UNITED NATIONS DEVELOPMENT PROGRAMME

FEASIBILITY STUDY FOR THE PAKISTAN VIRTUAL INFORMATION TECHNOLOGY UNIVERSITY AND THE SOUTH INSTITUTE OF INFORMATION TECHNOLOGY

THE UNITED NATIONS SYSTEM IN PAKISTAN

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Feasibility Study for the Pakistan Virtual Information Technology University and the South Institute of Information Technology

Report to UNDP's Pakistan Office

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5 December 2000

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This report was prepared by the authors based on interviews conducted during the period 30 October through 17 November 2000 in Islamabad, Karachi, and Lahore. Comments were sought and a meeting of the principal stakeholders was held on 23 November in Islamabad. The comments received in writing and during the meeting were taken into consideration for preparing this final version of the report.

This report has been prepared at the Request of the Government of Pakistan to the United Nations Development Programme and does not constitute any legally binding commitment for implementation of the Virtual IT University or the South Institute of Information Technology.

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Foreword

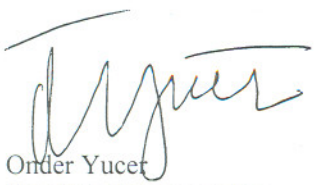
Information and Communications Technology (ICT) has revolutionalised the modern world. It is affecting several aspects of Society, Economics, Politics and Science. As captured in a recent UNDP Release, "ICT has become an indispensable tool in the fight against world poverty. ICT provides developing nations with an unprecedented opportunity to meet vital development goals such as poverty reduction, basic healthcare, and education far more effectively than before. Nations with successes in harnessing the potential of ICT can look forward to greatly expanded economic growth, dramatically improved human welfare, and stronger forms of democratic government."

"The scale of ICT challenge is immense. Despite the forces of market liberalization and globalization and efforts at public policy reform, the goal of achieving universal access to ICT and Global Information Infrastructure has remained elusive, and the disparity in access to ICT is growing. Today 96 per cent of Internet host computers reside in the highest income nations with only 16 per cent of the world population. There are more Internet hosts in Finland than the whole of Latin America and the Caribbean, more in New York city than on the entire continent of Africa."

"Yet there has never been a better time for collective action to connect all regions of the world. UNDP globally, in close partnership with key public and private sector players, is working to design a comprehensive strategy and implementation package to help transform the growing digital divide into a digital opportunity. A unique willingness exists among all partners and stake-holders, including governments, companies, foundations, non-governmental organizations, and multilateral organizations to work together to eradicate digital inequity among rich and poor, young and old, men and women."

Government of Pakistan is according high priority to the development and strengthening of Information Technology sector. The Government has adopted a national IT Policy and Action Plan in August 2000 to provide an overall policy framework. The national IT Policy and Action Plan focuses on Human Resource Development, Infrastructure Development, Software and Hardware Industry Development, Internet, IT promotion and awareness, Legislation, Regulations etc. Virtual Information Technology University (VITU) is a major component of national IT Policy and Action Plan focusing on Human Resource Development aspects. This is also gratifying to note that the Government is planning to make the VITU a regional IT facility to promote South-South Cooperation. This aspect was particularly highlighted by the Chief Executive of Pakistan in his speech at the G-77 meeting in Havana in April 2000.

UNDP is very pleased to help the Government prepare this Feasibility Report to establish the VITU/South Institute of Information Technology (SIIT). The report has been prepared by three UNDP funded consultants for the Government of Pakistan based on their research and interviews in November 2000. The report has addressed the issues of shortage of quality IT education opportunities in the country as well as in the region. Taking into account the government's strong commitment to the IT sector and the economic opportunities emanating from IT, the report suggests setting up VITU/SIIT at a total cost of Rs. 1.193 billion (nearly US $21 million). The five year financial model suggests that VITU/SIIT would attain self-sufficiency within four years of full operation and generate considerable economic and financial returns in the following years. The feasibility study assumes to start the IT programmes with an enrolment of 2000 students for various IT courses and to take them to 96,000 students in five years. The financial model suggests a pay back period of 4.5 years and an Internal Rate of Return of 38%.



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Executive Summary

Executive Summary

There is a severe shortage of quality IT faculty in Pakistan and a growing demand for large numbers of qualified IT graduates both within and outside Pakistan. The Virtual Information Technology University (VITU) will bring together a critical mass of quality faculty to provide world-class education in the IT sector to a large student body.

A parallel development will be the establishment of the South Institute of Information Technology (SIIT), initially a separate project proposed to the G77 Summit in Havana in April 2000 by Pakistan's Chief Executive. We propose that these two projects be merged. However, the analysis in this feasibility study is based largely on the VITU. Estimating the additional costs and revenues which would be generated by including non-Pakistani participating institutions and students resident outside Pakistan requires an international study which could not be undertaken in the short time available for this study.

The starting point and key for the expected success of the VITU and SIIT is that there is a documented, strong demand for computer science graduates meeting world standards of quality. Second, the project may be seen as the first step, a proof of concept, for a "smart, learning nation" approach to socio-economic development in Pakistan. The key to a *smart, learning nation* development strategy is to organize institutions and the population at large to take advantage of the technology now available to unleash and nurture the talent in the full population, not just a mostly-urban elite. Last but certainly not least, the VITU has been declared the highest priority project in the Ministry of Science and Technology's IT Action Plan, with the highest budget allocation of any project. In short, the project meets critical, felt and articulated need for IT personnel for domestic and international markets.

VITU proposes to address this situation by bringing together public and private sector institutions to participate in the VITU programme. Faculty expertise would be identified and utilized from its original location without any relocation. VITU will deliver high quality VITU using technological means supplemented by a tutor-network. VITU would participate in the establishment of over 100 state-of-the-art virtual learning centers with a capacity for teaching 50-100,000 students nationwide annually. One flagship "Virtual Campus" would be set up by VITU itself.

The principal stakeholders, such as public and private sector educational institutions and software houses, have shown a strong support for the project. Pakistan Telecommunications Corporation (PTCL) and National Telecommunications Corporation (NTC), the major telecommunications companies, have expressed willingness to participate in the project and both would want to supply communications services. NTC seems to be the logical choice.

One challenge for the VITU concept would be to bring the various educational institutions to common ground as far as course contents are concerned. Owing to the project's well-defined focus on IT, this should not cause any serious problems. The establishment of a national computer science association would be essential to guide the thrust of education and to raise the prestige of the profession. The proposed National Testing Service would play a crucial quality-assurance role for the VITU.

The VITU should start by offering short updating courses to existing IT professionals. These courses would act as pilot programs and would be used to iron out any deficiencies in the delivery and interaction mechanisms. A fast-track degree program could then be started aimed at engineers and science graduates and finally the full-fledged 4-year degree program could be initiated.

Instructional design would be a critical area for the new electronic content delivery mechanism being envisaged for VITU. Starting with a simple "camera-in-the-classroom" approach, VITU would evolve rapidly into delivering education through rich, interactive web-based content. Instructional designers would be required for this purpose and a master-trainer would be required to train a group of designers. Content development would be outsourced to other institutions as much as possible, thereby enlarging the community involved in the VITU effort.

The Pakistan Academic Intranet would form the basic infrastructure over which the major educational institutions would be connected. The same network would become the primary channel for use by VITU. The minimum bandwidth recommended for the network is 2Mbps with OC3 (155 Mbps) being the objective in the near term. The excellent national optical fiber network would be supplemented with two-way satellite connectivity, especially for the SIIT.

Eminent personalities from various walks of life should form the Board of Governors of the VITU. An Academic Council should be the controlling authority for course content and curriculum design. Prominent computer scientists, academicians and entrepreneurs would be invited to the Academic Council.

The study found strong support to the concept of VITU/SIIT among the various stakeholders that were interviewed. However, to create an environment conducive to long-term survival of the VITU, a focused effort would be required through strategic communications, marketing and advertising of the concept to create a favorable climate of opinion and build client support. It is important that the support base among stakeholders should be as broad as possible. The objective of this effort is to build political and financial support for the concept of VITU, more broadly, for a smart, learning nation strategy where the delivery system for IT education points the way to K-to-gray education and training – lifelong learning for anyone, anyplace, anytime, with just-in-time learning being an important part.

Financial projections for VITU for a period of 5 years starting from 30th June 2001 and ending at 30th June 2006 have been developed. These have been prepared on the basis of the underlying assumptions given in the report and the Annexes and show a healthy state of affairs whereby VITU is projected to attain self- sustainability within three years of full operations. Thereafter starting from the fourth year of operations i.e. June 2004 onwards the projections show that the University shows considerable profit, surplus cash and growth in assets and these keep increasing provided it attains the projected outreach (number of students).

1. Introduction and Background

Introduction and Background

There is a severe shortage of quality IT faculty in Pakistan, and the same can be said for many other countries in the South. Academia has lost a large number of qualified individuals to the software industry and this loss has not been replenished. What little faculty is left in institutes of higher learning is spread out in various universities without forming a critical mass at any single point.

Similarly, the output of qualified graduates from the various Bachelors in Computer Science programmes from all Pakistani institutions is estimated at about 4-5000 annually. Out of these, only 500 or so are classified as having international level skills. This number needs to be drastically increased if Pakistan is to get on the IT road map. There is an immense shortage of skilled IT manpower worldwide, which is projected to increase exponentially in the coming years. Pakistan should make all efforts to benefit from this.

The motivation behind the VITU is to bring together a critical mass of quality faculty to provide world-class education in the IT sector to a large student body. The Virtual IT University (VITU) will utilize the services of quality individuals wherever they may be without relocating them. This may involve faculty members located outside the geographical limits of Pakistan.

A parallel development will be the establishment of the South Institute of Information Technology, initially a separate project proposed to the G77 Summit in Havana in April 2000 by Pakistan's Chief Executive. We propose that these two projects be merged. However, the analysis in this feasibility study is based largely on the VITU. Estimating the additional costs and revenues which would be generated by including non-Pakistani participating institutions and students resident outside Pakistan requires an international study which could not be undertaken in the short time available.

VITU aims to provide quality education to a very large number of students. Considering only the Bachelor's level, it is estimated that annually over 40,000 students would want to pursue a career in Information Technology after qualifying their Intermediate examinations (12 years of study). This is in addition to a substantial number of engineers who want to re-train and enter the IT job market in the pursuit of more lucrative careers. The existing colleges and universities can only cater for a small fraction of these. VITU would be able to provide large-scale educational facilities for these students nation-wide. Further, by eliminating the need for qualified faculty at each VITU campus, the project would be able to provide this environment nationwide, even to remote areas.

Private sector institutes are generally better equipped than their public-sector counterparts as far as equipment used for the teaching of Computer Science is concerned. Local Area Networks are slowly replacing stand-alone computer systems. A recent scheme that has allowed the collaboration of private parties with public-sector colleges has been especially beneficial in establishing modest computer laboratories in many colleges of the Punjab. Other provinces are following the same path and it is anticipated that availability of computing resources will become widespread for the majority of higher secondary school students in the very near future.

The staff situation, on the other hand, is especially critical. Very few institutions (colleges or universities) can boast of adequate numbers of faculty, and even fewer would claim quality. Hence, the quality of education being imparted at the Bachelor's level and higher is generally dubious.

2. Vision and Strategy

Vision and Strategy

The starting point and key for the expected success of the VITU and SIIT is that there is a documented, strong demand for computer science graduates meeting world standards of quality. There is a shortage of such graduates in the OECD countries, witness the active recruitment of IT workers in developing countries such as Pakistan and India. This demand is felt and articulated in Pakistan as well – witness the hollowing out of computer science departments in all the first and second tier universities and the springing up of literally hundreds of IT institutes of to say the least, questionable quality. And then the VITU has been declared the highest priority project in the Ministry of Science and Technology's IT Action Plan, with the highest budget allocation of any project. In short, the project meets critical, felt and articulated need for IT personnel for domestic and international markets. Similar needs have been expressed in neighboring countries.

Second, the project may be seen as the first step, a proof of concept, for a "smart, learning nation" approach to socio-economic development in Pakistan. It will use learning centers in public and private universities and institutes all over the country and beyond to teach vital skills. This will accelerate human capital formation and unleash the creative talents of the population, even in remote areas. From teaching IT, Pakistan can proceed to teacher training to improve the quantity and quality of primary and secondary school teachers, and the VITU could expand into other strategic areas of knowledge.

The *smart, learning nation* strategy will improve learning for all, from pre-school children to retirees – from "k to gray".

In today's globalizing, knowledge-based economy, knowledge embedded in the labor force is a critical productive resource, equally if not more important than physical capital, land, and other natural resources. The future will belong to those individuals, companies, and nations who are able to capitalize on the revolutionary rapid and sustained fall in the cost of processing, storing, and transmitting information and knowledge – for which no end is in sight – to increase their competitiveness. It is now technologically possible to learn any thing, any place, any time, and in the not distant future, with the advances in automatic translation, in any language.

The key to a *smart, learning nation* development strategy is to organize institutions and the population at large to take advantage of the technology now available to unleash and nurture the talent in the full population, not just a mostly-urban elite. The Internet and the telecommunications technologies that can make it accessible to anyone (through public and private learning centers for those who cannot afford connections in their homes) can be a great leveler.

Investing in education of the people is the easiest and most politically acceptable way to redistribute income and wealth. When we make knowledge available to those who do not have it, we do not need to take it away from others who do. It is a win-win development strategy. The only "losers" could be those who enjoy temporary monopoly rents from possessing knowledge – their relative incomes could fall, but then they could learn more and new things, investing in themselves.

The real losers will be those individuals, enterprises, and nations, which fail to invest in knowledge using new, more efficient Internet-based teaching and learning technologies. They

may be left behind, perhaps irremediably. There is a real danger of national and global "digital divides".

IT can be a catalytic engine of development, spurring productivity increases in other areas of the economy. This essence of this realization has been captured in the IT Policy of the Government of Pakistan, which states as its vision:

> "***To harness the potential of Information Technology as a key contributor to development of Pakistan***"

The IT Policy goes on to outline its mission as "*the rapid development of infrastructure in synchrony with the creation of highly trained individuals and teams and directing them at transforming our society into a prosperous and dynamic one through the creation and free flow of information and knowledge. The Policy is directed at encouraging and assisting the entrepreneurial spirit, and making the fruits of this technology available to every citizen*".

VITU will become a critical component for achieving this vision. It will encourage business/academic "fusion" by bringing together the various stakeholders (producers, educators, consumers, and employers) to focus on their common objectives. Further, by actively involving a broad base of public and private sector educational institutions, the market-oriented approach of VITU will encourage the development of strong, collaborative partnerships thereby leading to a general improvement in the quality of education being imparted to the coming generations.

Pakistan has made considerable strategic investments in its telecommunications infrastructure in the form of optical fiber backbones, satellite links, microwave communications etc. Cable TV with broadband Internet connectivity as well as DSL projects have been initiated. Two-way VSAT broadband connections are possible today and will prove to be a cost effective means for reaching neighboring countries in the near future. The process is in fact accelerating and there are several current projects aimed at bringing communications in general and Internet connectivity in particular to a major segment of the population.

VITU intends to actively capitalize on these investments and assume a key role in realizing the benefits promised by the introduction of these technologies.

Submarine fiber now provides communications towards both the East and the West and there are several alternatives available for connection via satellite to the neighboring countries. The coverage includes South and South East Asia, the Central Asian states, the Middle East as well as Africa. VITU would therefore be able to command a large audience even beyond the geographical borders of Pakistan – evolving into a premier information technology institute for countries of the South.

There are no technical obstacles to the concept. The challenges are principally organizational.

The feasibility study includes low (minimum necessary to justify the effort), most likely, and high (most ambitious, stretching the envelope, most effective, highest-cost) scenarios/options.

3. The Project

The Project

VITU will address this situation by using the following approaches:

- Public and private sector institutions that could provide adequate computer laboratories would be invited to participate in the VITU programmes. This would alleviate, to some extent, the pressure on the VITU to establish its own dedicated campuses. Hardware already installed at these institutions would be validated and put to proper use, thereby increasing its utility manifold.
- Faculty expertise would be identified and utilized from its original location. Thus if an expert in networking was located in Karachi, while an e-Commerce expert was located in Islamabad, both would be invited to become part of VITU's faculty. These resources would not be hired on a full-time basis but would be signed on for a particular course and paid on the basis of their time involvement. The concept of utilizing these resources from their original locations would not be limited by the geographical boundaries of the country. Thus, if cutting-edge expertise were available in the United States, VITU would also utilize this.

In order to maintain a high standard in the quality of education imparted by the VITU, a tutor-network is envisioned. These tutors would be Master's level graduates who would have undergone teacher training. This tutor network would considerably value-add to the interactive experience of the students of VITU.

VITU will establish one administrative centre, which will act as the hub coordinating all activities of the University. This Administrative Centre will house the management as well as the basic electronic infrastructure for enabling the activities of the VITU. This will include, but not be limited to, Servers, Communications equipment, Content development workstations, CD-Writers and print media duplication facilities.

VITU will help establish a network of over 100 "Virtual Campuses" countrywide over the next four years. VITU itself, however, will own and operate only one such campus. Direct contacts will be established with all major national universities, both public and private sector, and they will be invited to subscribe to VITU programmes, both as providers as well as consumers. Participating institutions will then act as "Virtual Campuses" for VITU. Where there is a lack of such institutions, VITU would actively seek private sector involvement to set up "pure" virtual campuses. These would only be consumers of the VITU courses and would allow the dissemination of world-class education to remote areas. Subsequently, VITU would consider directly establishing Virtual Campuses only in areas where no major institutions exist and where private sector involvement cannot be obtained.

The Virtual Campuses would develop a total capacity for 50,000 students nationwide. Utilizing the centres on a full-day basis with a possibility of round the clock usage will further enhance this capacity to 100,000 or even beyond.

The Virtual Campuses will be equipped with state-of-the-art multimedia projectors and screens and multimedia personal computers. A Virtual Campus will be networked internally and also be interfaced to a high-bandwidth Wide Area Network (WAN), thereby allowing it to connect to all

other Virtual Campuses as well as to the Internet. Video equipment to receive television broadcasts and display via the multimedia projectors will also be incorporated in these centers.

VITU will also set up a "Virtual Library" which will provide electronic collections of course and supporting material. A CD-ROM library will be kept on line through CD Jukeboxes that will allow a huge amount of literature to be accessed directly by students of VITU. Subscriptions to electronic databases and libraries will also be established and offered through the Virtual Library. The library will also scan and make available useful resources from the Internet on a continuous basis.

The Virtual Library will also maintain the entire course collection of the VITU on-line. Electronic books will be made available by signing agreements with major international publishing houses. Linkages will also be sought and established with other electronic libraries, regardless of their location.

