Description: During the past 35 years, ultrasound and nuclear medicine were introduced into clinical medicine, computed tomography (CT) revolutionized diagnostic procedures and magnetic resonance imaging (MRI) emerged, bringing new diagnostic information at the cellular level. X-ray morphed from analog films to digital, and virtually all medical images became "soft" files on the electronic networks. 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). Most PACS handle images from various medical imaging instruments, including ultrasound, MRI, positron emission tomography (PET), CT, endoscopy, mammograms, etc.

The focus of this TriMark Publications report is to analyze and describe the PACS market segments. PACS market penetration in the U.S. healthcare space 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.

Contents:
1. Overview
   1.1 Statement of Report
   1.2 About This Report
   1.3 Scope of the Report
   1.4 Objectives
   1.5 Methodology
   1.6 Executive Summary
2. Picture Archiving and Communication Systems (PACS): An Overview
   2.1 Components and Architecture of PACS
      2.1.1 Image Acquisition Component
      2.1.2 PACS Controller
      2.1.3 Database Server and Archiving System
      2.1.4 Short-Time Archive
      2.1.5 Long-Time Archive
      2.1.6 Workstations
      2.1.7 Network
   2.2 Communication Protocols
      2.2.1 DICOM Standard
      2.2.2 HL7 Standard
      2.3 Current PACS Products and Software
      2.3.1 Agfa IMPAX 6
      2.3.2 Siemens syngo Suite
      2.3.3 OpenSourcePACS
      2.4 Future Trends and Developments in PACS
3. Medical Image Management in Healthcare Enterprise
   3.1 PACS and Medical Images
      3.1.1 Hospital Information System/Radiology System Database
      3.1.2 Database Gateway
      3.1.3 Imaging Modalities
      3.1.4 Acquisition Gateway
      3.1.5 PACS Controller – Image Database and Archive
      3.1.6 Workstations
      3.1.7 Application Servers
   3.2 HIS/CMS and Electronic Patient Record
3.2.1 Enterprise Level Image/Data Distribution
3.2.2 Business Models for Image/Data Management in the Enterprise Level

4. Processing of Medical Images
4.1 Medical Image Management and Image Data Mining
4.2 Bioimaging
4.3 Virtual Reality in Medical Visualization
4.4 Neuroimaging
4.5 Software Techniques Coping with Large Data
4.6 Utility of PACS in Medical Imaging
4.7 Need for a PACS System
4.8 Clinical Applications on PACS
4.8.1 Advanced Applications
4.8.2 Specialized Applications
4.8.3 Hospital Scenario Before and After PACS
4.9 PACS in HER Architecture
4.10 PACS Benefits
4.10.1 Improvements to the Quality of Patient Care
4.10.2 Improvements in Efficiencies and Effectiveness
4.10.3 Cost Savings/ Cost Avoidance
4.10.4 Other Important Benefits

5. Other IT Solutions in Hospitals: An Overview
5.1 Commonly Used Information Technologies in Clinical Setting
5.1.1 Hospital Management System (HMS)
5.1.2 Clinical Data Repository (CDR)
5.1.3 Clinical Decision Support (CDS)
5.1.4 Computerized Physician Order Entry (CPOE)
5.1.5 EHR Systems
5.1.5.1 Use of Electronic Health Records in U.S. Hospitals
5.1.5.2 Adoption of Clinical Functionalities in Electronic Format
5.1.5.3 Adoption of Electronic Records in U.S. Hospitals
5.1.5.4 Barriers to Electronic Record Adoption
5.1.6 Electronic Medical Record (EMR)
5.1.7 Electronic Medication Administration Record (eMAR)

