Improving The Operational Environment Thru Internet Utilization

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ABSTRACT

This study demonstrates how an Internet based network of railroad information resources can provide a dynamic, cost effective resource to help management improve their operational environment. The informational and knowledge sources needed to support the interoperability and integration of rail networks and their employees are increasingly available via the Internet. Public resources on the Internet primarily support the distribution of industry publications, notice and proceedings of industry conferences and meetings, communications about legal and legislative issues, and advertisements. Private resources on the Internet support reservation and scheduling of rail equipment, tendering shipment information, tracking equipment movements, and verifying billing information. Much of the private information is incorporated into the knowledge management systems developed by individual railroads. The study provides a proposed stratification of these resources into seven categories: Research and Statistical Resources, Newsletters and Press Releases, Industry Initiatives, Legislative Information, Industry Publications, Professional Associations, and Educational Resources.

Keywords: Operational Environment, Web Based Information Resources, Interoperability, Stratification

INTRODUCTION

*T*he purpose of this investigation was to identify relevant web based information resources and to provide a useful information classification schema for this external information. Increased availability and the explosion of information during the last decade have influenced recent methods and techniques used in the management of information. Knowledge management focuses on collecting and reorganizing information to understand patterns and relationships among the data to turn it into valuable knowledge [6,13,14]. In recent years, both the amount and type of information available to an enterprise has increased exponentially with the advancement of the Internet. The Internet is an important information resource for managers who must find new ways to increase knowledge availability while containing the cost of access.

This study demonstrates there is an Internet based network of railroad information resources that provide a dynamic, cost effective resource to help management improve their operational environment. Consistent with prior literature, these resources include (1) the coding and sharing of best practices, (2) the creation of corporate knowledge directories, and (3) the creation of knowledge networks [1,7,8]. The study proposes a stratification of these resources into seven categories: Research and Statistical Resources, Newsletters and Press Releases, Industry Initiatives, Legislative Information, Industry Publications, Professional Associations, and Educational Resources. While this discussion illustrates how these resources support railroad management, this stratification may also be used as a valuable organizing tool for Internet based resources supporting other industries as managers development knowledge management systems that incorporate selected external information.

BACKGROUND

Today, more than 600 freight railroads operate in North America. They form a seamless integrated system that provides the most efficient, cost-effective freight service in the world. North American railroads operate more then 173,000 miles of track, earn $42 billion in annual revenues, and account for more than 40 percent of all freight

transportation - more than trucks, boats, barges or planes. In 2002, total rail transportation volume was an estimated 1.5 trillion ton-miles (2, 3, 4, 11, 12). Continuously moving on the rail network are more than 20,000 locomotives and 500,000 freight cars. More than 165,000 rail employees schedule, monitor, and manage the network which includes main line track, switching yards, and customer locations. The American railroad industry has been characterized by intense competition since the passage of the Stagger's Act of 1980. Survival in the industry has been challenging and most railroads have either not survived or have survived as companies changed substantially by merger and acquisition activities.

Supporting interoperability and integration requirements among management, employees, and customers is a consistently challenging aspect of railroading. Interoperability is essential and is achieved primarily through standardization and benchmarks. For instance, track gauge, equipment sizes, and document layouts are standardized. Communicating traffic volumes and updates to standards is an essential element of interoperability. Integration initiatives among railroads include efforts to improve rail crossing safety, to influence the passage of legislation that favors the rail industry, and the communication of meeting notices and minutes for a variety of rail related industry associations. Integration initiatives among employee organizations include the sharing of labor union and railroad retirement communications.

The informational and knowledge sources needed to support the interoperability and integration of rail networks and their employees are increasingly available via the Internet. Public resources on the Internet primarily support the distribution of industry publications, notice and proceedings of industry conferences and meetings, communications about legal and legislative issues, and advertisements. Private resources on the Internet support reservation and scheduling of rail equipment, tendering shipment information, tracking equipment movements, and verifying billing information. Much of the private information is incorporated into the knowledge management systems developed by individual railroads.

INTERNET INFORMATION SERVICES

The methodology of this study is an investigation limited in scope to available public online internet sources of information and is carried out as a case study intended to contribute to further theoretical development [5,10]. Table 1 provides a summary of many of the primary web based sources of information and Table 2 provides illustrative examples of how information found on selected web sites may be categorized into a useful organizational schema. During this investigation the authors examined web sites related to freight railroads. This included associations, E-commerce, logistics, railroad, governmental, union, engineering, consultant and safety web sites. Web sites supporting interoperability contain information and documents such as contact information, standard industry terminology, standard operating procedures and railroad industry performance. Web sites supporting integration contain information about industry initiatives, proposed legislation, and rail related associations. Examples of the more interesting online data and information sources are discussed below.

