Customizing Consumer Mobile Devices to Meet Specific Business Needs

For more than 30 years, there has been a tug-of war in the IT and business world between special-purpose and general-purpose computing devices. Specialized devices such as dedicated word processors and number-crunching floating-point machines gradually gave way to multipurpose personal computers and servers in the 1980s. Although many special-purpose devices continue to play in niche markets, general-purpose platforms have come to dominate most market sectors.
In many instances, the general-purpose devices are platforms designed to satisfy both individual consumer and business user needs. They deliver reasonable performance along with greater application flexibility and lower costs than devices purpose-built for specific uses. Along with the rapid growth in off-the-shelf microprocessor power and storage capacities, general-purpose devices were able to offer simple and adequate performance.

Nevertheless, there are shortfalls to the general-purpose approach. Even with the many advances in hardware components, “one-size-fits-all” platforms that serve multi-purposes may still force some compromises that aren’t always performance related. In some situations, computing platforms with standard operating systems and software combinations may actually be too generic with limited functionality, or may offer unneeded capabilities for many targeted uses. In particular, different industry sectors—ranging from retail stores to restaurants to aviation companies—have their own specific computing and communications requirements.

The general-purpose versus specialized dynamic that played out in the personal computer and server markets is now at play in the world of mobile devices. General-purpose, consumer-oriented smartphones, tablets and, increasingly, wearable devices are being deployed in mind-boggling numbers. In 2014 alone, device vendors shipped more than 1.29 billion smartphones and 235.7 million tablets, according to market research firm IDC.

Not surprisingly, many types of organizations are already adopting these off-the-shelf mobile devices for a range of business tasks. The most common use is to support mobile workers—be they executives, salespeople or field technicians—who need lightweight and connected devices to work and communicate while on the go. Other businesses are tapping these devices for more specialized applications such as barcode readers in warehouses, handheld tablets for delivery truck drivers and even table-top or free-standing kiosks in retail, restaurant and hospitality venues.

A “best-of-both-worlds” solution would allow developers to easily configure and customize the functions of off-the-shelf mobile devices to meet specific business requirements. One company—Samsung—is offering a pioneering approach to mobile device customization that could change what is possible when creating tailored mobile solutions. The solution, called Samsung KNOX Customization, supports the customization of devices offered within the diverse Samsung product portfolio. The Samsung offering is available in two variants—as a software toolkit and as Samsung-provided consulting and development services that can even involve changes to the binaries of Samsung devices. KNOX Customization is already catering tailored mobile devices for a variety of companies across a range of industries.

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Customization Delivers Solid Business Benefits

In a business world that has largely focused on off-the-shelf solutions and the embrace of standard hardware and software, the potential value of custom-tailored solutions has sometimes been overlooked or forgotten. The most productive and efficient solutions, however, often start with a standards-based foundation that is then modified to more perfectly address an organization’s and its customers’ needs.

Although customization done wrong can be a surefire way to add unnecessary cost and complexity to operations, successful organizations have learned how to leverage partner resources, third-party expertise and their unique in-house knowledge to create powerful, targeted solutions.

Indeed, more than a decade ago Booz Allen Hamilton showed that companies able to effectively balance the value that customization brings with the complexity costs it can impose were able to generate organic sales growth and profit margins significantly higher than their industry’s average3. The consulting firm benchmarked business units of 50 North American and European product and service companies with sales from $1 billion to more than $20 billion.

In its study, Booz Allen Hamilton found striking differences between companies that adapted and aligned their customer strategies and fulfillment operations compared with those that constructed more ad hoc (off-the-shelf) responses to customer demands. For example, so-called “smart customizers” were twice as likely to have growth rates and profit margins above the industry average.

Still, most customized solutions have been costly and difficult to create. Because of these challenges, the compelling concept of “mass customization,” has been more of an ideal than a reality. With Samsung KNOX Customization, Samsung is opening the door to delivering on the promise of mass customization within the highly competitive mobile device industry.

