Management Information Systems
## MANAGING THE DIGITAL FIRM
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Chapter 1: Information Systems in Global Business Today

Learning Track 3: The Mobile Digital Platform

In a few years, the primary means of accessing the Internet both in the U.S. and worldwide will be through mobile devices like tablet and smartphone computers, and not traditional desktop or laptop PCs. This means that the primary platform for e-commerce products and services will also change to a mobile platform (Table 1-1).

FIGURE 1.1 U.S. Internet and Mobile Internet Users, 2011-2017 (millions)
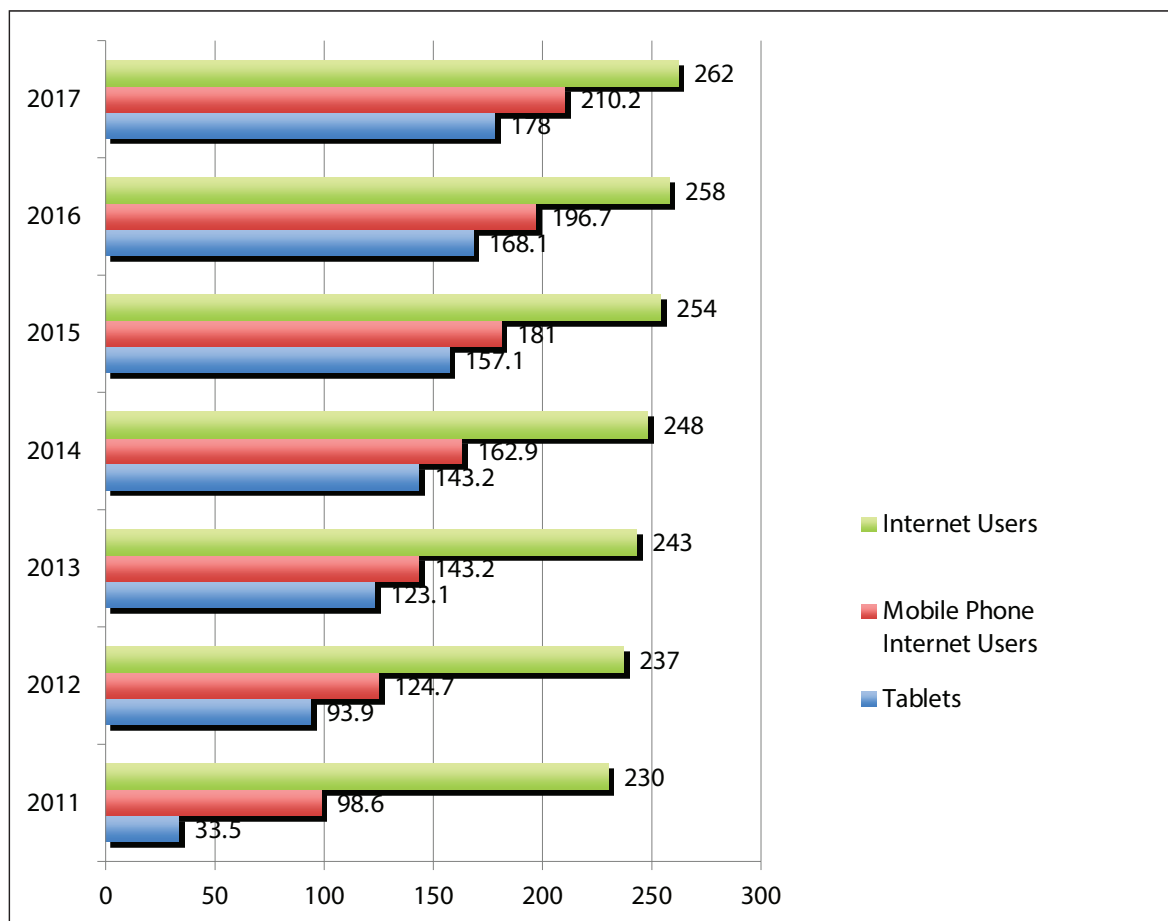
Mobile Internet—Smartphones and tablets are the fastest growing form of Internet access. Mobile Internet users will be 45% of all Internet users in 2013, and grow to 64% by 2016.
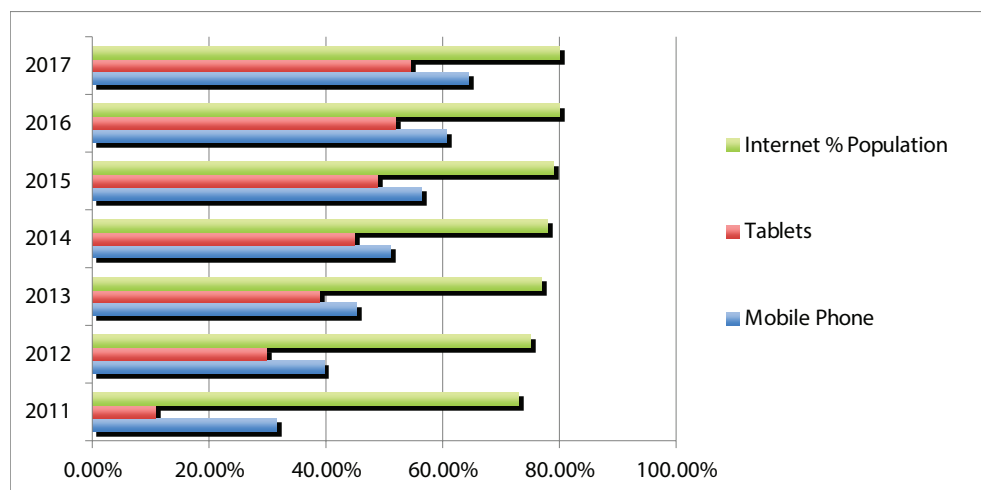
Source: eMarketer, 2013

