

BETWEEN THE LINES

TAPPING THE POTENTIAL OF
21ST CENTURY DOCUMENTS

by John M. Kelly

“It’s kind of fun
to do the impossible.”

Walt Disney

The Future of Documents and How to Leverage It

As recently as the 1980s, paychecks arrived in envelopes, document technology meant electric typewriters, interoffice mail was pervasive enough to require a staff and sales presentations sprang from mylar sheets on overhead projectors. The impact of digitized documents was just a dream, barely hinted at by the arrival of Wang word processors, IBM PCs and the Commodore 64.

Since those “early” days, documents have changed so dramatically and so intrinsically that it’s hard not to look forward to what lies ahead. The document advancements of the last few decades occurred while the digital revolution was in its infancy. Now that document technology has reached young adulthood, the potential for innovation is even greater.

As new technologies surface, documents are destined to become more dynamic and malleable, their content liberated to the point of virtual self-government. Countless emerging technologies—e-paper, cloud computing, and many others—are already proving the case. But what we are seeing today is merely a glimpse of what we are likely to experience tomorrow.

Form Follows Function ... or Not

The physical form of documents will continue to change at a rate Morpheus would envy. Anyone who has read the latest John Grisham thriller on an Amazon Kindle® or used their Apple iPhone® as a Starbucks debit card is experiencing the shift firsthand. If, as mentioned earlier, documents are information “containers,” then tomorrow’s containers will appear in an astounding variety of shapes and sizes—some changing right before our eyes.

Take for example, erasable paper. Developed at the Xerox Research Center in Canada, erasable paper uses compounds that change color when exposed to light. The light forces the paper’s content to disappear within 24 hours, enabling newly blank pages to be returned to the input tray. Documents like emails, memos and meeting notices are available while needed, then vanish. When you consider the security and sustainability advantages of erasable paper, it’s easy to see why we consider it remarkable—in all senses of the word.

Another promising advancement is flexible OLED “paper” from companies like Sony® and Samsung®. At first glance, an OLED (Organic Light-Emitting Diode) sheet appears to be a

photo print—a thin, full-color image. But when the image begins to move, you realize you’re watching a video display. One that curls and bends like a piece of paper.

If OLED displays grow in size and incorporate wireless connectivity, there’s no limit to their business possibilities: Sales sheets with built-in product demos. Live handouts at business conferences. Marketing materials that literally speak to each customer. These pioneering applications might seem to be decades away, but consider this—only a few years ago, “computer phones” appeared to be equally distant.

It’s a testament to the speed of technological change that the inclusion of e-books in this discussion feels almost quaint. Available to the general public since the 1990s, e-books have swiftly evolved from presenting Dickens novels in black and white e-ink to offering full-color, graphic-filled best-sellers with animated page turns. In fact, during the second quarter of 2010, for the first time ever, Kindle e-book sales outnumbered Amazon’s hardcover purchases—140 e-books for every 100 hardcovers.¹

That same year, schools in Virginia and California rolled out pilot programs that replaced textbooks with iPads. According to a Virginia elementary-school teacher whose iPad-based social studies curriculum is now exclusively digital, “It was fun watching the kids jump right in. They’re so used to technology, they took to them right away.”²

More recently, technologies like the Vook have begun reshaping e-publishing, blending the book format with high-quality video and Internet connectivity. The reading list includes everything from business advice to children’s books to golf tips. Let’s say you’re a golfer who needs help driving the ball longer. You download a golf Vook, read the chapter on golf-swing mechanics, watch a demo about long drives, view a follow-up clip of golf teacher Jim McLean, and then gloat about your newfound knowledge on Twitter—all within one document, without switching platforms.

We can also expect more expansive use of document technologies like embedded Radio Frequency Identification (RFID) tags, which facilitate document tracking and can trigger alarms at building entrances and exits. Plus documents that house their own microbatteries, circuits and antennas—PCs where the P means “paper.” Of course, there’s also the continuing evolution of e-paper itself.

Today, e-paper is primarily a passive medium: Experts provide content; everyone else accesses it. But how long will it be before e-paper escapes the book world and becomes as common as paper-paper? How will enterprises change when anyone can create portable e-pages? What marvels will spring to life when preschoolers start using e-paper like a disposable Ohio Art Etch-A-Sketch®?

