University of Waterloo

CS492 A3

The Changing Nature of Work with Mobile Devices

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4A Computer Science

May 2016

The rise of the "smartphone", devices with advanced operating systems and powerful hardware, has turned the average phone into a portable, multi-purpose computing device. The most common mobile operating system is Android, a system bought and currently maintained by Google which is based on the popular Linux kernel used on many desktop computers (HeatWare, 2014). While mobile phones used to be limited to basic calling and messaging functionality, today's Android phones come equipped with sensors ranging from light and motion detection to fingerprinting, as well as storage and processing power that already rivals many dedicated personal computers (Bonnington, 2015). These mobile devices are commonly referred to as "smartphones", computerized versions of traditional phones that provide users with fast access to the Internet and millions of custom applications. Smartphones are simplifying the workflow for many large companies by making it easier to coordinate with teams and access information. Additionally, smartphones have led to the creation of entirely new jobs for social media professionals and entrepeneurs who use their smartphone to organize their small business. There are many ways in which smartphones have positively impacted the workplace, however, the constant communication and availability that these devices allow can be overwhelming for employees who feel obligated to always remain connected. The widespread use of mobile devices is also impacting people's work through the damaging messages and images that are captured in their personal lives and noticed by their employers. While society will continue to benefit from the ease of information and communication that these devices provide, it is important that fair limits are established on work availability in the era of the "always on" smartphone and that people are educated people on the need to be careful when using these devices in their personal lives.

The ability to carry around a mobile device while on the go is helping people accomplish their goals during the workday. A 2012 study be Cisco found that "64% of firms in Europe and North

America identify providing more mobility support for employees as a top priority" (Forrester Research, 2012). The study also highlighted some of the most common ways that employees are using their smartphones, which included viewing documents and presentations, accessing the company intranet, and using the company email and calendar (Forrester Research, 2012). In order for Android and other mobile operating systems to be able to support all of these mobile computing use cases, these platforms provide developers with marketplaces, such as Android's Google Play Store. While traditional phones and early smartphones featured limited pre-loaded applications such as a basic calendar or notes tool, the rise of application marketplaces enabled companies to find or build their own applications that specifically met the uses cases they needed to improve their productivity. Developers write these applications in the Java programming language and compile them into the Android Application Package (APK) format in order to be run the Android runtime environment, the newest of which is the Android RunTime (ART) released in Android 5.0 in 2014 (Android, n.d.). The ART is a virtual machine that takes the APK byte-code generated when developers compile their Java applications and converts it into native hardware instructions that are executed on the devices (Frumusanu, 2014). Each Android phone is powered by a modern operating system capable of simultaneously running applications written by developers all across the world.

In 2015, there were over a million applications available for download on Android's Google Play store (Atkinson, 2015). Many of these apps are targeted at industries that can benefit from increased computerization, such as health care and construction. Health care professionals (HCPs) use applications such as Box, a popular cloud storage service for Android that is "reportedly compliant with both the Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Economic and Clinical Health (HITECH) Act", allowing for easier exchange and storing of patient information (Ventola, 2014). HCPs are using medical applications on their

smartphones to lookup drug references, determine dosages with medical calculators and perform electronic perscribing and research conducted has shown that "70% of medical school HCPs and students reported using at least one medical app regularly, with 50% using their favorite app daily" (Ventola, 2014). These applications are having meaningful impacts on professionals who use the capabilities of modern smartphones to make their jobs easier. In the construction industry, Bridgit, a Waterloo based company, has designed an Android app called Closeout that allows workers to take pictures and make notes about ongoing tasks so that teams can better collaborate on the progress of their projects (Bridgit, n.d.). The global distribution of applications on marketplaces like Google Play is making it possible for companies like Bridgit to improve the workflow of niche groups such as construction project managers and is an example of how mobile computing is benefitting many established industries.

In addition to helping large organizations collaborate across their teams, smartphones are creating entirely new kinds of work for people who use these mobile devices creatively. The success of social media sites such as Facebook and Twitter have required companies to create new roles for social media managers. Some of the duties of these managers include curating content for the company's online media presence, monitoring the performance of the content, and outreaching to other companies and interested parties (Kolowich, 2015). Buffer, a social media management service, estimates that there are 189 million Facebook users who only use the service through their smartphone (Cooper, 2013). Social media managers need to customize content for these mobile users and the time-sensitive nature of sharing and posting to social media services requires them to constantly be using their smartphones to manage their work while on the go.

