

Mobile Market Facts

Introduction

The mobile phones available to consumers in any given market are affected by the handsets released by the manufacturers (Nokia, Samsung, Sony-Ericsson, etc.) and the local adoption policies implemented by the mobile service providers (Vodafone, T-Mobile, Telenor, etc.). As of March 2008, there are 2.6 billion¹ mobile phones worldwide. Over the last 3 years, Nokia, Motorola, Samsung, LG, and BenQ have dominated the mobile manufacturing market (see Tables 1, 2, and 3). In 2007, these manufactures captured 84.2%² of the market.

MANUFACTURER	2007		
	RANK	UNIT SOLD‡	MARKET SHARE
Nokia	1 st	302.8	37.9%
Motorola	2 nd	122.1	15.3%
Samsung	3 rd	113.6	14.2%
SonyEricsson	4 th	72.0	9.0%
LG	5 th	56.1	7.0%
BenQ	6 th	7.0	0.9%
Others		126.2	15.8%
Total		799.8	100.0%

‡ In million units

Table 1. Mobile Manufacturer Ranking for 2007²

MANUFACTURER	2006		
	RANK	UNIT SOLD‡	MARKET SHARE
Nokia	1 st	347.5	34.4%
Motorola	2 nd	217.4	21.5%
Samsung	3 rd	118.0	11.7%
SonyEricsson	4 th	74.8	7.4%
Others	5 th	165.7	16.4%
LG	6 th	64.4	6.4%
BenQ		21.6	2.1%
Total		1,009.4	100.0%

‡ In million units

† BenQ put its German subsidiary (formerly Siemens Mobile) in insolvency

Table 2. Mobile Manufacturer Ranking for 2006²

MANUFACTURER	2005		
	RANK	UNIT SOLD‡	MARKET SHARE
Nokia	1 st	264.9	31.9%
Motorola	2 nd	146.0	17.6%
Samsung	3 rd	102.4	12.3%
LG	4 th	54.9	6.6%
Others	5 th	188.6	22.7%
SonyEricsson	6 th	52.8	6.4%
BenQ		20.3	2.4%
Total		829.9	100.0%

‡ In million units

† Siemens sold its mobile operations to BenQ

Table 3. Mobile Manufacturer Ranking for 2006²

The distribution of mobile phones within any specific market is largely determined by the handsets adopted by the mobile service providers. It is common for global providers to vary their handsets across markets in response to local consumer behavior and market economics. Table 4 shows the distribution of handsets across providers in three selected countries: Denmark, Germany, and US.

Denmark		Germany		US	
Manufacturer	Percent	Manufacturer	Percent	Manufacturer	Percent
Nokia	51.4	Nokia	39.5	Nokia	19.8
Motorola	2.8	Motorola	7.9	Motorola	21.7
Samsung	11.4	Samsung	21.5	Samsung	35.6
Sony-Ericsson	28.5	Sony-Ericsson	25.1	Sony-Ericsson	9.9
LG	5.7	LG	2.1	LG	12.8

Table 4. Distribution of offered handsets per country

Mobile Platforms

Each manufacturer produces mobile handsets based on the five major mobile platforms listed in table 5. In order to run software on a phone, it must be written in a language that matches the mobile platform. It is important to note that some mobile platforms are capable of running more than one type of software. For example, mobile phones based on the Symbian OS can run native Symbian applications and Java ME applications.

No	Platform
1	Microsoft Windows Mobile
2	Symbian OS
3	Java ME
4	Qualcomm BREW
5	Apple iPhone

Table 5. Mobile Phone Platforms

Microsoft Windows Mobile

Windows Mobile is Microsoft's OS for smartphones and PDA. As of March 2008, Windows Mobile phones account for 13% of the *smartphone market* worldwide, with sales of 11 million handsets in 2007. In the US, the iPhone has eroded some of the market share away from Windows Mobile during the last year.

To get an idea of the distribution of Windows Mobile phones in comparison to all mobile phones in general, it is useful to look at the percentage of handsets offered by the major manufacturers based on Windows Mobile (see Table 6).

