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# Knowledge sharing and organizational change in a leading telecommunications equipment vendor: a case study on Southern Networks

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# Knowledge sharing and organizational change in a leading telecommunications equipment vendor: a case study on Southern Networks

## **Abstract**

In 1999 Southern Networks deployed the Open Text Livelink knowledge management system (KMS). Livelink allowed for the centralization of key corporate applications and associated content at a global, regional, line-of-business, departmental and personal level. Prior to the implementation of Livelink on an enterprise scale, the corporation's 94,500 employees relied on fragmented departmental web pages which were scattered across eleven different Web servers making the task of finding information very difficult. This paper describes how the process of knowledge transfer at Southern Networks changed with the deployment of Livelink and how it enabled the automation of workflows through the company's Web-based Intranet. The paper also provides an insight into how KMS empowered employees, at least until the organization significantly downsized in 2001. The importance of this paper is in highlighting the role of people in the success of KMS and to provide examples of the knowledge sharing dynamics.

## **Keywords**

document management system, information in organisations, knowledge management, organisational change, IS downsizing, organisational culture

## **Disciplines**

Physical Sciences and Mathematics

## **Publication Details**

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# Knowledge Sharing and Organizational Change in a Leading Telecommunications Equipment Vendor: A Case Study on Southern Networks<sup>1</sup>

## Keywords:

Large Business, Private Sector, Intranets, Organizational Culture, Corporate Strategy, Knowledge Management, Document Management Systems, Case Study, Top Management, Organizational Change, Organizational Size, Virtual Teams, Organizational Communication, Organizational Strategies, Organizational Structures, Outsourcing, Internet Protocol, Online Collaboration, Information in Organizations, Change Management, IS Downsizing, Collaborative Work Systems, Electronic Collaboration, Information Storage and Retrieval Systems, Knowledge-Based Systems, User Behavior, User Expectations, Security Risk, Multimedia Application, Video Archives, Media Streaming.

## EXECUTIVE SUMMARY

In 1999 Southern Networks deployed the Open Text Livelink knowledge management system (KMS). Livelink allowed for the centralization of key corporate applications and associated content at a global, regional, line-of-business, departmental and personal level. Prior to the implementation of Livelink on an enterprise scale, the corporation's 94,500 employees relied on fragmented departmental web pages which were scattered across eleven different Web servers making the task of finding information very difficult. This paper describes how the process of knowledge transfer at Southern Networks changed with the deployment of Livelink and how it enabled the automation of workflows through the company's Web-based Intranet. The paper also provides an insight into how KMS empowered employees, at least until the organization significantly downsized in 2001. The importance of this paper is in highlighting the role of people in the success of KMS and to provide examples of the knowledge sharing dynamics.

## ORGANIZATION BACKGROUND

### The Early Days

Southern Networks Corporation, formerly known as SouthTel Limited, is a leading telecommunications equipment manufacturer with headquarters in Texas, USA. It has a long history dating back to the First World War when it manufactured radios and thereafter television sets. In the 1960s SouthTel began to manufacture digital switching systems, supplying operators throughout North America. They dominated circuit-switching technology in the public and private network space for decades until the rise of Internet Protocol (IP). SouthTel had an employee base of about 60,000 people located in over 150 countries in the mid-90s. However, in 1998, a strategic decision was made by the CEO to make a "right angle turn" towards IP infrastructure, and merger plans were announced between SouthTel and Fiber Networks, instantaneously growing the workforce to 95,000 employees. While the new company Southern Networks profited from the timing of the merger in the short term (as stock market speculators predicted massive profits), the price of the company's shares plummeted from US\$99 to US\$0.40 within a period of two year. In real terms, Southern Networks' capitalization fell from \$420 billion in September 2000 to less than \$10 billion in August 2002. A saturated market and unrealistic business plans

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<sup>1</sup> Southern Networks is a fictitious name that has been used to protect the organization in this real-life case study. Company products and application names have also been changed to this end.

were blamed for the downturn (Figure 1). More recently accounting scandals have been reported.

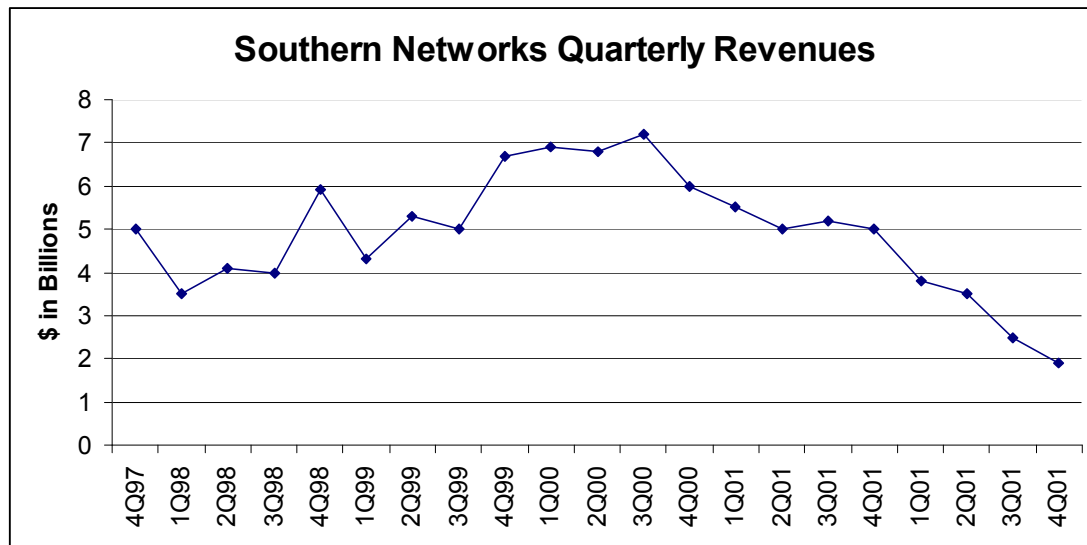


Figure 1. Southern Networks' Quarterly Revenues (Q4 1997 – Q4 2001)

### Organization Structure

The organization is divided into three regions for administrative purposes: The Americas (containing both North and South America), Europe and the Middle East (EME), and Asia (including Australia and New Zealand). Each region has a president who is in charge of the sales performance for each country within that jurisdiction. Each country has account teams and business development managers who are tied to a given product portfolio and report to a country manager. The support functions include: pre and post sales engineering, global professional services, global customer care, supply chain operations, human resources, information services, finance, marketing and legal. The process from the point of getting business to the point of delivery can be seen in Figure 2.

