



Your Bridge to the Future

Look inside for brief descriptions of our research reports, guides, and white papers.

## TFI Publications

Each year, TFI conducts a number of special research projects and publishes the results of these projects in reports that are available to the public. In addition, we sell reference books and monographs on technology forecasting and communication technologies. For more detailed information about our publications, please visit [www.tfi.com/pubs/](http://www.tfi.com/pubs/).



### Telecom & Technology Market Reports

- *Transforming the Local Exchange Network: 3rd Edition* ★New
- *Biotechnology: A Guide to Business and Workplace Development* ★New
- *The Conversion of Narrowband Access Lines to VHS Broadband Facilities: Analysis and Forecasts* ★Available soon
- *Forecasts for Broadband Communications: An Analyst Paper* by TFI
- *Forecasts for Higher Bandwidth Broadband Services*
- *Broadband Investment for Local Telecommunications Carriers*
- *Forecasts of Access Line Competition in the Local Exchange*
- *Depreciation Lives for Fiber Optic Cables in the Local Exchange*
- *The Local Exchange Network in 2015*
- *Salvage & Cost of Removal for LEC Investments*

### Communications Reference Book

- *Communication Technology Update: 10th Edition* ★New Edition

### Forecasting Guides

- *Introduction to Technology Market Forecasting*
- *Technology Forecasting: An Aid to Effective Technology Management*
- *Practical Technology Forecasting*

### E-Letter

- *Futures' Features*

### White Papers, Articles & Complimentary Reports

- *Top 7 Technology Trends for 2006* ★New
- *Strategic Roadmapping*
- *Peer Networks Plague or Promise*
- *Technology Forecasting for Telecommunications*
- *Emerging Technology Programs for Texas Colleges: Advanced Digital Manufacturing, Hybrid Vehicles, Micro-Electromechanical Systems, and Computer Forensics*
- *Homeland Security, A Technology Forecast*
- *Testing the Tea Leaves—Formal Methods for Evaluating the Validity of Forecasts* ★Signature TFI paper
- *Fuel Cells, A Technology Forecast*
- *Nanotechnology: A Technology Forecast*
- *Five Views of the Future™, A Strategic Analysis Framework: Overview & Methods* ★Signature TFI paper
- *Better Forecasts, Better Plans, Better Results*
- *Programs for Emerging Technologies*
- *Residential Broadband Forecast*
- *The Local Exchange Network in 2015*
- *A Structured Approach to Technology Assessment*
- *Identifying and Evaluating New Product Opportunities*
- *Identifying and Evaluating New Manufacturing Processes*
- *Opening New Markets for Existing Product Lines*
- *Winning by Coming in Second*

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## TECHNOLOGY FUTURES INC.

Since 1978, TFI has been conducting technology and market forecasts. As a result, we have developed an extensive toolkit of proven, quantifiable forecasting methods and strategic applications. Headquartered in Austin, Texas, we work with leading technology and industrial companies to provide a forward-looking vantage point for making sustainable business decisions.



### \*TTFG:

TFI has been the primary contractor for the Telecommunications Technology Forecasting Group (TTFG) since its inception in 1985. TTFG was established to promote the understanding and use of forecasting to predict and support the continuing evolution of the public telecommunications network.

Some of the research reports listed in this catalog were commissioned by this industry consortium to quantify the demand for new services, technology change, and competition on the public telecommunications network.

### TTFG member companies are:

- Bell Canada
- BellSouth Telecommunications
- Qwest
- SBC Communications
- Verizon

To qualify for TTFG prices, you must work on the regulated side of one of the member companies listed above or one of the telecommunications regulatory agencies. Call for TTFG prices.

## Technology Forecasting Guides

TFI offers educational publications and monographs on forecasting techniques and methodologies which can be used to address practical business problems in technology management, finance, marketing, and strategic planning.

### Introduction to Technology Market Forecasting

Lawrence K. Vanston, Ph.D. & John H. Vanston, Ph.D.