A comprehensive Courseware Management and Delivery system is also part of the facilities to be provided by VITU. Courses will be delivered through television broadcasts, online webcasts, video on demand and web-based content. This way, if any student misses the actual lecture/broadcast, he/she would have the opportunity of reviewing it at a later date or time. Similarly, by providing the entire lecture material in the form of web-enabled content (video-on-demand as well as hypertext), the full power of hyperlinks will be utilized to further enhance the learning process.

The Courseware Management and Delivery system will involve the use of television studio facilities, as well as multimedia content development facilities. The television production facilities of the Allama Iqbal Open University could be utilized for this purpose after an agreement to this effect is made. The multimedia content development will be done at the Administrative Centre or outsourced to other institutions/experts wherever they may be, in line with the concept of the VITU.

Project benefits: The impact of this project is multi dimensional.

1. It will provide a pool of highly trained professionals, which is non-existent at present.
2. It will enhance the quality of education in the existing IT institutions.
3. It will alleviate, to a certain extent, the severe faculty void in the existing IT institutions.
4. It will enhance the skill set of IT professionals
5. It will provide companies a core of trained manpower and it would encourage companies to expand into new areas. Internationally, there is an acute shortage of qualified manpower and the opportunity exists for companies to make major inroads if the necessary expertise becomes available.

The country is IT deficient at present. There are not enough professionals to cater to the requirements of the local IT industry, let alone the huge international demand. This project will provide quality manpower in IT. This trained manpower will be able to tackle large-scale projects in bigger organizations such as WAPDA, Sui Northern and Southern, CDA, PIA, Railways etc. as well as allow the local software industry to undertake sizeable international projects.

4. Stakeholder Analysis

Stakeholder Analysis

As part of the feasibility study, a considerable cross section of critical stakeholders was interviewed.

Public and private sector universities and educational institutions were visited in several major cities of Pakistan. These included chartered as well as un-chartered institutions. These institutions were approached with both perspectives: as potential "sellers" of courses, as well as potential "buyers". The interviews showed strong support from these institutions without any visible opposition. In fact, a considerable amount of excitement was generated by the project. All institutions were very aware of the issues faced by them, which were the very same factors, driving the VITU project: lack of adequate faculty and the requirement of a large, highly trained IT workforce.

International analysis, especially for countries of the South, would require a separate mission.

The two principal stakeholders in the telecommunication area – PTCL and NTC – were also interviewed with a view to determine the technological infrastructure. The study found that excellent communications infrastructure existed in the form of redundant optical fiber backbones in the country and both institutions were found very willing to collaborate in the exercise. Whereas PTCL owns the fiber backbones, the NTC has been charged with carrying the public sector communications traffic and has two fiber pairs at its disposal on each of the backbones. It is currently involved in setting up the switching equipment in various exchanges and has outlined a plan for nation-wide coverage as well as connecting major educational institutions. As such, the NTC seems to be the logical choice of carrier for VITU requirements.

The study also interacted with the principal consumer segment – software houses. It found complete support for the project. Software houses are already collaborating with several educational institutions by providing internships for students, validation of examinations and also by providing adjunct faculty to several Universities. This is an excellent example of industry-academic cooperation as this collaborative approach is critically needed and industry has to provide a direction for the educational institutions, especially in the fast paced IT sector.

5. Curriculum and Content Production

Curriculum and Content Production

Major Universities have expended considerable efforts in developing curricula aimed at providing high quality IT education. Out of these, the institutions having qualified faculty members would classify as "content-providers". Content could also be acquired from participating non-Pakistani institutions. However, these content-producing institutions are also potential buyers of content from VITU. There remains the challenge of developing common courses accepted by all the content-producing institutions for use in their own curricula. For the mainstream computer science courses, this should not pose too much of a problem because of the existence of standardized courses as outlined by the IEEE, ACM, and other such bodies. The overall curriculum would depend on the degree being offered.

Content producing institutions would have the option of offering their own degrees, filling holes in their teaching staff with courses purchased from VITU. However, they could also offer the VITU degree if they so choose. Pure Virtual Campuses would, of course, offer the VITU degree exclusively.

The Allama Iqbal Open University (AIOU) is actively seeking a role in this project, and in principle it is worth building on their infrastructure and experience, but perception of low quality as found in interviews with software houses and other institutions may be an obstacle. Their curriculum and content are currently under revision and content originating from AIOU could be utilized by VITU if it satisfies the quality requirements. Another role for the AIOU would be for their regional centers to upgrade to VITU learning centers and become pure Virtual Campuses for VITU. This may be especially valuable if the AIOU centers are located where no other major educational institutions exist or where no valid private sector participation can be found.

As an overall quality assurance mechanism, the establishment of a national computer science association as a professional body, would be crucial in developing external assessments (examinations), as well as raise the prestige of the profession. The proposed National Testing Service (part of the IT Policy) would be the primary mechanism for conducting the assessments. VITU would actively look towards the National Testing Service as a third-party quality assurance body and would require that its graduates qualify the NTS test. This would also allow VITU graduates to be ranked with their peers from other conventional universities.

VITU envisages a three-tier delivery model for its courses. An acknowledged master of the field would be the overall in charge of a course. He/she would act as the "knowledge-provider" for the course material and would also deliver lectures over television/streaming video where applicable. The course material would be transformed by instructional designers into web-based video content or hypertext, and webmasters would then be used to deploy the content. The entire group from the course in charge down to the webmasters would act as a cohesive team.

In order to maintain a high level of interactivity, a tutor network would also be used by VITU. Local instructors would be available at the learning centres to guide students where needed. An Instructor Supervisor would manage a defined group of Instructors and answer student questions beyond the capabilities of the local Instructors. Advanced or important questions would be forwarded for reply to the Professor in charge of the course and also for incorporation into the Frequently Asked Questions (FAQ's) list. All student queries would be responded to within a defined time period. All instructors/tutors would have to be validated by VITU and may even undergo instructor training at VITU before being employed at their Virtual Campus.

A fast-track option for VITU would be to focus on re-training qualified engineers and other holders of two-year scientific degrees. As this student population would already have covered the basic mathematics and humanities requirements, VITU could concentrate on CS courses and start turning out qualified computer scientists in a short period. Subsequently, VITU could move on to inducting fresh entrants into the four-year degree program.

The suggested sequence of events for VITU is to start short updating courses for existing IT professionals as soon as possible. These courses would be used to test the system during the period (January –August 2001) and ascertain the quality of knowledge/education delivery as well as the feedback mechanisms, while also testing the content development models. Subsequently, VITU could start the 4-year degree program with a fast-track option for engineers and other graduates as outlined above.

It is important to develop the understanding that the lecture is not the ideal unit of content for e-learning. Instructional designers will help in the "translation" of traditional content into modern web-based interactive instruction, with clear learning objectives, time budgets (for students), study guides, on-line tutoring, group project development, and other forms of interaction. Many students will eventually be doing collaborative work with distant partners over the Internet – their training should include doing work in this mode.

Developing a group of competent instructional designers will require technical assistance for training them, possibly technical assistance from abroad. This should be an integral part of the project.

While the "camera in the classroom" approach may be used to capture content initially, this is only a first step toward creation of a balanced mix of text, graphics, animated graphics (Flash animations, etc.), audio clips, and video clips. Bandwidth will not be a major constraint for the institutions on the optical fiber system, but "talking heads" should be used with discretion, and probably selectively where personality, body language, and "performance" really make them worthwhile.

One obvious place for video is for the professor to introduce himself to students, and outline the course objectives, methods, etc. establishing his "telepresence". Another good use of video is for live debates on controversial topics, where the interaction between participants is well captured by video and done in a studio setting. Studios may be rented for this purpose.

Video may also be useful for introducing difficult topics, motivating students, and the like, where the personality of the guru and his felt presence is important. But excessive use of video runs the risk of being a poor competitor with high-production-value TV programs, and it is not worth investing the kind of money necessary.

6. Technological Delivery Options

Technological Delivery Options

This section summarizes the detailed analysis contained in Annex A. The Pakistan Academic Intranet (Educational Network) is also part of the IT Policy. VITU should give high priority to delivering content over the proposed network. TV-based delivery is an immediate option and promises the broadest coverage. This would have to be coupled with the provision of a reverse interaction channel over the Internet. Major educational institutions in the larger cities would link to VITU over the optical fiber backbone but could also use TV-based reception of contents to relieve data congestion on the intranet.

The optical fiber backbone is already in place. The academic intranet would involve rings in major cities, with the rings connecting over the backbone to other cities. Institutions would be linked to the city rings. The academic intranet should operate at OC3 level (155 mbps) if possible, but a minimum of 2 mbps would be required.

The national fiber backbone has ample redundant connectivity to the Internet via satellite and submarine cables as shown in Figure 1. The planned expansion of the backbone through 2004 is shown in Figure 2. Coverage is expected to be quite complete, but last mile connectivity would have to be implemented for the educational intranet. New fiber could be laid, or spread-spectrum radio modems could be used. Radio-modems would offer a fast solution (possibly temporary) for up to 10 MBPS of connectivity to participating universities and other institutions providing learning centers. Cable TV infrastructure as well as DSL are also becoming available and could be considered for last mile connectivity. Remote sites could be connected through 2-way VSAT connections. Several satellite options are available for the country and the region providing wide-area coverage. Thaicom 3 and AsiaSat 3S are modern satellites that are available today. Intelsat 902 is a latest model satellite scheduled for launch in third quarter of 2001. Their footprints are shown in Figures 3-5.

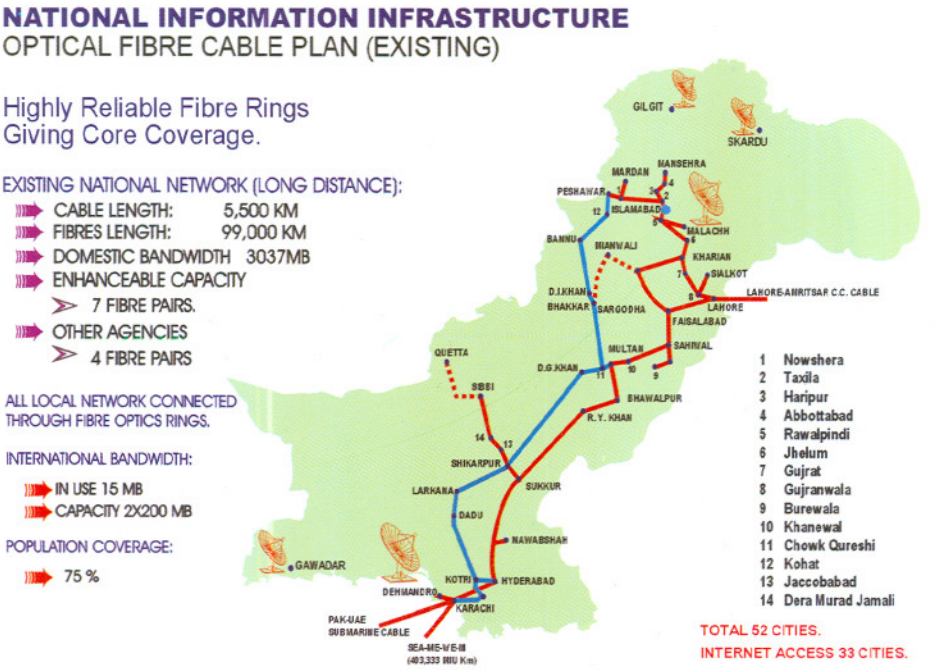


Figure 1: Current National Fiber Backbone

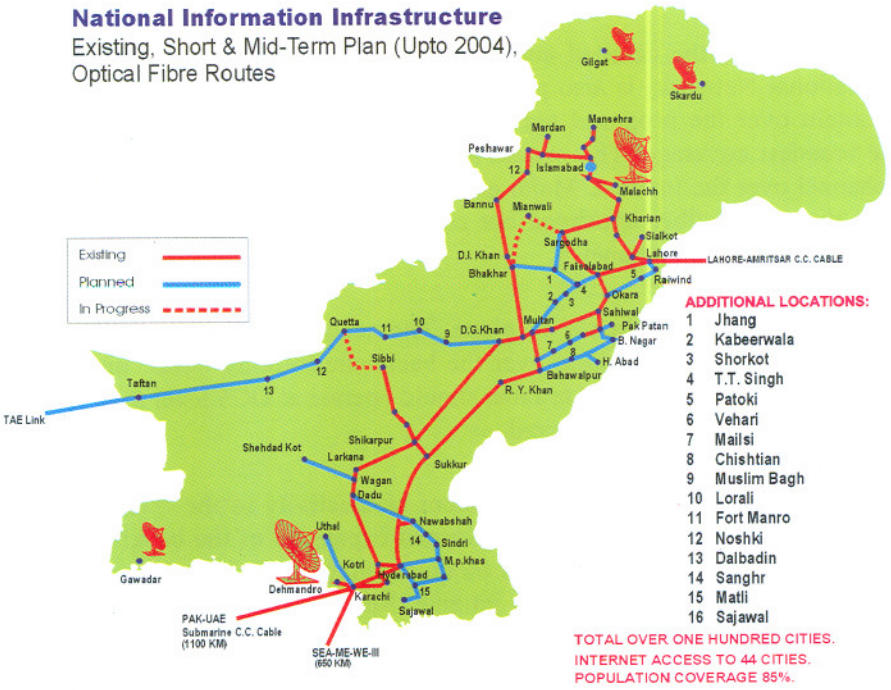


Figure 2: Planned Development of the National Fiber Backbone through 2004

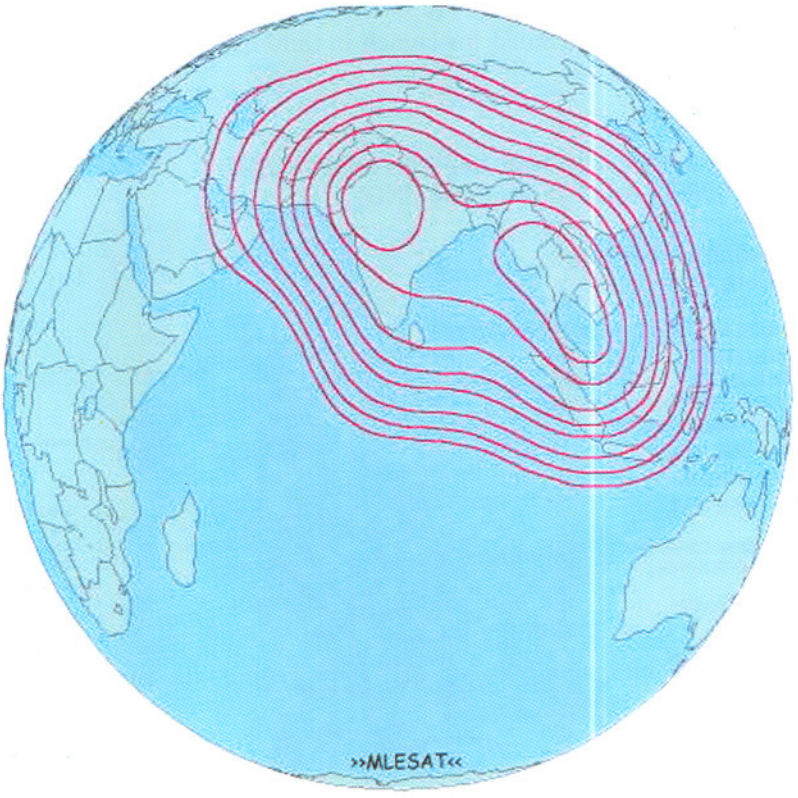


Figure 3: Thaicom 3 Regional Downlink Beam Footprint

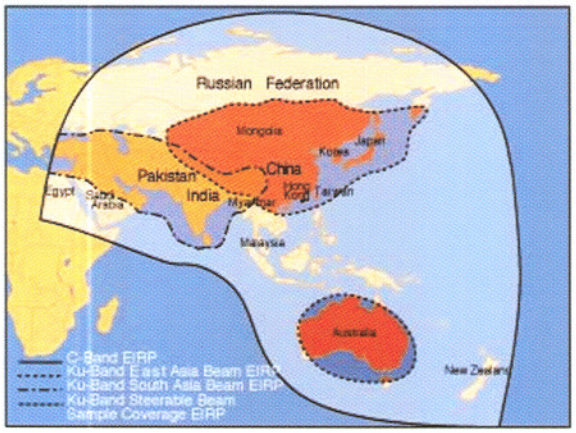


Figure 4: AisaSat 3S Footprints

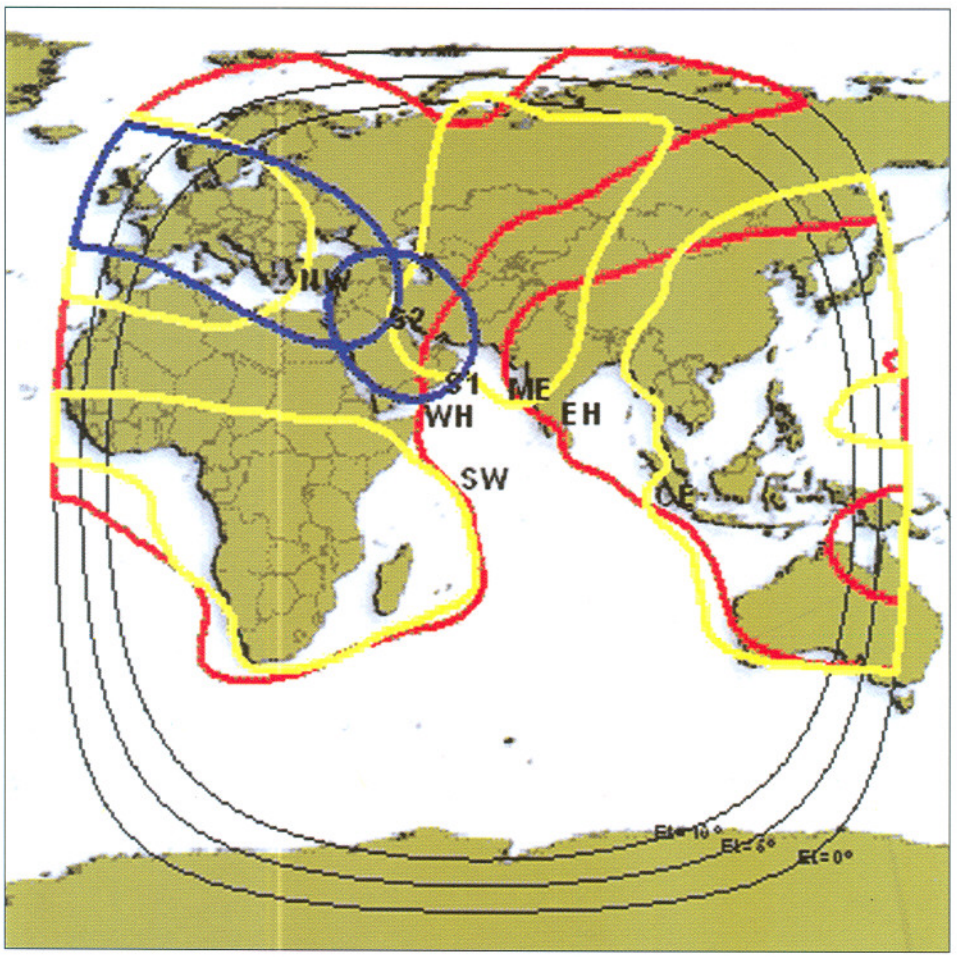


Figure 5: Footprints – Intelsat 902 60 E

7. Management and Organizational Structure

Management and Organizational Structure

A Board of Governors should be the principal governing body for VITU. It should be composed of eminent scientists and professionals, renowned educationists, prominent businessmen and entrepreneurs, as well as representatives of the Ministry of Science and Technology and the Ministry of Education. The BOG would set overall VITU policy and direction, approve the budget submitted by the Vice Chancellor, order and review financial audits, hire (and have the right to fire if necessary) the Vice Chancellor (basically the CEO, who would recruit his own core staff).

