Chapter 33
Procurement

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Contents

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33.1 Introduction

A well-planned strategy for procurement of products and services is vital to the success of any organization. Choosing the type of PACS solution based on the institution's demands, workflows, and infrastructure requires extensive investigation and considerable analysis. Over a decade ago, imaging departments were transitioning from analog to digital workflows and had the growing pains associated with moving to a PACS platform. Due to technological advancements in the medical imaging industry, many organizations are once again looking at PACS solutions to replace their legacy PACS. Imaging stakeholders recognize that their requirements have vastly changed since their first PACS purchase. Vendor agnostic enterprise imaging (EI) platforms as well as emerging technologies in advanced visualization, image sharing solutions, and artificial intelligence (AI) offer many options. Procurement is the act of researching market solutions and engaging with industry vendors to evaluate and purchase products that keep organizations running optimally. Finding a suitable vendor that can satisfy all organizational requirements is challenging as technologies in diagnostic imaging are rapidly evolving. Formulating a smart implementation strategy can mitigate excessive costs, risk, and downtimes in the short and long term, as well as provide leverage during the contract negotiation process.

DEFINITION: Procurement

The act of researching market solutions and engaging with industry vendors to evaluate and purchase products that keep your organization running optimally.

33.2 Standard Practices for Acquisition of Technology

Innovations in Radiology Information Systems (RIS), the DICOM standard, and Picture Archive and Communication Systems (PACS) have revolutionized medicine in a very short time and the momentum does not appear to be slowing down. Medical imaging stakeholders fundamentally understand that delaying a PACS replacement solution can significantly influence patient care. Keeping up with the rapid change in medical imaging technology, effectively controlling operational and capital spending, and providing quality patient care begins with a solid procurement strategy.

33.2.1 Developing an Appropriate Business Plan

- Create a PACS Procurement Committee to define the organizational needs and ensure that the procurement of a new PACS solution is in alignment with the organization's strategic plan.

- **Strategic Planning** involves the creation of objectives and goal setting for near-term and long-term periods. Strategic planning approaches include:
  - Competitive analysis
  - Environmental scanning and forecasting
  - Internal organization analysis
  - Determining long- and short-term objectives
  - Identifying strategic alternatives
  - Strategy evaluation and selection
  - Strategic control systems

CHECKLIST: Members of the PACS Procurement Committee

- Radiology Chairman
- Chief Medical Information Officer
- Hospital Management
- Imaging Department Director
- Biomedical Engineering Director
- Imaging Informatics Professional
- Finance Director
- Lead technologists
- Clinicians

- Consider the requirements of all stakeholders:
  - Radiologists
  - Technologists
  - Radiology administrators
  - Clinician specialists – surgeons, orthopedics, emergency medicine, referring providers
  - Information Technology (IT) Department
- Assess existing practice in detail and develop a **needs assessment** that includes:
  - Operational analysis (workflow)
  - Technical analysis (existing infrastructure, storage and network requirements, and HIS/RIS integrations)
- Create a business plan and perform a **cost-benefit** analysis
- Incorporate return on investment (ROI) analysis. Include estimated costs for initial and ongoing expenses versus expected cost savings.
- Factors to consider:
  - Cost of data storage
  - Potential liabilities
  - Improvements in workflows
  - Decreased workload
  - Improvements in patient care

FURTHER READING: Procurement Readiness

Oosterwijk H, Hardin N. Health imaging and informatics (CIIP) study guide. OTEch Inc.; 2009. www.otechimg.com.

DEFINITION: Return on Investment

Most purchases require an initial capital investment but (hopefully) reduce operational costs in the long term. ROI is a measure of how long it will take for the operational savings to make up for the initial investment.

33.2.2 Request for Information

- A Request for Information (RFI) is considered a preliminary step in the procurement process that is designed to obtain general information from potential vendors that have been identified for a pending project.
- The RFI document describes attributes necessary to be included in a Request for Proposal. These attributes can vary, but typically included:
  - Information about the company
  - Product portfolio
  - Experience in the relevant field
- Based on the results, a customer will decide whether to include the vendor in the product selection process.

KEY CONCEPT: Request for Information Versus Request for Proposal

Request for Information (RFI): A document delivered to vendors early in the product selection process. It provides general information about the problem and invites descriptions of potential solutions.

Request for Proposal (RFP): A document distributed to vendors late in the product selection process, after the type of product is known, to solicit specific information about the vendor's solution. Responses are compared between vendors to select the optimal solution.

