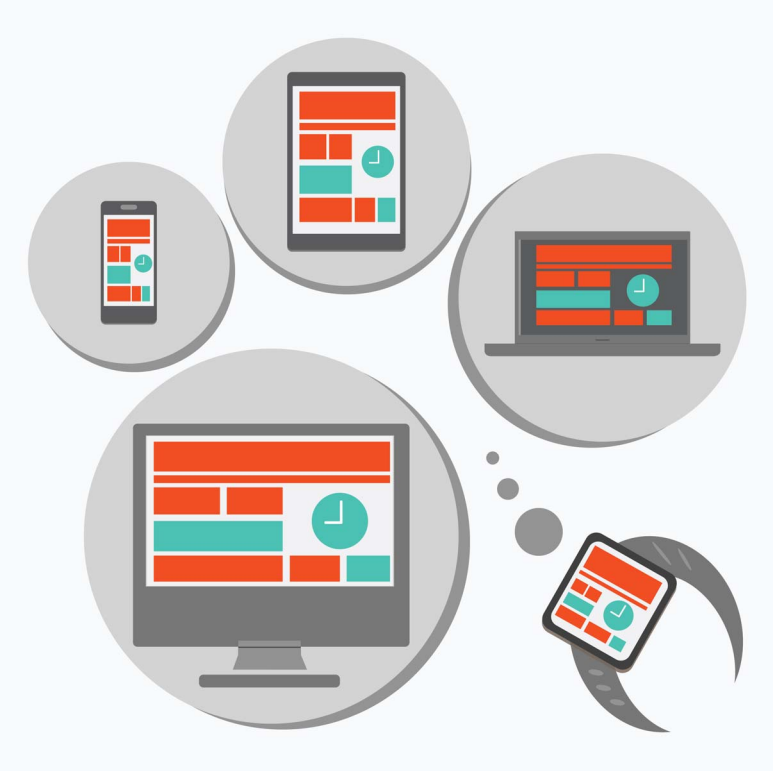
Deutsche Bank
Markets Research

Industry
Mobile & Consumer Internet

Date
17 December 2014

North America
United States

TMT
Internet



Ross Sandler
Research Analyst
(+1) 415 262-2028
ross.sandler@db.com

Lloyd Walmsley
Research Analyst
(+1) 212 250-7063
lloyd.walmsley@db.com

Deepak Mathivanan
Research Associate
(+1) 415 6173246
deepak.mathivanan@db.com

Kevin LaBuz
Research Associate
(+1) 212 250-2463
kevin.labuz@db.com

Shawn Rassouli Ghazikalaye
Research Associate
(+1) 415 617-3244
shawn.rassouli@db.com

F.I.T.T. for investors

Entering The Connected Life Era

Investor Guidebook For Navigating The Ecosystem Wars

The Connected Life era we are heading into is marked by two major trends: 1) huge ecosystems battling to enforce their standards and ensure a consistent user experience across any connected screen, and 2) traffic distribution and commercial activity is fragmenting and into different areas, creating opportunities for new entrants and challenges for incumbents. Content that once resided on PC websites or Smartphone apps is likely to be decentralized, broken down into smaller formats, and pushed to new "smart" devices. The TAM is enormous, 3B users generating $1500 in ARPU from software, services and advertising, or ~$2 trillion, just the biggest game in town.

Deutsche Bank
Markets Research

North America
United States
TMT
Internet

Industry
Mobile & Consumer Internet

Date
17 December 2014

FITT Research

Entering The Connected Life Era

Ross Sandler
Research Analyst
(+1) 415 262-2028
ross.sandler@db.com

Lloyd Walmsley
Research Analyst
(+1) 212 250-7063
lloyd.walmsley@db.com

Deepak Mathivanan
Research Associate
(+1) 415 6173246
deepak.mathivanan@db.com

Kevin LaBuz
Research Associate
(+1) 212 250-2463
kevin.labuz@db.com

Shawn Rassouli
Research Associate
(+1) 415 617-3244
shawn.rassouli@db.com

Investor Guidebook For Navigating The Ecosystem Wars

The Connected Life era we are heading into is marked by two major trends: 1) huge ecosystems battling to enforce their standards and ensure a consistent user experience across any connected screen, and 2) traffic distribution and commercial activity is fragmenting and into different areas, creating opportunities for new entrants and challenges for incumbents. Content that once resided on PC websites or Smartphone apps is likely to be decentralized, broken down into smaller formats, and pushed to new "smart" devices. The TAM is enormous, 3B users generating $1500 in ARPU from software, services and advertising, or ~$2 trillion, just the biggest game in town.

With any platform shift, we are likely to see new opportunities and risks emerge for companies like BABA, AAPL, GOOG, FB and many others.

What Is The Connected Life?

We are heading into a world whereby users are connected throughout their entire day across many new devices – in short, the "always on, always with you" nature of digital today is about to step into a new era. The Connected Life means constant interaction at all times, creating lots of fragmentation and complexity. Digital is going to take more share from analog, and consumption throughout a given day is only going to increase based on new use-cases.

Engagement Model Is Shifting – Push, Pull & Paid

The basic technical underpinnings of how publishers, developers and marketers engage with users in this new era is shifting toward native experiences inside cards, and away from centralized destinations like websites or apps. The goal remains the same: build great products and users will follow, but traffic flow in this new era is changing dramatically. In this report we attempt to address some key concerns around whether search, display or entirely new formats like push notifications are likely to flourish.

What Matters For In The Coming Ecosystem War?

During these kinds of technology shifts, it's often challenging for investors to see which companies are best positioned. We think criteria like identity and engagement, distribution, a direct billing relationship with users, strong brand and IP, the proximity to the OS and APIs, breadth of devices and third-party developers, and a few other criteria are key differentiators for the big ecosystem players globally. In the West you have Apple owning the high-end and Google the torso and tail, but in the East there are a number of new ecosystems emerging on the back of open source Android, and all is colliding in places like India. Power struggles, gatekeepers and control amidst this backdrop are likely to increase in importance, and in this report we attempt to answer the simple question of who is best positioned?

Quantifying The Opportunity – Its Massive - $2 trillion

We estimate that software, service and advertising amount to an annual $1500 per user "jump ball" in the Connected Life era in developed markets (around $300 in emerging), excluding the hardware opportunity – that's a $2T annual TAM. Importantly, time spent is becoming secondary to sessions in terms of measuring the monetization potential of any new engagement. Facebook leads the pack globally with 19% smartphone session share, followed by Google at 17% and Apple at 8% across their various apps and services.

Top picks

Google (GOOG.OQ),USD513.80	Buy
Facebook, Inc. (FB.OQ),USD76.99	Buy
Twitter, Inc. (TWTR.N),USD36.85	Buy

Source: Deutsche Bank

Companies Featured

Google (GOOG.OQ),USD513.80 — Buy

	2013A	2014E	2015E
EPS (USD)	21.94	25.59	28.49
P/E (x)	40.3	20.1	18.0
EV/EBITDA (x)	10.2	4.7	3.3

Facebook, Inc. (FB.OQ),USD76.99 — Buy

	2012A	2013E	2014E
EPS (USD)	0.53	0.87	1.69
P/E (x)	46.5	88.2	45.6
EV/EBITDA (x)	40.1	45.7	27.9

Twitter, Inc. (TWTR.N),USD36.85 — Buy

	2012A	2013E	2014E
EPS (USD)	-0.30	-0.18	0.09
P/E (x)	–	–	410.9
EV/EBITDA (x)	–	–	–

Source: Deutsche Bank

Table Of Contents

Executive Summary

The key points that we aim to highlight in this report are:

- We are heading into a new era where devices are becoming increasingly connected and smart. This phenomenon is creating device fragmentation and new digital interactions, to solve for this several new ecosystems are built by leading players in the space to ensure consistent design and user experience.
- The "starting points" for the everyday digital experience are evolving from search, direct navigation, social and apps to entire new traffic distribution. Engagement models in this new era are increasingly shifting to new native experiences such as cards and notifications, beyond the centralized experiences we see today in apps and websites. Publishers, developers and marketers are being forced to standardize content across multiple new screen sizes and formats.
- We believe the key criteria for large ecosystems to succeed in this era are identity and engagement, distribution, a direct billing relationship with users, strong brand and IP, and the proximity to the OS and APIs, breadth of devices and third-party developers building on top.
- We believe that the larger app publishers and OS platforms that own identity and first party data are massively advantaged. Further, we believe curating the user experience across multiple devices will become absolutely critical in the Connected Life era, and few can do it.
- Google and Apple are proving to have the best ecosystem approaches with their control of the OS layer and a strong suite of APIs, apps and services that sit on top. Many other ecosystems have cropped up to replicate this success in emerging markets.
- Companies such as Facebook and Twitter are also well positioned as their strong daily engagement and identity, but are playing in other company's sandboxes.
- In emerging markets, Alibaba is trying to replicate Google's strategy by offering a rich ecosystem including the OS (or custom ROM), third-party apps, and strong direct relationships with its users. Similarly, Xiaomi is more advanced today benefitting from its original software-centric approach, and has branched out to a number of Connected Life devices tailored specifically for emerging markets. Micromax in India is taking the Xiaomi playbook and running with it.
- Finally, in terms of total opportunity, we estimate that software, service and advertising opportunities alone in the connected era amounts to $1,500 per user in the western markets and $300 per user in the emerging markets for a TAM of over $2 trillion annually, the biggest game in town.

In the sections below, we provide a detailed discussion on each of the points above and discuss how leading companies are competing in the space.

Entering "The Connected Life" Era

The Intro

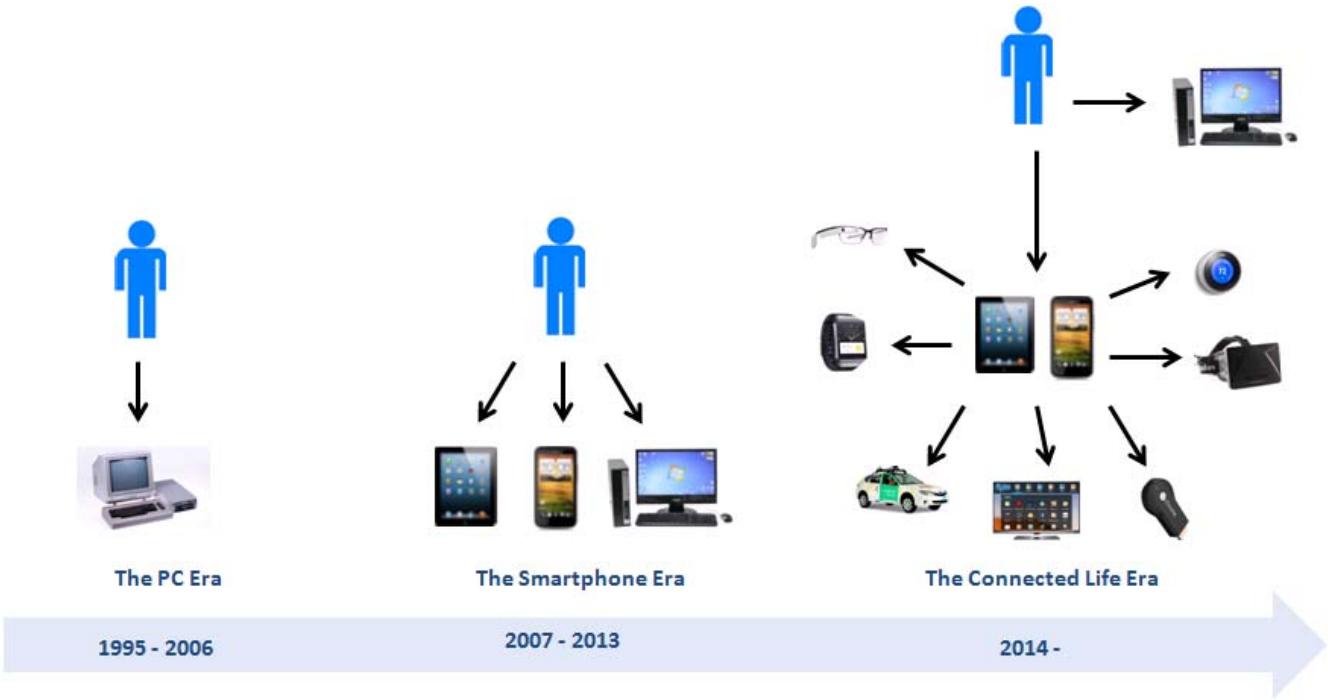
Heading into 2015, consumers are finally entering into what some have labeled "The Connected Life" era, whereby everyday products and devices are increasingly smart and connected, and where the software and smartphone plays a central role in communications across these screens. Not only do we now own more personal devices than ever before, the friction around getting things done on smaller screens and all the technology building blocks behind it are being removed:

- Identity is creating singular personalized experiences across many devices across Search, Social, Shop, Play and Work
- Content is going native, away from engaging only via web browser, and new technologies like cards and notifications are allowing developers to push content to any screen on any device to engage with users, most tethered to the smartphone
- Friction is being removed in discovery and communication between apps and native content through deep linking, the new connective tissue
- All of this is tied together by many new ecosystems and operating systems, connecting the user across all their devices throughout the day in the Connected Life.

One way to describe this new world is illustrated via an anecdote from Google's former Android boss Andy Rubin, is now somewhat famous for, whereby several years ago he asked his staffers to go home and count the number of screens they had in their home. Most came back the following day and said "about 4-5" counting a phone, computer, TV and maybe a tablet or one other device. Rubin dismissed this figure and went on to explain that there are upwards of 50+ screens in most homes that could be digital and connected, including ALL appliances, alarm clocks, utilities, watches, eyewear, clothing, etc. Steve Jobs had similar visions for years with iPod, Mac, iPhone and iCloud serving as the center of your "Digital Hub".

Sensors and software are ushering in this new era whereby anything from clothing, to wearables, to cars and appliances are all likely to: 1) be digitally connected all the time, around the clock, 2) solve many pain points for users, and 3) provide data around what users are doing to help further customize their experiences. In the Connected Life, basic tasks and functions like reading the morning paper, commuting to work, hitting the gym during lunch, taking a cab to a meeting, or meeting friends for dinner – are all going to be digital, curated and personalized based on whatever the user needs at that given time.

Figure 1: Entering The Connected Life Era



Source: Deutsche Bank, Company Reports

This transformation is one of the biggest trends for all of consumer internet, as it changes the thinking and the strategy about how brands, content owners, and individuals engage with one another. The technologies under-pinning this massive shift are only getting more complex. Prior to 2007, consumers had over 10 years of PC browser-based engagement primarily on destination websites or social networks, with standardized protocols like W3C in place.