The SIIT Board would include representatives of the most important (in numbers of students) countries participating in the SIIT.

An Academic Council, composed of prestigious computer scientists from public and private sector universities, software houses and research institutions inside and outside Pakistan would review all courses proposed for the VITU/SIIT curriculum and its approval would be required for a course to be offered. The Academic Council would also approve changes in the curriculum, including recommending short updating courses for IT professionals in the VITU/SIIT continuing education program. Assessing the quality of content would also be one its main concerns.

Overall leadership of the VITU requires a Vice Chancellor (VC) with the following skills:

- Entrepreneurial, capable of mobilizing financial and human resources
- Technically world class, with the respect of the Pakistani and international IT community
- Diplomatic/political, capable of motivating stakeholders and getting them to work in harmony toward common objectives

The staffing of VITU should be kept at the minimum level necessary to operate efficiently. There would be no gurus at VITU headquarters, but there would be a core academic group responsible for overall maintenance of the content, assignments, quizzes and other mechanisms to assess student performance. The same group would be responsible for the FAQ's and e-mail responses to student questions. The "gurus" would be contributed by content-producing member universities and institutes, Pakistani and foreign.

VITU/SIIT could and should have a group of expert instructional designers and webmasters to work with the gurus to translate lecture-and print-based content into web-based learning materials. Below the VC we propose the following key staff for the VITU

- Dean IT (Academic responsibilities)
- Registrar (Record keeping responsibilities)
- Treasurer (Financial responsibilities and negotiations with outside agencies)
- Network Executive (VITU Network and communications responsibilities)
- Dean Instructional technology and design
- Business/Marketing manager/PRO (Negotiating with participating institutions, marketing the concept, media relations etc.)

The academic infrastructure will also be kept lightweight with the concept of the core group being policy makers and facilitators, capable of utilizing the services of talented individuals wherever they may be located. Thus, education through VITU will be carried out using the core academic group, instructional designers, audio-video experts, and webmasters working with a distributed adjunct faculty.

The academic and management staff of the VITU is anticipated to start out with 22 individuals, including the VC, growing to a total of 81 in four years, including the VC and other managers. The majority of this staff would be the instructors responsible for student interaction. The growth of the academic group is anticipated as shown below:

Position	Year 1	Year 2	Year 3	Year 4
Professor	1	1	2	2
Assoc. Professor	1	1	3	3
Assist. Professor	1	3	4	5
Lecturers	2	4	6	8
Instructors	5	20	30	40

Another important group of the staff will report to the Dean, Instructional Technology and Design.

Instructional Designer	2	3	4	4
Audio-video expert	1	1	2	2
Webmaster	2	2	3	4

The Dean, Instructional Technology and Design would be one of the Instructional Designers
This group, composed of instructional designers, audio-visual experts, and webmasters, will be responsible for developing VITU's online educational materials, using the latest e-learning technologies and web-based instructional design methods.

Recruitment and training of this group will be a major responsibility of the VC, and the group must work closely with the staff reporting to the Dean, IT. This group is a service group to the academic staff, who are responsible for the intellectual content of the VITU/SIIT courses.

But there is a big difference between lecture-oriented classroom instruction and web-based distance learning, making full use of all digital media (e.g. e-mail and derivatives such as threaded discussion forums, listservs, chatrooms and recorded chat archives); video and audio clips delivered via streaming from a server (all delivered over the Internet by landline and/or satellite) and possibly broadcast television. This group will help the academic staff make and manage the transition.

The Dean, Instructional Design and Technology should have, or be acquiring at least a master's degree in online distance education – several such programs are being offered through online instruction from US and European institutions.

Since these skills are in short supply in Pakistan, a national / international search for instructional design and technology experts should be conducted to find a suitable person to occupy the position at least temporarily, and a training program using international experts undertaken as a high priority for the staff reporting to the Dean, Instructional Design.
If feasible, all courses will have externally assessed final examinations. The comprehensive examinations prior to awarding the BCS degree should definitely be assessed externally, preferably by the National Testing Service.
Feedback mechanisms will be employed to get constant input from students, tutor supervisors, and tutors to make necessary mid-course adjustments and constantly seek to upgrade quality

Annual evaluations of the VITU program will be conducted by an international review board selected by the Board of Governors

VITU will establish a virtual placement service, on the Web, which will allow graduates of VITU/SIIT to display their résumés, transcripts, recommendations, e-mail address, telephone numbers, and other relevant information for hiring. VITU will also promote its graduates through advertising, face to face (F2F) job fairs, and the like.

8. Marketing and Advertising

Marketing and Advertising

The study found strong support to the concept of VITU/SIIT among the various stakeholders that were interviewed. However, to create an environment conducive to long-term survival of VITU, a focused effort would be required through strategic communications, marketing and advertising of the concept to create a favorable climate of opinion and build client support. It is important that the support base among stakeholders should be as broad as possible.

The objective of this effort is to build political and financial support for the concept of VITU, more broadly, for a smart, learning nation strategy where the delivery system for IT education points the way to K-to-gray education and training – lifelong learning for anyone, anyplace, anytime, with just-in-time learning being an important part.

Electronic media will get heavy emphasis: in part the medium is the message – Television, and radio programming, use of websites, some push Internet material to selected mailing lists (via e-mail). Print media will not be neglected – newspapers, magazines are important to obtain the widest and long lasting coverage.

Initial contacts with a TV production company which is also developing an ISP and a print/electronic media conglomerate which is moving into ISP business and already puts its newspapers on its website (and gets a lot hits from Pakistanis living abroad) produced enthusiastic support, with a strong willingness to be involved.

All formats of TV should be considered – segments of news programs, documentaries, public service announcements (IT Minute), talk shows, round table discussions, dramatic serials (soap operas / telenovelas / mini-series with IT and development, learning nation themes built in). Dramatic serials are the most expensive, and would be in the high-cost (and benefit) scenario. Most of the same format would apply to radio.

Print should also consider a variety of options – normal news coverage, special inserts in newspapers and magazines, op-ed pieces, editorials.

Advertising should be used not to build political and financial support so much as to inform the public on courses available, fees, application deadlines, and the like.

9. Financial and Economic Analysis

Financial and Economic Analysis

Project Capitalization

The capital expenditure on the various expense heads of the Virtual University is projected to be incurred over a period of 24-30 months by which time it will evolve into a full-fledged distant learning institution with maximum/ full capacity. The capital expenditure for the Virtual University is projected to be incurred from January 2001 to December 2003 under the following main expense groupings:

Land & Building	An existing building is to be leased/rented from the Government of Punjab. It is proposed to rent up to 96,000 sq ft of area to be furnished and upgraded for setting up the Virtual University, Vice Chancellor office and the flagship teaching premises.
Computers, Accessories and Generators	The projections include buying substantial quantities of computers numbering approximately 2000 along with printers and multi media equipment, generators and UPS over the period of capitalization of the Virtual University Campus and Office.
E 1 Connectivity Costs of Universities	One of the main features of the Virtual University is that a number of Participating Institutions of repute shall participate in the delivery of quality lectures as well as receiving the lectures. For this purpose sophisticated equipment is budgeted which includes cabling, routers, digital cross connect and other equipment required for quality broadcast of lectures on a two-way system.
Content Development	The success of distance learning depends on the quality of the program delivered through any of the accepted modes of delivery. In the case of Virtual University it is proposed that quality content is developed from expert sources both locally and from abroad over the period of the first time delivery of the course program.
Other Assets	Communication, networking equipment and other ancillary assets like vehicles have also been budgeted.
Contingencies, Working Capital & Initial Years' deficit financing	Provision for contingencies have been made at the rate of 5% of the total capital expenditure. In addition provision has also been made for the initial years cash losses and initial working capital requirement

Summary of the proposed capital expenditure heads and their budgeted amounts and funding is given below, details of which are given in **Annex B-1.**

Capital Expenditure Budgeted Amount and Timeframe

Table-1

Rs. in '000

Particulars	Total	% of Total	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04
Land & Building	**63,733**	5.3%	15,353	18,690	14,483	15,207
Computers, Accessories and Generators	**190,062**	15.9%	38,494	36,823	40,565	74,181
E 1 Connectivity Costs	**396,333**	33.2%	98,500	195,300	102,533	-
Content Development	**210,250**	17.6%	53,500	102,500	54,250	-
Other Assets	**73,604**	6.2%	48,750	8,658	16,196	-
Contingencies & Working Capital	**74,199**	6.2%	20,730	37,599	11,401	4,469
Initial Year Loss Financing	**185,196**	15.5%	46,552	115,759	22,886	-
Total Capital Expenditure	**1,193,377**	100.0%	321,878	515,328	262,314	93,857

Assumptions on project cost

Connectivity costs: These pertain to connecting the 40 proposed Universities participating in the program and relate to 'last mile' costs and comprise of routers, digital cross connect etc.

Building costs: It includes refurbishment of the existing facilities provided by the government. It is proposed that the facilities shall be operational gradually over the 3-year period and include air-conditioning and furnishing for a area of 96000 sq ft

Computers, accessories etc. The cost of computers pertain to the proposed computer lab for the flagship campus and also provision has been made to replace all electronic and telecommunication equipment after 3 and 5 years respectively

Content development. This comprise of the cost of developing course material capable of broadcasting from both local and foreign sources.

Initial years deficit: This pertains to cash deficit likely to be incurred in the initial years of running the University. It relates to large infrastructure facilities cost as well as yearly costs to have the entire infrastructure in place to start distant learning from the start but all the costs will not be recovered in the initial years because of low volumes

Underlying Assumptions

Assumptions have been made regarding availability of certain infrastructure that is absolutely necessary for the running of the Virtual University while making the capital and financial projections. These are given below:

National testing service: It has been assumed that the National testing service which would take the exams would be in place by the time the Virtual university is in full operation. No cost of setting up this service has been included in the capital expenditure of the Virtual University, as it has been assumed that the cost of setting up this testing service shall be met under different budget

Band width costs: Estimated cost of bandwidth both local and foreign for the purpose of internet connectivity of the various institutions have been provided in the projections. These would have to be closely monitored by the government as any abnormal deviation could have a major impact on the sustainability of the University.

Content development : It has been assumed that main capability for producing the course contents is available within the country to produce quality lecture material which would then be used to broadcast and only a small portion will be bought from abroad. Provision for both types of costs have been provided for.

University Intranet: It has been assumed that the proposed University Intranet proposal will be in place and the cost needed to have the intranet in place are not included in the projected cost of the Virtual University.

Broadcasting cost: The important delivery medium of television has been assumed in the model for delivery of the course content. Full cost of the broadcasting for 12 hours per day have not been provided for in the projected model although certain cost have been provided as given in the assumption sheets

Proposed Funding

Funding of the projected capital expenditure is to be made from the government's budget allocated for the setting up of a Virtual University and is to be made available over the period of capitalization of the Virtual University. The summary of proposed funding is given below:

Table-2

Rs. in '000

Description	Total	% of Total	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04
Funding through Government Grant	1,193,377	100.0%	321,878	515,328	262,314	93,857

Operating & Financial Assumptions

The main areas of the financial feasibility of the project for a period of five (5) years ending 30th June 2006 with an initial start-up period of six months starting 1st January to 30th June 2001 is given below. However for the purposes of financial and economic analysis the projections have been made for a 10-year period. Some of the major assumptions used for forecasting revenues and expenses are given below. Detailed assumptions are given in **Annex B-2**

Major Assumptions

Table-3

Particulars	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Total No. of BCS Students Enrolled per Year in 4 years & Advance Credit Course	0	4500	15000	35250	65500	91500
No of students graduating	0	0	500	500	4750	10750
Students Enrolled in Other Professional Courses	2,000	2,000	3,000	4,000	5,000	5,000
Percentage increase in inflation / cost	0%	5%	5%	5%	5%	5%
Fee Per Course Per Year	12,000	12,000	12,600	13,230	13,892	14,587
Total Lectures to be delivered	120	1,170	1,620	1,620	2,070	2,070
Additional no. of participating Universities for E1 connectivity	10	20	10	0	0	0
Costs of offering courses:						
Cost of Study Guides & Workbooks- per student	600	630	662	695	730	767
Cost of Updating Lectures	4,000	4,200	4,410	4,631	4,863	5,106
Yearly Content Development Cost as a % of Total Content Development Cost	0%	0%	0%	20%	20%	20%
Local Bandwidth Costs (Rs. In '000)	100,000	100,000	100,000	100,000	100,000	100,000
% - Bandwidth Utilized	5%	20%	25%	30%	35%	40%
International Bandwidth cost (Rs. In '000)	10,080	10,584	11,113	11,669	12,252	12,865
Percentage usage	20%	50%	100%	100%	100%	100%
Television / Broadcasting Costs of lectures	39,000	40,950	42,998	45,147	47,405	49,775
Local Content development Cost per lecture	50,000	50,000	50,000	-		
Foreign Content Development Cost – Lump sum (Rs. In '000)	25,000	50,000	25,000	-	-	-
No of lectures developed for broadcast	570	1,050	585	-		
Professional & Marketing Expenses - % of Revenue	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Rent of building per month - Rs per sq. ft	10.0	10.5	11.0	11.6	12.2	12.8
Strategic Communication & Advertising	38,850	40,793	42,832	44,974	47,222	49,584
Personnel – Strength						
Administrative	32	47	69	81	82	83
Teaching	10	29	45	58	63	65

Assumption on key areas of financial projections

Land and building: Government of Punjab has provided building for setting up the first campus of the Virtual University. Projections have been made for refurbishment, air-conditioning etc of the campus. Provision for rent of the building has been in the projections.

***Students fees, books and courier services*:** Projections have been made on the basis of student intake in the first year of 4500 students which is then projected to gradually increase to 30,750 by year 30 June 2005 in each year. The capacity to handle students in all the semesters of the various courses have been fixed at 126,500 students and this capacity is projected to be achieved by the 30 June 2008. Also adequate provision has been towards cost of study materials and their delivery charges. The fees has been kept low to make it affordable. The model provides for participating institutions to charge extra for their services

Rate of inflation and exchange rate: The projections include 5% increase per year on account of inflation and exchange rate

***Bandwidth costs and percentage absorbed by the Virtual University*:** Initial estimates have been made for the cost of foreign and local bandwidth lines available. The entire cost of the bandwidth has not been absorbed in the projected income statement as it has been assumed that the Universities using this bandwidth will be using it for other purposes as well and not for the distant learning exclusively. The costs absorbed in the income and expenditure statement have been kept on a sliding scale taking into account the increasing usage with the passage of time.

***Content development and lecture delivery cost*:** The financial projections include yearly expense equivalent to 20 % of the capital cost of content development for updating and addition of new content after the entire content of the course has been developed

***Other assumptions*:** Provision has been made for strategic advertisement as a lump sum cost per year and marketing expenses as a percentage of revenue

Financial Projections

Financial projections for the Virtual University for a period of 5 years starting from 30th June 2001 and ending at 30th June 2006 are given hereunder. These have been prepared on the basis of the underlying assumptions given in the report and the Annexes and show a healthy state of affairs whereby the Virtual University is projected to attain self- sustainability within three years of full operations. Thereafter starting from the fourth year of operations i.e. June 2004 onwards the projections show that the University shows considerable profit, surplus cash and growth in assets and these keep increasing provided it attains the projected outreach (number of students)

The salient features of the financial projections are given in table 4 below

Income & Expenditure

Table-4-A

Rs. in '000

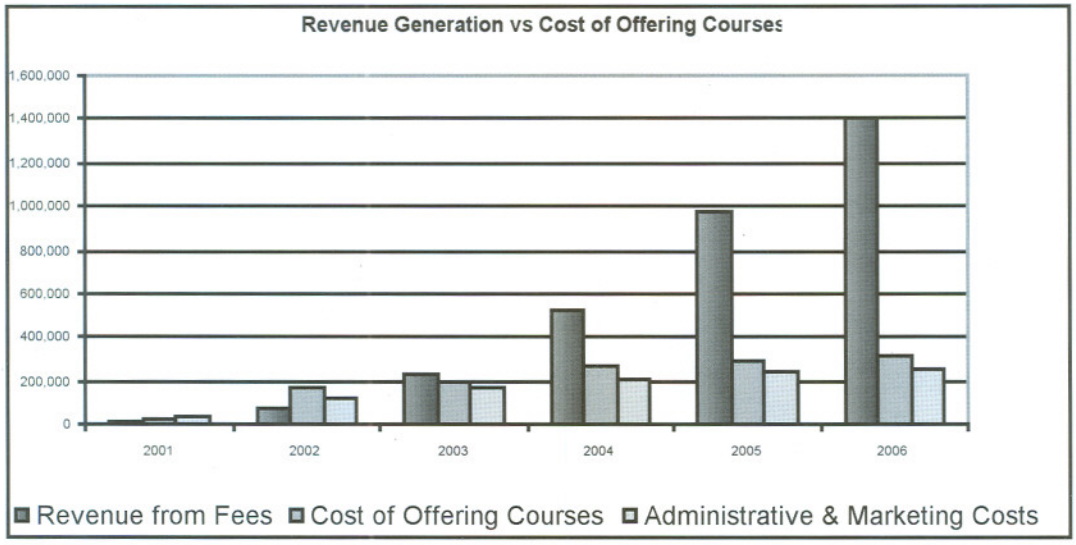
Particulars	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
No. of Students:	2,000	6,500	18,000	39,250	70,500	96,500
Total Days	90	300	300	300	300	300
Revenue from Fees	8,000	78,000	226,800	519,278	979,386	1,407,646
Cost of Offering Courses including broadcasting & E1 connectivity costs to selected Universities	19,284	167,185	193,787	263,418	288,390	318,762
Gross Surplus/ (Deficit)	**(11,284)**	**(89,185)**	**33,013**	**255,859**	**690,996**	**1,088,883**
Administrative & Marketing Costs	35,268	126,767	175,478	207,167	243,020	262,214
Net Surplus/ (Deficit)	**(46,552)**	**(215,952)**	**(142,465)**	**48,693**	**447,976**	**826,669**

The income and expenditure account has been prepared on the following basis:

- Total Nos. of students intake comprise mainly of BCS 4 year students whereas there will be a small number of students who would do advanced credit courses and other professional short courses
- The fees has been provided at 12000 per year and increased @ 5% per annum.
- The costs of offering courses comprise of cost of workbooks and study guides, estimated bandwidth charges, broadcasting costs of lectures and depreciation
- The administrative and marketing costs comprise mainly of salaries of vice chancellor, professors and other faculty and technical persons, strategic communication and advertising and fee collection and marketing expenses, courier and repair and maintenance expenses etc

The University is projected to show a small surplus by the year 30 June 2004 and thereafter by year 30 June 2006 the projections show a large surplus.