33.2.3 Request for Proposal

- A Request for Proposal (RFP) is a lengthier document submitted to vendors that indicates specific costs, offering of service, and their ability to meet the requirements of the project.
- This well-documented process is a standard practice for obtaining vendor bids, avoiding conflicts of interest, and maintaining public records for business relationships and transparency.
- The main objectives of an RFP are:
  - To provide the vendor with an overview of the organization.
  - To provide a detailed description of the specifications with the intent of including the vendor's response in the final contract.
  - To obligate the vendor to deliver per the requirements specified.
  - To solicit responses that facilitate comparison among the vendors particularly with respect to the issues identified as the selection criteria.
- Vendors respond to an RFP with a Proposal that includes:
  - Information related to the company
  - Product
  - Service offering
  - Pricing for the product of interest
  - Solution details specific to the organization

33.2.4 Technology Acquisition Components

Many organizations are bound to follow guidelines of the RFI and RFP processes for all purchases. However, if you have some flexibility in choosing vendors, the following criteria could be used to evaluate possible candidates. This does not mean that a formal RFP process still cannot be used, but there can be more value and risk mitigation in using a more creative approach. When acquiring a technology solution where the standards of functionality and performance are uncertain because it is cutting edge, the following flow chart provides guidance for each purchase and what approach to take. Narrowing the PACS purchase from among the five core approaches can provide organizations with a strategic path to success (Fig. 33.1). The five core approaches are:

1. Commodity-based purchase
2. Functionally differentiated
3. Best of Breed
4. Monolithic
5. Collaborative/Co-development

- **A1: Commodity-based purchase**
  - Often times these are generic technology services driven by hospital institutional standards.
  - Personal computers are an example of a commodity-based purchase since they are more straightforward in nature.
- **A2: Functionally Differentiated**
  - If the market is less mature, an RFP can aid decision making.
  - This should include a detailed checklist of desired functionalities from all aspects of the project (e.g., PACS system purchases from 10 years ago and upcoming Artificial Intelligence applications of today).
  - It is important to get timelines for version releases and future functionality defined while in the procurement process.
- You may need to make technical decisions that encompass multiple solutions. When the technology procurement comprises multiple solutions, you must choose between monolithic and best of breed strategies.
  - **Monolithic**: Selecting one single vendor to solve all solutions. If there is a clear vendor path that will solve all aspects of the project, a monolithic approach is best. If a single vendor has the best solution for each component of the project, you could have a single source for all issues. Monolithic purchases are ideal, but unfortunately, not always realistic.

HYPOTHETICAL SCENARIO: Commodity-Based Purchase

Your IT department may be standardized on a particular PC brand. Typically, the purchase is dependent on availability of product, reliability, cost, and longevity. If there is no big differentiator in functionality between vendors, then it is a commodity purchase. These are fully mature products without major unknowns.