6. Market Analysis
6.1 Global Opportunities in Medical Imaging
6.1.1 Global Market for Medical Imaging Equipment
6.1.2 Global Medical Imaging Market Share by Modality
6.1.3 Increased Utilization Rate in the U.S. for Medical Imaging Modalities
6.1.4 Utilization Rate in the U.S. for CT
6.1.5 Utilization Rate in the U.S. for MRI
6.2 Global Market for PACS
6.2.1 Market Barrier for PACS
6.2.2 PACS in the Immediate Past
6.2.2.1 Return on Investments in PACS
6.2.2.2 International Scenario of PACS
6.2.3 Five PACS Trends for the Next Five Years
6.2.3.1 One Workstation and Many Applications
6.2.3.2 Efficient, Shared and Multi-Site Workflow
6.2.3.3 Movement to Thin or Zero-Client
6.2.3.4 The Incompleteness of EMRs without Medical Images
6.2.3.5 Paying for PACS on a Usage Basis
6.2.3.6 Long-term View
6.2.4 A Buyer's Guide for PACS Workstations and Software
6.2.4.1 The PACS Workstation
6.2.4.2 PACS Radiology Reporting Workstation
6.2.4.3 PACS Mammography Workstation
6.2.4.4 PACS Cardiology Workstation
6.2.4.5 PACS Review Workstation
6.2.4.6 PACS Quality Assurance Workstation
6.2.4.7 Technical Considerations
7.4.2 U.S: Meaningful Use of HIT
7.4.3 Modest Increase in HIT Adoption
7.4.4 The U.S. HIT Scenario
7.4.4.1 Drivers of HIT Adoption
7.4.4.2 Physician Practice Management Software
7.4.4.3 Billing Systems
7.4.5 Essentials of the U.S. Hospital IT Market
7.4.5.1 Key Vendors in U.S. Hospital IT Market
7.4.6 U.S: Healthcare IT Trends
7.4.6.1 PACS Utilization in U.S. by Imaging Modality
7.4.6.2 CPOE Adoption in U.S. Hospitals
7.4.6.3 EMR Adoption in U.S. Hospitals
7.4.7 Electronic Health Records in U.S. Hospitals
7.4.7.1 Modest Gains in Electronic Health Record Adoption
7.4.8 State of HER Adoption
7.4.8.1 Factors Driving HER Implementation
7.4.8.2 HER Adoption Leaders
7.4.9 U.S. Adoption of Clinical IT
7.4.9.1 Federal Investment in HIT
7.4.9.2 Standardization
7.4.9.3 HIT Certification
7.4.9.4 National and Regional Networks
7.4.9.5 HIT Systems and Their Features
7.4.9.6 Difference Between HER and EMR
7.4.9.7 EMR System
7.4.9.8 Computerized Physician Order Entry (CPOE)
7.4.9.9 Picture Archiving and Communication System (PACS)
7.4.9.10 Benefits and Adoption Cost of PACS
7.4.9.11 Benefits and Adoption Cost of CPOE
7.4.9.12 Benefits and Adoption Cost of EMR System
7.4.9.13 Pattern of HIT Adoption in For-Profit vs. Non-Profit Hospitals
7.4.9.14 HIT Adoption by Hospital Type
7.4.9.15 HIT Adoption by Size and Rural Status of the Hospital
7.4.9.16 HIT Adoption by Hospitals with Medicare and Medicaid Patients
7.4.9.17 HIT Adoption in Contract-Managed Hospitals
7.4.9.18 HIT Adoption in Primary Care
7.4.9.19 Factors that Influence HIT Adoption in Ambulatory Clinics
7.4.10 Road to Meaningful Use of IT in U.S. Hospitals
7.4.10.1 Federal Investment in Health IT: the ARRA
7.4.10.2 Potential of EHR Systems to Improve Patient Care
7.4.10.3 Adoption of HER Systems in U.S. Hospitals
7.4.10.4 Planning and Deliberation Needed for Hospital IT Adoption
7.4.10.5 Need for Redesigning Care Delivery
7.4.10.6 HER Systems and Patient Care
7.4.10.7 Need for Adequate Capital
7.4.10.8 External Challenges in Adopting HER Systems
7.4.11 Essentials of the U.S. Hospital IT Market
7.4.11.1 The EMR Adoption Model
7.4.11.2 Scoring Format
7.4.11.3 EMRAM Comparison, 2008–2009
7.4.11.4 National Review of EMR Scores
7.5 Healthcare IT in European Hospitals
7.5.1 Varying IT Budgets in European Countries
7.5.1.1 Limited IT Budgets for External IT Purchases in Europe
7.5.1.2 Anticipated Increase in IT Budget in Europe
7.5.1.3 Information Technology Budget Increase in a Contained Way in Europe
