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A Technical SWOT Analysis of ICT Facilities: Jammu University, Jammu, India

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Abstract - This paper presents a technical SWOT analysis of Information & Communication Technology (ICT) facilities of Jammu University, Jammu India. With the objective of achieving quality and excellence in higher education system in Jammu and Kashmir region of India, this study provides a basis to decision makers to exploit opportunities and minimize the external threats. Guided by the initiatives of National Mission on Education through ICT (NMEICT) and National Knowledge Network (NKN) for SWOT analysis, findings of this paper reveal, relative consistency of their categories of universities, with the earlier study. A few opportunities, with focus on problem solving orientation in higher education, have been made to strengthen the leadership of universities in the field of ICT.

Keywords - SWOT Analysis, ICT, NMEICT, National Knowledge Network (NKN), Wi-Fi, LAN

I. INTRODUCTION

SWOT (Strength, weakness, opportunities and threats) analysis has proved to be a general tool at the preliminary stages of policy making and strategic planning of an organization. At a later stage, it is quite helpful to analyse the performance and planning for further development and progress of the organization, and provide answers through SWOT analysis, to some very relevant questions for future development and difficulties faced by the universities. In view of that experience, one looks for opportunities provided by such an analysis. A saying is that opportunities knock the door at least once which is to be promptly identified and utilized.

In this connection, Narayana Murty (2009) [1], non-executive chairman of Infosys Technologies, Bangalore, India, while addressing a convocation in Katra Jammu, admonished that problem- solving oriented education system should be the priority which would produce skilled professionals as good teachers and should be adopted by the universities as their sacred responsibility. This problem solving attitude using ICT as a tool will definitely lead universities to win – win situation.

A. SWOT as an Analytical Technique

The origin of the SWOT, as an analytical technique, lies in connection with the growth of strategic planning which dates back to the decade of 1960s. The concept was developed later, to address possible shortcomings in the outcome of strategic planning (Johnson et al 1989 [2], Bartol & Martin 1991[3], Mintzberg 1994) [4].

SWOT has established itself as a framework for analysing strengths, weaknesses, opportunities and threats. Strengths and weaknesses are mainly based on internal audit, as a result of introspection of an organisation/University. The opportunities are related with the internal as well as external environmental factors. Threats are concerned mainly with the external environment factors. The external factor implies economy, competition, sources of funding, demographics and culture. These are needed to be taken care in strategic planning and activities. Opportunities represent factors that can be beneficially exploited. While threats need to be considered because of their potential of damaging the organization / University. SWOT analysis normally reflects a viewpoint which can be used by others. It has to be positive so that the analysis is exploited for the benefit of the organisation/ University. Different variants of SWOT (Wehrich 1982 [5]; Hauben et al. 1999 [6]) provided a structure based planning. (Bourgeois 1996; Pearce and Robinson 1997 [7]). This technique is used to develop a project or find a solution to a problem that takes care of several different internal and external factors and maximizes the potential of strengths and opportunities while minimizing the effect of weakness and threats.

In a recent paper, Sharma (2012) [8], presented a comparative SWOT analysis of six universities in the western Himalayan Region of India in the context of ICT implementation in these universities. The historical perspective gives a bird's eye view of evolution of the university in this field, which could be quite motivating. With this, the SWOT analysis may provide guidance and directions for making decisions and strategies about the relative merits and demerits of different ICT facilities and activities in the universities.

In order to have detailed SWOT analysis [9], an essential pre- requirement is that the primary data collected should be through technical responsible person who have all technicalities of organisation /university, including its historical perspective. This is helpful in order to identify its strengths, weaknesses and opportunities with a sound understanding of internal and external environment, which may effect positively as opportunities and negatively as harmful effects (Jackson et al. 2003) [10] and threat. Hill and Westbrook (1997) undertook the SWOT analysis of wide range of application areas in their work [11], Balamurli Krishna and Dugger (1997) [12].

B. National Mission on Education through ICT

One of the most crucial challenges facing Indian higher education is its quality for which Government of India has an ambitious goal for eleventh plan. Recently, Government of India through Ministry of Human Resource Development (MHRD) has developed a holistic approach on National Mission on Education through ICT (NME ICT- 2009) [13]. NMEICT has brought out a document, which has already been triggered during the period of tenth plan (phase I). As per its strategy, its future vision, planning and developmental activities would form phase II and phase III during the eleventh and twelfth five year plan period respectively.

It has an ambitious vision of providing one stop solution for the learning community under NMEICT. The working document of the mission is concerned with the education from school/ college (regular & engineering) level to university level. It has three guiding principles.

