

Solving Organisational Problems with Intranet Technology

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I. INTRODUCTION

Information serves as an essential intermediate input in decision-making for any business process. It is an essential requirement not only for effective and efficient management but also for medium and long term planning. In this era of technological advancement the rapid growth of information flow has contributed significantly in the expansion of business, commercial, industrial, financial, educational and research organisations. Electronic communication provides the ability to overcome many organisational problems. In recent years, an easy and inexpensive access to information through the Internet and e-mail has created an atmosphere of strong competition among organisations. In this competitive environment, the organisations need an efficient, productive and competent internal set-up based on a well-informed workforce. In the absence of effective co-ordination, the expansion of an organisation may result in inter-group conflicts, unhealthy bureaucratic activities, and various complexities in decision-making [Telleen (1996)]. This applies even more to organisations in developing countries such as Pakistan that are in need of efficient ways to improve governance and enhance institutional reforms.

How can an organisation enhance its productivity, reduce cost, and increase internal communication in a time efficient mode? Can information technology help in strengthening and improving the existing organisational set-up and therefore its overall performance? The *Intranet* has revolutionised the way in which organisations work, communicate, and collaborate. What is the intranet? What are its uses and advantages? How can intranet solve the organisational problems? What are its costs and benefits? The objective of this paper is to answer these questions. In doing so the

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paper highlights the importance of the intranet as a means to enhancing governance and speeding up institutional reform.

This paper is divided into six sections. The importance of the intranet is highlighted in the second section. The advantages of the intranet and its many uses are presented in sections three and four respectively. The designing of an Intranet is described in section five and conclusions are presented in the final section.

II. IMPORTANCE OF THE INTRANET

What is the Intranet?

An intranet is an inter-organisational network that uses the tools and standards of the Internet to create an infrastructure that connects the offices and staff members of an organisation, regardless of their geographical location. The internet is a network of networks that connects people and machines all over the world and provides a broad base for information exchange. An intranet on the other hand assists in lowering the operational cost of an organisation by regulating its functions in more efficient ways. The intranet acts as a catalyst that accelerates business activity by improving overall performance and competitiveness of an organisation. It increases the speed of information transfer that, in turn, boosts business activities. In order to support business applications, the intranet uses the open internet technologies such as, HTML, HTTP, FTP, and TCP/IP communication protocol with a graphical web browser such as the Netscape Navigator or the Internet Explorer¹. Intranet requires a web server² connected to an organisation's local area network³ and thus accessible only to functionaries within an enterprise. In other words, an intranet is protected by firewalls⁴. The web server stores all the important information, such as, an organisation's data base and documents repositories on the web server. This information can be accessible through the web browser to the employees of an organisation.

Let us consider an example to understand the difference between Internet, Intranet and Extranet. We all use telephones. To talk to any person having a telephone, we pick up the phone and dial the number we wish to talk to via the public telephone network. Internet is also a public network—accessible to everyone. We can reach any site by typing its internet address in the web browser. So Internet can be viewed as a public telephone network. Intercom telephone exchanges are common in offices. These are also telephone networks, which work on the same principle as

¹Both these web browsers offer access to web, mail, FTP, news services, facilities for editing HTML, and support for Java. Both use TCP/IP communication between computers.

²The web server stores and serves up all the programmes and documents placed on it.

³A local area network is a group of computers and associated peripheral devices connected by communications channel, capable of sharing files, programmes and other resources between several users.

⁴Security devices that regulate traffic between an organisation's Intranet and outside world.

the public telephone network. The only difference is that it is accessible to the people in within an organisation. So intranet can be viewed as a private telephone intercom. If we connect this private intercom exchange with the public telephone network so that the outside world can talk to the people in the organisation, it becomes an extranet.