7.5.1.4 Limited Impact of Economic Downturn in Europe
7.5.1.5 Main Media for Storing and Archiving Medical Records
7.5.1.6 Hospital IT Market by Market Segment in Europe
7.5.2 Israel’s Health IT Industry
7.5.3 Comparative Health IT
7.5.3.1 Denmark
7.5.3.2 Sweden
7.5.3.3 Netherlands
7.5.3.4 U.K.
7.5.3.5 Israel
7.5.3.6 U.S.
7.5.3.7 EMR Adoption and Use in Industrialized Countries
7.6 Healthcare IT Adoption in Asia
7.6.1 Health IT Market in Asia
7.6.2 Phenomenal Growth of IT Market in Asia
7.6.2.1 Competition Cauldron
7.6.3 HIT Adoption in China
7.6.3.1 Chinese Government’s Policy
7.6.3.2 Primary Drivers of HIT Adoption in China
7.6.3.3 Primary Funders of HIT in China
7.6.3.4 Future Direction of HIT Adoption in China
7.6.4 Current HIT Scenario in China
7.6.4.1 Components of Hospital Information System (HIS) in China
7.6.4.2 Current Situation in Chinese Hospital Computerization
7.6.4.3 Comparison with Computerization of Hospitals with Developed Countries
7.6.4.4 Expanding HIT Market Investment in China
7.6.4.5 Investment Structure of Chinese HIT Market
7.6.5 Malaysian HIT Background
7.6.6 Singapore’s Healthcare IT
7.6.7 HIT Market in Australia
7.6.8 HIT Market in India
7.6.8.1 HIT Adoption in India
7.6.8.2 Current Exemplars
8. Selected Company Profiles
8.1 Agfa Healthcare
8.1.1 Selected Products from Agfa Healthcare
8.1.1.1 IMPAX RIS Gateway
8.1.1.2 IMPAX
8.1.1.3 IMPAX EL
8.1.1.4 IMPAX ES
8.1.1.5 IMPAX Enterprise
8.1.1.6 IMPAX Integrated Reporting Solution (RIS/PACS/Speech)
8.1.1.7 IMPAX for Breast Imaging
8.1.1.8 Elefante.NET
8.1.1.9 IMPAX RIS for Hospitals
8.1.1.10 MediWeb Ordering
8.1.1.11 MediWeb Results
8.1.1.12 QDoc RIS
8.1.1.13 QPlanner
8.1.1.14 QdReport
8.1.1.15 RIS Management Reporting
8.1.1.16 SpeechMagic
8.1.1.17 TalkStation IS
8.1.1.18 TalkStation Integrated Solutions
8.1.1.19 TalkStation Radiology
8.1.1.20 TalkStation TeleDictation
8.1.1.21 TalkStation TeleReport
8.1.1.22 TalkStation Web Typist
8.1.1.23 Cardiovascular Entry Level Solution
8.1.1.24 Cardiovascular Multimodality Edition
8.1.1.25 Cardiovascular Solution
8.1.1.26 IMPAX HeartStation ECG Management System
8.1.1.27 Integrated Cardiovascular Solution
8.1.1.28 IMPAX Registration and Fusion
8.1.1.29 IMPAX Virtual Colonoscopy
8.1.1.30 IMPAX X-Ray Angio Analysis
8.1.1.31 IMPAX for Radiology
8.1.1.32 IMPAX OT3000
8.2.1.1 CyberLab
8.2 Aspyra, Inc.
8.2.1 Aspyra's Laboratory Products
8.2.1.1 CyberLab
8.2.1.2 CyberLab Enhancements
8.2.1.3 CyberMATE
8.2.1.4 CyberPATH
8.2.1.5 WebGateway
8.2.2 Aspyra's Imaging Products
8.2.2.1 CyberRAD
8.2.2.2 AccessRAD
8.2.2.3 AccessNET
8.2.2.4 AccessMED
8.3 Avreo, Inc.
8.3.1 Selected Products from Avero
8.3.1.1 interPRISE
8.3.1.2 interWORKS
8.3.1.3 interDAYHAWK
8.3.1.4 interVIEW
8.3.1.5 interORTHO
8.4 Carestream
8.4.1 Selected Products from Carestream
8.4.1.1 DIRECTVIEW Capture Link System
8.4.1.2 DIRECTVIEW EVP Plus Software
8.4.1.3 DIRECTVIEW General Radiography CR Software
8.4.1.4 CARESTREAM Image Suite Software
8.4.1.5 DIRECTVIEW CR Long-Length Imaging System
8.4.1.6 DIRECTVIEW Remote Patient Data Entry Software
8.4.1.7 DIRECTVIEW Total Quality Tool
8.4.1.8 Carestream Vue RIS
8.4.1.9 Carestream Vue PACS
8.4.1.10 Carestream Vue Motion
8.4.1.11 Carestream PACS 3D Functionality
8.4.1.12 ORTHOVIEW Orthopedic Digital Templating for Carestream PACS
8.4.1.13 Virtual Colonoscopy for Carestream PACS
8.4.1.14 Image Fusion Suite for Carestream PACS
8.4.1.15 Carestream Vue Mammo
8.4.1.16 Carestream Vue for Cardiology
8.4.1.17 Carestream Vue Connect
8.4.1.18 Carestream Vue for Vendor Neutral Archive
8.4.1.19 Carestream Vue for Cloud-Based Services
8.5 Cerner Corporation