Human resource development: Talent in the higher education should be identified, trained and utilized in the service of the country.

E- content/ resource development. Quality e- content should be developed and delivered through the network connectivity of NME ICT.

Building connectivity and knowledge network: In order to provide maximum benefit to the learners, the maximum possible inter- connectivity should remain available among and within institutions of higher learning in the country with a view to achieve critical mass of skilled human resource/ researchers in any given field.

These guiding principles are expected to lead to various steps in planning and implementation as follows:

- ICT Technology should reach to each learner.
- Generation of quality e-content, questions bank as modules-based learning.
- Development of interface modules for physically challenged learners.
- Facility of Geographical Information System (GIS) for planning up to the village level.
- Improvement in course curriculum and teachers training programmes.
- Efficient and effective knowledge transfer to learner with proper interaction
- Voice over Internet Protocol (VOIP) supported communication between learner and teacher
- Educational Resource Package (ERP) and e-governance for education, coordination & synergy for implementation of the policies, setting up virtual laboratories and support for creation of virtual technical universities.
- Performance optimization of e-resources
- Certification of attainments of any kind at any level.

C) National Knowledge Network (NKN)

University of Jammu is among the few universities who got the NKN facility during the first Phase. In this connection it may be worth mentioning that National Knowledge Network [14], the agency of government of India has been given the responsibility to provide the state of the art technological ICT infrastructure namely:

- Establish a high-speed backbone connectivity which will enable knowledge and information sharing
- Enabling Collaborative Research, Development and Innovation.
- Distance Education (Virtual Classroom/Library).
- Ultra High speed backbone for E-Governance
- Sharing of Computing resources

It is pertinent to mention that NKN high speed backbone connectivity has been implemented various universities of India including Jammu University, Jammu. All these ICT components are supposed to contribute towards the SWOT analysis of any higher educational institutions/universities in India. In the present paper SWOT analysis will be carried out through a 2x2 matrix worksheet as given in Table I, of ICT of Jammu University, Jammu, and located in J& K state of India

TABLE I

Strengths	Weakness
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Opportunities	Threats
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Such a work sheet for SWOT analysis is particularly well suited in providing a objectivity, transparency with real picture of any institution /university, if it is carved out by a small visionary group. Strengths and weaknesses may be visualized from the success and failure of an organization at the level of implementing policies and its performance thereafter. Further, one has to identify promptly the most attractive opportunities arising from internal factors to convert the weaknesses/ failures to the advantage of institution/organization. In general, internal weaknesses must be tackled first, in the form of opportunities, before looking at the external environmental factors.

II Jammu University- Existing ICT Facilities & Motivation.

Jammu University initiated the process for setting up of campus network in 2003. In 2004, Campus network with optical fiber Connectivity was put into operation. The internet and other facilities were extended to the users for 24*7 hours in all the departments of the University on this Campus network.

A. Network Infrastructure:

The whole setup is on Cisco and Dlink Platform consisting of two Cisco Layer three catalyst switches 4050, around 96 distribution switches installed at various departments which are connected to the core switches through optical fiber backbone using multimode 6 and 12 core fiber of the University for the setting up of the private Lans for each departments. The whole network is distributed with VLANs, so each department is having their own private class 3 ranges.

Special consideration is given to the security of the network by placing perimetric firewalls Cisco PIX, Cisco IDS/IPS for checking any vulnerability over the network and Unified threat management to monitor the user activities, gateway level antivirus, AAA, Internet Bandwidth Management

Network diagram of Jammu University is given below in Figure 1:

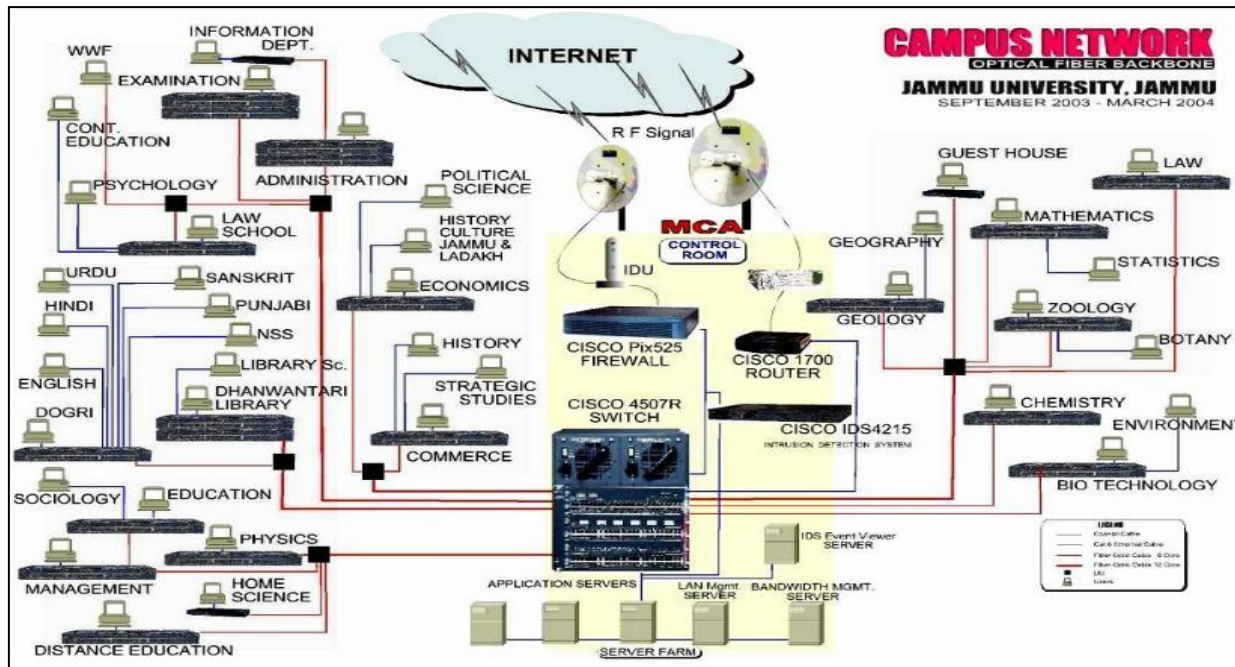


Fig: 1. Network Diagram of Jammu University, Jammu, J&K, India.

There are around 96 distribution layer 2 manageable switches which are installed at various departments of the campus.

Table- II Details of Network Switches (Layer 2) installed in the various departments of Jammu University, Jammu, India.

S.no	Department	No. of SWITCHES	S.no	Department	No. of SWITCHES
1	Department of computer science and IT	10	29	Guest house	1
2	School of Management	6	30	Transit House	1
3	Physics	5	31	Mathematics	1

4	Central Library	4	32	Geology	1
5	New Biotech	4	33	Geography	1
6	Education/sociology	3	34	Botany	1
7	Directorate of Distance education	3	35	Zoology	1
8	Admin old	3	36	Psychology	1
9	Admin New	3	37	cont education	1
10	Examination	3	38	Zorawar Singh Auditorium	1
11	Environmental Science	2	39	Human Genetics	1
12	Chemistry	2	40	Hospitality and tourism management department	1
13	Dogri	2	41	Department of Strategic studies	1
14	Economics	2	42	Physical Education	1
15	Library &Info science	2	43	Registration sec undergraduate	1
16	Law Deptt	2	44	Chander Bagga Girls Hostel	1
17	Law School	2	45	Priya darshini Girls Hostel	1
18	Statistics	2	46	Sarojni Naidu Girls Hostel	1
19	Home science	1	47	Vice- Chancellor Lodge	1
20	Urdu	1	48	Nehru Boys hostel	1
21	Punjabi	1	49	Old Dean academic affairs	1
22	English	1	50	Academic staff college	1
23	Hindi	1	51	Health Centre	1
25	Commerce	1	52	Works Department	1
26	Political science	1	53	Dean students welfare	1
27	University scientific instrumentation centre	1	54	World wide fund	1
28	Sanskrit	1	55	Vivekananda boys hostel	1
				Total	96

B. Campus Wide Optical Fiber Network:

Six core and Twelve core multimode optical fiber is used. The fiber is spread over a distance of 6 to 7 kms approx within the campus connecting all the departments, hostels and administrative blocks at the control room campus network. Star Topology was implemented on campus. But one of the major challenges was to implement optical Fibre without redundant link. Authorities did not agree upon to lay redundant link because it amounts extra amount of liquidity. Due to which if it is very difficult to maintain the network and extra care is to be taken so that all the links keeps on working on 24*7 bases.

Video Conference Facilities:

Video conferencing facility through campus network was also established in 2005 for Global interactive programme in collaboration with East Carolina University , USA.

