

Does Print Complement Mobile Computing?

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Abstract

Mobile device adoption is growing at a pace that is considerably faster than desktop computers, and the category of smartphone is growing at the fastest pace. The Tablet device category is also growing dramatically. These devices alternately replace the need for print, yet may create demand for it. Software has been built to support print from these devices, for applications ranging from production of business documents to ordering of photo products. In addition, complementary technologies like QR codes have been “hyped” and can be seen on marketing materials like posters and in printed publications. Augmented Reality is another technology area that some have employed in conjunction with printing applications. Photo applications are a clear area where smartphones have achieved market acceptance, virtually obsoleting stand alone “point and shoot” cameras, and the market for digital photo printing is growing. Finally, mobile support for commercial printing applications is emerging, and likely will play an important role.

Printing from Mobile Devices

The ability to print from mobile devices like iPad and iPhone wasn’t included in their initial releases. However, third-party developers quickly released their own software to connect the devices to printers. Apple’s IOS5, the operating system for the devices, included support for generating PDF files, and printing. The question remains, though: what is being printed from a phone or iPad or other tablet device and why?

Marketing Applications

Many industry pundits, software developers and some printers are agog at the possibilities Quick Response (QR) codes and other encoded printed technologies might bring in combination with software for smartphones. The problem at this

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writing is the devices don't come with built-in software for reading and executing the codes. Reports have been published indicating consumers don't know what the codes are. Some users have discovered that the payoff did not justify the effort of getting the code read. Other new technologies like mobile visual search, Google Goggles, and even Apple's Siri may obviate the need for a specific code on the page, but deliver the same or better results.

Photo Products

There is no question that the inclusion of cameras in smartphones has changed the photo market dramatically and quickly. It's also brought about the launch of numerous new Internet-based photo-oriented businesses, and revitalized some existing ones; however, it's also made Facebook the number one photo sharing property on the web and called into question the desire on the part of consumers to print photos the way they once might have.

Commercial Print

If one believes (as these authors have for several years) that much of commercial print will eventually be purchased over the Internet, then one must also believe that much of print will be purchased via mobile devices—simply because there are already countries in the developing world where such devices outnumber PCs; some of those countries are today the fastest growing print markets. In fact, according to Gartner, the number of browser-equipped phones in the market globally will exceed 1.83 billion by 2013 compared to 1.78 billion computers in use.

Summary

While it is too early to tell whether many of these mobile printing applications will succeed or fail in the marketplace, we can look at what they do, and subjectively evaluate their relative utility. We will discuss real-world applications that users and print service providers can implement; enabling and incorporating mobile-based printing and print-complementary functionality.

Introduction

In the process of asking and attempting to answer many questions around the subject of whether or not print complements mobile computing, it initially began to look like either the answer would be no, or simply that there are many applications of print that are being wholesale replaced by mobile. While there are a large number of applications that are actually being replaced by mobile devices, the conclusions we reached are a bit more positive than this pronouncement may imply without explanation.

There continues to be an evolution of what applications are appropriate for print, whether “in the field” or in an office environment. Many activities we conduct that formerly involved print are increasingly conducted online. Way back in 2010, research firm Gartner forecast that by 2013, browser-equipped phones will exceed 1.83 billion, compared to 1.78 billion old fashioned computers in use. Three billion of the world's population will be able to conduct electronic transactions via mobile or internet technology by 2014, with those devices becoming most users primary browsing experience in 2015.

Applications such as VDP- print personalization, PURLS, transpromo, etc., have for years been promoted by the vendor community in the printing industry to sell hardware and software solutions. While there is no question that these applications have been useful to print consumers, have made money for some print service providers, and have helped to sell equipment and software for vendors, the net benefits to the industry of these technologies may have been fallen short. At this writing, all forms of digital printing make up only about 2% of the worldwide print market, variable or not, so it is hard to estimate the impact personalization has had. Having said that, though, it is clear that the trend is toward digital printing, and customized, personalized and/or targeted print will be a key part of the future of ink (or toner) on paper.

The key is that marketers believe in personalization, and whether they continue to believe in print personalization in the face of digital alternatives is the question. Many print applications that were previously hyped by vendors, are being systematically replaced by “interactive advertising technologies”, notably the meteoric growth of solutions like Google AdWords and the nascent Facebook Ads, which let advertisers connect with millions of potential customers, easily choosing audiences for ads by location, ages and interests, and then accurately measuring the results of campaigns deployed.