Background

The intranet has its roots in technological advancement. In the 1960s, the US Department of Defence first established an experimental four-computer network to share information flow among diverse sites and researchers. The protocol that developed for this purpose was called Internetworking Protocol or TCP/IP. The use of this protocol quickly spread outside the defence community as TCP/IP provided an effective way to move information across diverse networks. In the late 1980s, the National Science Foundation's NSFnet began its own network and made it publicly accessible. In 1989, the European Particles Physical Center (CERN) in Switzerland proposed to use Hypertext Markup Language (HTML) for formatting hypertext files. The protocol that was used for transferring HTML files was called Hypertext Transfer Protocol (HTTP). They used the Web to describe the results of transferring HTML files through HTTP protocol. In 1992, the World Wide Web (WWW) system and software were released. The Web is an efficient and economical medium of information exchange as compared to printed material, telephone and fax. The information, or Web pages are stored on the web servers. Web server programmes are designed to receive requests for web pages. The information placed on the web server can be readily accessible to a wide variety of users. The software that retrieves and displays the HTML files is called a browser. The first graphical web browser, Mosaic, was introduced in 1993. In 1994, Netscape communications released Netscape Navigator browser and in 1995 Microsoft introduced the Internet Explorer. The year 1995 was the year of the Internet and the World Wide Web that revolutionised the world of information technology. According to Creative cyber webs, radio took 38 years, television 13 years and the internet only 4 years to make 50 million users. A substantial growth in Internet domains, website, servers, networks and users has been noted. According to an estimate, the Internet is growing by 1 million users per month and its traffic is doubling every 100 days.

The intranet originated with companies using Internet technology on their internal network in 1995. The year 1997 witnessed a sharp rise in the use of web-based e-mail, groupware,⁵ and database access. In October 1995, the Internet search engine Altavista showed 45 references to the word "intranet". This number had increased to 10,000 in June 1996 and in September 1999 more than 1.4 million

⁵A network software designed for the use by a group of people all working on the same project or need access to same data.

documents containing the word “intranet” were found on this search engine. In the US, nearly 77 percent companies were using the intranet in 1998. The Business Research Group predicts that 90 percent of all U.S. corporations will have an Intranet by January 2000. Zona Research Inc. predicts that worldwide Intranet software sales will increase 16-fold in three years. There will be 133 million intranet users worldwide by 2001. The Intranet servers will increase to 45,000,000 in the year 2000 from 80,000 in December 1998 [see LPI Software Funding Group Inc. (1998)].

Uses of Intranet

The information placed on an intranet server can be accessible by all the users on a network regardless of geographical location, as intranet is extendable to remote workers through controlled access to internal information. Intranet provides a central place to the people of an organisation to produce and consume information, communicate and collaborate with each other. The intranet can be used for the following purposes:

- **Information Publishing:** This means to deliver news, announcements, e-mail and telephone directories, policies and procedure manuals in easy and more accessible mode.
- **Internal e-mail:** This allows a two-way flow of information, i.e., users can get information and send their requests, queries and complaints to the concerned persons. In other words, intranet e-mail can serve as help desk for the users. In addition this will promote forum discussions.
- **Document management:** Intranet makes documents available to the users on request. This boosts the accessibility to information.
- **Workflow:** This would enhance the online administrative processes in each department, such as human resources, sales/marketing, finance and management, etc.
- **Online training:** Intranet can provide online training to its users.

III. ADVANTAGES OF THE INTRANET

Intranet provides a platform that easily allows its users to get required information from any department of the organisation whenever needed. It is a powerful tool for collaborating, project managing, data collecting, and presenting results of analyses. Numerous benefits are associated with the use of the intranet as the web technology can be applied in wide area networks as well as small-to-medium sized local area networks.

1. The Intranet Can Promote a Paperless Office

The intranet technology is an excellent way to publish large number of frequently changing documents within a corporation e.g., company policies,

procedure manuals, directories, newsletters, technical support manuals etc. Besides, by posting these documents electronically, an organisation can save money on printing and distribution. As an example, consider the case of a human resource department. In order to fulfil its objectives, it needs a lot of paper to be circulated in its offices in printed and published form. An intranet can make the information distribution timely and accurate to the staff members working at the headquarters as well as to those who are working in remote offices within and outside the country. Similarly, in order to maintain an updated record about the employees, essential information can be collected through the intranet. All the employees can have access to the updated rules and regulations and their personal records. For example, they can check the following from intranet: policies and rules and regulations; details of health and other benefit programmes; the number of vacations that are accumulated in their account; details about present and past customers/clients and partner companies; any change in the organisational set-up; details of performance related compensation schemes; forthcoming important events; information on new employees in the office; etc. They can submit their requests/applications regarding various requests and can get response through intranet. This not only saves time in sending and receiving but also saves money that is involved in printing and handling and distribution.