You can see this sea change in technology platform today whenever you travel and watch business people peck away at their Blackberries in airports and train stations; kids in school text away madly to their friends on cell phones, many using Twitter; high school and college kids are often buried in games, movies, TV shows, emails, and text on their smartphones; and people on trains reading the newspaper, magazines, and books on their tablets. Just in case you haven't noticed, mom and dad are no longer at home anymore. Instead they're in a car taking the kids to the next "engagement." And both are working long hours and bring work home with them or come home late. They've learned to shop and work on the way, ordering everything from pizzas to entre dishes. Fashion magazines, books publishers, and online newspapers have received a lift as tablet computers become a very popular platform for viewing and purchasing clothing and other retail goods.

The changing platform is a challenge for even the dominant Internet players. Google finds its PC-based ad business must somehow shift to the mobile platform and make up for slowing growth in its traditional search engine-based marketing engine. Apple struggles against the growing popularity of cheaper Samsung Android phones, and tries to develop a mobile advertising platform (iAd) to rival the leader in mobile ads (Google). Microsoft and Intel both struggle to develop mobile hardware and software for the consumer and business market. HP and Dell experience declining PC revenues, and fail to develop mobile alternatives to for their customers. Amazon struggles to encourage customers to purchase retail products using their phones, while experiencing some success with tablet-based retail, and dominating ebook sales both with its Kindle reader, and Kindle apps on mobile devices.

Figure 1.2 illustrates how fast mobile devices have grown as a percentage of the Internet population. In 2013, 75% of the U.S. adult population uses the Internet, but 45% use phones, and 38% tablets. By 2017, Internet penetration slowly grows to 80%, but phone and tablet users grow to 64% and 54%, respectively.

FIGURE 1.2   Internet, Mobile, and Tablet Users Penetration (% of Internet Users)

While PCs are expected to remain the largest % of Internet users by 2017, table and phone Internet access is expected to grow much faster and nearly equal the penetration of PCs.
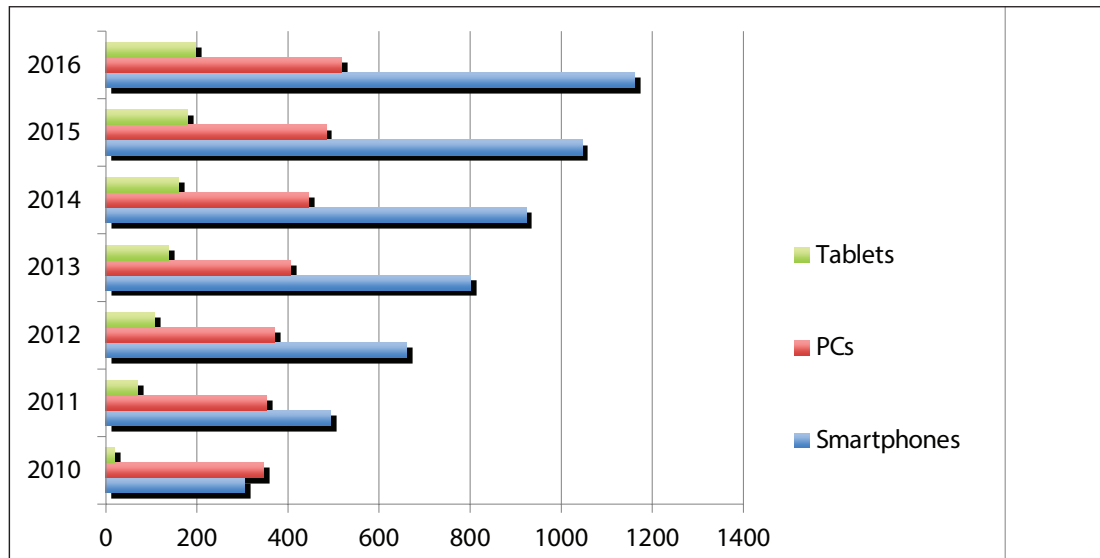
Source: eMarketer, 2013

Mobile Is Global

The rapid growth of the mobile Internet platform is a global phenomenon, and not just a U.S. phenomenon. Figure 1.3 illustrates the changing global Internet platform.