Looking ahead, users are going to engage with their curated content at all times throughout the Connected Life on various devices. **Figure 2** below illustrates "A Day In Life" of a user in the Connected Era. A typical day can be broken down into six timeframes depending of the type of activity primarily performed by the user. During each timeframe, the user has interaction primarily with a few devices. For example, PCs and smartphones will be the primary devices of use during working hours between 9-5. Later in the evening, connected TVs, tablets and wearables will be primarily used for entertainment and fitness activities. Some users who drive to work will engage with connected auto during their commute hours and others who commute on public transportation will use smartphones and tablets during their commute. During each timeframe, users will interact with a number of devices, which we refer to as sessions.

The nature of each session varies depending on the device. Devices such as PC will have fewer sessions per day but each session is typically longer and presents more ad monetization opportunity than a smartphone session or a wearable session. We have discussed the calculations behind the share of sessions and share of potential ad impressions across various devices later in this report.

Figure 2: Day In Life – Connected Device Activity

Source: Deutsche Bank, Company Reports, Estimate of session breakdown is discussed later in the report

To elaborate on the examples discussed above, a user on a smartwatch working out at their gym should be in a position to read a bite-sized piece of content via new technologies like cards or a notifications without even having a browser on the watch. Users walking into their living rooms with a wearable should be able to turn on Spotify on their connected home speakers with a wave of their hand, and immediately pick up on a personal playlist. Commuters could be listening to their cars' radios, read through a customized Twitter or Facebook newsfeed while on their drive home, catching up on news and content personal to them, and responding with voice-enabled direct messages. As more and more consumer sessions shift from analog to these new platforms and experiences, it should create significant opportunity for many new (and existing) players to increase engagement.

In this report, we lay the framework for analyzing opportunities in this new era. It is far too early to make definitive statements like "XYZ will win" but we can clearly see which companies across consumer internet and software are best positioned. Below we will address the following major topics:

- New engagement models – how does traffic flow in this new era?
- The role of OS vs. apps? Who is entering the picture globally?
- Where is commercial activity likely to take place?
- Lastly, we attempt to quantify the opportunity overall and for some of the larger players in the space

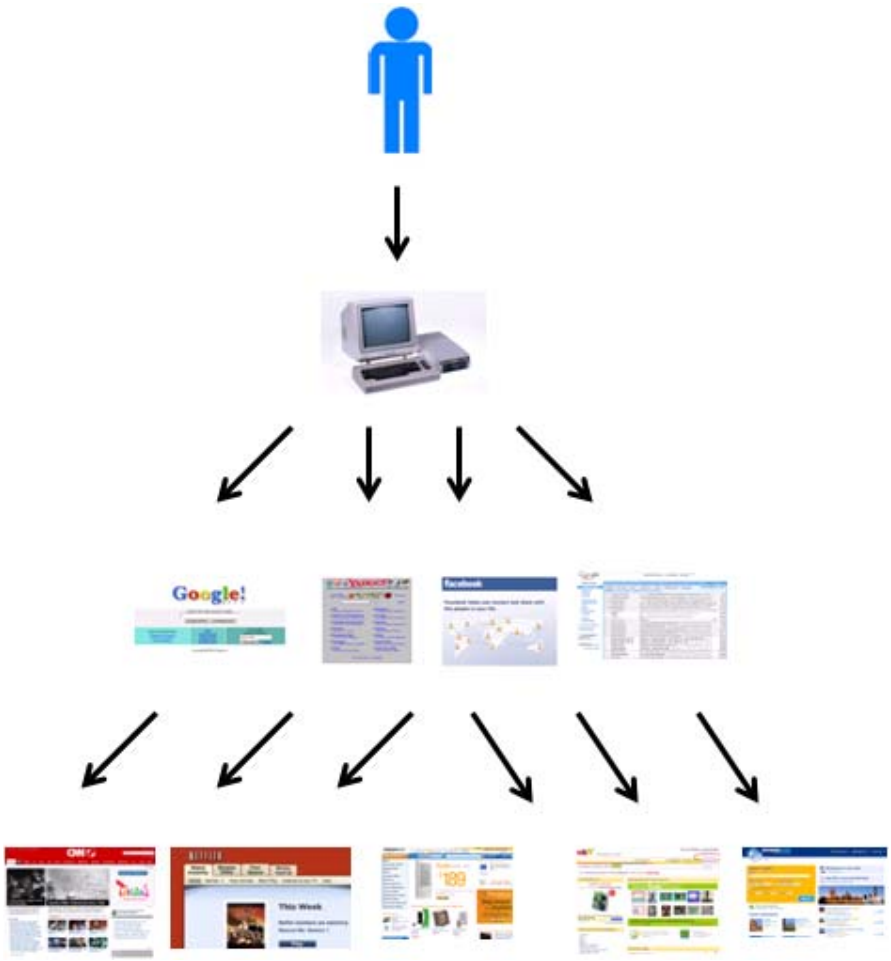
Disclaimer: We are a consumer internet research team, hence in this report, we address the implications of this massive shift from the lens of the Global Internet ecosystem (not really focusing on the hardware side of the thesis), covering topics around: 1) how platforms are evolving for this new era, 2) how consumer behavior is changing, and 3) how various companies are positioned to take advantage. We'll leave the hardware and chips discussions for others.

New Engagement Models – How Does Traffic Flow In The Connected Life?

Looking at how the consumer engages with any technology is important to understanding the opportunities and gate-keepers in any era. As we've articulated at length in previous research, we believe the first era for consumer internet engagement models lasted for about 12 years from the dawn of the web in the mid-1990's to 2007. This era was very standardized, existed mostly within the PC web browser, and had a few primary on-ramps for traffic distribution: 1) direct navigation, 2) portals, 3) search engines, and 4) social networks, which admittedly came into the forefront exiting this era with Facebook.

In this era, significant economic value accrued to companies that control traffic distribution, namely Yahoo in the early years under the portal approach, ceding to Google for most of the 2000's with search, and lastly Facebook entering the picture towards the end with social. We also include email as another way to distribute content and marketing, which was consistent in the PC era.

Figure 3: 1995-2006 – Traffic Distribution: Portal, then Search, then Social



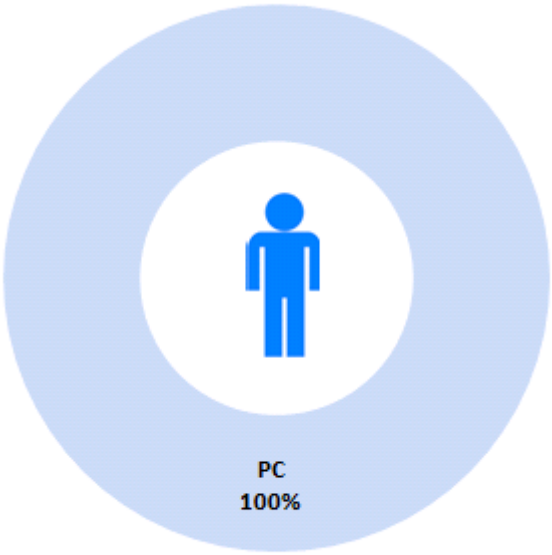
Source: Deutsche Bank, Company websites

The PC era was a two-device era, with the work PC and home PC treated as two separate entities in the eyes of developers, content owners and marketers.

It wasn't until very late in the PC era when social arrived that for the first time, the concept of mapping identity across various devices become an early endeavor. Companies like Facebook (and some email providers) tied the curated personal experience to the user profile and logged-in services came of age (regardless of what PC the user was on).

During the PC era, the average user conducted six to eight sessions per day (in 2006) all with their PCs, the remaining day parts were in analog experiences, not connected. With the emergence of smartphones and new connected devices, the number of sessions on PC has declined in the last few years.

Figure 4: Sessions In The PC Era (n=8 sessions per day)

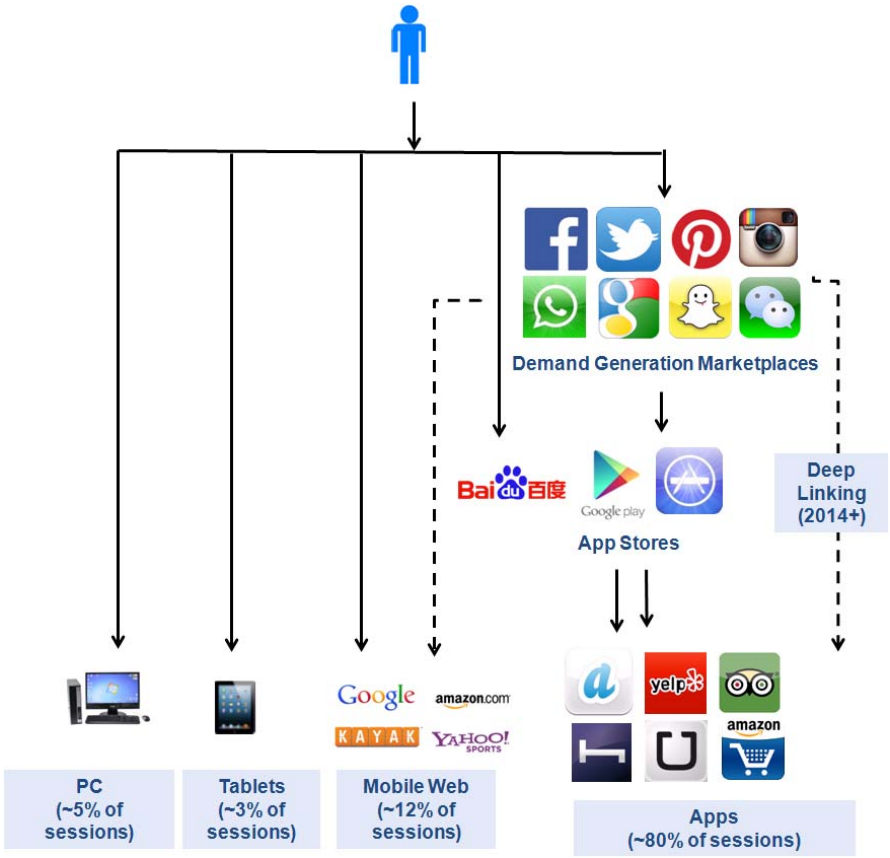


Source: Deutsche Bank, Using TecMark survey of smartphone vs. desktop browser users

The PC-only era ended in 2007 with the introduction of the iPhone, which ushered in a whole new era in digital consumption. Smartphones are the truly the killer innovation or change-agent, as they are: 1) always on always with you, and 2) open the ecosystem up to billions of users who previously had no connections to digital. From 2007 to 2014 users shifted to multiple device ownership, namely PC and smartphone and in some markets tablet.

Unlike the PC era, where users engaged on 17-inch screens with keyboard, mouse and browser, smartphones and tablets are optimized for touch and smaller screen sizes, and have many more signals that can be accessed and leveraged in new ways by software (location, camera, touch-screen, sensors, etc). Native software (Apps) takes advantage of the smartphone's functionality much better than the browser, hence apps have flourished. As a result, new gate-keepers like the app stores, launchers, messaging and social apps, and many others have emerged as the key traffic distribution channels in mobile.

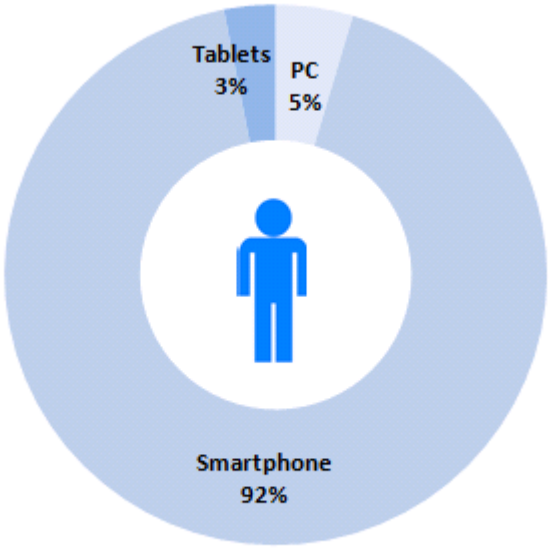
Figure 5: 2007-2013 – Traffic Distribution: Apps vs. Web, App Stores, Messengers



Source: Deutsche Bank, Company Reports , calculation of sessions is discussed later in the report

The other interesting trend playing out in the smartphone era is that the 1B+ users who had access to digital in the PC era have ported over to mobile and generally skew towards western markets (the largest percentage of the PC base). Most of these users are already aligned with Apple or Google in terms of operating system powering the device (and hence gate-keeper for various apps and phone features) and many default utility apps like Gmail, Google maps, Facebook, etc. In markets like India and China, where the next 1-2B connected users are on-boarding today, and where users have alignment with other internet ecosystems like Alibaba, Tencent, etc, the market is fragmenting. China has dozens of app stores and utility app providers running on Android open source, or custom modifications of it. India is earlier in terms of mobile penetration than China, and loyalty to the ecosystem (or brand) has yet to develop. This fragmentation and open playing field in emerging markets is allowing for many new entrants to flourish, including Xiaomi, MicroMax, OnePlus, CoolPad, Meizu/YunOS, and others (discussed further below).

Figure 6: Sessions breakdown in 2007-2013 Era (n=130 sessions)

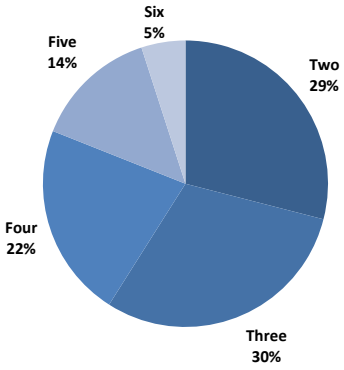


Source: Deutsche Bank, Company Reports

Google recently disclosed that the average Android user accesses their smartphone 120 times per day in 2014, illustrating the "always-on, always with you" nature of the medium. These 120 sessions are in some cases cannibalizing previous PC use, but many of them are new and incremental, happening in day-parts that were previously analog and not connected. We estimate that the average user in the smartphone era has around 130 sessions per day, across three primary devices: PC, smartphone and in some cases tablet and over majority of the sessions are on smartphones.