This monograph, written by leading technology forecasters, includes discussion and examples of several substitution models including the Fisher-Pry and Gompertz models. When combined with good judgment and knowledge of the industry, these relatively simple models can usually outperform industry wisdom and the guesses that often pass for market forecasts. Anyone whose future depends on technology markets will find them extraordinarily useful both in gaining insight and understanding, as well as in decision making.

### Table of Contents

Introduction to Technology Market Forecasting • Processes and Patterns of Technology Adoption • The Process of Technological Substitution • The Process of Diffusion • The Process of Mortality • Mathematical Models for the Adoption of New Technology • The Fisher-Pry Model • The Gompertz Model • Using Technology Market Models for Forecasting • Experience with Forecasting with Substitution Models

US \$25, 1996, 27 pages, Softcover,  
Sponsored by the TTFG\*  
ISBN 1-884154-07-7

### Technology Forecasting: An Aid to Effective Technology Management

John H. Vanston, Ph.D.



This guide details technology forecasting (TF) management techniques that will contribute to better decision making, and will provide assistance for organizations to improve planning, operations, and marketing.

### Table of Contents

Selecting Objectives for TF Activities • TF Techniques • Application of TF Technologies • Initiating, Conducting, and Utilizing a TF Program

US \$45, 1994, 1988, 59 pages, Softcover  
ISBN 1-884154-03-4

### Practical Technology Forecasting

James R. Bright, Ph.D.



Technology forecasting describes a group of techniques that predict, in quantifiable terms, the direction, character, rate, implication, and impact of technical advance. This book provides an excellent overview of most of the methods currently in use.

US \$25, 1978, 110 pages, Softcover  
ISBN 1-884154-09-3

## Communications Reference Book

### Communication Technology Update: 10th Edition

August E. Grant, Ph.D. & Jennifer H. Meadows, Ph.D., Editors. In association with Technology Futures, Inc.



Now that we have entered the 21st century, we see new communications technologies being introduced at an astonishing rate. Making sense of these technologies is increasingly difficult. This publication is the single best source for the latest developments, trends, and issues in communication technology. Now in its 10th edition, *Communication Technology Update* has become an indispensable information resource for business, government, and academia.

### Topics

**Introduction:** The Umbrella Perspective on Communication Technology • Communication Technology Timeline

**Electronic Mass Media:** Digital Television • Cable Television • Direct Broadcast Satellites • Pay Television Services • Interactive Television • Streaming Media • Radio Broadcasting

**Computers & Consumer Electronics:** Personal Computers • Mobile Computing • Interactive Video Game Technologies • The Internet & the World Wide Web • E-Commerce • Virtual & Augmented Reality • Home Video Technology • Digital Audio • Digital Photography

**Telephony:** Telephony • Broadband Networks • Home Networks • Wireless Telephony • Teleconferencing

**Conclusions:** Other Cutting-Edge Technologies

US \$50, August 2006, 384 pages, Softcover  
ISBN 0-240-80881-9  
Published by Focal Press

## Telecom & Technology Market Reports

TFI publishes in-depth research reports providing analyses and forecasts of emerging communications and telecom technologies and markets. These reports are written for decision-makers looking for the competitive edge in specific technology and market areas. Topics include many of the non-traditional telephony products and services from the broadcast, cable, computer, satellite, and wireless industries. Many of the publications are sponsored by the Telecommunications Technology Forecasting Group (TTFG). \* *Extended tables of contents and lists of figures are available on our website at [www.tfi.com](http://www.tfi.com) or by contacting TFI.*

### **Transforming the Local Exchange Network: 3rd Edition**

Lawrence K. Vanston, Ph.D.  
& Ray L. Hodges



According to this report, incumbent local exchange networks (ILECs) have no choice but to invest in new technology and offer high-speed broadband and video to stay in the game. This report presents the latest TFI forecasts for the North American local exchange network, covering switching, circuit equipment, and outside plant. The report also includes TFI's recommendations on depreciation lives for local exchange telephone plant, accounting for technology displacement and loss of access lines due to competition.