The good news for many print service providers is that they are not dependent on advertising products or are focused on advertising applications where the message the audience is “captive”, such as point-of-sale. The 2012 drupa trade exposition in Germany is taking place as I put the finishing touches on this paper. Much of the focus of vendors at the show was on wide format (as well as superwide and “grande”), packaging and labels—because these areas are thought to be “immune” from the never-ending march of digitization of which mobile plays a now small, but growing role.

This paper will attempt to address basic questions, like:

- Is mobile print useful?
 - o Will it be more or less useful in the future?
- Are existing applications featuring mobile printing novelties?
- Do mobile applications result in net new printing occurring?
- Who are consumers of mobile print?

More than one third of American adults own smartphones, according to a survey conducted by the Pew Internet and American Life Project of the Pew Research Center (www.pewresearch.org) in July, 2011. Pew's definition of smartphone encompasses iPhones, Blackberry devices, and phones running the Android, Windows or Palm operating systems. An important trend noted by the study is that, already today, one quarter of smartphone owners use their phone for "most" of their online browsing.

An even more recent study by Pew, conducted in collaboration with The Economist Group, found that 18 months after the introduction of the iPad, 11% of the U.S. population own a Tablet computer, and 77% of them use the device daily. The study also demonstrated that Tablet owners are more educated, richer and fully employed than the rest of the population.

Many say that mobile is "Web 3.0", the next frontier for the consumer Internet. If it really is, we need to answer one of the key questions Print Service Providers have about mobile printing applications (that on the surface appear to be complementary to print): whether or not these applications are capable in some way of preventing print from losing market share to e-delivery.

Mobile Document Printing

The big question here is: does one even need to print from a mobile device? A sales person waits in the lobby of a hotel, for his corporate legal department to finally send a contract that has been through multiple revisions between his own legal department and his client's. He is to deliver the contract to the client and obtain a signature today. It arrives in his smartphone's inbox. He can read it on the screen, but needs to print it out so the client can sign it.

Enabling printing of documents from a post-pc device like a smartphone or a tablet to a network- or cloud-connected output device should allow him to print the contract in the hotel. A variety of public or semi-public "cloud-based" printing services are

variously now available to let one print to network or cloud-accessible output devices in hotels. These services include offerings from Google, HP, EFI's PrintMe, PrinterOn, and even Xerox. The EFI PrintMe service has been in existence and deployment since 2001. One uses software on a computing device (smartphone, tablet, PC) to print the document to the cloud, and then the printer (or the workstation or computer-based device to which it is attached) has service-specific software to retrieve it and output it.

If the hotel has a FedEx Kinkos retail store in its lobby (common at hotels focused on accommodating large business meetings), it is likely possible to access their proprietary infrastructure for mobile printing from a variety of devices, including BlackBerry and other smartphones.

Perhaps ironically, though, at a time when many hotels have begun to offer the aforementioned types of services, they have also begun to offer hotel-provided workstations and printers. Many business-friendly hotels provide this free workstation/printing setup for guest use in any application. They've realized that guests won't try to print very large documents on slow desktop printers (and also that the "delightment" of guests outweighs the cost.)

But there are significant alternatives for the scenario we describe. For example, when would it not be acceptable to email the contract to the client, so they can print it in their office? It is possible that the document is so confidential enough that it is unacceptable for one to print it from a mobile device to a "public" printer. However, this might also mean it should not be opened on a mobile device, at all—and it may also mean that the sales person could not use one of the aforementioned services available in the hotel to print it, either.

Many new printers in corporate environments are including Cloud-based printing capabilities. So one could potentially go to the client's office, and connect via WIFI to a printer, or a workgroup printer down the hall. Again, security restrictions often apply.

Many do this in a proprietary way, but three major computing companies have published technical specifications and literature on "open" capabilities. Apple Airprint, Google CloudPrint and HP ePrint are the wave of the future for mobile office printing. These services will eventually lead the way in the office and in public venues (in one form or another), integrated into hardware and software from a variety of third-party vendors. Many of these capabilities today are "casual and consumer", but will eventually evolve into robust enterprise applications.

