Going Digital

When Apple personal computers were first introduced for home use in 1984, the 128-kilobyte unit cost nearly $6,000 in today's dollars. Twenty-five years later, a portable Chromebook with a full color screen, Internet capability, and vastly greater processing power costs around $150. I recently bought a touch-screen tablet for $35. By the time you read this book, that may seem high. Since the 1960s, computer power has doubled about every two years. This phenomenon has been so steady and predictable that it has come to be referred to as Moore's Law. A corollary is that digital devices are steadily becoming more and more affordable.

A digital divide still exists between rich and poor, but it's smaller than you might think. According to a study by

Victoria Rideout and Vikki Katz published in 2016, more than 90 percent of American families living below the poverty line have access to the Internet; 85 percent have some kind of mobile device, and 69 percent have some type of computer. The quality of access still varies greatly between rich and poor. Lower-income families tend to have slower connections, limited data plans, and fewer devices. The basic components, however, have already become affordable to nearly everyone in the United States.

Even in the developing world, Internet-capable technologies are rapidly becoming universal. Here also, mobile phones lead the way. Nokia's most basic feature phone—with a small color screen, alphanumeric keypad, flash camera, mobile, wifi, and Bluetooth capabilities—is available for just U.S. $25 in Kenya. A Tecno Spark smartphone—with full-sized screen, digital camera, and fingerprint sensor—sells for around $85. By 2020, smartphone adoption is expected to reach 55 percent in sub-Saharan Africa, 63 percent in Asia, 64 percent in the Arab world, and 70 percent in Latin America. The number of people using mobile phones and tablets to access the Internet doubled between 2012 and 2017; the mobile phone industry trade association known as GSMA expects that figure to reach 4.7 billion by 2020. The high

rate of mobile access, even among the poor, opens tremendous new opportunities to address book hunger through digital distribution models.

African Storybook Project

In a Tanzanian library, more than a hundred children sit cross-legged on the floor. They have come on a field trip from a nearby school. The librarian, recently trained in the operation of a two-hundred-dollar laptop and a three-hundred-dollar projector, displays an African Storybook Project digital story onto a sheet at the front of the room. The gathered children are as excited by this new media experience as American kids would be at an IMAX theater. The librarian reads each line of text, then has the children repeat it back as a group. The story is locally relevant and entertaining. The children are fully engaged; some of them are literally rolling on the floor with laughter. In one month, fourteen thousand schoolchildren will make twenty-three thousand visits to this library. If visits continue at this rate for a year, the cost approaches something on the order of a penny per child.

Africa will strike some as an unlikely setting for cutting-edge, high-tech approaches. It has the lowest rate of Internet access of any continent, and familiarity with computers is limited even among teachers and librarians.

Technology that may be affordable by American standards remains costly relative to African incomes. Moreover, prices for the same technology are often substantially higher in developing countries, because of import taxes and distribution difficulties. An iPad in Kenya, for example, might cost twice as much as one purchased from a U.S. discount store. Many communities still have unreliable electricity sources.

These challenges, however, are actually less intimidating than the challenges of distributing printed books across land. The continent is vast, and much of it is landlocked, without access to seaports except through a neighboring country. Railways and highway systems are underdeveloped, and most of the population still lives in rural areas. Corruption and theft result in significant losses along the textbook supply chain, and postal services are similarly unreliable. In comparison, the challenges of digital distribution are quite manageable.

The African Storybook Project formats the books it creates as digital slide shows. This allows them to be opened on standard-issue software, such as Microsoft PowerPoint or any of the free alternatives. These can be digitally projected for reading in a large group. Even a smartphone screen can be made large enough for a small group of students to read through a cheap plastic

magnifier. African Storybook Project is also experimenting with on-demand printing technologies to avoid distribution hurdles typically associated with print books. ASP's Tessa Welch explains: "I think it is important for children to have books in their hands, but maybe not distributed so far. Maybe if the library has a printer, a child can take home a particular book on loan."