Detailed projections are given in Annex B-3, while the graphical presentation of the projected revenue generation, costs of offering courses and the administrative & marketing costs over the period of 5 years is given below:



Cash Flow

There is a cash deficit for the initial 3years but in the year 2004 the situation improves and there is a net cash surplus on operations of **Rs.173 million** which increases to **Rs.940 million** in the year ending 30 June 2006. There is no financing from Government from 30 June 2004 onwards. The positive closing balances in the initial years up to 30 June 2003 are basically derived from the government funding. Detailed projections are given in **Annex B-4**:

Table-4-B

Rs. in '000

Particulars	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Net Cash Surplus / (Deficit) from Operations	(46,552)	(115,759)	(22,886)	169,996	557,169	935,252
Capital Expenditure	(254,596)	(361,971)	(228,027)	(89,388)	(44,037)	(109,193)
Financing from Government	321,878	515,328	262,314	93,857	-	-
Closing Cash & Bank Balances	20,730	58,328	69,730	244,195	757,328	1,583,387

Balance Sheet

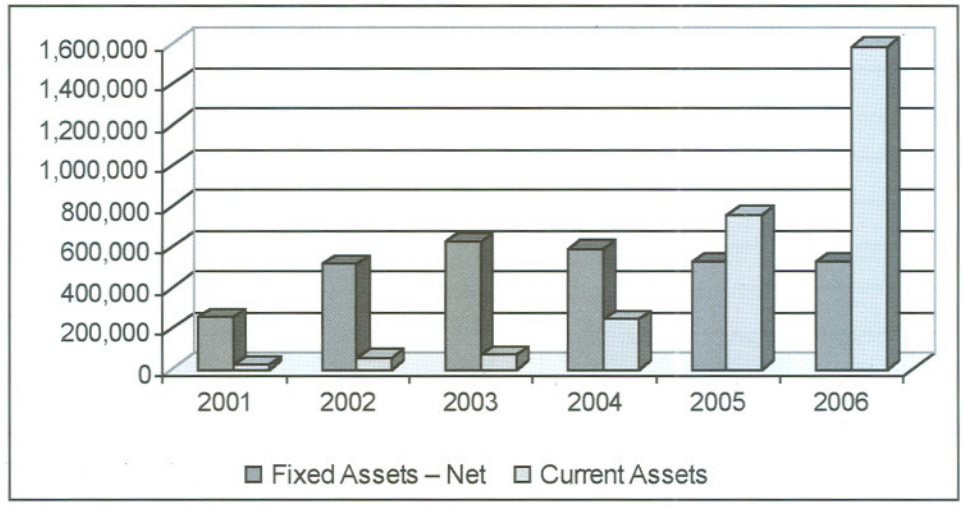
Project's net assets start increasing from year 30 June 2004 onwards where after the University attains self-sustainability. Government financing is also increasing till 2004 and thereafter no funding is required. The initial years deficit of **Rs. 45 million** in the year 2001, increases to **Rs. 412 million** in the year 2003 but is completely wiped off in year 30 June 2005 and there after the capital and net assets of the University increases manifold rising to Rs. 2.12 billion only in 30 June 2006. Detailed projections are given in **Annex B-5**:

Table-4-C

Rs. in 000's

Particulars	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Fixed Assets – Net	254,596	516,374	624,821	592,905	527,749	528,359
Current Assets	20,730	58,328	69,730	244,195	757,328	1,583,387
Government Financing/ Capital	321,878	837,206	1,099,520	1,193,377	1,193,377	1,193,377
Retention/ (Deficit)	(46,552)	(262,504)	(404,969)	(356,276)	91,700	918,369

The graphical presentation shows the increase in current and operating fixed assets of the Virtual University over the projected 5-year period up to 30 June 2006.



Financial & Economic Analysis

The financial & economic analysis carried out on the basis of projected financial results show the Virtual University as self sustainable having high net present value, low capital cost per beneficiaries, a comparatively early payback period and low project risk after the initial years. Some of the important analysis carried out is given below:

1. Discounted Cash Flow:

The internal rate of return (IRR) of the project calculated over a period of 10 years is approx. **38%** and the payback period is **4 years and 6 months**. The Net Present Value comes to **Rs. 1.56 billion**, presenting a benefit over costs of **2.1 X**, discounted at 16%

per annum being the opportunity cost of capital. The table showing the various elements of the analysis is given below and detailed calculations are given in **Annex B-6**.

Table-5-A *Rs. in 000's*

Particulars	10-Year Period
IRR	**38%**
Cumulative Cash Inflows - Discounted	3,035,720
Cumulative Cash Outflows - Discounted	1,471,204
Benchmark Rate – Opportunity Cost of Capital	16%
NET PRESENT VALUE	**1,564,516**
BENEFIT-COST RATIO	**2.1**
PAY-BACK PERIOD	**4.5** Years

2. Project Value-Added:

The projected total revenue generation calculated over a 10-year period is **Rs. 13.771 billion** with a value addition of **Rs.10.091 billion**. The total benefit in terms of salaries over the life of the project is **Rs. 0.958 billion** and the total bought-out services is **Rs. 3.680 billion**. The total number of employees including teaching staff, technical staff and administrative staff is 137 and the direct beneficiaries in terms of students comes to 206,250 students giving capital employed per beneficiary of **Rs.5,786.** The table showing the various elements of the analysis are given below and detailed calculations is given in **Annex B-7**

Table-5-B

Rs. in 000's

Particulars	10-Year Period
PROJECT VALUE-ADDED	
Total Revenues	13,771,771
Total Value-Addition	10,091,568
Total Payment to Employees	958,106
Total Bought-Out Materials & Services	3,680,203
Total No. of Beneficiaries/ Students completing studies	206,250
Total Capital Employed	1,193,377
Capital Per Beneficiary	5,786

3. Foreign earnings from remittance of students working abroad:

The potential of the Virtual University producing IT experts capable of getting Jobs abroad is enormous. A conservative calculation based on the assumption that if only 20% of the graduates get jobs abroad and they remit only 10% of their earnings to Pakistan over a 10 year period then they would have remitted a minimum of US $ 447.53 million on the assumption that the graduates going abroad shall earn a minimum of US $ 2,500 per month which will grow at a average rate of 5% per annum. Detailed calculations are given in **Annex B-8.**

4. Break-Even Analysis:

The Virtual University is expected to achieve the projected out-reach of enrolling a minimum of 96,500 students per year by 30 June 2006 and ultimately rising 126,500 students of all types of courses by year 30 June 2008 however it is projected to achieve breakeven by year 30 June 2005. The financial projections show that by year 30 June

2005 the university will reach a operating risk of 29%. The table showing the various elements of the analysis are given below and detailed calculations is given in **Annex B-9**

Table-5-C

Rs. in '000

Particulars	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
No. of Students	2,000	6,500	18,000	39,250	70,500	96,500
Total Revenue	8,000	78,000	226,800	519,278	979,386	1,407,646
Actual Contribution	(20,013)	(123,608)	(20,593)	185,964	596,140	983,483
Per Unit Contribution	(10,007)	(19,017)	(1,144)	4,738	8,456	10,192
Fixed Costs	26,538	187,453	225,824	245,211	246,279	254,020
Break-Even Number of Students	-	-	-	51,755	29,125	24,925
Contribution Margin	0.0%	0.0%	0.0%	131.9%	41.3%	25.8%
Safety Margin	0.0%	0.0%	0.0%	0.0%	32.1%	48.4%

5. Key Financial Ratios:

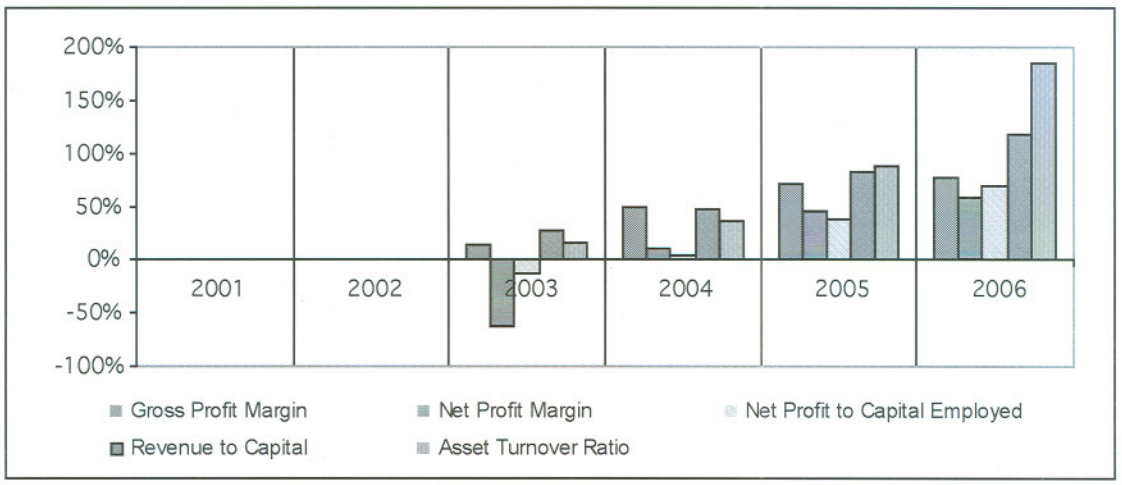
The profitability and asset-based ratios show a considerable improvement over the 6-year scenario showing that University is financially sustainable. Some of the salient ratios are given below:

Table-5-D

Profitability Ratios	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Gross Profit Margin		-114%	15%	49%	71%	77%
Net Profit Margin		-277%	-63%	9%	46%	59%
Net Profit to Capital Employed		-26%	-13%	4%	38%	69%
Revenue to Capital		24%	27%	47%	82%	118%
Asset Turnover Ratio		3%	15%	36%	88%	186%
Avg. Revenue Per Student (000's)	4.00	12.00	12.60	13.23	13.89	14.59

Following is the graphical overview of the project's financial performance over the period of 5 years.

Graph 3: Financial Ratios Analysis



6. Sensitivity Analysis:

The sensitivity analysis of the projections of the Virtual University has been carried out by considering the effects of 10% changes in the following key variable factors and its effect on the various financial and economic figures and ratios

- Student In-take – decrease by 10%
- Fee Income – decrease by 10%
- Operating Costs – increase by 10%
- Capital Costs – increase by 10%

The effect of changes on the projected key figures and ratios of the project given a change of 10% in the 4 key variable factors of the University as defined above are given below. This is based on the operating results of year ended 30 June 2006 and shows that the project is most sensitive to the fees per student whereby a 10 % decrease in the fees lowers the projected gross surplus by 13 % and net surplus by 17% and the IFRR of the project by 16 %

Table-5-E

Rs. in '000

	Gross Surplus/ (Deficit)	Net Surplus/ (Deficit)	IFRR %	Margin of Safety
Base Year (year 5)	1,088,883	826,669	38%	48%
Decrease in Student Intake	955,520	697,852	33%	37%
increase/decrease %	-12%	-16%	-14%	-23%
Decrease in Fees	947,993	688,352	32%	44%
increase/decrease %	-13%	-17%	-16%	-9%
Increase in Operating cost	1,080,590	782,585	36%	45%
increase/decrease %	-1%	-5%	-7%	-6%
Increase in capital Cost	1,065,928	801,221	35%	47%
increase/decrease %	-2%	-3%	-8%	-4%

SWOT Analysis

The motivation behind the Virtual University for IT is to bring together a critical mass of quality faculty to provide world-class education in the IT sector to a large student body. Following is the SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis of the University.

Strengths: ▪ **Human Resource Development** ▪ Highest Quality Education ▪ Economical/ Affordable Rates ▪ Industrial Orientation ▪ Developing Domestic Market ▪ Credibility ▪ State of the Art Technology ▪ Low Fixed Cost ▪ High Opportunity Cost	**Weaknesses:** ▪ **Management and Control** ▪ **Non-Proctored Academic Environment** ▪ **Extensive Initial Marketing**
Opportunities: ▪ **Increase in GDP** ▪ **Attracting Foreign Nationals from other Developing Countries** ▪ **Creating a Positive IT Image Abroad**	**Threats:** ▪ **Proper Execution of Plan** ▪ **Rapid Change in Technology**

STRENGTHS

Strengths of the University relate to those micro and macro economic, financial and social benefits that will accrue through its establishment. These benefits will have their impact both in the short as well as the long term.

Human Resource Development: It aims to produce large number of IT professionals who undergo extensive training through the easy accessibility of the program. The human resource development in the IT sector will reduce the demand supply gap leading towards self-sufficiency for this upcoming need.

Highest Quality Education: Quality, not only in terms of the course contents but also the pedagogues who will be veterans in their field.

Economical/ Affordable Rates: In Pakistan, shortage of IT universities deprives many deserving students of their right to education. The proposed tuition rates will be economical as compared to the local as well as foreign universities.

Industrial Orientation: The teaching methodology will be industrial orientated that in turn will ensure quick market acceptability of the graduates.

Developing Domestic IT Market: Right now, for Pakistan, one of the rudimentary needs is to develop the domestic IT market that includes the computerization of commercial areas, government offices etc. The graduates of Virtual University will be utilized for developing the domestic IT market, which needs considerable attention.

Credibility: Stakeholders of the University are both from the public as well as the private sector. Involvement of private sector, that includes both private universities as well as faculty, ensures credibility of the program in the long run.

State of the Art Technology: The setting up of the University involves introduction of sophisticated cables, routers, digital cross connect and other equipment for the daily broadcast of lectures on the two-way system, multimedia, generators, UPS, PCs, printers etc.

Low Fixed Cost: Public and private sector institutions that could provide adequate computer labs will be invited to participate in the graduation programs. Thus the Virtual University will not be required to establish its own campuses everywhere, which in turn will lower the fixed cost.

High Opportunity Cost: It has a very high opportunity cost. The following two alternatives can substantiate this fact:

a) The first alternative is to have conventional 'campus based universities' for which not only the cost would be quite high but also the ultimate objective of producing large number of quality IT professionals will be lost. It has already been proved through the facts and figures.

b) The second alternative would be to abort the idea of giving IT education to the large number of students. This is not recommended as this would mean that our objective of educating large numbers of IT experts cannot be fulfilled in a short span of time and that would leave our country behind both economically and technically

Both the alternatives are absolutely non-feasible resulting in high opportunity cost for the Virtual University. Thus prudence demands undertaking this project as a high priority.

WEAKNESSES

Weaknesses relating to the Virtual University are those factors, which may cause hindrance for the proper execution of the plan thus leading to non-fulfillment of objectives. Some of the weaknesses relating to this project that needs genuine consideration are given below.

Management and Control: One of the weaknesses is that the University is being set up as a State owned project and the government might have considerable involvement in its management and control. There are several examples to substantiate the fact that state owned organizations are not efficient enough to ensure quality and excellence.

Non-Proctored Academic Environment: One of the inherent weaknesses regarding distance learning is the methodology itself. Most of the people, especially the fresh college graduates, are not used to a non-proctored academic environment and thus they will have difficulty getting accustomed to the system.

Extensive Initial Marketing: Virtual University is a relatively new idea for Pakistani people. Initially there will be resistance and apprehensions regarding its methodology, management, and credibility.

OPPORTUNITIES

The objectives of the plan will be achieved only though proper implementation, which in turn will open doors of opportunities having positive implication on the economic status of Pakistan. Some of the opportunities generated through establishing the Virtual University are discussed below:

Increase in GDP: It seeks to generate employment. Through employment the standard of living of people will accentuate and so would the per capita income. On the other hand, expatriate Pakistani graduates who will get employment abroad will be a source to generate foreign exchange, thus strengthening the economic state of the country.

Attracting foreign nationals from other developing countries: Given the proper implementation of the plan, it will develop long-term credibility. This will help to form an IT education platform not only for the Pakistani nationals but will also attract people from the developing countries specially the South.

Creating a positive IT image abroad: The graduates produced would help in the development of IT culture and would be a source of software exports and expertise of highest quality. This will impart a favorable IT image of Pakistan abroad.

THREATS

Threats are those contingencies, which need to be addressed from time to time. Ignorance of these factors will have serious consequences resulting in the failure of the project.

Proper Execution of Plan: The success of the project lies in the collaboration of various stakeholders. If they fail to perform their due part, the project may face difficulties.

Rapid Change in Technology: The rapid inherent change in the IT industry is the threat for the project. The consequences of this fast technology transition are manifold including the requirements in education. The Virtual University cannot afford to neglect this factor. Once the technology regarding the existing hardware & its related software changes, the expertise may become obsolete or not upto date. In order to compete globally the rapid changes in technology have to be accounted for and changes will be needed in the curriculum and methodology.

Scenario Analysis

Virtual University's (VU) standalone risk depends on both (1) the sensitivity of its NPV to changes in key variables and (2) the range of likely values of these variables. As sensitivity analysis considers only the first factor, a comprehensive Scenario analysis of VU has also been

developed which takes into consideration both the sensitivity of NPV to changes in key variables and the likely range of these variables.

For Scenario analysis, we have developed three sets of circumstances: High, Medium, Low. The following four key elements have been identified upon which this analysis is based: i) Student intake, ii) Fees, iii) Operating cost, and iv) Capital cost. Medium scenario is the most likely actual situation which has been taken as a base for the development of High and Low scenarios.

High scenario assumes a higher student intake by 25% and an increase in the fee of courses by 20%. This scenario also assumes that both the operating costs and capital costs of the project will be low by 10%. This is the ideal situation under which the NPV of the project is Rs.4.268 billion whereas the IFRR is 68%. Other key financial performance indicators are given in the table below.