8.5.1 Selected Products from Cerner
8.5.1.1 Acute Care Electronic Medical Record
8.5.1.2 Cardiovascular Solutions
8.5.1.3 Cerner Network
8.5.1.4 Clinical Imaging
8.5.1.5 Solutions for Community Hospitals
8.5.1.6 Computerized Provider Order Entry (CPOE)
8.5.1.7 Solutions for Critical Access Hospitals
8.5.1.8 Solutions for Critical care
8.5.1.9 Document Imaging
8.5.1.10 Solutions for Emergency Departments
8.5.1.11 Laboratory Information Solutions
8.5.1.12 Solutions for Medical Devices
8.5.1.13 Oncology Solutions
8.5.1.14 Perioperative Solutions
8.5.1.15 Solutions for Pharmacies
8.5.1.16 Point of Care Solutions
8.5.1.17 Radiology Solutions
8.6 DR Systems, Inc.
8.6.1 Selected Products from DR Systems
8.6.1.1 Unity RIS/PACS
8.6.1.2 Unity Cardiology CVIS
8.6.1.3 Digital Mammography Integrated with PACS
8.6.1.4 Unity Pathology
8.6.1.5 Integrated RIS
8.6.1.6 DR Scheduler
8.6.1.7 Management Reports
8.6.1.8 Document Scanning
8.6.1.9 Patient /Film Tracking
8.6.1.20 Advanced Image Processing
8.6.1.21 Catapult Technologist QC Workstation
8.6.1.22 Dominator Diagnostic Reading Workstation
8.6.1.23 Web Dominator
8.6.1.24 Digital Mammography
8.6.1.25 Diagnostic Reading Advanced Image Processing
8.6.1.26 Digital Transcription Workstation
8.6.1.27 Web Transcription
8.6.1.28 Instant Reporter
8.6.1.29 Report Manager
8.6.1.30 Output to Billing Systems and Services
8.6.1.31 HIS/RIS Interfaces
8.6.1.32 Dedicated Test System
8.6.1.33 Ambassador Clinical Review
8.6.1.34 Media Ambassador
8.6.1.35 LAN Ambassador
8.6.1.36 Network Media Ambassador
8.6.1.37 Web Ambassador
8.6.1.38 DR Web Launch
8.6.1.39 Orthopedic Tools
8.6.1.40 Central Image Server
8.6.1.41 Communicator Web Server
8.6.1.42 Storage Solutions
8.6.1.43 Unity PACS-SC
8.7 Fujifilm Corporation
8.7.1 Synapse (PACS)
8.8 GE Healthcare
8.8.1 GE's Cardiology Imaging Software
8.8.1.1 CardIQ Function Xpress
8.8.1.2 CardIQ Fusion
8.8.1.3 ReportCard 4.0
8.8.1.4 CardIQ Physio
8.8.1.5 Innova EP Vision
8.8.1.6 SmartScore 4.0
8.8.1.7 CardIQ Xpress 2.0 Reveal
8.8.1.8 Dynamic VUE
8.8.1.9 Flow Analysis 4.0
8.8.1.10 Left Ventricle Analysis
8.8.1.11 StarMap 4.0
8.8.1.12 Stenosis Analysis
8.8.1.13 CardEP
8.8.2 Interventional Imaging Software
8.8.2.1 Integrated Registration
8.8.2.2 Innova 3D
8.8.2.3 Innova Vision
8.8.2.4 Innova Track Vision
8.8.3 Selected Neurology Imaging Software
8.8.3.1 Autobone and VesseliQ Xpress
8.8.3.2 Dynamic Shuttle
8.8.3.3 CT Perfusion 4D
8.8.3.4 Cortex ID
8.8.3.5 GSI Viewer
8.8.3.6 Integrated Registration
8.8.3.7 BrainWave
8.8.4 Selected Oncology Imaging Software
8.8.4.1 Advantage 4D
8.8.4.2 OncoQuant
8.8.4.3 PET VCAR
8.8.4.4 Motion VUE
8.8.4.5 AdvantageSim MD
8.8.4.6 GSI Viewer
8.8.4.7 CADstream
8.8.5 Selected Vascular Imaging Software
8.8.5.1 Angio Card 1.0
8.8.5.2 Vessel IQ Xpress
8.8.6 GE's Other Imaging Software
8.8.6.1 DentaScan
8.8.7 GE's Platforms
8.8.7.1 AW Server
8.9 INFINITT Healthcare, Co, Ltd.
8.9.1 Selected Products from INFINITT
8.9.1.1 Radiology PACS
8.9.1.2 Mammography PACS
8.9.1.3 Cardiology PACS
8.9.1.4 Dental PACS
8.9.1.5 Report Systems
8.9.1.6 Imaging EMR
8.9.1.7 RIS Solutions
8.9.1.8 3D: Colon
8.9.1.9 3D: Cardiac
8.9.1.10 3D: Lung
8.9.1.11 3D: Fusion
8.9.1.12 3D: Dental
8.10 LUMEDX Corporation
8.10.1 Selected Products from LUMEDX
8.10.1.1 CardioStar
8.10.1.2 Apollo Advance
8.10.1.3 CardioPACS 5.0 Enterprise Server
8.10.1.4 CardioPACS 5.0 Diagnostic Viewer
8.10.1.5 CardioPACS 5.0 Web Server
8.10.1.6 CardioPACS 5.0 Web Viewer
8.10.1.7 CardioPACS 5.0 LVA Module
8.10.1.8 CardioPACS 5.0 QCA Module
8.10.1.9 CardioPACS 5.0 CVUS Module
8.10.1.10 CardioPACS 5.0 IVUS Module
8.10.1.11 CardioPACS 5.0 Measurement Gateway
