Microsoft's Tablet PC: A Slow Go for Healthcare

Microsoft's newly launched Tablet PC, with its ink and handwriting recognition capability, provides new possibilities for healthcare applications; however, adoption will remain limited through 2003.

On 7 November 2002, in New York, Microsoft launched its Tablet PC running the Microsoft Windows XP Tablet PC Edition operating system, and featuring a new ink data type, annotation capabilities and handwriting recognition. Although most of the few dozen organizations that participated in the launch were hardware manufacturers and suppliers (including well-known names such as Fujitsu, Hewlett-Packard (HP), ViewSonic and Acer), a number were software application-focused (such as SAP). Three application vendors were healthcare-specific: Eclipsys, Allscripts Healthcare Solutions and Stentor. Gentiva Healthcare, although not participating at the event, was also listed as an early user adopter.

Microsoft's launch of the Tablet PC comes amid much fanfare and expectations as a corporate and consumer notebook replacement. Microsoft and its many partners hope that the new ink capabilities, handwriting recognition, annotation capabilities, seamless docking/redocking capabilities and the ability to rapidly bring the system out of sleep/standby mode will encourage buyers to spend a few hundred dollars more for a unit they can use for note taking, book reading and other basic computer-interaction tasks without having to type (although many of the hardware designs include integral or optional keyboards).

Although Microsoft has, first and foremost, targeted the device as a horizontal tool, Gartner believes that Tablet PCs will see slow initial adoption in the broad market (primarily for reasons of cost and lack of application support) and will initially have higher appeal and penetration in vertical markets, including healthcare (see "Microsoft Tablet PCs — The New Notebook Computer"). However, pen tablets (such as those from Fujitsu) — also known as tablet notebooks and tablet PCs — have been used in healthcare for many years, but with only limited adoption (see "Pen Tablets: Poised for Point-of-Care Success?").
Here, we examine the challenges that Microsoft and its horizontal and vertical partners must overcome to make the Tablet PC successful in healthcare. These challenges include form factor issues, functionality/ease-of-use issues, platform maturity, and vendor and application support.

**Form Factor (Size, Weight, Cost):** Despite the development of a few new and clever convertible hinge/swivel designs to switch between (and protect) the tablet surface or keyboard, the basic dynamics of size and weight of the tablet form factor remained unchanged with the Tablet PC.

Although the average screen size of the tablets, as shown at the Microsoft launch, was smaller than that of typical notebooks (that is, 10.5 inches, instead of 12 or 14 inches) and not as bright as a desktop display (particularly when using battery power), the form factor is still much larger than a personal digital assistant (PDA), and generally large enough for many desktop-type healthcare applications, such as order entry (the Tablet PC can also be docked with larger screens for complex decision support or viewing digital medical images).

Tablet PCs are generally as heavy or heavier than their tablet precursors (two to three pounds in the nonruggedized versions), although a few manufacturers have slimmed the devices down considerably — resembling more of a clipboard (a form factor clinicians are already comfortable with) and light enough for book reading. HP offers a snap-on keyboard. A problem for healthcare with these units is what it takes to ruggedize them for industrial use (where they may dropped onto hard hospital floors) or to seal them so that they can be effectively cleaned following healthcare spills or contamination. Manufacturers showing industrialized designs for those healthcare organizations (HCOs) that want to take this extra step include WalkAbout Computers (specializing in ambulance/emergency service applications) and Xplore Technologies (partners with Symbol Technologies, which is not yet convinced there is enough of a volume market in healthcare to warrant manufacturing a Tablet PC itself). However, this adds another 1.5 to two pounds to the weight and puts the unit in the category of potentially being too heavy to hand carry for long periods of time.

Because of the few hundred extra dollars of expense for the active screen and stylus (the higher sampling rates improve the handwriting recognition; however, the disadvantage is that the screens do not respond to touch, and the stylus can be lost), manufacturers have had to offer much slower processors (800 MHz to 1.2 GHz), less memory and smaller hard drives to keep tablet PC prices close to other notebooks. Adding ruggedization also doubles the cost, putting the units into the $4,500 to $5,500
range. Using the device undocked with a wireless LAN also puts a heavy drain on the battery, with one or more recharges necessary per shift. By placing docking stations at strategic locations where the user can use a full-size keyboard and screen and get a recharge at the same time, this problem is somewhat addressed, although at additional cost.

Another challenge for tablets is the difficulty of securing such a mobile device against theft. Issuing Tablet PCs to specific individuals, and making them responsible if the device is dropped or stolen, is one strategy that should improve manageability and costs. In the end, HCOs will have to decide whether sticking with a notebook on a cart makes more sense than going with a tablet (not an easy decision, considering that the cost of a laptop on a cart is also in the $4,000-$5,000 range).

**Functionality/Ease-of-Use:** Perhaps the biggest plus for the Tablet PC in healthcare, when compared to many of its tablet predecessors, is that it runs Microsoft XP (albeit, a specially licensed version), rather than the more-limited Windows CE (or other older or nonstandard OSs). Previous tablet and application providers in healthcare were limited in functionality and compatibility compared to full-sized desktop applications, leading to some "kludges" that did not meet healthcare market demands. The Tablet PC's more robust ink, Microsoft Journal, annotation and drawing capabilities are also big pluses — enabling clinicians to capture handwritten notes and to circle, draw, point and comment on Microsoft PowerPoint presentations, Web pages, spreadsheets or lab reports, and have it all captured and transmitted digitally. For example, being able to send handwritten notes or a medical drawing in an e-mail between physicians obviates the need for scanning and faxing — a potential time saver for healthcare.