Low scenario represents the worst situation and assumes that the student intake will be less by 10% and the course fee will be less by 15% than those expected in Medium scenario. This scenario also assumes that the capital costs of the project will increase by 25% whereas the operating costs will increase by 20%. This scenario takes into account the provision for high exchange rate fluctuation and unforeseen events. This is the worst scenario where the project has a negative NPV of Rs.(0.287) billion where as the IFRR of the project is 12%. Other outcomes of this scenario are given in the table below.

Particulars		**High Scenario**	**Medium Scenario**	**Low Scenario**
			Actual	
Key Parameters:				
Student Intake		125%	100%	90%
Fees		120%	100%	85%
Operating Cost		90%	100%	120%
Capital Cost		90%	100%	125%
Key Indicators (10 Years Scenario):				
NPV	*Rs. In '000*	4,268,305	1,564,516	(287,344)
IFRR	*Rs. In '000*	68%	38%	12%
Benefit Cost Ratio		4.1	2.1	0.8
Payback Period - Years		3	4	7
- Months		7	6	9
Capital per Beneficiary	*Rs*	3,943	5,786	8,786
Maximum Student Intake	*Nos*	158,125	126,500	113,850
Key Figures (5 Years Scenario):				
Student intake - 30 June 2002	*Nos*	8,125	6,500	5,850
2006	*Nos*	120,625	96,500	86,850
Gross Profit - 30 June 2002	*Rs. In '000*	(34,785)	(89,185)	(147,374)
2006	*Rs. In '000*	1,807,577	1,088,883	692,617
Total Assets - 30 June 2002	*Rs. In '000*	532,195	574,703	700,765
2006	*Rs. In '000*	3,731,042	2,111,746	1,220,572
Total Project Capital Costs	*Rs. In '000*	1,016,426	1,193,377	1,630,864

10. Conclusions and Recommendations

Conclusions and Recommendations

Neither technology nor finance are likely to be constraints on the execution of the VITU and SIIT. The technology to provide broadband connectivity is in place, the challenge being to deliver the "last mile" – by fiber, spread-spectrum radio modems, or two-way VSAT links, or (as interim measures) DSL, coaxial cables, and/or television.

The principal risks to the VITU and SIIT projects are

- Institutional and individual egos – the lack of a collaborative tradition between institutions in Pakistan, and between Pakistani and other teaching institutions in the South.
- Lack of a tradition of instructional design for distance education outside the traditional distance education institutions, principally AIOU, and consequently a lack of skilled instructional designers for online distance education.
- The shaky reputation of distance education as regards quality, particularly in computer science, in Pakistan, and probably other countries as well.
- Lack of experience in organizing the production, marketing, and delivery of individual courses (both short and long) and degree programs.
- Lack of support from future Governments could be a problem if the project does not develop strong support in civil society.

These risks can be minimized by

- Providing the carrot of high-bandwidth connectivity to the participating institutions. The driving force is the lack of qualified professors even in the best institutions. If the institutions are connected, we believe the required collaboration will materialize, driven by the felt need for more and better professors. Thus a first priority is delivering on the promise of broadband Internet connectivity, the academic Intranet. Given the low levels of connectivity currently available, even a 2Mbps initial connection will result in a quantum increase in the speed of web access.
- "Importing" an instructional designer with experience in online distance education for at least one year to serve as Acting Dean of Instructional Design. International assistance should be sought to fund this position, perhaps within the context of the SIIT project.
- Beginning with the "camera in the classroom" approach using traditional lectures, and moving as fast as possible toward web-based learning using all the interactivity and multimedia delivery potential of broadband Internet. A lower-bandwidth variant, using only small compressed video clips in 4-6 square inch windows, and assuming 28.8 kbps speeds should be developed. The strategic communication campaign should also help break down resistance to new ways of teaching and learning, showing that they can deliver learning results of equal or better quality than the F2F, televised, or streaming video lecture mode.
- Hiring (1) an experienced Vice Chancellor with high academic, entrepreneurial, and diplomatic skills; and (2) a business manager to help with marketing and with welding the participating institutions into an effective business-like organization, building strategic alliances with the participating institutions, the private sector, government agencies, and international donors.
- Investing significantly in a strategic communication program using both print and electronic media and a broad range of formats to build excitement about, understanding of, and support for the *smart, learning nation* strategy in general, and the role of the VITU in particular in that strategy.

A study tour to visit institutions offering online courses in computer science in Singapore or Hong Kong, USA (UC Berkeley Extension, UCLA Extension, NTU, University of Maryland University College and possibly one or two others), possibly Canada or Australia also should be undertaken. This study tour could also be used to scout out potential candidates for the Acting Dean of Instructional Design position.

Annex A: Technological Delivery Options

Technological Delivery Options

In order to understand the technological aspects of the various delivery options, it would be pertinent to understand the nature of the content that is to be delivered over these channels. The content provided by VITU would be in the form of multimedia content and rich web-based content.

Multimedia content would include conventional audio-video content, which could be a simple introduction of a course by a Professor; a video clip explaining some point; or even a full-motion video of a Professor delivering a lecture, live or recorded. Other multimedia content could be streaming video and hypermedia processed video clips.

Rich web-based content would be HTML based with graphics, hyperlinks and animations, sometimes with embedded video clips. The VITU Web server would also maintain Frequently Asked Questions (FAQ's) as well as exercises, reading material and other reference material.

The content delivery channels can be broadly classified into two main areas: Internet Protocol (IP) based delivery and interaction, and Television based delivery with Internet based interaction. IP based delivery and interaction can take place over fiber terrestrial networks or via two-way satellite communications. TV delivery can be via satellite using analog or digital broadcast, with a modest bandwidth requirement for reverse interaction over normal dial-up or dedicated lines.

Pakistan Academic Intranet

The setting up of a nationwide academic network is part of the IT Policy of the government. This network would connect all major universities and educational institutions together through a high bandwidth nationwide network. The suggested bandwidth for the network is 155Mbps. Several designs are under consideration but the one that makes the most logical sense from an economic as well as a management perspective is to develop city rings (metropolitan area networks) connecting all educational centres within the city. These rings would then be connected over the national fiber backbone to form the Pakistan Academic Intranet. The Academic Intranet will be connected to the Internet at one or more points, thereby providing Internet connectivity to all institutions connected to the Academic Network.

VITU should give high priority to delivering content over the Academic Intranet. The content producing institutions would be connected to this network, as would be the majority of consuming universities. This would allow for full Internet Protocol (IP) based delivery of contents and interactivity between the various centers.

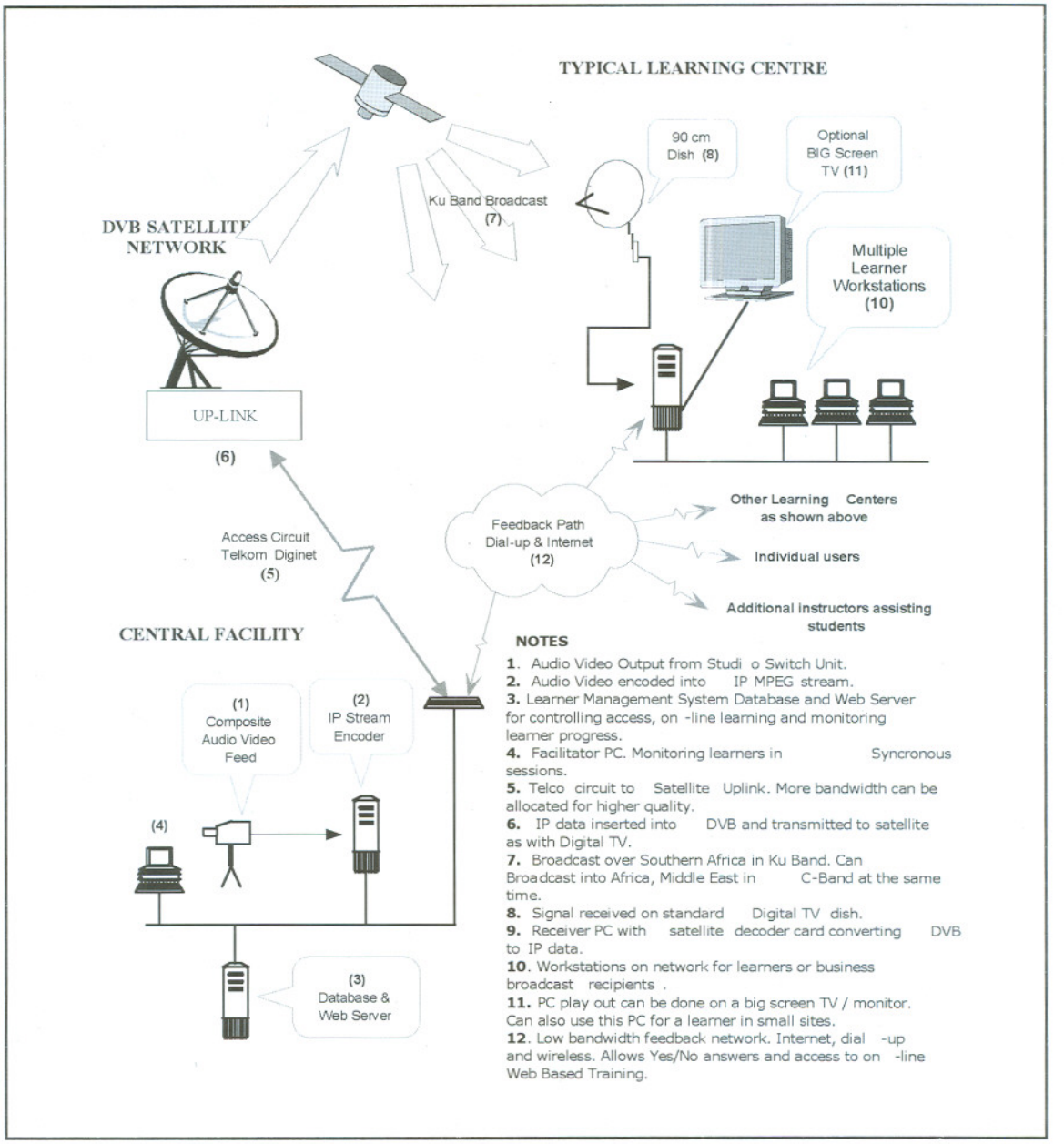
Content servers would be housed at the VITU headquarters and mirror servers would be maintained at each city ring. The mirror servers would be synchronized every day during a low activity period, preferably the early morning hours. The distributed servers would help alleviate bandwidth congestion over the national backbone, provide faster response times for local users, and also make the VITU content network more resilient to single point failures.

As shown in Figures 1 and 2 in Chapter 6, Pakistan already possesses an impressive terrestrial optical fiber network, which is further proposed to cover the major population centers by year 2004. This would provide the requisite bandwidth for the backbone of the Pakistan Academic Intranet. By creating city rings, VITU would be able to use pure IP based delivery and interaction and both obtain and deliver content effectively over this intranet.

TV Based delivery with reverse Internet based interaction

The Academic Intranet can potentially link the major cities within Pakistan in a short time. However, more extensive coverage will gradually be achieved over the next four years. As such, in the short term, VITU would be restricted in coverage unless alternate channels are employed. The logical choice is television with its complete nation-wide coverage. Currently there are two main broadcast methods available. Pakistan Television (PTV) uplinks via digital channels to the Thaicom 3 satellite, which is then used to downlink to terrestrial broadcast stations which provide local area coverage using ordinary antennas. PTV2 uses conventional satellite broadcast to cover the region and requires analog satellite receiving equipment to view the broadcasts.

SIIT in any case would require satellite based delivery and interaction to deliver content to the region. Using the experience of the network currently used in South Africa, deploying IP over DVB Satellite broadcast technology is currently quite feasible. The setup deployed in South Africa is shown below.



With current advances in technology, the analog video cameras with composite audio-video outputs and the IP Stream encoder can be replaced with low-cost digital cameras with IEEE 1394 ports supplying direct digital output in MPEG format. This further lowers the cost of the broadcast site and also allows for multiple broadcast centers as envisaged for VITU. The Academic Intranet may further reduce the requirements for satellite-based delivery by providing direct connections between provider and consumer sites.

The content originating sites for VITU are anticipated to be major education institutions with quality faculty available. These institutions would be linked over the Academic Intranet. However, if IP over DVB broadcasts are used for delivery of content to all learning sites, the Academic Intranet would only need to provide an E1 (2Mbps) link from the originating institution to the satellite uplink station, thereby saving on valuable bandwidth and also allowing multiple institutions to assume the role of the broadcast center as and when needed. The interaction would be obtained over the Academic Intranet as well as over regular dial-up lines from remote stations.

Two-way satellite connectivity

The above solution would work for Pakistan as well as other countries of the South, which have the facility of reverse connectivity via the Internet. For extremely remote areas, as well as regions where the Internet has not yet obtained a foothold, a newly emerging technology provides the solution. This is two-way IP based interaction via satellite.

Two-way access to the Internet is already being provided via satellite by at least one company in the United States. Many more are expected to follow in year 2001. The technology is based around a low cost ($600) card installed in a personal computer allowing for bandwidth up to 500kbps for the downlink with the uplink being slightly slower at about 150kbps. The downlink speed is adequate for reasonable delivery of rich content. Small aperture satellite dishes are requires for this connection.

This option could easily be adapted for use by SIIT/VITU. The coverage possibilities are nearly global and by utilizing the concept of learning centers instead of individuals at home, thereby spreading the cost over many users, the economics seem very favorable. This may be the path for the future and may also become the fastest method for bringing new centers online.

Last mile issues

As would be clear from the above discussion, the Academic Intranet forms the heart of the VITU vision. Hence, connectivity of the various educational institutions around the country becomes a critical component. Whereas there is an extensive and excellent fiber network across Pakistan, last mile connectivity remains an issue.

Setting up fiber-based city rings will require considerable investment and can only be achieved over a period of time. Using the Digital Cross Connects (DXX) already in place provides the fastest path towards the goal, but may not have the broadest coverage as many in-city institutions may be prohibitively far from the nearest DXX equipped exchange. Remote areas, of course, do not have access to DXX connectivity.

An alternative would be to use spread-spectrum radio connectivity to set up the city rings. This can be achieved in a short period of time and the cost scales linearly with the number of institutions. Bandwidths up to 10Mbps can be achieved over 15-20km distances using this

technique. The problem with this technique is the congestion in the frequency bands used by the radio modems. Special frequency allocation may be required if this technique is to be used by the Academic Intranet.

PTCL has also requested letters of interest from companies desiring to provide Digital Subscriber Loop (DSL) connectivity. DSL, in association with cable-modems may also compete for providing last-mile connectivity in the major urban centers.

Annex B: Financial and Economic Analysis

Annex B: Financial and Economic Analysis

Annex B-1

CAPITAL COST Rs in 000's

Description	30-Jun-01 Total	30-Jun-02 Total	30-Jun-03 Total	30-Jun-04 Total	4 year Total	%
Land	-	-	-	-	-	0.00%
Leased/ rented building, improvements & furnishing	15,353	18,690	14,483	15,207	63,733	5.34%
Vehicles	5,550	1,365	4,024	-	10,939	0.92%
Power Generators & UPS	14,298	12,360	15,761	23,876	66,295	5.56%
Connecting Cost of VU	5,500	-	-	-	5,500	0.46%
E 1 connecting cost of Universities	93,000	195,300	102,533	-	390,833	32.75%
Other Communications & Networking Costs	43,200	7,293	12,172	-	62,665	5.25%
Computers	21,450	22,473	23,646	49,378	116,947	9.80%
Printers, Accessories & Multimedia	2,746	1,991	1,158	926	6,821	0.57%
Content Development	53,500	102,500	54,250	-	210,250	17.62%
Total Capital Expenditure	**254,596**	**361,971**	**228,027**	**89,388**	**933,982**	**78.26%**
Cash deficit/ loss on operations during prelim period	46,552	115,759	22,886	-	185,196	15.52%
Contingencies @ 5% of Costs	12,730	18,099	11,401	4,469	46,699	3.91%
Working Capital	8,000	19,500			27,500	2.30%
Total Capital Cost	**321,878**	**515,328**	**262,314**	**93,857**	**1,193,377**	**100.00%**
Government funding	**321,878**	**837,206**	**1,099,520**	**1,193,377**		

Annex B-1-1

LAND — **Rs. in '000**

	30-Jun-01			30-Jun-02			30-Jun-03			30-Jun-04			Total
Description	Yards	Rate / Yard	Total	Yards	Rate / Yard	Total	Yards	Rate / Yard	Total	Yards	Rate / Yard	Total	
Leased/ rented from Government													

BUILDING — **Rs. In '000**

Description	Sq. ft	Expense / Sq. ft	Total	Sq. ft	Expense / Sq. ft	Total	Sq. ft	Expense / Sq. ft	Total	Sq. ft	Expense / Sq. ft	Total	Total
Leased/ rented from Government													
For VU Main Offices													
For Campus / Computer Lab													
Improvements to/ Furnishing of Leased Building:													
For VU Main Offices	17400	431	7,500	3000	525	1,575							
For Campus / Computer Lab	11000	482	5,300	24000	608	14,595	20000	1,323	12,679	20000	1,389	13,313	
Facility for Air conditioning:													
For VU Main Offices	14400	109	1,571	3000	115	344							
For Campus / Computer Lab	9000	109	982	19000	115	2176	15000	120	1804	15000	126	1894	
TOTAL			**15,353**			**18,690**			**14,483**			**15,207**	**63,733**
Details for improvement & furnishing:													
For VU Main Offices													
For Executive Staff	4000	500	2,000										
For Tutors	3000	500	1,500	3000	525	1,575							
For other Staff	2100	500	1,050										
For Web Administrators	1800	500	900										
For Server Rooms	1000	500	500										
For Library	2500	500	1,250										
Circulation Area	3000	100	300										
	17400	431	7,500	3,000	525	1,575	-		-	-		-	
For Campus / Computer Lab													
Computer Lab for 400 Computers	6000	600	3,600	19000	630	11,970	15000	662	9,923	15000	695	10,419	
Office Area	3000	500	1,500	5000	525	2,625	5000	551	2,756	5000	579	2,894	
Circulation Area	2000	100	200										
	11000	482	5,300	24,000	608	14,595	20,000	1,323	12,679	20,000	1,389	13,313	

Annex B-1-1 (contd.)

