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| The Advent of the Smart Phone |
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| **Andrew Chen**  **STS.001** |
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Driven by information societies’ demand for increasingly versatile personal devices, the smart phone is a technical achievement that has led to more educated societies. After the success of the mobile phone proved large scale networks could be constructed to distribute voice data to and from programmable personal devices, societies were soon inspired to develop the system to bring additional capabilities to the mobile phone. Several years later, mobile phones evolved into smart phones with the addition of fast internet connections, hardware such as video cameras, and hundreds of thousands of different ways to use your phone in the form of applications[[1]](#footnote-1). With the added convenience of increasingly more information and computing power readily available, smart phone users are able to do and learn more, leading to a more educated population in information societies with smart phone capabilities.

The primary societal force that shaped and continues to shape the development of smart phone technology is the growth of the information society. An information society, as I refer to it, is any society that utilizes information technology to advance social and economic development. And information technology, as I intend it to mean, is defined as follows by a social science encyclopedia[[2]](#footnote-2):

*Broadly speaking, information technology refers to knowledge about how to create, manage, and use information to accomplish human purposes, and so includes not only advances in computing and telecommunications, but also advances in the techniques and skills for using these systems for such purposes as modeling and computer simulation.*

And so, examples of using information technology expand beyond activities often associated with IT departments such as maintaining computer servers and setting up wireless networks. Using information technology includes communicating with email, banking online, creating electronic documents, and shopping on the internet. Thus the more a society’s members conduct those types of activities, the more the society has grown as an information society. So now why would a growing information society with increased use of information technology create a demand for added functionality to the mobile phone, i.e. the smart phone? Because a mobile phone with a flexible selection of costless additional functionality is better.

One can historically observe that many products have tried to gain a competitive edge by offering multiple functionalities into a single product. The classic Swiss army knife contains a knife, scissors, screwdriver, and tweezers. Newer digital cameras also contain a video camera and basic image editing software. Many TVs also contain a VCR and DVD player built right in. Who doesn’t want more functionality in their product? Why not bundle as much functionality into one product as possible? The answer is because there is a limit to the benefits of products with multiple functions. Two barriers to the success of function packed products include an inflexible offering of functionality and negative side effects that come with the additional functionality.

An example of decreased demand for an inflexible functionality offering could be a TV with integrated VCR and DVD player offered to a consumer who wants the new Blu-Ray disc player instead of the outdated VCR. Most integrated TVs do not have the flexibility to switch out their media players and so the integrated TV product would suffer popularity and demand from the inability to provide the newest and latest popular development function, in this case the Blu-Ray disc player. Another example can be gleaned from the website of Victorinox, the official supplier of Swiss Army Knives. Attempting to browse Victorinox’s selection of multi-tools reveals a choice of 256 product options of varying combinations of tools and design styles[[3]](#footnote-3). This many options is presumably offered to cater toward the exact preference of a customer, an attempt to ensure value is not lost in their product offering at the slightest change of a consumer’s preferences. This however, decreases the individual value of each product; with no flexibility, none of the options is exactly what every Swiss Army Knife customer wants. Victorinox’s apparent need to offer 256 variants of its Swiss Army Knife to satisfy its target customer base is a characteristic example of a disadvantage to offer inflexible bundles of functionality in a product.

Smart phone innovation benefited greatly from its electronic ability to offer flexible bundles of functionality in the form of applications. Smart phones can download and install applications just like desktop and laptop personal computers can. If developing the mobile phone system to support smarter phones would mean phone providers could offer consumers 256 different types of smarter phones that each offered a different set of functionality, the demand for these smarter phones would be much diminished. Imagine if one phone let you check your email but couldn’t check the weather while another let you check both but couldn’t make phone calls. These might be extreme examples, but they demonstrate how undesirable the wrong functionality offering can be. In addition, smart phones’ flexible offering made sure future functionalities could also be supported. While an inflexible integrated TV would not be able to support the new Blu-Ray disc format, the flexible smart phone would simply have to wait for the development of a new application to support playing a video encoded with a new format.