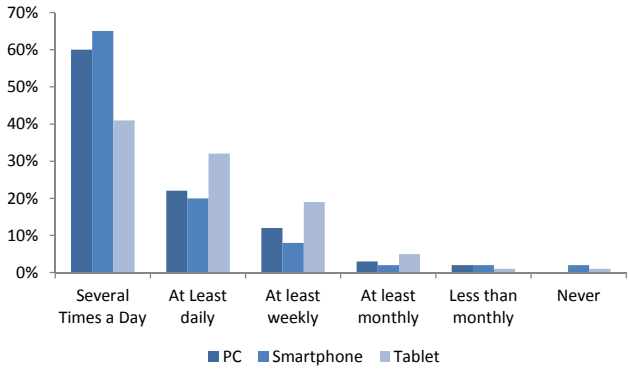
This is also highlighted by a number of consumer behavior surveys. A Survey of 1,500 US connected users by Forrester Research in July 2014 found that more than 70% use three or more devices. A similar survey found that ~65% of smartphone users use their device several times a day, vs. 60% for desktop/laptop users and 41% for iPad users.

Figure 7: Number of devices per user



Source: Deutsche Bank, Forrester Research Survey of 1500 US connected device users

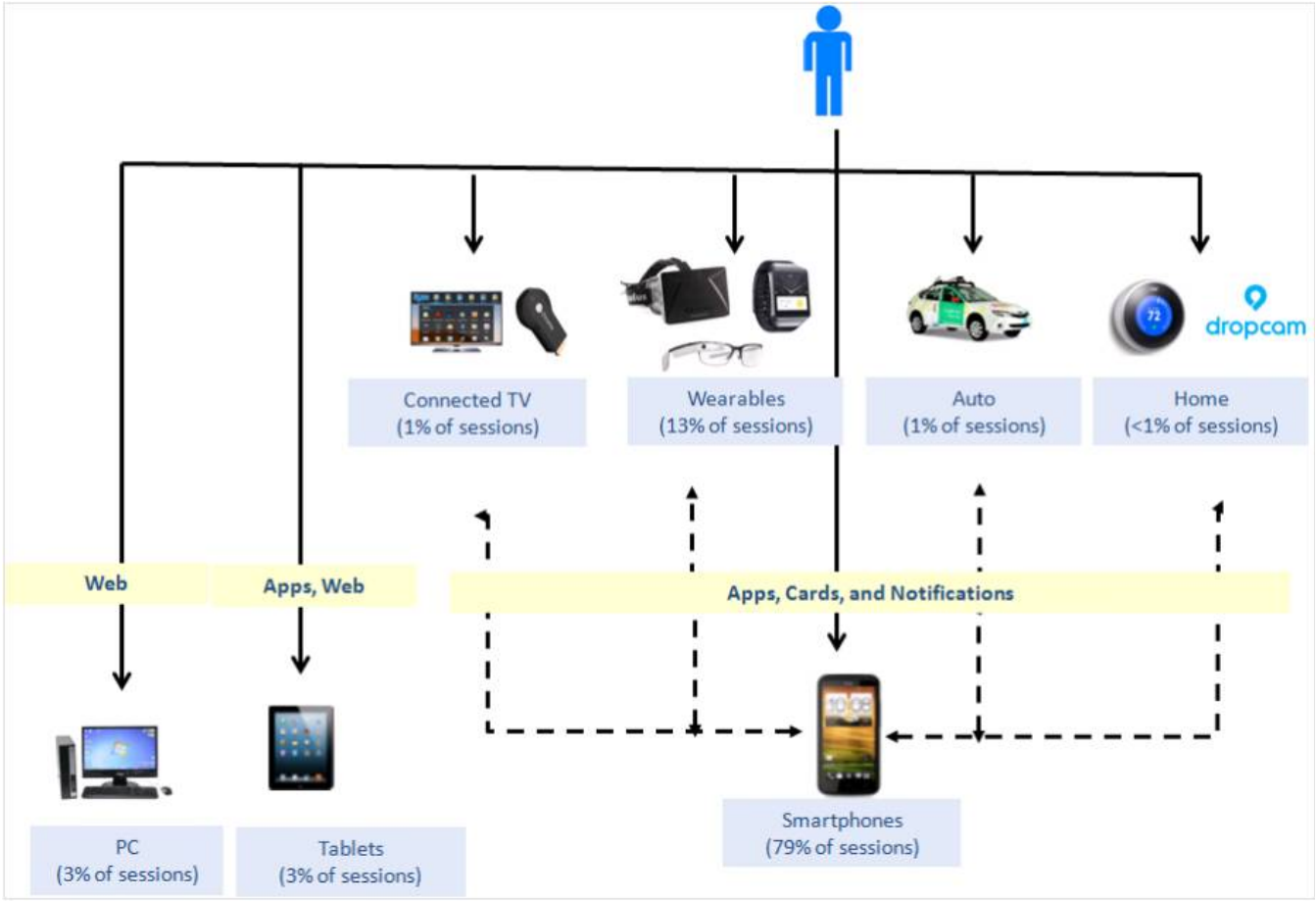
Figure 8: Frequency in use of various devices



Source: Deutsche Bank, Forrester Research Survey of 1500 US connected device users

Looking ahead, we expect digital interaction to shift from the three primary devices in the smartphone era (PC, phone, tablet) to the "Connected Life" Era, marked by many/many/many/many more screens, including wearables (watches, connected clothes, glasses), in-home smart devices (like TVs, streaming devices, Nest, Sonos, etc), virtual and augmented reality devices, and other use cases like in-car digital interfaces. Analyzing the technical plumbing for the new Connected Life era across these various devices is critical in understanding how traffic is likely to flow and which companies are likely to be in a position to increase engagement with users.

Figure 9: 2015 and Beyond – Traffic Distribution In the "Connected Life" Era



Source: Deutsche Bank, Company Reports, Methodology used in calculation of sessions is discussed later in the report

Over the previous two eras, we moved from singular PC browser to app/browser hybrid, and from 17-inch screens with keyboard/mouse to 3-inch touch-screens. The PC era was built of the back of standardized protocols like W3C, and the smartphone era is still working through the protocols around deep linking, app indexing and the various connective tissue between apps. The lack of standards and increasing fragmentation around devices, OS's, and apps in the Connected Life era is likely to only increase the complexity. This creates opportunities for new entrants to emerge.

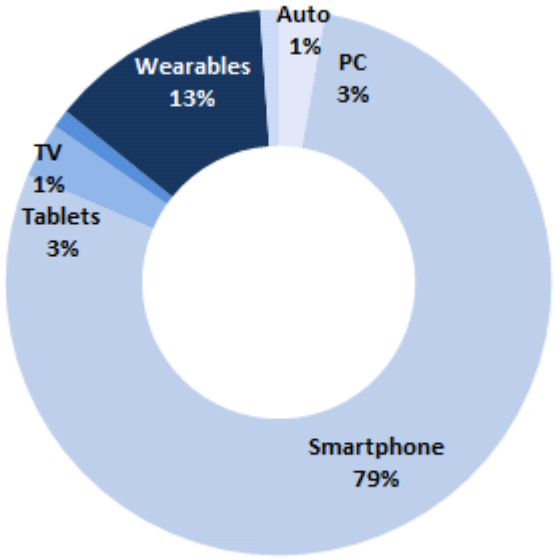
To illustrate, as mentioned previously, most new smart watches (iWatch, Samsung Gear, Moto 360, etc) ship with no browser but with light apps, and are tethered to a user's smartphone. The same can be said for the digitally connected car. Other wearables like fitness trackers are optimized for battery life and the sensors that pass information from device to app, and can be used to control other devices.

With this increased complexity as a backdrop, we break down the primary engagement models using three broad umbrellas: pull, push, and paid subscription. Pull is simple, its when the user takes action on a device like a smartphone and asks to receive information. Conducting a search (voice or text) or looking for directions are examples of pull engagements. The challenge with pull is that typing in keywords is not proving to be the pervasive behavior

on small screens outside of very specific queries, most engagement in mobile is shifting to Push. Hence, Push is where we see most of the action in the Connected Life, in terms of innovative engagement models. The other engagement model is paid subscriptions which is common on services like Spotify and Netflix.

There are a number of technologies colliding to improve push engagement: 1) Identity – logged in experiences that can be personalized and can be mapped across any device in the Connected Life is critical, 2) Cards protocols – most major mobile apps have created their own cards technology whereby app developers (publishers) can atomize content and push it into any environment: other apps, devices, lock screens, etc. 3) Deep linking – standards for connecting apps to other apps for quicker navigation is being implemented, 4) Enhanced notifications – similar to email from a decade ago in the PC era, notifications are becoming a primary means for driving re-engagement and surfacing content in new environments. All of these new innovations are reducing friction and improving the user experience across the Connected Life.

Figure 10: Sessions In Connected Life Era (n=183 sessions per day, 2020)



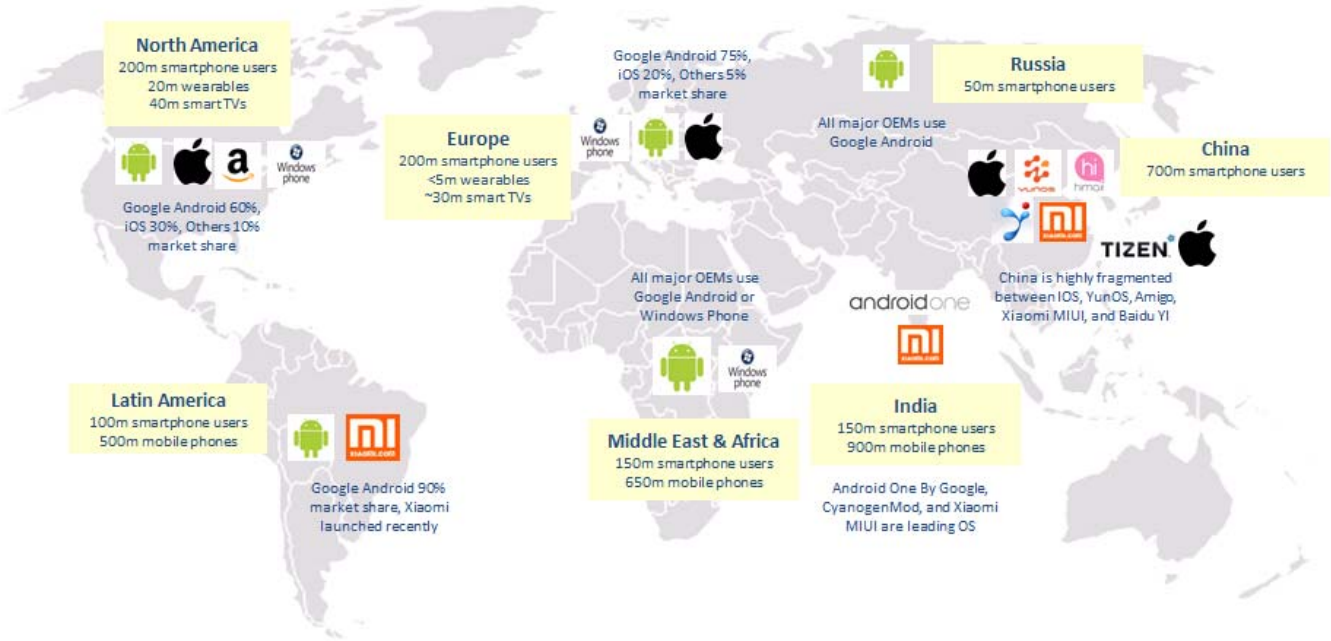
Source: Deutsche Bank, Company Reports, Calculation for session share is discussed in detail later in the report

As we move into many more devices in the Connected Life era, the number of digital sessions should increase dramatically vs. the prior era. We estimate that by 2020, the number of digital sessions could be as high as 183 throughout a single day with new form digital sessions created by smartwatches, connected TVs, and connected cars. Lots of new engagement opportunities are arising from these additional sessions, which we quantify in more detail below.

Who Is In Control In The Connected Life, Apps or OS? It Depends…

If we fast forward five years to a time when users globally are wired up with 10+ devices in their homes, cars, pockets, clothes and jewelry, on their wrists, etc, the next obvious question to ask is which companies are likely to benefit the most? Is it the hardware OEMs, the app developers, or the OS ecosystem enablers? The quick answer is all of the above, at the expense of analog. But if we work back from the inevitability coming in the Connected Life era, with all the new and awesome user experiences, we see several new gate-keepers emerging globally.

Figure 11: Leading Connected Life Ecosystems Emerging



Source: IDC, eMarketer, TNS Survey(Europe smartphone), GSMA Mobile, CCS Insights (wearable), Informa, Deutsche Bank

Illustrated above in **Figure 11**, the western markets are pretty well defined along the lines of Android and iOS. Apple controls the top ~25% of the market in US and ~15-20% in Europe for high-end devices and is likely to eventually push into lower price points and build out the breadth of products available. This is consistent with Steve Job's original Digital Hub vision in the early days, but with iPhone serving as the centerpiece of the hub vs. the Mac. Android is already branching out into TVs, cars, watches, on top of years of development in phones and and tablets. Unlike Apple who controls most of its device experiences end to end, approved-Android (which are devices that come with the latest version of the OS and the Google Play Services installed) is allowing OEMs to build their own apps and experiences into the various devices. This half-open, half-closed approach has allowed Android to create an environment of fairly rapid innovation via its OEMs, and has allowed the ecosystem to flourish across multiple price tiers and geographies faster than Apple's closed approach, in recent years.

The biggest anchor to approved Android innovation is speed and functionality. Google has wisely moved much of the innovation out of the OS layer and into the API and Google Play Mobile Services layer. This strategy has allowed for much higher performance levels of the newest Android devices vs. open source Android versions like Kindle Fire smartphone. It also has allowed Google more control over the app ecosystem that thrives on top of the OS and APIs. As a result of this strategy, approved Android phones are selling much better than open source forks. The ancillary benefit of selling lots of approved Android handsets, is that Google Search, Now, Gmail, Maps are the default utility apps within the Google Play Mobile Service layer (per agreements with OEMs) which allows for billions of apps to be pre-installed and adopted by new users.

Figure 12: Apple & Google Mobile Stack (for Approved Android devices)

Source: Deutsche Bank, Company Reports

The eastern markets (the largest being China and India) are evolving in a much different way. Google has no presence in China, hence the market for open source Android devices with proprietary custom ROMs is flourishing. A ROM is a layer above the OS that can be tweaked by developers. These devices have Android OS, but all the functionality and control sits on the layers above via the APIs default app settings – similar to where Google Play Mobile Services sits for approved-Android.

