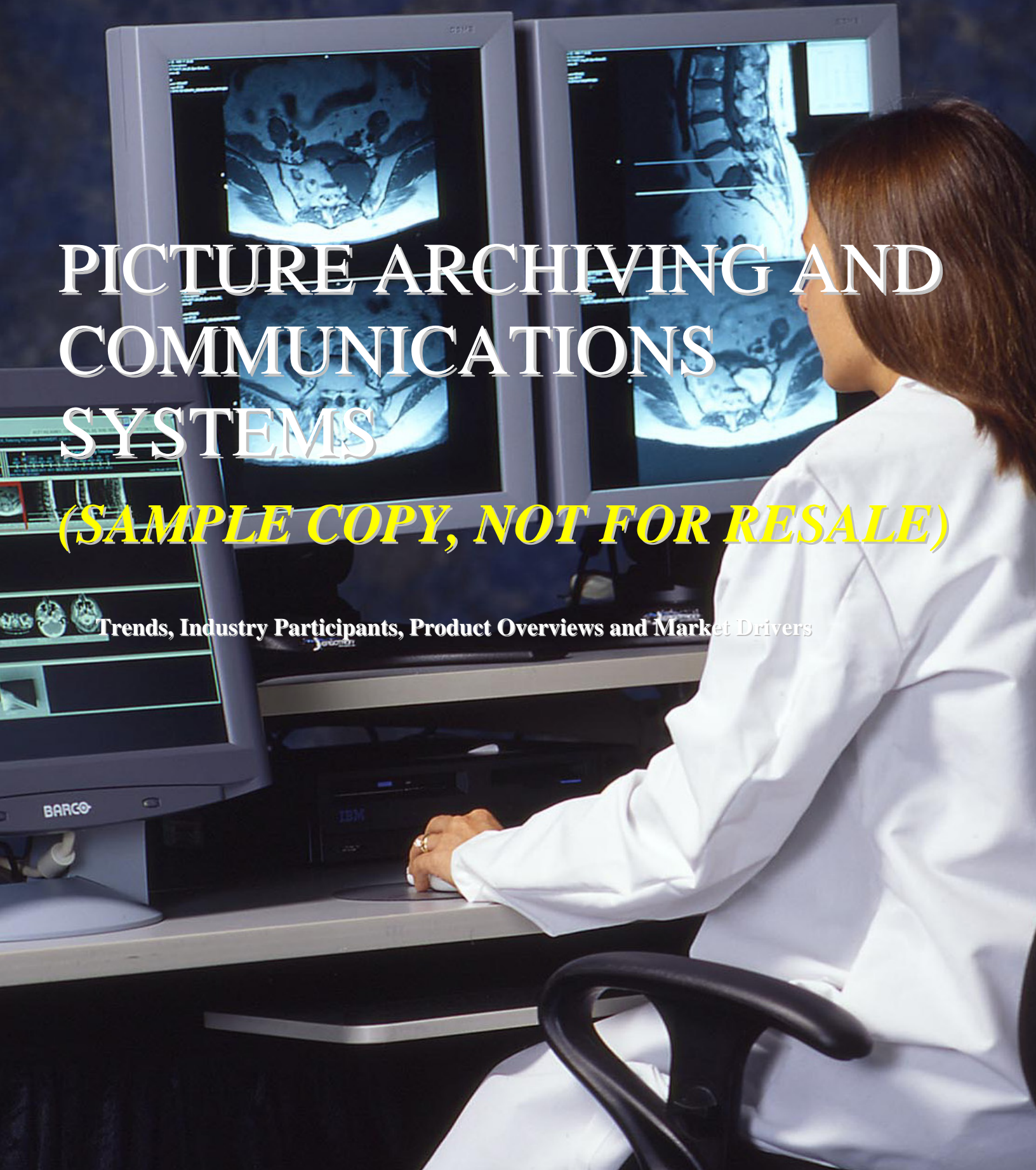


# PICTURE ARCHIVING AND COMMUNICATIONS SYSTEMS

***(SAMPLE COPY, NOT FOR RESALE)***

Trends, Industry Participants, Product Overviews and Market Drivers



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## 1. Overview

### 1.1 Statement of Report

As imaging departments in healthcare facilities have migrated from film to digital, the display and storage systems have had to migrate too. These new digital imaging storage and display systems are called picture archiving and communication systems (PACS). Their market penetration in the U.S. has been significant, at almost 90%. A PACS network typically consists of a central server that stores a database containing the images connected to one or more clients via a local area network (LAN) or a wide area network (WAN) that provides or utilizes the images. More and more PACS utilize Internet-based technologies as their means of communication. This allows remote viewing and diagnosis with implications for both civilian and military healthcare facilities. Since radiology departments dominate the production of images, interconnections with radiology information systems (RIS) are also looked at in this study. As such, the focus of this report is to analyze and describe the PACS market segments.