Let us take an example of the Company Policy, which is printed and distributed to employees in the form of ring binder. If we simply put the Company Policy on the intranet we can quantify the savings. If the cost to publish and distribute the manual is Rs 300 and 1,000 people in the company need a copy, the first print run costs Rs 300,000. If 20 percent of that information is out-of-date three months later and has to be revised, republished and redistributed, the update will cost Rs 60,000. The same information can be published and updated on the intranet without any additional cost.

According to Indus International, four to eight percent of total corporate revenue is spent on the creation and distribution of documents, fifteen percent of which is often wasted because information gets outdated by the time it has been received.

2. Intranet can Support Sales and Marketing Efforts

Intranet is extremely useful for electronic commerce, especially for marketing and sales purposes. In electronic commerce everything from the initial order to the final payment happens faster and quicker than traditional methods. Intranet improves communication between employees; provides product specifications; testing results and price list; and, keeps employees updated about business related information, especially to sales representatives who remain away from the office most of the time.

Sales persons can get information regarding new products and obtain the sales kits instantly. They can in turn provide success/failure and demand/supply information on a product in a specific market to headquarter immediately. Intranet makes it possible to fulfil orders in time. This results in efficient business dealings by reducing the overall cycle time involved in the process of each transaction; improved responsiveness to customers; and lower operating costs. The companies that have several offices all over the world can be benefited most by the intranet as they operate and conduct business as if under one roof. This helps in boosting the exports of a country at a much lower cost and thus facilitates international trade.

The Hewlett-Packard used to publish a monthly sale-force newsletter that weighed 8.5 pounds per issue. Between publication dates, new information was not available and the sales force had to wait for the next issue. Hewlett Packard decided to publish the information in one central location on its Intranet and now the sales staff has continuous access to the updated information. And HP saved a huge amount of money in printing and distribution costs.

Source: Coleman and Dyson (1996).

3. Intranet can Make Customer Service Better

In the competitive market where time-to-market is critical, quick communication between customers and suppliers is vital for an organisation. Intranet can enhance customer service in public dealing offices, such as, banks, hospitals, hotels, railways and airlines by expanding knowledge and keeping updates through the connected offices. Customer's feedback can help in improving information flow. The information network among different offices of an organisation can serve as a vital source of knowledge about market trends and customer's demand. Therefore, an intranet provides more innovative and cost effective ways to fulfil the customer's expectations by increasing productivity and competitive advantage.

4. Intranet Can Provide On-line Training

Another productive use of the intranet is that it can provide on-line training. The corporate sector, educational institutions, government agencies, research organisations and business community can benefit from such on-line training. All the people of an organisation, wherever they are located can benefit from on-line training through intranet. They can obtain information on course outlines, class/exam schedule, registration forms, subject lists, recommended reading lists, faculty members, training manuals, presentations and audio/video material. Assignments/examinations can be forwarded and received through intranet. This is extremely useful for universities that deal in distant education, banks, research institutes, and many other institutions that have several geographically dispersed offices.

The Citibank needed a way to get learning materials and courses to 1200 employees in 30 countries of the banking giant's intranet operations without overloading the network. They used web-based training of 70 on-line courses over the company's intranet through WAN links that connected multiple locations.

Source: Asbrand (1999).

5. Intranet can Make Educational and Research Institutions More Efficient

Educational and research institutions can use intranet in a wider range. For example, sharing research projects and ideas; presenting research work to get feedback; getting information to and from students; easy interaction within faculties; and easy use of library. In addition, syllabus, class schedule, course outline, teachers' instructions, assignments, results, etc. can also be placed on the intranet. Research organisations can put newsletters, research agenda, working papers, research reports, and journals on the intranet. This not only saves printing and publishing costs but also distribution time.

6. Cross-platform Compatibility

Different hardware and software platforms make it difficult to communicate and talk with each other. Intranets, by adopting open-platform web technical standards, overcome this barrier of divergent machines and allow free sharing of information and resources regardless of geography.

