

Wireless Healthcare

A Picture Of Health.

When the personal computer was first launched few people in the healthcare sector believed it would ever play more than a peripheral role in imaging and archiving. Twenty years ago applications that are now classified as PACS (Picture Archiving and Communications Systems) were hosted on mainframes or a minicomputers.

Over time, as the power of the personal computer increased, clinicians began using them to access stored images and carry out elementary processing of x-ray images and MRI scans.

Photographic film manufacturers recognised the arrival of networked PCs and digital camera technology as a significant threat to their core business. They responded by developing their own digital camera technology and purchasing small PACS vendors. Now, as they wrestle with the challenge of replacing film with digital content in the consumer market and integrating PACS divisions with their healthcare business, a new threat has emerged: small vendors marketing low cost wireless PACS products and services.

While the performance of the current generation of picture phones and PDAs is limited a number of clinicians are experimenting with these devices, using them to either access existing PACS data or to build completely new medical imaging applications. Some of these ad hoc trials employ off the shelf picture phone technology and require only minimal participation on the part of IT departments and vendors while others are supported by purpose built wireless imaging products.

In this report we examine the wireless PACS market, discuss the impact of a new generation of handset and PDA technology on this market and look at existing and potential applications of wireless imaging within the healthcare sector.

At a Glance

Consumer picture phones are being used in wireless medical imaging applications.

Independent of their IT departments, clinicians can buy handsets and set up simple wireless PACS services.

The next generation of mobile devices will support a wide range of PACS applications.

Health providers are already using wireless based medical imaging products, such as capsule endoscopes.

Wireless imaging represents a significant threat to the PACS operations of photographic film vendors.

There may be some overlap of consumer and healthcare markets for picture phone technology.

Inside this report: -

An overview of wireless based PACS applications including case studies.

Profiles and analysis of Kodak, Agfa, Fuji, Given Imaging and Pedagog.

Lessons Learned From PC Based PACS

The arrival of the microcomputer made life difficult for IT managers. Employees could purchase a computer from a high street store or via mail order and construct their own applications. Rather than put in a requisition for a video frame store compatible with the company's minicomputer or mainframe the employee could purchase a microcomputer and a video digitiser to capture images. Within a matter of days the employee could have their personal image-processing project up and running.

As an increasing number of microcomputers entered the organisation as unofficial terminals it must have seemed as though the IT manager was losing control of their own department. Eventually IBM came to the rescue with its own PC. No matter that the first model was little more than a word processor, IT departments insisted that anyone wanting a microcomputer on their desk had to make do with an IBM PC.

Standardising on the IBM PC forced image processing applications developers to resurrect their unofficial equipment-purchasing programs. This time the purchases were plug in graphics cards, video digitisers, optical disk drives and accelerator boards. These modifications were often incorporated in the next generation of PCs and were eventually supplied as standard by specialist image processing vendors. Eventually, with the arrival of PACS, medical imaging became just another off the shelf product the healthcare provider's IT manager incorporated into their equipment and software budget.

The smart phone, like the microcomputer before it, challenges the authority of the IT manager. Heavily marketed by manufacturers and network operators these devices are attractive to clinicians who require access to medical images while they are on the move either within, or outside of, a hospital. Smart phones are available in high street stores and some network operators, eager for publicity, will supply handsets free of charge to clinicians who are setting up mobile medical imaging trials.

Picture phones, like early microcomputers, make life difficult for the IT manager who usually exercises control over the hardware and software clinicians use to carry out medical image processing

Standardising on the IBM PC forced developers to purchase plug in graphics cards and accelerator boards which enabled the PC to support imaging applications.

Some network operators will provide handsets free of charge in exchange for the publicity a trial attracts.

Even if purchased handsets are heavily subsidised.