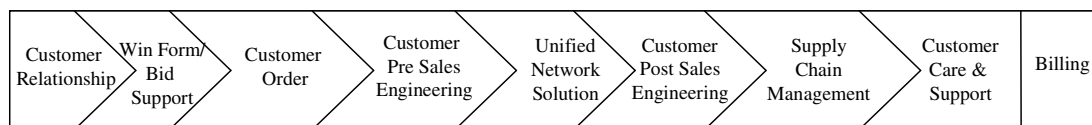


Figure 2. Southern Networks' End-to-End Sales-Delivery Process

This case is written from the perspective of the Network Planning (NP) team located in Australia between 1995 and 2005. The NP team reported to the Professional Services support cluster under Customer Care Asia, and the broader Service Provider and Carrier Group (Table 1).

Table 1. Organization Chart

CORP- Global	President and CEO
SPC- Global	President, Service Provider and Carrier Group
SPC- Regional	President, SPC, Asia
SPC- Country	Vice President, Customer Care
SPC- Australia	Director, Business and Network Planning
SPC- Australia	Manager, Network Planning

## The Workforce

Today Southern Networks employs about 33,000 people, two-thirds of which are engineers. This is far from the burgeoning figure it employed at its peak of 94,500 in December 2000 when it acquired over 16 companies in a single quarter. At that time the market for skilled and scarce resources was so competitive that the company was prepared to pay its employees \$3,000 USD for successful referrals (in addition to the new hire receiving a healthy lump sum to begin work immediately). In well-known high-tech *valleys* in the United States, competing companies were so aggressively poaching staff that a contract-based ‘ceasefire’ was declared between a number of leading organizations, preventing an employee from joining a competing firm within a six month period. Expansion was in the air, with large budgets allocated to the refurbishment of lavish office space and off-site employee team-building exercises. Authorization levels were also relaxed and sign-offs for amounts of \$5,000 USD could be done by any manager without higher approval. The reigns were pulled back in February of 2001 when executives realized that the risks they had taken to accelerate the company’s market position had backfired. In one small research and development regional office in Australia, 50 of the 60 new graduate hires (some of whom had already been given a relocation allowance) were made redundant on the spot and given a 3-month redundancy package. By the end of 2001, the company had shed almost half its workforce in an amazing fall from grace (Figure 3). Whole departments were being slashed in a bid to decrease operational expenses and make profits look better.

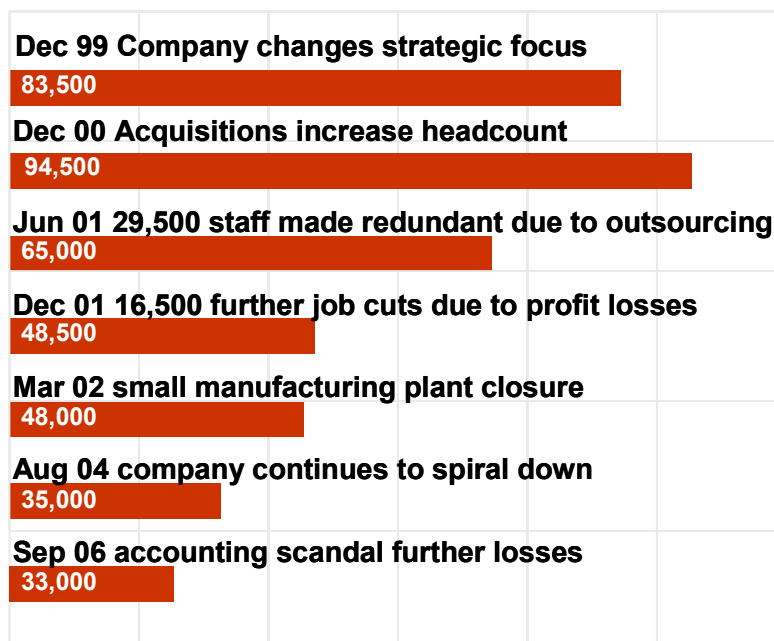


Figure 3. Southern Networks’ Downsizing Profile

## The Products

Southern Networks have five lines of business (LoB): Carrier Voice over IP, Optical Long Haul Networks, Metro Networks, Wireless Networks, and eBusiness Solutions (Figure 4). While there is a reshuffle and re-badge of their distinct lines-of-business every couple of years, they mostly serve the needs of public network carriers, in the

wireline, wireless and cable spaces. After the 2001 crisis, Southern Networks decided to change their strategic direction and only deal with customers that had real money to spend. This did not mean that they ignored enterprise-class customers but were merely wary of beginning negotiations with customers that were not serious about buying and just wanted free consulting advice. Southern Networks likewise stopped manufacturing a great number of their products that were unrelated to their core business. In addition, after the number of acquisitions in the late 90s, Southern Networks had too many products on their shelf and decided to phase out overlapping products that had similar functionality, or products that just had too low a margin. At one stage too many products were blamed for losses in sales that corresponded to customer confusion and internal product strategy wars. Others blamed the losses on the turbulence caused by over-inflated bandwidth predictions in the global telecommunications sector.

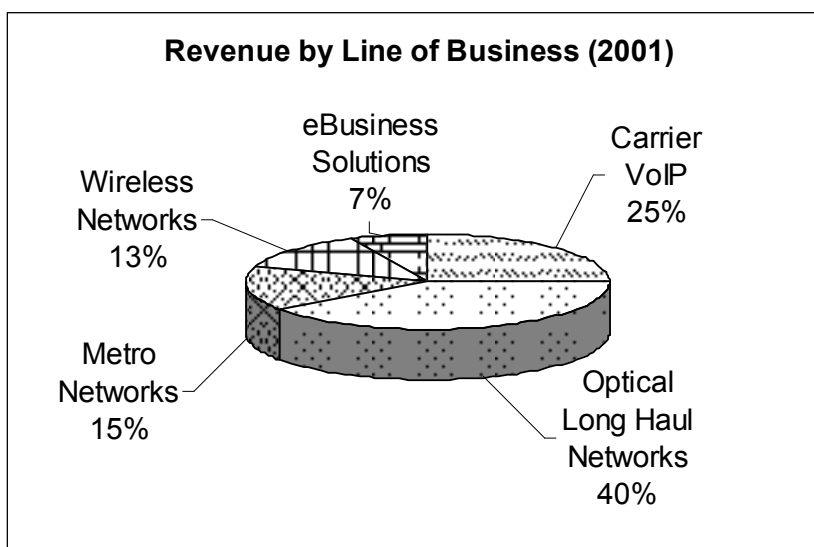


Figure 4. Annual Revenue Breakdown by Line of Business (LOB) for December 2001

#### The Customers

The customers of Southern are mostly made up of large multinational global players. Southern Networks have supplied telecommunications equipment to the vast majority of the top fifty Fortune 500 companies. Smaller enterprise players like large businesses spanning a variety of industry sectors are also important to Southern's sustained revenue. After all, it was in the early 90s that SouthTel became particularly well-known for their PABX solutions. Today Southern Networks has a presence in every continent- they are particularly looking at capturing some part of the lucrative People's Republic of China market and entering into a number of joint ventures with local players. While they still maintain a presence in countries like Singapore and Thailand, their biggest opportunities in Asia are in China and India.