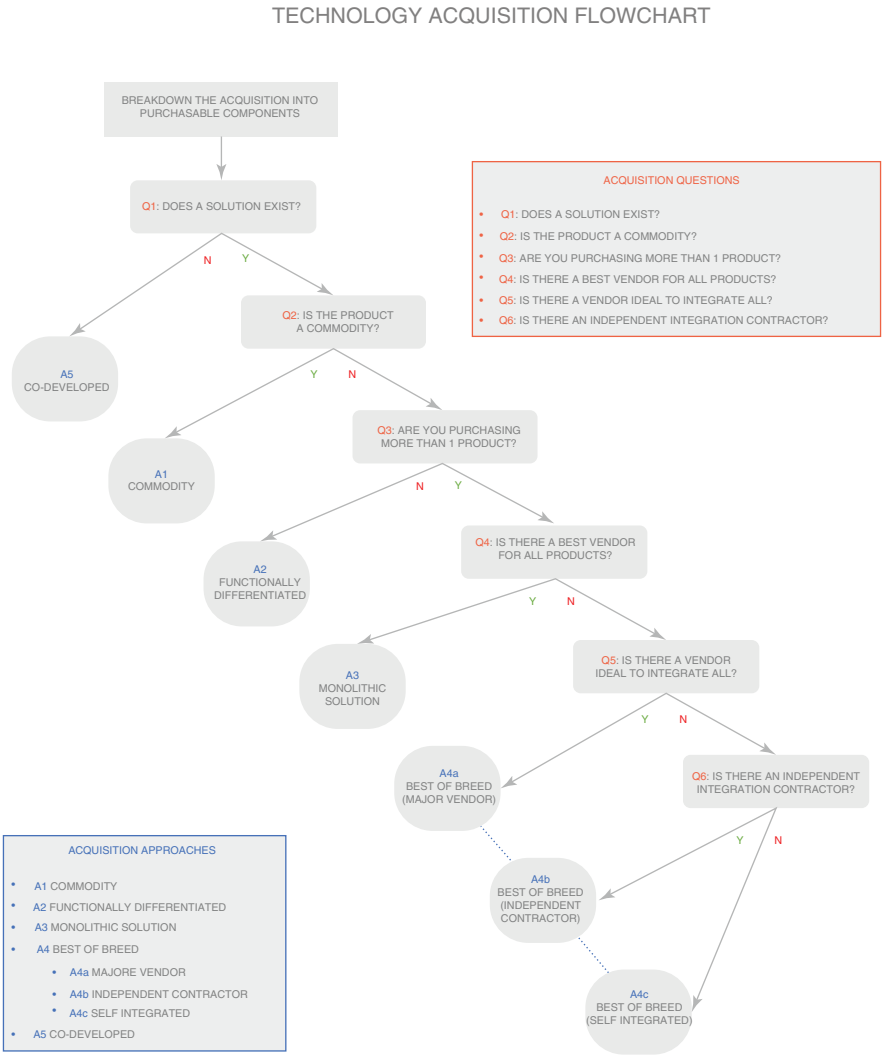

Fig. 33.1 Choosing an acquisition approach

– **Best of Breed**: Alternatively, a best of breed approach could provide you with an opportunity to select the best component for each problem. However, this strategy introduces challenges with integration and coordination of

DEFINITION: Best of Breed Strategy

A process of selecting the best products or systems that will meet your business requirements. This often requires different vendors for different components of the project.

disparate solutions working together. In that best of breed approach someone in your organization needs to be the general contractor. Most likely that is one of three choices:

Major Vendor: One of the vendors that you chose for the components acting as a coordinator for the other vendors.

Independent Contractor: An external consultant hired to coordinate and manage the project.

Your Organization: If careful consideration is toward using a major vendor or contractor, the responsibility of coordination will be up to your organization to manage.

- **A5: Collaborative/Co-development**: If no product exists to meet your needs, you may be able to develop your own. Many organizations work independently or collaborate with vendors to co-develop an in-house solution to a technology need.

33.3 Requirements

Transparency between purchaser and vendor is essential. Historically, the procurement process was held at a distance from healthcare workers. However, involvement of key players in the procurement process helps build close and collaborative relationships, fostering discussions and solutions instead of pursuing legal recourse when issues arise. Being mindful of potential conflicts of interest, the value of transparency between both sides is key to a strong relationship.

33.3.1 Vendor Management Strategies

- The goals, objectives, and expectations of the imaging department and the healthcare enterprise should be explicit:
  - Extent and time for the project
  - The expected improvements in departmental and enterprise productivity
- General information about the healthcare enterprise:
  - Single site or multiple sites across a larger healthcare enterprise
  - Number of sites
  - Types and number of specialties
  - Locations of the key departments
  - Patient populations
  - Inpatient and outpatient imaging volumes at each site
  - Number of inpatient beds at each site
  - Plans for future expansion projects
  - Business strategies of the enterprise as a whole

- Operational and workflow information about the imaging department and other departments with access to PACS.
  - Workflows
    - Patient registration to exam scheduling
    - Ordering and performance of studies
    - Interpretation of the examination by the radiologists
    - Report generation
  - Specific workflows
    - For individual sites in a multisite organization
    - For each imaging modality at each site
- Workload for professional staffing and exam volume information
  - Number of location of imaging sites
  - Number of imaging modalities at each site
  - Exam volume by modality at each site
  - Inpatient versus outpatient mix
  - Number and location of interpretation sites
  - Subspecialties at each site
  - Number of radiologists, including number of staff members, fellows, and residents
  - Number of examinations reported per day
  - Number of radiologists reading simultaneously
  - Division of work within the department
  - Departments such as emergency medicine and intensive care units may require high-resolution, primary grade monitors similar to those deployed at diagnostic workstations.
  - Other consumers of medical imaging such as referring physicians, radiotherapy, surgeons, orthopedists, and remote sites requiring images for their medical practices
  - Teleradiology operations
  - Volume change projections
- Carefully documenting internal clinical workflows and expected outcomes/changes based on the acquisition of technology is paramount to ensuring that vendors understand the goals. Vendors can then effectively propose solutions that match the clinical and technical workflows of the institution.
- Choosing a vendor that best aligns with the goals of the project will help establish practices of transparency from the start.
- An important aspect of the decision-making process comes down to mutual amicability and motivation between the customer and the vendor throughout the RFP negotiation process.
  - Do the vendors possess the communication skillset the customer requires?
  - Just evaluating a vendor on cost and functionality alone can leave organizations vulnerable if their team is not up to the task.
  - Make sure the vendor can offer a committed team that works well with your internal delegates for the project.

- Relationship Management during the project is also crucial to transparency. To avoid delays and unexpected issues:
  - It is important for organizations to set expectations with the vendor for performance metrics and timelines critical to roll outs and "go live" dates.
  - In turn, the vendor should be completely transparent regarding their ability to meet those needs and provide proper staff and resources.