Involvement of an IT vendor, or an IT department within these trials is often minimal as the smart phone is merely being used to take a picture of a patient, or an existing x-ray film, for transmission across an existing mobile network. For the purpose of this report we will refer to this type of implementation, which requires no direct access to an established PACS database, as an 'informal' application. Subsidised by the network operator, mobile handsets are relatively cheap compared to other IT equipment. The microcomputer vendor did not have the equivalent of a mobile operator pressurising them to continually innovate. For this reason evolution of the mobile handset has been rapid and the power and performance of mobile devices increases radically with each generation of product. It is likely, therefore, we will see an increasing number of 'informal' wireless imaging applications trialed by clinicians.

If the picture phone is only used to capture an image of an existing x-ray film, rather than access a PACS database, there is little need for input from the IT department when setting up the trial.

Overcoming Technical Limitations

In 2002 the Neurosurgery Department of The Murakami Memorial Hospital in Japan began using J-Phone's 'Sha-Mail' service to send images of MRI scans to specialists outside of the hospital. Images were sent as email attachments and, despite being little more than 100 x 100 pixel resolution, the clinicians who set up the system claimed these images were for sufficient for early diagnosis and initiation of treatment in an emergency. However a number of similar trials in the UK have been unsuccessful. Radiologists at the Royal Glamorgan Hospital in Wales attempted to exchange images of x-rays using picture phones but abandoned the trial at an early stage.

Clinicians in Japan claim 100 x 100 pixel resolution images are sufficient for their wireless imaging application.

The Royal Glamorgan Hospital system relied on the person taking the picture selecting the relevant section of an x-ray and ensuring the camera was correctly focussed. The picture phones used were ideal for taking relatively low resolution colour photographs but were not designed to capture high-resolution greyscale images. As well, the picture messaging network service used during the trial was designed with the consumer in mind and there were restrictions placed on the size and number of images that could be transmitted.

In a trial carried out in the UK the limitations of the handset and the mobile messaging network proved to be a significant drawback.

Less ambitious systems are proving more successful. Fife Fire and Rescue in Scotland use picture phones to capture images of injuries suffered by accident victims. Images are transmitted to the accident and emergency department of a local hospital – clinicians at the hospital use the images to help them prepare for the admission of the patient. Also, based on the images received, clinicians decide whether to attend the scene of the accident or delay treatment until the victim is brought into the hospital. Here the resolution of the camera is not a major issue as images are supported by a voice call from a rescue worker.

A mobile imaging system is used to alert the A&E department of a hospital to the extent of an accident victim's injuries.

Some wireless imaging applications are already well established. RDP displays Ltd have developed a wireless enabled PC trolley that is used to display x-ray images and MRI scans at the point of patient care. Given Imaging have embedded a miniature, wireless enabled, camera in a capsule that is small enough for a patient to swallow. As it passes through the patient's body this 'capsule endoscope' transmits images of large and small intestines to an external receiver worn on the patient's belt.

Wireless technology is already being used to support imaging applications such as trolley mounted graphic displays and capsule endoscopes.

More complex applications will require more sophisticated handsets and the next generation of handsets and PDAs should overcome some of the problems encountered during recent trials. The latest CCD (Charge Couple Devices) technology will enable picture phones to capture high resolution images similar to those produced by a conventional digital camera. The next generation of CCDs will also increase the performance of capsule based endoscopes and reduce the cost of conventional endoscopes to the point where they can be classified as consumables.

The miniature disk technology developed by Toshiba will radically increase the storage capacity of handsets and PDAs and possibly open the way for some local processing and analysis of images: CAD (Computer Assisted Detection) for example.

The next generation of mobile handsets will support a broader range of wireless imaging applications.

Formal, Versus Informal, Systems.

One way to overcome the limitations of a picture phone's low resolution camera is to access a PACS database directly. A number of 'formal' wireless imaging systems do just that. Formal applications are usually tightly specified by the health provider's IT department and have a significant input from vendors. As well as having direct access to the health provider's PACS database, formal systems can, in theory, access data stored in an electronic patient record database.

Formal applications are usually tightly specified and have input from the IT department and vendors.