FIGURE 1-3   Global PC, Smartphone and Tablet Shipments, 2010–2016

Source: IDC, 2012

In 2013, 800 million smartphones were shipped worldwide, while only 400 million PCs were shipped. By 2016, the gap will increase to 1.1 million phone shipments and only 520 million PC shipments. Tablets trail both PCs and phone shipments by a significant amount, but are growing much more rapidly than PCs. The relative surge in smartphones is understandable: they are much less expensive than either PCs or tablets, and in developing countries with limited land-line Internet facilities, cell phones are much more easily and inexpensively deployed.

It Isn't Just the Technology: Changes in Consumer and Corporate Behavior

While the emerging mobile digital platform is certainly a hardware event, it also involves changes in software, as well as changes in our society and culture which sometimes drive the technology in certain directions, and in other cases are driven by the technology to enable and support new kinds of behavior. Soccer moms and dads long preceded the advent of iPhones, but smartphones and tablets enable that style of parenting on the move and sometimes make it more enjoyable. How else would it be possible to coordinate play dates, car pools and dinner on the fly?

In 2013 the U.S. labor force has about 155 million workers. Cellular industry experts believe about 60% of the US labor force uses mobile devices as a part of their jobs. Half of the federal labor force uses mobile devices at work. The new mobile workforce is composed of full and part-time knowledge workers who can work at home, at a coffee shop, airport or on a train; extended day workers who don't stop working when they leave the office; truly mobile workers who live out of briefcases, classic road warriors; and event driven mobile workers who respond to emergency situations where the traditional infrastructure is disabled or non-existent.

What is driving the growth of consumer and business purchases of smartphones? The mobile platform enables changes in work and consuming. Work used to be a place, but today it's a set of activities performed anywhere that you get paid for. Consuming used to take place in a marketplace or department store, then it moved to the PC at work and home, and today it's moving to a mobile device. Consuming today is a set of activities performed anywhere, every where you spend money on goods and services. Dealing with client requests for delivery dates and price quotes used to be an "I'll get back to you in a couple of hours" affair. This changed with mobile computing to "I have the dates and prices in my hand." The speed of both consumer and business information is greatly accelerated with the mobile platform. The quality of managerial and business decision making is improved by more accurate and up-to-date information. These social-technological phenomenon have significant implications for e-commerce now and in the near term future five years.

The Mobile Platform: Technology

Smartphones are a disruptive technology which radically alters the personal computing and e-commerce landscape. Smartphones involve a major shift in computer processors, and software that is disrupting the forty year dual monopolies established by Intel Corporation and Microsoft, whose chips, operating systems and software applications have dominated the PC market since 1982. Virtually no cell phones use Intel chips, which power 90% of the worlds PCs; Only 12% of Smart phones use Microsoft's operating systems and that's mostly in Asia (Windows mobile). Instead smart phone manufacturers either purchase operating systems like Symbian, the world leader, or build their own like Apple's iOS and Google's Android OS, typically based on Linux and JAVA platforms. 90% of the billion cell phones shipped each year use some version of ARM (Advanced RISC Machine) chips, licensed by ARM Inc. and manufactured by many firms. For instance, Apple's latest iPhone 5 uses an Apple-designed A6 ARM chip with a dual core 1.3 gigahertz processor that uses only .45 milliwatts of power (compared to a typical laptop dual core mobile Intel processor that uses 25 watts—about 500 times more power consumption). Apple has not officially released information on the chip or its manufacturer, but it is believed the chip is manufactured by Samsung. Smartphones and tablets do not need fans because they use so little power. Mobile devices do not use power hungry hard drives, but instead use flash memory chips with storage up to 64 megabytes. While the latest

Energy Star 4 lap top disk drives consume 500 milliwatts at idle, and 1 watt writing and reading, flash memory chips consume about 50 milliwatts writing and reading data (twenty times less power).