#### Current Instability

Unfortunately, the latest results report that Southern Networks has had a loss of \$360 million, or 9 cents per share in the last quarter, for the fourth successive quarter. This is highly problematic indicating the company has never quite recovered from the massive slump it went through in 2001. In 2004 revenues were about \$US10 billion and their net income about \$US60 million. The figures for 2005 showed revenues to be about \$US8 billion and predictions for 2006 indicate an even further drop in

revenues. Further redundancies are looming- and one UK laboratory has already announced 3,000 more job losses in the next three months.

With so many redundancies since the glory days of 1999, staff morale has been a major issue throughout the changes of the organization downsizing. While whole laboratories were closed down, there were some that remained opened but opted for eliminating particular departments over others. In some instances, friends and family were divided by the downsizing, which was costly to productivity, as lives were impacted. The company slogan “bringing people together” and the corresponding advertising theme song which was based on a 1960s hit single, did not hold up very long after all the hype had worn off. While downsizing had the temporary effect of making earnings look better to shareholders, continuing to cull one’s workforce would inevitably have major repercussions. Band-aid measures consisting of impromptu business plans and strategies to keep shareholders happy are no solution for long-term woes.

How to continue to function competitively when an organization is in a state of flux, particularly how to manage knowledge as people come and go, is explored in the remainder of this case. The main objective of the paper is to tell the story of the impact that Open Text Livelink had on 95,000 employees and their information sharing practices in a corporation that spanned a presence in over 150 countries between 1996 and 2002. The before, during, and after KMS snapshots are presented to bring to the fore those overriding challenges, struggles and subsequent successes that follow an implementation of a large-scale eBusiness solution. In addition knowledge transfer dynamics in the company are explored, as are the effects of downsizing on the value of knowledge management.

## SETTING THE STAGE

Knowledge management is defined as “the systemic and organizationally specified process for acquiring, organizing, and communicating knowledge of employees so that other employees may make use of it to be more effective and productive in their work” (Hahn & Subramani 2000, p. 302). It then follows that a knowledge management system (KMS) are all those components (software, hardware, people and processes) that support knowledge management initiatives. These may include but are not limited to work flow maps, web sites, portals, document management systems, customer relationship management (CRM), data warehousing, data mining processes, virtual teams, contact lists, databases, collaboration tools, applications and news (Davenport & Prusak 1998; Jashapara 2004). Although a term that is often used interchangeably with document management and information management, knowledge management seeks the higher ideal of wisdom, the tying together of the tacit and explicit realms. As Agostini et al. (2003) add: “knowledge is not important *per se*, instead the process of knowing, learning, and creating knowledge is the relevant aspect” (Nonaka & Takeuchi 1995). Leitch & Rosen (2001) believe knowledge management is a *misnomer* and prefer the term knowledge processes. Today leading organizations have adopted the current notion of business intelligence to describe the coming together of all these fundamental knowledge concepts.

## Knowledge Management System Features

Livelink is a knowledge management and collaboration enterprise system. It allows employees to configure project workspaces, add folders, documents and web links,

check in and out documents, maintain file versions, create aliases of documents so that there is no redundancy of information, discussion threads, favourites, news tickers, news channels, reports, document reservation, perform searches and queries, create tasks and define workflows, view documents, and an ability to set permissions via an access control mechanism. Livelink allows for the creation of workspaces which can be set at differing levels- from personal workspaces only visible to the individual employee, to department-wide workspaces that can be seen by colleagues, to corporate-wide workspaces that can be seen by the whole organization. Typically network planning projects run at the departmental level, while portal links relevant to all employees are located on corporate-wide workspaces (Figure 5).