Small businesses are also taking advantage of the latest smartphone technology. One of the

ways that these handheld computers are making their lives easier is by managing their business

transactions. Square, a company that provides Point-of-Sale (PoS) products, helps these businesses

organize the way they collect payments by providing them with hardware devices that connect to

smartphones and turns them into PoS systems such as credit card readers (Yeung, 2015). These PoS

systems allow anyone from lunch truck drivers to farm stand operators to accept different payment

methods using only their smartphones and charges a flat 2.75% per transaction (Fayman, 2011). The

use of smartphones to accept and manage PoS systems is a new idea that harnesses the power of

modern mobile devices to help entrepeneurs run their businesses and many people are taking this idea

even further. Current smartphones are already advanced enough to coordinate the logistics of running a

small business, such as in the case reported by USA Today of women's clothing store owner Kimberley

Davidson. Kimberly takes orders for items using Google Voice and Paypal, schedules employee hours

and events using Google Calendar, and markets new products by using her phone's Instagram app

(Pisani, 2014). A single smartphone has the multi-tasking ability and the applications available to

manage the workflow of these creative entrepeneurs and perform tasks that would not be possible

without the advancements that have been made in recent years to mobile computing.

While smartphones give employees the ability to conduct much of their work from the palm of

their hand, the ease with which smartphones allow people to stay connected to their job can often

become a problem. A study of executives, managers and professionals (EMPs) from the Center for

Creative Leadership found that nearly 60% of sampled EMPs stated that they were connected to work

through their smartphones for 13.5-18.5 hours per day (Deal, 2015). In one case, attorneys were told

that in today's society, notifications must be checked both inside and outside of the office on a regular

basis and that it should be one of the "last things you do before you retire at night" (Deal, 2015).

Smartphones are enabling people to work more flexibly, and as a result of clients and co-workers

working different hours, there is an expectation that people must remain available during these flexible time periods. The "always on" mentality that smartphones have helped to create is also damaging how effective employees are during the work day. In recent years police officers are finding that they themselves are being heavily policed by concerned smartphone users who record their actions and post them to social media. While holding the police accountable is important, a study conducted by Carleton University in 2015 showed that the constant scrutiny that these devices impose on police officers can lead to "risk-averse policing" by officers who may hesitate to act when they are placed in hostile situations out of doing something the public could view negatively (Fiebel, 2015). More work needs to be done to determine the effect this media surveillance is having on officers and this is a complication of the prevalence of smartphones that does not yet have a clear answer.

Most officers are aware of the implications of smartphones capturing their actions while on duty, however, many people forget that they also need to be careful of what they say and do in their personal time. The HuffingtonPost has an entire page called "Fired over Facebook" that highlights articles of people who who lost their jobs over images and messages posted to social media (The Huffington Post, n.d.). A survey the site conducted found that 57% of Americans using social media have made posts or texts that they ultimately regret, while 21% expressed concern that they "might adversely affect their careers with a questionable social media post" (Neil, 2015) and there are good reasons for people to be concerned. The recruiting platform Jobvite's 2014 Social Recruiting Survey noted that "93% of hiring managers review a candidate's social profile before making a hiring decision" (Davidson, 2014). The irresponsible pictures and insensitive comments that used to go unnoticed by employers are now being captured by the same devices that are helping them do their work. While society is obsessed with obtaining the latest details from Android keynotes and Apple phone unveilings, information regarding the consequences of carrying around these mobile computers is not given the

same level of attention.

There are many ways that companies can help their employees achieve a fair work-life separation while continuing to receive the benefits of using smartphones. In Germany, large companies including BMW and Volkswagen have instituted limits on contacting employees outside of work hours and in 2014 the German Labour Minister investigated instituting this policy across the country (Stuart, 2014). Laws that prevent companies from overworking their employees are one of the recommended ways to limit the negative impact smartphones have over people's personal lives and more countries should look into implementing this sort of legislation. Members of law enforcement should participate in more pilot programs such as those being tested by the Toronto Police Services that equip officers with body-worn cameras (Toronto Police Services, 2016). These body cameras provide the public with an unbiased record of police actions, reducing people's need to record officers with their smartphones, and therefore limiting officers concerns over videos being spread on social media. It is also recommended that companies provide employees with access to a clear social media policy that highlights the consequences of using their smartphones to share improper content online. The Privacy Commissioner of Canada has specific criteria for this policy, stressing the importance of making sure employees know what the company is monitoring, as well as what it considers to be inappropriate and the penalties that will result from violations of the policy (Office of the Privacy Commissioner of Canada, 2015).

Smartphones running systems like Google's Android OS are powerful computers that give people access to millions of applications that they can use to help them complete their work. These mobile computers are benefitting large companies by making it easier to organize projects and teams and are also helping to create new jobs for social media experts who rely on using their smartphones to communicate with other mobile users. Entrepeneurs and small businesses are greatly benefitting from

the multitasking abilities provided by the latest smartphones, enabling them to accomplish many of the responsibilities of their business. While these devices will continue to benefit people in the workplace, smartphones keep people constantly connected to work and social media and there are negative consequences to this frequent media exposure on their work and personal lives. The recommendations made address these issues and offer possible solutions and advises ways to reasonably limit the use of these powerful mobile computers.

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