Powerful, energy efficient client devices are only one-half of the emerging digital platform. Without second and third generation cellular networks, and Wi-Fi wireless local networks, mobile platforms enabling computing anywhere and anytime would be impossible. By 2013 there will be 143 million cell phone subscribers in the United States, and 1.7 billion cell subscribers worldwide. Most subscribers are using broadband 3G and 4G networks that enable users to view customized Web pages with a traditional browser, and over a million smartphone apps that do not require a browser. While the US lags behind Asia and Europe in 4G networks, carriers have finally established their basic 4G footprints. Speeds on Verizon's 4G LTE network realistically are about 8.5 Mps down and 6 Mps, enough to watch TV shows and movies without a hitch. As with all cellular service, speed and reliability depend on a variety of conditions, such as how far you are from a cell tower, how many other users are connected in your vicinity and how much data they're moving.

Mobile Commerce

Up until the introduction of the Apple iPhone smartphone in 2007, and the development of iTunes store where millions of iPod and iPhone users could download songs, mobile e-commerce in the United States was more of a dream than a reality. In Asia and northern Europe (particularly Finland and Sweden) mobile payment systems were developed for cell phones in 2000, but there was very little shopping or advertising with traditional cell phones and few applications. Mobile e-commerce failed to develop in part because there was no mobile client hardware with sufficient capacity to communicate, work or shop, and in part because existing cell phone networks lacked the capacity to deal with millions of simultaneous users surfing the Web. That's all changed.

Figure 1.4 illustrates the rapid growth of m-commerce following the introduction of mobile devices. In 2011, m-commerce was only 7% of all e-commerce. By 2013 it had grown to 15%, and in 2016 is estimated to be 23%-- nearly a quarter of all e-commerce.

FIGURE 1.4   M-commerce and E-commerce, 2011-2016
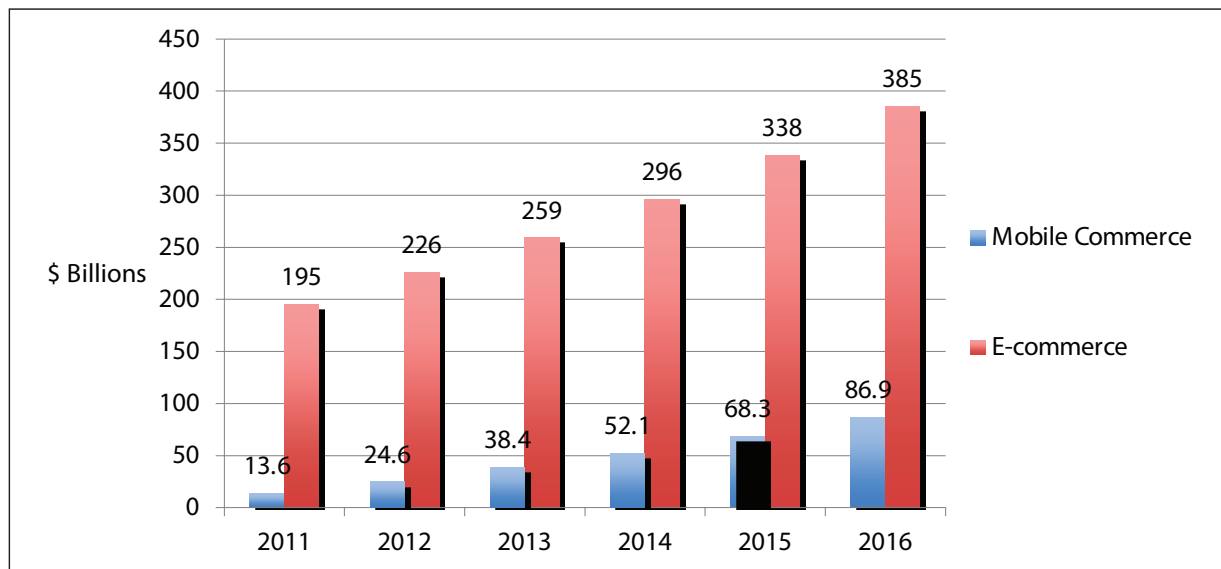
Source: eMarketer, 2013

It is important to understand what is meant by "m-commerce" and "e-commerce" sales. E-commerce and m-commerce sales include the buying of physical goods and services using a browser or app on a mobile phone, tablet, e-reader, or other handheld device. Other kinds of devices include game boxes and systems. M-commerce includes the sales of mobile apps, as well as sales that take place within an app. Travel and event ticket sales, and payments such as Square, are not included in m-commerce. Consumers who just shop (browse) from mobile devices are considered "shoppers" and are not included even though online browsing has a very large influence on off-line purchases.

