Adoption of Alternative Financing Strategies to Increase the Diffusion of Picture Archiving and Communication Systems Into the Radiology Marketplace

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The objective of the study was to evaluate current marketplace conditions and strategies employed by major picture archiving and communication systems (PACS) vendors in the creation of alternative financing strategies, to enhance the diffusion of filmless imaging. Data were collected from the major PACS vendors in the forms of survey questionnaires and review of existing leases. Topics evaluated in the survey included current financing options available, foreseeable changes in PACS financing, role of third-party financiers, and creation of risk-sharing arrangements. Generic leases were also reviewed evaluating the presence or absence of several key variables including technology obsolescence protection, hardware/software upgrades, end-of-term options, determination of fair market value, functionality/acceptance testing, uptime guarantees, and workflow management consulting. Eight of the 10 PACS vendors surveyed participated in the data collection. The vast majority of current PACS implementations (60% to 90%) occur through direct purchase, with conventional leasing (operating or capital) accounting for only 5% to 30% of PACS installations. The majority of respondents view fee-for-lease arrangements and other forms of risk sharing as increasing importance for future PACS financing. The specific targets for such risk-sharing arrangements consist of small hospital and privately owned imaging centers. Leases currently offered range in duration from 3 to 5 years and frequently offer technology obsolescence protection with upgrades, multiple end-of-term options, and some form of acceptance testing. A number of important variables frequently omitted from leases include uptime guarantees, flexibility in changing financing or vendors, and incorporation of expected productivity/operational efficiency gains. As vendors strive to increase the penetration of PACS into the radiology marketplace, there will be a shift from conventional financing (loan or purchase) to leasing. Fee-for-use leasing and other forms of risk sharing have the greatest potential in smaller hospitals, which do not have the financial resources to pursue conventional financing options. Potential PACS customers must be cautious when

entering into these alternative financing strategies, to ensure that appropriate safeguards are incorporated, in order to minimize downside risk.

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THE LARGE-SCALE implementation of picture archiving and communication systems (PACS) has occurred at a much slower rate than initially anticipated, despite the multitude of operational efficiency and productivity gains well documented in the radiology literature.¹⁻³ The business side of PACS has observed the migration from innovators to early adopters. However, the largest component of the prospective PACS marketplace lies in the early and late majority users, which have not embraced PACS to date. The challenge for PACS vendors is to develop effective marketing strategies for this large majority user group, which accounts for approximately two thirds of the marketplace as a whole.

Part of the challenge of developing effective PACS marketing strategies is the unique nature of PACS, which differs from traditional imaging modalities in the following ways:

- (1) Installations of PACS are typically protracted over long time periods, requiring significant infrastructural modifications to support the technology. PACS is not a "plug and play" device, which can be delivered and immediately implemented.
- (2) Acceptance testing is a critical component, yet extremely subjective and difficult to define in objective means. The expectations of the customer typically focus on achieving productivity and operational efficiency gains, which the vendor is reluctant to promise. This creates a challenge to both parties: assuring functionality for the user while maintaining fairness to the vendor.
- (3) Unlike traditional imaging modalities which have a fairly well-defined lifetime, PACS is a rapidly evolving technology. Future developments in hardware/software rapidly outdate existing technology, rapidly producing technology obsolescence.

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- (4) While imaging modalities are typically contained within the confines of the imaging department, PACS is an enterprise-wide system, consisting of multiple components, which must be properly interfaced for appropriate functioning.

Collectively, these represent unique and interesting challenges to PACS vendors. The ability to overcome these hurdles requires developing new and innovative financing strategies. This report addresses these challenges by surveying the leading PACS vendors regarding current and future strategies for PACS financing.

METHODS

Survey questionnaires were developed to query the major PACS vendors on current and future strategies and experience with various PACS financing strategies. The primary topics covered in the survey are listed in Table 1. Participating vendors were asked to define how current PACS customers use currently available financing options according to hospital size, geography, and market sector.

Surveys were distributed to 10 major PACS vendors, with eight respondents including Eastman Kodak, International Business Machines, Picker Medical Systems, AGFA, DR Systems, Fuji Medical Systems USA, General Electric Medical Systems, and Siemens Medical Systems. For the purposes of maintaining confidentiality, the responses were presented in an anonymous fashion.