Many new successful companies have cropped up using this model, the leading player being Xiaomi. Xiaomi started with its custom Android ROM (MIUI) in 2010, then morphed into end-to-end hardware/software in 2011 with Mi One smartphone, which focused more on apps and services. Xiaomi sells the vast majority of its devices using a direct-to-consumer model, mostly internet sales on Mi.com and promoted through flash sales on popular social platforms like WeChat. The company has extended its ecosystem into phablets, wifi routers, streaming TV boxes, air purifiers, fitness trackers and other devices. Xiaomi has moved from China to many other emerging markets, the company is the fastest growing and most impressive companies globally in technology.

Ironically, this morphing of Android in China and other emerging markets is actually consistent with Google's initial vision for the software, but it limits the company's presence in many markets. We expect a number of new ecosystems, particularly from the BAT complex in China to emerge similar to Xiaomi over the coming years.

Alibaba looks especially interesting with YunOS (the Android ROM), its distribution capabilities via Taobao that are unmatched by any other outlet in China, its content relationships with Youku and its mobile assets with UCWeb, Autonavi, Alipay and Taobao. The company has three of the key mobile pillars across: search, shop, play and work.

Figure 13: Mobile Stack In Emerging Markets ("forked" Android)

Source: Deutsche Bank, Company Reports

As we look towards India and the rest of APAC, the market evolution is different than in China. Intellectual property rights are more heavily enforced, as we've seen recently with Xiaomi having legal issues in India for lack of licensing agreements. India is an important market to watch, as it has the largest potential future digital user base of any country.

In approved-Android markets like Korea and Japan, we see some similar morphing towards the China model, whereby large companies are building their own ecosystems on top of Android and offering a strong suite of utility apps and services.

It's not yet clear what model is likely to flourish in ex-China APAC, but it usually comes down to which company or structure is building the best performing products at each price tier. Google has been working on Android with thousands of engineers for the past decade, and Lollipop is a huge step forward in terms of functionality with its 5000 APIs running on top, and the

strong core utility apps, hence we see few ecosystems competing on features and speed.

However, Google's brand isn't as strong in some of these emerging markets, and often times at lower price points, the consumer on-boarding process often dictates who wins the distribution battle. Buying mobile devices in each country is quite different. In the US, consumers are increasingly buying online, but carrier retail stores and heavy carrier subsidies often means consumers buying their devices in carrier retail stores. These Android phones often come with the carrier and OEM bloat-ware apps, but Apple has been able to avoid this. In Europe, most consumers buy unlocked phones and switch carriers/SIMs regularly. In emerging markets, mobile devices are often purchased in physical stores and increasingly online by younger demographic. Consumers value brand recognition and look for attractive price points when purchasing a device. Similar to the west, many phones come with default settings. But there are many companies that can install apps over-the-top after the purchase, forcing the consumer to take their browser, app store, etc. and replacing the default provider.

Hence we see distribution deals playing a major role in which companies gain market share, on top of the usual features, functionality and performance that drive share.

Figure 14: Common On-boarding Behavior - Western vs. Emerging Markets

Source: Deutsche Bank, Company Reports

Finally, another interesting fact to consider as we see many new Connected Life ecosystems emerging in these various international markets, is that despite its tremendous brand and direct distribution capabilities, Amazon was unable to find the same kind of success via its Android ROM "fork" strategy with the Kindle Fire smartphone. This could have been a result of market timing (very late entrance in the west), the phone's features and functionality, or limited choice and breadth of the Play Mobile Services layer utility apps. It clearly wasn't a result of brand or distribution. So as we look at India and other APAC countries separate from China, it's going to be interesting to see whether Google can gain market share via the Android One initiative with approved devices wrapped in Play Mobile Services, or whether India goes the way of China where the forks take all the share (intellectual property issues aside). We currently think the latter is likely, but are watching objectively to see how things play out. Google has a much stronger presence and staff dedicated to India and other APAC countries than China, and has partnerships in place with most OEMs, so the company believes that India and other

southeast Asia countries are likely evolve similar to western markets vs. China. We'll see.

What About Apps vs. OS?

Controlling the OS is important because it ensures that the products across the Connected Life have a consistent look and feel, as Apple and Xiaomi have demonstrated. The other benefits are that the OS layer is often a data depository, an identity management layer connecting the device experiences to a single user (can store payment credentials etc), and has access to many of the device's push capabilities including enhanced notifications, launchers, etc. So we view companies that are in a position to control the device and the core user experience as very valuable longer term.

However, single-point solution apps and services can also flourish in this OS environment. Companies like Jawbone that help any user on any operating system improve their daily health regiments via and experience that combines a wearable with a mobile app on any OS is a good example. Social apps like Facebook, WeChat and WhatsApp that work across all OS's and devices, and that increasingly have access to device notifications and payment capabilities, can seamlessly exist on top of the Connected Life ecosystems. Apps that store identity, payment, and social graph data in the cloud are portable to any device on any OS. Some of these apps have significant mindshare among consumers (namely FB's ecosystem of apps) and we see a strong possibility that the cloud-based approach could allow certain companies (FB, Twitter, Tencent) to expand their ecosystem to many new business models in the future, without controlling but straddling across the OS layer. For these apps, it's all about trying to improve the user experience and increase engagement, which increases monetization opportunities on any device, discussed below.

What Determines If An Ecosystem Can Thrive?

We've witnessed a number of very interesting power struggles among the mega cap tech players in this space in 2014. Notably: 1) Apple is selling the Office suite (not surprising) and is getting its full 30% cut (very interesting to us), 2) one of Amazon's flagship apps was recently kicked out of the Google Play store because it also included its own App Store inside the app, a violation of Google's terms and conditions, and 3) Xiaomi has recently faced legal issues in India. While all three of these examples (and we could list many more) are completely unrelated, it piqued our interest around who has control of the Connected Life ecosystems? Does most of the control sit with companies that have immersive experiences and sit on top of existing OS's? Do the OS's themselves have a leg up on everyone else?

It's challenging to make broad generalizations when technology is changing as rapidly as it has over the past decade, but we think there are a number of factors, and the combination of those factors, that play a key role in determining who really controls the ecosystem, including:

- Does the company have a direct billing relationship with the consumer?
- Does the company manage the OS?
- Does the company manage the API's that developers can plug into to enhance their app's performance?

- Does the company have its own direct distribution model for selling products to consumers?
- How fast does the ecosystem advance, and which companies are influencing the technology advancements?
- Does the company have its own suite of apps, do users engage with those apps?
- Does the company have a strong brand?
- Does the company have adequate intellectual property?
- Does the company have the breadth of devices across a range of price points?
- Does the ecosystem have breadth of third-party developers innovating on top of it?

There are likely a number of other factors that play into the success or lack thereof for any ecosystem, but these criteria cover a lot of ground, and can be used to assess just about any company competing in the space. Below, we have stacked a few of the larger and emerging ecosystems side-by-side based loosely on the criteria we find important.

Figure 15: What Matters In Connected Life?

Source: Deutsche Bank

Where Is The Commercial Activity Taking Place In The Connected Life Era?

The OS, App or Browser?

Everywhere….

A key determinant of where potential economic value is across consumer internet is understanding where the commercial activity is taking place. With all the metrics getting thrown around describing what users are doing in the Connected Life, it can get very confusing for investors (and marketers). Starting points for the digital experience have evolved from Search to Social to Apps over the past decade, and looking forward, traffic distribution is likely to continue to shift to new interaction models like cards and notifications.

Time spent matters much less than commercial intent in advertising. To illustrate, a session on Google.com whereby the user enters the keyword "Nike

Running Shoes" is only around five seconds in duration from query to when that user leaves Google. That session likely was highly commercial, and depending on what geography the query was conducted in, may have generated a CPM in the several-hundred-dollar range. A session whereby the user sees a TV commercial from Nike during a news broadcast may be a 30 second ad during a 60 minute program, at a $30 CPM. The first engagement or session is highly commercial and short, the second is likely a little bit less commercial and much longer time spent. Hence, we look at sessions (ultimately ad impressions) and the commercial intent of the user in each session as key variables, and time spent as more of a correlated output.

With that as a backdrop, it's fairly easy to see how the commonly kicked around datapoint that 86% of time spent in mobile apps vs. 14% in mobile web is misleading in terms of the breakdown of where the commercial activity is taking place in the Connected Life. The commercial activity is happening everywhere: in mobile browser sessions, in app store and regular searches, and across contextually relevant and predictive push notifications.

Figure 16: Engagement Models In The Connected Life

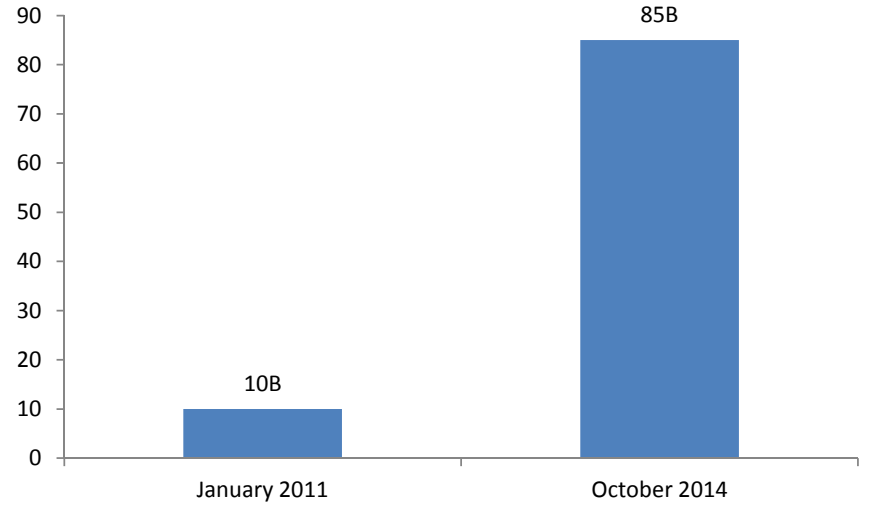
Source: Deutsche Bank, Company Reports

One of the fiercest debates is the future role of each of these engagement models in the future Connected Life era. As native mobile apps allow developers to create experiences that run faster and smoother while also leveraging the smartphone's native functionalities (such as camera, photos, accelerometer, etc) they have seen massive adoption. Many wearables are shipping without browsers, which brings about entirely new thinking of distributing content and marketing. As smartphones increasingly become the center of the Connected Life, distributing much of the content and messaging to any screen, the role of apps is becoming much more central, and the browser is being deprecated (outside of text-based media)

To illustrate, each of the main app stores (Apple App Store and Google Play Store) now have more than a million apps listed, with the number of

cumulative iOS app downloads exceeding 85 billion a couple of months ago (up from 8.5x from January of 2011).

Figure 17: Cumulative iOS app downloads



Source: Deutsche Bank, Apple

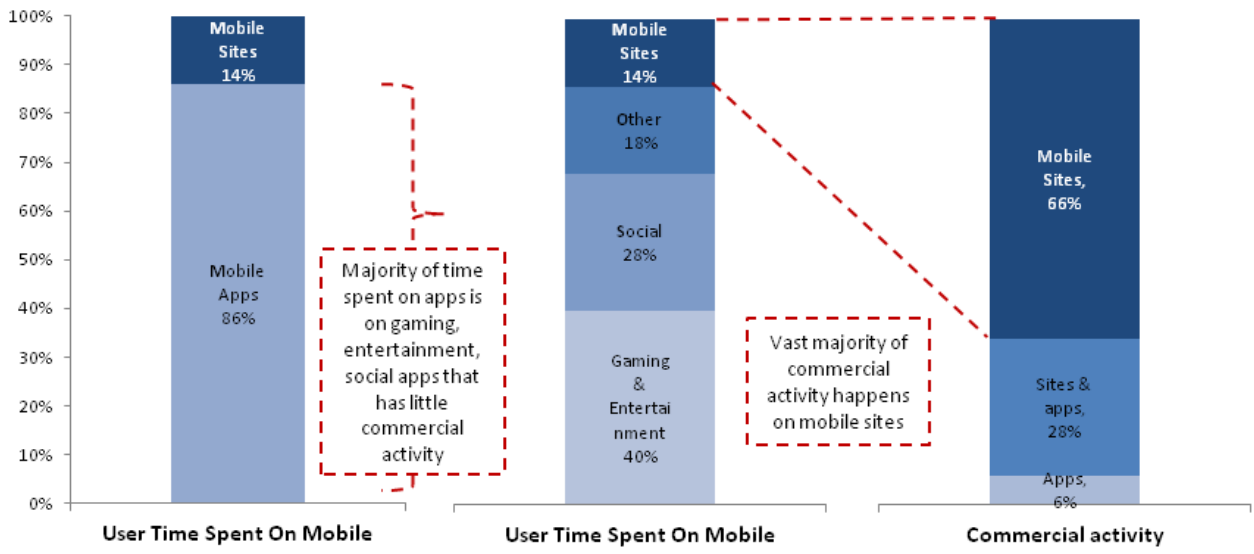
This explosive growth in mobile app usage has given rise to skepticism about the future of mobile web – and whether there is a future for it at all. A number of high profile proclamations by internet juggernauts have added fuel to the fire. Recall that Mark Zuckerberg called the company's focus on HTML5 development "its biggest mistake" – he was joined a few months later by LinkedIn by switching focus from HTML to native mobile apps.

These comments have certainly weighed on where leading developers are likely to allocate resources, with much more innovation happening in apps than in mobile browser. The output is the 86% vs. 14% ratio from Flurry.

But one important nuance is that this figure doesn't capture where a lot of innovation in commerce and payments is happening in mobile. New companies like Uber, Hotel Tonight, or even mobile gamers like King, which never had a website or web presence are setting the gold standard for app transactions. But these examples are a fraction of the commercial activity happening in mobile today. Many of the large and established web-first companies like Amazon, Booking.com, etc have extended their PC websites to mobile, and have also embarked on hybrid apps (discussed below) whereby much of the search and discovery takes advantage of the smartphone or tablets small touch screen, but the actual transaction flow happens on a web page.

Further, if we just break down the 86% vs. 14% into sub-categories, it further sheds light on where the commercial activity is taking place.

Figure 18: Time Spent Doesn't Equal Commercial Activity



Source: Deutsche Bank, Flurry data for time spent on apps and websites, Google chrome developer conference presentation for commercial activity

Beyond the commercial activity, the statistic in general paints a pretty dire picture for the prospects of mobile web consumption – more granular examination offers an alternative view.

Time spent in mobile apps is highly concentrated

Firstly, as shown in **Figure 18**, of the 86% time spent within apps – as we mentioned above, 40% is spent within gaming and entertainment (YouTube, Pandora, Spotify, etc.) apps and another 28% is spent within social apps (Facebook, Twitter, etc.). This means that 'productive' time spent on mobile – which we define as time spent in apps that help people accomplish tasks (utility, ecommerce, e-mail, etc.) – makes up less than 18% of time spent on mobile.