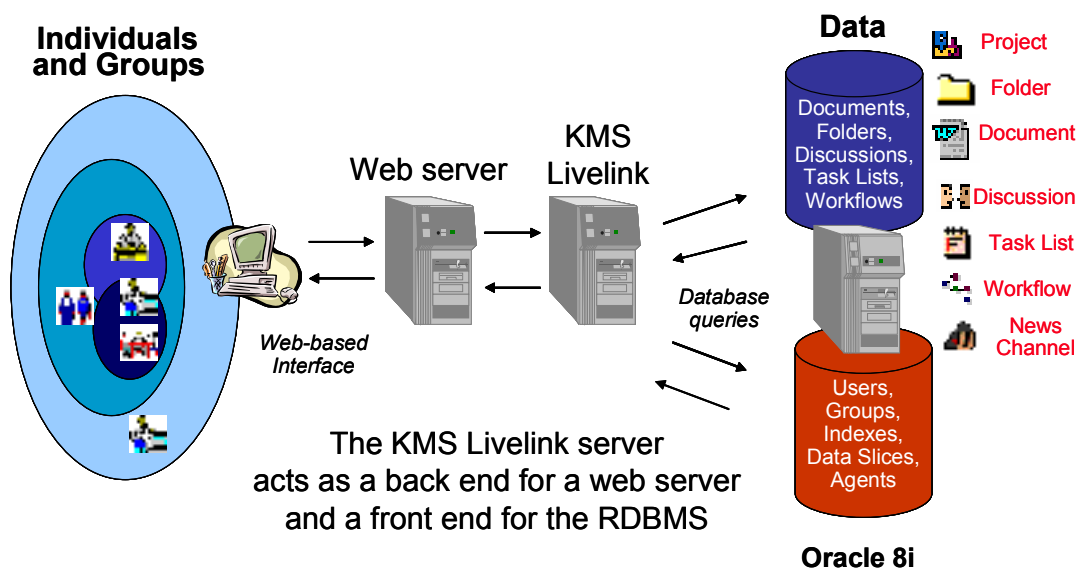


Figure 5. High-level Knowledge Management System Architecture

Livelink at Southern Networks was implemented using an Intel server platform on an NT Server 4.0 operating system. The web server that was utilized was Microsoft IIS 4.0. The chosen database was Oracle 8i and the web browser platform was Internet Explorer 5.01. The KMS Livelink server acted as a back end to the web server that received transactions, and a front end for the relational database management system. Livelink was deployed in *clusters* with numerous servers residing each in The Americas and EME, and one in Asia in Hong Kong, for a total of eight Livelink server instances. Each cluster catered for about 10,000 employees with system performance being maintained even during peak loads. One of the biggest advantages of Livelink was that administration for the system could be done at a local level. This was important as the information services department (ISD) was made redundant in mid-2001, after Southern Networks decided to outsource the competency. Each instance of Livelink required one contractor 24x7 to be allotted to its operation, save for the initial installation which required specialized set-up and associated portal development.

#### KMS Deployment

Livelink was deployed at Southern Networks in a staggered fashion. The company had long considered a virtual team/portfolio management approach to doing business. Indeed today in Australia, only the senior executive team have fixed office locations,



with the rest of the employee base using temporary workstations and being pulled together and apart dependent on the opportunity at hand. However, the notion of virtual teams struck at the core of the way the business ran. Previously, SouthTel had been known for its exhaustive development and manufacturing processes, at the cost of time-to-market. SouthTel's solutions were always considered the *Rolls-Royce* telecoms solution, expensive yet very reliable and robust. The Internet however, was set to change the way people worked and the way corporations did business, especially as customer-to-supplier expectations were increasing and product innovation cycles were decreasing.

In 1997, the Wireless Group in North America purchased a single instance of Livelink for the main purpose of competitive intelligence gathering. Although there were a number of groups that showed disquiet about the legacy Intranet, it was not until 1999 that another instance of Livelink was purchased by the Design and Engineering Group. This group was interested in using knowledge management to develop advanced software technology products. It took until 2000 for a corporate wide basic Livelink system to be purchased allowing for previously disparate applications to be centralized onto a common portal (Figure 6). The data population of Livelink occurred in a haphazard fashion, at least at the grassroots level. From the perspective of the network planning employees (which numbered about 20 in all of Asia) there was little training provided, little preparation and planning for how to move forward, and not enough time allocated to formalising how the system was to be used. One of the team's longest-serving network architects reflected that most of the data uploading was done after hours. With over 10,000 department files to upload, getting the legacy data into the KMS was not going to be easy, particularly because there were no defined rules on what to upload and what was deemed valuable with respect to the department's core function. Business operations do not suddenly cease for the introduction of new enterprise systems. In addition, some groups viewed as more important to the organization, had their departmental workspaces allotted well ahead of other groups, making some groups like the regional research and development laboratory in Australia, feeling left behind and unimportant to the business at large.

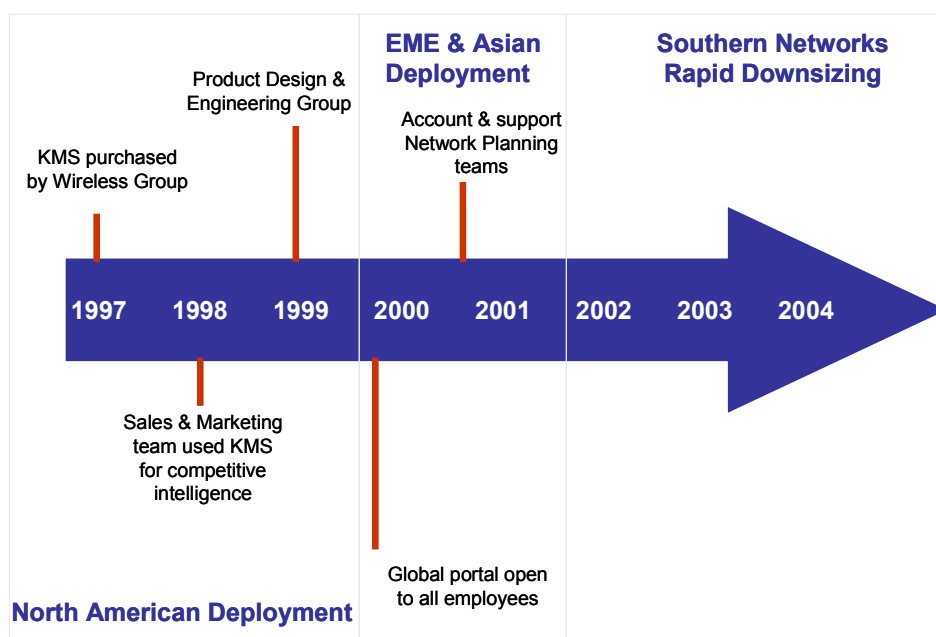


Figure 6. OpenText Livelink Rollout at Southern Networks

#### CASE DESCRIPTION

##### The Fragmented Intranet

It was not that long ago that employees of global companies relied on fragmented web pages scattered across a multitude of servers throughout the world for their corporate information needs. Conducting searches for key pieces of data integral to the successful completion of a task was often a hopeless exercise. More often than not account project teams had to pour through completely irrelevant hits on the company's search engine only to walk away without locating anything of value. Southern Networks employees working in offices throughout Asia in 1996 for instance, had limited access to information generated by employees in other regions. Even within Asia the practice of uploading data onto servers as a means of making documents available to others was uncommon, save for small software development teams whose work by its very nature demanded accessibility. File transfer protocol (FTP) servers were the closest anyone got to sharing data and these were often analogous to garbage dumps that were cleared periodically to free up server space. File naming conventions were absent, as was version control, and any other form of metadata describing individual documents.