These breakthroughs—and countless others—will deliver new forms of incredibly rich content in extraordinary new ways. We rightly applaud our present-day ability to read the *New York Times* on a Nook or to enlarge a touch-screen page with a sliding finger. But when it comes to e-documents, we are only beginning to scratch the surface.

A New Dynamic, Inside and Out

The changes affecting the document form factor will be matched, or possibly exceeded, by those influencing document content.

Mobile and cloud-based technologies in all forms—Software as a Service (SaaS), Infrastructure as a Service (IaaS) and Platform as a Service (PaaS)—will make documents more accessible than ever. At the same time, standards like XML will simplify content exchange. Information will be simultaneously more open (the cloud) and more structured (standards). As a consequence, content will move readily from one place to another, with or without the wrapping of its original document, morphing as needed along the way.

One quick aside—if you find the industry buzz around the “cloud” a bit vague, here’s a crisp definition from Wikipedia, “Cloud computing is Internet-based computing, whereby shared resources, software and information are provided to computers and other devices on demand, like the electricity grid.”

What does the cloud have to do with documents? Plenty. With cloud computing and dynamic content, individuals around the globe will be able to create documents, make changes, reconfigure content chunks, repurpose content, embed new content forms, aggregate real-time information, develop mosaic documents from multiple sources and so on—without worrying about having the “right” operating system or application. In short, users will be able to easily access, manipulate and share documents and content from any computing platform that has a Web browser.

Tools like Basecamp® and DocuShare® have already set this trend in motion, but the open cloud platform will shatter its limits. Learning curves will be minimized. Documents will become easier to create and more intuitive. Collaboration will be simplified.

Documents will evolve from static frameworks housing self-contained pieces of information toward aggregates of flexible content drawn from diverse sources. NewsCorp’s iPad newspaper, which pulls stories from multiple news feeds based on reader preferences is one small embodiment of the concept. Technology is rapidly advancing to a point where multi-author mashups may soon be common and tools like Box.net will enable global workflows over mobile devices.

Content will also become more dynamic in and of itself, as touch-screen manipulation blurs the line between user and document. In the past, interfaces displayed the document; today, they sometimes are the document. This shift requires a new way of thinking about document design. An article on crowdsourcing.org explains it this way:

Where professionals once wrote memos to be read, 2011 begins an era in which documents are written with touch both in mind and on fingertips. Designing documents to be a sensual physical experience and not just a visually cognitive one demands different aesthetics and sensibilities. This nascent transition will be as profoundly important for future interpersonal communications—and branding—as the transition from radio to television. Having the right touch to get the right touch will become a desirable communications competence.³

Equally pivotal, social networking tools like Facebook and Twitter will broaden their business role as the distinction between “personal” and “professional” fades. Social content such as Yelp preferences and Foursquare badges may serve as the foundation for highly customized, one-to-one marketing campaigns. Business-centric social applications like salesforce.com’s Chatter might offer enterprises their own private social network. And user-generated bits and pieces may come together to serve enterprises in ways that are impossible to predict.

Documents with a Mind of Their Own

As a complement to their increasingly kinetic nature, documents are becoming smarter, moving from passive to proactive in beguiling new ways. Tools like semantic software are creating an intrinsic awareness around document content and purpose, resulting in a sort of document cognizance. This is already evident in documents that route themselves to recipients and in applications like Meshin™, which employs semantics to comprehend and sort Outlook content.

Another visionary example lies in the digital mailrooms being implemented by leading-edge companies. When a letter arrives at these state-of-the-art facilities, smart document technologies read and analyze the content. Decisions are automatically made about content, recipients and document type. Is the letter handwritten or printed? Paragraph form or order form? All without human intervention.

As a next step, tools such as OCR software and linguistic engines identify words, names, dates and other information to establish links within the document and beyond. So, for instance, a smart document might search for the word “cancel” in conjunction with other keywords, or for the word “expiration” accompanied by a specific date. Additionally, intelligent redaction

software might be used to delete sensitive data before the letter is systematically categorized and sent on its way.

No longer confined to electronic communication, smart document technologies are increasingly being applied to hard copy materials. Consequently, they are bringing greater intelligence—and, in a sense, self-awareness—to all manner of documents.

These innovations not only aid productivity and decision-making, but also significantly alter the way we retrieve and mine content. IDC estimates that more than 2,600 exabytes of information will be added to the cloud by the year 2012.⁴ The smarter our document processes become, the easier it will be to pierce the growing density of information and leverage content that is meaningfully organized.