As in the early days of the microcomputer, informal applications tend to be dynamic and generate a wealth of user experience. However this experience is lost when the trial ends - whether or not the trial has been successful. Formal applications, on the other hand, usually require modification of an existing service or software package. A vendor will incorporate these modifications in subsequent versions of their product. As well, the user will benefit from a relationship with a vendor through access to tools not supplied with an off the shelf consumer picture phone. For example, a DICOM (Digital Imaging and Communications in Medicine) viewer can overcome some of the problems encountered when working with small snapshots of large x-ray images.

Formal trials benefit from access to tools such as special DICOM viewers that enable parts of a large image to be displayed on a mobile device.

Market Drivers And Inhibitors.

As the performance of picture phones and wireless PDAs increases both formal and informal medical wireless imaging applications will begin to impact on the PACS market - a trend that is being keenly watched by photographic film manufacturers. As early as the 1980's manufacturers recognised the threat digital technology posed to the market for photographic film - most sought to diversify into digital photography and imaging. In the consumer sector this process was slow as none of the major manufacturers was able to identify a business model centred around digital technology that replaced one based on manufacturing and processing film. In the healthcare sector film manufacturers were concerned that their digital products and services would cannibalise revenue from photographic film.

Film manufacturers were concerned that their digital products and services would cannibalise revenue from photographic film.

The prospect of the next generation of picture phones and digital cameras destroying the consumer market for photographic film has forced manufacturers to seek new business models. In the healthcare sector, where margins on photographic films are under pressure, film manufacturers have been purchasing PACS vendors and small digital imaging companies.

Photographic film vendors believe picture phones pose a greater threat to their consumer business than their healthcare business. However the reason clinicians are setting up wireless based medical imaging trials is because, just like consumers, they find digital files easier to access and distribute than film.

The funds that would enable healthcare providers to invest heavily in new PACS applications are not scheduled to become available until electronic patient records are in place. As well, the mobile imaging market could also be inhibited, in the short term at least, by delays in rolling out 3G networks and a shortage of suitable handsets. This, in theory, should give film manufacturers time to build a portfolio of digital medical imaging products and integrate their PACS units with their core healthcare business.

In practise, however, the manufacturers' conventional and PACS businesses will both come under pressure over the next five years as new players bring wireless based PACS technology to the market.

If they do manage to develop a new business model based around digital technology, film manufacturers may find there is a potential overlap of consumer and healthcare imaging products and services. Patients, their GPs and their carers could be provided with the ability to access x-ray and MRI scans via mobile devices. New medical imaging services could be marketed directly to the public - for example skin cancer screening, carried out by the user in their own home or by clinicians located in supermarkets and other public areas.

The next generation of picture phones will represent a significant threat to the film vendor's consumer products.

Clinicians find digital images easier to access than film.

There is a potential overlap of consumer and healthcare imaging products and services

(See the In-store profile.)

Conclusions

Today, each generation of mobile handsets and PDAs achieves a step increase in performance and functionality greater than that achieved in the personal computer market during the early 1980's. While almost two decades elapsed before commercial PC based PACS applications appeared, a number of wireless medical imaging products and services are already emerging from their trial phase.

The availability of smart phones and picture messaging services has encouraged a number of clinicians to experiment with mobile medical imaging. Experiments, or trials, are usually based on the capture of images from x-ray film, or directly from the patient, using picture phones designed for the consumer market. These 'informal' medical imaging applications do not require direct access to an existing PACS database or support from either a vendor or an in-house IT department.

Trials of informal applications often lack the tools needed to support mobile medical imaging and are, consequently, less successful than formal applications that are purpose built and have direct wireless access to an existing PACS database. Lessons learned from trials of formal applications tend to find their way into a vendor's product development process or are used as a basis for a new trial.

The current generation of smart phones and PDAs lack the performance and capacity required to support a comprehensive range of PACS applications. However emerging technology such as high resolution CCD chips and miniature hard disks will radically increase the functionality of smart phones and enable developers to build robust and efficient mobile medical imaging solutions.