Manufacturer	Percent
Nokia	0
Motorola	4
Samsung	2
Sony-Ericsson	2

Table 6. Percent of Total Offered Handsets Running Windows Mobile

As we can see, the largest phone manufacturers offer relatively few Windows Mobile phones. However, Microsoft has announced that it expects sales to increase from the 11 million units sold this year to 20 million over the next year as a result of new phones that it plans on unveiling and its relationship with HTC, inc. HTC is a relatively small mobile phone manufacturer that offers a wide range of innovative Windows Mobile phones with many of the same capabilities as the iPhone. Sony-Ericsson also introduced a new device called [XPERIA](#), which might help Windows Mobile gain some market share.

Windows Mobile in Selected Markets

Table 7 shows the percent of handsets adopted by the mobile service providers in Denmark, Germany, and the US based on the Windows Mobile.

Denmark		Germany		US	
Provider	Percent	Provider	Percent	Provider	Percent
Sonofon	0	T-Mobile Ger	3	AT&T	6
TDC	3	O2 Ger	2	T-Mobile US	3
Tele2	0	ePlus	5	Sprint	5
Telia	13	Vodafone Ger	4.2	Verizon	0
Average	4	Average	3.5	Average	3.5

Table 7. Percent of Total Offered Handsets Running Windows Mobile

Windows Mobile Technical Overview

Windows Mobile phones can run applications written in:

- (1) Any of the .NET languages,
- (2) Java ME application (through the introduction of a 3rd party Java virtual machine.)

Windows Mobile has strong ties to the desktop versions of Windows. The OS offers access to downscaled versions of the Win32 APIs. It also comes with “mini” versions of Microsoft’s Office product line. Mobile applications that perform “computer-type tasks” are extremely easy to develop because the developer can use many of the same functions used to write a traditional PC application. Applications that tie into the “mobile-phone” aspects of the handset (sending MMS, location services, etc.) are harder to develop because these have to tie into the phone’s functionality rather than the functionality provided by Windows.

Bottom line

- Runs its own native application
- Also runs Java
- Easy to develop applications that tie into Windows
- Harder to develop applications that tie into “mobile phone” components

Symbian OS

The Symbian OS is the leading operating system among smartphones, with a 67% share *among smartphones* worldwide. A total number of 77.3 million Symbian OS smartphones were shipped in 2007. The OS can be seen running on Nokia’s Series 60 phones [N95, N72, E65, etc.]. To get a better idea of the distribution of Symbian OS phones in comparison to all mobile phones in general, it is useful to look at the percentage of handsets offered by the major manufactures capable of running Symbian (see Table 8).

Manufacturer	Percent
Nokia	25
Motorola	1
Samsung	6
Sony-Ericsson	11

Table 8. Percent of Total Offered Handsets Running Symbian OS

Symbian OS in Selected Markets

Table 9 shows the percent of handsets adopted by the mobile service providers in Denmark, Germany, and the US based on the Symbian OS.

Denmark		Germany		US	
Provider	Percent	Provider	Percent	Provider	Percent
Sonofon	40	T-Mobile Ger	7	AT&T	2
TDC	13	O2 Ger	5	T-Mobile US	3
Tele2	11	ePlus	12	Sprint	0
Telia	5	Vodafone Ger	8.5	Verizon	0
Average	17.5	Average	8.1	Average	1.2

Table 9. Percent of Total Offered Handsets Running Symbian OS

Symbian OS Technical Overview

Symbian OS phones can run applications written in:

- (1) C/C++ compiled for Symbian OS,
- (2) Java ME

Symbian OS is one of the most capable mobile OS available. Mobile applications written natively for Symbian can access any of the phone's native capabilities relatively easily, including the camera (with flash), Bluetooth, text messaging, etc. Native applications can access portions of the phone that are not accessible from Java ME.

Symbian phones can also run Java ME applications. Java ME applications running under Symbian have the same limitations as when running on native Java ME phones.

Bottom line

- Market penetration of Symbian OS varies greatly based on Geographic location.
 - 17% in Denmark, 8.1% in Germany, 1.2% in US
- Symbian applications have significantly less limitations than Java ME applications, but must run on a Symbian phone
- Symbian phones can also run Java ME applications.
 - Java ME applications under Symbian OS have the same limitations when running on Java ME phones.