As a matter of fact, according to a recent Google presentation, 66% of commercial tasks on mobile take place on sites – and only 6% of commercial tasks can be attributed to mobile app activity alone.

Hybrid apps and apps with significant in-app browser activity

While hybrid apps are also counted as native apps (you can download them on the app store), they are essentially coded with web technologies (HTML, CSS and JavaScript) and only run within a native container. A study of over 7,000 developers (by VisionMobile 2014) that 15% of developers use HTML 5 beyond the browser, via hybrid apps or HTML5-to native tools.

Further, a number of highly popular mobile apps, including Facebook and Twitter, rely heavily on the use of their in-app browser (we have all clicked on those BuzzFeed or HuffPo links that open up the browser page within the Facebook app). We believe all the time spent within these in-app browsers are also counted as time spent within apps vs. the web. While we do not have an accurate estimate for how much of the total time spent within apps is spent within the in-app browsers, anecdotal evidence suggests 20-30% of time spent within these two apps is spent consuming web content. Further, a recent

study by Quantcast, the measurement/analytics company, found that nearly ***a quarter*** of mobile web views may be coming from in-app browsers running on Facebook or Twitter.

We believe the web is here to stay….but perhaps in a different form

We believe many of the factors that made web a successful platform on desktop will continue to be relevant in the mobile age. We believe large parts of the mobile industry has come to the realization that rendering all content within native apps is impractical and inefficient. Mobile apps are after all actual applications that require installation and consumption of varying amount of memory, which depending on the speed of connection and the device functionality could be a laborious process.

At the same time, the web continues to offer compelling value to consumers and publishers:

- **Discoverability of content**: Today, it is much easier to discover content on the web that it is within the siloes of mobile native apps. This is become web content is linkable and can easily be viewed from other sites (and apps) with a single click. Search engines and social media sites further fuel the discoverability of web content.
- **Low friction**: Installations are not necessary to view web content. No memory is occupied when the content sits on a webpage vs. an app.
- **More Safety:** Clicking on a URL is many times safer than installing an app. This is especially true on emerging platforms (e.g. forked versions of the Android).
- **Memory consumption:** The latest data from ABI Research shows that the global average app size across all categories was 23 megabytes in September, 16% more than in March.

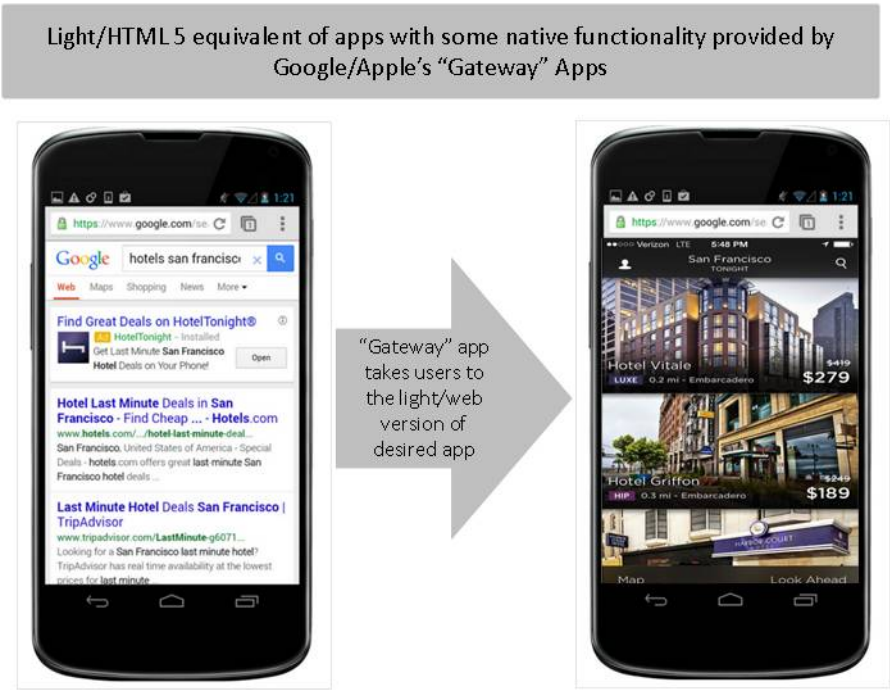
It is because of the above reasons that we have seen an emergence of "Light Apps" in emerging markets. To solve for 2G and slower 3G networks, Baidu unveiled its version of Light App last year. Light App is essentially a directory app for other apps – think Yahoo in late 90s for websites. By developing 'lighter' web/HTML enabled applications that mimic the native experience without requiring the user to download the full app, developers could take advantage of the Baidu Light App's reach to get distribution. Those users that become regular users of these apps would likely download the native version or continue using the lighter version, both of which would be good outcomes for the developer. Although light apps would offer an inferior user experience/functionality compared to their native equivalents, Baidu says Light App would provide some level of native functionality, such as location-based services, active the camera/phone call, save to the cloud for these apps to improve the overall user experience.

Figure 19: BIDU's Light-Apps

Source: Deutsche Bank, Company Reports

Google and Facebook (and, going forward, Twitter) have also embarked on light app and web app strategies for their core apps in emerging markets. WhatsApp may be the poster child for a globally relevant speedy light weight native app that spans any device type, any connectivity speed, and consumes little phone resources.

Figure 20: Light vs. HTML5 Functionality



Source: Deutsche Bank, Company Reports

Mobile web browsers are evolving

The recent Google Chrome Developer Summit provided glimpses into improvements being made in mobile web browser technology that could significantly boost mobile web's appeal to both users and developers.

Faster graphics performance has always been one of the largest advantages of native development. The Google Chrome team announced that it is making strides in lowering the amount of time it takes for the browser to render every frame down to 60 frames per second. Such improvements should enable various forms of animations and special effects (Slide drawers, Pull to Refresh, etc) that were previously only possible through mobile native app development.

We also believe there is ongoing work at W3C (the international standard setting body for web development) in order to standardize web technologies that allow access to many of the features found on smartphones. Many of these features including accessing the phone's camera, managing a device's address book, and messaging were only available through native apps.

Identity, Cards & Notifications – The Next Phase Of Engagement In The Connected Life

Presenting users with "push" marketing messages in the form of banner ads was the first widely adopted monetization mechanism for companies in the early days of the PC era. With few tools at their disposal to gather relevant data on users, and given the absence of advanced ad targeting technology, the performance of these ads were crude at best. Soon after, search was determined to be a highly effective way of targeting users with the right message as people drove in numbers to search engines to "pull" information and could be served with highly relevant ads. Overture (acquired by Yahoo!) was a pioneer in the space and Google later mastered the art and began its period of dominance over the technology, which continues to this day.

Entering the Connected Life era, push becomes critically important, and will likely increase its share of overall marketing messages sent to users across devices. In a multi-device universe, the conundrum of reaching people with the right marketing messages at the right time has evolved considerably. On one hand, identifying users across a fragmented device universe with highly variable form factors has created challenges. On the other side, mobile devices arguably provide orders of magnitude more relevant signals on the "perpetually connected consumer" that could be leveraged when identifying what commercial messages to serve.

Identity - Cross-device identification and data are key

When it comes to identifying users across devices, there are three main primary approaches:

- **Deterministic Single-Source:** Identifying users across devices through a single source of information, which could be a large platform in this case such as Facebook, Google or Twitter. Many users on these platforms log into their accounts on multiple devices and as a result the platform can link those devices to that user. This approach has a very high level of accuracy and depending on the reach of the platform's user base could capture a large portion of the internet user base.
- **Deterministic Multi-Source:** This approach relies on identifying users through patching of data from multiple platform partners. A common approach is to "pool" hashed e-mail addresses users provide to various publishers and connect those to those users' device IDs.

- **Probabilistic:** Draws inferences without access to specific inputs by the user and based on inputs such as IP addresses/Device IDs, GPS data, etc.

Figure 21: Various approaches to cross-device identification

Approach	Description	Examples	Accuracy
Deterministic: Single-Source	Massive "walled garden" platforms with log-in info on and off their platform	Facebook, Google, Twitter, Apple, and Amazon	90-100%
Deterministic: Multi-Source	Smaller platforms without direct access to consumer information - have to stich together data from multiple publishers to determine identity	DSPs, Ad Networks, Data Managmenet Platforms, etc.	80-95%
Probabilistic:	Platforms that make statistical inferences at cross-device identity based on various inputs	Drawbridge and TapAd	80-95%

Source: Deutsche Bank

We believe among these three different approaches, the larger app publisher and OS platforms relying on first party data are massively advantaged given their reach and accuracy of their approach. Further, we believe identifying a user across multiple devices is absolutely critical in the Connected Life era, and few can do it. Building out and maintaining profiles on users are where most of the heavy lifting needs to be had. Again, we believe the OS ecosystems and social app platforms with real-time access to dynamic first party data are at an advantage.

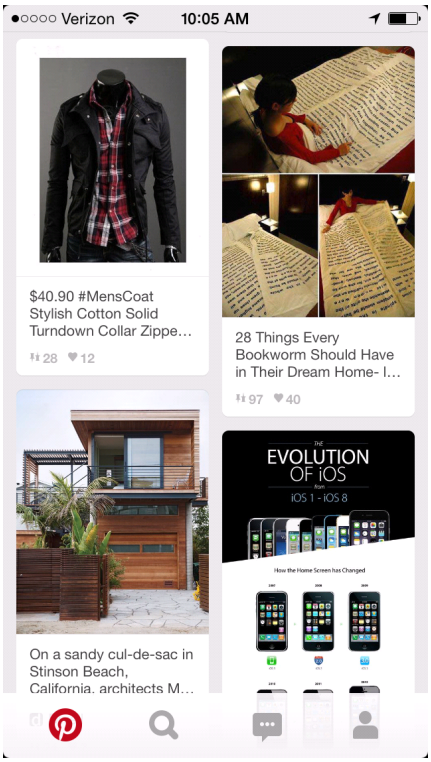
Cards, Notifications, and Push In Connected Life

We are seeing an increasing number of mobile publishers redesign their sites/apps away from pages toward cards. Cards are an aggregation of many pieces of content presented in a format that people are familiar with – they have been used as content delivery vehicles for many years, dating well back into analog eras. They allow for effective organization and dissemination of content.

In the digital age, Apple was one of the first to experiment with the concept, through HyperCard, at a time when the market was not fully ready to accept it. HyperCard was a Mac application developed in late 80s and early 90s, that leveraged the concept of virtual cards holding data - similar to how they would in an actual rolodex – with each card containing interactive objects and data.

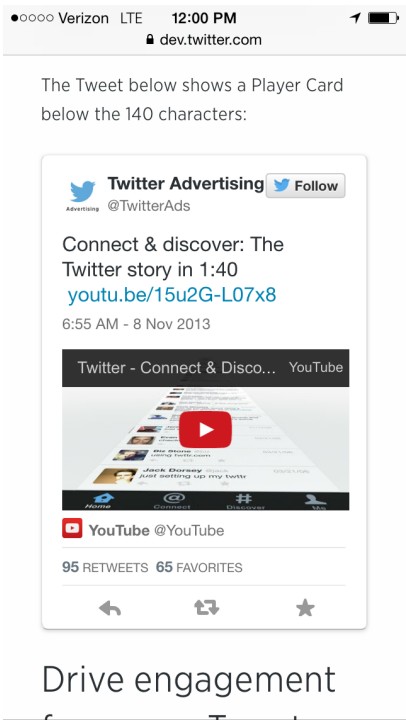
Today, we are seeing apps and sites increasingly leverage cards to present their content. Google, Twitter, Pinterest, Facebook, a number of other leading apps are all using card protocols to various degrees. Further, while cards are largely currently being used as static objects – they are increasingly becoming dynamic in nature. Twitter cards now allow embedding of videos, slides, music and all sorts of actionable items.

Figure 22: Pinterest Pins (Cards)



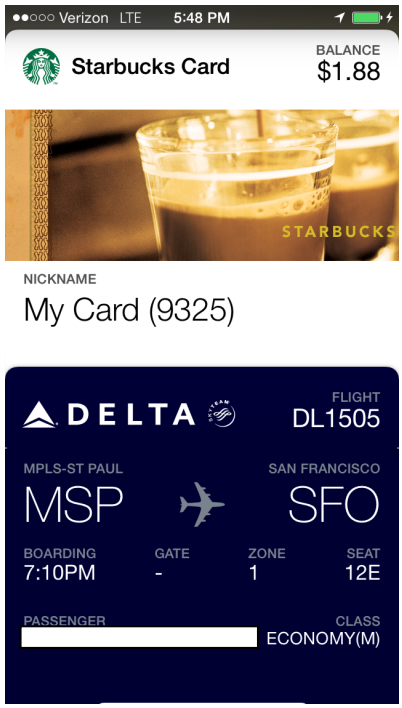
Source: Deutsche Bank, Pinterest

Figure 23: Twitter Card



Source: Deutsche Bank, Twitter

Figure 24: Apple Passbook



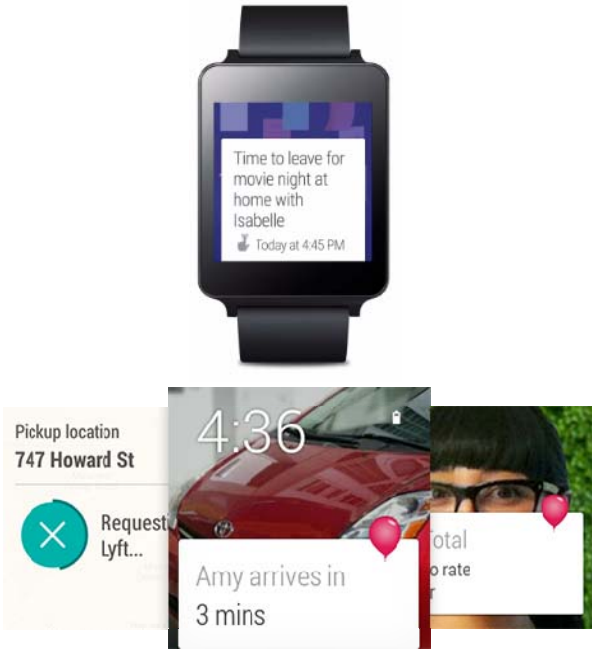
Source: Deutsche Bank, Apple

Content being broken down in atomized pieces enables their presentation on screens of all shapes and sizes. On mobile devices, cards can be stacked vertically or through a stream. As containers, they can carry other cards within them. For example, a notification card from Facebook could have an ESPN video card imbedded within it. Or an eBay seller could have a Buy-It Now card imbedded within an eBay card, imbedded within a Twitter card.