8.10.1.12 CardioPACS 5.0 MWL/MPPS SCP
8.10.1.13 CardioDoc Cath Reporting
8.10.1.14 CardioDoc Echo
8.10.1.15 CardioDoc PVI
8.10.1.16 CardioChart
8.10.1.17 CardioGate
8.10.1.18 CardioInventory
8.10.1.19 CardioCharge
8.10.1.20 Vascular Interventional Radiology Module
8.11 McKesson Corporation
8.11.1 McKesson's Technology Solutions
8.11.2 Key solution areas
8.11.2.1 Clinical Management
8.11.2.2 Enterprise Imaging
8.11.2.3 Variable Thickness Regional Intensity Protocol (VTRIP)
8.11.2.4 Critical Results Reporting
8.11.2.5 Horizon Medical Imaging Enhanced Workflow Tools - Peer Review
8.11.2.6 Horizon Medical Imaging Mammography Plus
8.11.2.7 Horizon Rad Station – Advanced
8.11.2.8 Horizon Rad Station – Distributed
8.11.2.9 Horizon Rad Station – eJacket
8.11.2.10 Financial Management
8.11.2.11 Resource Management
8.11.2.12 Automation
8.11.2.13 Physician Practice Solutions
8.11.2.14 Horizon Ambulatory Care
8.11.2.15 Practice Partner
8.11.2.16 Connectivity
8.11.2.17 Pharmacy Management Software and Services
8.12 Meditech
8.12.1 Selected Products from Meditech
8.12.1.1 Emergency Department Management Solution
8.12.1.2 Enterprise Medical Record
8.12.1.3 Operating Room Management Solution
8.12.1.4 Bedside Verification Solution
8.12.1.5 Physician Care Manager
8.12.1.6 Anatomical Pathology Solution
8.12.1.7 Imaging and Therapeutic Service Solution
8.12.1.8 Laboratory and Microbiology Solution
8.12.1.9 Oncology Management Solution
8.12.1.10 Pharmacy Solution
8.12.1.11 Enterprise Patient Index and Medical Records
8.13 Merge Healthcare, Inc.
8.13.1 Selected Products from Merge Healthcare
8.13.1.1 Merge iConnect Access
8.13.1.2 Merge iConnect Share
8.13.1.3 Merge iConnect VNA
8.13.1.4 Merge iConnect Kiosk
8.13.1.5 Merge RIS
8.13.1.6 Merge PACS
8.13.1.7 Merge Financials
8.13.1.8 Merge Documents
8.13.1.9 Merge CADstream
8.13.1.10 Merge Mammo
8.13.1.11 Merge OrthoEMR
8.13.1.12 Merge OrthoCase
8.13.1.13 Merge Cardio
8.13.1.14 Merge Hemo
8.13.1.15 Merge AIMS
8.13.1.16 Merge Presurgical
8.13.1.17 Merge LIS
8.13.1.18 Merge LabAccess
8.14 NovaRad Corporation
8.14.1 Selected Products from NovaRad
8.14.1.1 NovaPACS
8.14.1.2 NovaRIS
8.14.1.3 NovaPro
8.14.1.4 NovaMG
8.14.1.5 NovaDash
8.14.1.6 NovaCardio
8.14.1.7 Nova Ortho
8.14.1.8 Nova View
8.14.1.9 Nova Vault
8.14.1.10 NovaRIS Billing
8.15 Philips Healthcare
8.15.1 Selected Products from Philips
8.15.1.1 Brilliance Everywhere
8.15.1.2 Brilliance Workspace
8.15.1.3 CT Visualization Software
8.15.2 Selected Philips' Clinical Informatics
8.15.2.1 HeartStart Telemedicine System
8.15.2.2 Event Review Pro - EMS
8.15.2.3 Event Review Pro - Hospital
8.15.2.4 HeartStart Data Manager
8.15.2.5 HeartStart Data SDK
8.15.3 Selected Workflow Solutions in Nuclear Medicine
8.15.3.1 Extended Brilliance Workspace
8.15.3.2 NM Application Suite
8.15.3.3 PET Applications
8.15.3.4 CT Applications
8.16 Sectra Medical Systems S.L
8.16.1 Selected Products from Spectra
8.16.1.1 Sectra RIS/PACS
8.16.1.2 Sectra Breast RIS/PACS
8.16.1.3 Cross-Enterprise Sharing
8.16.1.4 Cross-Enterprise Archiving
8.16.1.5 Sectra PACS Components
8.16.1.6 Spectra Orthopedic PACS Solution
8.17 Siemens Healthcare
8.17.1 Selected Products from Siemens
8.17.1.1 The syngo.plaza
8.17.1.2 The syngo Imaging
8.17.1.3 The syngo Dynamics
8.17.1.4 The syngo Workflow
8.17.1.5 The syngo Portal Radiologist
8.17.1.6 The syngo Portal Executive
8.17.1.7 PACS Disaster Recovery
8.17.1.8 Med Administration Check
8.17.1.9 Medical Device Connectivity
8.17.1.10 Practice Management System
8.17.1.11 PDA Clinical Assistant
8.17.1.12 Computerized Physician Order Entry (CPOE)