C. Wi-Fi Wireless Network Highlights:

- Only Wi-Fi Campus Network in western Himalayan region of India to cover entire campus which includes all buildings and outer surroundings with seamless roaming having following facilities:

- 7*24 hours Availability
- 802.11g/b/n protocol used
- Data transfer rate up to 54/150 mbps
- Centralized manageable wireless network
- **Wi-Fi facilities:** In 2006, to strengthen the existing network it was decided to implement Wi-Fi technology on campus. The project for the implementation of wireless network was drawn in details by bringing in all the latest features of wireless like 802.11 g/b , 54 mbps data transfer rates , 256 bit encryptions and authentication server with all security components. There are various indoor access points (table III) and outdoor access points (table IV) which are implemented in Jammu University campus.

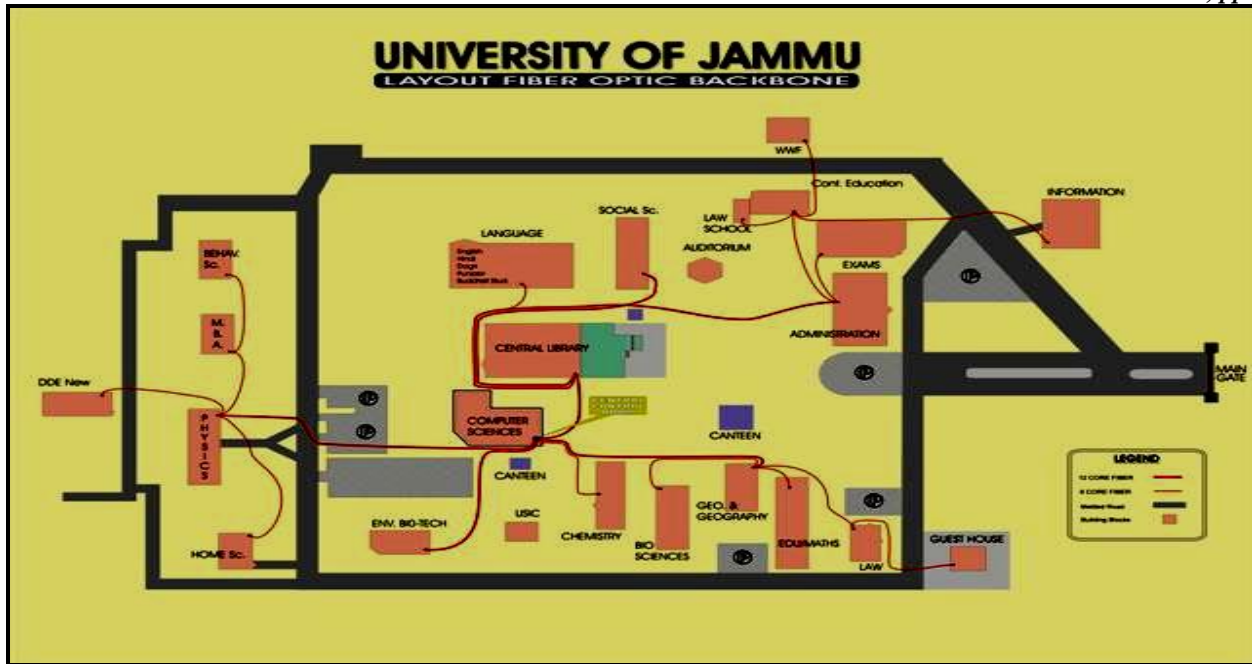


Fig: 2. Optical fiber Layout Diagram of University of Jammu, Jammu

Table III Details of Wi-Fi access points implemented in different departments.

S.no	Department	no of access Points	S.no	Department	no of access Points
1	Nehru Boys hostel	15	26	Punjabi	3
2	Directorate of Distance education	9	27	Urdu	3
3	Chander Baga Girls Hostel	8	28	Botany	2
4	Central Library	8	29	Commerce	2
5	Examination	8	30	Department of Strategic studies	2
6	Department of computer science and IT	8	31	Department of Strategic studies	2
7	School of Management	8	32	Dogri	2
8	Priya darshini Girls Hostel	8	33	Geography	2
9	Sarojni Naidu Girls Hostel	8	34	History	2
10	Administration blockNew	7	35	Home science	2
11	Administration block old	6	36	Human Genetics	2
12	Chemistry	5	37	Law School	2
13	Education/sociology	5	38	Library & Infosc	2
14	Law Deptt	5	39	Physcology	2
15	Physics	5	40	Political science	2
16	Zorawar singh Auditorium	5	41	Sanskrit	2
17	Economics	4	42	Hospitality and tourism management department	2
18	Geology	4	43	Statistics	2
19	New Biotech	4	44	ViceChancellor Lodge	2
20	cont education	3	45	Zoology	2
21	English	3	46	Academic Staff College	1
22	Environmental Science	3	47	Old dean academic affairs	1
23	Guest house	3	48	Physical Education	1
24	Hindi	3	59	Registration sec undergraduate	1
25	Mathematics	3	50	Transit House	1
				Total	195

Table IV Details of Wi-Fi Outdoor Access Points implemented in university Campus.