There already exists a market for specialised wireless imaging systems within the healthcare sector. At the basic level there are trolley mounted wireless enabled PCs that allow clinicians to access PACS at the point of care. As well, there are a number of wireless endoscopy applications available, including one that employs a wireless enabled camera embedded in a capsule that is swallowed by the patient.

Advanced picture phones and PDAs are being used in wireless medical imaging applications.

Clinicians can buy a handset in a high street store and set up a simple wireless PACS service.

Without vendor support lessons learned during trials of new technology do not find their way into commercial products.

The next generation of mobile devices will support a wide range of PACS applications.

Wireless based medical imaging products, such as capsule endoscopes, are already being sold to healthcare providers.

In the medium to long-term photographic film manufacturers, who have recently diversified into the PACS to offset the decline in their core business face a threat from mobile and wireless imaging applications and services. However there may be opportunities for film manufacturers to use their knowledge of digital imaging to develop products and services that are relevant within both the consumer and healthcare markets.

Wireless imaging represents a threat and an opportunity for both the healthcare and consumer arms of the film manufacturer's business.

Case Studies

Picture phones can be purchased from high street stores and it is relatively straightforward for a clinician to build a simple wireless medical imaging system. For this reason a number of trials have been started without the support of an equipment or software vendor. The following are two such examples.

Royal Glamorgan Hospital

Consultants at the Royal Glamorgan Hospital In Wales set up a short trial to assess the effectiveness of a picture phone service as a substitute for the physical distribution of x-ray films. It was hoped the use of mobile devices would reduce the number of films sent by taxi to specialists and eliminate the need to telex images between departments.

Vodafone, the UK based mobile network operator, supplied a number of handsets for the trial. However this was the limit of the operator's involvement and the images themselves were transmitted using the same SMS picture messaging facility used by consumers.

Although there were early indications that the trial might be successful the limitations of the picture phone used (the GX10S) meant that it was not possible to highlight hairline fractures or identify problems involving soft tissue. There were also limitations on the number and size of images that could be sent using the picture messaging service.

In common with other healthcare providers who are hoping to use picture phones in medical imaging applications, clinicians at the Royal Glamorgan believed they could overcome problems associated with the mismatch between the resolution of the conventional image viewer and that of the mobile handset by photographing a small area of an image. For this to be effective, however, there needed to be some way to put the 'picture tiles' into context when they arrived on the clinician's handset.

The system was eventually abandoned, as it was 'not considered beneficial.'

Trial At A Glance.

Trial started in June 2003.

Employed Vodafone's picture messaging service.

Involved clinicians taking digital pictures of existing x-ray films and transmitting them to specialists located off site.

Trial terminated at an early stage as the system was 'Not considered beneficial.'

Fife Fire And Rescue.

Fife Fire And Rescue and the A&E department of the Queen Margaret Hospital are collaborating in a trial using picture phones to aid the rescue of road accident victims. Rescue workers, attending an incident, use picture phones to transmit an image of the victim's injuries to a clinician. Based on the images received, and additional information provided by a voice call from rescue personnel, the clinician decides whether they need to attend the scene of the accident or delay treatment until the victim has been released from the vehicle and brought to the hospital.

As in the Mobihealth project (Profile available on request) the pictures sent from the scene of the accident are used to give prior warning of the injuries staff will be treating when the accident victim arrives at the hospital. Conventionally Polaroid photographs are used for this purpose – however these usually arrive at the A&E department at the same time as the patient.

A standard GPRS picture imaging service operated by Orange is being used to support this trial. It was originally envisaged rescue officers attending accidents would carry the picture phones. However the handsets have now been installed in the rescue tenders as these vehicles usually arrive at the scene of an accident before the rescue officer.

As this is a small-scale trial there have been few instances where the hospital has been alerted prior to a victim arriving – either because the victim's injuries were light or because they died before the rescue crew arrived at the scene. Due to the lack of data gathered, and because of the decision to transfer the picture phones from the accident officers to the rescue vehicles, it has been decided to extend the trial beyond the planned six months duration.

Trial At A Glance.