APPENDIX

Appendix 1: Picture Archiving and Communication Systems (PACS): Myths and Facts
Appendix 1.1: Myth: PACS are Complicated and Expensive
Appendix 1.2: Myth: PACS Require Workstations
Appendix 1.3: Myth: Client License Required
Appendix 1.4: Fact: Planned Obsolescence
Appendix 1.5: Fact: DICOM and World Wide Web
Appendix 1.6: Facts: PACS Increases Referral Volume
Appendix 1.7: Fact: Arrival of Electronic Medical Records
Appendix 2: Cloud Infrastructure in Vendor Neutral Archive Configurations
Appendix 2.1: The concept of Vendor or PACS Neutral Archive
Appendix 2.2: Early VNA Configurations
Appendix 2.3: Market Description
Appendix 2.4: Leading Edge Innovations in Storage Solutions
Appendix 2.5: HTTP Access Methodology
Appendix 2.6: Metadata
Appendix 2.7: Introduction of MINT
Appendix 2.8: Market Adoption
Appendix 2.9: General Description of EMC
Appendix 3: Self-Funding Transition Plan to Electronic Health Records
Appendix 3.1: The High Cost of Record Keeping
Appendix 3.2: The Enormous Challenge to Maintain Hospital Records
Appendix 3.3: The Plan Needed to Meet the Challenges
Appendix 3.4: Three Phases of Transition
Appendix 3.5: Developing a Self-Funding Transition Plan
Appendix 3.6: Designing the Pathway
Appendix 3.7: Measuring the Results
Appendix 4: The Health IT Workforce
Appendix 4.1: Quantities and Staffing Ratios
Appendix 4.2: Workforce Roles
Appendix 4.3: Growth and Gaps
Appendix 4.4: Leadership Qualifications
Appendix 4.5: Education and Competencies
Appendix 5: Glossary of Terms: PACS
INDEX OF FIGURES