A Library in Every Pocket

After working as a Microsoft executive and overseeing sales at Amazon, David Risher spent a year traveling the world with his wife and two young daughters. Near the end of the trip, his family was visiting an orphanage when Risher noticed a padlocked building. It was the library. Risher, a book lover and comparative literature major, asked to look inside. The orphanage director confessed that she did not know where to find the key. Like many small libraries in the developing world, it had simply fallen into disuse. Its collection of discarded American books held little interest or relevance for local children with limited English. It might as well have been a long-distance landfill.

"That was it, that was my moment," Risher says. "I looked through my life and I saw books over and over again and technology over and over again." Risher came

back to San Francisco and founded Worldreader as a charitable startup. He estimates at least a billion people are held back by low literacy and book hunger. To Risher, this is not just a tragedy; it is a business opportunity. "Ours is a social enterprise, but we still think of it as a business." In starting any business, Risher explains, "you want to make sure you're solving a real problem, and you want to make sure you're trying to do it in a way that's different from what people have tried before." Delivering relevant books to readers in the developing world was clearly a big problem. Given his background, Risher naturally saw the potential to solve this problem digitally.

In the basement of Worldreader's San Francisco office, a technology team loads the library onto devices for a school in Kenya. Dozens of wires dangle from an Ikea shelf. Each Kindle must rest here for two hours to receive its library. The Kindles cost thirty dollars each, thanks to a discount from Amazon. Fully loaded, the pocket library of one hundred titles costs around seventy dollars. A hand-drawn diagram calculates how long each step in the process takes, which determines how many Kindles can be loaded in a day. The goal is eventually to shift this process to the country where the Kindles are used. This will create jobs abroad, save on labor costs, and, most important, cut down the lead time to set up a new school.

For the moment, loaded Kindles get packed into cardboard boxes to be shipped overseas.

The work doesn't end once the boxes reach their destination. Worldreader also works to train the teachers on the technology, literacy methods, and gender sensitivity. Female students in Ghana, for instance, typically lag far behind their male peers. In Worldreader schools, the gender achievement gap disappears. The program even includes training on how to conduct local fundraising to ensure the school can buy additional e-books in the future—an added bonus for schools and for local publishers. In communities without electricity, solar panels will be installed at the school. The long battery life of the dedicated e-reader means that students can charge the device at school and still take it home to share with siblings and parents.

Ensuring the sustainable production of locally relevant content is also a goal. Staff members think in terms of cultivating an entire digital ecosystem around local books. Worldreader works with local publishers to digitize their books for the first time, and trains them on how to market their e-books at Amazon.com for global sales. "Even though there are only a small number of new books published in Africa each year, if we can unlock their backlist of books and digitize them, we have got an incredible

resource." American publishers donate content, while African publishers are paid about seventy cents (U.S.) per e-book. This can add up to a regular stream of several thousand dollars per year in additional income for a small publisher. From these resources, a customized library of around one hundred books is created for school.

Risher brings a mindset shaped by his years managing Amazon's explosive growth. Worldreader now operates on a $10 million annual budget—this includes the value of donated e-books—and has already reached more than five million readers. It is still in the stage of refining its programs and optimizing its model, with an eye toward much greater expansion over the next decade. Worldreader hopes to serve forty million readers by 2020, and one billion by 2025.

Although both print books and dedicated e-readers have their place, the cheapest strategy by far is to deliver e-books to devices people already own. Library for All, now Nabu.org, has prioritized this approach from the beginning. Its cofounder Tanyella Evans explains: "Our [mobile] distribution strategy is really driven by the market—these Chinese and Asian companies producing these low-cost handsets. People know what *Tecno* and *Blu* are, even in these rural areas. It's like Coca-Cola." Unlike Worldreader's Kindle strategy, "we believed that the

potential was in the device-agnostic platform." Smart-phones also made it possible to distribute illustrations in color, which was important to Library for All's vision of a high-quality digital reading experience.