S.no	Department	Outdoor AP
1	Department of computer science and IT	3
2	Vice Chancellor Lodge	2
3	Zorawar Singh Auditorium	1
4	Transit house	1
5	Social Science	1
6	Hospitality and tourism management department	1
7	Priyadarshini Hostel	1
8	New Biotech	1
9	Math	1
10	Information Block	1
11	Education	1
12	Dogri	1
13	DDE	1
14	Chemistry	1
15	Central Lib	1
	Total	18

The users are free to roam inside the campus from one place to another seamless without getting disconnected from the wireless network. To provide better and efficient services to the users on 24*7*365 basis, so they can roam and browse internet and other applications like access to the journals etc. anywhere within the campus. The whole setup was on cisco linksys platform for indoor access points 802.11g and outdoor access points were on Cisco Aironet 802.11g. The Implementation was on mixed mode i.e inside buildings in access mode and Point to point in outdoor access points and access mode.

D. Challenges:

There having all different kinds of challenges faced during implementation of Campus Network and Wi-Fi implementation. Major challenges are User Verification, authentication and security related. For this purpose proper registration form was filled up by all wireless users. Another challenge was proper Signal. University of Jammu Campus is full of greenery with very dense trees. These dense trees did not allow the signal to propagate properly within the campus. The other challenge for the signal propagation was very thick structural building with chipped building material. This also created a very big issue during the implementation particularly to check the capacity. While implementing it was specially considered that one should get minimum good signal where ever they move within the campus. Heavy rains and winds also disturb the connectivity's. The outdoor equipments become faulty or shift the directions. This also leads to improper signals. While shifting from 802.11g to 802.11n outdoor wireless access points, STPI cables were used to provide better stability.

Special consideration is given to security by implementin user level Authentication, Accounting and Authorization [AAA] using UTM RADIUS Server 128 bit WEP key data encryption

E. Wi-Fi Design factors considered for Implementation:

- Radio frequency Interference
- Mobility – Seamless Roaming
- Coverage vs. Capacity
- Secure Access with Authentication, Accounting and Authorization
- In 2012, University decided to upgrade the wireless connectivity with latest protocol in the industry i.e N keeping in view the latest technology and the user's intake.

In first phase, the wireless outdoor access points get upgraded to 802.11n from 802.11g and in hostels and some departments Indoor access points are installed on N technology for better performance and throughput.

