to resources not currently available on their continent. This offers opportunities to benefit academic and industrial bodies and the African population in general, but requires foreward thinking.

3.6 Discussion

Are similar issues currently being faced in your country or region?
What relevance do you believe Grid applications have for your region or country?
How could the capabilities of Grid be used to address specific problems across Africa?
What cultural, legislative or other barriers exist to successful adoption of Grid in your country?

3.7 References

Lessons from Europe's International Grid Initiatives: Grid Technology in Africa
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CERN, Geneva, Switzerland

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IIMC International Information Management Corporation, 2006
ISBN: 1-905824-01-7

More information is available at http://www.eu-egee.org/

Mozambiquan eBusiness Case Studies

4. e-Business in the Banking Sector Case Study

Banknet is a Banking ICT solution which is used as an e-Business solution. It is a set of information systems that is composed of:

- An Enterprise Planning Resource (ERP) developed on top of 5 ERP solutions.
- An in-house development Banking Risk Analyses developed as a community project incorporating 11 banks with the referred Bank was the project sponsor. It is now used as a working system in the 11 participant banks

4.1 Case background and narrative

The Bank upon which this case study is based is located in Africa and was created in 1980 to be the Central Bank and the Issuing Bank. It also functions as a Commercial Bank. As a result of introduction of overall economic reform in the country, the Bank has exclusively been acting as the Central Bank since 1990.

The main objective of the Bank is to guarantee the value National Currency. As a Central Bank, it is the advisor and consultant to the Government in relation to monetary and financial issues, the manager of the monetary policy, banker of the State and of the Institutions of Credit, the manager of foreign reserves, supervisor of the financial sector, exchange authority and representative of the Government in international monetary relationships.

Since the second half of the 1990s, the Bank decided to use ICT for modernization of their business process and it implemented online solutions within branches. The information systems developed and implemented during this period allowed the Bank to learn about the process as well as creating an improved ICT culture among its staff.

From 2000 the Bank embarked on a system re-engineering project, to facilitate the bank to provide an eBusiness solution. Under this project, a ***Banknet***, that allows the Bank to offer an e-Business solution for Business to Business (B2B) was developed and implemented.

4.2 Objective analysis

As a Central Bank, it has the responsibility to supervise Financial Institutions and provide Banking service for Commercial Banks and Government.

The management of the Bank understood that ICTs plays an important role and add value for service delivery to his partners, in term of:

- Providing access to timely information for monetary policy;
- Providing home banking to partners which results in reducing general operation costs of the Bank;
- Providing integrated information for the management of the Bank leveraging *ERP* principles;
- Access to integrated prudential information from financial institutions for systemic risk management.

To achieve this, it is important that it has a responsive information system that can provide information and services. The following factors must taken into account:

- Financial institutions are well developed in term of utilization of ICT, so the Bank was under pressure to delivery a high level service for this sector to provide access to timely information for the purpose of monetary policy;

- The Government is in process of restructure including computerization of their business process. So, this partner of the Bank demands online service in order to fulfil the long way government strategy of financial management.

The *Banknet*, allows the Bank to provide a lot of electronic business between his partners (Financial institutions and Government), namely:

- **Home banking principal**, where Financial intuitions can login into tje *Banknet* to undertake the following business processes:
  - *Exchange control*, where information regarding the authorizations about exchange control can be loaded and validated;
  - *Money Market*, where Banks can undertake money market operations (in local and foreign currency) such as liquidity exchange, auctions etc;
  - *Commercial information*, where financial institutions (Banks and micro-finance institutions) can provide access to Credit Risk information and black lists of banking checks clients;
  - *Electronic fund transfer*, where banks and government can transfer funds online between themselves;
  - *Clearing house*, where the banks can exchange financial information on checks traded between Banks, in around of 72 hours over the country.
  - *Account information*, where Banks and government can online access to their account balance and statements;
  - *Exchange Rate,* where Banks provide information for exchange rate information as well as access the results of calculation for their business process
- Other *form of e-Business using Banknet*
  - *Bank Supervision Information*, where financial institutions submit their returns electronically (using secure email) and other prudential information and tracking their licensing process.
  - *Internet service*, under the statistics information system the Bank partners can provide through Internet statistic information as well as the feedback by the some way.
  - As part of an *INTRANET*, the Bank provides facilities to users to update the web page as well as dialogues between internal users through email and other facilities such as interactive web.