Beyond FTP servers, emailing attachments was heavily relied upon to the detriment of increasing operational costs. Employees in Asia were warned by superiors on occasion- even by the region's president- to pick up the telephone instead of emailing, as the costs for transporting megabytes of data throughout Asia were becoming exorbitant. A good PowerPoint package for instance could make the rounds of your inbox even as often as five times from five different sources. It was also a topic of amusement and debate that original work completed by an employee in one office (e.g. a newly created Excel model) would make its way across the corporate intranet and come back several months later by email from another employee unknown to the original author. Sometimes authorship was even overridden and credit given to another individual who had simply adapted a few bits and pieces. This could be considered a form of internal plagiarism, save for the fact that the company theoretically owned the intellectual property. In other cases, information was emailed without an audit trail of recipients; there was no concept of privileges (save for hardcopy documents that contained a front cover distribution list). The word "confidentiality" acquired different meanings for different people. In fact, releasing a document to the account team, independent of the level of security clearance placed on it, meant that it would end up in the hands of customers within days, if not hours, even if the contents had not yet been fully discussed internally. Stating that something was "confidential" was like placing a magnet on it for unauthorized disclosure.

On other occasions employees would receive large email attachments that had little, if anything, to do with their daily work tasks. As 'downloading-on-demand' was still unfeasible given the lack of infrastructure availability and adequate web training, broadcasting messages would ensure blanket coverage of the employee base and thus not miss any of the key recipients it was meant for originally. It was not on a few instances, however, that commercial Southern Networks product pricing lists (including margins and discount rates for different countries) would make the rounds of everyone's email inbox. This was not only a careless practice but competitively foolish. The telecoms sector is a small world, many employees working at Southern

Networks at the time, had extended family working in opposition vendors, particularly in the United States. Even worse was that this type of practice was never identified as strategically perilous by upper management.

At the time the typical departmental setting was one where the majority of working information was stored on local hard drives instead of a common server with employees responsible for making their own back-ups of data. At Southern Networks in Australia key project member's computers often fell victim to viruses or worms. And to make matters worse, as if the loss of files was not detrimental enough, back-up storage procedures for laptops and notebooks were non-existent. Project team members were often left scrambling to locate older versions of files to meet customer deadlines, on occasion losing days and even weeks of work and research. Employees also required numerous passwords for a variety of applications, most of which would expire or be forgotten. The absence of a central login to company applications was always a contentious issue as company employees lost valuable time waiting for IT personnel to reset passwords when they could have been working on important documents for customer engagements. Smart card secure ID badges were even deployed to staff in 1997 for remote access but due to synchronization problems they were abandoned some time later.

#### The Problem of Knowledge Transfer

The absence of a central portal for employees also meant that individual web-based applications were unknown unless the exact universal resource locator (URL) was marketed via email or some other general communications forum. Different departments within the company may have had their own web pages but again these were inadequate, poorly maintained and updated, contained broken links, and had a very small audience with little or no access security on the intranet. Up until 1998, subordinates in technical support teams like the network planning group relied on the ingenuity, good name, and goodwill of their supervisors and managers to gather and socialize important information. For this reason, a good supervisor could fast-track an associate engineer's career giving them access to more. Other supervisors would hoard information, keep it to themselves for the purposes of self-promotion, and then tell their subordinates that they did not wish to overload them with unnecessary information. Employees in teams were expected to share their findings with one another in order to complete tasks but this was not always the company culture. It was impossible to know who the key experts in the company were for collaborating on projects, unless an employee was introduced by word-of-mouth or chain-style emails. To be good at one's work, more often than not, meant that an individual had to have a good network of colleagues- knowing the right people could save an employee a great deal of time, not to mention raising the accuracy of the actual results or solutions proposed.

Expatriates were often brought in to enhance the transference of knowledge between the US, the United Kingdom and other more isolated or newly established regions like Australasia. But no matter how good and strong these internal networks were there was always a question mark surrounding the vintage of the information sent by key contacts. Was it the latest product information for instance? Was the plan-of-records (PoR) the most recently defined? There was not always enough time to check these very important questions- especially given the time zone differences between Asia and other Southern Networks offices. One had to go on what they had as it was better

than nothing and at least more accurate than a guesstimate. Sometimes consultants were seconded to projects for a short time, their access to company information was even more limited, and so they spent time reinventing the wheel, separated *logically* from the rest of the organization.

Collaboration was mainly insular, within project teams, and there was no manner to denote who did what in the corporation. Even up until 1998, the online corporate directory only noted the employee's name, telephone number, location, and reporting manager. Thus, the problems were not only physical in nature with regard to the corporate intranet infrastructure but were application-centric as well. Simple Word documents like company policies were even difficult to locate on local servers. These factors altogether contributed to a loss of productivity and propagated inefficiencies across departments. The problem however was not isolated to Southern Networks- all the other telecommunication giants were suffering likewise. Companies were struggling with how to manage "knowledge" in large corporations with complex product and service mixes. The answer was to evolve to a better working environment that took advantage of internet protocol (IP) and embraced it as a medium of communication. To this end, in late 1998 all Southern Networks employees were required to complete a basic IP certification course.

Doing business at web-speed caused dramatic changes not only to the way information was exchanged but to the way people themselves worked. At about the same time that SouthTel merged with Fiber Networks and announced the change in focus from circuit-switched telephony to IP, the company CEO Jamie Ross, decided to invest in knowledge management (KM) to help facilitate the merger process, promote knowledge sharing among employees, encourage refinement of business processes through workflow management leading toward ISO9001 certification, offer a central login for employees, and assist in employee communications from the top down and vice versa. Ross was a CEO who sought opinions on particular issues directly from his employees. He purposefully showed by example, crafting global memos that were pages long of heart-to-heart reflection. He made employees feel special, even if they were entry level or worked in support functions. If he shared his thoughts openly, the mandate was that employees should also share more knowledge with each other. He urged employees to think together, and create an environment of openness to help win more business. His decision to implement a corporate-wide knowledge management system fundamentally came from an organization need to remain competitive, even though the decision to specifically purchase the Livelink system was allegedly decided on a golf course.

### The Process of Change

Livelink did more than just enforce a technical change in infrastructure layout. It changed the way people worked and it challenged individual beliefs about ownership of information. The process of implementing a knowledge management system (KMS) was more than just about allowing the centralization of information and enabling the collaboration between individuals in different regions. It was to strike at the very core of departmental and global business practices. In fact, the implementation of Livelink coincided with the company's efforts to attain ISO9001 certification for as many different functional areas as possible. Some departments, like the Network Planning department in Asia, found the challenge almost impossible. There was no defined workflow to how employees in designated roles conducted their

studies, and studies varied in time, size, complexity and resource requirements. Some employees continually insisted to work with local files and share only a selection of documents with their project team. One of the key architects in the Network Planning team in Sydney believed that their sophisticated models, if placed in the wrong hands, could have major repercussions on Australian business. He argued that his tools contained a great deal of sensitive customer and proprietary information, and if used inappropriately would mislead other customers or give competing companies unfair advantage. During the dot.com bubble, it was reported widely by the internal security team, that industrial espionage was a common happenstance. Southern's security personnel warned of a spate of professional crimes that had taken place in the UK, eventuating in twenty-five stolen laptops in a single quarter, most of which had taken place at airports and hotel car parks.