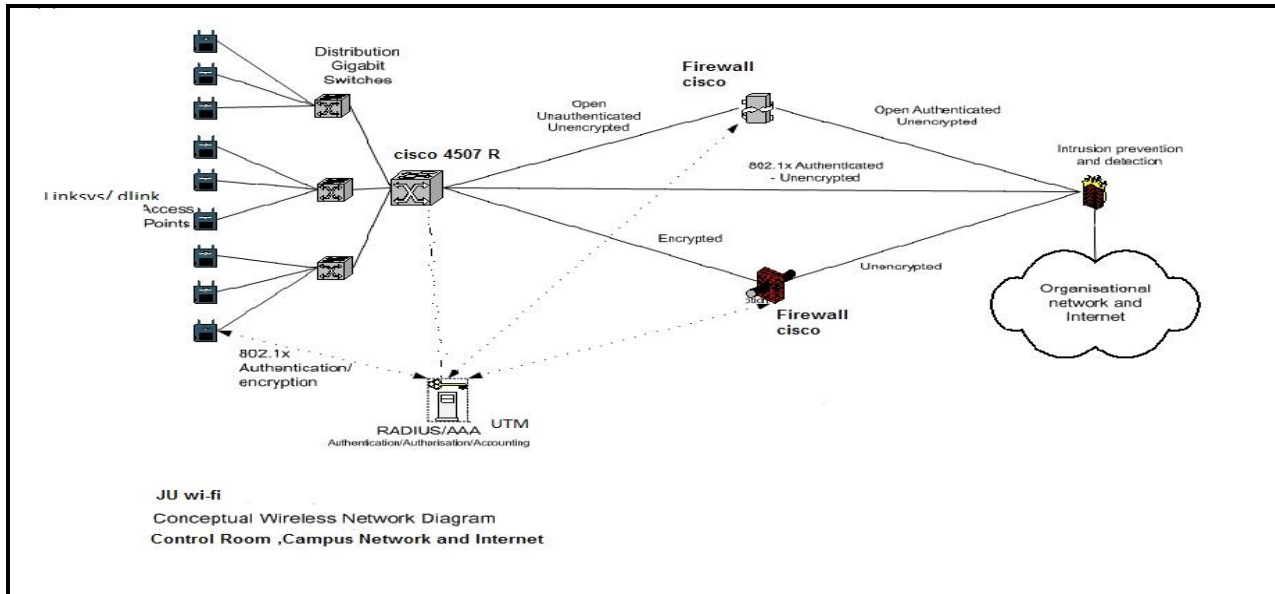


Fig. 3. Conceptual Wireless Implementation Network Diagram, Jammu University, Jammu

III. ICT Facilities And SWOT Analysis.

The strength, Weakness, opportunities, and threats of ICT facilities in Jammu University is given in table V :

Table V: SWOT Analysis of ICT Facilities in Jammu University, Jammu

Strengths:	Weakness:
<ul style="list-style-type: none"> • Redundancy in the UTM (Unified Threat Management) • IPS / IDS • Gateway level Antivirus and Anti spam • Monitoring of Internet Usage. • Multiple Internet Bandwidth connectivity's : NKN 1giga and Reliance 40 Mbps 1:1 • Optical fiber Giga Backbone connectivity • Wireless Connectivity in whole campus • Rfid - Library • Collaborative Course through Video Conferencing • Managed dedicated Web server for website hosting and mailing • High end computing labs Sun Solaris , VLSI lab 	<ul style="list-style-type: none"> • ICT budgeting • Single Window Integrated Software based solution (ERP, Online Admission/registration, Online examination based system, e-placement and alumni portal, etc). • Lack of Data Centre/Cloud Facility • VOIP • Lack of Redundancy in Campus Network backbone • ICT based trainings for professionals • Wi-Fi Security through controller based wireless equipments • Outdated Video Conferencing Infrastructure • Security from Virus • Shortage ICT trained manpower

<p>Opportunities:</p> <ul style="list-style-type: none"> • Threat Behavioral analysis tool • Centralized desktop level antivirus • Up gradation of internet Bandwidth at regular intervals • Controlled based wireless • E- learning and virtual class rooms • Close contact with alumni • University industry interaction • Collaboration with foreign universities • Resource sharing among state Universities 	<p>Threats:</p> <ul style="list-style-type: none"> • Congestion • Viruses and other attacks • Bandwidth • Wireless Security • Migration of students to other universities • New Central universities • Threat from Govt. Policies • Non availability of Funds • Increase in users number
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Various Points regarding SWOT, are elaborated below:

A. Strengths: The strengths of Jammu University, Jammu:

1. **UTM:** University of Jammu has installed Unified Threat Management (UTM) System in 2007. With the help of UTM it helped university to monitor the bandwidth utilization, load balancing gateway level antivirus and anti Spam, Authentication and user database with various policies and User level monitoring. Further in 2010, High availability for UTM was introduced to give redundancy at the gateway level. With the failure of the UTM at the University level leads to the failure of the network. This UTM is an integrated security package that includes protection against multiple threats. This typically includes a firewall, antivirus software, content filtering and spam filter. IPS (Intrusion prevention system(IPS) is also a part of this and capable to detect and block/prevent malicious traffic. Intrusion detection system (IDS) instantly alerts administrators upon detecting a hacking attempt and raise alerts accordingly.
2. **Multiple Internet Banwidths:** University of Jammu is having two Internet connectivity's which are used simultaneously by the users of the university. One connectivity is One Gbps connectivity link from National Knowledge Network and other is 40 Mbps unshared 1:1 Internet connectivity from Reliance communication Pvt Ltd.
3. **High Speed Optical Fibre Campus Backbone:** University of Jammu has High Speed optical Fiber backbone Connectivity connecting various departments including teaching departments, administrative departments boys and girls hostel, V.C lodge , Auditoriums , guest houses , academic staff college etc of the University.
4. **Wi-Fi Campus Connectivity:** University of Jammu has implemented roaming Wi-Fi connectivity both indoor and outdoor on 802.11b/g with strong security in 2005. Whole University campus is seamless roaming campus. Special consideration was given to coverage versus capacity. At present there are Approx 900 users including teaching, non teaching, scholars and students which are actively using this facility. In 2011 , Outdoor access points were upgraded with 802.11 a/b/g/n dual band (2.4 and 5 GHZ) , dual channel which has the capacity to transmit data upto 150 mbps and indoor access points with 802.11 a/b/g/n dual band (2.4 and 5 GHZ) were installed at all the hostels on the university. This facility is available to the all the users 24*7 days.
5. **RFID Library Facility:** The Central Library of the University is the hub of academic activities where students sit from morning evening everyday throughout, the year. Its four storey building has spacious reading halls and compact stack areas. The Library has a collection of nearly 3.5 lakh volumes are rare as well as latest, and 250 current periodicals with back numbers. The Library also provides the access to the different online journals only in the campus. The Library possesses facilities like photocopiers, LCD projectors, INFLIBNET, CD-ROM databases and inter-connected computer terminals at selected sites. It has Radio Frequency Identification (RFID), an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is a small object that can be attached to or incorporated into a product like books. RFID tags contain silicon chips and antennas to enable them to receive and respond to radio-frequency queries from an RFID transceiver. The University Library is centrally located and constructed on modular plan.
6. **Video Conferencing Facility:** Jammu University is successfully running collaborative course on Global Understanding with East Carolina University through Video conferencing since 2005. The Global Understanding Course provides a format for students to learn about other cultures without traveling. Currently there are 27 institutions 18 countries participating in the Global Understanding Course. These partner institutions are diverse and