7. Intranet is Inexpensive

Many studies found that Intranet is inexpensive, more quickly developed, and easier to manage as compared to groupware programmes such as Lotus Notes. According to a study by LPI Software Funding Group Inc., the average cost of a Notes application was around \$ 2,50,000 while an intranet could be set up for less than \$ 10,000. As described earlier, intranet needs a web server, web browser, local area network and trained staff. Web servers typically do not need the computational power or hard disk space. Most of the web browsers are available for all operating systems and hardware combinations; and, most of them are free. However, web server and intranet applications are inexpensive on initial purchase, training and deployment. In addition, intranet is easy to use. Information can be obtained by simply pointing and clicking on the word or graphics.

Examples

Following are some examples of how several companies can use an intranet to distribute information in faster and less expensive ways, to communicate with

employees in a more timely manner, and in general, to run their businesses more effectively:

- McDonnell Douglas distributes some 4 million pages of documentation every year and estimates that distributing this information in paper form costs twice as much as hypothetical disseminating it via web.
- Cargill International employs more than 70,000 people engaged in commodities trading around the world. Even with only 25 percent of company materials on its intranet, Cargill estimates it saves tens of thousands of dollars annually by posting electronic updates rather than printing, binding, and distributing them through traditional means.
- Through its intranet, the Merrill Lynch private group makes research information available to 15,000 consultants and clients. When the system is fully developed, Merrill Lynch expects to cut its need of paper by 90 percent—currently 7 million pounds annually.

IV. WHO NEEDS INTRANET?

The answer to this question, not surprisingly, is *almost anybody*. Internal documents and databases such as procedure manuals, company policies, technical specifications, troubleshooting tips, newsletters and so on—which are regularly updated and distributed to each employee via paper—can instead be put online. The intranet can be effectively implemented in organisations where any of the following business processes exist:

1. Any business process that involves the production, requisition, distribution and update of dynamic information that has traditionally been published on paper. Examples include employee directories, medical benefits descriptions, product specifications, user manuals, price lists, marketing collateral, financial reporting systems, and policies and procedures.
2. Any business process that involves the consolidation of information from multiple data sources. For example, a retail customer service representative must access and consolidate customer information, order history and product information (description, pricing, availability) and enter sales order information—all while speaking to a customer on the telephone.
3. Any business process that requires a high level of communication and collaboration between people, especially if they are separated geographically. Today, for example, many engineering projects involve the coordination of multiple development groups scattered in multiple locations. Many companies have field sales offices that need constant, up-to-date access to company information as well as daily contact with the head office.

4. Any business process that depends on people finding or requisitioning information or products. Examples include reference manuals, internal requisition systems and channel distribution order systems.
5. Any business process currently automated by a client-server or mainframe application. This is particularly significant for companies with older legacy systems that need to be brought up-to-date.

V. DESIGNING AN INTRANET

Before going into the details of how to construct an intranet, there is a need to understand what is needed for creating an internal website. Designing of an intranet requires:

- Forming a project team to manage and maintain the intranet.
- Conducting a cost benefits analysis on whether to design an intranet or not.
- Preparing intranet infrastructure.
- Making corporate home page.

Forming a Project Team

The first step to design an intranet is the formation of a project team. In addition to the technical staff, this team should include a member from each department in the organisation such as, human resources, finance, marketing/sales, customer services, research and development, etc. The technical staff would design, manage and maintain the intranet by defining an appropriate security. Members of other departments would be responsible for providing updated/new information of their departments. An ideal team would consist of:

- Web administrator: who is responsible for day-to-day running of the intranet, adjusting the configuration as needed, and making the backups and system upgrades.
- Script developer: who is responsible for developing scripts needed to do things that are needed and cannot be done with HTML.
- Webmaster: who is the point of contact with users and is responsible for responding to complaints and suggestions and for co-ordinating sites within an organisation.
- Content authors: these persons are responsible for submitting new material and updating old material.

Cost Benefit Analysis

Computing the costs involved in designing and maintaining an intranet and assessing the benefits that can be earned through intranet are crucial to consider

before implementing an intranet in the organisation. In order to conduct a cost-benefit analysis, the following steps are needed: First, identify the purpose/uses of intranet in the organisation under consideration. As described in the previous section these may be internal publishing, document management, online training, collaborative work, discussion, and online help desk etc. Second, categorise the costs that will be incurred in setting up and running an intranet. Third, estimate the benefits that can be achieved through intranet. Table 1 describes the categories of expected costs and benefits of an intranet.