Unfortunately, the handwriting recognition capabilities of Tablet PC, although the best available to date and requiring minimal user training, will initially be of only marginal value for healthcare. Although no handwriting recognition solution today can decipher really poor handwriting (cursive writing is actually easier to recognize than block letters, a plus for users that write in longhand), a lack of healthcare-specific language models brings recognition rates for healthcare below most clinician acceptance levels. Although it could be argued that giving physicians the option of continuing to handwrite their notes (without recognition) rather than type them or use structured documentation is a step backward, the converse is that it has the potential to lead to increased computer use as opposed to paper dependence. Eventually, it is hoped that these same physicians and other healthcare professionals would start to take advantage of continually improving handwriting recognition capabilities and the
potential to capture more-structured data. It should be noted that speech recognition, although included on Tablet PCs, is being downplayed in this first release and does not come with the medical-specific language models that will also be necessary for productive healthcare use.

**Vendor and Application Support:** That the Tablet PC was so long in development, and so few healthcare vendors were part of Microsoft's early adoption program (only a handful were invited to participate in the initial launch), is some indication that support for Tablet PC in healthcare will, at least initially, be only lukewarm. More significantly, most healthcare vendors that have explicitly expressed support for Tablet PC have done little with their products and applications to take specific advantage of Tablet PC functionality, or gotten specific commitments from customers.

For example, Allscripts Healthcare Solutions, a leader in mobile/wireless healthcare computing (see "Mobile/Wireless Healthcare Application Magic Quadrant"), while announcing Tablet PC support, has so far only held some focus groups with a few dozen physicians regarding the device and did not take customer preorders (although it claims good interest from customers now). However, the Tablet PC does allow Allscripts to provide its entire TouchWorks ambulatory product on a mobile platform — something it couldn't do on the small screen of a PDA.

Eclipsys, a major enterprise computer-based patient record system vendor, was the most significant healthcare vendor at the launch. It is already working with some early adopter sites on TabletXA, a generally available component of SunriseXA that supports voice and pen input. It expects to support ink embedded in clinical documentation for nurses and physicians in early 2003. Notably, Eclipsys has bet its future on Microsoft's .NET framework technology and will serve as a major early indicator of the success of the Tablet PC in the healthcare marketplace. Stentor, an innovative disrupter in the digital medical images distribution and viewing market, has only gone as far as announcing a beta version of its Tablet PC solution — it is not expecting general availability until 2Q03 (it claims two major prospects keen to run pilots). Amicore — already experienced with tablet devices from Fujitsu in its clinical offering, has ordered 100 convertible Tablet PCs from Toshiba and some Tablet PC slate designs from Fujitsu. Amicore intends to modify its clinical application to leverage the handwriting and speech recognition capabilities of the Tablet PC and hopes to migrate its entire physician customer base to Tablet PCs by YE03. Gentiva Health, a major user organization in the home health market, intends to use the tablets for its visiting nurses.
Key areas that healthcare vendors and others will need to address to succeed with Tablet PC initiatives include leveraging annotation and note taking, and designing forms and screens (interchangeable between portrait and landscape modes) optimized for handwriting recognition, voice recognition and multimodal correction (such as via pen, keyboard or voice).

**Perspective:** Microsoft and its partners have taken a significant step forward in adding handwritten note capture, annotation and stylus input to mainstream computing, and such capabilities can only add to the adoption of computing by physicians and other healthcare professionals. Tablet PC, while not changing the basic dynamics of weight and durability of such devices, has increased the value equation for carrying such a device, and will show increasing use during the next few years. Key milestones will occur as pilot purchases are proven effective during the next nine months, as healthcare language models are added to improve handwriting and speech input, as users become more accustomed to handwriting and voice recognition correction mechanisms, as the OS stabilizes, and as manufacturers work out the manufacturing bugs, increase their shipping volumes and lower the price points of these devices.

Over time, the Tablet PC will begin to take its place as a significant and relied-on form factor in healthcare, alongside pocket devices, notebooks and desktop computers. However, **through 2003, healthcare adoption of Microsoft's Tablet PC will be limited to pilot purchases because of a lack of tablet-specific healthcare vendor application support, platform immaturity and higher costs (0.8 probability).**

**Bottom Line:** Type A (technologically aggressive) healthcare organizations (HCOs) should begin to investigate and work with their vendors to pilot the ink and note-taking capabilities of Microsoft's Tablet PC on small, controlled projects. HCOs looking to use the tablets in a busy clinical setting will need to make their own judgments regarding the trade-offs of weight and cost of industrialized vs. nonindustrialized versions. More-conservative HCOs will have to wait at least nine months for more than just a handful of healthcare vendors to begin to embrace the ink and other innovative capabilities of this platform and for the platform to mature. **Through 2004, the adoption of Microsoft Tablet PCs as point-of-care devices will be less than 10 percent (0.8 probability).**

**Acronym Key**

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<th>Definition</th>
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<tr>
<td>HCO</td>
<td>Healthcare organization</td>
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