A Blend of Common and Unique Mobile Device Requirements

Before considering some of the specific benefits that customized mobile devices can deliver in different industry sectors, it’s important to remember that there are a number of common mobile device requirements shared by almost all organizations including the need:

- for devices with the form factor, screen size and performance profiles suitable for handling the targeted tasks
- for devices that can run the commercial or customized software required by the intended deployment scenarios
- to keep device acquisition, deployment and training costs under control

STEADY GROWTH IN THE INTERACTIVE TABLET INDUSTRY

TABLETS A COST-EFFECTIVE OPTION TO REPLACE BULKY KIOSKS

Revenue Growth

<table>
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<tr>
<th>Year</th>
<th>North America</th>
<th>Europe</th>
<th>APAC</th>
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<td>2012</td>
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<td>2016</td>
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SOURCE: Technavio Global Interactive Kiosk Market 2012-2016
By extending enterprise-grade videoconferencing, along with its inherent quality and security policies, between specialists and patients, hospitals can protect patient privacy while tapping new resources to potentially save lives.

• to manage and secure the devices, while also protecting employee privacy
• for reliable devices that don’t break easily or rapidly become obsolete
• for devices that can be adapted to meet changing business and operational requirements

Beyond these common requirements, each organization has specific mobile device needs of its own. Many of these needs reflect the industry sector in which a company operates, as well as its individual business objectives. The following usage scenarios illustrate representative uses of mobile devices in different vertical market sectors.

**Retail Sector**

There are two major categories of mobile device scenarios in the retail sector. One category involves handheld tablets or other devices for store clerks that are used to facilitate their interactions with customers. Store representatives can use the handheld devices to search for products in inventory, to make sales transactions on the spot, and for other in-store operations.

The second broad category of scenarios involves using mobile devices as the core platform of stationary, self-service kiosks. While kiosks are certainly not limited to the retail sector, in-store customer facing kiosks that display product features or the venue layout provide interactive and rich customer experiences while helping the brand stay connected with its visitors. These configured tablet kiosks also play critical roles in a variety of industry sectors including the hospitality, financial and transportation sectors, among others.

Stationary kiosks represent one of the many examples of special-purpose platforms that are easily replaceable by customized general-purpose tablets and other devices. Market research firm TechNavio predicted nearly a 15 percent growth for the global interactive kiosk market from 2012 to 2016, but also noted the potential for a changing of the technological guard in this market. The kiosk market was “witnessing the use of tablets as a medium for interaction,” the research firm noted, while warning that “rapid technological obsolescence could pose a challenge to the growth of this market.”

Furthermore, a recent survey conducted by Mindtree demonstrated the significance of using technology to support and engage retail customers. The IT consultancy surveyed more than 4,000 shoppers in the United States, the United Kingdom, Germany and Benelux to better understand what it termed “phy-gital” shoppers—those that combine physical in-store shopping with digital online activities.

Among the results that Mindtree reported:

• The percentage of surveyed shoppers who said they met the phy-gital definition ranged from 30 percent in Germany to 70 percent in the U.K.
• 17 percent of apparel shoppers listed the ability to self-checkout at a kiosk or via a roaming store associate with a tablet as a Top 3 desirable feature
• Shoppers want to use in-store kiosks to order out-of-stock items for home delivery, a capability listed as a Top 3 feature by 12 percent of home and garden shoppers and 13 percent of electronics shoppers

For effective and purposeful placement of such kiosks, retailers can choose to modify off-the-shelf mobile devices in a variety of ways to make them suitable for in-store and kiosk applications. Power saving modes and other battery life-extending features may be critical for handheld tablets used by store associates, while of little concern for plugged-in kiosk uses. Stationary interactive kiosks will typically have customized splash screens as well as internal device setting modifications that prevent users from accessing communications networks or device settings.

Retailers may also want to pair the devices with OCR or RFID scanners or other peripheral attachments to deliver a personal, service-enhancing customer experience. In one pilot project with customization, a large tire retailer in Canada paired a Samsung Galaxy Tab 4 tablet to a barcode scanner configured with USB hardware with Power over Ethernet technology for dual charging and internet connectivity. This combination provided seamless integration and continuous user experience for customers selecting products. The customized platform, configured as a kiosk, allows customers to easily find the correct parts for their cars while also providing price checking and digital signage capabilities, all in one simple customized mobile tablet.