OUR EXPERIENCE: What We Wished the Vendor Knew/What the Vendor Wished We Knew

Procurement Team Challenges

- Gathering accurate organizational requirements for prospective vendors
- Documenting clear expectations and what success of the project means to the organization
- Providing consistent evaluation criteria that facilitate comparable elements
- Composing an RFP that provides context and asks the right questions
- Providing adequate transparency to all vendor participants
- Creating sufficient scoring guidelines
- Allowing sufficient time for vendor response
- Availability of procurement committee members in order to carefully examine vendors' proposals
- Facilitate a follow-up process
- Avoiding procurement committee member conflict of interest

Vendor Challenges

- Interpreting unclear RFP objectives
- Uncertainty of the product's intended use
- Obtaining a firm understanding of customer's expectation (avoiding assumptions)
- Transparency to organization of what the vendor can do and what it cannot do
- Tracking down answers to ambiguous questions
- Subject matter expert collaboration
- Meeting target dates when completing lengthy RFPs
- Providing quantitative and qualitative responses
- Mistakenly responding to lose-lose RFPs

- Defining Success:
  - What a successful PACS acquisition looks like from the organizational perspective should be transparent in the early stages, and well documented in detail.
  - Depending upon the type of application or system being implemented, uptime guarantees, performance metrics, daily use, and the interaction with other applications will vary in urgency and importance.
  - The vendor should fully understand the intended use of the product or service and its level of criticality in order to determine if their product is a good solution for the organization.

33.3.2 Technical and Hardware Requirements

- **Modality inventory**: List the imaging modalities including vendors with model numbers, dates of purchase, software versions, and DICOM Compliance for each modality.
- **Archiving and storage of images**:
  - Estimate and explicitly specify requirements for online cache storage capacity as well as long-term persistent storage.
  - Preferred method of imaging study storage:
    Lossy compression in online storage versus uncompressed or lossless compressed images in long-term storage.
    Specify if long-term storage will be online or will act as near line storage from which the images are prefetched.
    Presence of priors versus no priors contained within online storage.
    Specify timeframe during which images must be immediately available online.
    Requirements for backup and disaster recovery storage.
    Confirm integration requirements with preferred storage vendor (if different from the PACS vendor).
- Requirements for image retrieval and interpretation:
  - Workstation requirements:
    Number of workstations
    Diagnostic monitor requirements (resolution, singe/dual/quad configuration)
  - Software functionality—determine user interface:
    Worklists
    Queries
    Report displays
    Image displays

KEY CONCEPT: Supply Chain Asset Management

Supply chain asset management is the task of deciding when new purchases are needed and when equipment has passed its useful life. Asset management databases store pertinent imaging modality data and provide the essential information needed in making cost-effective decisions about procurement and decommissions. Supply chain software companies use artificial intelligence (AI) algorithms to identify and recognize modality usage patterns and provide the information needed for purchase, redundancy, and decommission planning.

KEY CONCEPT: PACS Functional Requirements

System functionality for the end user is a critical aspect for PACS. Therefore, this section in the RFP should be extremely detailed.

Paging
Stack mode
Hanging protocols
Prior report display
Image manipulation (e.g., window/level, zoom, pan/scroll, measurements, annotations)

- Advanced visualization imaging workflow options from the PACS vendor or the need for integration with third-party software and hardware:
  MIP
  MPR
  Volume rendering
  PET/CT fusion
  Cinematic Rendering (CR)
  Artificial Intelligence (AI)
  Quantitative treatment planning software
  Digital Breast Tomosynthesis software

KEY CONCEPT: RFP Construction

- Provide detailed specifications of the institution's software functionality and hardware performance requirements for both primary interpretation and clinical review.
- Request that vendors specify whether they can provide these features and describe any available alternatives.

- Determine **web distribution** requirements:
  - Allows for distribution of images for clinical review across the healthcare enterprise.
  - Specification for areas with access to PACS images:
    Technologists
    Referring providers
    Film librarians
- Integration requirements:
  - Specify the integration requirements for existing systems (Electronic Medical Record (EMR), Radiology Information System (RIS), voice recognition, advanced visualization platforms, etc.).
  - Request vendor specifications, prior experience, and pricing for interface builds.
- Data management requirements
  - Specify the requirements for patient demographic and image data management, which is typically done with commercially available database management systems (e.g., Oracle, MS/SQL, Sybase).
  - Request the specification of data management systems and provide a detailed description of any redundancy features of this system component.
    Could expose a single point of failure (SPOF)
  - Request a description of image reconciliation tools (moving images, merging or separating imaging studies, etc.)