Table 1. Topics of Survey Questionnaire on PACS Financing Strategies

A. Existing Financing Options
1. current options available
2. utilization according to customer demographics
B. Critical Variables in Determining the Optimal Financing Strategy
C. Use of Leasing
1. specific variables offered in lease agreements
2. specific variables not being offered
3. length/end-of-term options
D. Fair Market Value (FMV)
1. who determines FMV
2. when is FMV determined
E. Strategies for Technology Obsolescence
F. Risk-Sharing Arrangements
1. existing forms
2. experience to date
3. future use
G. Role of Third-Party Financiers
H. PACS Primary Decision Makers
I. Future Financing Strategies
1. future trends
2. customer specific strategies
3. overall effect on PACS sales

RESULTS AND DISCUSSION

Existing Finance Strategies

All vendors offer a multitude of available financing strategies to current PACS customers, including direct purchase, conventional financing (loan), and leasing.⁴ In addition, 75% of all respondents offer some form of risk-sharing, primarily in the form of a fee-for-use lease. The vast majority of PACS customers to date have chosen direct purchase as the means of financing, with a reported range of 60% to 100%. It is interesting to note that the one vendor reporting 100% of PACS sales in the form of direct purchase deals exclusively with the government sector.

While loan and leasing options are commonly employed in the financing of conventional imaging modalities, they remain sparingly used in the current PACS marketplace. With the exception of the one vendor reporting 100% of direct purchases, the remaining PACS vendors report loan options accounting for only 5% to 10% and leasing 5% to 30%, for all PACS purchases to date. While risk-sharing alternatives are commonly offered, the overwhelming majority of vendors report less than 5% of PACS customers choosing this strategy.

When evaluating financing strategies according to demographics, some interesting observations are made. Direct purchase remains the dominant choice of financing, regardless of hospital size and location. Operating leases are beginning to gain popularity in both the government and commercial sectors. This shift towards exploring leasing alternatives at a national government level represents a divergence from the traditional means of financing through direct purchase. In the private sector, small to medium-sized hospitals are becoming more interested in leasing alternatives, as a means to preserve precious capital. In addition, these smaller hospitals take advantage of off-balance sheet financing, which improves the institution's finance ratios.

Risk-sharing alternatives to date remain the domain of larger hospitals and integrated health-care delivery networks (IHDNs). These tend to be market leaders by their sheer size and available resources. One interesting comment made by one of the survey respondents stated that hospital size is not as important as initially thought. In their opinion, the choice of financing is somewhat idiosyncratic in nature, based on the individual bias

of the institution's administration (ie, Chief Financial Officer).

Critical Variables in Determining the Optimal Finance Strategy

The importance of individual variables in determining the ideal finance strategy is summarized in Table 2. A subjective score of 1 to 5 was assigned for each individual variable being assessed, with 1 representing an unimportant variable and 5 deemed essential to the final decision. It is interesting to note that the variables with a mean score exceeding 4.0 include expected lifetime of the equipment, upgradeability, financial strength of the institution, and individual bias of the administrator. Not surprisingly, this latter variable (administrator bias) had the highest mean score of 4.7.

Those variables felt to be of lesser importance, with a mean score of less than 3.0 included hospital size, modality mix, and the tax status (for-profit v not-for-profit) of the institution. The distinction between hospital size and examination volume is a critical one, because respondents did identify examination volume as a significant variable, with a mean score of 3.8.

Use of Leasing

Leasing has traditionally been a popular financing option for imaging modalities, such as computed tomography (CT) or magnetic resonance imaging (MRI). To date, however, it has not been commonly employed to finance PACS, but does appear to slowly be gaining popularity. A large number of variables must be considered when

contemplating a PACS lease, including technology obsolescence protection, hardware/software upgrades, multiple end-of-term options, means of acceptance testing, incorporation of productivity/operational efficiency benchmarks, uptime guarantee, on-site service, and consulting services. As the popular saying goes, "you can have whatever you want, if you are willing to pay for it." When questioned regarding these protective clauses in a lease agreement, most vendors respond that customers are not prepared or willing to pay the price required for inclusion of these important variables.

The overwhelming majority (>80%) of vendors do address (in some form) the following variables in their PACS leases: (1) technology obsolescence protection; (2) hardware/software upgrades; (3) multiple end-of-term options; (4) acceptance testing; and (5) on-site service/maintenance.

The same majority of vendors do not address or offer: (1) ability to change vendor during lease term; or (2) incorporation of productivity/operational efficiency benchmarks.

There was significant divergence in vendors offering these variables: (1) ability to change financing option during lease term; (2) network upgrades; (3) uptime guarantees; and (4) consulting services (to optimize workflow).