Marketing Applications

Print has been an important part of marketing to people “on the go” for many years. Brochures, flyers, and datasheets are examples of “portable commercial print”. Outdoor advertising and point-of-purchase (POP) displays and signage are all targeted at people who are “mobile”. While we can expect all of these applications to continue for years to come, they are all under pressure from new technologies. POP displays are even under pressure from digital signage, another emerging advertising channel, which we won’t discuss here (perhaps a future TAGA paper will examine this.)

With smartphones and post-PC era device, new modes have emerged for shopping and buying, and as a result marketing has, and will continue to be, impacted. At this writing, it is primarily the most affluent who own smartphones and other post-PC devices, and they are an important target audience for marketing. Over time, adoption will trickle down to less affluent segments. Conversion of prospects into sales is already a key mobile app goal. For example, eBay expects to record more than \$8 billion in mobile sales in 2012, up from \$5 billion in 2011; most online retailers have similar expectations for growth.

So let’s take a look at applications that make marketing print applications complementary in some way to mobile devices, and/or vice-versa. Do we believe enough in the technologies that are being deployed today to invest? Will the marketing executive at a major corporation hire a print service provider to create a campaign that integrates print and mobile?

QR Codes

Although the printing industry (or perhaps slightly more accurately, its consultants and journalists) seems to have latched onto QR codes in a pretty dramatic way, parallels can be drawn to the initial hype of VDP PURLs (Personalized URLs) that took place in the early 2000s. If you pick piece from a printing trade journal written seven or so years ago about VDP and PURLs, you could replace the acronym “PURL” with “QR Code”, and the piece would likely still have the same meaning; tell the same story.

In overview, the goal of QR codes is to enhance the user’s (i.e., reader or consumer) seemingly dull print piece with access to new, rich media experiences that complement the print piece. The flip side is the notion that the print piece is driving customers to the rich media experience waiting for them to view, to help “close the deal.” These are both worthy goals, but have encountered some challenges along the road to adoption.

For printers who have implemented VDP, QR Codes are technically just like implementing a PURL (Personal Response URL) on a printed piece—the benefit

is that the recipient doesn't have to type it in. This should increase the likelihood that the prospect will engage and see the additional content. That additional content to be provided via the QR Code's link is often a mobile website these days, but can take other forms, like playing a video or showing a map. Like PURLS and other VDP applications, QR Codes can be "one to many", where the same QR Code could be scanned by thousands of prospects, and they are all taken to the same unique content, or they can be 1:1, where each user gets their own personalized QR code, that takes them to some content that is personalized just for them. Printing QR codes is easy, and can technically be done by any Print Service Provider, using inexpensive and even free software.

One of today's QR Code applications, readily seen is on signs and graphics. The consumer at the point of purchase, or in the aisle of a retail store, is enticed by offer text and graphics on a printed piece; or the merchant wants to make a special offer on a particular product or add-on item.

QR Codes have appeared in many different shapes and sizes of printed products in addition to signage and display graphics. These include magazines and newspapers, brochures and datasheets, and even stationery including business cards. The results are mixed because of some obvious limitations of QR Codes.

The biggest obstacle is software that can read the code, which is relatively cumbersome to obtain today. This limits the audience for the code to tech-savvy consumers. While at this writing some 88% of smartphones have cameras, apparently only about 13% have software installed to allow them to read QR Codes. This special reader software must be installed on a smart phone to scan the code, and it is not included with Google's Android smartphone software nor on the Apple iPhone and iPad devices. Until Apple and Google include native QR Code applications that automatically work with smartphones built-in cameras, QR codes will remain a curiosity that will only be used by technical and "bleeding-edge" users.

Another problem with QR codes is their size and appearance on the printed piece. To make them easier to scan, they are generally fairly large on the printed piece. Making them bigger also makes them obvious to the user, because it's a double edge sword—they are seen, but they are ugly (a bunch of square dots inside a larger square), as well as meaningless and unfamiliar to most consumers. All while taking up print "real estate".

So although the QR Code is being touted by consultants and pundits in the printing industry, it has not achieved enough traction or "ubiquity" to justify the amount of attention it has received. Does it make print complement mobile? It technically can, but today the consumer has to be quite motivated (presumably by an enormously valuable offer) to act. While it could be said that this may be the problem, not the technology itself—i.e., the creativity and motivation of advertisers to actually use

this new mechanism in campaigns— it’s kind of a chicken and egg thing, and if advertisers really saw the value in doing this versus alternatives, perhaps we would all be scanning QR codes multiple times a day.