Worldreader has since deployed a cell-phone strategy as a complement to its longer-standing Kindle programs. Whereas Worldreader's Kindle programs focus on school-based instruction, its mobile programs target out-of-school adults and preschoolers. Its mobile platform got an early boost from a partnership with Opera, which at that time held 25 percent of the mobile phone browser market. In this partnership, the Worldreader app came preinstalled on most phones distributed in the developing world, greatly boosting its visibility. Mobile delivery "allows us to move quickly," Susan Rimerman of Worldreader points out: "People already have the device. We have huge audiences in Ethiopia, Nigeria, and the Philippines. We can put books in people's hands where we don't have the resources to put feet on the ground." This enables Worldreader to expand nimbly into new languages or settings.

Whether on a mobile phone or dedicated e-reader, the digital strategy "is absolutely tied to our success," Rimerman notes. "We now have books in 43 languages and it enables us to quickly add depth to our collection. The cost

to prepare smaller print runs for small language groups makes it expensive—we jump over that hurdle." After discovering that romance was a hot category among women in Muslim areas of Nigeria, for example, Worldreader was able to quickly load more Harlequin titles. This agility also came in handy when the organization obtained funding to launch an Arabic-language program with Syrian refugees in Jordan. "One of the great things about digital is that you don't have the limits of print and paper or the logistical challenges of distribution beyond your local market," Rimerman notes. "You can just get your books out there."

Digital Versus Print?

The rise of e-readers sparked significant controversy among U.S. book lovers. Can reading on a screen really be "as good" as reading on paper? American bibliophiles tend to have strong opinions one way or another. Supporters praise the convenience of instant access and portability. Detractors say the devices rob readers of the tactile coziness of holding a book in one's hands, turning the pages, feeling and smelling the paper.

Recently, it seems that the detractors are winning, at least in the United States. Sales of e-books peaked at 36 percent of the U.S. book market in 2014, but are now

declining. According to the Codex Group, the primary reason is "digital fatigue." Americans spend too much time on their screens already. For print media, they are happy to seize the option to read on paper. Indeed, digital natives are leading the way in fleeing e-books for print. Americans also have high standards for digital reading, and strongly prefer reading on a Kindle, Nook, or tablet. Cell phone purchases are only 3 percent of all e-book sales in the United States. Of course, American readers need only wait a day or two for Amazon to deliver a print book to their doorstep. Paper remains a very convenient, and perhaps the most pleasant, way to read for American book buyers.

Readers experiencing book hunger, however, are less picky about their options. According to Rimerman: "People in North America and Europe are really hung up on paper versus digital. When you talk to African librarians, they don't care. They don't have this attachment to paper. They say, 'We're fine, we just want the books.' " For many low-income readers in Africa and elsewhere, print books remain hopelessly out of reach. To encounter a digital library on one's cell phone is to experience the same awe and excitement that American book lovers might feel walking into a particularly outstanding book store. For readers who have never owned a laptop or a

tablet, a tiny smartphone screen feels miraculous rather than inferior.

Most book nonprofits currently taking advantage of digital distribution possibilities are using common e-book formats such as ePub and PDF. Some publishers, however, are experimenting with more creative formats. Instead of attempting to recreate the experience of a paper book on a digital device, these "digital first" strategies reimagine the book to leverage the capabilities of digital devices. Rather than adopt the e-book formats common in the United States, however, Pratham Books formats stories in a way that is optimized for reading on mobile phones. Readers scroll down through text interspersed with pictures, without ever turning a page. The format imitates the layout of web pages, which were themselves designed for digital reading, rather than the traditional layout of paper binding. As software to support mobile reading has advanced, nonprofit publishers no longer have to create their own distribution platforms.

It would be a mistake, however, to think of mobile reading as a complete substitute for print. "For children's books, when a picture book is laid out with big illustrations, and the text is designed beautifully on top of that image, it's a great reading experience," Rimerman acknowledges. Digital devices are not yet there. Even when

mobile capability does become nearly universal, traditional paper books will probably continue to play an important role for novice readers. Worldreader has found that teachers who had previously used paper books find it easier to adjust to using Kindles. In contrast, first-grade students often have difficulty operating a Kindle even after months of practice. Print on paper is more accessible for novice readers—assuming they can get their hands on such books. "Digital is not going to be right in every scenario," acknowledges Evans; "this is not a silver-bullet solution. We want to make sure the content we are creating is print-ready so that is an option."