Table 1

<i>How to Conduct a Cost-benefit Analysis of Setting up an Intranet</i>	
Costs	Benefits
<i>Initial Costs</i>	
1. Cost of Hardware <ul style="list-style-type: none"> • New PCs • Network connections • Web server 	1. Saves costs of paper, printing, publishing, and telephone. Three steps are involved in calculating the cost savings: <ul style="list-style-type: none"> • Identify the number of incidences of expenditures in a given time • Calculate the cost of each incidence • Estimate the proportion of expenditures that could be eliminated through using intranet
2. Cost of Software <ul style="list-style-type: none"> • Server software • Software applications 	
3. Cost of Training <ul style="list-style-type: none"> • Training to the existing technical staff • Hiring trained technical staff • Training to the users of intranet • Training to providing departmental contents 	
	2. Saves time of labour involve in carrying out different tasks
	3. Third benefit is associated with increased productivity
<i>On-going Costs</i>	
4. Maintaining intranet	These benefits can be calculated for each department in an organisation. For example, how much cost and labour will be saved in human resource department and how much productivity increases this department after using intranet
5. Improving and promoting intranet	
6. Upgrading server hardware and software	

The costs can be calculated from the office budget and benefits can be quantified by using appropriate measures. Table 2 explains how can we quantify the benefits.

Table 2

Measuring Benefits of Intranet

Benefit	How to Measure
• Saves Costs	Consider each person in an office receives 300 pages during a year and the cost of one page including printing and delivery is Rs 20. How much this office will save if 70 percent of these pages will be produced on the intranet? Answer is $300 * 20 * 70 \text{ percent} * \text{strength of office}$.
• Saves Time	This can be done by: (number of hours saved/total number of working hours)*strength of office. This will give the hours saved per person per day.
• Increases Productivity	These can be measured by estimating the difference in output before and after the use of intranet.

And the fourth step is to compare the benefits with costs. The benefits that are outlined in Table 1 can be estimated for each task, i.e., information publishing, document management, workflow, training, etc. in each department of the organisation. The comparison may spread over two or more years because the element of time is involved in *developing and launching* intranet for the *trained users*. Therefore the first year benefits may perhaps not show an encouraging picture. And at the same time, due to the initial costs (investment) incurred in building the intranet infrastructure, the net returns may turn out to be negative. Once the intranet infrastructure is developed and users have been trained, the operational cost will decline substantially and the organisation can enjoy positive and growing net returns with the use of intranet. Consider the example quoted by Shepherd (1999) that is presented in Table 3. This example shows that the costs of hardware and software start declining after year 3. Whereas the costs of training, promoting intranet, and design consultancy decline substantially after year 1. The maintenance cost is zero in first year and increases in the following years. On the other hand, benefits remain positive from year 1. However, the first year benefits are 50 percent of those in the subsequent years. Net returns are negative in the first year, positive but low in second and third years and increase considerably in the fourth year. Accumulated returns indicate that the write-off period is three years in this example.

Table 3

Comparing Costs and Benefits of an Intranet over a Span of 5 Years

	Year 1	Year 2	Year 3	Year 4	Year 5
Benefits	301311	602622	602622	602622	602622
Information Publishing	91346	182693	182693	182693	182693
Internal e-mail	0	0	0	0	0
Document Management	0	0	0	0	0
Training	22336	44671	44671	44671	44671
Workflow	22170	44340	44340	44340	44340
Database	0	0	0	0	0
Discussion	165459	330917	330917	330917	330917
Costs	458056	529667	539944	369667	369667
New PCs	6667	6667	6667	0	0
Networking	5000	5000	5000	0	0
Server Software/ Hardware	16667	20833	25000	12500	12500
Applications	152222	158333	164444	18333	18333
Editorial Personnel	30000	30000	30000	30000	30000
Technical Personnel	200000	200000	200000	200000	200000
Internet Access	2500	2500	2500	2500	2500
Maintenance	0	95833	95833	95833	95833
Design Consultancy	20000	5000	5000	5000	5000
Promotion of Intranet	10000	2500	2500	2500	2500
Training	15000	3000	3000	3000	3000
Net Returns	-156745	72955	62677	232955	232955
Accumulated Net Profit	-156745	-83790	-21113	211842	444797

Source: Shepherd (1999).