The number of sites containing information related to railroads is immense. The depth and breadth of the sites investigated is particularly interesting because the railroad industry is not typically thought of as information intensive [13]. The site RailroadData.Com, for example, contains more than 4,000 links. The links include government agencies, e-commerce sites, classified ads, rail newspapers, railroad associations and listings of railroad bridges and tunnels. There are a number of railroad related associations maintaining web sites. Some of these include the American Public Transit Association, American Railway Development Association, American Railway Engineering & Maintenance-of-Way Association, Association of American Railroads, Intermodal Association of North America, North American Rail Shippers Association, National Industrial Transportation League, National Railroad Construction and Maintenance Association, Operation Lifesaver, Railway Association of Canada, Railway Engineering-Maintenance Suppliers Association, and Railway Industrial Clearance Association of North America.

The Association of American Railroads' (AAR) web site contains a wealth of statistical information organized by the size of the reporting railroads. Typical information includes total miles of road operated, average employee compensation, traffic characteristics, financial reports, and gross tons transported. This information is presented at an aggregate level and provides information essential for railroad managers and planners. The AAR also publishes weekly statistical performance data for seven major US and Canadian railroads including freight cars

on line, average train speed, average terminal dwell time, bills of lading timeliness and grain car loadings. These statistics are used as a bench mark for railroad management.

Railroad knowledge management can draw heavily from the field of logistics and from the websites dedicated to logistics. The Intermodal Association of North America (IANA) is North America's leading industry trade association representing the combined interests of the Intermodal freight industry. Their membership includes railroads, port authorities, truckers, logistics companies, and suppliers to the industry. Their web site contains information of interest to railroad managers including terminal operations, transport equipment, containerization, documentation, liability rules, and technology trends. It also takes an in-depth look at interrelationships between modes of transportation, shippers and governmental agencies, and presents emerging trends occurring within the industry. Another example is a complementary web site maintained by LoadMatch, which matches loads, trucks, and equipment used for inland intermodal transportation. Some Government agencies which maintain web sites with extensive information include the Canadian Transportation Agency, DOT Research & Special Projects Administration (HazMat), Environmental Protection Agency, Federal Railroad Administration, National Transportation Safety Board, Surface Transportation Board, Transport Canada, U. S. Department of Agriculture, U. S. Department of Transportation, and U. S. Railroad Retirement Board. The Federal Railroad Administration (FRA) contains information on legislative and regulatory initiatives; federal regulations, orders and notices; safety data; a grade crossing viewer; FRA studies and FRA publications.

The U. S. Department of Transportation websites has a wealth of information including information on railroad grade crossings, financial statistics, transportation statistics, laws and regulations, safety issues and rail planning. The Bureau of Transportation Statistics within the U. S. Department of Transportation has statistical information from all areas of transportation and comparative studies between modes of transportation. Schedule Distribution Services (Skedz) is a freight service management company site whose goal is improving management of each step of the freight shipping process for the freight shipping community. They provide access to schedule information for all North American Intermodal carriers, including the schedule of service for each city serviced.

STRATIFICATION

Our analysis indicates that the number of sites containing railroad related information is very large, and that a schema for organizing and filtering the information incorporated into a knowledge management system used by rail managers is essential for the productive use of available resources. The categories proposed for this purpose are as follows: Research and Statistical Resources, Newsletters and Press Releases, Industry Initiatives, Legislative Information, Industry Publications, Professional Associations and Educational Resources.

Research and Statistical Resources

A large volume of railroad research and statistical reports are available online including freight statistical data showing the yearly total tons of each commodity shipped by rail, detailed information on each railroad, and detailed traffic reports. The Bureau of Transportation Statistics, the Federal Railroad Administration and the Association of American Railroads maintain particularly informative web sites.

Newsletters and Press Releases

Managers and executives in the railroad industry must keep up with a changing business environment. There are a number of web sites which provide newsletters, press releases, position papers and railroad related events which can assist the managers to keep abreast of an ever changing environment. The Association of American Railroads (ARR) and Federal Railroad Administration (FRA) has a wealth of this type of information. For example the AAR's "In and Around the Industry" section of its web site provides details regarding the events in a number of railroads and numerous position papers. Numerous speeches and testimonies by governmental officials and others are available.

Industry Initiatives

Safety is the highest priority concern for railroad managers with hundreds of accidents per year. Operation Lifesaver is an industry initiative supported by all major railroads that seeks to significantly reduce the number of railroad accidents. Operation Lifesaver's web site contains a wealth of information including educational materials, statistical data and library information. Of particular interest are the accident statistics for all grade crossings in the US.