### 1.2 About This Report

PACS was enabled by the development of standards by the American College of Radiology/National Electrical Manufacturers Association (ACR/NEMA) called the Digital Imaging and Communications in Medicine (DICOM) protocol. Other key regulations and standards that impact this space and are also examined are the Health Insurance Portability and Accountability Act (HIPAA) and the health level seven (HL7) guidelines. In this report, the trends, key vendors and market drivers are examined and abundant graphs and tables detailing important aspects of the space are provided.

By purchasing this study, the reader will have:

- An understanding of the most exciting PACS market segments.
- The latest information on leading products and R&D initiatives.
- Familiarity with recent developments and their effects on selected markets.
- Knowledge of the PACS market as an area of growth, research and investment.
- An extensive review of the PACS hardware, software and radiopharmaceuticals markets leading companies.

Key questions answered in this review are:

- How can PACS tools and technologies facilitate improved patient care?
- What are the main types of PACS technologies that are currently available?
- Who are the current key players in this marketplace?
- What is the current state of the PACS market?
- What are the major trends in PACS solutions?
- What is the impact of regulatory changes on the PACS markets?

Additionally, this examination contains:

- In-depth profiles of the leading companies with PACS tools and technologies.
- Detailed analysis of the trends in the PACS marketplace.
- Views on the PACS industry from leading industry experts.
- Analysis of new PACS applications.
- The latest news and M&A developments in the PACS marketplace.

Analysis includes charts and graphs measuring product growth and trends within the marketplace. Company-specific information, including sales figures, product pipeline status and R&D trends, is provided.

The study will help the reader to:

- Evaluate the effect of strategic factors such as technology driven change and industry consolidation.
- Investigate how cost-constraints and technological advances are driving change in the PACS markets.
- Review the main participants in each sector and plan an entry strategy in line with the strengths and weaknesses of the competition.

### **1.3 Scope of the Report**

This analysis primarily focuses on PACS and RIS. It discusses products, trends, new developments and compensation issues that are currently affecting or are likely to affect the market soon. Detailed analyses are provided for each of the key companies in the major and minor market segments. More comprehensive information is provided for those companies that are in the major market segments.

The reader should consult other TriMark Publications reports at <http://www.trimarkpublications.com> for a detailed discussion of the important individual market segments that are related to these markets such as the diagnostics, medical devices and pharmaceuticals markets. Fuller explorations of these and other areas of interest can be found in other TriMark Publications reports.

### **1.4 Objectives**

Discussions of the key products for PACS market are presented here. The analysis goes on to discuss the trends that have developed and are stimulating this market. A survey of all of the significant, active companies known to be marketing, manufacturing or developing instruments and agents in the areas selected as leading PACS markets in the U.S. is included in this study.

### **1.5 Methodology**

This analysis is based in part upon interviews with research and marketing professionals of companies in the imaging market. They were queried about their companies' products and development strategies as well as their overall thoughts about their industry segment. The information in this report is based on a review of the relevant published and web literature, interviews and meeting presentations. Our review is based on interview and meeting data, in addition to the peer-reviewed literature, with the aim of providing a more current and in-depth assessment than a literature review alone, and so also reflects our own interpretations, as well the opinions of our interviewees.

Sources of information for the study were trade association publications and meetings, product brochures and catalogs, and company literature. Where the companies under discussion were publicly held, an examination of the annual reports, 10k filings and financial reports were used as the basis of the data reported. Important data sources include the Health for All Database of the World Health Organization (WHO), data published by the statistical office of the European Communities (Eurostat), as well as various health data from the United Nations (UN) and the Organization for Economic Cooperation and Development (OECD). Where possible and practicable, the most recent data available have been used.