Calculating returns of investment (ROI) is another way of conducting a cost-benefit analysis. In the business world, most financial managers look for projects for which the ROI exceeds 20 percent. For the above example, Shepherd (1999) calculated the ROI that is presented in Table 4.

Table 4

Calculating Returns on Investment

	Year 1	Year 2	Year 3	Year 4	Year 5
Benefits	301311	602622	602622	602622	602622
On-going Costs	232500	369666	369666	369666	369666
Net Returns	6881	232955	232955	232955	232955
ROI (%)	12	40	40	40	40
Accumulated ROI (%)	12	51	91	131	171

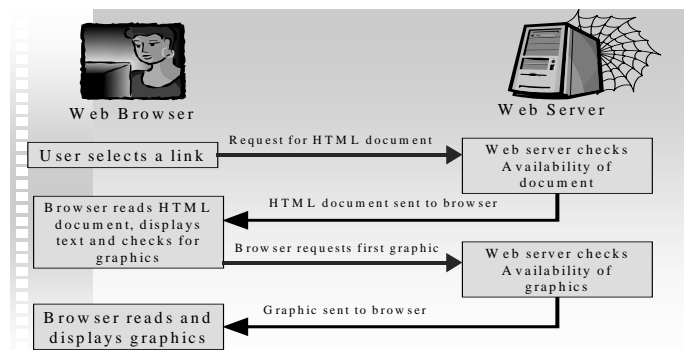
Source: Shepherd (1999).

META Group's June 1997 study finds that 80 percent of companies using intranet show an enormously positive ROI, with an average annual rate of 38 percent. International Data Corporation (IDC) study wrote: "a typical corporate intranet investment is achieving an ROI well over 1000 percent and that the typical payback period is six to 12 weeks".

Preparing Intranet Infrastructure

Client-server Model

The computer that requests the document is known as a *client*, and the computer that makes the document available is known as a *server*. Put the two together, and we have the fundamentals of the client-server model for distributed computing. Clients request information from the servers, and the servers store data and programmes and provide network-wide services to clients. On an intranet, as on the internet, the client software is called a *browser*, and the server software is called a *Web server*; the browser is used to look at the HTML content files located on the Web server (See Figure 1).



Source: Coleman and Dyson (1996).

Fig. 1. Client-Server Model.

What Hardware is Required?

- **Network Requirement:** A TCP/IP network is an essential requirement for the intranet.
- **Server:** A separate web server is required which will store the application tools to manage the stored information. All the web pages will reside on the web server. The typical specifications of the web server could be 256 MB RAM, a Pentium III dual processor CPU, 8.5 – 10 GB Hard disk and 16 MB video RAM.

- *Client:* The client machines will be on employee's desk and can be almost anything as long as they have network interface cards.

What Software Would be Needed?

- *Operating System:* The TCP/IP protocol can connect anything to anything else, so there is an open choice of the available operating systems.
- *Tools and Applications:*
 - *Browser:* Netscape Communicator and Internet Explorer are the two most popular web browsers available, and both of them are free of cost.
 - *Web Server Software:* Netscape Communications Corporation claims that more than 80 percent of the company's revenue comes from providing the software to run corporate intranets, and more than 70 percent of Fortune 1000 companies use Netscape Software. *Netscape's SuiteSpot* is a modular collection of server software for building and maintaining a large Intranet. The major components included in this suite are Catalogue server, Certificate server, Directory server, Enterprise server, LiveWire pro, Mail server, News server and Proxy server.
 - *Authoring Tools:* In order to create and design the web pages, html authoring tools are required. Most of the popular tools include MS Front Page, Netscape Composer, Adobe PageMill, Hot Dog etc.

What about Security?