- Image management requirements
  - Image importing software
  - Image sharing platforms
  - Image compression rules (what images can be compressed and what images cannot)
  - Image Lifecycle Management
  - Routing rules (sending to third-party applications or other destinations)
  - DICOM functions (query/retrieve, DICOM copy, etc.)
- Networking infrastructure
  - Description of the existing enterprise networking infrastructure.
  - Assessment of suitability of the existing infrastructure.
  - Define the minimum acceptable performance requirements for several measurable scenarios based upon various representative image sets.
    The vendor should specify the maximum time taken by the PACS to fully display various imaging study types at the radiologist workstation.
  - Demand in writing that the network is adequate for proposed system.

KEY CONCEPT: Breast Imaging Compression

Digital Breast Tomosynthesis and 3D breast imaging technology have high image storage demands. The FDA requires that facilities store breast imaging studies in original or lossless compressed formats.

33.3.3 Additional RFP Information

- **Timeline for Installation and Implementation Responsibilities**
  - PACS implementation typically requires a multiphase approach. The timeline for each phase should be clearly defined.
  - Outline the customer's expectations priorities and objectives within the implementation timeline
  - Request details on the implementation responsibilities and personnel:
    Time to spent at the site
    Costs associated with implementation
    Personnel minimum qualifications
- **Training requirements**
  - Request details for various user classes:
    Technologists
    Radiologists
    Referring providers

KEY CONCEPT: Legality of RFP

An RFP is a legal document and should be signed by appropriate representatives of the institution and the vendor. The vendors are thereby obligated to meet the requirements they have specified in the RFP even if not specified in the final contract.

Imaging Informatics Professionals
System owners
Training venue
Hours
Number of sessions
Reference materials

- **Financial terms**
  - Provide an itemized (line item) pricing form to facilitate comparison of the bids among the vendors solicited.
  - Include details on all components of the system and services offered:
    Software
    Hardware
    Technical costs
    Labor costs
    Upgrades
    System integration
    Installation
    Training
    Extended maintenance services
- Warranties:
  - Describe expected warranty coverage and duration along with upgrades included during this period.
  - Request detailed description of what the warranty includes.
  - Demand the vendor the same uptime guarantees and service response times as the support committed to in the maintenance and support section.
  - Demand that the PACS offered must remain compliant with all applicable laws and regulations, including those regulated by the Food and Drug Administration (FDA).
- Maintenance and Support
  - Request expected vendor commitments during the implementation and planning including:
    Vendor support strategy
    Staffing
    Nearest sales and service office
    Expected uptime
    Service response times for remote and onsite support
    Software release schedule
    Installation procedures for software updates
- System Security:
  - Request a description for security and authentication supported by the system and compliance with HIPAA standards and regulations.
  - Request details on backup and disaster recovery techniques.
  - Involve your security division of your IT department

OUR EXPERIENCE: Establishing DICOM Security at the Onset

If you are implementing a DICOM-based system, try to establish DICOM security requirements at the onset of the project. There are many attack vectors via DICOM that can be leveraged by hackers. Many DICOM devices are not very secure and are susceptible to impersonation, insecure communication, and in some cases cannot easily prevent unauthorized access. We strongly urge you to consult with potential vendors early in the process to understand their strategies in combatting security vulnerabilities.

33.3.4 Defining Expected Performance and Product Stability

Measuring performance and reliability of the products used at your organization is crucial to assuring system stability. The most import aspect in guaranteeing uptimes is approaching a product decision with known uptime requirements and **Uptime Guarantees**. It can be possible to increase your degree of certainty in their reliability by addressing the following criteria in the RFP:

- Reviewing the Service Level Agreements (SLAs) or building guarantees and remedies into the vendor contract.

KEY CONCEPTS: Business Continuity Versus Disaster Recovery

Business Continuity (BC): The ability to maintain essential business functions during routine system disruptions.

Disaster Recovery (DR): Processes and systems that put into production to prepare for adverse events associated with catastrophic system failures such as natural disasters (fires, floods, earthquakes) or human-made disasters (ransomware attacks).

- Clarification on what the vendor is promising and determining that the vendor meets organizational expectations.
- Scheduled downtimes/maintenance.
- Hardware, Services, Applications—establish an approach for each area.
- Determine how application responsiveness will be continuously measured.
- Architecting a solution early in the vendor selection process to address the above will define the capabilities as well as expose shortcomings of a given product and the vendor's technical team.
  - Try to design a solution that enables multiple independent instances of the system to be implemented.