It is not far-fetched to envision a day when intelligent, proactive documents process information to make recommendations or reach conclusions. For example, a smart document might analyze the historic data related to a specific type of lawsuit, then suggest a legal argument based on the successful strategies of the past. Or documents may:

- Automatically search for new information to keep content current and relevant
- Create original documents out of what they've "learned"
- Pull information from social sites to create customized, one-to-one communication materials for customers
- Automate time-consuming steps in business processes
- Maintain audit trails to track their own use and evolution
- Learn user viewing preferences to present information in a predetermined way (regardless of device)
- Retire themselves to an archive when they're no longer needed.

As smart as these documents may appear to be, they are ultimately just a reflection of the user's mind-set. Like avatars in the digital document world, they focus on providing user-valued information while brushing aside everything else.

Documentality: Thinking About Documents in a New Way

So how do you leverage the continually changing nature of documents? How do you ensure that your current and future documents—in all forms—drive your enterprise, rather than drag it down? You begin with a shift in your thinking. A new documentality, if you will.

It's a foundational mind-set that has three dimensions. The first involves a backwards glance at the documents of your past. By scanning and digitizing older documents, you can extract knowledge and meaning from their content, making valuable information readily accessible to more employees. Imagine a scientist in the middle of the rain forest accessing a research library via a tablet computer, and you get one tiny piece of the picture.

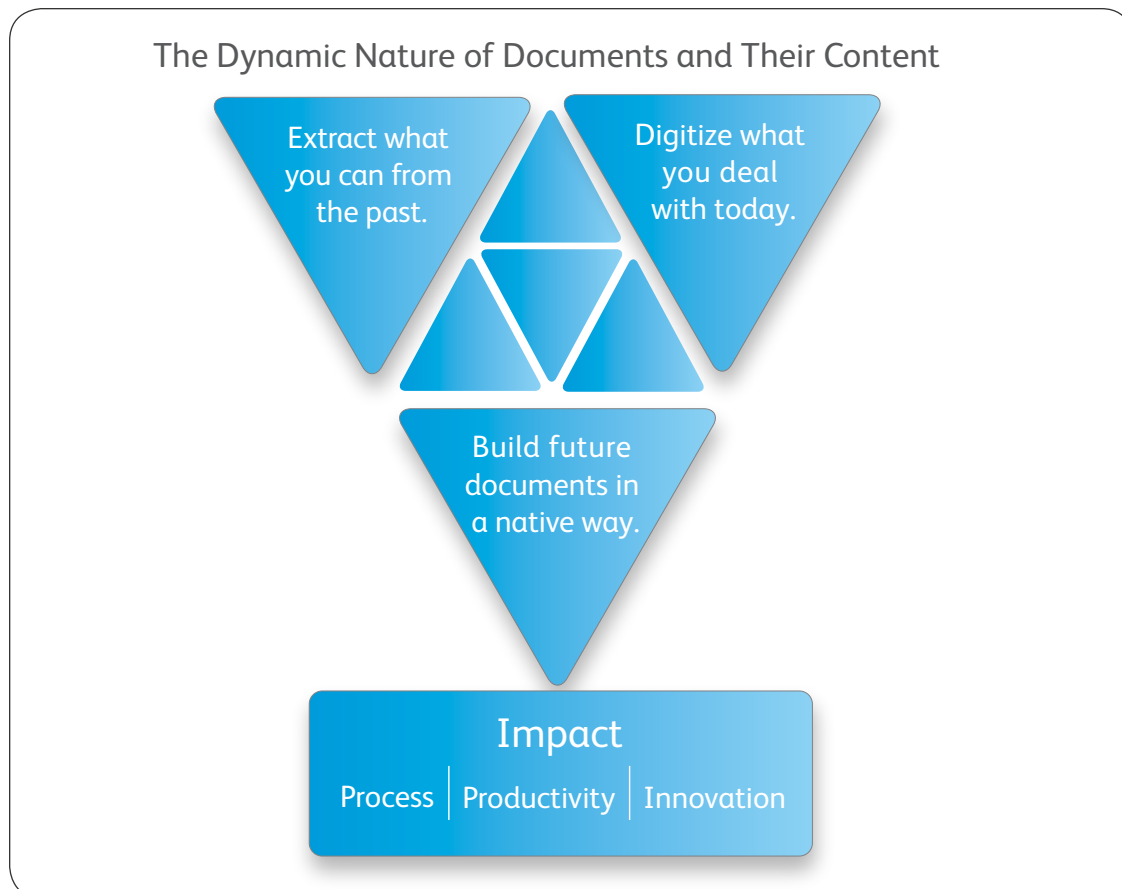
The second dimension is the present. You need to look for ways to enhance the here and now, digitizing today's documents and their processes. Mailrooms. Financial workflows. Customer correspondence. The state-of-the-art technologies mentioned earlier, such as OCR and linguistic software, are among the many advancements that can place new document efficiencies within your reach.