Mobile commerce is growing so rapidly in part because it gives consumers the ability to access information now, buy it now, and pay for it now. Because mobile phones are usually always on, and usually attached to the consumer, they provide to access instant coupons, deals, and flash sales, all of which are powerful motivators to purchase something. Product information, deals and sales, and the power to purchase now are all available with a tap of a fingertip. The forecast for m-commerce suggests double-digit increases inthe number of mobile shoppers and buyers, and overall sales through 2016. By comparison, traditional e-commerce conducted over PCs is expected to increase at 9-10% in the period.

Online retailers are finding that consumers might browse on their cell phones, but it's difficult for them to purchase from phones because of the small screen, and difficulties of keying in credit card information. While not as portable as phones, the larger high resolution screens of tablets are ideal for mobile browsing, and large enough to complete a credit card transaction with ease. For this reason,

tablets will play a significant role in the growth m-commerce as their adoption rates are higher than for smart phones.

Figure 1.5 illustrates the comparative influence of smartphones and tablets in the growth of m-commerce.

FIGURE 1.5   M-commerce Sales by Device
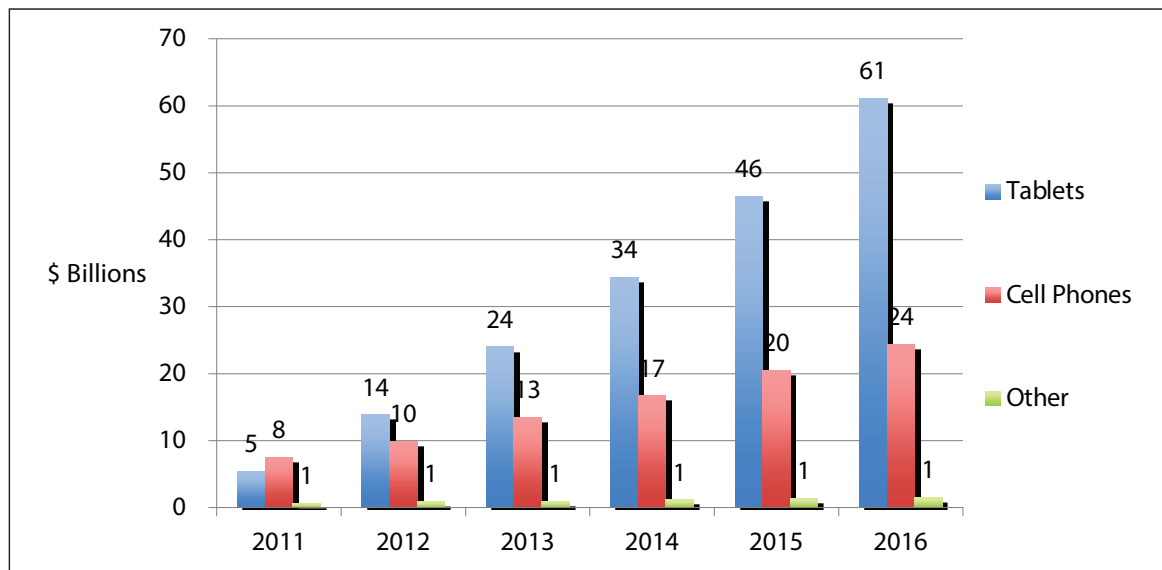
Retail purchases made through tablets are expected to comprise 70% of m-commerce sales in 2016, up from 62% in 2013. Smartphone sales are expected to grow at double-digit rates and comprise 35% of m-commerce sales in 2013, falling to 28% in 2016. Sales made through other mobile devices, such as e-readers or handheld gaming systems, will represent less than 3% of total m-commerce sales during the period.

M-Commerce: Where's the Money?

There are five major m-commerce revenue streams: software apps, sales of physical goods and services (banking for instance), entertainment (video), music, and books (Figure 1.7)