General benefits of e-Business for the Bank include:

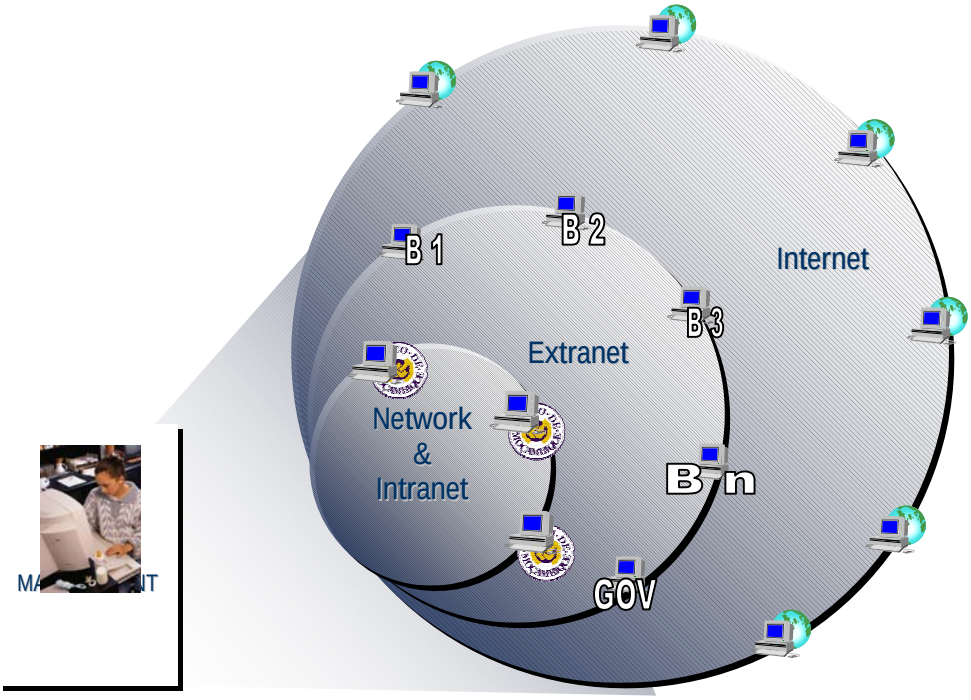
- Efficiency Improvements;
- Improvement of the quality of service and reduction of operational costs;
- Reduction of systemic risk of financial sector, due to the reduced period of time within which the funds are delivered to the final beneficiary and prudential information is provided in time;
- Timely delivery of information and service for decision makers;
- Better control of the financial sector
- Improvement of the banking and money market operations due the online service.

Tools involved

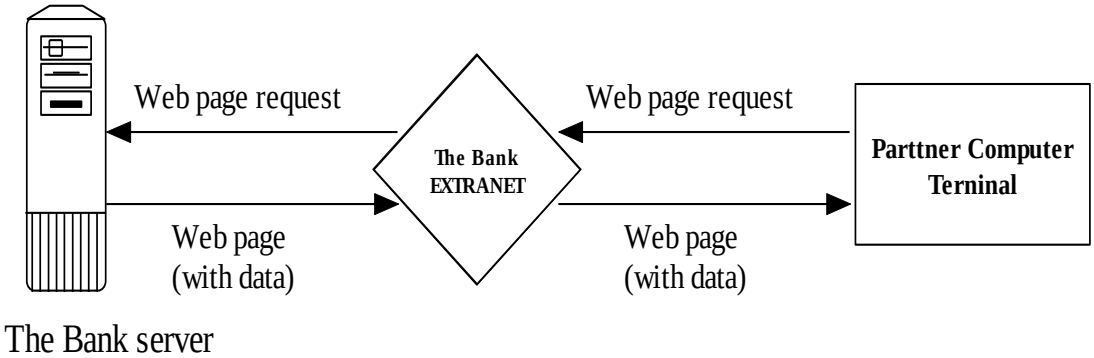
Banknet is leveraging the following platforms:

- Operating System: HP-UX
- DBMS: Oracle

The general Architecture concept of *Banknet* is illustrated in the figure below.



- To delivery the electronic transaction over the ***Banknet*** the Internet Service Transaction (ITS) of the *ERP* solution is used, which in general works as following:



- The security is guaranteed by the security concept in the ERP solution and including also SSH and SSL to ensure that information flowing over the Extranet is secure.

4.3 Lessons learnt

Any lessons learnt from the case study including the following:

- Critical Success Factors,
  - The surrounding environment in term of usage of ICT in the banking industry;
  - The economic growth and increase of financial sector in development counties;
  - Global marketing and integration impose a new behaviour on the financial sector in term of efficiencies;

- The skill for ICT development is essential for sustainability of an e-Business;
- Development county can cut step for ICT development and use ICTs in efficiency manner

4.4 Conclusions

The described e-Business concepts in this business case are relevant to any B2B solution. Success is not always measured by how profit you get from the result of e-Business implementation, but rather by efficiency and add value for the service delivery.

An e-Business Implementation requires a massive effort in terms of:

- Business Planning taking in account the surround environment as well as the available communication infrastructure;
- A lot of investment in ICT infrastructure security and the skill development for sustainability of the e-business solution
- Involvement of stakeholders and potential clients of the e-Business solution

4.5 Group work

Group of 3 or 5 delegates can present a SWOT analysis for the e-Business solution implemented by the referred Bank, taking in account of the following factors:

- The referred Bank is not commercial oriented;
- The know how issue surrounding the e-business development process;
- The level of development financial sector in context of development economies.

5. e-Business as an ISP Case Study

We have defined e-business not just as basically the act of selling and buying goods and services through the Internet, but also as the conduct of business over the Internet including collaborating with business partners. We have also presented two major emerging business models that consist in business built on the Internet and business providing the infrastructure. The second major category of e-business model comprises *businesses that provide the platform* upon which digital businesses are built and operated:

- Create and package technology-based products, services, and solutions;
- Enable consumers and business to access online services and information;
- Enable technology buyers and sellers to transact business.

