SurgiScheduler White Paper
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How HIT Can Weather the "Perfect Storm:" Little Solutions in Big Data

The ongoing explosion of information technology is a veritable post-industrial revolution, a sea change in how things work. And nowhere is this sea change more freighted with consequences, and beset by crises, than in healthcare information technology (HIT).

HIT is engulfed by a perfect storm of powerful business forces, chaotic market demands, and intense governmental scrutiny and regulations. All of us, customers and providers alike, face hard choices, too many options, and conflicting market signals. Plus, every year or so, up comes another new frontier for us to cross or be left behind.

HIT's Dilemma

Maybe it make sense to sit on the sidelines for a while to let things sort themselves out? After all, even Bill Gates was nearly caught out by unexpected industry trends. In a famous memo, he said, "I have gone through several stages of increasing my views of its importance. Now I assign the Internet the highest level of importance" (Gates, 1995). True, MicroSoft recovered nicely, no doubt about that, after being wrong-footed by the Internet, but an epochal collapse such as befell RIM's Blackberry juggernaut (Weisenthal, 2013) can also happen.

As for sitting it out, companies that produce IT solutions for the market have little choice about the matter. Risk is part of the competitive environment: You may make the wrong choices and fail, but making no choices and standing pat is almost always wrong. Yet consumers, too, may be forced to act without sufficient information, especially in HIT. Healthcare providers are increasingly hemmed in by government restrictions and mandates for IT, from medical coding to EHR systems to HIPAA rules. Government regulations even seem to be gravitating beyond system capabilities to implementation practices and user outcomes, as "meaningful use" joins the roster of mandated requirements (EHR, 2010). There are other pressures on the healthcare community to make choices about their HIT solutions, driven by a wealth of new and useful clinical solutions, new cloud-based services, etc., but regulatory pressures are significant contributors to the perfect storm.

Commit? Wait? This HIT dilemma pervades healthcare organizations, from large medical centers to private physician practices. Like it or not, we're all in this together, because information connectivity seems to be approaching some sort of threshold, a sea change that affects everybody and, indeed, every "thing" (Chui, Löffler, & Roberts, 2010). To weather this storm, a strategy is needed to discern some direction, or trend, so at least we can adapt as demands, opportunities, and risks swirl about us.

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Big Data

The topic of big data has generated plenty of discussion, and those discussions may reveal a strategic lodestar to guide us through the perfect storm. But the strategy, as I see it, is to resist the siren song of big data, important though it will probably be in the coming decade for advancements in medical science and practice. As always when the latest Next Big Thing comes around, there's a bit of confusion over definitions, and while I would normally avoid arguments about definitions, the question of what "big data" means is interesting here for its strategic implications.

A common, and fascinating, approach to the topic of big data is to focus on how massive data stores can be mined to discover unsuspected patterns and connections in the blooming, buzzing confusion that reality can be for us. This approach is about new algorithms and methods like natural-language processing, pattern recognition and machine learning (Lohr, 2012). A related, but quite different, approach is to focus on how data are captured and organized. This is also very much a problem of big data, but what's interesting for our present concern is to note the differences between the hype of a few years ago about data warehousing (and data mining), and the current hype about big data (Piatetsky-Shapiro, 2012). A data warehouse, according to Oracle, is a relational database designed for query and analysis rather than for transaction processing (Lane, 2005). The difference, subtle but fundamental, is the term "relational database." Data warehouses typically contain data from various data sources that has been cleansed, standardized, and imported to a relational database management system; the RDBMS is a formal data structure, and structured query language (SQL) is the most widely used programming language to report on such data. But big data is usually accessed by programs that are "not only SQL," meaning that they perform somewhat like a RDBMS, but lack some of the logical constraints of a full relational database (Henschen, 2013). When a company like Google wants to organize several hundred terabytes of data on thousands of servers, they will employ Bigtable, their proprietary data storage system, which does not support a full relational data model—yet it does provide a data model for dynamic control and format across truly vast quantities of stored and even streaming data (Chang et al., 2006).

Little Data

But what about the data sets and application software used at the scale of humans at work? The limitless ocean of big data, captured in capacious batches and analyzed with tools and algorithms created for these immense tasks, doesn't feel like what SurgiScheduler does, even though our products are highly scalable. (We do, after all, install big groups, and even groups of groups, across multiple campuses.) But big data is about accumulating data at increasing volume and velocity from numerous sources, including people at work; the data are records of that work. To a great extent, that data, the records of all that work, is gleaned from numerous special-purpose applications that were developed and installed not as data-capturing systems, but as components of computer-aided work processes.