- Work with the vendor to enable an Active-Active design where both instances are clinically operational. Advantages of an Active-Active design include:
  - Multi Datacenter instances
  - If only one location is available, then consider two independent environments within the single site.
  - Cloud Implementation.
  - Provides significant geographic redundancy.
  - One instance can be on-site and one can be maintained by a cloud provider.
- Accepting a solution that provides passive standby components rarely work due to the inactive nature of the passive system.
  - During normal operations, passive systems are not in service and it is not until the primary system fails when you will learn if the passive system is truly operational and properly configured/maintained.
  - To test the passive system it will require a scheduled downtime of the primary system. Often there is more downtime due to passive system testing then there are real issues.

FURTHER READING: RFP

Oosterwijk H. All you need to know about a PACS RFP, you learned in kindergarten. Radiol Manage. 1998;20(5):39–43.

Orenstein BW. On the right path – preparing an RFP for a successful PACS purchase. Radiol Today. 1998;6(13):14.

Schweitzer AL, Smith G. Creating the PACS request for proposal and selecting the PACs vendor. In: Dreyer KJ, Hirschorn DS, Thrall JH, Mehta A, editors. PACS: a guide to the digital revolution. 2nd ed. New York: Springer-Verlag; 2002.

Williams J, Riggs A. Mastering the PACS RFP. Radiol Manage. 2005;27(4):46–8, 50.

33.4 RFP Review

33.4.1 Review Responses to RFP

Written responses can help the buyer compare the merits of each system and make the appropriate selections of the solutions most suitable for their facility. The PACS procurement committee should set aside ample time to review each of the RFP responses. Using a predefined scoring system, where each of the RFP elements can be ranked according to the degree of actionable components.

STEP-BY-STEP: Reviewing Responses to the RFP

1. The PACS procurement committee should short list the vendors to a manageable number (about 4–6 vendors); selecting those who appear to be most suitable for their requirements.
2. The RFP should be sent out to these vendors giving them a firm response date (generally less than 8 weeks to respond).
3. The responses to the RFP should be summarized and tabulated for evaluation. All discrepancies or ambiguities should be clarified with the vendor.
4. For evaluation of the responses, each criterion being judged should be first weighted by importance using consensus of the PACS procurement committee.
5. Each vendor should be scored for each criterion and these scores weighted based on the importance of the category being analyzed.
6. The scoring should be based on the responses to the RFP as well as prior knowledge of the vendors.
7. The totals of the weighted scores should then be calculated for each vendor.
8. Based on the evaluation, the vendors should be narrowed down to 2–3 preferred and alternative vendors for manageable contract negotiations.

33.4.2 Site Visits

- The PACS procurement committee should schedule one or more site visits at locations where the PACS under consideration is already in use.
- Schedule site visits close to each other in time to ensure better comparison.
- The buyer does not necessarily have to go to the sites chosen by the vendor. Buyers can choose to visit other sites with the system version that their institution is intending to purchase, and who emulate similar workflows, business requirements, and IT infrastructure (e.g., EMR, RIS, voice recognition).
- The review team should attend the site visits in order to identify technical and operational issues. The review team could include:
  - Radiologists
  - Technologists
  - Imaging Informatics Professionals
  - IT staff
  - radiology administrators
  - Clinicians

KEY CONCEPT: Site Visits

Visits to other healthcare institutions that are already using the product permit feedback from experienced users. By observing the system in action, a comprehensive site visit can help the team discover and anticipate many potential issues that may undermine a successful implementation.

FURTHER READING: Site Visits

Archer LH, Pliner N. PACS site visits: when where, who, and how. Radiol Manage. 2006;28(5):48–53.

CHECKLIST: Site Visit Sample Questions

- Radiologists should evaluate the workstation and observe different users to assess the time taken and the steps involved for actions such as:
  - Opening a new imaging study
  - Viewing images
  - Manipulating images, annotating, saving
  - Accessing prior reports and images
  - Retrieving prior exams for comparison
- Technologists should evaluate the networking and steps involved in sending completed studies to PACS.
- Imaging Informatics Professionals (IIPs) should ask for a demonstration of a merge, name change, and other elements associated with data management.
- Administration should assess workflow impact of PACS.

- For an enterprise-level PACS, the clinicians' opinion is important. However, since site visit teams are limited (6–8 people), only the key players should be included in the site visits. Often a Chief Medical Information Officer (CMIO) will represent the clinician perspective in the absence of local expertise amongst the clinicians.
- Site visit planning includes:
  - A specific site agenda
  - A list of questions and evaluation criteria should be provided to the target site prior to site visit. This practice optimizes the time spent during the site visit.
  - The individual members of the review team should focus on their own area of expertise and schedule time to talk to their peers during the site visit.
  - The team should engage the key stakeholders at the site without the vendor being present.

33.4.3 Proof of Concept (POC)

DEFINITION: Proof of Concept

A small-scale test environment that runs proposed software solutions inside your hospital system. Enables the buyer to see how the system integrates with existing solutions and test functionality before a purchase is finalized.