Legislative Information

Railroads historically have had a close relationship with government. Management must stay informed of current legislation and legislative initiatives. Most railroad related web sites have links to key legislation and regulatory sites.

Industry Publications

Managers need to keep up with general issues and activities in the rail industry. Many of the rail association sites have links to their publications. For example, The National Industrial Transportation League web site provides information on domestic and international transportation policy issues. The Association of American Railroads has several hundred publications covering a wide variety of industry topics. RailroadData.Com has more than 5,000 railroad related links including links to discussion forums, rail contractors, governmental agencies, rail associations and technical data. It also has many links for the rail hobbyist, tourist, commuter and international sites, which are not of general interest to the railroad manager.

The Intermodal Association of North America (IANA) web site contains statistical data related to Intermodal activities, legislative bills and alerts, Intermodal market trends, a quarterly report that provides a comprehensive look at rail and Intermodal activity and best practices video tapes. IANA also provides a detailed uniform Intermodal interchange and facilities access agreement. This is the only standard equipment interchange contract used in the Intermodal industry.

Professional Associations

Most active railroad executives and managers are members of one or more professional associations or societies and participate in their activities. For example National Industrial Transportation League (NITL) represents the interests of shippers before government regulatory agencies. This organization holds a yearly national conference, publishes a monthly newsletter and publishes on its web site its legislative activities. It also publishes a Code of Ethics reflecting the need for ethical behavior by railroaders. As pointed out above the American Railroad Association is a very active and large association holding its annual meetings in Washington, D.C. and a yearly Railroad Day on Capitol Hill. The AAR is organized into seven departments including the President's Office, Administration and Finance, Communications, Government Affairs, Law Department, Policy & Economics and Safety & Operations each with its own informative Web pages.

Educational Resources

As with any profession, educational information and training courses are important for continuous improvement initiatives. The Federal Railroad Administration and the Department of Transportation web sites present links to numerous training opportunities. Operation Lifesaver, an initiative to improve grade crossing safety, has useful educational materials designed for teachers to use with school age children.

Table 1
North American Rail Freight Transportation Related Web Sites

Rail Freight Associations

American Railway Development Association	http://www.amraildev.org
American Railway Engr. & Maint. Assn.	http://www.arema.org
American Short Line & Regional Railroad Association	http://www.Aslrra.org
Association of American Railroads	http://www.aar.org
Association of Car Accounting and Car Service Officers (ACACSO)	http://www.acacso.org
Coalition Against Bigger Trucks	http://www.cabt.org
Hazardous Materials Advisory Council	http://www.hmac.com
High Speed Ground Transportation Association	http://216.181.117.50
Institution of Railway Signal Engineers	http://www.irse.org
Intelligent Transportation Systems	http://www.itsonline.com
Intermodal Association of North America	http://www.intermodal.org
League of Rail Industry Women	http://www.lriw.org
NASSTRAC (shippers association)	http://www.nasstrac.org
National Association of Railway Business Women	http://www.narbw.org
National Industrial Transportation League	http://www.nitl.org
National Railroad Construction and Maintenance Assn.	http://www.nrcma.org
North American Rail Shippers Association	http://www.railshippers.com
Operation Lifesaver, Inc.	http://www.oli.org
RailroadData.com	http://www.railroaddata.com
Railway Association of Canada, The	http://www.railcan.ca/
Railway Engineering-Maintenance Suppliers Assn.	http://www.remsa.org
Railway Industrial Clearance Assn of North America	http://www.rica.org
Railway Progress Institute	http://www.rpi.org
Railway Systems Suppliers, Inc.	http://www.rssi.org
Railway Supply Association	http://www.rsaweb.org
Railway Tie Association	http://www.rta.org
Transportation Consumer Protection Council	http://www.transportlaw.com
Transportation Intermediaries Association	http://www.tianet.org
Transportation Research Board	http://www.nas.edu/trb

Rail Related Government Web Sites

Bureau of Transportation Statistics	http://www.bts.gov
Canadian Transportation Agency	http://www.cta-otc.gc.ca
D.O.T. Research & Special Projects Administration (HazMat)	http://hazmat.dot.gov
Environmental Protection Agency	http://www.epa.gov
Federal Railroad Administration	http://www.fra.dot.gov
National Transportation Safety Board	http://www.ntsb.gov
Surface Transportation Board	http://www.stb.dot.gov
Transport Canada	http://www.tc.gc.ca/
U. S. Department of Transportation	http://www.dot.gov
U. S. Railroad Retirement Board	http://www.rrb.gov