The typical lease term offered is between 3 to 5 years, although terms as long as 10 years are available. One unique circumstance exists with the federal government and department of defense, where commitments are made on a yearly basis only, due to fiscal year funding restrictions. This allows for an "opt out" option, which significantly compromises the long-term commitment between PACS vendor and customer.

The vast majority (75%) of vendors specify multiple end-of-term options in a PACS lease, including the options to terminate at lease term, continue (at a reduced price), or purchase the system at fair market value (FMV).

Establishing Fair Market Value

Establishing FMV for a used PACS is a difficult proposition and nearly impossible in today's marketplace for two primary reasons: the rapidly evolving nature of the technology and the lack of an established aftermarket for used equipment. While traditional imaging modalities, such as CT and MRI are individual devices that can be used elsewhere (frequently in underdeveloped coun-

Table 2. Critical Variables in Determining Optimal PACS Financing Strategy

Variable	Mean Score (1-5)*
Hospital size	2.5
Exam volume	3.8
Modality mix	2.7
Payer mix	3.5
PACS expected lifetime	4.4
Market interest rates	3.0
Upgradeability	4.1
Profit v nonprofit (tax status of hospital)	2.3
Financial strength of hospital	4.3
No. of facilities in network	3.5
Individual bias of administration	4.7

*Grading scale from 1-5, where 1 is least important and 5 is most important.

tries), PACS is a multicomponent system that is difficult to remove, transport, and install elsewhere. Functionality requires complicated interfaces with information system technologies, in addition to the individual imaging modalities. Collectively, these factors provide a deterrent to selling PACS in the aftermarket.

Once this concept is agreed upon, one can argue that the value of a used PACS outside of its host institution is negligible. While leasing customers (lessees) would favor this argument, the PACS owner (lessor) would reject this argument, in order to recoup as much of their initial investment as possible. This presents a challenge in establishing an equitable FMV for both parties to agree upon, for the purpose of purchasing the PACS at lease term.

When vendors are surveyed, the majority (63%) call for a "neutral" third-party to determine FMV. This can take the form of a financing /leasing company or used equipment broker. This is not necessarily fair to the lessee because many leasing companies have longstanding business relationships with the vendors, and no used equipment aftermarket really exists at this time. A minority of vendors go one step further in assigning the task of establishing FMV by their own company. This clearly is not in the customer's best interest.

The preferable solution is to establish FMV jointly, as a collaboration between vendor and customer. To do so, there must be some existing precedent in the marketplace, and an available arbitration process in the event that both parties cannot reach an acceptable compromise. This represents a challenge to all concerned and will undoubtedly become a greater problem as more leases come to term end and existing PACS customers look to "upgrade" their existing systems.

The other important factor regarding FMV is when is it established, ie, at lease inception or expiration. In light of the rapidly evolving nature of the technology, it is difficult to predict value 3 to 5 years into the future. The majority of vendors therefore call for FMV to be determined at lease expiration. It is critical from the customer's perspective to ensure that the contract specifies when and how FMV will be determined.

One must remember that the ultimate leverage exists in the hands of the lessee, because no PACS vendor wants to be faced with the labor and

expense of removing a used PACS and trying to resell it.

Strategies for Technology Obsolescence

Technology obsolescence remains one of the primary concerns for PACS customers. One of the common themes that recurs among survey respondents is the need to provide prospective PACS customers with some optional form of hardware/software upgrades, in the hopes of keeping the technology current. One must remember that the "latest and greatest" technology in and of itself, is not necessarily functional. As complicated upgrades are introduced, they have the potential to temporarily decrease productivity, as practitioners find themselves on a new learning curve. This requires a commitment to additional training to assist technologists, radiologists, clinicians, and clerical staff; and can be a time-consuming and costly process.

A traditional means of addressing technology obsolescence is the technology refreshment lease, which allows the customer to exercise an option to upgrade technology anytime during the lease term. In return, the additional costs incurred in the upgrade are added to existing lease payments or through lease extension. Another option offered by PACS vendors is a graded level of technology obsolescence protection, which is priced according to the level and type of upgrade desired, and is incorporated into the service/maintenance contract.

The prospective customer must always consider the long-term viability of the individual PACS vendor. As continued consolidation occurs in the PACS industry, many PACS products will not be continually supported, as individual companies are bought or go out of business. This has the potential to hasten technology obsolescence of some systems, by no longer having available upgrades.