FIGURE 1.7   Sources of M-commerce Revenues
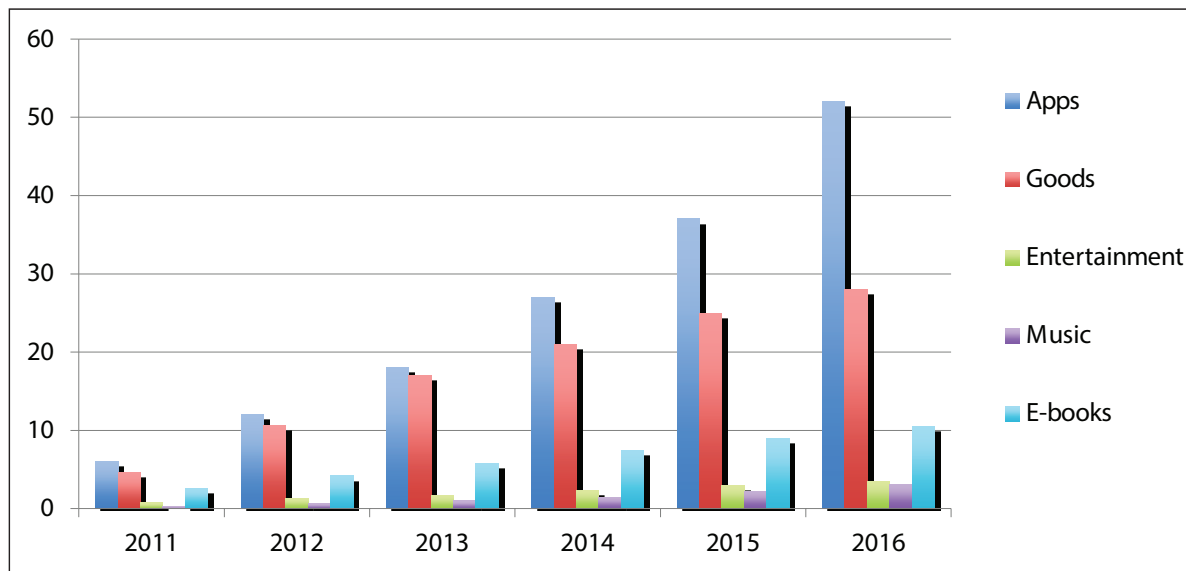
Sources: eMarketer, 2013; author estimates

There are several surprises in Figure 1.7. The sales of apps on both Apple and Android devices is larger than sales of goods in 2013, and is expected to grow faster than all other mobile revenues through 2016. By 2016, sales of apps and sales of services within apps is almost twice as large as the sale of goods. Second, physical goods and services sales, while growing, do not grow as fast as expected. Third, e-book sales are surprisingly strong when compared entertainment and music. Here are some explanations.

The app sales reflects in part the growth in apps—Apple and Google each claim to have over 1 billion apps in their stores. There are an estimated 50 billion app downloads each year from both services. While most of these apps are free, especially game apps, maps, and apps for online retail stores like Amazon and Macy's, many of the most useful apps sell from a few dollars to several thousand dollars. The top ten most expensive apps range in price from $179 (Nursing Constellation Plus, a reference tool for emergency room physicians) to $999 (BarMax California Edition, a students taking the California Bar exam). The most expensive iPad apps are a little more expensive, ranging in price from $299 for TouchChat HD (a tool for communicating with the impaired) to $999 for Intuition Control (a scrap management system). In comparison, single music tracks sell for .99 cents, and despite the number of musical downloads, the revenue is far less than app revenue.

The relatively slow growth of mobile physical goods and services revenue may result from the fact that consumers do not use their smartphones for purchasing goods, at least not directly. Surveys of smartphone users show people use their phones primarily for "me time" (relaxation, entertainment), socializing, browsing/shopping, managing finances and health, planning, discovery of news and information, and self-expression. Direct purchasing is a very small part of the smartphone user mobile time.

There's also the "fat finger" problem: purchasing on a 3.5" square screen is difficult, mistakes are common, and clicking on tiny mobile ads is just no fun and often is just a mistake as the user is trying to accomplish something else. While direct phone sales are very small, browsing and shopping is very common, and may very well lead to an Amazon or Macy's app where purchases are easier. Tablets do not seem to suffer as much from the fat finger effect. Tablet screen size (9.7" for the large screens) is less than half the size of 15" laptop screens, but their higher resolution makes up for this to some extent. For this reason, tablet retail sales will grow much faster than smartphone retail sales of goods.

Figure 1.8 illustrates how consumers actually use their smartphones as indicated by the kinds of apps they are downloading.