	30-Jun-01			30-Jun-02			30-Jun-03			30-Jun-04			
Air conditioning:													
275 sq. ft per ton @ Rs 30,000 per ton													
For VU Main Offices	14400	109	1571	3,000	115	344							
For Campus / Computer Lab	9000	109	982	19000	115	2,176	15000	120	1,804	15000	126	1,894	
	23400		2,553	22000		2,520	15000		1,804	15000		1,894	

VEHICLES — **Rs. In 000's**

Description	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Total
Vehicles 1600 c.c.	2	950,000	1,900										
Vehicles 1300 c.c.	1	700,000	700				1	771,750	772				
Vehicles 1000 c.c.	2	650,000	1,300	2	682,500	1,365	2	716,625	1,433				
Staff Car	1	650,000	650				1	716,625	717				
Staff Van	1	1,000,000	1,000				1	1,102,500	1,103				
TOTAL	**7**		**5,550**	**2**		**1,365**	**5**		**4,024**	-		-	**10,939**

GENERATORS & UPS — **Rs. In '000**

Description	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Total
250 KV- GENERATORS	1	2,500,000	2,500				1	2,756,250	2,756				
10 KVA- UPS	21	550,000	11,798	21	577,500	12,360	21	606,375	13,005	38	636,694	23,876	
TOTAL	**22**		**14,298**	**21**		**12,360**	**22**		**15,761**	**38**		**23,876**	**66,295**

Annex B-1-1 (contd.)

COMMUNICATION & NETWORKING — **Rs. in '000**

	30-Jun-01			30-Jun-02			30-Jun-03			30-Jun-04			
Description	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	**Total**
Connecting Cost of VU													
Per University Cost													
Last mile fibre cost per Km on turnkey basis	5	500,000	2,500										
Terminating equipment on campus site & local exchange, AND Router/ Switch	Set		3,000										
Total Cost Per University			5,500										
Total Connecting Cost of VU	**1**	**5,500**	**5,500**										**5,500**
E 1 Connectivity of Institutions	**10**	9,300,000	**93,000**	**20**	9,765,000	**195,300**	**10**	10,253,250	**102,533**				**390,833**
Last mile cost for 6-7 KM	$ 20,000	1,200,000		$ 20,000	1,260		$ 20,000	1,323					
Router	$ 80,000	4,800,000		$ 80,000	5,040		$ 80,000	5,292					
Digital Cross Connect	$ 25,000	1,500,000		$ 25,000	1,575		$ 25,000	1,654					
Other Equipment	$ 25,000	1,500,000		$ 25,000	1,575		$ 25,000	1,654					
	$ 150,000	9,000,000		$ 150,000	9,450		$ 150,000	9,923					
Video Projector / Receiver	$ 5,000	300,000		$ 5,000	315		$ 5,000	331					
Other Expenditures:													
LAN Servers - VU Main Office	6	3,000,000	18,000				1	3,307,500	3,308				
LAN Switches - VU Main Office	3	300,000	900										
Communication - VU Main Office	1	7,000,000	7,000										
PABX with telephones - 10/100	1	300,000	300										
Broadcast Quality Digital Camera	20	$ 5,000	6,000	20	$ 5,250	7,293	20	$ 5,513	8,865				
PTV HQ Connectivity Equipment	Set	10,000,000	10,000										
Remodeling & Wiring	1	1,000,000	1,000										
Total - Other Equipment			**43,200**			**7,293**			**12,172**			-	**62,665**

Annex B-1-1 (contd.)

COMPUTERS — Rs. in '000

	30-Jun-01			30-Jun-02			30-Jun-03			30-Jun-04			
Description	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	**Total**
For Administration	29	50,000	1,450	28	52,500	1,473	29	55,125	1,596	53	57,881	3,073	
For Labs	400	50,000	20,000	400	52,500	21,000	400	55,125	22,050	800	57,881	46,305	
TOTAL	**429**		**21,450**	**428**		**22,473**	**429**		**23,646**	**853**		**49,378**	**116,947**

PRINTERS, ACCESSORIES & MULTIMEDIA

	30-Jun-01			30-Jun-02			30-Jun-03			30-Jun-04			
Description	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	**Total**
Printers													
For Administration	2	48,000	96	2	50,400	101							
For Labs	4	75,000	300	4	78,750	315	4	82,688	331	4	86,822	347	
Copy Printers	2	500,000	1,000	2	525,000	1,050							
CD Writers - Bulk	1	250,000	250				1	275,625	276				
Multimedia Projector	2	500,000	1,000	1	525,000	525	1	551,250	551	1	578,813	579	
VCR's	5	20,000	100										
TOTAL			**2,746**			**1,991**			**1,158**			**926**	**6,821**

CONTENT DEVELOPMENT

	30-Jun-01			30-Jun-02			30-Jun-03			30-Jun-04			
Description	Lecture Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	Nos.	Rate per unit	Total	**Total**
Local													
BCS COURSES	450	50,000	22,500	900	50,000	45,000	450	50,000	22,500				
PROFESSIONAL COURSES	120	50,000	6,000	150	50,000	7,500	135	50,000	6,750				
Foreign													
Lump sum provision			25,000			50,000			25,000				
Total Cost	**570**		**53,500**	**1,050**		**102,500**	**585**		**54,250**	-		-	**210,250**

Annex B-2

Assumptions	Unit		30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Exchange Rate (US $ = Rs.)			60	63	66	69	73	77
R&M Costs as percentage of capital cost			2.0%	2.0%	1.5%	1.5%	1.0%	1.0%
Percentage Overheads on Salaries			15%	15%	15%	15%	15%	15%
Percentage increase of fixed assets				5%	5%	5%	5%	5%
Percentage increase of operating cost/ Exchange Rate				5%	5%	5%	5%	5%
No of semesters per Year	Nos	2	2	2	2	2	2	2
No of courses per Semester	Nos	5	5	10	15	20	20	20
No of Lecture per course	Nos	45	45	45	45	45	45	45
Cost of Updating lectures	Rs	4000	4000	4,200	4,410	4,631	4,863	5,106
Cost of Study Material & Work Books	Rs per Year	600	600	630	662	695	730	767
No of Students per course								
BCS 4 year	Nos per year		0	4000	10000	20000	30000	30000
Year 1	Nos per year		0	4000	10000	20000	30000	30000
Year 2	Nos per year			0	4000	10000	20000	30000
Year 3	Nos per year				0	4000	10000	20000
Year 4	Nos per year					0	4000	10000
Total Students	**Nos per year**		**0**	**4000**	**14000**	**34000**	**64000**	**90000**
BCS Advanced Credit - 2 Yr	Nos per year		0	500	500	750	750	750
Year 1	Nos per year	1	0	500	500	750	750	750
Year 2	Nos per year	2		0	500	500	750	750
Total Students	**Nos per year**		**0**	**500**	**1000**	**1250**	**1500**	**1500**
Professional Courses	**Nos per year**		**2000**	**2000**	**3000**	**4000**	**5000**	**5000**

Annex B-2-1

Assumptions	Unit		30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
No of Lecture per Year								
BCS 4 year	Nos			450	900	1350	1800	1800
BCS Advanced Credit - 2 Yr	Nos			450	450		0	0
Professional Courses	Nos		120	270	270	270	270	270
Total Lectures			**120**	**1170**	**1620**	**1620**	**2070**	**2070**
Fee per student per year								
BCS 4 year	Rs per Year	1000	12000	12000	12600	13230	13892	14587
BCS Advanced Credit - 2 Yr	Rs per Year	1000	12000	12000	12600	13230	13892	14587
Professional Courses	Rs per Year	1000	4000	12000	12600	13230	13892	14587
Prospectus Printed as ratio of students				2	2	2	2	2
Marketing & Other Expenses % of Rev			2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Contents Development Costs- Local								
BCS Courses			50,000	50,000	50,000			
Professional Courses			50,000	50,000	50,000			
Contents Development cost - Foreign lump sum			25,000	50,000	25,000			
Recurring cost of content development as % of total content development cost						20%	20%	20%
Bandwidth Costs								
Estimated Rent of Dedicated Line -local			100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000
Percentage Utilized by VU			5%	20%	25%	30%	35%	40%
International Bandwidth cost			10,080,000	10,584,000	11,113,200	11,668,860	12,252,303	12,864,918
Percentage usage			20%	50%	100%	100%	100%	100%
Television Broadcasting Costs								
Costs in US $								
2 Channel Satellite Transmission rental			$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000
Other Equipment - At Master Site			$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000
Costs in Rs. 000's								
2 Channel Satellite Transmission rental			30,000,000	31,500,000	33,075,000	34,728,750	36,465,188	38,288,447
Other Equipment - At Master Site			9,000,000	9,450,000	9,922,500	10,418,625	10,939,556	11,486,534

Annex B-2-1 (contd.)

Assumptions	Unit	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Communications & Networking Costs of VU							
"Last Mile Fiber Costs"- Cost per Km US$	5	500,000	525,000	551,250	578,813	607,753	638,141
Terminating equipment on campus site & local exchange, AND Router/ Switch	Set	3,000,000	3,150,000	3,307,500	3,472,875	3,646,519	3,828,845
E 1 Connectivity of Institutions							
No. of Universities to be connected		10	20	10			
Last mile cost for 6-7 KM		$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Router		$ 80,000	$ 80,000	$ 80,000	$ 80,000	$ 80,000	$ 80,000
Digital Cross Connect		$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000
Other Equipment		$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000
Video Projector / Receiver		$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000
Other Communications & Networking Equipment							
LAN Servers - VU Main Office		3,000,000	3,150,000	3,307,500	3,472,875	3,646,519	3,828,845
LAN Switches - VU Main Office		300,000	315,000	330,750	347,288	364,652	382,884
Communication - VU Main Office		7,000,000	7,350,000	7,717,500	8,103,375	8,508,544	8,933,971
PABX with telephones - 10/100		300,000	315,000	330,750	347,288	364,652	382,884
Broadcast Quality Digital Camera		$ 5,000	5,250	5,513	5,788	6,078	6,381
PTV HQ Connectivity Equipment		10,000,000	10,500,000	11,025,000	11,576,250	12,155,063	12,762,816
Remodeling & Wiring		1,000,000	1,050,000	1,102,500	1,157,625	1,215,506	1,276,282
Generators, Computers & Printers etc							
Generators		2,500,000	2,625,000	2,756,250	2,894,063	3,038,766	3,190,704
UPS		550,000	577,500	606,375	636,694	668,528	701,955
Computer Prices		50,000	52,500	55,125	57,881	60,775	63,814
Printers For Administration		48,000	50,400	52,920	55,566	58,344	61,262
Printers For Labs		75,000	78,750	82,688	86,822	91,163	95,721
Copy Printers		500,000	525,000	551,250	578,813	607,753	638,141
CD Writers - Bulk		250,000	262,500	275,625	289,406	303,877	319,070
Multimedia Projector		500,000	525,000	551,250	578,813	607,753	638,141
VCR's		20,000	21,000	22,050	23,153	24,310	25,526
Renovation of Building							
For VU Main Offices	Offices 500						
	Circulation Area 100						
	Computer Labs 600						
Air conditioning:	275 Sq. ft per ton	30,000	per ton				
		109	Per Sq. ft cost				

Annex B-2-1 (contd.)

Strategic Communication & Advertising Costs							
Technical Updates (min/day)		5	20,000,000	21,000,000	22,050,000	23,152,500	24,310,125	25,525,631
Inserts in Television Programs (min/month)		25	13,500,000	14,175,000	14,883,750	15,627,938	16,409,334	17,229,801
Print Media cost as % of above		10%	3,350,000	3,517,500	3,693,375	3,878,044	4,071,946	4,275,543
General Advertising			2,000,000	2,100,000	2,205,000	2,315,250	2,431,013	2,552,563
Courier Costs for Books								
BCS Program			150	158	165	174	182	191
Professional Program			50	53	55	58	61	64
Vehicle Prices								
Vehicles 1600 c.c.			950,000	997,500	1,047,375	1,099,744	1,154,731	1,212,467
Vehicles 1300 c.c.			700,000	735,000	771,750	810,338	850,854	893,397
Vehicles 1000 c.c.			650,000	682,500	716,625	752,456	790,079	829,583
Staff Van			1,000,000	1,050,000	1,102,500	1,157,625	1,215,506	1,276,282

Annex B-3

Projected Income & Expenditure Account — **Rs. in 000's**

	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Operating Statistics:						
Total Students	2,000	6,500	18,000	39,250	70,500	96,500
Total Courses	6	26	36	36	36	36
Total Semesters	2	6	8	8	8	8
Total Transmission Hours	120	1170	1620	1620	2070	2070
Total Days	90	300	300	300	300	300
TOTAL REVENUE						
BCS - Courses	-	54,000	189,000	466,358	909,926	1,334,711
Professional Courses	8,000	24,000	37,800	52,920	69,460	72,935
Total	**8,000**	**78,000**	**226,800**	**519,278**	**979,386**	**1,407,646**
COST OF OFFERING COURSES						
Total Cost of Study Guides & Workbooks	300	4,095	11,916	27,279	51,465	74,016
Total Cost of Lectures	480	4,914	7,144	49,552	52,116	52,619
Total Bandwidth Costs	5,504	22,117	27,778	33,501	39,288	45,146
Total Broadcasting Costs	13,000	40,950	42,998	45,147	47,405	49,775
Depreciation	-	95,109	103,951	107,939	98,115	97,207
	19,284	**167,185**	**193,787**	**263,418**	**288,390**	**318,762**
Gross Surplus	**(11,284)**	**(89,185)**	**33,013**	**255,859**	**690,996**	**1,088,883**
ADMINISTRATION & MARKETING						
Salaries	12,330	40,065	62,311	77,432	90,491	97,337
Rent	2,124	6,980	9,975	13,252	13,915	14,611
Utilities	1,696	6,494	9,091	9,091	12,273	12,887
Transport & Communications	3,686	8,403	10,278	10,766	11,304	11,869
Strategic Communication & Advertising	11,050	40,793	42,832	44,974	47,222	49,584
Repairs & Maintenance	2,546	12,331	12,669	14,010	14,450	15,173
Printing, Stationary etc	935	2,594	3,054	3,554	4,096	4,301
Course Running Expenses	900	4,024	9,639	20,724	38,189	45,076
Depreciation	-	5,085	15,628	13,364	11,078	11,376
Total Operating Expenses	35,268	126,767	175,478	207,167	243,020	262,214
Net Surplus / (Deficit)	**(46,552)**	**(215,952)**	**(142,465)**	**48,693**	**447,976**	**826,669**

Annex B-3-1

TOTAL REVENUE **Rs. in 000's**

	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
	Total	Total	Total	Total	Total	Total
Total Numbers						
BCS- 8 Semesters- No of Students	-	4,000	14,000	34,000	64,000	90,000
BCS- 4 Semesters- No of Students	-	500	1,000	1,250	1,500	1,500
Professional Course	2,000	2,000	3,000	4,000	5,000	5,000
Total Revenue						
BCS (8 Semesters)	-	48,000	176,400	449,820	889,088	1,312,830
BCS (4 Semesters)	-	6,000	12,600	16,538	20,838	21,881
	-	**54,000**	**189,000**	**466,358**	**909,926**	**1,334,711**
Professional Course	8,000	24,000	37,800	52,920	69,460	72,935
TOTAL REVENUE FOR THE YEAR	**8,000**	**78,000**	**226,800**	**519,278**	**979,386**	**1,407,646**

Annex B-3-2

BASIS OF REVENUE						**Rs. in 000's**
	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
	Total	**Total**	**Total**	**Total**	**Total**	**Total**
BCS- 8 Semesters- No of Students						
Year 1	-	4,000	10,000	20,000	30,000	30,000
Year 2	-	-	4,000	10,000	20,000	30,000
Year 3	-	-	-	4,000	10,000	20,000
Year 4	-	-	-	-	4,000	10,000
Total Numbers	**-**	**4,000**	**14,000**	**34,000**	**64,000**	**90,000**
Fees per annum per student	12,000	12,000	12,600	13,230	13,892	14,587
Total Fees:						
Year 1	-	48,000	126,000	264,600	416,760	437,610
Year 2	-	-	50,400	132,300	277,840	437,610
Year 3	-	-	-	52,920	138,920	291,740
Year 4	-	-	-	-	55,568	145,870
Total	**-**	**48,000**	**176,400**	**449,820**	**889,088**	**1,312,830**
BCS- 4 Semesters- No of Students						
Year 1	-	500	500	750	750	750
Year 2	-	-	500	500	750	750
Total Numbers	**-**	**500**	**1,000**	**1,250**	**1,500**	**1,500**
Fees per annum per student	12,000	12,000	12,600	13,230	13,892	14,587
Total Fees:						
Year 1	-	6,000	6,300	9,923	10,419	10,940
Year 2	-	-	6,300	6,615	10,419	10,940
Total	**-**	**6,000**	**12,600**	**16,538**	**20,838**	**21,881**
Professional Course						
No of Students	2,000	2,000	3,000	4,000	5,000	5,000
Fees per annum per student	4,000	12,000	12,600	13,230	13,892	14,587
Total	**8,000**	**24,000**	**37,800**	**52,920**	**69,460**	**72,935**

Annex B-3-3

COST OF OFFERING COURSES						Rs. in 000's
	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
	Total	Total	Total	Total	Total	Total
Total Cost of Study Guides & Workbooks	300	4,095	11,916	27,279	51,465	74,016
Total Cost of Lectures	480	4,914	7,144	49,552	52,116	52,619
Total Bandwidth Costs	5,504	22,117	27,778	33,501	39,288	45,146
Total Broadcasting Costs	13,000	40,950	42,998	45,147	47,405	49,775
Total	**19,284**	**72,076**	**89,836**	**155,479**	**190,274**	**221,556**
Cost of Study Guides/ Workbooks	600	630	662	695	730	767
Degree Courses						
BCS (8 Semesters)	-	2,520	9,268	23,630	46,720	69,030
BCS (4 Semesters)	-	315	662	869	1,095	1,151
Professional Course	300	1,260	1,986	2,780	3,650	3,835
Total	**300**	**4,095**	**11,916**	**27,279**	**51,465**	**74,016**
Cost of Lectures						
Lectures Updating Costs	480	4,914	7,144	7,502	10,066	10,569
Content development cost - revision and updating				42,050	42,050	42,050
Total	**480**	**4,914**	**7,144**	**49,552**	**52,116**	**52,619**
Total Air Time:						
Hours of Air Time Required for Broadcasting	**120**	**1,170**	**1,620**	**1,620**	**2,070**	**2,070**
Total Capacity:						
Available Air Time	1,200	3,600	3,600	3,600	3,600	3,600
Total Number of Institutions	10	30	40	40	40	40
Bandwidth Costs						
Estimated Rent of Dedicated Line -local	5,000	20,000	25,000	30,000	35,000	40,000
Estimated foreign bandwidth costs	504	2,117	2,778	3,501	4,288	5,146
Total Broadcasting Costs:						
24 Hrs Channel Rental	13,000	40,950	42,998	45,147	47,405	49,775