Figure 3.1: Patient Work List and Image Display
Figure 3.2: Enterprise Level Web-based Image/Data EPR Server with Archive
Figure 4.1: Content-Based Medical Image Retrieval Using the IRMA Framework
Figure 4.2: Visualization of MRI (blue) and PET (ocher) Data Sets with Two Different 1D Transfer Functions
Figure 4.3: Components of a Picture Archive and Communications System
Figure 4.4: Schematic of “Before PACS” Processes
Figure 4.5: Schematic of “After PACS” Processes
Figure 4.6: PACS as part of the Electronic Health Record Architecture
Figure 5.1: Major Perceived Barriers to Adoption of Electronic Health Records (EHRs)
Figure 5.2: Perceived Facilitators of Adoption of Electronic-Records Systems
Figure 6.1: Global Market for Medical Imaging Equipment by Geography, 2010
Figure 6.2: Global Medical Imaging Market Share by Modality, 2010
Figure 6.3: Utilization Rates for X-Ray, CT and Ultrasound in the U.S.
Figure 6.4: Utilization Rate for CT in the U.S.
Figure 6.5: Utilization of MRI in the U.S., 2007-2010
Figure 6.6: Global PACS Market, 2010-2017
Figure 6.7: PACS Web Server Concept
Figure 6.8: U.S. Market for PACS, 2010-2017
Figure 6.9: U.S. Hospitals with PACS Installed
Figure 6.10: Total Number of Hospitals vs. Hospitals with PACS Installed
Figure 6.11: Replacement and New PACS Purchases in the U.S. Hospitals
Figure 6.12: PACS Installations by Bed-size in the U.S. Hospitals
Figure 6.13: PACS Modalities Installations in the U.S. Hospitals
Figure 6.14: PACS Company Market Share in the U.S.
Figure 6.15: PACS Image Distribution in Hospital Departments in the U.S.
Figure 6.16: PACS Image Accessibility by Physician in the U.S.
Figure 6.17: RIS and PACS Interface in the U.S.
Figure 6.18: PACS Market: Revenue Forecasts (Brazil), 2010-2015
Figure 6.19: PACS Market: Company Market Share by Revenues (Brazil), 2008
Figure 6.20: European PACS Market, 2010-2017
Figure 6.21: Major PACS in U.K.
Figure 6.22: European Radiology PACS Market, 2010-2017
Figure 6.23: European Cardio PACS Market, 2010-2017
Figure 6.24: RIS/PACS Market in India
Figure 6.25: Total PACS Market in India
Figure 7.1: Percent Revenue Spent on IT by Different Industries
Figure 7.2: HIT Adoption Rate
Figure 7.3: Primary Care Physicians Using Electronic Health Records (HER)
Figure 7.4: Global Market for HIT, 2010-2017
Figure 7.5: North American HIT Market ($2.7 Billion), 2010
Figure 7.6: U.S. Market for HIS, 2009-2016
Figure 7.7: Percentage of U.S. Physicians Using EMRs/EHRs, 2001–2009
Figure 7.8: U.S: Changes in EHR Adoption Rate, 2008-2009
Figure 7.9: Increased IT Budgets in the U.S. Hospitals
Figure 7.10: PACS Utilization by Imaging Modality
Figure 7.11: CPOE Adoption in U.S. Hospitals
Figure 7.12: CPOE Adoption in Academic and Non-Academic U.S. Hospitals
Figure 7.13: EMR Adoption in U.S. Hospitals
Figure 7.14: Changes in Electronic Health Record (EHR) Adoption Rate from 2008 To 2009
Figure 7.15: Primary Driver for HER Implementation
Figure 7.16: HER Adoption Leaders
Figure 7.17: Distribution of Non-Profit and For-Profit Hospitals on Clinical HIT Sophistication Scale
Figure 7.18: HIT Adoption by AHA Hospital Bed Size Category
Figure 7.19: Clinical HIT Adoption in Hospitals of Medicare and Medicaid Discharges
Figure 7.21: HIT Adoption by the Size of Hospital's System and in Stand-Alone Hospitals
Figure 7.22: HIT Adoption in Contract-Managed Hospitals
Figure 7.23: Adoption in Systems and Hospitals with a Primary Care Department
Figure 7.24: Adoption of EMR in Ambulatory Practices by Size
Figure 7.25: HER Functions and Communication Capabilities
Figure 7.26: Sample Connection Points between EHR and Other Systems within the Hospital
Figure 7.27: Percentage of Hospitals that Have Implemented Select Electronic Capabilities, 2009
Figure 7.28: Percentage of U.S. Hospitals that Have Implemented Medication Safety Alerts, 2009
Figure 7.29: Percentage of U.S. Hospitals that Use Bar Codes to Identify Patients and Medications, 2009
Figure 7.30: Percentage of Hospitals that Expect to Incur a Financial Penalty for Failing to Demonstrate Meaningful Use by 2015
Figure 7.31: Sample EHR Implementation Process
Figure 7.32: Sample Workflow Process for Medication Order before Redesign
Figure 7.33: Sample Workflow Process for Medication Order after Redesign
Figure 7.34: Percentage of Hospitals Reporting Change in Access to Tax-exempt Bonds, January 2009
Figure 7.35: Percentage of Hospitals Reporting Change in Ability to Access Capital Since December 2008
Figure 7.36: IT Budget as % of Total Hospital Budget per Country in Europe
Figure 7.37: External IT Budget as % of Total Hospital IT Budget per Country in Europe
Figure 7.38: Expected Evolution of Hospitals’ IT Budget, 2008-2012
Figure 7.39: Anticipated Growth of Hospital IT Budget, 2009-2012
Figure 7.40: Perceived Impact of Economic Downturn in Europe
Figure 7.41: Hospital IT Market by Market Segment in Europe, 2008
Figure 7.42: Use of EHR Systems by Primary-care Physicians, 2009
Figure 7.43: EMR Adoption and Use in Industrialized Countries
Figure 7.44: Growth Rate of Chinese HIT Market Investment
Figure 7.45: Investment Structure of Chinese HIT Market
Figure 7.46: Singapore’s HIS Market
Figure 7.47: Australia’s Health IT Market
Figure 7.48: Key Australian Health IT Players
Figure 7.49: Implication on India HIT market by U.S. Service Providing Penetration
Figure App. 2.1: Atmos High-Level Service Oriented Architecture
Figure App. 3.1: The Three Phases of Transition