FIGURE 1.8   The Apps Consumers Use
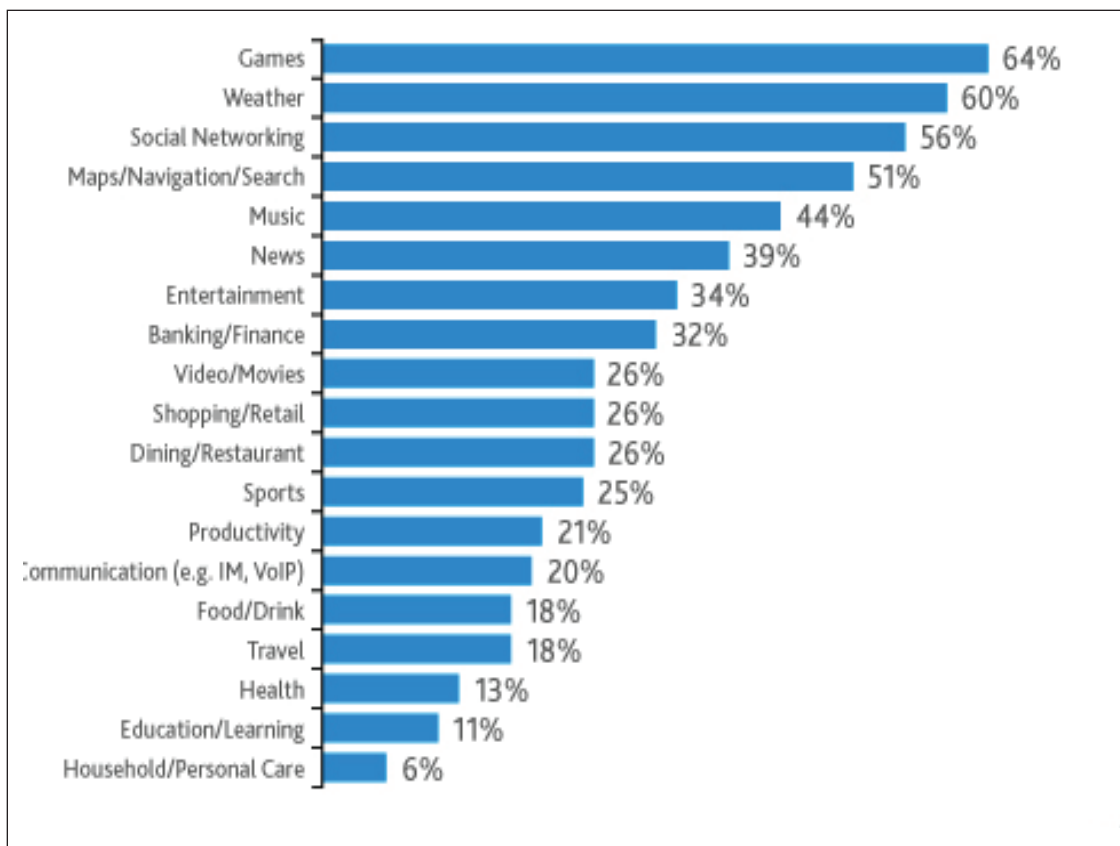
Source: Nielsen, 2011

Purchasing goods and services, as opposed to informing and socializing activties, is not high on the list of apps that are downloaded. Only 26% of smartphone users download shopping/retail apps, and actual purchasing is not that common (as opposed to shopping).

A final surprise in Figure 1.7 concerns the strength of mobile eBook sales which are expected to grow faster than entertainment revenues (TV and video). In part this is due to the extraordinary success of the Amazon Kindle devices which are both low in cost, and adequate for browsing the Web (Kindle Fire). Small smartphone screens are adequate for books, and large tablet screens are close to ideal book readers. Books are just a better fit with the mobile platform than purchasing goods, or watching movies. The small smartphone screen is a hindrance to experiencing feature length movies. Tablets are much more suited to the task. But most consumers are watching movies and TV series using their full size TV screens and streaming the entertainment from Web services like Netflix. In a pinch, consumers will watch a TV series using their smartphones, but it is not a preferred platform. How about a 50" high definition screen in the living room?

The Mobile Platform Transforms Online Advertising

So far we've discussed how the mobile platform is changing e-commerce in terms of sales of goods and services. The mobile platform is also having a powerful impact on the marketing and advertising industry. Marketers have to go where consumers go, and increasingly, this means going mobile. E-commerce marketers, retailers, and service vendors are discovering that smartphones represent a new channel for selling and paying for goods and services, the so-called "fourth screen" (Hollywood movies, television, and personal computers being the first three screens).

Smartphone advertising in the form of banner ads is being developed in a number of ways, including mobile Internet use, email like Google's Gmail which contains ads, instant messaging, ringtones, games, and music downloads. A new avenue for distinctly app banner advertising is accomplished through proprietary applications which users download. Applications like the VirtualZippo lighter, Audi's A4 challenge, Kraft fFoods' iFood Assistant, and Levi's Dockers Shakeable apps are the vehicle for presenting the brand to users. Charmin (the toilet paper brand) decided not to build an application showing its products at work, but has instead sponsored the popular SitOrSquat application, a user generated public restroom locator Web site. Users create the sites content by rating and commenting on restrooms. Over 50,000 restrooms worldwide have been rated, and the application has been downloaded 80,000 times.

US mobile advertising spending is about $7 billion in 2013 (compared to $46 billion for all online advertising), and is expected to grow at 25% to 40% a year to 2016, reaching a total spend of $27 billion in 2017. In 2013 mobile advertising is only 16% of all online advertising. Mobile advertising is growing about four times faster than all online ad spending). By 2016, mobile advertising will be an estimated 40% of all online advertising.