Trail started in August 2003.

Employs Orange Business Solution's GPRS based multimedia messaging service.

Involves rescue crews, arriving at the scene of an accident, taking pictures of a victims injuries and transmitting these images to the A&E department of a nearby hospital.

The trial has been re-structured and extended.



Analysis

These two implementations of wireless imaging can be regarded as 'informal' applications - meaning there is no access to patient data or stored images. Even during the Royal Glamorgan Hospital trial images were transferred by capturing snapshots of selected sections of an x-ray film as opposed to accessing a PACS file.

The advantages of a trial based on an informal system are two fold. Firstly there is the ease with which the trial can be set up - there is no need for the approval of the IT department. Secondly, the costs involved are minimal as there is little input from an IT vendor and no requirement for customised equipment or software.

However there are a number of disadvantages associated with this type of trial. Because they are simple to set up, informal applications of mobile imaging are sometimes poorly thought out. If the trial fails the experience gained is seldom used to redesign the system. Often the health provider is unwilling to make a second attempt even if, with the a few modifications, the system would have a reasonably chance of succeeding a second time around. With no vendor involvement there is no easy way the results of a trial, even a successful one, can be translated into a commercial product or service.

Vendor Profiles

AGFA Agfa

In common with other companies supplying photographic film to the healthcare sector Agfa has broadened its product range to include digital products. Typical of the areas where Agfa's IMPAX system is deployed is the PACS installation at Leeds Teaching Hospitals NHS Trust. This system will support 200,000 examinations per year and keep six year's of patient images on-line for internal use. Users will also be able to access a particular image via the Web for up to two years.

Agfa use a wireless network in their deployment of the IMPAX system at four hospitals on Reunion Island. Up to 30 sites, some on neighbouring islands have been linked via a radio frequency network called 'PIRES'. Encrypted data is exchanged at up to 2Mbps and it is planned to carry out between 50,000 and 80,000 examinations per year - representing a data flow of 15 Tb.

Agfa At A Glance

Headquartered in Morstel Belgium.

Earnings for the first three quarters of 2003 were 205 Million Euro down from 230 Million for the same period in 2002.

www.agfa.com

Analysis

At first sight, if it was hoping its healthcare business would cover the hole left by falling demand for consumer photographic products, Agfa should be disappointed by its results for 2003. Healthcare related turnover for the first three quarters of 2003 fell by 5%. However after taking variations in exchange rate into account turnover actually rose by 4.8% - this at a time when the exchange rate adjusted turnover in consumer imaging fell by 9.3%.

Agfa's commitment to healthcare imaging may not be as high as other film vendors - it includes healthcare in its 'Technical Imaging' business segment. However the company is active in wireless imaging and used wireless technology to deploy PACS in a situation where existing infrastructure could not support a wide area networked imaging system. Agfa may be able to use this experience to give its IMPAX a competitive edge over other PACS products. For now, however, it regards the present generation of mobile devices as being inadequate for imaging and tablet PCs as being too expensive and prone to damage for use within a PACS system.



Given has produced a dedicated wireless imaging product, the M2A Capsule Endoscope, based around a camera embedded in a capsule that is swallowed by the patient. As the capsule passes through the patient's gut system images are transmitted to an array of sensors attached to the patient's body. The technology is similar to that used in wearable computing applications in that the data collected is stored in a recorder attached to a belt worn by the patient.

In a typical 8 hour test the recorder collects approximately 50,000 images. The M2A system is supported by Given's RAPID workstation that assembles the still pictures into a video sequence and enables the clinician to edit, archive and email images.

The M2A capsule could be particularly useful in applications where examination with a conventional endoscope is difficult or disruptive – for example the examination of the small intestine.