Java ME (formerly J2ME)

Java ME is the most pervasive mobile application platform. It runs on over 95% of mobile phones worldwide. It can run on any phone that has a Java ME virtual machine. Approximately 2 billion phones are capable of running Java ME. Of the phones sold in 2007, 720 million phones are Java ME capable. Table 10 shows the percent of all phones that run Java ME that are available as of March 2008 from the major manufacturers.

Manufacturer	Percent
Nokia	96
Motorola	78
Samsung	91
Sony-Ericsson	98

Table 10. Percent of Total Offered Handsets Running Java ME

Java ME in Selected Markets

Table 11 shows the percent of handsets adopted by the mobile service providers in Denmark, Germany, and the US based on Java ME.

Denmark		Germany		US	
Provider	Percent	Provider	Percent	Provider	Percent
Sonofon	100	T-Mobile Ger	100	AT&T	95
TDC	98	O2 Ger	100	T-Mobile US	98

Tele2	100	ePlus	97	Sprint	96
Telia	95	Vodafone Ger	92	Verizon	0
Average	98.3	Average	97.3	Average	72.25

Table 11. Percent of Total Offered Handsets Running Java ME

Java ME Technical Overview

Java ME applications can run on:

- (1) native Java ME phones
- (2) Windows Mobile phones
- (3) Symbian OS
- (4) Apple i-Phone [starting in July 2008]

Java ME provides a common sandbox environment for mobile applications. As long as an application stays within the boundaries of Java ME, it will run on most phones. As phones with new capabilities enter the marketplace, Java ME libraries that integrate those capabilities are introduced. It takes approximately 18 to 24 months for phones that include a new Java library to reach critical mass.

For example, the JSR-234 “Advanced Multimedia Supplements” library extends the camera capabilities of Java ME beyond those capabilities available under the previous multimedia library. The new library allows Java ME applications to use the flash on the camera, control exposure, etc. This particular library is available on new Sony-Ericsson phones released after September 2007, Nokia’s upcoming N96 line, and Motorola’s Z8 line.

Bottom line

- Very high market share --- over 95% globally
 - 98.3% in Denmark, 97.3% in Germany, XXX in US
- Additional capabilities added through optional libraries, which ship with new devices
- More limited than native applications

Qualcomm BREW

BREW (Binary Runtime Environment for Wireless) is a mobile platform that is prevalent among CDMA service providers running a “closed content” network. BREW provides a highly controlled development, distribution, and billing platform for mobile applications. It enables service providers to create an encompassing branded experience on their handsets by controlling all aspects of the mobile experience. The user is only able to access content provided and approved by their network provider. It is not possible for the user to use WAP/Internet to download content [software, music, video, etc.]. In the US, Verizon’s VCast system is an example of BREW.

In the past, CDMA providers were always associated with BREW and GSM providers with Java ME. This is no longer the case. In the US, Sprint is a CDMA network provider, but their phones run Java ME.

Markets where Brew is prevalent

- US (Verizon)
- South Korea
- Parst of Canada

Table 12, shows BREW distribution among the markets that we have been observing.

Denmark		Germany		US	
Provider	Percent	Provider	Percent	Provider	Percent
Sonofon	0	T-Mobile Ger	0	AT&T	0
TDC	0	O2 Ger	0	T-Mobile US	0
Tele2	0	ePlus	0	Sprint	0
Telia	0	Vodafone Ger	0	Verizon	100
Average	0	Average	0	Average	25

Table 12. Percent of Total Offered Handsets Running BREW

BREW Capabilities

BREW applications have almost complete access to all portions of the mobile phone. This makes it easy to overcome technical limitations that are present in other platforms such as Java ME or Symbian OS. In exchange for this free reign to the phone functionality, BREW imposes a much more stringent testing/certification test than other mobile platforms. The application must undergo BREW certification and then be evaluated by the service provider that will carry the application. Testing and certification can take significantly longer on this platform than on others. BREW is implemented very similarly on handsets running this platform. This greatly reduces the length of time to port applications to a wide set of devices.