Finally, it is important to start building for the future in a native way. From the moment you consider creating documents and/or content, you should do so with a view toward making them dynamic and inherently smart.

No mistake about it—there's a lot of hard work required to bring these dimensions to life. You have to use technology creatively. You need to intersect existing processes with newly built capabilities. You may have to change long-standing behaviors or organizational infrastructure. And your knowledge of emerging document technologies has to advance past cursory.

But the payoff is worth the pain. You'll deliver legitimate value for your enterprise, impacting processes, knowledge-worker productivity and even your ability to innovate.

The New Documentality



The Process Impact

The first major payoff of a new document mind-set is process impact. Quantum leaps in document form, content creation and cloud compatibility will make it easy to use documents and content more effectively, contributing to the efficiency of countless processes.

Employees will exchange documents and incorporate information from virtually any source, without reformatting. Tools like audit trails will track document development and usage. And new technologies will bring structure to the world of unstructured data, making even more information readily accessible and usable.

These advancements will undoubtedly change the way we work—not only with documents, but also with each other. Simply stated, when you transform the document, you transfigure the document process. Better processes yield better decisions; better decisions drive better results. Add cloud computing to the mix, and companies of all sizes will be able to recast their document workflows and reenergize their business.

- Processes that require sorting through mountains of documents, such as drug development, litigation-related discovery and engineering research will benefit from greater focus and control, leading to increased productivity and more informed decision making.
- Document processes that involve step-by-step approvals, like mortgages, will be reengineered to provide internal and external reviewers with simultaneous access, reducing cycle times and increasing customer satisfaction.
- Back-office processes like accounts payable will be enhanced with digital forms and automated workflows, improving turnaround times and overall cash management.
- And any document-related process will be able to benefit from shorter time frames and better control, as documents are automatically read, categorized and distributed—all with fewer errors.

These advantages are already evident in many of the Xerox case studies presented earlier: The Trident Group's mortgage processing. Ducati's user manual production. Target's direct-mail processes. Northwest Airlines' online self-service. Each workflow became simpler and faster because of powerful document technologies. We can only wonder what will happen as those technologies grow even smarter and more dynamic.

Every document-driven industry stands ready to benefit. Picture this health-care scenario: A physician's smartphone rings at 2 a.m. The patient on the other end is experiencing dizziness. The physician accesses the patient's records via the phone to help determine what's wrong. If necessary, the doctor e-faxes a summary of the patient's records to the nearest ER or forwards a prescription to the patient's pharmacy. Diagnosis and treatment improve because the right information is right at hand.

Or imagine a diabetes patient wearing an insulin pump that automatically documents his physical activity and insulin use. The pump wirelessly sends the patient's electronic journal to a server on the Internet for review by a caregiver. Sound like fantasy? In actuality, each of these "what if's" is a "what is"—new technology that is real and ready to break out.

The Productivity Impact of Dynamic Document Access

The preceding processes all point toward greater productivity. But when these processes are tied to emerging mobile technologies, as in the previous health-care examples, knowledge workers can become productive in ways never before seen. Consequently, the impact of mobile innovations cannot be overstated.

In a brief period of time, the number of mobile workers in the U.S. has grown to 100.3 million, about 72 percent of whom are mobile knowledge workers.⁵ Because of this trend, mobile devices are quickly evolving into multi-function business tools. In a recent InfoTrends study, mobile knowledge workers reported reading 59 percent of their documents on screen.⁶ Equally noteworthy, 72 percent of the respondents had the ability to collaborate, update and amend documents remotely.⁷

With another 22 million American workers expected to go mobile by 2014, it is clear that we are on the cusp of a major shift. InfoTrends captures the point succinctly:

Mobile knowledge workers are arguably the fastest-growing segment of today's office workforce. InfoTrends anticipates significant changes in how and where mobile knowledge workers create, access, collaborate, print, and perform many information-based business processes.⁸

One such process is evident in Xerox's new mobile print technology, which enables smart phones to locate and access printers anywhere in an enterprise. For illustration purposes, let's observe a Cleveland employee visiting her company's Taiwan office:

The employee taps the Xerox Mobile Print app on her smartphone, looks at a Taiwan floor plan dotted with printer sites, selects one and emails her document to the device. She also punches in a security code. The code is reentered at the device for verification purposes. The printing begins.