- Before commencing to the overall contract review process, it is strongly suggested to perform a POC (Proof of Concept) that "tests" the system against expectations.
- Even if the vendor requires some funding for resources, this is the only opportunity to vet the system and reject the product before being shackled to a bad deal that cannot be undone.
- If the provider pushes back, move on to your next best choice.

- Factor in additional non-expiring professional service (PS) hours beyond implementation that can be applied to any vendor resource.
- This up-front negotiation will give you leverage for possible reduced rate hours or additional hours at no charge.
- A POC will enable project owners to address items missed during the original scoping or add additional scope to the project without having to secure new/additional funding.
- A POC enables both parties to address items in a timely fashion without bureaucratic delays.

33.4.4 Deconstructed PACS

Deconstructed or Best of Breed can deliver awesome capabilities to the clinical users but can also create significant integration issues. There are bound to be issues when there are two or more systems that depend on the information from one or more systems in order for its data/state to be clinically accurate.

OUR EXPERIENCE: Best of Breed "Beware"

Spend significant effort capturing all workflow events and working with the selected vendors to ensure detailed requirements for functionality and integration are documented before commencing a deal.

- Standards only go so far.
- There are many workflow conditions that are not properly captured leading to inconsistence between systems that interact for clinical state.

33.5 Contracts

An important part of procuring products for your institution is risk mitigation. There is no greater opportunity to protect your purchases then with standard practices for Vendor Contract negotiations that cover three main areas: business, technical, and legal terms.

33.5.1 Business Terms

- Have a designated **Contract Manager** take the lead internally on vendor contract negotiations and review.
  - Having a designated point person to coordinate discussions reduces project delays.
  - This delegate should have full knowledge of the organization's standard business terms to ensure the organization is properly represented in the contract.

- Some aspects to consider with each contract:
  - Nonnegotiable terms, such as payment terms, tax exempt status, and other business-related standards enforced by your organization.
  - A full understanding of the corporate expectations for submitting invoices, getting vendors set up in the organization's active directory, contacts for accounts payable, etc.
  - Contract term—most vendors have a specific term built into their SLA and maintenance agreements.
    Committing to a 3-year term initially, and each year after the contract renews.
    Negotiate the actual start and end date of the contract.
    Define automatic renewals.
    Establish product and environment testing requirements before the actual start date.
- **Payment milestones** mitigate risk of recovering funds if goals are not being met. Payment milestones should be coordinated with the technical team to keep the vendor on the hook for:
  - Completing the implementation in stages
  - Proper testing
  - Providing financial incentives for meeting goals
- A contract manager can tie a proof of concept stage to the contract process, working with the technical team to establish a baseline test before going too far down the contract process.

OUR EXPERIENCE: Sometimes There Is No Guarantee

Building safeguards into contracts and SLA's is definitely the recommended approach. Establishing a remedy for falling outside the promised guarantees with applied penalties or credits should be negotiated and included in the contract language. However, in our 25 years of experience we have never once received a payment or credit back from a vendor. The best you can do is follow protocol to mitigate risk and put your organization in the best possible position, but ultimately there are no guarantees the penalties will stick.

33.5.2 Technical Terms

- There should be a point person or technical team in place to answer any contract questions relating to the technical aspects of the project.
- These team members should read the actual contract to understand the terms of the contract.
- The following areas of the contract should comport with the organization's expectations:
  - Hardware requirements.
  - Determine if the software needs to communicate with any other products already in place.

- Determine how the license fee is calculated.
- Stages of implementation with proper testing milestones (this will relate to the payment milestones mentioned above).
- Maintenance requirements:
  Determine if the organization needs additional maintenance outside of what the contract stipulates.
  Decide if an annual auto renew option is beneficial.
  Requirements for scheduled maintenance downtimes.

33.5.3 Legal Terms

Internal discussions with your legal department at the onset of the contract negotiations will lead to a more effective and advantageous negotiations with the vendor. Simply sending a vendor contract to your legal department asking them to review the terms can cause a series of issues and delays. Advantages of including a **designated attorney** include:

- Your organization will be protected legally.
- All relevant concerns can be addressed.
- Internal discussions of the issues will lead to more effective and advantageous negotiations with the vendor.
- When sending your legal department a vendor contract that has been reviewed and red-lined with proposed business and technical edits ahead of time, your legal counsel will become an integral team member involved in any purchase to be sure you are protected.
- Every boilerplate vendor contract has legal terms that should be familiar to your attorney and can be negotiated to properly protect your organization.
- You will have the most leverage with contract terms if you have your attorney take the lead on negotiation discussions with the vendor.
- Relevant members of the technical team, as well as your contract manager, should be present during negotiations.
- It can take several rounds of negotiations to get a sound contract that meets the needs of the organization.