There are other ways to achieve the same results that QR Codes are promising. A company called DigiMarc, based in Beaverton, Oregon (www.digimarc.com) has been creating what they call Digital Watermarks for many years. Their software accomplishes the same end goal as QR Codes, but without the visible barcode-style manifestation. The August 2012 edition of Seventeen Magazine makes extensive use of the technology. Similar to QR Codes, the company’s solution requires reader software to be installed on the consumer’s smartphone to activate the rich media experience (in this case, software that is proprietary to DigiMarc), leaving that hurdle for the consumer to overcome. Seventeen Magazine’s young readership may be a good test, because it “seems” likely they would engage and want to see rich media associated with the “fun” content in the printed magazine. We will stay tuned and look forward to seeing the results.

Image recognition technology is likely to become much more powerful in smartphones as their processor speeds and memory capacity increases. This will allow the phones to recognize images, and retrieve offers based on the actual image itself, without a code. Google has been working on such technologies for several years, and is likely to make this available as an adjunct to their Ad Words offerings in the future.

Voice Recognition software in phones is only in its infancy now with technologies like Apple’s Siri, but will very likely be used for advertising applications. Instead of having to scan a poster, for example, you could simply speak particular text from the poster (i.e., keywords) to Siri, and she would retrieve an offer for you on your IOS-based smartphone. Apple is making gigantic investments in mobile advertising technology, so we can expect this to happen sooner rather than later.

Augmented Reality

One of the most exciting areas in which post-PC devices can complement, and be complemented by, print is in the area of Augmented Reality. Augmented reality (AR) in print applications uses the screen on your device to provide a view of the printed piece in which elements are augmented by graphics, video and/or sound.

It’s possible the first large-scale commercial application of AR to complement a printed piece was toy maker Lego’s implementation in early 2011 that allowed shoppers in their stores to hold a box in front of a video display, and then showed them a cool 3D rendering of the assembled toy inside. The image on the box triggered the software to display the corresponding graphic; you could tilt and turn the box to see the toy from multiple angles.

Recently, HP made a \$10 billion acquisition of software company Autonomy, who among many other categories of cutting edge software also own a company called Aurasma (www.aurasma.com), which is a pioneer in AR applications. At the 2012 SXSW Interactive Festival, Marvel Entertainment launched Marvel AR, the first major augmented reality app from a comic book company, using the Aurasma technology and available on both Apple IOS and Android devices. After downloading and installing a special App, the consumer can scan Marvel comics displaying an AR logo, which “unlocks” exclusive content on the device featuring the company’s popular super heroes — including Iron Man, Thor, Captain America, Spider-Man, Wolverine, Hulk and others.

The Ikea catalog has long withstood the pressures that have caused so many other consumer goods catalogs to cease publication. And Ikea has always been known as a technology pioneer in the manufacturing of the printed catalog, and in all of their use of print. In 2013, Ikea is adding Augmented Reality to the catalog by partnering with technology provider Metaio. Downloading Ikea’s app will include software from Metaio that recognizes specific pages and displays extra content, including additional views of furniture and fun video providing decorating ideas and other useful information. This application definitely fits into the definition of “mobile complements print”. Without the mobile app, you would likely have to visit the store to obtain any additional insight into the furniture.

Photo Products

One of the most prominent mobile printing applications today is the Cards application that Apple, Inc. delivered along with the iPhone 4S launch. The name “Cards” describes exactly what the app does. The consumer takes a picture on their iPhone camera, and then instantly makes that photo into a greeting card in the interface. The card is then physically manufactured and mailed to a recipient the user specifies. At this writing, Cards is a simple offering, with a handful of designs provided, suitable for a variety of occasions. Once ordered, the printed piece is produced “letterpress” on 100% cotton paper, put into a nice envelope, and for \$2.99 delivered to the US or \$4.99 for those sent elsewhere.

This is a great example of print complementing mobile. The consumer is on vacation, but his Mom isn’t there with him.. He wants to send her pictures of the kids enjoying the beach. Could he email them? Well, yes. Could he post them on Facebook? Yes, and probably will. But wouldn’t it be nice to send Mom a card, saying “Wish you were here?” Yes, arguably, this is the nicest.