INDEX OF TABLES

Table 4.1: Examples of Large Medical Image Data
Table 5.1: Examples of Health Information Technology for Hospitals and Physicians
Table 5.2: HIMSS Definitions of Health Information Technology Applications
Table 5.3: Selected Electronic Functionalities and Their Level of Implementation in U.S. Hospitals
Table 5.4: Electronic Requirements for Classification of Hospitals as Having a Comprehensive or Basic Electronic-Records System
Table 5.5: Adoption of Comprehensive and Basic Electronic-Records Systems According to Hospital Characteristics
Table 5.6: The Difference between EMR and HER
Table 5.7: Top Ten eMAR Installed and Contracted Systems, 2009
Table 6.1: Display Resolution Comparison in PACS Image Viewing
Table 6.2: PACS Radiology Workstation Tools for Image Manipulation
Table 6.3: PACS Radiology Workstation Tools for Image Measurement
Table 6.4: PACS Radiology Workstation Tools for Advanced Visualization
Table 6.5: Hospital Adoption Timing/Incentive Payout
Table 6.6: Medicare Incentives for Physicians
Table 6.7: Impact of Top Four Industry Challenges (Brazil), 2010-2015
Table 6.8: Market Drivers Ranked in Order of Impact (Brazil), 2010-2015
Table 6.9: Market Restraints Ranked in Order of Impact (Brazil), 2010-2015
Table 6.10: PACS Ownership in the National Health Service
Table 6.11: PACS Installation by Geographical Area
Table 6.12: Level of PACS Integration
Table 6.13: Strategies for the Future
Table 7.1: U.S. HIT Market Size, 2009
Table 7.2: Selected EHR Functions and Implementation in U.S. Hospitals In 2009
Table 7.15: Hospitals That Adopted 1–9 “Core” Meaningful-Use Objectives, 2009
Table 7.3: Potential Savings from Clinical HIT Applications in Major Cost Categories
Table 7.4: Adoption of HIT Applications and Systems in For-Profit and Non-Profit Hospitals
Table 7.5: Clinical HIT Adoption in Acute Care Hospitals of Various Types
Table 7.6: HIT Adoption by Location
Table 7.7: EMR Adoption Model Trends, 2008-2009
Table 7.8: EMR/SEHR Adoption Model Scores, 2009
Table 7.9: Hospital IT Market Size in Europe
Table 7.10: Main Media for Storing and Archiving Medical Records in Europe
Table 7.11: Areas Where Hospital IT Systems are in Place in Europe
Table 7.12: Challenges for HIT Adoption in China
Table 7.13: Computerization of Chinese Medical Institutions
Table 7.14: Current Hospital MIS Situation Statistics in China
Table 7.15: Hospital MIS Implementation Situation Statistics in China
Table 7.16: Annual Average Investment in Computerization of Chinese Hospitals as a % of Revenue
Table 7.17: Key E-Health Players in Malaysia
Table 7.18: Key E-Health Players in Malaysia
Table 7.19: Key Contributors of Telemedicine in India
Table App. 3.1: Operational Costs Reduced Through Transition Planning

Ordering:

Order Online - http://www.researchandmarkets.com/reports/651533/
Order by Fax - using the form below
Order by Post - print the order form below and send to

Research and Markets,
Guinness Centre,
Taylors Lane,
Dublin 8,
Ireland.
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct and select the format(s) you require.

- **Product Name:** Picture Archiving and Communications Systems (PACS)
- **Web Address:** [http://www.researchandmarkets.com/reports/651533/](http://www.researchandmarkets.com/reports/651533/)
- **Office Code:** SCD4LQXY

Product Formats
Please select the product formats and quantity you require:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic (PDF)</td>
<td></td>
</tr>
<tr>
<td>Single User:</td>
<td>USD 3400</td>
</tr>
<tr>
<td>1 - 10 Users:</td>
<td>USD 6800</td>
</tr>
<tr>
<td>Enterprisewide:</td>
<td>USD 10200</td>
</tr>
</tbody>
</table>

Contact Information
Please enter all the information below in **BLOCK CAPITALS**

- **Title:** [Mr] [Mrs] [Dr] [Miss] [Ms] [Prof] [ ]
- **First Name:** ___________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **Last Name:** ____________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **Email Address:** * ____________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **Job Title:** _____________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **Organisation:** __________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **Address:** ______________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **City:** _________________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **Postal / Zip Code:** ______________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **Country:** _______________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **Phone Number:** __________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]
- **Fax Number:** ____________________________ [ ] [ ] [ ] [ ] [ ] [ ] [ ]

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:
Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:
Account number 833 130 83
Sort code 98-53-30
Swift code ULSBIE2D
IBAN number IE78ULSB98533083313083
Bank Address Ulster Bank,
27-35 Main Street,
Blackrock,
Co. Dublin,
Ireland.

If you have a Marketing Code please enter it below:

Marketing Code: ____________________________

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp

Please fax this form to:
(646) 607-1907 or (646) 964-6609 - From USA
+353-1-481-1716 or +353-1-653-1571 - From Rest of World