Restaurant and Hospitality Sector
Customized device scenarios in the restaurant and hospitality sector also include both kiosk and handheld or wearable applications. Hotels and restaurants are increasingly placing kiosks in their lobbies, where customers can make reservations, check reservation status, view room and facility amenities, find local attractions or perform other tasks. Hotels are even placing in-room tablets to serve as controllers for entertainment, heating and lighting as well as direct order placement for room service, creating value as an up-selling tool. In a similar manner, restaurants are adopting tablets as interactive menus and embedding them into tabletops for customers to order food, play trivia games or summon a waiter.

Clearly, there are various ways and options to integrate tablets in this diverse industry sector, and an open and general-purpose mobile device wouldn’t be suitable for these or many other applications. By customizing and configuring these devices to align with their intended use, margin-conscious hotels and

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One large chain of restaurants and sports bars with locations throughout North America initially went with purpose-built handheld devices that diners could use to play various card, arcade and trivia games. The devices succeeded in keeping customers entertained, extending the time they spent at the restaurant and increasing their purchases, but the custom hardware was expensive, inflexible, and quickly outdated.

To address these pain points, the restaurant end-customer worked with Samsung to build a new handheld platform using Galaxy Tab 3 7-inch tablets. These devices were restricted to control the features customers could access, and configured at the system level so that specific and unnecessary functions were disabled. In addition to reducing their costs, the restaurant was able to increase sales to their diners and enhance their customer engagement by allowing access to a wide range of new entertainment content from the Android game library.

Another restaurant chain—one of the world’s largest—chose to install fixed Samsung Galaxy tablets in locations where customers could use them as interactive digital signs. The compact size and table-top location of the tablets allowed the restaurant a more nimble approach to promote its products compared to the traditional marketing signs. The interactive digital signs also helped the restaurant more easily alter their marketing content depending on the context and time throughout the course of day. This flexibility, in turn, has helped boost sales, and has driven a higher level of service due to the direct customer feedback diners are able to provide. Some of the customizations made to the tablets included power source charging configurations, reconfiguring the screen timeout extension, and an auto start functionality for specific functions.

**Aviation Sector**

People traveling by plane will increasingly find mobile devices embedded in kiosks at airport terminals, in seat backs or as handheld devices while in the air. All of the restricted-use parameters of kiosks in retail, hospitality and restaurant settings hold true for kiosks deployed in airports. Plane-based devices, whether fixed or mobile, also require customized configurations and feature sets.

Flight crews, a key user group of aviation mobile devices, are increasingly using tablets and smartphones to service customers and perform other aspects of their jobs. “The plans of many major airlines to give tablets to cabin staff will empower them to service customers proactively,” noted air transport communications and IT company SITA in a recent publication. “At the same time, pre-flight preparations and post-flight reporting will gain from a more productive and flexible way for working.”
For passenger entertainment, one international airline based in Europe wanted to give its business class customers custom tablets loaded with premium content, including a “moving map” to keep them informed of their current location. The airline was looking to replace their existing bulky in-flight entertainment (IFE) systems with a lighter and sleeker option that could also be modified as needed to meet Federal Aviation Administration (FAA) safety regulations as well as the copyright security regulations required by movie producers.

The airline substituted its seat-embedded systems with customized handheld Samsung Galaxy Tab Pro 10.1-inch and 12.2-inch devices. The customized tablets preloaded with the IFE solution didn’t require FAA approval and allowed the airline to set specific software and hardware key functions. The tablets were also optimized with an audio configuration designed to disable boot-up speaker sounds and increase the default headphone volume for during flight. Unlike the previous wired-in solution, any faulty tablet can be easily swapped out, reducing maintenance time and costs.

**One size does not fit all**

The retail, restaurant and aviation sectors, of course, represent just a handful of the many industrial, government and educational sectors that can benefit from tailored mobile devices. And, for every particular function and need, there is an ideal mobile device form factor and feature set. Fortunately, companies looking to purchase off-the-shelf products can make their selection from a wide variety of options. There are dozens of smartphones and tablets with different screen sizes, display resolutions, processing speeds, input capabilities and other characteristics. Some of these devices have been designed to perform well in harsh environments, to offer extended battery life and to deliver other premium features.