worldwide and communicate through live video and chat technology. Institutions are partnered in pairs so that only two cultures meet at any one time. Partners swap in a round robin fashion during a semester so each culture is partnered with three other cultures, one at a time for four weeks each.

7. **Dedicated Servers/labs:** University of Jammu has Hosted managed Dedicated Server for its own Applications like Web site , Email and for other applications etc. University of Jammu is having high end computing labs like Sun Solaris Lab, Thin client Lab, VLSI Lab. SUN SOLARIS lab is based on SUN SOLARIS 10.0 with 20 sunray clients and is established to provide working experience of Sun Solaris platform. Dedicated thin client VLSI and Embedded systems Lab is also based on Thin Client technology. Lab has High-end servers based on Windows 2003 Server OS and 30 Networked systems with latest configuration. VLSI & Embedded Systems Lab provides the exposure of chip designing & testing to the IT-student community. This lab is setup in collaboration with IIT Powai, Mumbai.

B. Weaknesses: Jammu University, Jammu is a state university and has following weakness due to lack of ICT based financial budgetary provisions:

1. **Single Window Integrated Software based solution:** There is no such single window software based Educational resource planning software, that has facility like complete information system, Online Admission/registration, Online examination based system, placement and alumni portal etc.
2. **Campus Network Redundancy Link:** Since are there more than 3000 users on campus, but there is no redundancy link of optical Fibre available. Once if any segment goes down then there is no alternative route available for connectivity.
3. **IP Telephony:** Since all the campus is networked together, yet this network could be capatilise by providing IP telephony to the users. This help in order to have voice, video data transfer facility between users. It can also be useful to have meetings within and outside campus those having same facility.
4. **Lack of Data Centre/Cloud Facility:** In the era of internet and cloud computing, this concept is still to be used by this university. All data is to be kept at cloud so that this data could be accessed from anywhere and anytime.
5. **Virtual Classroom Facility:** This university is connected to National Knowledge Network and for using this facility, there is a urgent need to have latest/updated equipment based virtual class room in this university, so that high end quality service could be provided to students and staff. Using this facility world renounced experts could be invited to deliver a lecture and for interaction with students and staff and this kind of exposure is very important to students and faculty members of J&K State, India.
6. **Wi-Fi security:** Jammu is using large no of wireless access points in campus. But still there Wi-Fi facility is not provided through Wireless Access Controller. Access through Wireless Access Controller based will be more secured due to following reasons :
 - **Security Policies:** It facilitates security policies and also having capabilities of enforcing these, also having facilities like- intrusion prevention,
 - **Effective Quality of Service (QoS):** This is also capable of providing effective quality of service (QoS) with RF management facility and mobility to users.
 - **Reliable Facility-** This is also capable to provide the control, scalability, and reliability, secured connectivity to users at a large-scale wireless networks.
7. **Security from Internal Virus-** There is a urgent need to deploy centralised anti virus server, which can provide security over LAN.
8. **Shortage of Trained ICT Manpower:** Due state govt. university and limited staff vacancies this is one of major bottleneck for recruit trained ICT based manpower.