While presently available for intra-company use, this mobile print application has implications that transcend company walls. With the integration of cloud printing and GPS technologies, our Cleveland friend will be able to find a printer inside or outside the enterprise, based on her location. So if she is traveling down La Cienega Boulevard, she can instantly send her document to the nearest El Segundo Staples, Kinkos or Office Depot.

Mobile financial transactions are also on the rise. While we have already seen the emergence of mobile banking, more recent advancements include credit-card readers designed for smartphones and mobile payment systems that use Near-Field Communication to access credit-card, gift-card and bank funds over iPhones. With approximately 1.2 billion people already carrying handsets capable of rich, mobile commerce,⁹ wallets and purses may soon house nothing more than a driver's license.

The combination of mobile applications and cloud computing will be unstoppable. According to IDC, the projected annual growth rate for cloud services from 2009 to 2014 is expected to be 27.4 percent—more than five times the rate of traditional IT offerings.¹⁰ As the cloud spreads, organizations of all sizes will be able to leverage complex, document-driven workflows, streamlining their business processes by scanning documents to the cloud for processing, reworking and storing. As Joe Tucci, CEO of EMC Corp, described it, “We’re now going through what I believe is pretty much going to be the biggest wave in the history of information technology.”¹¹

The Third Impact: Documents as Innovation Catapults

Tomorrow's document advancements will certainly help enterprises enrich what they are already doing. But their real allure lies in enabling enterprises to do what they've never done before. In short, technology innovation begets business innovation. And the need for business innovation is pressing.

Today's global playing field is packed with teams who have never been more eager to win. In his 2011 State of the Union address, President Obama linked U.S. innovation to job development, economic growth and global competitiveness, and urged Americans to “think bigger” and seize “our generation's Sputnik moment.” When *Ad Age* and Forrester Research asked 20 top marketers to name their priorities, “developing a culture that fosters and supports marketing innovation” landed in the top three.¹²

More than simply an internal rallying cry, innovation has become a differentiator, inside and outside the office. Customers seek it from their vendors. Vendors seek it from their suppliers and partners. In a recent HFS Research report on Business Processing Outsourcing (BPO), 94 percent of the respondents stated that their company's executive leadership views innovation as “a critical or quite important component of their BPO strategy ... becoming the major differentiator in provider selection.”¹³

In leveraging new technologies to lighten your document burden, you can enhance your position as an innovative company. Your focus can move from document management to business management, with a renewed emphasis on your core market offering. Conversely, you may find that the changing nature of documents leads you toward a completely new business model—one with even greater promise.

Take as an example Groupon, which provides daily localized coupons to online subscribers. Groupon's discounts don't become real until a critical mass is attained—i.e., a prespecified number of users must commit to the Groupon offer. Once the tipping point is reached, the deal is on.

There's nothing new about Groupon's document type—it's a coupon. And there's nothing particularly unique about its website. But the fact that Groupon uses real-time data to determine whether it has a "product" is groundbreaking. As is the fact that sponsors don't commit to a discount until the economies of scale are in their favor. It's a business model that couldn't have existed 10 years ago.

ZipCar represents similar ingenuity. Users reserve a car from a PC or mobile phone, locate the car's local parking space, unlock the car with a Zipcard and head off with their hourly rental—without filling out hard-copy applications or approaching a service counter. It's another business model that couldn't exist without digital documents ... much like Netflix, Zillow, eBay and countless other companies on a list that grows longer every minute.

But innovation doesn't have to manifest itself as a game-changer. Truly visionary organizations look to innovate everywhere, even in the most mundane areas. Take for instance, sports teams that allow their schedules to be integrated with their fans' Outlook calendars. It's a simple, original idea that strengthens customer loyalty in a way many costlier programs don't. Or imagine a sports stadium tracking real-time concession sales so that it can offer a 20 percent discount on slow-moving items during the seventh-inning stretch. Will these ideas change the industry? Hardly. Will they change the cash register receipts? Hopefully.