Cards are critically important to the Connected Life era because they help publishers and marketers standardize content across multiple screen sizes and engagement types. Mentioned previously, wearables (watches, glasses, etc) are being shipped without browsers; hence, cards protocols are used to push content and messages into these new environments, illustrated below.

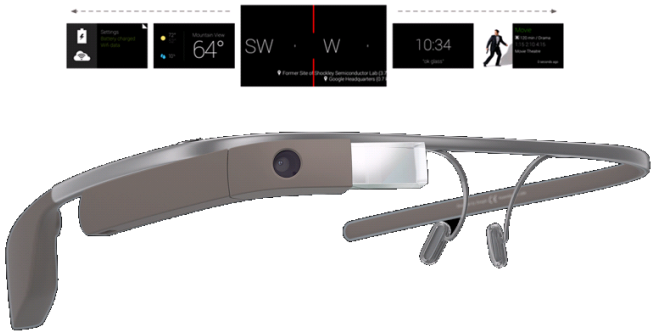
The importance of this technology can't be understated. It's massive. One of the biggest challenges for content discovery and distribution is that nearly every app today has to be installed, and that most apps don't communicate with one another. Deep linking solves the communication and connective tissue problem, and cards allow users to see content or take actions in any environment on any screen, from any publisher or developer. If I want to tap my watch to order pizza, that transaction is facilitated by a notification and a card. If I want to listen to an audio clip from Soundcloud in my Twitter feed, BLE'd into my Beats headphones, one day this will just happen, without all the downloading and installing of applications. If I want to order an Uber from my phone via Google Maps, but don't have the app installed, a card can facilitate.

Figure 25: Cards on a smart watch



Source: Deutsche Bank, Google

Figure 26: Cards are the primary way of delivery messages on Google glass



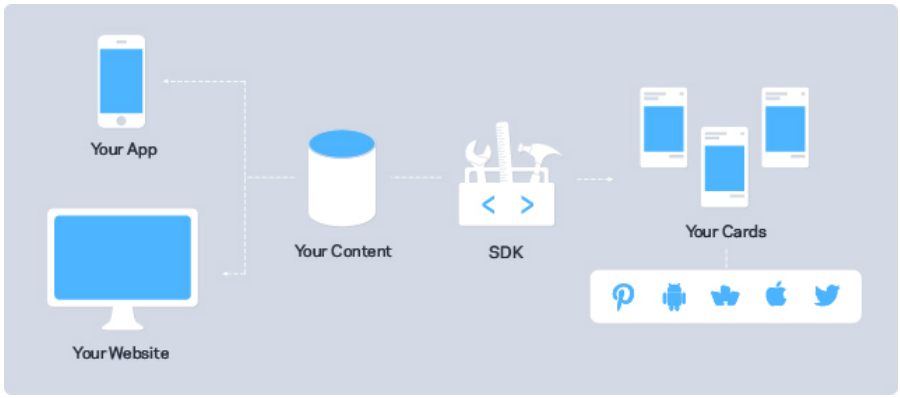
Source: Deutsche Bank

New startups emerging around the card concept

As part of our research into cards, we spoke with a couple of start-ups who are building entire businesses around the concept of cards – both with strong visions for the future of engagement.

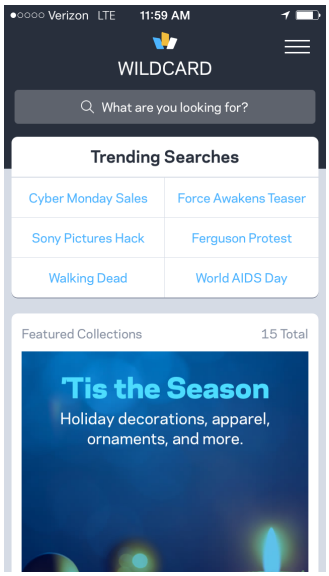
WildCard is a New York City-based start-up that believes cards could act as the middle ground between mobile web and native apps. The company's mission is to have publishers and advertisers package their content into Cards (JSON objects), which are structured data instead of unstructured HTML content – therefore allowing for faster, smoother rendering of the content within various platforms (**Figure 27**). Similar to web pages, each Card will have its own address and could permit for a whole host of different actions (Buy, Sign-up, Search, etc). The company has also developed its own browser/search engine app – which is entirely based on cards.

Figure 27: How Wildcard works



Source: Deutsche Bank, Widcard

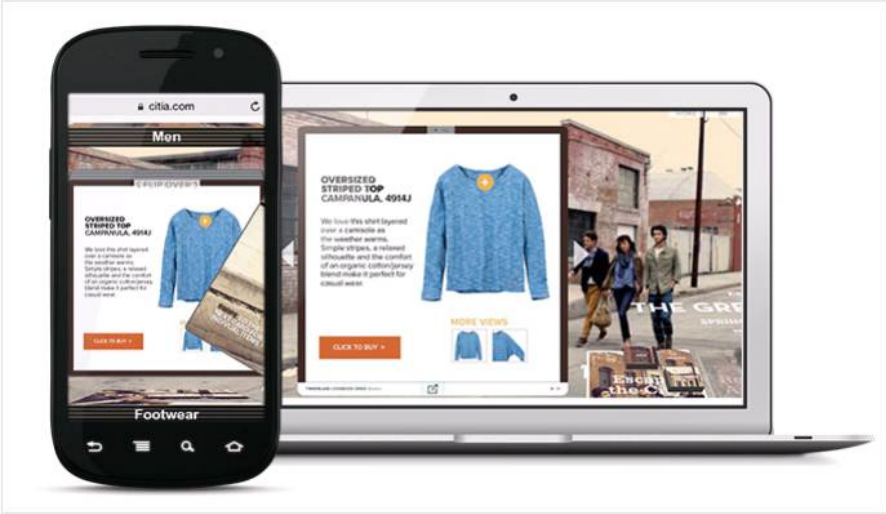
Figure 28: Wildcard iPhone app



Source: Deutsche Bank, Wildcard

CITIA cards is another NYC-based start-up that is developing a SaaS-based application that helps publishers/advertisers to package their content into card streams. CITIA's philosophy is that in order to render truly native advertising experiences in social, you need an advertising medium that resembles feeds. As a result, marketers can package their content into card streams, which can be opened up on any site or social platform through links to CITIA's pages. CITIA's approach is slightly different than Wildcard's as it renders these cards using HTML formats presentable within existing browsers.

Figure 29: CITIA cards rendered on mobile and web



Source: Deutsche Bank, CITIA

Why Are Notifications Powerful?

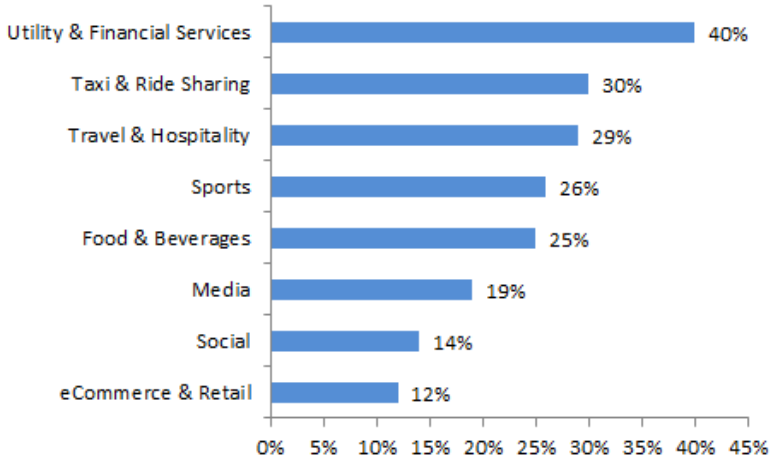
Notifications have been labeled the email of the mobile era, as they are pushed to users and are tools that allow developers to increase engagement, the same way email push has been used in the PC era to re-engage users with websites. The best app developers know how to prudently use push notifications to

generate engagement, and not cross the "spammy-ness" line. Notifications can be enabled and managed at the app or the OS level, and Google, Apple, Facebook, Twitter and many others all have embarked on strategies to use push notifications to increase user engagement.

Studies have shown that push notifications deliver strong engagement rates when used appropriately. Apps that are everyday critical use-cases for consumers such as financial services, ride sharing, and travel have seen high app engagement rates from push notifications, illustrated below in **Figure 30**. There are three important factors to consider when using push notifications 1) timing the notification, 2) targeting with right content, and 3) managing the right frequency. For example, Uber uses push notifications to alert the consumer when the car arrives. On the other hand, push notifications on sports category and ecommerce have low engagement rates for apps likely because they are often served up despite the user asking for or needing the service at the time, hence are less personal or targeted.

It's still early days for notifications, kind of in the "wild west" stage of development, so we expect this tactic to become increasingly spammy as more marketers adopt the media in the near-term, but over the longer-term, notifications are likely to prove to be incredibly valuable for app developers in the Connected Life.

Figure 30: Push Engagement Rates By Industry



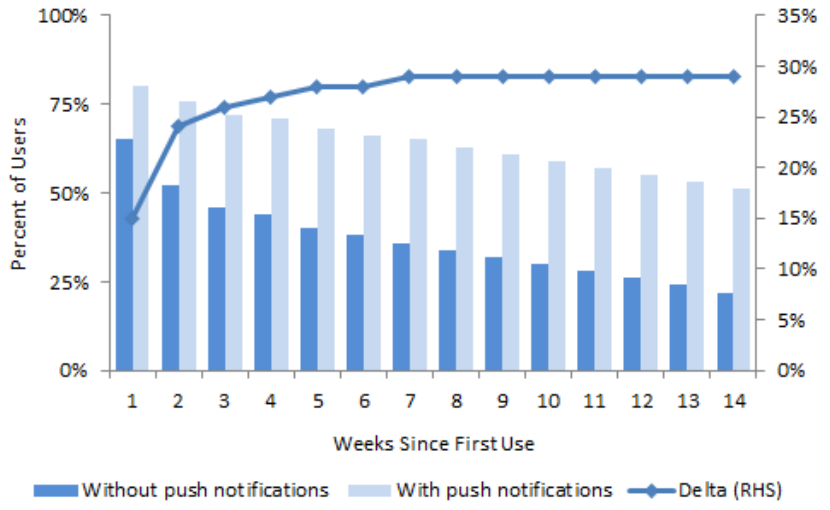
Source: Deutsche Bank, Kahuna Group

Push notifications also drive higher retention

Push notifications when used appropriately can also improve the retention rate for mobile apps. App developers spend enormous amounts of marketing dollars on app install ads to acquire new users. However, many app installs driven by these ads don't convert into a valuable subscriber. A study by Kahuna Group found that only 10% of the users acquired using paid app install channels become valuable users over time. Data shows that when app developers use push notifications, however, it improves the retention rate for the app. As shown in **Figure 31** below, on average, push notifications (when implemented appropriately) increased retention by over 25pts. Kahuna Group analyzed two sets of users for this study for the same mobile app: 1) users who were sent push notifications and 2) users who were not sent any push notifications by the mobile app. For this specific app used in this study, push

notifications increased week one retention rate from 62% to over 77%. As weeks progressed, using timely push notification boosted retention rates even further. By week 14, retention rate for users who were sent push notifications was almost higher by 30pts.

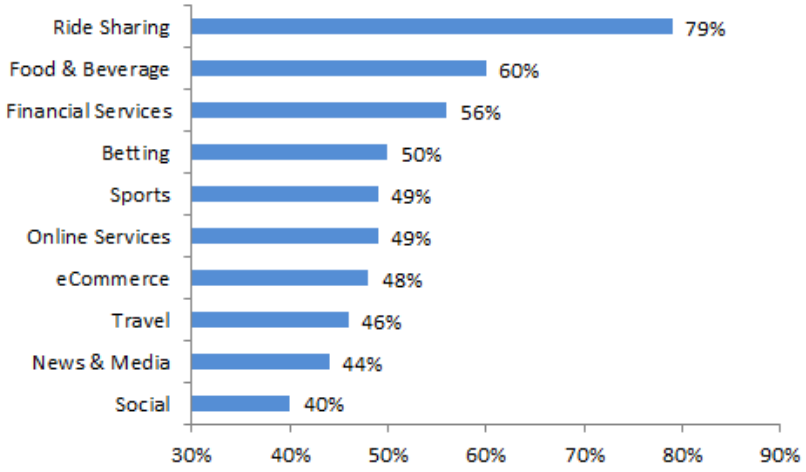
Figure 31: % of Users retained between 1-14 weeks since first use with and without push notifications



Source: Deutsche Bank, Kahuna Group

It is important to note that users ultimately control opting into required permissions to enable push notifications. iOS and Android ensure that apps obtain required permissions for push notifications when the app is installed by the users. Users can revoke these permissions at any point for an app through app settings. **Figure 32** below shows the push notification opt-in rates for apps under different app verticals. In addition to having high engagement rates, ride sharing and food & beverage apps have the highest opt-in rates at over 75%. This is probably because users inherently prefer to be alerted by these services either when their car arrives or when their food is delivered. Social media and news related apps have the lowest opt-in rates, which is likely because users prefer to access these apps directly and proactively instead, and the content firehose coming from social apps can become overwhelming and spammy pretty rapidly.

Figure 32: Push Notification Opt-in rates by Verticals

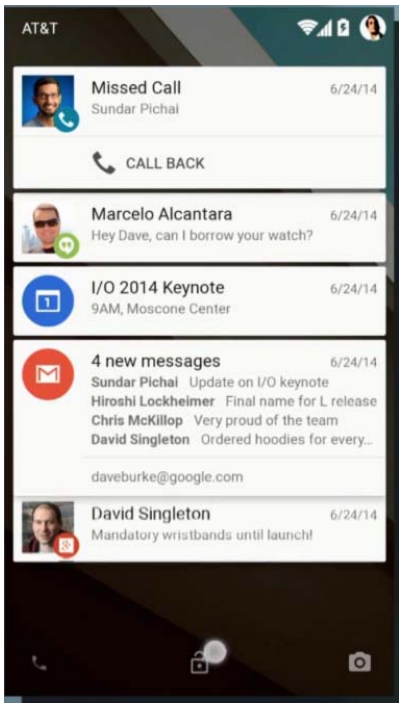


Source: Deutsche Bank, Kahuna Group

Notification tray becoming the next news feed?