C. Opportunities: The weaknesses in respect of ICT are to be converted into opportunities in infrastructure and ICT activities. These are as follows:

1. **Problem solving Orientation-** The more crucial is to adopt the technology of problem solving orientation in learning as internal factors and to face the challenges due to external factors like collaboration with other universities, industries and development of ICT applications at the advanced and professional level.
2. **Threat Behavior Analysis Tool-** Software tools like threat behavior analysis tool could be very useful in order to analysis if any kind of threat is there to campus Network. It is also capable to take care of internal threats such as desktop level antivirus, etc. This could be useful to use networks efficiently i.e. without congestion and therefore it could be better utilized.
3. **Upgradation ICT infrastructure:** Upgradation of ICT infrastructure on campus is also important, e- learning and virtual class rooms to be made and utilized. There should be resource sharing among universities so that implementations like ERP should be utilized efficiently, which reduces the cost of developing such applications. Any bottleneck over LAN is to be removed in order to have smooth functioning and optimisation of Bandwidth.
4. **Data centre and cloud facility-** Time has come when data is to be kept at the data centre or cloud, so that the data is

secured and could be available at any time and anywhere.

5. **ICT based specialised staff:** Since this university is not having sufficient ICT trained manpower, therefore data cloud facility is to be utilized. This is quite viable solution, so that specialised ICT team of experts who are maintaining cloud would be able to take of sensitive data of this university also. Other wise more ICT experts are to be recruited or training is to be given to existing one, in order to establish Data Centre in the University campus.

D. Threats: Threats come from government policies, private & foreign universities. ICT based security is the major threats to and all concerned educational Institutions and universities. Following are the ICT based threats of Jammu University, Jammu:

1. **Congestion:** This University is facing acute Congestions, Viruses over LAN.
2. **Security of WiFi-** Wi-Fi facility on campus is to be more made more strong by introducing latest security authentications and Implementation of Controller based is to be introduced which will help the administrators to manage the wireless links and equipments consisting accesspoints etc. efficiently and affectively.
3. **Viruses and other attacks :** Virus attacks and other attacks like ips/ ids etc are posing a great threat to the users on the campus.
4. **Bandwidth :** There should be constant upgradation of bandwidth is required keeping in view the increase in numbers of users.
5. **Non availability of funds:** No proper budgetary provision also posing a great threat to ICT implementations , maintenance and future projects .

IV. CONCLUSIONS AND SUGGESTIONS

Keeping ICT arena into consideration w.r.t securities in educational Institutions and universities, following are the conclusions:

- **Single Window Integrated Software based solution:** There is urgent need to implement single window integrated software solution. This will help facilities like complete online information system, Online Admission/registration, Online examination based system, e-placement and alumni portal, online library system, online hostel, etc.
- **Campus Network Redundancy Link:** Since are there more than 3000 users on campus, optical fibre redundant link to be implemented. This could be done by diving campus into three different zones with layer 3 switch and this will have a combination of star and ring topology. This network design will have better performance and user will have any difficulty.
- **IP Telephony:** Since all the campus is networked together, providing IP telephony to the users will be of great help. This will have capabilities of voice, video, data transfer facility between users.
- **Cloud Facility:** In the era of internet and cloud computing, All the sensitive data is to be kept on cloud, so that this data could be accessed from anywhere and anytime. Since cloud is being maintained by ICT experts and all the security aspects is being taken care. This will not have any burden on existing ICT staff.
- **Virtual Classroom Facility:** This university is connected to National Knowledge Network and for using this facility, virtual class room in this university, is urgently required, so that high end quality service could be provided to students and staff of J&K State, India.
- **Wi-Fi security:** Wi-Fi facility is to be provided through Wireless Access Controller. For better security policies, QoS, reliability, etc
- **Threat Behavior Analysis Tool-** Threat behavior analysis tool should be implemented at the university level. It would could be very useful to analysis the network congestions and classification of internal network traffic. It is also capable to take care of internal threats such as desktop level antivirus, etc. With this it would be possible to use networks efficiently i.e. without congestion.
- **Viruses and Patch server** - Centralised Antivirus and Patch server is to be implemented in order to provide better performance to the users over LAN.

Further, with the focus on dealing with security threats, virus, etc a thorough study may be undertaken on Intrusion Prevention System (IPS)/ Intrusion Detection System (IDS), how policies could be framed in order to take care of different kinds of virus attacks from internet and how hackers are attempting to attack the network, such alerts are also very critical to understand the pattern, which and research will further strengthen IPS for better and effective protection.

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