Beyond specific products and services, business structures themselves are likely to assume a more innovative profile. With greater access and fewer limits, small companies may begin operating like big ones, offering products that are created and sold through a continuously evolving supply chain that forms on demand from a global pool. Large companies may consist of a small central team, complemented by a virtual workforce of independent contractors and temporary employees around the world.

Dispersed, distributed workflows could become commonplace. Companies might assemble and disassemble virtual teams as needed, redefining "departments" completely (goodbye, silos). Or knowledge workers might move freely from one company to the next, working remotely for one enterprise before assuming an on-site position at another. The technology makes these structures and workflows possible. The question is: How do we make them practical?

Rapid Change? Not So Fast.

Unfortunately, the path toward the utopian document future is not without its obstacles. And they're substantial. Leading the list are security and privacy. The doorway to cloud computing needs quite a few more locks and burglar alarms before many enterprises will enter. And the "access anywhere" platform of mobile devices needs a little less "access" before businesses will confidently agree to "anywhere." There are also concerns about control. As businesses venture farther from their core infrastructure, they must be able to extend their reach without losing their grip. Control and continuity outside of the enterprise walls—including the firewalls—must be ensured. The reliability of the cloud also needs to be a given. Anyone who's ever shouted "You're breaking up" into a cell phone knows how tenuous today's networks can be. Tomorrow's networks can't repeat the sins of the past.

The growth of user-generated material raises an additional set of control anxieties. If user content is pushed and pulled by an enterprise, it must be tightly managed and undeniably secure. But how? Are new infrastructures required to address the situation?

And what about compatibility and longevity? Will all of your documents move smoothly to the mobile world? Will content remain accessible and readable as future technologies change? How will you access your files if your data provider goes out of business? These are major questions, and companies are already scrambling to find—or build—solutions.

Beyond the technological complexities lies a minefield of business issues, such as measuring the ROI of social media and finding the right pricing structure for pay-as-you-go services. There are also human issues, such as employee acceptance of new workflows and technology clashes between generations. Not to mention legal issues. If personal and professional lines grow blurrier, how do you define "your" documents? Who "owns" the tweets and blogs?

Of course, breakthrough technologies always tend to raise questions and fears. They wouldn't be considered disruptive if they didn't. But history has shown that when the benefits of a new technology are powerful and desirable, the opportunities somehow manage to trump the obstacles.

The Next Chapter

The transformation of documents over the last 30 years has been astonishing. What was once considered a digital revolution is now the status quo, providing a tremendous platform for further innovation.

In the coming years, documents will continue to evolve, abandoning their traditional role as fixed containers of static information. A greater number of documents—perhaps all—will be

dynamic, with liberated content that can be quickly accessed, analyzed and merged with other documents. A new breed of intelligent documents will act on our behalf, simplifying the search for information and streamlining time-consuming tasks. In addition, the distinction between a document and its technology will be increasingly difficult to discern, giving new meaning to Marshall McLuhan's claim that the medium is the message.

These changes will enable a "document" to be as large as a library or as small as a cluster of spreadsheet cells, with a shelf life ranging from a few seconds to a digital lifetime. Content may be limited to words or may overflow with moving images, real-time text and personalized audio. And "paper" may become nothing more than a portable, ever-changing display.

One thing that won't change, however, is the significant role that documents will play in our business lives. Whether conventional or revolutionary, documents are essential to progress. They sell products and services. Provide strategy and direction. Empower workflows. Record transactions. Generate revenue. Establish and enhance customer loyalty. Drive innovation. And impact virtually every aspect of enterprise success.

Documents are no less important in our personal lives. From the moment we are born until the day we depart, they define us. Birth certificates announce our arrival; death certificates tell the world our days have ended. Every meaningful occasion in between is marked by birthday cards, diplomas, photos, Facebook status updates, earnings statements, business licenses, mortgage approvals, tweets, passports and other evidence of our existence.

As we head toward the future, documents won't stop doing what they have always done. They will just do it more quickly, more intelligently and in remarkable new ways. No matter what tomorrow's documents may hold, each will continue to deliver on the promise of the man who first made document distribution possible:

"Like a new star it shall scatter the darkness of ignorance," predicted Johannes Gutenberg, "and cause a light heretofore unknown to shine among men."

Endnotes

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