Melody Zavala of Books for Asia agrees. For decades, the organization has focused on distributing physical books donated by U.S. publishers. More recently, Books for Asia has seized on digital distribution as a way to meet critical needs for mother-tongue content. "It is amazing, digital access and the use of mobile phones, where we are it is huge, it is skyrocketing. It is important to program for that and take advantage of that—but also to know that in some places, the barriers are so huge that it's not going to happen. We need a variety of approaches. The world is a complicated place. For anyone to say that digital is the solution, or that it has to be all print . . . there is no flipping of the switch here. The

mix is important. We're going to continue to do that mix for a long time."

The Digital Advantage

As hardware and software efficiencies continue to improve, so do the advantages of digital distribution. Paper, trucks, and warehouses are expensive, particularly for a large-scale operation. Of course, mobile phones, software, and Internet connections also cost money. But where readers have already acquired these for basic communication, e-book distribution can "free-ride" on the existing system. Physical distribution barriers rooted in long distances, mountainous terrain, poor infrastructure, corruption, and limited logistical expertise become irrelevant.

Digital distribution also brings cost advantages to content development. Major publishers find it simple and nearly costless to donate e-books. "At first it makes them nervous that they are going to turn titles over in digital format for mobile availability," Rimerman acknowledges. "Piracy is a concern for some publishers." Systems have been designed, however, to make it virtually impossible to download whole books. In contrast, for-profit publishers cannot afford to print paper books for the sole purpose of donating them to charity. Even with a tax credit, doing this would result in a financial loss. Instead, publishers

donate paper books only when they have miscalculated demand and printed more copies than they were able to sell. Even then, charities must cover the costs of collecting the remaindered copies and distributing them to readers.

The digital revolution also enhances prospects for diverse books. In a print world, titles with niche appeal are risky to invest in. They cost much more to produce per copy, because editing, design, and even printing all depend on economies of scale. Niche books cannot be stocked in a brick-and-mortar bookstore, where the hypothetical reader interested in a particular title may simply never come along. The rise of online booksellers and digital publishing has led to an explosion in titles available in the United States, precisely because these constraints no longer apply. A corollary of greater affordability is that a title does not have to be a best-seller in order to be financially viable. Older titles now out of print remain available.

Closely related to this point is the advantage of digital distribution for accommodating linguistic diversity. According to Evans: "In Uganda there are 52 different languages. To print all the different versions of those books, no one would want to invest in that as a print strategy. Reversioning is only cost-effective digitally." A neighborhood

bookshop might carry a few dozen titles, and an urban bookstore several hundred titles. But mobile devices connected to a cloud library can offer access to millions of different titles. This is crucial in multilingual contexts, where the population of a single city may need access to books in hundreds of languages. This complexity of offerings could never be accomplished in print distribution. Traditional publishers and bookstores by necessity specialize in one or two languages. In the digital world, hundreds of thousands of books are quickly searchable by language, reading level, and topic.

Digital technologies also make it easier to pay for publishing. Once a title is made available, a digital copy can be transported to a reader anywhere in the world for pennies on the dollar. This has two implications. First, nonprofits can have a much greater impact with their charitable dollars. Second, and perhaps more transformatively, it may become possible to charge developing-world readers, schools, or libraries highly affordable prices— perhaps a nickel or a dime per e-book. Even this very low income might support a financially self-sustaining model that would enable much faster growth. Smartphone and platform companies also have a business interest in supporting charitable publishing. Free libraries represent yet another value-adding feature that can motivate consumers

to purchase a smartphone, or to spend more time on a social platform.

As technology costs continue to drop, the advantages of digital approaches become even more salient. Sooner or later, as with every other sector, digital disruption is coming to charitable book publishing.