#### Key Findings:

- Technology change, competition, and the growth of broadband have accelerated their impacts on the local exchange network.
- The local exchange telecommunications industry is transitioning from a narrowband network of circuit switches and copper cables to a broadband network of packet switches and fiber optics. This transition will largely be complete between 2015 and 2020, but probably not much before.
- Increasing bandwidth is now mandatory for ILEC, but the best way to do it depends on a number of factors and the ultimate winner is still unclear to the dispassionate observer.
- Depreciation lives that fully take into account technology change and competition are still generally consistent with those used by ILECs for financial reporting and those previously recommended by TFI. They imply that property tax valuations may be too high in some jurisdictions.

**US \$2,495**, March 2006, 150 pages,  
Softcover or PDF, Sponsored by the TTFG  
ISBN 1-884154-25-5

### **The Conversion of Narrowband Access Lines to VHS Broadband Facilities: Analysis and Forecasts**

Lawrence K. Vanston, Ph.D.  
& Gary Crosbie



Available Summer 2006!

**US \$495**, 37 pages, Softcover or  
PDF, Sponsored by the TTFG  
ISBN 1-884154-26-3

### **Biotechnology: A Guide to Business and Workplace Development**

John H. Vanston, Ph.D.  
& Henry Elliott, M.S.



A must-have report for individuals and small and medium-sized businesses interested in entering or expanding activities in the biotechnology industry. The report gives a detailed overview and analysis of employment opportunities, drivers for success, funding sources, potential buyers and sellers, and research and commercialization opportunities. It includes direct input from experts currently working in the biotech area.

**US \$350**, April 2006, 150 pages, PDF Only  
ISBN 1-884154-27-1

### **Forecasts for Broadband Communications: An Analyst Report by TFI**

Lawrence K. Vanston, Ph.D.



We expect broadband to continue to be adopted at a rapid rate, and ultimately, reach levels of penetration comparable to other popular consumer electronics. Higher broadband speeds will also increase dramatically. This paper provides TFI analyses and forecasts for the growth of residential broadband and higher broadband speeds. Material in this paper is adapted from TFI's report *Forecasts for Higher Bandwidth Broadband Services* which was sponsored by the TTFG.

**US \$199**, December 2005, 12 pages,  
PDFOnly. ISBN 1-884154-22-0

### **Forecasts for Higher Bandwidth Broadband Services**

Lawrence Vanston, Ph.D.,  
Ray Hodges, & Joseph  
Savage



This report forecasts the increase in broadband data rates and discusses the applications, especially IP Video, driving the increase. It also covers the current leaders—South Korea, Japan, and Italy. By 2006, U.S. broadband penetration will likely reach 50% and a shift to data rates of 24-100 Mb/s will have begun. By 2010, 75% broadband penetration is likely, with 10-20% of households subscribing to very high-speed-broadband.

#### Key Findings

- Broadband will eventually be adopted by most households as websites become increasingly designed for broadband, e-mail attachments grow large, and new services such as VoIP become widely adopted.
- U.S. residential broadband will demand higher data rates than currently provided, probably in the range of 6-10 Mb/s, which is already available in leading broadband countries.
- Bandwidth increases reflect the general tendency for demand to increase along with computing power and memory. They will also reflect the demand for specific services such as IP video that require more bandwidth. TFI forecasts IP video penetration of 40% in 2010, with high definition IP video penetration of 20%.
- In 2006, a shift to much higher data rates in the range of 24-100 Mb/s is likely to begin. So far, only a few places have access at these rates, notably Japan.
- Leading broadband countries are a full generation ahead of North America. Japan and Korea are already rolling out the subsequent generation of services operating at 20 Mb/s and above, and have plans to complete the transition by 2010.
- There are factors that favored early broadband adoption and rapid broadband progress in the leading countries. However, there is nothing unique about these countries in their need for broadband and faster rates and nothing that indefinitely precludes North America from having it available.
- The results confirm TFI's scenarios for the placement of fiber optics deep into ILEC networks, extending to the home via BPONs, or very close to the home via VDSL technology. In the process, much of ILEC current investment in metallic cable will be made obsolete.