33.5.4 Negotiating the Contract

- To obtain the best possible contract terms, it is generally helpful to simultaneously negotiate with two or more vendors regarding:
  - Price
  - System options

- Hardware
- Software upgrades
- Software licensing
- Service contracts

33.5.5 Payment Terms and Budgeting

- Cost negotiations should be discussed internally and ahead of time.
  - Determine how fees are calculated.
  - Review the options and determine which will work best for the organization.
- Be mindful of price caps as it may weaken the incentive for lower prices.
  - Many vendors will offer a great up-front price, but if a cap on fees is not negotiated for the years to follow, your budget may take an unexpected hit.
- Include associated costs such as:
  - Implementation
  - Maintenance
  - Software licenses
  - Interface customization fees
  - Other factors such as loss of time and productivity during implementation
- Consider several options such as traditional capital purchase, lease application service providers, where pricing is typically based on the annual exam volume.
- The decision between the different options usually depends on the financial resources at the given institution.
- At the time of negotiation, it is important to factor in:
  - Initial costs
  - Maintenance:
    - Maintenance costs
    - Version changing costs
    - Replacement costs
  - Operational costs:
    - Cost per exam (user must carefully define an exam to offset any confusion and surcharges)
    - Costs with fluctuation of exams per year
    - Fluctuations with training of staff due to changes in the version of software or hardware.

KEY CONCEPT: Payment Options

1. Traditional capital purchase: needs substantial up-front capital investment, which may negatively impact cash flow. Ownership of equipment bears the risk of technological obsolescence but allows complete ownership and flexibility.
2. Capital or operational lease: needs less initial investments on software or hardware and has steady predictable costs.
3. Software only option: needs less initial costs as the vendor markup on hardware may be more expensive when compared to other sources. However, institution needs to have the expertise and resources to buy, support, and maintain the hardware.
4. Combined options like capital purchase of equipment with leasing the software.

PEARLS

- Assemble a PACS procurement committee.
- Develop a strategic business plan.
- Determine software, hardware, and workflow requirements.
- A Request for Information is a preliminary step in the procurement process.
- A Request for Proposal (RFP) is a document with explicit objectives, and goals. General information about the enterprise and departments utilizing PACS, and a detailed list of requirements and specifications.
- Review the responses to the RFP by weighing each category and *scoring* the responses to narrow the field to two or three preferred and alternative vendors.
- Transparency is mutually beneficial to both the customer and the vendor.
- Perform comprehensive site visits.
- Negotiate service contracts, payment terms, and budgeting.

Self-Assessment Questions

1. What is the first step when selecting a vendor?

   (a) Developing a strategic business plan
   (b) Writing an RFP
   (c) Negotiating the contract
   (d) Site visits
   (e) Deciding payment options

2. When sending out the RFPs, how many vendors should be selected by the imaging informatics team?

   (a) 1–3
   (b) 2–4
   (c) 4–6
   (d) 8–10
   (e) 10–15

3. Which is the correct order of operations?

   (a) RFP, RFI, site visits
   (b) Site visits, RFI, RFP
   (c) RFI, site visits, RFP
   (d) RFI, RFP, site visits
   (e) RFP, site visits, RFI

4. For an enterprise-level PACS, generally clinicians are a part of the site visit team:

   (a) Always true—clinicians must always attend
   (b) True to a certain extent—experts in different divisions may attend within group site constraints
   (c) False—consultants replace the clinicians in all visits as the number of people visiting sites is limited
   (d) Vendor decides if clinicians must attend

5. What is *not* true about site visits?

   (a) Location should be decided by the vendor.
   (b) The review team can include radiologists and clinicians.
   (c) One or more site visits should be made.
   (d) Different visits should be close to each other.
   (e) A specific site visit agenda should be established.

6. What is the correct order for the following steps?
   1. The responses to the RFP should be summarized and tabulated for evaluation.
   2. The RFP should be sent out to the vendors giving them a firm response date.
   3. Each vendor should be scored for each criterion and these scores weighted based on the importance of the category being analyzed.
   4. The PACS selection team should short list 4–6 vendors selecting those who appear to be most suitable for their requirements.

   (a) 4,2,1,3
   (b) 1,2,3,4
   (c) 2,1,3,4
   (d) 2,4,1,3
   (e) 2,3,1,4

7. How much time should be given to the vendors to respond to the RFP?

   (a) Less than 16 weeks
   (b) Less than 8 weeks
   (c) Less than 2 weeks
   (d) They can take as much time, as long as they address all the questions in the RFP.
   (e) Less than 4 weeks