Given state that over 65,000 patient examinations have been carried out using the M2A Capsule Endoscope. The company claims the capsule can detect Crohn's disease, Celiac disease, benign and malignant tumours of the small intestine, vascular disorders and medication related small bowel injuries

Given At A Glance

Founded In 1998

NASDAQ listed (GIVN)

Headquartered in Yoqneam, Isreal with offices in Atlanta, USA and Hamburg, Germany

Revenue for the fourth quarter of 2003 was \$12.5 Million a 38.9% increase over the same period in 2002 and 28.9% increase over the third quarter of 2003.

www.givenimaging.com



Analysis

Given's capsule endoscope is an example of a niche application of wireless imaging. The device, and the technique, are achieving acceptance amongst healthcare providers in 50 countries. Improvements in wireless and camera technology will enable the company to add new features to, and find additional applications for, their capsule endoscope. However at some point sales will plateau. Then, building on their knowledge of wireless imaging, Given will need to develop new devices and find additional applications for its RAPID platform. Alternatively a larger healthcare equipment vendor could add capsule endoscopy to its portfolio by purchasing Given Imaging.

Pedagog

Pedagog's key product is a GSM based video system that is used to fill gaps in CCTV networks – areas where it is uneconomic or impractical to mount conventional cameras. The company have used their experience in this field to develop a wireless PACS system for Cardiff and Vale NHS Trust. This system uses Hewlett Packard iPac PDAs to display images retrieved from an Oracle database.

The company feels its system could be used in both consumer and healthcare markets with family members or GPs using a picture phone or PDA to access medical data remotely. Pedagog also believes its system could be used for research that requires access to patient x-rays images. The system employs a DICOM viewer to manage access to images over a narrow bandwidth connection. As it has been designed to run on an ARM processor the software should be compatible with a wide range of mobile devices.

Pedagog At A Glance

Founded in 1996, incorporated in 1998

12 Employees

Initially financed by UK Steel Enterprise Ltd. and Wales Fund Managers Ltd.

A £1 Million of second round funding provided by Finance Wales, NatWest Bank and Regional Selective Assistance.

www.pedagog.com



Pedagog's PDA based PACS access application

Analysis

Pedagog is operating in a relatively immature market. It is, therefore, no surprise that a significant part of the company's income is derived from trial installations. Although its wireless CCTV system has been rolled out as a product their telemedicine system is still in the experimental phase. In part this is due to the company concentrating resources on its core CCTV products. Pedagog's wireless PACS system would benefit significantly from the increased functionality provided by the latest generation of PDA's and smart phones.

The wireless PACS trial at Cardiff and Vale NHS Trust was a formal installation, requiring significant input on the part of Pedagog. This means the experience gained during the trial could be used to enhance the system with a view to rolling it out as a product at a future date.

An interesting aspect of Pedagog's PACS system is its accessibility. As images can be retrieved via a mobile device, GPs could gain access to a patient's x-ray images. In theory patients who take a keen interest in their own treatment could also be given access to a PACS database.



FujiFilm has invested heavily in what it terms 4th generation CCD sensors which will be incorporated in digital cameras, mobile handsets and medical instrumentation. One of the uses FujiFilm has identified for these devices is an endoscope system capable of high-sensitivity and high-resolution video recording at 30 frames/second. The company already has a system that can be used to investigate the small intestine.

The NTT DoCoMo D505i mobile phone with camera functions incorporates a Fuji Super CCD with approximately 630,000 effective pixels that is capable of the high-sensitivity, high-speed capture of SXGA-sized (960 x 1,280 pixel) images with approximately 1.23 million recorded pixels. FujiFilm claim that the inclusion of their CCD enables the camera-phone to capture pictures of a similar quality to those captured using a full-scale digital camera.

FujiFilm At A Glance

Founded in 1934

72,600 Employees

Has invested heavily in what it terms 4th generation CCD chips that will be incorporated in digital cameras, mobile handsets and medical instrumentation.

Net income for 2003 \$458 Million, for 2002 \$767 Million

www.fuji.com

Analysis

In common with other film manufactures Fuji recognises digital technology poses a threat to its core business. In response to this threat the company has developed an impressive range of digital cameras and is pushing its CCD technology into the mobile handset and medical instrumentation markets. The next generation of CCDs should allow the company to support a variety of healthcare related imaging applications that, up until now, could not be mobilised due to the poor resolution of existing mobile devices.