**US \$495**, December 2004, 47 pages,  
Softcover or PDF, Sponsored by the TTFG  
ISBN 1-884154-22-0

\*TTFG member list on page 2.

## Telecom & Technology Market Reports (Continued)

### Broadband Investment for Local Telecommunications Carriers

Lawrence K. Vanston, Ph.D.  
& Gary Crosbie



US \$495, 2005, 82 pages,  
Softcover or PDF, Sponsored by the TTFG\*  
ISBN 1-884154-24-7

### Forecasts of Access Line Competition in the Local Exchange

Lawrence K. Vanston, Ph.D.



Competition is having a major impact on incumbent local exchange carriers. After years of high growth, the number of ILEC retail narrowband switched access lines peaked at 181.3 million lines in 1999 and has continuously declined since then, falling to 162.7 million lines by December 2002. This report documents TFI's latest forecasts of the future of competition in the local exchange and its impact on the ILECs.

US \$495, December 2003, 180 pages,  
Softcover or PDF, Sponsored by the TTFG\*  
ISBN 1-884154-21-2

### Depreciation Lives for Fiber Optic Cables in the Local Exchange

Ray L. Hodges &  
Lawrence K. Vanston, Ph.D.



This report addresses the economic life of single-mode fiber optic cable installed by incumbent local exchange carriers (ILECs) in the local exchange network. The depreciation lives of these cables are derived from analysis of demand, technology substitution, physical mortality, and competitive factors. The technology and competitive issues driving network changes are explained in detail.

US \$495, February 2003, 72 pages, Softcover or PDF, Sponsored by the TTFG\*  
ISBN 1-884154-20-4

### TFI Publication Archive

For complete list of older TFI publications and information, please visit:  
[www.tfi.com/pubs/archive.html](http://www.tfi.com/pubs/archive.html)

### The Local Exchange Network in 2015

Lawrence K. Vanston, Ph.D.



This is a forecast of the North American local exchange network at the end of 2015, viewed from the perspective of 2001. It is based on forecasts by TFI.

#### Key Findings

- The typical household subscribes to broadband service at 24 Mb/s to 100 Mb/s.
- Medium and large businesses access the network directly with fiber at data rates from 2.4 Gb/s to 40 Gb/s.
- Fiber dominates the outside plant, comprising 100% of the interoffice network, 97% of the feeder network, and 95% of the distribution network.
- Switching is 100% packet-based on ATM and IP switches.
- Almost 70% of North American households no longer have a standard wireline and use wireless or computer telephony instead.
- The interoffice network is all fiber, with dense wave division multiplexing on most routes.
- Of the \$355 billion of network investment in 2001, well under 10% is still in use in 2015.

Free PDF version available on the TFI website. Printed copy US \$25, December 2001, 28 pages, Softcover, Sponsored by the TTFG\* ISBN 1-884154-18-2

### Salvage and Cost of Removal for LEC Investments

Ray L. Hodges



This review of salvage and cost of removal factors for local exchange carriers analyzes salvage trends and issues for computers, circuit switching, and outside plant investments, including non-metallic cable, poles, and conduit. It provides an identification and assessment of potential changes in salvage and cost of removal factors due to current and future technology trends.

Although the future net salvage (FNS) may be near 0% for most telephone companies, it is still important to determine the correct FNS by account since many of today's prices are cost-based for unbundled elements. The report is designed to support LEC regulatory filings, financial decisions, and auditor reviews.

US \$495, March 2000, 98 pages, Softcover or PDF, Sponsored by the TTFG\*  
ISBN 1-884154-13-1

## TFI White Papers, Articles & Complimentary Reports



Written by members of our distinguished staff of experts, these white papers, articles, and complimentary reports provide interesting perspectives on technology and telecom issues, as well as examples of actual forecasting projects. These are available at no charge online or by calling TFI. See list on front page. Visit <http://www.tfi.com/pubs/white.html> for more information and links to papers.

## Futures' Features

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[www.tfi.com](http://www.tfi.com)

\*TTFG member list on page 2.