BREW applications can only be distributed through the consumer's service provider. This adds two layers of complexity to the development of BREW applications. First, the content of the application must be approved by the provider. Second, the service-provider will expect monetary compensation for distributing the application. In the case of digital-goods, this typically comes down to the provider taking a portion of the sales price.

Bottom line

- Prevalent in South Korea, US, and parts of Canada
- Very uniform capabilities among devices. Makes it easy to deliver a consistent experience for consumers.
- Must pay the service provider per copy of the application they delivery over their network
- Content must be approved by the service provider
- When a service provider supports this technology, they generally support it on 100% of their phones

iPhone

The iPhone is an interesting handset with some unique market characteristics. Apple has officially released the iPhone in the US, UK, Germany, and France under exclusive distribution with AT&T (US), O2 (UK), T-Mobile (Germany), and Orange (France). Its performance in each of these markets has varied greatly. The iPhone was released in each of these markets in the US during the summer of 2007 and in the European countries during the 4th quarter of 2007.

In the US and Germany, the iPhone has done relatively well. In the US, it has captured 28% of the smartphone market. This places it at the number two spot in the smartphone market in the US. In Germany, it sold over 70,000 in the first 3 months. In the UK and France, the iPhone has done relatively poorly. Sales in the UK during the first two months of release (190,000 units) fell short of the 350,000 units predicted by Gartner. In France, Orange sold approximately 90,000 units.

As of today (December 7, 2008), the iPhone is the top selling phone in the US. However, it is not the most numerous phone in the market ---- that honor goes to the MOTOROLA RAZR and all of its variants. If the iPhone continues to sell at current rate, it will overtake the RAZR as the most numerous phone in the US in approximately 26 months.

In some respects, the performance of the iPhone within each of these markets is a reflection of its capabilities. The phone offers a great user interface, tremendous integration with Apple's iTunes, great media capabilities, an amazing multi-touch display, and a great web-browser. It has also been marketed very well. In markets like the US, these capabilities are enough to set it apart from the competition. Its ease of use is second to none. Most consumers in the US have never experienced a mobile phone that offers all of the capabilities of the iPhone.

In the UK, the iPhone finds itself competing with phones that have offered all of the capabilities of the iPhone. Nokia's N series of phone have offered fully web browser at 3D speeds since 1995. In the US, the iPhone has brought the mobile internet into the public consciousness. Prior to the iPhone's introduction less than 13% of phone users paid for full internet access on their mobile handsets.

Development Opportunities

Developing for the iPhone should be approached cautiously. Development for the iPhone is done using the iPhone SDK in Objective-C. Mobile applications written in this manner will only run on the iPhone. Developers have to determine if it makes sense for them to spend the resources necessary to develop for this platform when they might only target 200,000 consumers worldwide. In contrast, spending the same resources to develop for Java ME would target 2 billion consumers.

Immediately after announcing the SDK for the iPhone on March 6, 2008, Sun announced that it would release a Java Virtual machine for the iPhone by June of 2008. As for today, however, this has not happened due to Apple's EULA, which bans the creation of a virtual machine on the iPhone. For projects where it makes sense to develop natively on the iPhone SDK, the environment is very well thought out and offers access to a wide range of capabilities.

Mobile Service Providers

Service providers also affect the consumer's experience on their handsets through a process called "handset customization", "branding", or "locking." During this process, the service providers install software onto the phones to imprint their brand identity on the phones and often service providers modify the software security policies on the phone to support their business model. These policies determine the ability to install 3rd party software and also the capabilities that are accessible to the software. Table 13 illustrates the software policies for some of the providers in the US, Denmark, and Germany.

Provider	Restrictions to Trusted 3 rd Party Applications
3 (Denmark)	No access to the phone's file system No access to consumer's contacts
TDC (Denmark)	No restrictions
T-Mobile (USA)	Everything is restricted. No Bluetooth, No internet access, etc.
T-Mobile (Germany)	No restrictions
AT&T (USA)	No access to Bluetooth No access to user contacts No access to phone's file system

Table 13. Security policy for selected providers

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