An example of the second limitation to functionality-packed products – negative side effects – is the Wenger Complete Swiss Army Knife. Before being bought out by Victorinox, Wenger was a second supplier of Swiss Army Knives that constructed the most multifunctional penknife according to the Guinness Book of World Records. This penknife boasts 87 tools with 112 functions including a corkscrew, fish line guide, golf club face cleaner, bike chain rivet setter, toothpick, and nail file[[4]](#footnote-4). These functions cover a quite comprehensive set of needs so who wouldn’t want all these tools in their pocket? Well, the problem is that each of these tools carries with it a negative side effect: physical space and weight. The Wenger Complete Swiss Army Knife is 3.75 inches long, 8.75 inches wide, and 2.75 pounds. In contrast, the classic Victorinox Swiss Army Knife is 2.25 inches long, 0.25 inches wide, and 0.1 pounds. That’s 35 times thinner and 27.5 times lighter. While it would be nice to have all the functionality of the Complete Swiss Army Knife, the enormous size and weight is a large drawback. One can imagine a similar problem with the integrated TV example as well. For example, it might be nice to have a TV integrated with a VCR, DVD player, and Blu-Ray Disc player. However, if this meant doubling the size and weight of the TV, this negative side effect limits the practical amount of media players that can be packaged into a single integrated TV.

Smart phone innovation again benefited from its electronic nature by avoiding the physical drawbacks of added functionality that affect physical products. For example, adding support for different media formats in the integrated television requires additional physical space and weight, while adding support for different video encodings on an electronic device does not; it only requires additional software code. It may be pointed out that additional software code consumes electronic memory and processing power that, if in enough demand, might require larger hardware that will consume physical space and weight. However, in 1992, the beginning of the decade in which mobile phones were becoming popular enough to begin using second generation networks[[5]](#footnote-5), electronic technology had already developed enough to support a proof-of-concept phone. The IBM Simon contained basic software such as a calendar and address book[[6]](#footnote-6), proving that hardware at the time was capable of supporting such software functionality. This proof-of-concept in addition to Moore’s Law – which states the capabilities of digital electronic devices double approximately every two years – gave much reason to believe that electronic hardware would not prove to be a bottleneck constraint.

Promising flexible and practically costless additional functionalities, the smart phone would fit the needs of every person who used information technology in their life. No matter how small a niche a person’s personal desired functions might be or how variable a person’s needs might be, the smart phone promised the ability to fulfill those functions and needs. Thus, as information societies grew with progressively more people using information technology for more and more purposes, so grew the demand for the smart phone.

In response to society’s demand for increased functionality in their mobile phones, the technologists of the day undertook the technological development of the two components of the mobile phone system: the phone and the network. Developing one without the other would be like developing an arrow into a bullet without developing a bow into a gun – completely useless. Between the launch of the proof-of-concept smart phone in 1992 and today, technologists have developed the smart phone from a bulky, black-and-white, single-tasking device with ten available applications to a sleek, full-color, multi-tasking device with hundreds of thousands of available applications.

The development of the communication network was a key to the success of the smart phone because the network dictates the speed and capacity of information transfer between the smart phone and the rest of the world, i.e. the Internet. With limited data speed and capacity, internet browsing, large file sharing, and any real-time data applications such as driving directions become impractically slow. Thankfully, technologists have increased the mobile phone bandwidth from 10 to 20 kilobits per second[[7]](#footnote-7) to 5000 to 12000 kilobits per second for the average user[[8]](#footnote-8).

To better understand the societal and cultural forces that shaped the development of smart phone technology, we

Games: yes they can waste time but they fill in time that would be otherwise wasted.

and how the subject reflected the society, politics, and culture in which it emerged and/or existed (technology as social product).

technologists have developed internet access to a mobile phone that now includes sophisticated operating systems such as Windows Mobile and additional hardware such as cameras.

# Bibliography

Apple Inc. (2011, January 22). *Apple's App Store Downloads Top 10 Billion.* Retrieved April 23, 2011, from Apple.com: http://www.apple.com/pr/library/2011/01/22appstore.html

Hammacher Schlemmer. (2011). *The Only Complete Swiss Army Knife*. Retrieved April 23, 2011, from Hammacher Schlemmer: http://www.hammacher.com/publish/74670.asp

Kuper, A., & Kuper, J. (2003). *The Social Science Encyclopedia.* New York: Routledge.

Motorola, Inc. (2008). *2G and 3G Cellular Networks.*

Verizon Communications Inc. (2010). *LTE: The Future of Mobile Broadband Technology.*

Victorinox AG. (2011). *Victorinox Swiss Army - Multi-Tool Selector*. Retrieved April 23, 2011, from Victorinox Swiss Army: http://www.swissarmy.com/multitools/Pages/Selector.aspx?property=MultiToolSize&value=%22%22

1. [↑](#footnote-ref-1)
2. [↑](#footnote-ref-2)
3. [↑](#footnote-ref-3)
4. [↑](#footnote-ref-4)
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