Although many printers are getting into the manufacturing of photo products, “most” print service providers probably won’t be printing any of these consumer cards anytime soon. There are numerous other companies besides Apple who provide similar services, in many cases with more choices and features for the print products.

These include Sincerely, Postagram, Popbooth, Dotti, Quiption, Waddle, Picsicle, ShipMate, Filtermania, Interlacer, Lonely Planet, I Am Awesome, Pregnancy Progress, Pic Collage, Color Effects, Storyboarder, Path, Gopostal, Postcardontherun, Touchnote, and Pixyme.

What Apple has done is solved a problem we discussed before in the context of QR Codes: they eliminated the need to access a site, and/or download software. It is pre-installed in the smartphone. Apple took a similar tack by pre-installing iPhoto on Macintosh computers several years ago, virtually guaranteeing its status as the number one personal computer photo application by doing so. Apple also created a photo product business that complements iPhoto with printed products like cards, calendars and photo books.

So this strategy does seem to complement print. Interestingly, for all but Apple it is a very fragmented marketplace in which it is very difficult to make money. And there are no clear winners on either the print side, nor on the mobile side.

With Facebook's recent (2012) acquisition of InstaGram, a very popular photo app for both Android and IOS devices, we should expect them to enter this space. They already dominate online photo sharing, by some estimates hosting more than 10 times as many photos as the nearest competitor, despite the fact that such competitors have been around in some cases for over a decade.

Commercial Print

The entire commercial print application space is arguably better characterized as mobile complementing print instead of the other way around. There is clear established utility in using post-PC devices to order printed products, with many and varied use cases.

A Print Service Provider's corporate customer can benefit from mobile print in many situations. For example, sales staff could use a mobile app to send a printed, personalized thank you card after a sales call to a prospect immediately following a visit, right from their car in the parking lot or while waiting for their next appointment. This requires a only a small investment in technology to accomplish today.

Mobile CRM (Customer Relationship Management) is an essential tool for sales people, and integration with print ordering means that a salesperson could use their mobile device to order the overnight delivery of a literature package, a set of data sheets, or the presentation used in a meeting-- directly relevant to the products discussed, with a personalized cover letter, right from wherever they are. This is a great benefit to the sales force—putting them immediately at the top of mind of the prospect, and is also greatly benefitting the rep himself-- priming the prospect for a follow-up call.

Trade show and event staff can use mobile print when they realize they are running low on literature for a particularly hot product they are showing. Instead of getting on the phone, or going to the venue's business center (where there is usually a long line), they can reorder quantities of particular print products they need right from the trade show floor.

Each of these examples is being done by companies today. Although adoption is growing, it's surprising that only a limited number of commercial printers today offer such services. In the future, all commercial printers will possess such capabilities.

Summary

A story published in the UK Guardian this past January referenced the fact that of Facebook's (at the time) 800 million users, more than 350 million were accessing the social network via mobile devices. This number is growing rapidly. In the future, Facebook expects more users to come from mobile devices than from desktop computers, especially new user growth.

Apple sold 37 million new in Q4 2011 alone, not to mention "millions and millions" of iPads last year. Google reports more than 300 million Android units, and now at a run rate of greater than 850,000 activations per day.

What this data tells us is mobile is exploding, globally. The numbers will be larger in countries outside the US, too. The key to mobile is to wrap print with technology. It also doesn't hurt to be doing business in countries where both mobile and print are rapidly growing: places like Brazil, Mexico and other Latin American countries, as well as India and China.

In the software development world, there is a new mantra that says, "think mobile first". Increasingly, applications are being developed for mobile, then for the desktop browsers. This helps a developer focus their efforts on what the user really needs, and also forces simplicity in applications because of the limitations of a small screens and the limited power of post-PC era devices right now. Most important, it gives you access to the fastest growing marketplace of potential users on the mobile platforms.

In conclusion, it is hard to argue against the idea that print does complement mobile, and mobile also complements print. We must remember that the iPhone was initially released about 5 years ago, bringing about great upheaval in the way many people and companies operate. This print and mobile marketplace and the technologies associated with it will rapidly evolve.

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