Annex B-3-4

DEPRECIATION SCHEDULE

Rs. in 000's

Description	%age Rate	30-Jun-01				30-Jun-02				30-Jun-03			
		Opening Bal	Additions During Yr	Deprec. for Year	WDV	Opening Bal	Additions During Yr	Deprec. for Year	WDV	Opening Bal	Additions During Yr	Deprec. for Year	WDV
Land	0%	-	-		-	-	-	-	-	-	-	-	-
Leased/ rented building, improvements & furnishing	20%	-	15,353		15,353	15,353	18,690	6,809	27,234	27,234	14,483	8,343	33,374
Vehicles	20%	-	5,550		5,550	5,550	1,365	1,383	5,532	5,532	4,024	1,911	7,645
Power Generators & UPS	20%	-	14,298		14,298	14,298	12,360	5,331	21,326	21,326	15,761	7,417	29,670
Connecting Cost of VU	20%	-	5,500		5,500	5,500	-	1,100	4,400	4,400	-	880	3,520
E 1 connecting cost of Universities	10%	-	93,000		93,000	93,000	195,300	28,830	259,470	259,470	102,533	36,200	325,802
Other Communications & Networking Costs	20%	-	43,200		43,200	43,200	7,293	10,099	40,394	40,394	12,172	10,513	42,053
Computers	33%	-	21,450		21,450	21,450	22,473	14,494	29,428	29,428	23,646	17,514	35,560
Printers, Accessories & Multimedia	20%	-	2,746		2,746	2,746	1,991	947	3,789	3,789	1,158	989	3,958
Content Development	20%	-	53,500		53,500	53,500	102,500	31,200	124,800	124,800	54,250	35,810	143,240
Total Depreciation Charge		-	254,596	-	254,596	254,596	361,971	100,193	516,374	516,374	228,027	119,580	624,821
Allocated to Admin													
Land	0%	-	-		-	-	-	-	-	-	-	-	-
Leased/ rented building, improvements & furnishing	20%	-	9,071		9,071	9,071	1,919	2,198	8,792	8,792	120	1,782	7,130
Vehicles	20%	-	5,550		5,550	5,550	1,365	1,383	5,532	5,532	-	1,106	4,426
Power Generators & UPS	20%	-	2,500		2,500	2,500	-	500	2,000	2,000	2,756	951	3,805
Connecting Cost of VU	20%	-			-	-	-	-	-	-	-	-	-
E 1 connecting cost of Universities	10%	-	-	-	-	-	-	-	-	-	-	-	-
Other Communications & Networking Costs	20%	-	-		-	-	-	-	-	-	-	-	-
Computers	33%	-	1,450		1,450	1,450	1,473	964	1,958	1,958	1,596	1,173	2,381
Printers, Accessories & Multimedia	20%	-	96		96	96	101	39	157	157	52,920	10,615	42,462
Content Development	20%												
Total for Admin		-	18,667	-	18,667	18,667	4,857	5,085	18,439	18,439	57,392	15,628	60,203
Allocated to Cost of sales			235,929	-	235,929	235,929	357,114	**95,109**	497,935	497,935	170,634	**103,951**	564,618

Annex B-3-4

DEPRECIATION SCHEDULE (contd.)

Rs. in 000's

Description	%age Rate	30-Jun-04				30-Jun-05				30-Jun-06			
		Opening Bal	Additions During Yr	Deprec. for Year	WDV	Opening Bal	Additions During Yr	Deprec. for Year	WDV	Opening Bal	Additions During Yr	Deprec. for Year	WDV
Land	0%	-	-	-	-	-	-	-	-	-	-	-	-
Leased/ rented building, improvements & furnishing	20%	33,374	15,207	9,716	38,864	38,864	-	7,773	31,092	31,092	-	6,218	24,873
Vehicles	20%	7,645	-	1,529	6,116	6,116	-	1,223	4,893	4,893	7,083	2,395	9,581
Power Generators & UPS	20%	29,670	23,876	10,709	42,837	42,837	15,355	11,638	46,554	46,554	18,248	12,960	51,841
Connecting Cost of VU	20%	3,520	-	704	2,816	2,816	-	563	2,253	2,253	-	451	1,802
E 1 connecting cost of Universities	10%	325,802	-	32,580	293,222	293,222	-	29,322	263,900	263,900	-	26,390	237,510
Other Communications & Networking Costs	20%	42,053	-	8,411	33,643	33,643	-	6,729	26,914	26,914	34,715	12,326	49,303
Computers	33%	35,560	49,378	28,030	56,909	56,909	28,681	28,245	57,345	57,345	30,179	28,883	58,641
Printers, Accessories & Multimedia	20%	3,958	926	977	3,907	3,907	-	781	3,126	3,126	-	625	2,500
Content Development	20%	143,240	-	28,648	114,592	114,592	-	22,918	91,674	91,674	-	18,335	73,339
Total Depreciation Charge		**624,821**	**89,388**	**121,304**	**592,905**	**592,905**	**44,037**	**109,193**	**527,749**	**527,749**	**90,225**	**108,583**	**509,391**
Allocated to Admin													
Land	0%	-	-	-	-	-	-	-	-	-	-	-	-
Leased/ rented building, improvements & furnishing	20%	7,130	-	1,426	5,704	5,704	-	1,141	4,563	4,563	-	913	3,650
Vehicles	20%	4,426	-	885	3,540	3,540	-	708	2,832	2,832	7,083	1,983	7,933
Power Generators & UPS	20%	3,805	-	761	3,044	3,044	-	609	2,435	2,435	3,191	1,125	4,501
Connecting Cost of VU	20%	-	-	-	-	-	-	-	-	-	-	-	-
E 1 connecting cost of Universities	10%	-	-	-	-	-	-	-	-	-	-	-	-
Other Communications & Networking Costs	20%	-	-	-	-	-	-	-	-	-	-	-	-
Computers	33%	2,381	3,073	1,800	3,655	3,655	1,879	1,826	3,708	3,708	2,037	1,896	3,849
Printers, Accessories & Multimedia	20%	42,462	-	8,492	33,970	33,970	-	6,794	27,176	27,176	123	5,460	21,839
Content Development	20%												
Total for Admin		60,203	3,073	13,364	49,912	49,912	1,879	11,078	40,714	40,714	12,433	11,376	41,771
Allocated to Cost of sales		564,618	86,314	**107,939**	542,993	542,993	42,157	**98,115**	487,035	487,035	77,791	97,207	467,620

Annex B-3-5

Advertisement & Marketing Cost **Rs. in 000's**

	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
	Total	Total	Total	Total	Total	Total
RENT & SALARIES						
Salaries	12,330	40,065	62,311	77,432	90,491	97,337
Rent Expense	2,124	6,980	9,975	13,252	13,915	14,611
UTILITIES						
Electricity Charges	1,696	6,494	9,091	9,091	12,273	12,887
TRANSPORT & COMMUNICATIONS						
Communications	1,742	4,068	4,801	5,015	5,266	5,529
Travelling & Transportation	1,944	4,334	5,477	5,751	6,039	6,341
STRATEGIC COMMUNICATION & ADVERTISING						
Strategic Communications & Advertising	11,050	40,793	42,832	44,974	47,222	49,584
REPAIR & MAINTENANCE						
Repair & Maintenances	2,546	12,331	12,669	14,010	14,450	15,173
PRINTING, STATIONARY & BOOKS						
Library, books & journals	515	1,082	1,136	1,192	1,252	1,315
Printing & Stationary	420	1,512	1,918	2,362	2,844	2,986
OTHER COURSE RUNNING EXPENSES						
Delivery/ Courier Charges for Study Materials	100	814	2,646	6,352	12,246	17,836
Fee Collection, Professional & Legal Charges	200	1,950	5,670	12,982	24,485	25,709
Office Running Expenses	600	1,260	1,323	1,389	1,459	1,532
Total Administrative & Marketing Costs	**35,268**	**121,683**	**159,850**	**193,802**	**231,942**	**250,837**

Annex B-3-5a

Total Staff Salary Expense **Rs. in 000's**

	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Categories						
Vice Chancellor	1,260	2,646	2,778	2,917	3,063	3,216
Dean IT	750	1,575	1,654	1,736	1,823	1,914
Registrar	450	945	992	1,042	1,094	1,149
Treasurer	450	945	992	1,042	1,094	1,149
Business Manager	600	1,260	1,323	1,389	1,459	1,532
Network Exec	450	945	992	1,042	1,094	1,149
Executive Positions	**3,960**	**8,316**	**8,732**	**9,168**	**9,627**	**10,108**
Professor	1,260	2,646	5,557	5,834	9,189	9,649
Assoc. Professor	750	1,575	4,961	5,209	7,293	7,658
Assist. Professor	450	2,835	3,969	5,209	6,564	6,892
Lecturers	600	2,520	3,969	5,557	7,293	9,189
Tutors/ Instructors	900	7,560	11,907	16,670	17,503	18,378
Teaching/ Scientific	**3,960**	**17,136**	**30,363**	**38,479**	**47,842**	**51,766**
Webmaster	600	1,260	1,985	2,778	2,917	3,063
Instructional Designer	750	3,150	4,961	6,946	7,658	8,443
Audio-Video Expert	300	662	1,323	1,459	1,608	1,773
Net Admin	150	630	992	1,042	1,094	1,149
Electrical Support	90	378	595	833	875	919
Marketing Executive	180	756	1,191	1,667	1,750	1,838
Technical & Marketing	**2,070**	**6,836**	**11,047**	**14,725**	**15,902**	**17,184**
Staff Officer	150	630	992	1,042	1,094	1,149
Secretary	90	189	198	208	219	230
Asst Registrar	45	284	496	833	875	919
Accounts	45	284	496	833	875	919
Library	45	95	198	208	328	345
Store	39	164	258	361	379	398
Sweepers	48	151	212	222	233	245
Chowkidars	270	756	1,191	1,250	1,313	1,378
Administrative	**732**	**2,552**	**4,042**	**4,959**	**5,317**	**5,582**
Per Annum Costs	**10,722**	**34,839**	**54,183**	**67,332**	**78,688**	**84,641**
Salary Overheads @ 15%	1,608	5,226	8,128	10,100	11,803	12,696
Total Salary Expense	**12,330**	**40,065**	**62,311**	**77,432**	**90,491**	**97,337**

Annex B-3-5a-i

TOTAL STAFF REQUIREMENT

	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Categories						
Vice Chancellor	1	1	1	1	1	1
Dean IT	1	1	1	1	1	1
Registrar	1	1	1	1	1	1
Treasurer	1	1	1	1	1	1
Business Manager	1	1	1	1	1	1
Network Exec	1	1	1	1	1	1
Executive Positions	**6**	**6**	**6**	**6**	**6**	**6**
Professor	1	1	2	2	3	3
Assoc. Professor	1	1	3	3	4	4
Assist. Professor	1	3	4	5	6	6
Lecturers	2	4	6	8	10	12
Tutors/ Instructors	5	20	30	40	40	40
Teaching	**10**	**29**	**45**	**58**	**63**	**65**
Webmaster	2	2	3	4	4	4
Instructional Designer	1	2	3	4	4	4
Audio-Video Expert	1	1	2	2	2	2
Net Admin	1	2	3	3	3	3
Electrical Support	1	2	3	4	4	4
Marketing Executive	1	2	3	4	4	4
Telecom engineers	1	2	4	5	5	5
Technical & Marketing	**8**	**13**	**21**	**26**	**26**	**27**
Staff Officer	1	2	3	3	3	3
Secretary	2	2	2	2	2	2
Asst Registrar	1	3	5	8	8	8
Accounts	1	3	5	8	8	8
Library	1	1	2	2	3	3
Store	1	2	3	4	4	4
Sweepers	2	3	4	4	4	4
Chowkidars/Drivers	9	12	18	18	18	18
Administrative	**18**	**28**	**42**	**49**	**50**	**50**
Total Number of Staff	**42**	**76**	**114**	**139**	**145**	**148**

Annex B-3-5b

COMMUNICATIONS

Description	30-Jun-01 No. of Units	Per Month Charges	Per Annum Costs	Total	30-Jun-02 No. of Units	Per Month Charges	Per Annum Costs	Total	30-Jun-03 No. of Units	Per Month Charges	Per Annum Costs	Total
Telephone Connection Charges	25	4,500	4,500	56	5	4,725	4,725	24	5	4,961	4,961	25
Telecommunication Charges	25	3,000	36,000	450	30	3,150	37,800	1,134	35	3,308	39,690	1,389
Satellite Link Charges	1	150,000	1,800,000	900	1	157,500	1,890,000	1,890	1	165,375	1,984,500	1,985
WAN Charges	2	25,000	300,000	300	3	26,250	315,000	945	4	27,563	330,750	1,323
Hosting Charges	1	6,000	72,000	36	1	6,300	75,600	76	1	6,615	79,380	79
TOTAL				**1,742**				**4,068**				**4,801**

TRAVELLING & TRANSPORTATION

Description	30-Jun-01 No. of Units/ Persons	Per Month Costs	per person annual cost	Total	30-Jun-02 No. of Units	Per Unit Costs	Per Annum Costs	Total	30-Jun-03 No. of Units	Per Unit Costs	Per Annum Costs	Total
Foreign Travels	3	25,000	300,000	450	3	26,250	315,000	945	3	27,563	330,750	992
Inland Travels	15	10,000	120,000	900	15	10,500	126,000	1,890	15	11,025	132,300	1,985
Local Travels	2	4,500	54,000	54	2	4,725	56,700	113	2	4,961	59,535	119
Vehicle running costs - Executives	5	10,000	120,000	300	7	10,500	126,000	882	10	11,025	132,300	1,323
Vehicle running costs - Staff	2	20,000	240,000	240	2	21,000	252,000	504	4	22,050	264,600	1,058
TOTAL				**1,944**				**4,334**				**5,477**

Annex B-3-5b (contd.)

PRINTING & STATIONARY

	30-Jun-01				30-Jun-02				30-Jun-03			
Description	Nos.	Per Month/ Unit Costs	Per Annum Costs	Total	Nos.	Per Month/ Unit Costs	Per Annum Costs	Total	Nos.	Per Month/ Unit Costs	Per Annum Costs	Total
Stationary & General Items		10,000	120,000	60		10,500	126,000	126		11,025	132,300	132
Stationary - Campus		50,000	600,000	300		52,500	630,000	630		55,125	661,500	662
Stationary - Printing		10,000	120,000	60		10,500	126,000	126		11,025	132,300	132
Prospectus					4000	158	630,000	630	6000	165	992,250	992
TOTAL				**420**				**1,512**				**1,918**

STRATEGIC COMMUNICATION & ADVERTISING COSTS

	30-Jun-01	30-Jun-02	30-Jun-03
Description	Total	Total	Total
Technical Updates	5,000	21,000	22,050
Inserts in Television Programs	3,375	14,175	14,884
Print Media cost as % of above	1,675	3,518	3,693
General Advertising	1,000	2,100	2,205
TOTAL	**11,050**	**40,793**	**42,832**

Annex B-3-5b (contd.)

COMMUNICATIONS

	30-Jun-04				30-Jun-05				30-Jun-06
	No. of Units	Per Month Charges	Per Annum Costs	Total	No. of Units	Per Month Charges	Per Annum Costs	Total	Total
Description									
Telephone Connection Charges									
Telecommunication Charges	35	3,473	41,675	1,459	35	3,647	43,758	1,532	1,608
Satellite Link Charges	1	173,644	2,083,725	2,084	1	182,326	2,187,911	2,188	2,297
WAN Charges	4	28,941	347,288	1,389	4	30,388	364,652	1,459	1,532
Hosting Charges	1	6,946	83,349	83	1	7,293	87,516	88	92
TOTAL				**5,015**				**5,266**	**5,529**

TRAVELLING & TRANSPORTATION

	No. of Units	Per Unit Costs	Per Annum Costs	Total	No. of Units	Per Unit Costs	Per Annum Costs	Total	Total
Description									
Foreign Travels	3	28,941	347,288	1,042	3	30,388	364,652	1,094	1,149
Inland Travels	15	11,576	138,915	2,084	15	12,155	145,861	2,188	2,297
Local Travels	2	5,209	62,512	125	2	5,470	65,637	131	138
Vehicle running costs - Executives	10	11,576	138,915	1,389	10	12,155	145,861	1,459	1,532
Vehicle running costs - Staff	4	23,153	277,830	1,111	4	24,310	291,722	1,167	1,225
TOTAL				**5,751**				**6,039**	**6,341**

Annex B-3-5b (contd.)

PRINTING & STATIONARY

Description	Nos.	Per Month/ Unit Costs	Per Annum Costs	Total	Nos.	Per Month/ Unit Costs	Per Annum Costs	Total	Total
Stationary & General Items		11,576	138,915	139		12,155	145,861	146	153
Stationary - Campus		57,881	694,575	695		60,775	729,304	729	766
Stationary - Printing		11,576	138,915	139		12,155	145,861	146	153
Prospectus	8000	174	1,389,150	1,389	10000	182	1,823,259	1,823	1,914
TOTAL				**2,362**				**2,844**	**2,986**

STRATEGIC COMMUNICATION & ADVERTISING COSTS

Description	Total	Total	Total
Technical Updates	23,153	24,310	25,526
Inserts in Television Programs	15,628	16,409	17,230
Print Media cost as % of above	3,878	4,072	4,276
General Advertising	2,315	2,431	2,553
TOTAL	**44,974**	**47,222**	**49,584**

Annex B-3-5c

DELIVERY / COURIER CHARGES

	30-Jun-01			30-Jun-02			30-Jun-03		
	No. of Units	Per Unit Costs	Total	No. of Units	Per Unit Costs	Total	No. of Units	Per Unit Costs	Total
BCS Program	0	150	-	4500	158	709	15000	165	2,481
Professional Program	2000	50	100	2000	53	105	3000	55	165
TOTAL			**100**			**814**			**2,646**

RENT EXPENSE

	30-Jun-01			30-Jun-02			30-Jun-03		
	Sq. ft	Rent / Month	Total	Sq. ft	Rent / Month	Total	Sq. ft	Rent / Month	Total
Building	20400	10.0	1,224	20400	10.5	2,570	20400	11.0	2,699
Campus	15000	10.0	900	35000	10.5	4,410	55000	11.0	7,277
TOTAL			**2,124**			**6,980**			**9,975**

REPAIR & MAINTENANCE

	30-Jun-01		30-Jun-02		30-Jun-03	
	Per Annum Costs	Total	Per Annum Costs	Total	Per Annum Costs	Total
Total Cost as a percentage of Total Fixed Expenditure	5,092	2,546	12,331	12,331	12,669	12,669
TOTAL		**2,546**		**12,331**		**12,669**

Annex B-3-5c (contd.)