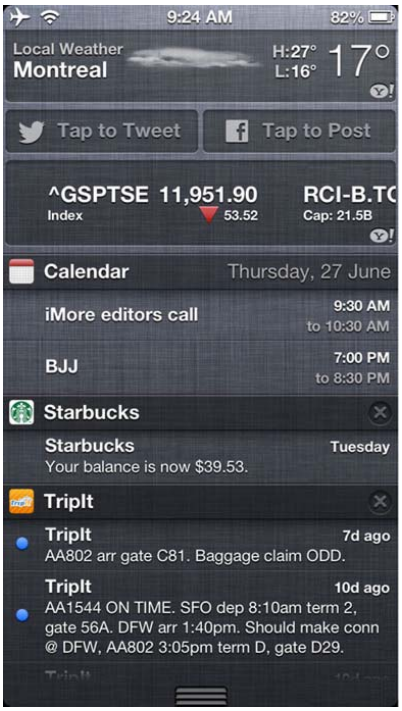
In a nutshell, we are seeing notifications go from just being signposts to other places to being actionable, interactive cards. Looking at what iOS and Android are doing with notifications surfaced to lock-screen and home screens, it becomes easy to see a future where users can spend entire mobile and Connected Life sessions interacting solely with Notifications. We believe this could morph into the new "feed" in the same way that launchers surface content to users on an opt-in basis, vs. the traditional newsfeeds inside native apps. With cards and notifications, users could potentially be able to send e-mails, shop for goods, share content with their social network, all through their enhanced notifications or launcher apps.

Figure 33: Android Lollipop Enhanced Notifications



Source: Deutsche Bank, Google

Figure 34: Notifications on iOS



Source: Deutsche Bank, Apple

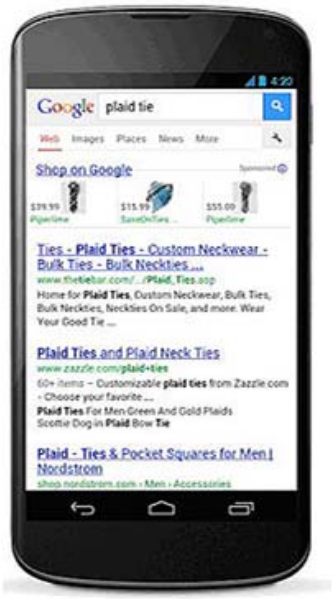
Quantifying The Value Of A Connected Life User

Each User Is Worth ~$1500 In The Connected Era

With all the innovation happening across the software layers mentioned above, and all the new ways to engage with users across these many new device types in the Connected Life era, the next logical question to ask is "what is this all worth to an ecosystem?" Below we attempt to answer that question from the standpoint of software, services and advertising. Importantly, we do not attempt to quantify the hardware opportunity. What we attempt to quantify is once Apple or Google or Xiaomi has a user in its ecosystem, what kind of ARPU is likely to be generated from all the software, services and advertising opportunities.

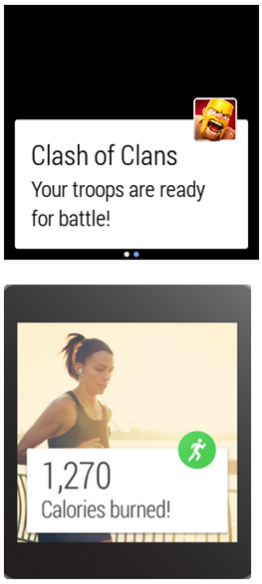
As we mentioned above, given how engagement models are changing rapidly in the Connected Life era, we firmly believe the right approach when assessing the monetization potential per user is measured in terms of sessions (not time spent). We further analyze the respective monetization potential for different engagement models (push vs. pull vs. paid) on various devices. Breaking down user sessions based on commercial intent and the ad engagement approach on various devices is important because different engagements and behaviors monetize at different rates. For example – a search on Google for a commercial term carries a very high eCPM, whereas a newsfeed ad on Facebook or Twitter may not carry the same level of user intent. If we extend to ad formats we are likely to see in the Connected Life era like push notifications and card-based offers, displayed on smaller screens, the commercial intent of these engagements is going to fragment further. Lastly, a number of new services are being introduced on mobile devices for the first time, and those subscriptions and in-app-purchases carry very high revenue per session and eCPM equivalent rates. For example, if a user pays $10 per month for a Spotify subscription, and accesses the service three times per day (~100 times per month) each session would amount to around $0.10, or the equivalent of a $100 ad eCPM.

Figure 35: Example of a pull session



Source: Deutsche Bank, Google

Figure 36: Example of a push session on smartwatch & smartphone



Source: Deutsche Bank, Google

Figure 37: Paid subscription model

Source: Deutsche Bank, Spotify

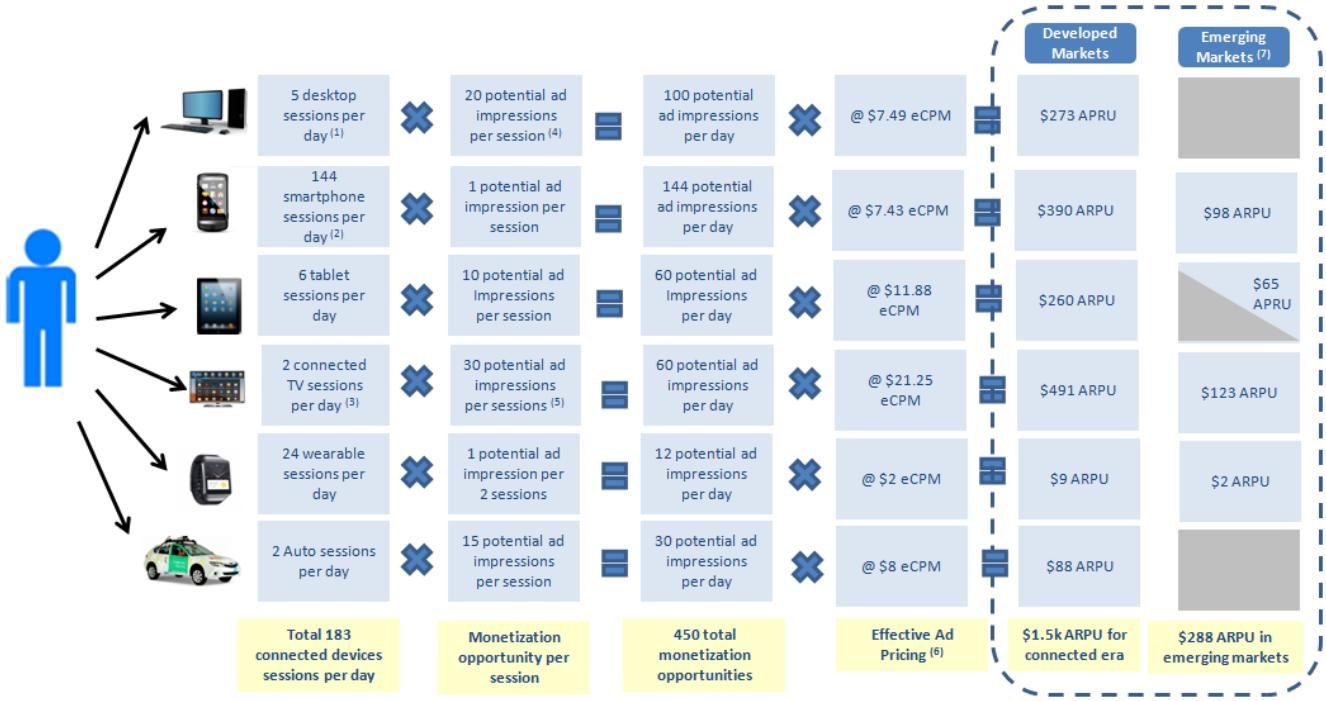
Our framework to estimate the value per user on a connected device ecosystem involves the following steps on a high level.

- **Step 1 - Estimate total sessions:** As noted previously, we refer to sessions as the number of times a user accesses the device. Google noted during its I/O conference that the average Android user accesses their smartphones 120 times per day (some higher, some lower) so we use that as a based-line for all smartphone sessions. For other devices (PCs and tablets), we've used a number of data sources to estimate the average number of sessions per device, and for newer devices yet to be broadly adopted, like smartwatches, wearables and connected home devices, we have made our own estimates in measuring potential session count.
- **Step 2 – Estimate ad impression opportunities:** We arrived at total ad impression opportunity across each of these devices based on ad load potential (per session) for various existing equivalent media types.
- **Step 3 – eCPM across devices:** Once we have estimated the total number of ad monetization opportunities per user across the various devices, we calculated the effective monetization rates using industry average rates for push (display ad average value by device type), pull (search ad average value by device type), and subscription models.
- **Step 4: Value per user:** Finally, we forecast the above metrics into 2020 to estimate value per user across devices by 2020. We further segment the ARPU based on where the user is located. We have lots of proprietary data on the like-for-like ad formats across various geographies, but for simplicity, we've measured emerging market users at 1/4th the equivalent eCPM vs. developed markets.

It is important to note that this quantification is just for illustrative purpose and there are number of inputs which are based on a wide range of assumptions and industry averages. We also do not add any hardware or device revenue in our calculations, only software, services and advertising. Our objective behind this exercise is to establish a framework to evaluate the value per user in the Connected Era.

Figure 38 below illustrates our findings.

Figure 38: What is the value of a Connected User (2020)

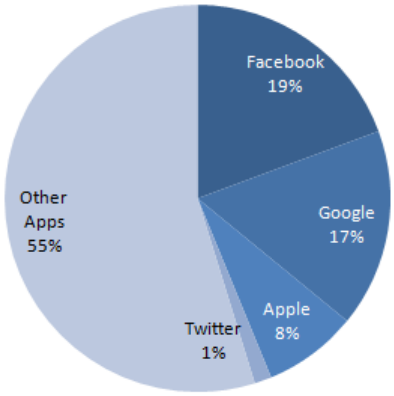


Source: Framework by Deutsche Bank, TecMark survey, Google, Gartner (for tablet sessions), ZenithOptiMedia, Nielsen, and Company Reports
(1) TecMark survey on mobile vs desktop use (assuming to decline by 1 session further by 2020)
(2) using 120 Android sessions per day and estimating 20% increase by 2020 and a small cannibalization from other devices
(3) ~2 hours of TV viewing per day vs. 5hous on average for US
(4) estimated based on Google search results per day per user + display ad impressions viewed per day
(5) the number of 30 sec ad slots per hour on TV assuming 25% ad content per TV hour (current US average is 30%)
(6) using average CPM rates across Google search, display ads (ZenithOptiMedia), and paid subscription (Spotify), TV eCPM determined by average cost for running 30 sec slot and the estimated reach, assuming smartphone is 90% of PC
(7) assuming ¼ APRU for emerging market consistent with historical FB monetization rates

Smartphone Share In 2014 Among The Bigger Players

As mentioned above, Google noted at i/o that on average, Android smartphone users access their devices 120 times a day. These 120 sessions include a wide range of activities such as checking Facebook, SMS or WhatsApp messaging, viewing and replying emails, listening to music, checking Twitter, watching videos on Youtube, and searching for directions on maps. Very little research is available in terms of the breakdown of these activities across the major app ecosystems, but we attempt to do so based on proprietary data and estimates. in **Figure 39** below.

Figure 39: Global Share of Smartphone Sessions by Company (ex-China, 2014)



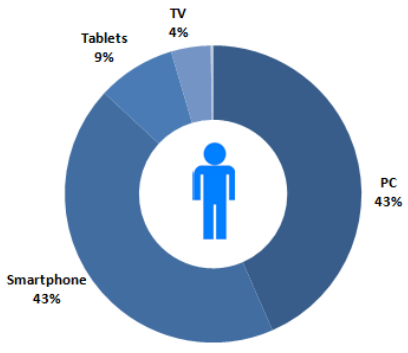
Source: Deutsche Bank, Company reports, Sessions share excludes China users, Session share is estimated by property for each company. Google sessions include Mail, Maps, Chrome, Search, Messenger, and OS Commercial sessions, Facebook includes FB, WhatsApp, Instagram, Hangouts, Apple includes Safari, Maps, iMessenger, and OS sessions.

Ad Impression Jump-Ball Across The Connected Life

We extended the above framework one level further from a per user basis, to an aggregate basis across the total addressable market of ALL users of ALL device-types from today (2014) to 2020. Currently PCs and smartphones almost have equal potential ad impression opportunity (this is explained by a much higher ad load for PC sessions vs. smartphone sessions), and tablets together account for majority of the total since other devices are relatively small in the ecosystem.

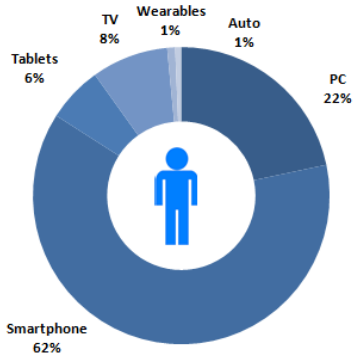
But in the next few years, the shift towards smartphone should accelerate from users coming on in emerging markets. Smartphone usage in terms of sessions per day (120 currently) is also estimated to grow further as the performance and use cases expands further. More importantly, total smartphone subscriber base is expected to go from 1.7B today to closer to 3B in 2020. During the same time, we expect the share PC to decline modestly, resulting in smartphones gaining nearly 20pts in the share of total ad impressions by 2020.

Figure 40: Mix of total potential ad impressions by device (2014)



Source: Deutsche Bank estimates, eMarketer, IDC, Digital TV Research, HIS Automotive Device estimates: PC (1.7B), smartphone (1.7B), Tablets (500m), Connected TV (330m)

Figure 41: Mix of total potential ad impressions by device (2020)

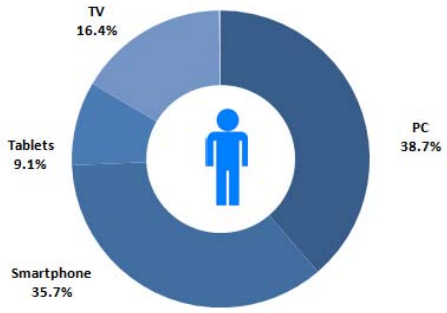


Source: Deutsche Bank estimates, eMarketer, IDC, Digital TV Research, HIS Automotive Device estimates: PC (1.5B), smartphone (3B), Tablets (700m), Connected TV (950m), Wearables (500m), Auto (150m)

How does it look in terms of ad dollars opportunity?