Within the mobility marketplace, no vendor has a broader selection of mobile devices—or greater overall popularity worldwide, than Samsung with its large device portfolio running the Android operating system. In 2014, IDC estimates that Android-based smartphones constituted 82.3 percent of the worldwide smartphone market\(^7\), while Android-based tablets made up 67.7 percent of the worldwide tablet market\(^8\).

Samsung is the leading Android platform vendor and accounted for nearly one-quarter (24.5 percent) of all the smartphones of any type shipped during 2014, according to IDC.\(^9\) It’s also the leading supplier of Android-based tablets, and accounted for 17.5 percent of all the tablets shipped worldwide in 2014, IDC estimates.\(^10\)

Despite the depth and breadth of its mobile device portfolio, Samsung recognized that many business customers needed more specific solutions than its off-the-shelf products offered. The company created KNOX Customization to...
allow the devices to be configured and customized to uniquely match more-focused requirements throughout different vertical industries. Offered as either Custom Toolkit, or Custom Services, KNOX Customization can meet the diverse and deep level requirements of all business customers.

KNOX Customization
Offering a type of service unavailable from any other major device manufacturer, Samsung KNOX Customization provides many capabilities that give developers the ability to modify a Samsung device’s configuration parameters as well as other settings and features. Systems integrators have the flexibility and support from Samsung to modify everything from the device’s connectivity controls to its advanced device settings. With support from Samsung’s KNOX Customization technical teams, businesses can request even greater configuration changes such as modifying device boot up splash screens or altering voltage charging levels.

KNOX Customization is offered in two forms: the Custom Toolkit and the Custom Service. Depending on the level of modifications and the approach required, businesses and system integrators are able to select the mode of customization that best suits their business. The two offerings differ in their deployment models and pricing as well.

FIGURE 1. KNOX CUSTOMIZATION
CUSTOM TOOLKIT FEATURES
The Custom Toolkit is designed primarily as a tool to be used by systems integrators and value-added resellers representing the end customer. The third party developers are provided with the Software Development Kit and licenses to enhance their solutions with customized devices.

The Custom Toolkit itself includes a set of key configuration features that SI/VARs can use to customize the device functionalities at the app level. Through the toolkit, they can set the device in Enhanced Kiosk mode, manage access to device settings, can provide custom connectivity control and can block or modify other device behaviors. Figure 1 (above) illustrates the three major categories of functionality that developers can modify using the Custom Toolkit.

In addition to offering the same range of modifications permitted by the Custom Toolkit, the Custom Services of KNOX Customization allows even more alterations at the binary level. Performed by Samsung’s own consulting group, these changes can include changes such as:

- Remapping the functions of the device’s hardware keys
- Changing the booting splash screen
- Setting up custom configurations for specific connectivity needs
- Deriving APIs for a partner’s app development

Mobile Solutions Without Compromise

By leveraging the Custom Toolkit and the Custom Services of KNOX Customization, companies, educational institutions and other organizations now have a simpler and more-efficient way to acquire the world’s most familiar mobile devices configured in ways that meet their precise needs. Businesses no longer need to choose between expensive and inflexible custom hardware solutions, or generic and poorly configured consumer smartphones and tablets.

Samsung’s KNOX Customization has broken new ground in the long-running race to find the optimal balance between off-the-shelf simplicity and cost and high-value tailored solutions. By making customization easy and affordable, KNOX Customization gives organizations the best blend of off-the-shelf and customized mobile devices, meeting specific industry needs with affordable, powerful and compelling solutions.

1 IDC Press Release, December 1, 2014
2 IDC Press Release, November 24, 2014
4 TechNavio report summary
5 The Point of Sale News, “Results of a New Shopper Study: Decoding the Phy-gital Shopper,”
6 SITA article, “Empower Your Crew: The Rise of Tablets,”
7 IDC Press Release, December 1, 2014
8 IDC Press Release, November 20, 2014
10 IDC Press Release, February 2, 2015