Chief knowledge officers (CKOs) were appointed in departments as well as ISO9001 team leaders to help the process overcome initial teething problems. However the use of an ISO 'policeman' in each department put some individuals in some very difficult situations. Some employees clashed with the ISO mandate which made them automatically rebel against the use of Livelink when in actual fact the two were separate requirements. More generally, there was resistance to change toward Livelink, and a number of employees believed that this was primarily due to the lack of information provided to employees before the system was rolled out worldwide. For instance, some employees complained that it was too time consuming to upload and download relevant data from the KMS and have to record the adequate metadata for every single document (Table 2). While other employees saw the advantages of downloading-on-demand and the right to access useful information that could help make them more effective employees. Chief knowledge managers (CMO) for some of the larger departments were also appointed to promote the use and benefits of Livelink but these employees were often ostracized by others who did not respect their work. Most employees viewed these individuals as an unnecessary company overhead, claiming that they knew little about how the business worked and were restricted in what they could bring to teams as they were not involved in the initial creation of knowledge. Subsequently, the perception was that the need for chief knowledge managers to come up to speed meant that employees would be disrupted by incessant questioning.

Table 2. Asia's Network Planning Team - File Creation and Access (Before Livelink)

Types of Files	Average Number of Files (Viewed, Created or Modified) by Team	Who Creates?	Who Has Access?
Plain Text	5 per day per user Files would vary in size from a couple of kilobytes to 10 megabytes.	Few. Or sourced directly from the customer or a third party statistical agency.	Highly restricted access if customer details contained within file. Otherwise general statistics shared to create realistic assessments of potential business.
Emails	200 per day per user (15% of these containing attachments in excess of 1 megabyte)	Everyone	Individual recipient or project group.
Spreadsheet	Size and complexity of spreadsheet varied. One workbook could contain even as many as 15 worksheets of 1 letter page in size each. A model created in a spreadsheet environment	Everyone	Depends if the spreadsheet was a tool or contained customer data or contained demographics in a region.

	could also take 3 days to develop then another 2 days to refine and another 5 days to populate and run various scenarios with the correct details. File sizes would vary from 10 kilobytes to 3 megabytes in size.		
Database	5 per user per day Files would vary in size from a couple of hundred kilobytes to 10 megabytes.	Usually market analysts	Anyone who needed the statistical data.
Visual Basic Code	0.5 per user per day Typically small file sizes of code that would need to be compiled and executed.	Skilled BNP tool developers	The actual models developed were accessible on a 'needs only' basis and was dependent on whether the creator wished to grant access to other colleagues. Seldom was sharing the case unless multiple resources were allotted to project.
Geographic Information Systems (AutoCAD, Mapping, Satellite and Aerial Photos)	25 per user per day Very large files exceeding 10 megabytes but depended on scale and resolution and whether the data was vector or raster imagery.	Number of licenses dependent	GIS-skilled personnel
Presentation Software	10 per user per day Typically between 300 kilobytes and 10 megabytes. Depended on clip art used if sales presentation or other file types embedded with animation.	All	If tool-based for training purposes, all in the department have access. Some restrictions on sales presentations.
Word Processing	20 per user per day Varied from 20 kilobyte file size to 400 kilobytes. With images or graphs the size could go as large as 2 megabytes.	All	All
Proprietary Project Management Software	1 per user per day File sizes were typically small depending on what data was exported for reports.	Senior manager with assistance from personnel	All
Third Party Business Case Software	1 per user per day File sizes were typically small depending on what data was exported for reports.	Business case skilled personnel such as solutions advisors.	Relevant personnel on project, particularly members of the account team and the customer.
Proprietary Network Planning and Dimensioning Software	5 per user per day File sizes were typically small depending on what data was exported for reports.	Solutions architects who are versed in traffic dimensioning.	Pre-sales planners who require an understanding of a high level bill of materials (BoM). Business case developers need access to the capital expenditure also.
Radio Network Planning Software	0.05 per user per day Very large file sizes exceeding 1 megabyte showing wireless signal strengths and digital elevation, clutter	Radio planning department	GIS-skilled personnel.

Adobe Acrobat Files	10 per user per day Typically 400 kilobytes to 700 kilobytes.	Product/technical developers and human resource staff.	Everyone
Competitive Intelligence Reports	20 per user per day Most of the files were in HTML format not exceeding 300 kilobytes.	Third party suppliers like Yankee, IDC, Meta Group	Everyone

There were a number of shortcomings related to the KMS in 2000 many of which were linked to the capacity for Livelink to handle multiple file types, especially object programming code and geographic information systems (GIS) extensions. Other issues were about the actual implementation of the system, such as: where did the given department fit in the global organization structure, how would the department segment their server space to provide a repository of information that was meaningful in nature into the future, how could all the features of Livelink be utilized effectively etc. Timely training of how to use Livelink was also lacking and many of these courses came post-implementation. Colleagues first heard about Livelink through the grapevine, in an almost organic fashion, but when some groups had access and others did not it became a little confusing. The phased deployment plan was never communicated properly to employees, if at all, in some lines-of-business (LOB). Livelink definitely required top-level management support but even with this backing it still took some time for the sceptics to be converted. In essence the CMO was not saying that files could not be saved locally but that all working files had to be uploaded in a timely manner. When it came to deciding what kind of sensitive data/models to upload and who could and should be able to view them, there were some interesting confrontations. In essence key personnel who were experts in a given area and were generating their own models to support their work tasks, did not wish to give up what made *them* special, for others to easily mimic or learn from with time. There continued to be some resistance until these same employees began to use access privileges for their uploaded files and essentially block everybody but themselves from using particular files. This was not in the true spirit of the KMS but at least this promoted another level of back-up storage. The facility for a personal (i.e. private) workspace on Livelink was available but few took advantage of it, opting to place work documents on the enterprise workspace or store things on their locally hard drive.