The company has recently trialed a service that enables mobile phone users to transfer images taken with their mobile phones onto film. This is perhaps the one area of concern as it demonstrates how difficult it is for a company, whose business is built around the production and marketing of film, to find a new business model.



Kodak

Eastman Kodak, a pioneering manufacturer of low cost photographic film, was founded in 1879. Today the company's principle business is still based around the supply and processing of film. This film is marketed to the general public, industry and the healthcare sector – where it is principally used in radiology departments. As long ago as the 1980's the company recognised the potential threat digital technology posed to its core business and began developing products based around CCDs. Today Kodak produces a range of digital cameras and has added PACS applications to its healthcare products portfolio.

Kodak has acquired PracticeWorks, MiraMedica, VIParchive and Algotec Systems to support its assault on the PACS market. The company is also working with IBM to extend its healthcare product portfolio beyond radiological applications.

So far Kodak's use of healthcare related wireless technology has been limited to a wireless PDA-based dictation system designed for use by radiologists. This product has been introduced in Europe and Australia but, to date, is not available in the USA. In the consumer market Kodak has worked with mobile network operators to launch a picture phone based imaging service.

Kodak will take a charge of approximately \$1.5bn spread over the next three years to cover the cost of developing a business model that takes into account developments in digital technology. It has already reduced its total employee count by 5,000 and intends to reduce it again by 15,000 over the next three years.

Kodak At A Glance

Founded in 1879

Headquartered in Rochester, New York, US.

Pioneer of low cost photographic products and services for consumers and professional photographers.

70,000 employees.

Earnings for the fourth quarter were \$19 Million down from \$113 Million for the same period in 2002.

www.kodak.com

Analysis

Although Kodak's healthcare imaging business is performing better than its photography business – growing by 1% rather than shrinking by 4% - it still faces similar pressures in both sectors. While film sales to radiology departments have not fallen as sharply as those to professional photographers and the general public, margins are under pressure. As more hospitals move over to PACS the market for film shrinks. The more successful Kodak is selling its PACS solution the faster demand for its film declines.

Like a number of other companies Kodak's traditional business model has been disrupted by digital technology. With the prospect that a new generation of wireless based digital cameras (picture-phones) could eat into both its film and digital based consumer photographic business Kodak realises it must now act in earnest. In the past the company was reluctant to let new digital products cannibalise revenue from its film business. Now, belatedly, it is taking radical steps to realign both the size and nature of its business with an increasingly digital marketplace.

If wireless based imaging gains acceptance within the healthcare sector Kodak will need to build wireless functionality into its PACS products. Whether it could do this through acquisition is open to question given the difficulty the company is experiencing with the large number of companies it has taken under its wing in the last two years. A partnership along the lines of its relationship with IBM, only this time with a large wireless technology vendor, might be a better solution.

Of all the film vendors, Kodak is best placed to exploit the sort of medical wireless imaging products and services that would sell in both healthcare and consumer markets.

Resources

Implementation of a DICOM viewer on a mobile device :-
<http://www.mocomed.org/workshop2002/abstracts/kroll.htm>

Trolley mounted, wireless enabled display:-
http://www.rdpdisplays.com/mobile_pc_cart_intro.htm

Wireless Healthcare undertake consultancy, research and analysis for vendors, investors and healthcare providers. Reports are published by Steinkrug Publications Ltd price £56 + vat per printed issue or £49 + vat per electronic issue. Subscriptions are available.

©2004 Steinkrug Publications. No part of this publication to be reproduced or copied without the prior permission of the publisher. Comments on companies in this report should not, on their own, provide the basis of the decision whether to, or not to, invest in the companies.

Steinkrug Publications Ltd
20 Leaden Hill. Orwell
Royston Herts.
SG8 5QH

Tel. ++ 44 (0) 1223 208926
Email info@wirelesshealthcare.co.uk
Web www.wirelesshealthcare.co.uk