Railway Labor Organizations

Brotherhood of Locomotive Engineers	http://www.ble.org
Brotherhood of Maintenance of Way Employes	http://www.bmwe.org
Brotherhood of Railway Signalmen	http://www.brs.org
Transportation Communications International Union	http://www.tcunion.org
Transportation Trades Department, AFL-CIO	http://www.ttd.org
United Transportation Union	http://www.utu.org

Major Railroads and Industry Partners

Burlington Northern & Santa Fe Railway	http://www.bnsf.com
Canadian National	http://www.cn.ca
Canadian Pacific Railway	http://www8.cpr.ca/cms/English
CSX Transportation	http://www.csx.com
Ferrocarril Mexicano, S.A. de C.V.	http://www.ferromex.com.mx
Kansas City Southern Railway Co.	http://www.kcsi.com
Norfolk Southern Corporation	http://www.nscorp.com
RAILINC Corporation	http://www.railinc.com
TTX Company	http://www.ttx.com/
Union Pacific Railroad	http://www.uprr.com

Trade Publications

International Railway Journal	http://www.railjournal.com
Journal of Commerce	http://www.joc.com
Pocket List of Railroad Officials	http://www.cbizmedia.com
Railway Age	http://www.railwayage.com
Railway Track & Structures	http://www.rtands.com
Traffic World Magazine	http://www.trafficworld.com
Trains Magazine	http://www.trainsmag.com

Table 2
Selected Web Sites and Information Categorization Illustrations

	Research and Statistical Resources	News-letters and Press Releases	Industry Initiatives	Legislative Information	Industry Publications	Professional Associations	Educational Resources
American Short Line Railroad Association		Position Papers & News		Legislative and Regulatory Initiatives	Tariffs	Events	Online Safety Seminars
AFL-CIO Transportation Department		Press Releases & Position Papers		Legislative and Regulatory Initiatives, Filings, & PAC Links			
Association of American Railroads	Research & Statistical Reports	Press Releases & Position Papers, News	Links to Related Sites	Legislative and Regulatory Initiatives, Filings, & PAC Links	Numerous Publications	Seminar Presentations, Meeting Minutes, List of Members	Links to Related Sites
Burlington Northern Railroad	Company Information	Press Releases	Safety Data				
Department of Transportation	Research Reports	Grant Information & News		Legislative and Regulatory Initiatives	Geo-graphic & Atlas Data		Online Journal Access & Link to National Transportation Library
Federal Railway Administration	Research & Statistical Reports		Grade Crossing & Safety Information	Legislative and Regulatory Initiatives & RR Administration Issues			Educational Materials & Links to Related Sites
Intermodal Association of North America	Statistical Reports	Press Releases	Grade Crossing & Safety Information & Links to Related Sites	Legislative and Regulatory Initiatives		Seminar Presentations & Meeting Minutes	
National Industrial Transportation League	Statistical Reports	Press Releases News-letter, & Grant Information		Regulatory Filings	Tariff & Crude Oil Price Publi-cations		Training Courses
National Shippers Association		Press Releases & News-letters		Legislative and Regulatory Initiatives, & Filings		List of Members & Events Calendar	
Operation Lifesaver	Statistical Reports	News	Initiative Updates				Lesson Plans & Training Materials for Teachers
Railway Age (magazine)	Statistical Reports	News				Advertise-ments	
U.S. Senate Committee on Commerce, Science & Transportation		Press Releases		Legislative and Regulatory Initiatives, & Filings			

SUMMARY

During this investigation the authors found a number of online sources of information and data useful to the railroad manager. Much of the information was available free of charge, though we did find that a number of the professional associations which restricted access to members only. Both interoperability and integration initiatives were supported by the Internet resources identified in this study. Web sites supporting interoperation include information such as railroad classifications and contact information, bridge and tunnel dimensions, railroad equipment classifications, industry terminology, and engineering standards. Web sites supporting integration included information about topics such as Operation Lifesaver, the Safe Highways and Infrastructure Preservation Act (H.R. 3132), railroad related associations, and schedules of industry conferences.

Our findings also indicate that web based information resources that support integration and interoperability within an industry may be stratified into the following categories: Research and Statistical Resources, Newsletters and Press Releases, Industry Initiatives, Legislative Information, Industry Publications, Professional Associations, and Educational Resources. Both the number of web sites and the amount of information contained on the web sites indicate how important external information is within an industry and how important it is to have an effective organizing mechanism. The stratification proposed here is one useful way to organize a vast array of information into useful categorizations as knowledge management systems incorporate external information sources.

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