#### Enter a Knowledge Infra-“structure”

For some departments, the KMS was the answer to gaining timely access to internal and external intelligence information. For other departments, the KMS would help them in their quest to raise their profile by providing an avenue to showcase their work. But before launching any such site, groups had to work together to map out the layout and structure of their virtual space on the KMS. This was not an easy task especially for those who had been working with ill-defined processes in the past- they were not embarking on building a pretty web site but to some degree on aiming for best practice. The initial brainstorming period raised questions about how work was being carried out, the type of work being completed in some departments, and the level of quality and quantity of work being produced in other departments. In effect, this gave birth to project management demands in the company, and encouraged visibility and transparency throughout the organization.

The knowledge infrastructure did not appear overnight. Groups worked for weeks and in some instances, months, to define what they believed would be a “future-proof” layout. After all, this space was to be the interface between them and the rest of the Southern Networks world. For the Network Planning team, this required a lot of collaboration, consultation, and review. It also had to be decided which documents, past and present, would be ported onto Livelink, how this would be done, and who would have the responsibility (Figure 7). In the end the manager and chief knowledge officers did the great majority of this work, believing in the system, and made it voluntary for other employees in the team to follow suit. It took some months before the whole group had bought into the idea but the team finally became proficient at using the KMS. During projects only the crucial documentation would be uploaded to Livelink and the URL shared with other collaborators. At the conclusion of projects, all the inputs, processing, and outputs would be uploaded to Livelink. For the Network Planning team, it was hoped that one day they would be able to use the KMS to automate their Bill-of-Materials (BoM) sheet for customers’ Request for Quotation (RFQ). The proposal was to create Adobe PDF forms for “inputting” and use extensible markup language (XML) to facilitate the end-to-end calculations in Microsoft Excel or Access. In this way it was hoped that reusable content and repeatable processes could save employees time and allow them to take on more projects than in the past, as well as decreasing their time-to-market (TTM). The idea was to be able to source data that was usually all over the place (in essence distributed and in different formats), and to put it into some structured context, where it had an invaluable role. Too often market researchers and financial analysts in the corporation would spend hours, if not days, searching for the right value- the KMS was about to change things.



Figure 7. The Network Planning Departmental Workspace (Market-Client-Project)



Initially only a small number of features were being used on Livelink from those available. For example, although it was possible to “check-in” and “check-out” documents, hardly anyone ever did. This would have ideally suited employees who were using databases and financial systems. Employees could also take advantage of creating metadata for their documentation or define access privileges but very few ever did. Naming conventions were specified, usually at the department level, but some documents complied while others did not. In brief, those practices that were pre-Livelink were difficult to break after the implementation of Livelink, although bit-by-bit, change did occur. For example, in the Network Planning team, filenames were made up of country telephone area codes, the type of task, the initials of the author and a date and version number. Livelink also allowed for the creation of workflows for specific projects, allocating tasks and their duration, and other dependencies. It was not that the feature was not useful but that project management skills were in short supply.

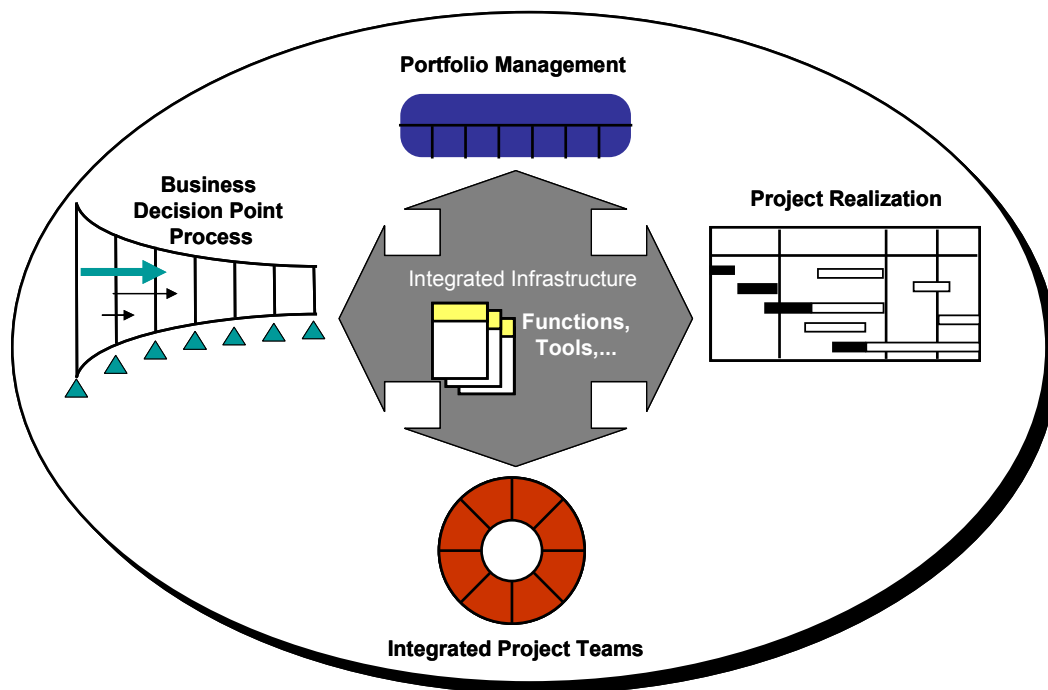


Figure 8. Toward an Integrated Knowledge Infrastructure

To some degree, the majority of the corporation was using Livelink as a Document Management System (DMS) in the beginning, but this changed as time went on and new applications were specifically created to help the employees of the corporation communicate and collaborate better. The notion of virtual teams became prevalent around the year 2000, and this is when the KMS became very important (Figure 8). Customers also, for example, were given access to an extranet space in Livelink where they could upload and share files with Southern. Account teams also made use of this capability to gather as much intelligence from clients and provide commensurate returns to them with product knowledge that was not accessible to the public via the external corporate site [www.southernnetworks.com](http://www.southernnetworks.com). Livelink helped consolidate and strengthen business relationships. Within six months of its introduction the benefits of the KMS were evident. Remote dial-up access users especially found it much easier to send around a URL embedded in an email than

having to wait over one hour to attach a file to an email and then send it to a list of recipients. It saved time and made employees more productive. One manager even credited the KMS to a growth in the number of patents generated by Southern Networks. In the past the organization was very customer responsive at the expense of their knowledge creation- Livelink facilitated this business process (Perna 2001).

