Manager's Journal:

Why Johnny Can't Read His Data

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In Scientific American earlier this year, Rand researcher Jeff Rothenberg posited an interesting thought exercise: Suppose his grandchildren 50 years from now, rummaging through his attic, find a CD-ROM and a letter dated 1995. The letter reveals that the CD-ROM contains instructions for obtaining the Rothenberg family fortune. "Even if they can find a suitable disk drive, how will they run the software necessary to interpret what is on the disk? How can they read my obsolete digital document?"

This bit of speculation has parallels in the real-life world of 1995. As Mr. Rothenberg notes in his article, invaluable and irreplaceable government data -- the 1960 U.S. Census data, for example -- have been or still are at risk of being lost because the equipment used to record them has become obsolete several times over. In commerce, firms that once committed reams of data to computer-output microfilm to save money on magnetic tapes now search for ways to reverse the process in hopes of re-creating valuable databases.

In business applications, any method of backing up data can be swept aside by a sudden technological advance. When a company adopts a new digital recording method, it should re-record the current backup copies of data onto the new medium; however, many firms postpone this tedious bit of housekeeping, hoping to avoid the chore until it becomes absolutely necessary (or until the data lose their significance). Sometimes, however, when it does become necessary to recover the data, a company finds out that it has lost the ability to do so, because the backup copies have degenerated physically or because the equipment for reading them can no longer be restored to good working order.

Obsolescence is not the only "reading disability" facing users of digital documents. Incompatible standards sometimes lead to an inability to exchange information between systems of similar vintage and purpose.

The potential for incompatibility problems is inherent in any point of contact between internal and external users of digital documents, as an example from the securities industry illustrates. According to the Securities Industry Association, broker-dealers can expect several key benefits from managing records as digital document images stored on optical disks: increased information security, improved productivity, enhanced customer service, and cost savings compared with paper or microfilm records storage.

The Securities and Exchange Commission recognizes these enormous benefits to broker-dealers. Still, it is worried about the potential for optical disk storage to hurt the commission's examination and audit operations. Since the

industry's standards for image storage and retrieval systems are still evolving, a broker-dealer's digital records may be incompatible with the SEC's electronic imaging platforms. The SEC needs to be sure that it can access a broker-dealer's records even if that broker-dealer has an imaging system that cannot export images and index data in a format the commission can use.

Therefore, although official SEC rules specify only paper and microfilm as the authorized media for records storage, the commission issued a "no-action letter" in June 1993 that permits broker-dealers to switch to optical disks for storage and maintenance of their records without incurring SEC enforcement action, so long as they meet certain conditions. One is that the broker-dealer identify a third party that will agree to translate digital documents from the optical disks in the event that the broker-dealer is no longer able to do so.

A similar situation currently arises when one firm merges with or acquires another. Some mergers have foundered on the problems of harmonizing back-office operations; not least of these is the incompatibility between data processing systems, including digital document systems. Melding the two systems into one often entails unloading the digital documents and other data from one system, making changes (whether minor or major) to their formats, and loading them into the other system.

Not all incompatibility issues involve systems outside the organization. Firms that upgrade digital document systems have to worry about backward compatibility between the planned and existing systems. This is sometimes

problematic when the upgrade is between versions of one vendor's system; if the upgrade involves replacing a system with one from a different vendor, the problems multiply.

In software applications such as word processing, vendors include translation utilities that allow their packages to read digital documents created by a competitor's software. In integrated systems, such as electronic imaging, upgrades can involve changes not only to the software that controls the data format but also to the hardware that records the data and to the storage medium itself. If the current backfile of digital documents is large, the task of converting it to the new data and storage formats can be daunting.

As more business information is generated, managed and disseminated digitally, the risks posed by data incompatibility increase. Fortunately, firms can turn to third-party service companies for help with data literacy. Various firms specialize in different aspects of data reformatting: some simply re-record data to new media without changing the data format, others translate the data format only, and still others do both. With resources like these, firms can avoid being hampered by data-reading disabilities.

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