The author of this report has an MD with a specialty in clinical radiology. The senior editor is a doctoral-level clinical scientist. He is a PhD in biochemistry with many decades of experience in science writing and as a medical industry analyst, and has been a senior director of several large regional and national imaging laboratories.

Some of the statistical information was taken from Biotechnology Associates' databases and from TriMark's private data stores. The information set forth in this study was obtained from sources that we believe to be reliable, but we do not guarantee the accuracy, adequacy or completeness of any information contained herein or the results obtained by the use of such information.

Key information from the business literature was used as a basis to conduct dialogue with and obtain expert opinion from market professionals with regard to commercial potential and market sizes. Senior managers from major company players were interviewed for part of the information in this report.

*Primary Sources:* TriMark collects information from hundreds of Database Tables and many comprehensive multi-client research projects and Sector Snapshots that we publish annually. We extract relevant data and analytics from TriMark's research of the past three years as part of this data collection. We also extract qualified data feeds from e-questionnaire responses and primary research responses for this compilation.

*Secondary Sources:* TriMark uses research publications, journals, magazines, newspapers, newsletters, industry reports, investment research reports, trade and industry association reports, government-affiliated trade releases and other published information as part of our secondary research materials.

The information is then analyzed and translated by the Industry Research Group into a TriMark study. The Editorial Group reviews the complete package with product and market forecasts, critical industry trends, threats and opportunities, competitive strategies and market share determinations. The report's conclusions are verified through intensive interviewing of top-ranking companies in the industry.

### ***TriMark Publications Report Research and Data Acquisition Structure***

The general sequence of research and analysis activity prior to the publication of every report includes the following items:

- Completing an extensive secondary research effort on an important market sector, including gathering all relevant information from corporate reporting, publicly available databases, proprietary databases, direct meetings and personal interviews with key personnel.
- Formulating a study outline with the assigned writer, including important items:
  - Market and product segment grouping and evaluating their relative significance.
  - Key competitors' evaluations, including their relative positions in the business and other relevant facts to prioritize diligence levels and assist in designing a primary research strategy.
  - End-user research to evaluate analytical significance in market estimation.
  - Supply-chain research and analysis to identify any factors affecting the market.
  - New technology platforms and cutting-edge applications.
- Identifying the key technology and market trends that drive or affect these markets. Assessing the regional significance for each product and market segment for proper emphasis of further regional/national primary and secondary research.
- Launching a combination of primary research activities, including two levels of questionnaires, executive-direct focused, company-specific and region-specific communications to qualified and experienced senior executives worldwide.
- Completing a confirmatory primary research assessment of the report's findings with the assistance of Expert Panel Partners from the industry being analyzed.

## **1.6 Executive Summary**

In order to put PACS in a proper context, we begin this report with an examination of key characteristics of the overall imaging market. We describe the number of radiologists, the number of hospitals, the dominant companies and various market factors such as the drivers, the restraints and the major segments. Most PACSs handle images from various medical imaging instruments, including ultrasound, magnetic resonance imaging (MRI), positron emission tomography (PET), computed tomography (CT), endoscopy, mammograms, etc. So, it is important to understand what is going on in those areas since they help drive the PACS market.

Next, we examine the PACS markets. We look at the market dynamics both civilian and military, and examine industry forecasts. PACS can be purchased various ways including:

- Traditional (TURNKEY) PACS.
- Web-based PACS.
- Software-only PACS (best of breed/unbundled solutions).
- Application service provider.

In the fourth section, we look at the impact of regulatory issues. Two of the most impactful areas are Health Insurance Portability and Accountability Act (HIPAA) and Digital Imaging and Communications in Medicine (DICOM). DICOM is a standard for handling, storing, printing, and transmitting information in medical imaging. It includes a file format definition and a network communications protocol. The communication protocol is an application protocol that uses TCP/IP to communicate between systems. DICOM files can be exchanged between two entities that are capable of receiving image and patient data in DICOM format. The National Electrical Manufacturers Association (NEMA) holds the copyright to this standard. It was developed by the DICOM Standards Committee, whose members are also partly members of NEMA. Technology trends are described as well, with details on specific companies. The information on these companies includes the following:

- Business summary including partnerships.
- Key corporate statistics.
- Valuation measures.
- Financial highlights.
- Trading information.

For those companies that are not publicly traded, available financial information is provided. There is also a news section that includes M&A information.