#### Knowledge Management Applications

By the end of 2000, the knowledge management system was increasingly being touted as Southern's most important corporate tool. It not only brought teams closer together that were previously geographically disparate but it formed the basis for the launch of the company's key communication and collaboration applications including: Southern Portal, Strategic Advisor, Market Analyzer, Customer Aware, Sales.Channel, World Database Watcher, Corporate ID, Organization Structure, PeopleFind, Building Locator, EmployeeOnline, CareerDev, Employee Training and Development, Information Services, MeetingsOnline, Purchase Online, Travel Online and Stock Price, among others. Southern Portal let the CEO directly broadcast multimedia clips to all the employees in the corporation. Employees could watch the broadcast live, or download a broadcast and watch it later using Media Player. Southern Portal also reported the latest customer wins, highlighted key account and product strategies, and identified key employees and groups in the corporation. There were also a number of applications that supported sales-technical and marketing activities including: Sales.Channel, Customer Aware, Market Analyzer, and Strategic Advisor. Employees could use these portals to search for information about products, target markets, client backgrounds, and business case examples from across the globe. This knowledge empowered individuals and groups to produce higher quality output.

Although employees performing searches on the Intranet would argue that results returned were information overload at times, this was better than days gone by, when no data whatsoever was available. The assumed information overload problem could also help employees by allowing them to compare facts from a variety of sources, and grant them the ability to make a decision on which data was the most useful for a given project. Employees could also quickly ascertain who their counterparts were in other regions and who would be a likely collaborator for advice on technical matters. While collaborative tools like MeetingsOnline and NetMeeting were not a consequence of Livelink, they were taken advantage of more, because employees were made aware of the services via the KMS. The applications were paramount to those employees who made use of them every single day and multiple times a day. Livelink had become so embedded in practice that when the Code Red worm infected servers it knocked out two days of productivity for most groups. Without access to the KMS, people could only use the telephone to communicate (if they had the name of the person they wished to contact), read printed matter and or use electronic resources on their local desktop.

#### CURRENT CHALLENGES/PROBLEMS FACING THE ORGANIZATION

In 2001, after dozens upon dozens of acquisitions, the company began to downsize as a direct consequence of the dot.com crash. At the time the share price of the company had reached some ninety-nine US dollars at its peak, and at its lowest fell to below one US dollar. The regime to downsize, in some cases meant that whole departments were made redundant- irrespective of the top talent within it- and this had a major repercussion on the value of the KMS in the organization. Members from one school

of thought could argue that the introduction of Livelink was “just-in-time”, that it had taken root as an important tool before the downsizing was announced. Members from another school of thought could argue that the value of the KMS decreased after the rapid downsizing measures were enacted. Independent of the view taken the reality was that the KMS did help to retain corporate knowledge but it did not do so without end.

The challenge for those still employed by the company was first to know about the knowledge (in some instances it had been made private or read access only), and second if obtainable to know what to do with the information and how to use it. While some documentation was still used after the departure of the document creator, in most instances, employees felt they had to generate a lot of new material. In Southern Networks what became clear was that there was an intrinsic link between knowledge management and collaboration; take the collaborator away and the knowledge available to you lessens in worth significantly. The company continued to take drastic downsizing measures from 90,000 employees in 2001 to some 30,000 employees in 2004. Having cut about 60,000 jobs in three years the KMS could no longer expect to work miracles. The KMS once alive and used by so many, no longer had the same number of employees “feeding” it with information. Some employees, desperate to remain employed, even retreated to pre-Livelink practices, refusing to share their information with others, hoping that that would maintain their employability throughout the downsizing spiral.

The value of knowledge management to large multinational corporations is undisputed (Housel, 2001). KMS is integral in organizations today that work at web-speed and require the creation of virtual teams who rely on reusable content and repeatable processes. Knowledge management does grant competitive advantage (Tata, 2005). However it needs to be emphasized that a KMS is not just a technology that can be implemented and can succeed on its own. It is people who will ultimately drive its success or failure- it is embedded in practices people follow and in culture, i.e. the way people go about doing things. If used correctly KMS benefits are manifold including a dynamic working and learning environment that fosters information sharing and new value creation. Knowledge management helps employees build a collaborative culture, and create and extend their own personal business networks. Indeed there is a social side to this e-business solution. At no other time does this “socio-cultural” phenomenon become most obvious than when it is disrupted by necessary corrective actions to an organization’s size. In the case of Southern Networks employees, it was wonderful to share and create together until the threat of redundancies loomed and subsequently affected social practice. In times of downsizing the “one big happy family” culture is quickly overtaken by the “everyone for himself” reality and this has the effect of stifling the value of a KMS in the short-term, especially as employee morale is generally low during these times of substantial change. It does not mean that the KMS loses its value altogether, to some degree it becomes increasingly important because there are less heads working together to solve the same number of problems. As the organization again reaches equilibrium the KMS can be used as a catalyst to re-build, re-create, and re-store.

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## APPENDIX

Table 3. Southern's Strategic Objectives in 2000

<p><i>Right Angle Turn:</i></p> <ul style="list-style-type: none"> <li>- Move from being a manufacturer of voice only telecommunications equipment to offering IP-centric solutions</li> </ul> <p><i>Outsourcing and Contracts:</i></p> <ul style="list-style-type: none"> <li>- Limit involvement in manufacturing and repairs and develop relationships with smaller contract players for supply</li> </ul> <p><i>Business Processes:</i></p> <ul style="list-style-type: none"> <li>- Streamline operations to compete with market leaders in unified networks market</li> </ul> <p><i>Expansion:</i></p> <ul style="list-style-type: none"> <li>- Form new alliances and acquire for faster time to market</li> </ul> <p><i>E-business Strategy:</i></p> <ul style="list-style-type: none"> <li>- Become involved in application service provisioning</li> </ul>
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Table 4. Southern Networks' Strengths vs. Weaknesses (1999)

*Strengths:*

- Major player in optical internet and high speed networks
- Large customer base which is diversified
- Expand broad product portfolio with diverse solutions (one stop shop)

*Weaknesses:*

- Time to market does not align with major competitors
- Do not meet industry benchmarking indices (e.g. revenue per employee)
- Brand awareness

Table 5. Livelink Installation Specification

Livelink Server Platform

- Intel

Operating Systems:

- NT Server 4.0

Web Servers

- Microsoft IIS 4.0 (CGI and ISAPI)
- Netscape iPlanet Web Server Enterprise

Databases

- Oracle 8i 8.16 Enterprise Edition
- MS SQL-Server 7.0

Web Browser Platform

- Windows 2000 Professional

Web Browser

- Microsoft Internet Explorer 5.01