PROFESSIONAL & MARKETING EXPENSES

	30-Jun-01		30-Jun-02		30-Jun-03	
	Percentage of Revenue	Total	Percentage of Revenue	Total	Percentage of Revenue	Total
Fee Collection, Professional & Legal Charges	2.5%	200	2.5%	1,950	2.5%	5,670
TOTAL		**200**		**1,950**		**5,670**

LIBRARY & BOOKS

	30-Jun-01			30-Jun-02			30-Jun-03		
	No. of Units	Per Unit Costs	Total	No. of Units	Per Unit Costs	Total	No. of Units	Per Unit Costs	Total
Professional Books	1000	1,000	500	1000	1,050	1,050	1000	1,103	1,103
Periodicals/ Journals	120	250	15	120	263	32	120	276	33
TOTAL			**515**			**1,082**			**1,136**

OFFICE RUNNING EXPENSES

	30-Jun-01			30-Jun-02			30-Jun-03		
	Per Month	Per Annum	Total	Per Month	Per Annum	Total	Per Month	Per Annum	Total
Office Expenses	60,000	720,000	360	63,000	756,000	756	66,150	793,800	794
General Expenses	15,000	180,000	90	15,750	189,000	189	16,538	198,450	198
Miscellaneous	25,000	300,000	150	26,250	315,000	315	27,563	330,750	331
TOTAL			**600**			**1,260**			**1,323**

Annex B-3-5c (contd.)

DELIVERY / COURIER CHARGES

	30-Jun-04			30-Jun-05			30-Jun-06
	No. of Units	Per Unit Costs	Total	No. of Units	Per Unit Costs	Total	Total
BCS Program	35250	174	6,121	65500	182	11,942	17,517
Professional Program	4000	58	232	5000	61	304	319
TOTAL			**6,352**			**12,246**	**17,836**

RENT EXPENSE — **Rs. In '000**

	30-Jun-04			30-Jun-05			30-Jun-06
	Sq. ft	Rent / Month	Total	Sq. ft	Rent / Month	Total	
Building	20400	11.6	2,834	20400	12	2,976	3,124
Campus	75000	11.6	10,419	75000	12	10,940	11,487
TOTAL			**13,252**			**13,915**	**14,611**

REPAIR & MAINTENANCE — **Rs. In '000**

	30-Jun-04		30-Jun-05		30-Jun-06
	Per Annum Costs	Total	Per Annum Costs	Total	
Total Cost as a percentage of Total Fixed Expenditure	14,010	14,010	14,450	14,450	15,173
TOTAL		**14,010**		**14,450**	**15,173**

Annex B-3-5c (contd.)

PROFESSIONAL & MARKETING EXPENSES						
	30-Jun-04			30-Jun-05		30-Jun-06
	Percentage of Revenue		Total	Percentage of Revenue	Total	
Fee Collection, Professional & Legal Charges	2.5%		12,982	2.5%	24,485	25,709
TOTAL			**12,982**		**24,485**	**25,709**

LIBRARY & BOOKS							Rs. In '000
	30-Jun-04			30-Jun-05			30-Jun-06
	No. of Units	Per Unit Costs	Total	No. of Units	Per Unit Costs	Total	
Professional Books	1000	1,158	1,158	1000	1,216	1,216	1,276
Periodicals/ Journals	120	289	35	120	304	36	38
TOTAL			**1,192**			**1,252**	**1,315**

OFFICE RUNNING EXPENSES							Rs. In '000
	30-Jun-04			30-Jun-05			30-Jun-06
	Per Month	Per Annum	Total	Per Month	Per Annum	Total	
Office Expenses	69,458	833,490	833	72,930	875,165	875	919
General Expenses	17,364	208,373	208	18,233	218,791	219	230
Miscellaneous	28,941	347,288	347	30,388	364,652	365	383
TOTAL			**1,389**			**1,459**	**1,532**

Annex B-3-5d

ELECTRICITY CHARGES

		30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
Connected Load	KWH	250		350	450		
Requirement of Energy							
No. of days		365		365	365		
Shifts per day		1		1	1		
Hours per shift		12		12	12		
Utility Factor		85%		85%	85%		
Fixed charges (per KW per month)	Rs	200		200	200		
Variable charges (per KWH) Including FAC per unit	Rs	6.00		6.00	6.00		
Total Percentage electricity used		50%	100%	100%	100%	100%	100%
Variable Cost	Rs	1,396,125	5,863,725	8,209,215	10,554,705	11,082,440	11,636,562
Fixed Cost	Rs	300,000	630,000	882,000	1,134,000	1,190,700	1,250,235
Percentage increase per year			5%	5%	5%	5%	5%
TOTAL		**1,696**	**6,494**	**9,091**	**9,091**	**12,273**	**12,887**

Annex B-4

CASH FLOW STATEMENT **Rs. in 00's**

	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
	Total	**Total**	**Total**	**Total**	**Total**	**Total**
Cash Flow from Operations						
Net Surplus/ (Deficit)	(46,552)	(215,952)	(142,465)	48,693	447,976	826,669
Add: Depreciation	-	100,193	119,580	121,304	109,193	108,583
			-	-	-	-
Net Inflow	(46,552)	(115,759)	(22,886)	169,996	557,169	935,252
Less:						
Capital Expenditure	(254,596)	(361,971)	(228,027)	(89,388)	(44,037)	(109,193)
Total inflows / (outflows)	(301,148)	(477,730)	(250,912)	80,608	513,133	826,059
Add						
Financing:						
Government funding for capital costs	254,596	361,971	228,027	89,388		
Government funding for contingencies	12,730	18,099	11,401	4,469		
Government funding for initial years operation	46,552	115,759	22,886			
Government funding for working capital	8,000	19,500				
	321,878	**515,328**	**262,314**	**93,857**	-	-
Net Cash Flow During the Year	**20,730**	**37,599**	**11,401**	**174,465**	**513,133**	**826,059**
Opening Cash Balance	-	20,730	58,328	69,730	244,195	757,328
Closing Cash Balance	**20,730**	**58,328**	**69,730**	**244,195**	**757,328**	**1,583,387**

Annex B-5

Balance Sheet **Rs. in 000's**

	Opening	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06
	Total	**Total**	**Total**	**Total**	**Total**	**Total**	**Total**
Deployment of Funds:							
FIXED ASSETS							
Cost	254,596	254,596	616,568	844,594	933,982	978,019	1,087,211
Accumulated Depreciation		-	100,193	219,773	341,077	450,269	558,852
Written Down Value	254,596	254,596	516,374	624,821	592,905	527,749	528,359
CURRENT ASSETS							
Cash	20,730	20,730	58,328	69,730	244,195	757,328	1,583,387
Working Capital							
Assets	**275,326**	**275,326**	**574,703**	**694,551**	**837,101**	**1,285,077**	**2,111,746**
Financed By:							
Government funding	275,326	321,878	837,206	1,099,520	1,193,377	1,193,377	1,193,377
Retentions/ (deficit)		(46,552)	(262,504)	(404,969)	(356,276)	91,700	918,369
Total Financing	**275,326**	**275,326**	**574,703**	**694,551**	**837,101**	**1,285,077**	**2,111,746**

Annex B-6

INTERNAL RATE OF RETURN & NPV — **Rs. in 000's**

	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06	30-Jun-07	30-Jun-08	30-Jun-09	30-Jun-10	30-Jun-11
	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Capital Expenditure	(254,596)	(361,971)	(228,027)	(89,388)	(44,037)	(90,225)	(730,538)	(66,079)	(418,989)	(200,030)	(471,725)
Net Surplus/ (Deficit)	(46,552)	(215,952)	(142,465)	48,693	447,976	826,669	1,075,975	1,304,946	1,356,733	1,423,490	1,479,920
Add: Depreciation	-	100,193	119,580	121,304	109,193	108,583	190,051	172,171	198,112	212,878	241,965
			-	-	-	-	-	-	-	-	-
	(46,552)	**(115,759)**	**(22,886)**	**169,996**	**557,169**	**935,252**	**1,266,025**	**1,477,116**	**1,554,845**	**1,636,369**	**1,721,885**
Net Cash Flow	**(301,148)**	**(477,730)**	**(250,912)**	**80,608**	**513,133**	**845,028**	**535,488**	**1,411,038**	**1,135,856**	**1,436,339**	**1,250,160**

Internal Rate of Return	**38%**
Opportunity Cost of Capital	**16%**

Pay back Period	**Years**	**Months**
	4	6

Net Present Value											
Discounted Cash Outflows	254,596	312,044	169,461	57,267	24,321	42,957	299,844	23,381	127,802	52,598	106,932
Discounted Cash Inflows	(46,552)	(99,792)	(17,008)	108,909	307,720	445,286	519,630	522,647	474,267	430,288	390,323

NET PRESENT VALUE	**1,564,516**
BENEFIT COST RATIO	**2.06**

PROJECT VALUE ADDED												Rs. in 000's
	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06	30-Jun-07	30-Jun-08	30-Jun-09	30-Jun-10	30-Jun-11	Total
	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	
Total Revenue – Fees	8,000	78,000	226,800	519,278	979,386	1,407,646	1,784,314	2,034,373	2,136,079	2,242,845	2,355,051	13,771,771
Total Costs	54,552	293,952	369,265	470,585	531,410	580,976	708,339	729,427	779,346	819,355	875,131	**6,212,338**
Less:												
Salaries to Administrative Staff	8,915	25,285	36,123	44,243	49,227	52,689	55,940	59,902	63,647	67,656	71,950	**535,577**
Salaries to Teaching Staff	3,416	14,780	26,188	33,189	41,264	44,648	46,881	49,225	51,686	54,270	56,984	**422,529**
Depreciation Costs	-	100,193	119,580	121,304	109,193	108,583	190,051	172,171	198,112	212,878	241,965	**1,574,029**
	12,330	**140,258**	**181,891**	**198,735**	**199,684**	**205,920**	**292,871**	**281,298**	**313,445**	**334,804**	**370,899**	**2,532,135**
Total bought in Materials & Services	42,221	153,694	187,375	271,850	331,725	375,057	415,468	448,130	465,901	484,551	504,232	**3,680,203**
Value Addition	**(34,221)**	**(75,694)**	**39,425**	**247,428**	**647,661**	**1,032,589**	**1,368,846**	**1,586,243**	**1,670,178**	**1,758,294**	**1,850,819**	**10,091,568**

Annex B-7 (contd.)

Application of Value added is as follows:												**Total Rs in 000's**
i. To be paid to Employees as Salaries	12,330	40,065	62,311	77,432	90,491	97,337	102,820	109,127	115,333	121,926	128,933	**958,106**
ii. To be paid for expansion & maintenance of Assets												
Depreciation	-	100,193	119,580	121,304	109,193	108,583	190,051	172,171	198,112	212,878	241,965	**1,574,029**
Retained earnings	(46,552)	(215,952)	(142,465)	48,693	447,976	826,669	1,075,975	1,304,946	1,356,733	1,423,490	1,479,920	**7,559,433**
	(34,221)	**(75,694)**	**39,425**	**247,428**	**647,661**	**1,032,589**	**1,368,846**	**1,586,243**	**1,670,178**	**1,758,294**	**1,850,819**	**10,091,568**
New Jobs Created	42	34	38	25	6	2	0	1	0	0	0	**151**
Total No. of Employees	151											**151**
BCS - beneficiaries			500	500	4,750	10,750	20,750	30,750	30,750	30,750	30,750	**160,250**
Other	2,000	2,000	3,000	4,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	**46,000**
Total No. of Beneficiaries/ Students completing studies	206,250											
Total Capital Employed	1,193,377											
Capital Per Beneficiary	**5,786**											

Annex B-8

Assumptions for Graduating Students Going Abroad

Graduates going abroad	20%
Av. Starting salary of a BCS graduate abroad	$30,000
Expected annual growth in salary	1.05
Annual growth in salary due to Experience	1.05
Av. Rate of remittances	10%

Foreign Earnings Remittance from Graduates Working Abroad

(Millions of US $)

Year	No. of Graduating Students	Total Revenue Earned by Students Abroad	No. of Students going abroad	Total Annual Remittance
1	-	-	-	-
3	500	100	6.62	0.66
4	4,750	950	39.94	3.99
5	10,750	2,150	120.34	12.03
6	20,750	4,150	285.25	28.52
7	30,750	6,150	546.76	54.68
8	30,750	6,150	833.71	83.37
9	30,750	6,150	1,147.98	114.80
10	30,750	6,150	1,491.60	149.16
Total	160,250	32,050	4,475.34	447.53

Annex B-9

BREAK-EVEN ANALYSIS **Rs. in 000's**

	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	30-Jun-05	30-Jun-06	30-Jun-07	30-Jun-08	30-Jun-09	30-Jun-10	30-Jun-11
			100%	100%	100%	100%	100%	100%	100%	100%	100%
Total Capacity		18,000	39,000	70,000	96,000	130,000	130,000	130,000	130,000	130,000	130,000
No. of Students	2,000	6,500	18,000	39,250	70,500	96,500	116,500	126,500	126,500	126,500	126,500
Operating Capacity		**36%**	**46%**	**56%**	**73%**	**74%**	**90%**	**97%**	**97%**	**97%**	**97%**
Total Revenue	8,000	78,000	226,800	519,278	979,386	1,407,646	1,784,314	2,034,373	2,136,079	2,242,845	2,355,051
Total Contribution	(11,284)	(89,185)	33,013	255,859	690,996	1,088,883	1,354,514	1,600,246	1,665,428	1,747,514	1,822,151
Less: Variable Costs of admin and marketing	8,729	34,423	53,606	69,895	94,856	105,400	114,288	121,902	127,997	134,397	141,117
Actual Contribution/ (deficit)	**(20,013)**	**(123,608)**	**(20,593)**	**185,964**	**596,140**	**983,483**	**1,240,226**	**1,478,344**	**1,537,431**	**1,613,117**	**1,681,034**
Per Unit of Contribution/(deficit)	**(10,007)**	**(19,017)**	**(1,144)**	**4,738**	**8,456**	**10,192**	**10,646**	**11,687**	**12,154**	**12,752**	**13,289**
Fixed Costs	26,538	187,453	225,824	245,211	246,279	254,020	343,779	334,962	369,792	393,969	433,022
Break-Even - No of Students	-	-	-	**51,755**	**29,125**	**24,925**	**32,293**	**28,662**	**30,427**	**30,895**	**32,585**
Safety of Margin					**32%**	**48%**	**62%**	**75%**	**73%**	**73%**	**72%**
Contribution Margin		**0%**	**0%**	**132%**	**41%**	**26%**	**28%**	**23%**	**24%**	**24%**	**26%**

Annex C: List of Institutions Visited and Persons Interviewed

Annex C: List of Institutions Visited and Persons Interviewed

Government

Ministry of Science and Technology

- Atta ur Rahman, Minister
- Javed Masud, Secretary
- Wahaj us Siraj, Principal Staff Officer, IT

Planning Commission

- Shahid Amjad Chaudhry, Deputy Chairman and Minister of State
- Quaiser Sohail, Director General

Information Technology Commission

- Salman Ansari, Member

Punjab Information Technology Board

- Jawaid Ghani, Chairman

State Bank of Pakistan, National Institute of Banking and Finance

- Shakil Faruqi, Advisor to the Governor, Director NIBF

International Organizations

United Nations Development Programme

- Önder Yücer, Resident Representative and UN Resident Coordinator
- Mohammed Zafar Iqbal, Assistant Resident Representative
- Kristen Sv. Helgason, Coordinator, South Asia Region
- Lena M. Lindberg, Deputy Resident Representative and Director, Development Division
- Naeem Ahmad, Program Management Officer, Development Division
- Muhammed Mateen-ud-Din, Programme Officer
- Hasan Akhtar Rizvi, Project Director, Sustainable Development Networking Programme
- Ahmed Qadir, Deputy Project Director, Sustainable Development Networking Programme

World Bank

- John W. Wall, Country Director
- William Byrd, Principal Economist
- Ishfaq A. Sheikh, Sr. Information Technology Officer
- Amir Munir Khan, Information Technology Specialist

Academic Institutions

National University of Computer and Emerging Sciences

- Amir Muhammed, Rector
- Syed Refaqat, Pro Rector
- M. Ayub Alvi, Dean

National College of Business Administration

- Shahid Ali Haidar, Vice President, Development
- Aamir Iftikhar Khan, Director Studies

Lahore University of Management Sciences

- Syed Zahoor Hassan, Professor and Dean
- Muhammad Ramzan, Chief Librarian

Sir Syed University of Engineering and Technology

- Athar Mahboob, Associate Professor of Computer Science and Systems Manager

National University of Engineering and Technology

- Ansar Ahmed Khan, Chairman, Department of Mathematics and Sciences and Professor of Computer Science
- Sh. M. Wahabuddin Usmani, Assistant Professor, Department of Computer Science

Allama Iqbal Open University
- Nazir Ahmed Sangi, Professor and Chairman, Department of Computer Science

Planwel
- Shahab Khan, Director

National Insititute of Information Technology
- Arshad Ali, Director

Beaconhouse Informatics
- Khaver Zia, Director

Operation Bader
- Zia Ullah Khan, Xenosys Corporation

Aga Khan University
- Shamsh Kassim-Lakha, President
- John B. Stevens, Director of University Administration and Director General/CEO
- Robert Baker, Director General, Planning
- Naseem Z. Siddiqui, Director, Information Technology
- Nurallah A. Merchant, Sr. Director, CFO

Software Houses and other Private Businesses

Network Solutions
- Saeed Ghauri, Management Executive
- Sajjad Kirmani, Director IT and Operations

Acer Computer Pakistan
- Ijaz Anwer, Country Manager

Hi Tech Business Machines (Pvt) Ltd.
- Amer Nazir, CEO

Asia Satellite Communication Co., Ltd.
- William Kwan, Regional Manager

Techlogix
- Sohail Aslam

SoftNet
- Aamir Matin, CEO

Telecommunication Companies

PCTL
- Noor ud Din Baqai, Director
- Altamash Kamal, Director

NTC
- Azhar Maud, Chairman
- Khalid Javed, Chief Engineer, Development
- Tahir Ahmed, Divisional Engineer, Data Networking and Modernization
- Miraj Gul, Divisional Engineer, Development

Media

The News/Jang Group of Newspapers
- Iqbal Hussain, Group Business Development and Systems Implementation Director
- Arshad Siddiqui, Group Director, IT and Communications
- Mohammed Suleman, Group Editor, Editorial Management and Development
- Mohamed Z.A. Syed, Group Finance Director

TeleBiz
- Zafar Siddiqui, Managing Director
- Amir Jahangir, Manager, Islamabad Office