In this case study we present a successful case of business providing the infrastructure that has started from scratch by a University Computer Center (UCC).

5.1 Case Background and narrative

The computer center is this case study is an autonomous institution within the public University in an African country. The UCC was established in 1979. In 1982, it became a formal computer centre. Its purpose is to spearhead the introduction of information and communication technologies (ICTs) in the university and in the community at large. The Centre also functions as a commercial Internet Service Provider (ISP)[1], providing Internet services, training courses and research, supports national information technologies (IT) policy development, software analysis and design, including hardware installation and maintenance, web design and hosting for private clients as well as for the University. The UCC provides access not only to students but also to NGOs, businesses, government and members of the international community. It also operates the largest Internet service.

The UCC, for example provides a course on Networking for CISCO systems; web pages are developed for government institutions, public institutions and the public in general. Students and the university teachers use e-mail provided by UCC free of charge.

The UCC was the first public ISP for the country. It initially provided free Internet accounts for the first one hundred users in order to build awareness about the Internet. Today, UCC has more than 2000 e-mail clients registered on the web as e-mail users and around 600, those who pay for email use.

Analyzing UCC as an ISP, it provides e-mail and Internet access to individual citizens and organizations, including the University, to conduct their business. These services are part of the core business of UCC. The question that arises is how UCC became one of the major ISPs in the country?

The basic premise of running an e-business is the creation of a good infrastructure to run the business. In the beginning, UCC relied on the telecommunication infrastructures provided by the local public telecommunications provider, however, afterwards, the UCC drew up and implemented its own plans concerning the

[1] An internet service provider (ISP) is a business or organization that offers users access to the internet and related services. Most telecommunications operators are ISPs. They provide services such as internet transit, domain name registration and hosting, dial-up access, leased line access and collocation.

improvement of the infrastructure connecting them to the Internet to become a full-Internet Service Provider.

The UCC's first Internet connection was in 1992 through a dial-up link of 9.6Kb to Rhodes University in Natal, South Africa, through UNINET, paying $14,000 USD/month. In 1993, the Center moved to a leased line of 14.4 Kb, then to 28 Kb and then 33 Kb. Its first VSAT link was through transtel in South Africa (64 Kb connection).

It was finally upgraded in 1997 to a 1 MB shared connection with Tanzania and the Seychelles. This upgrade was funded through the Leland Initiative. The Leland Initiative is a US AID project that funded five Internet Service Providers from the private sector. The quality was very low for the demand (less than 128 Kb), so a decision was made to move to a dedicated link in October 2000.

This is a 2-way link (394 down and 128 up). The second VSAT link (through the World Bank's satellite channel) is from the US. It is a 512 Kb link to be strictly used for educational purposes (such as video conferencing) and not for commercial purposes. This link was funded through the World Bank. The UCC is licensed to provide Internet services, which maintains its license through payment. The UCC also has a license for a wireless metropolitan network, which costs the same as the ISP license.

5.2 Objective Analysis

The UCC has done an excellent job in supplying people and organizations with e-mail and Internet access. Although it has not satisfied the needs of the whole country, due to many constraints, such as funds, infrastructures, regulations, human resources capacity, the selected strategy of finding the right partners to fund the infrastructures and interested in the same business as UCC was one of the major issue to the success of the business provided to the clients in a very a low costs.

We have to underline that, Internet is the basic requirement for running an e-business, and, UCC was the first organization in country to provide this important tool – access to the Internet. Today the country has more than ten ISPs under the umbrella of the UCC vision. Therefore, we have to eulogize UCC, an institution that is not business oriented but has opened windows for other business institutions either as ISPs or as just Internet users for e-business.

5.3 Lessons learnt

Critical success factors

UCC was always led by many bright minds who are tirelessly striving to lay the foundations and building blocks of an economy that can compete in the new world order, an economy that has only recently ended two wars, one civil and the other of independence, not so long ago. The team lead is characterized by:

- Good management skills
- Vision
- Intensive work by people at the UCC and their foreign partners
- Willing to win and to be useful for the whole society
- Innovation.

5.4 Alternative and Conclusions

Within a set of objectives of UCC, the provision for access to the Internet and e-mail was one of them. However, the existing infrastructure, funds available and willingness were not compatible, so the UCC had to draw its own strategies for acquiring the appropriate infrastructures for data in order to provide effective and cheap services. Another alternative adopted by the UCC would be to rely and work within the existing telecommunications infrastructures. Probably, with this alternative UCC would have achieved less customers and the reputation than today. For other companies willing to provide platforms for e-mail and internet services for business, and do not have infrastructures for data telecommunications, it seems to be feasible to use the same strategy as that of the UCC, by getting partners or making a joint venture with big telecommunications companies or funding.

5.5 Group Work

In small groups of 4, delegates discuss and present the main challenges faced by the UCC considering that:

- It was the first ISP of the country to serve two different kinds of community (academic and the public in general) and there was no model within the country to follow.