Risk Sharing

A number of different types of risk sharing options are currently being offered, with the most common ones based on utilization (fee-for-use). These can take the form of payments tied to exam volume, image access, or megabyte of storage used. While 75% of vendors report offering some form of risk sharing, less than 5% of all existing PACS customers exercise this financing option.

Some of the more interesting risk-sharing options being considered are incentive-based in na-

ture, where payments are tied directly to operational cost savings achieved with PACS implementation. While this appears to be an extremely attractive alternative to the customer, it can be a major headache to the vendor to accurately monitor and verify changes in productivity and operational efficiency. In addition, the vendor has limited control over workflow, which is a critical component in optimizing productivity. Without this control, many vendors are reluctant to enter into such a risk-sharing arrangement.

A novel approach to risk-sharing is currently being offered by one vendor, which is referred to as a "media conversion program." In this scenario, the customer continues to pay the costs determined for film-based operation, with the vendor providing filmless transition.

The vendors participating in the survey were essentially split in half as to their opinion of what impact risk-sharing will have on the future PACS market. Several believe that as cost-justification for PACS improves, risk-sharing arrangements will decrease in favor. This is because PACS customers will be reluctant to transfer a portion of their financial upside to the vendor, if they believe PACS will be profitable. The other half of vendors believe risk-sharing offers an opportunity for providers, (especially those outside of the hospital), to make the transition to PACS as performance guarantees are offered.

When asked as to whether operational efficiency and productivity gains should be incorporated into the PACS contract, the majority (63%) of vendors responded in the negative. As previously stated, this is partly out of their lack of control in the implementation process. Some vendors are beginning to offer customers consulting services, to optimize workflow and assist with information technology integration.

Role of Third-Party Financiers

Third-party financiers have traditionally played a vital role in the financing of imaging modalities. Many of the larger radiology equipment providers have responded by developing their own finance divisions. When asked to assess the role of third party financiers with PACS, vendors offered some interesting and divergent opinions.

One common response is that third parties will take an active role in the PACS aftermarket, as new generations of PACS are introduced. It is important

to note that each individual third party has its own individual area of expertise. Often the specific type of equipment and services being offered will determine the financial underwriter.

As risk-sharing concepts take on greater interest in the PACS marketplace, the role of third party financiers could be limited by the reluctance of vendors to enter into such arrangements without complete financial control. Perhaps the most intriguing and controversial opinion was offered by one vendor, who believes that technological differences between PACS vendors will begin to converge. In this scenario, the distinguishing factor in choosing one PACS vendor over another will become the business deal itself. This could make the role of the financing partner even more significant, and could present unique partnership opportunities between the smaller PACS vendors (who do not have their own financing divisions), and third-party financing companies.

Primary Decision Makers

One of the few areas in the survey where all vendors agreed is when asked who they view as the primary decision maker for PACS purchases. All respondents believe hospital administrators, in the form of either the Chief Executive Officer or Chief Financial Officer, ultimately make the decision of PACS implementation in a hospital setting. Hospital administrators, in turn rely more on the advice of information technology specialists under their employ (ie, Chief Information Officer), than radiologists or referring clinicians. This decision-making process is often facilitated by paid consultants, who are hired to assist with fact-finding, cost analysis, and drafting/analyzing the request for proposal and responses. The one place where this decision-making tree may not be applicable is in the radiologist-owned outpatient imaging center, where PACS implementation has not yet occurred to any great degree.

Future Financing Strategies

The vast majority of vendors surveyed believe that traditional leasing models will increase in the near future, as many PACS customers avoid ownership for the increased flexibility offered through leasing. One vendor observed that "PACS customers are becoming more concerned with the "use" of the technology, rather than the traditional aspects of ownership."

While the federal government often takes the

initiative with respect to development of new technologies, vendors view the private sector as the future trend setter. While larger hospitals have traditionally accounted for the majority of PACS sales to date, the greatest potential for future PACS sales lies in the small and medium-sized community hospitals.

One of the areas PACS vendors see as future opportunity is the outsourcing of all information services, of which PACS is a key component. While several PACS vendors have strategic partner-

ships with IT vendors, none to date offers a complete turnkey operation.

Many vendors believe current PACS selling strategies are limited by the lack of scientific data demonstrating return on investment after PACS implementation. As more literature is published in the scientific literature regarding PACS cost-analysis, sales should increase. While PACS remains in the early adoption phase of the marketing cycle, creative financing strategies will serve as a more effective means to enter the majority phase.

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