These niche applications that compete so aggressively for adoption by specialized user groups have some shared history with the PC apps that have dotted business communities since the early 1980s. What these end-user favorites tend to have in common is being an annoyance to IT and the subject of sometimes acrimonious disputes between user sub-communities and IT. The pattern of those familiar disputes is the key to SurgiScheduler's strategy, outlined here, for weathering the perfect storm.

The Origins of Data

In the physical sciences, vast quantities of data are gathered through observation and experimentation, but in social enterprises data is created through work and cooperation (exchange). Most IT data comes from transactions and communications that are captured, these days, in the computer-aided processes that constitute transactions and communications. We are data.

We may well ask—we human actors whose choices and behaviors are being transmogrified into data—we may ask, How does our work become data? There was a time, not so long ago, when the answer was clear: an entire category of workers was devoted to the task of transmuting the work of bookkeepers, purchasing clerks, accounts payable clerks, et al., into computer databases. People did their work, which often included filling out a lot of forms; admin assistants filed and cross-filed papers; and data entry clerks turned tally sheets into computer cards. Finally, after yet more labor-assisted steps, those green-striped bundles of printout came thundering off the high-speed printers to be delivered, like the latest edition of the daily newspaper, to offices throughout the enterprise and to clients around the country.

To oversimplify the process, we can say that the productive work within an organization was documented by added work that was, at best, indirectly productive. That documentation was then input to computers for processing and analysis by adding yet more indirectly productive work. (This labor can be called "unproductive," but I don't want to derail the discussion by using a term that might sound pejorative to some.) From all this added labor, combined with capital-intensive information technology, came the information that organizations needed for accounting and other administrative necessities, plus, of course, business intelligence. A rather substantial amount of labor was devoted to capturing information and transmuting it into computer data. It was worth it, because the computer performed major steps in the overall process of gathering, storing, analyzing, and reporting with so much greater speed and accuracy than could those who toiled at such tasks when "computer" was a job description, not a machine, before the invention of electronic computers (IEEE).

Evidently, the role of IT as a labor-saving factor has not diminished. Rather, IT has stepped in earlier in the overall process that we call "work." Before, in simplified terms, we could say that fundamental work was performed; then additional work documented and codified elements of the fundamental work; and then IT systems processed and reported on the coded information. But now, computer-aided processes permeate through the entire work flow. In some cases, robots automate stages of the overall process, but in many cases, IT applications are part of computer-aided processes. Now, instead of adding labor in order to capture and transmute information about the work being performed, the very act of working is producing computer-ready information, because the IT application that enhanced a worker's productivity did it by capturing and manipulating data in the background. IBM's Memory Typewriter enabled typists to complete their work faster and easier because it stored everything typed, allowing the operator to recall and revise previously typed material (IBM, 1977). Yet the data captured for this purpose could, as IT improved by giant strides, be saved and put to previously unimagined purposes. The capture and storage of such typed information is not the result of added labor; it is a byproduct of a labor-saving device.

The Data Vanguard

If we are data—if, that is, the work we do is the substance of databases—then we are also the vanguard of data. What we do as purchasing experts, accounts payable clerks, clinical nurses, surgical physicians, and all of the other work that takes place in the healthcare industry, is where data comes from—what data consists of, really. And so, no matter how vast and technical the empires of IT may be, we need to remember that, increasingly, it is the process of helping people do their work that is the front end of IT.

In a nutshell, that is SurgiScheduler's strategy: Help surgeons (and their helpers) do their work. There will always be ways to use the data that we capture in background, as a byproduct of the help we provide, as long as we take care to be good stewards of the data. Big data is showing the way to process more information, more in terms of amounts and more in terms of variety. But it is "little data," the real-life workers who change the bed sheets and repair defective heart valves, these workers rich and poor, few and numerous, whom we seek to assist. And by assisting them, by providing applications that they don't want to do without, we capture the information that IT experts need.

We take care of the data so it won't be lost. We protect it so it is HIPAA compliant. We cooperate with IT departments and centers to deliver it in a format they can readily use.

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