- Securing the information resources stored on the computer systems is always an issue, whether we are connected to LAN, implementing an Intranet, or connected to the Internet. There can be two kinds of intranet:
 - *Self-contained Intranets:* Self-contained intranets are not connected to the Internet and are specifically used by company employees. For such intranets, the important security concerns are those most familiar to all network administrators: access, authentication, file and directory rights, and permissions.
 - *Intranets Connected to the Internet:* If the intranet is connected to the Internet, a proper security policy needs to be established. External security threats are the most problematic. The US Department of Defence admits that its computer systems were attacked more than 250,000 times in 1995.
- If the intranet is self-contained, the intranet users, however, may access the Internet by using a proxy server residing on the web server. This proxy

server should be equipped with firewall capabilities. The firewall sits between the private LAN and the Internet, and all the traffic from one to the other flows through the firewall. By installing a firewall properly, an intruder will never reach the internal protected network.

- The internal security should be tackled by proper user identification, authorisation, files and directory rights, and permissions.

Making Corporate Home Page

A home page is a starting point of any exploration on Internet or intranet site. This page sets the tone of the rest of the site and serves as gateway where everyone can start exploration. A home page must reflect the main focus of the intranet. The number of home pages depends on the number of departments and the size of organisation. A home page contains the Table of Contents that describes the organisation of the intranet. The intranet content development diagram shows a typical site map of an intranet site in an organisation (See Figure 2).

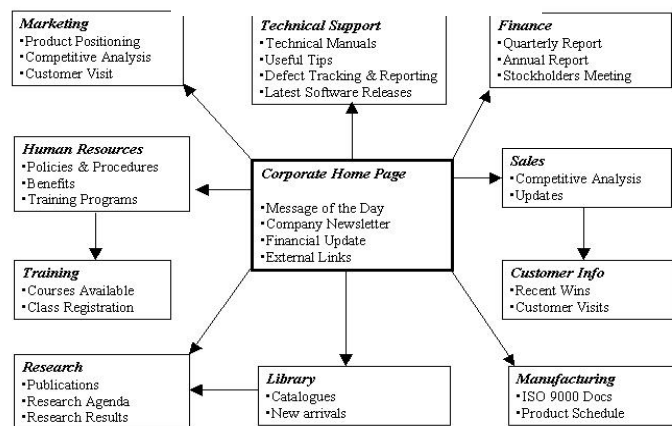


Fig. 2. Intranet Content Development.

Each item of the table of content can have a separate home page with its own table of content and each department can have its own table of content. Each item on the table of content of every department can have detailed information that is available to the user only by a click of a button. Every home page must have links with other departments.

VI. CONCLUSIONS

Intranet is the way of looking at communication and information flow in an organisation in a time and cost efficient way. The information placed on an intranet server can be accessible by all the users on a network regardless of geographical location as intranet is extendable to remote workers through controlled access to internal information. Intranet provides a central place to the people of an organisation to produce and consume information, communicate and collaborate with each other. This paper presents the advantages and uses of an intranet and briefly explains the steps needed in designing an intranet. This paper concludes that intranet is easy to use; can promote paperless office, support sales and marketing efforts; make customer service better; provide on-line training; and play an important role in educational and research organisations. And, therefore, an intranet can help in overcoming the problem of governance in an organisation.

Since the primary objective of this paper is to introduce the concept of intranet technology in Pakistan, therefore, a detailed cost-benefit analysis is not presented here. This paper, therefore suggests that organisations like ministries, educational institutions, especially those dealing in distant education, banks, railways, airlines, big organisations with many offices in different geographical locations, can undertake the exercise that is presented in the section of cost-benefit analysis and estimate costs and quantify benefits and thus, can derive net returns that would help in deciding whether to set up an intranet facility or not.

REFERENCES

- Asbrand, Deborah (1999) Banking on Intranet Training. *The Intranet Journal*. September. <http://www.intranetjournal.com>.
- Coleman, Pat, and Peter Dyson (1996) *Mastering Intranet*. San Francisco: SYBEX.
<http://toLearn.net/marketing/netgrowth2.htm>
<http://www.altavista.com>
<http://www.idc.com>
<http://www.indusinternational.com>
<http://www.lighthousemarketing.com>
<http://www.metagroup.com>
<http://www.netscape.net>
- LPI Software Funding Group Inc. (1998). <http://www.lpilease.com/column.htm>
- Shepherd, Clive (1999) <http://www.fastrak-consulting.co.uk>
- Telleen, Steven. L. (1996) <http://orpheus.amdahl.com/doc/products/bsg/intra/adapt.html>