FIGURE 1-5   U.S. Mobile Ad Spending 2011-2017 (millions)
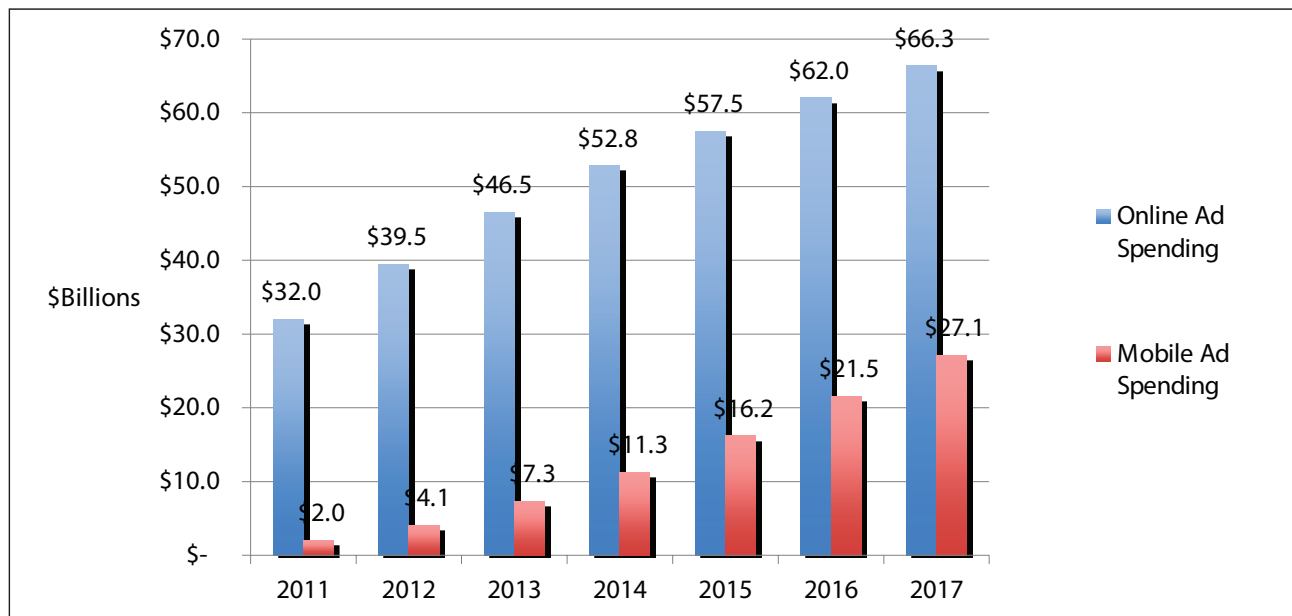
Mobile Internet advertising is the fastest growing online ad channel.

Source: eMarketer, 2012

Mobile ads come in all the same formats as traditional online Web ads. Examples include banner ads displayed when using applications (not interfering with phone use, SMS or email) and exposure to ads while using smart phones for viewing the Web. There are also product specific applications which are sponsored by firms directly and their marketing firms. But most mobile ads are simply smaller versions of traditional Web ads. To date, display ads on mobile devices, particularly smartphones, have not been very successful. In fact, they are "worth" only one-quarter to one-half of what traditional display ads are worth (which is not much to begin with). Advertisers know that consumers find mobile phone ads are annoying and inconvenient in part because they interfere with use of the phone to read other information and messages on the tiny screen. With the small screen, mobile ads have no right side and the ads have to be put center screen. So your Facebook mobile news feed will be broken up with ads, some so small you can't understand what they are selling.

The low value and utility of mobile ads poses a threat to Google, Facebook, and Amazon, and most other online marketing and advertising firms. As users turn away from their traditional large screen Web screens, and switch to mobile devices, ad revenues decline because the ads just don't work as well driving customers to shop and purchase products. Once again, the mobile platform is transforming and disrupting to some extent the comfortable market positions that many firms have found in the "big screen" Web experience.

The future of mobile advertising arguably lies in ads displayed within apps. Mobile users spend about 80% of their time using apps and only 20% of their time using their general purpose mobile browsers.

The biggest revenue generating apps for advertising will be games and entertainment (art 42% of user time, it's the largest time segment for mobile users), social networks (mostly Facebook, 32% of mobile user time), utilities (maps, text, photo sites), discovery and shopping (Yelp, TripAdvisor, Instagram), and brands (like Amazon, Nike, Coke, and scores of others). In-app advertising may well be more acceptable to users, and more lucrative for app makers, because the user has already shown an interest in the app content, and might be more accepting of app-related ads. For instance, when users download the Nike app to play a game, or browse for Nike shoes, an advertisement for a new Nike shoe might be perceived as acceptable, even helpful. Users may come to expect ads inside apps, whereas they are annoyed when ads pop up on their mobile browser screens and interfere with their activities.