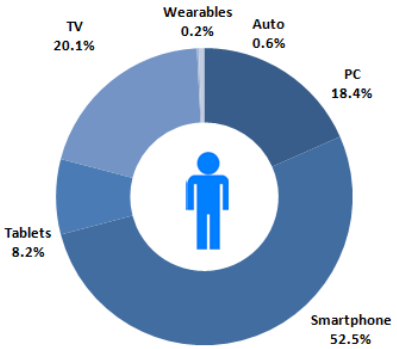
Figure 42 and **Figure 43** below illustrate the breakdown of total ad monetization opportunity (in terms of revenues) across different devices in the Connected Life era. It is important to note that these figures illustrate the total potential ad monetization and not what is currently being realized. The key point here is that monetization rate varies across different use cases and devices because the nature of the ad units is evolving for each type of connected device. Take smartphones for example. They account for 44% of the total ad impression opportunity but account for only 23% of the total advertising opportunity due to the lower monetization for push advertising (vs. pull or paid). Connected TVs on the other hand account for 5% of the total potential ad impression opportunity currently but represent a much bigger share of ad revenue opportunity, as those users are much more captive and the screen size affords much higher eCPM (over 4x that of the typical ad units on smartphones). Over the next 5-6 years we expect a big share of ad opportunity shift from PCs to smartphones, connected TVs, wearables, and connected Auto as usage on these devices shift.

Figure 42: Potential Ad Revenue Opportunity (2014)



Source: Deutsche Bank estimates, eMarketer, IDC, Digital TV Research, HIS Automotive
Device estimates: PC (1.7B), smartphone (1.7B), Tablets (500m), Connected TV (330m)

Figure 43: Potential Ad Revenue Opportunity (2020)



Source: Deutsche Bank estimates, eMarketer, IDC, Digital TV Research, HIS Automotive
Device estimates: PC (1.5B), smartphone (3B), Tablets (700m), Connected TV (950m), Wearables (500m), Auto (150m)

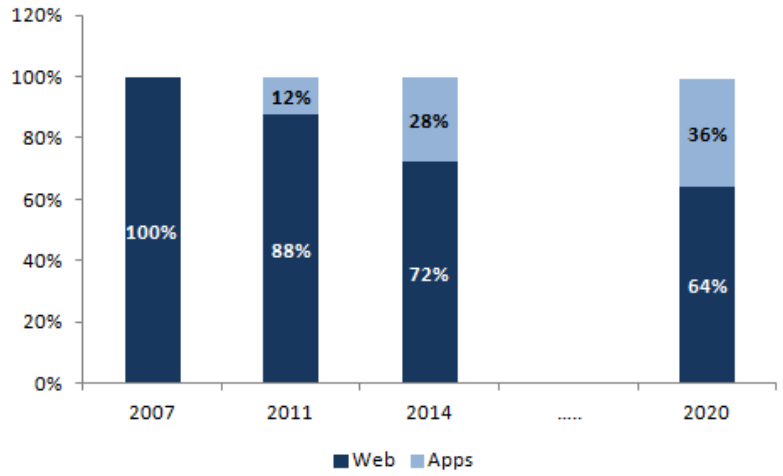
It is quite possible that in the next 10 years, smartphones could become just as powerful as today's PCs measured by computing power and storage, hence we expect to see further cannibalization of PCs, consistent with what is happening today.

Does App vs. Web Matter? Not Really, It Comes Down To Commercial Intent

We think the structural shifts around content distribution and marketing are going to blur the lines as we enter the Connected Life era. Cards replace the need for users to "install" apps, notifications allow for marketing messages to be pushed to any screen, and identity solves problems for users throughout the day before you even open the digital device. In that context, we think the debate around whether the world is going app vs. web is becoming less important. What is important is where is the commercial activity happening, across which devices, which sessions, and which companies are best positioned to get in front of the user at those key times. With that as a caveat, we see the world shifting to one where commercial opportunities arise in both places. In 2007, there were no smartphones and all ad opportunity was exclusively on browsers. In the last few years, share of ad opportunity on apps increased steadily to 34% as smartphone usage increased to 2B users

worldwide. In the next few years, as smartphones and new devices such as wearables continue to grow, we expect apps to further gain share of ad revenue opportunity, illustrated below in **Figure 44**.

Figure 44: Breakdown of Ad Opportunity Between Apps vs. Web On All Devices



Source: Deutsche Bank estimates, eMarketer, IDC, Digital TV Research, HIS Automotive
Forecasts assume opportunity as PC (100% web), Smartphone and tablets (75% web & 25% apps),smartwatch, auto, TV (100% app)
Device estimates: PC (1.5B), smartphone (3B), Tablets (700m), Connected TV (950m), Wearables (500m), Auto (150m) for 2014
PC (1.5B), smartphone (3B), Tablets (700m), Connected TV (950m), Wearables (500m), Auto (150m) for 2020

Google

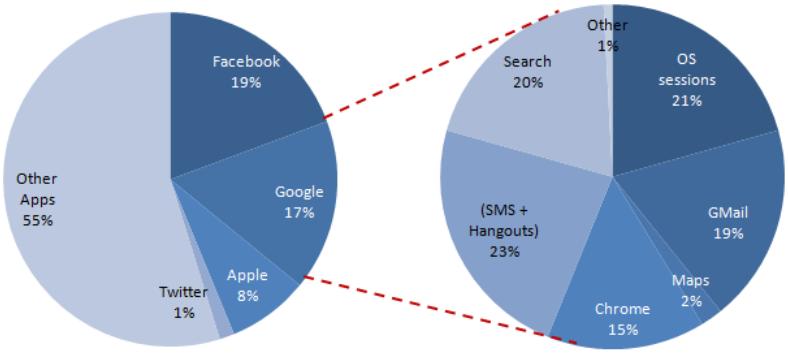
Android Everywhere

Like every other company competing in the ecosystem battle, Google's motivations can be explained by where their business is strongest: providing free software and monetizing via advertising. However, in contrast to the PC or smartphone eras, Google's revenue model has evolved to include several new areas: payments (Google Wallet), subscriptions and digital goods (App Store), and hardware (Nexus, Android One), on top of the legacy model of advertising (search, Youtube, ad tech, etc).

Google and Apple are the furthest along in building out the Connected Life ecosystems in the Western markets, while Xiaomi and several others are competing in the East. Google was admittedly late (and lucky) with Android gaining its real momentum nearly 4-5 years after iPhone came on the scene. But the open ecosystem approach leveraging R+D not just from Google but from the many global OEM partners, has allowed Android to flourish.

Google has the widest breadth of mobile apps of any company aside from Facebook. "Real" mobile statistics are hard to come by, but Android's influence can be seen in install volumes disclosed by the app store, with only 6 apps worldwide having crossed the 1B install mark, including 5 from Google (Search, Youtube, Maps, Gmail and Play) and core Facebook. If there is one area we see as potential risk to Google's strategy it could be around bundling their own services into Android with aggressive terms, there has been press reports that this could raise regulatory red flags, but let's keep in mind that all these services are provided for free and are one-click away from not being used.

Figure 45: Google Sessions Share In Connected Era



Source: Deutsche Bank, Company reports, Sessions share excludes China users, Session share is estimated by property for each company. Google sessions include Mail, Maps, Chrome, Search, Messenger, and OS Commercial sessions, Facebook includes FB, WhatsApp, Instagram, Hangouts, Apple includes Safari, Maps, iMessenger, and OS sessions.

Given how transformational the shift to mobile has been and how critical it remains entering the Connected Life era, for the entire internet ecosystem, we believe Google has been the most active at ensuring its continued relevance. We believe the company's efforts are multi-pronged and focus on:

- Ensuring the competitiveness of the Android ecosystem vs. iOS and forked versions – through 1) providing competitive and rich products at all price points throughout the spectrum (higher income Western customers as well as those in developing countries). 2) A renewed focusing on design and providing guidelines to ensure users using apps on Android and Chrome get a consistent experience. 3) Moving the innovation to the API and Play Mobile Services layers of the stack, which creates ecosystem lock in and better performing devices vs. the open source android peers. 4) Maintaining strong partnerships with OEMs globally. 5) Continuing to innovate around its popular default utility apps. 6) Extending Android beyond smartphone to all digital form factors in the Connected Life.
- Creating a central repository of "identity" across products and devices.
- Ensuring Google remains central to information discovery and content distribution, and that that strategy ports from the PC era to the smartphone era to the Connected Life era. Googles web index and search engine was the start. App indexing was introduced to organize and unlock content within silo'ed apps. Android APIs also help content distribution.

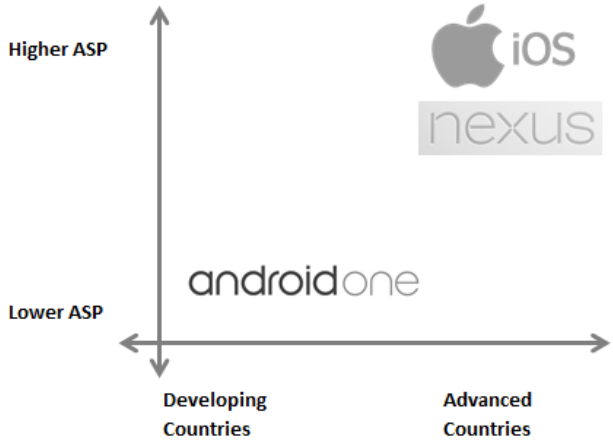
Below we will touch on each major portion of Google's strategy.

Ensuring The Viability & Competiveness of Android

Google is working diligently to solidify Android's future as we move from the smartphone era to the Connected Life era, amidst the increasing competitive dynamics globally. Its original strategy for Android is playing out nearly as Andy Rubin envisioned it, with a strong ecosystem of app developers, OEMs, and users with Google sitting in the middle. The environment Google has created is very dynamic (more so than Wintel even) whereby the company has pushed all of these forces build together, in a competitive state, and the collective ecosystem advances faster as a result. Android's ascendancy vs. iOS since 2007 is a function of this competitive state, the breath of products across price points and geographies. In short, Android moves faster than iOS, and while this comes with many roadblocks and headaches for Google, it seems to have been the right strategy to date.

Nexus pushes innovation every year at the high end, using the best features in Android to set the standard for the rest of the OEMs. And while Android One is new and less proven, it should be a strong competitor to the AOSP forks in emerging markets, as it comes with Google Play Mobile Services and local distribution. Google sees the emerging markets (ex-China) evolving the same way as in the west, with a very open and competitive set of Android OEMs driving innovation, and consumers making decisions around best performance across the various price tiers. Brand strength and distribution will play roles in emerging markets, but we view Google as well positioned.

Figure 46: Android's Breadth and Depth



Source: Deutsche Bank

The other strategy Android is pursuing directly ties with our Connected Life theme, and was unveiled at i/o this summer. Android is porting its OS from smartphones and tablets to now include wearables "Android Wear", cars "Android Auto" and connected TVs and streaming sticks "Android TV". This horizontal extension comes on the back of Android Lollipop, the biggest leap forward Google has take in the past several versions.

A critical factor that Android is embracing, similar to what we have seen from iOS, is that the smartphone plays a central role across the Connected Life devices. Most devices are tethered to the smartphone via BLE, and have light weight native apps running on their screens. As we discuss below, the enhanced notifications feature in Android manages a lot of the engagements on the various browser-less screens. Importantly, app developers do not have to submit separate APKs for each of the new device types that emerge, they all run off the core Android OS and smartphone app, with small modifications.

Figure 47: Planting The Seeds For Connected Life Era

Source: Deutsche Bank, Company Reports

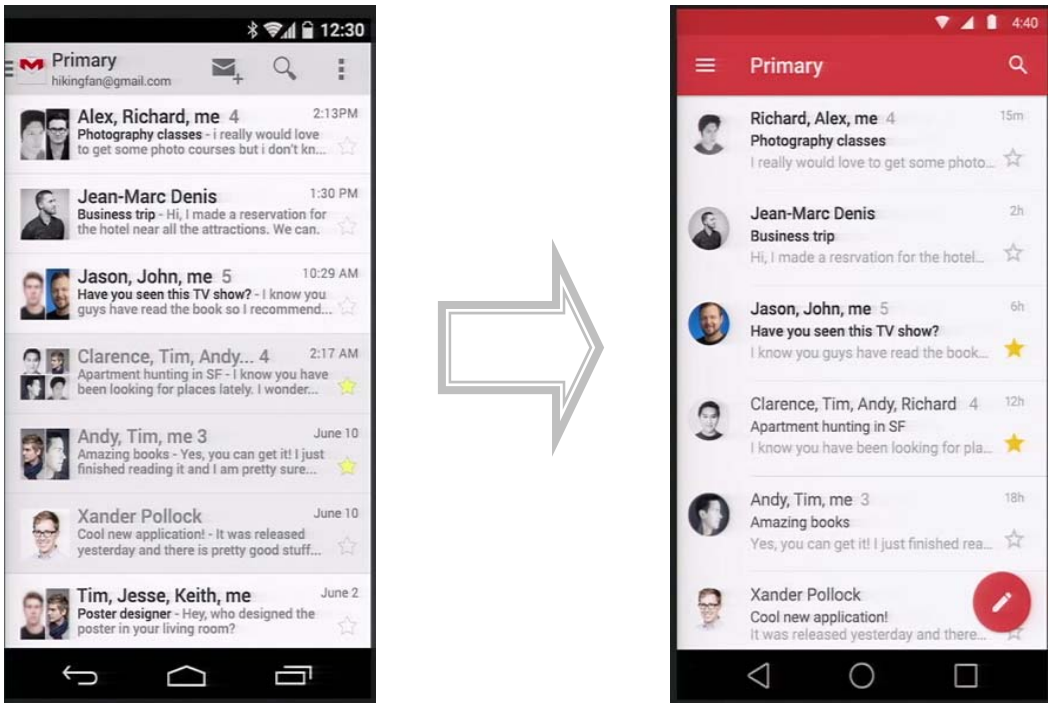
Renewed Focus On Design and Consistency

One of the big criticisms around Google's open approach with Android is that it has led to too much fragmentation. User experience on one device could be dramatically different than on others, because OEMs and carriers are allowed to add apps and other services. The only consistency is the Google Play Mobile Services suite of apps and APIs. Form factor, design and pre-loaded apps make for an inconsistent feel, in stark contrast to iOS's very unified approach.

Prior to Larry Paige taking over the CEO role in 2011, Google was not really known as a design company as its priorities were focused on 1) simplicity and 2) utility. Since taking over, Google has significantly expanded its efforts in design so that not only it keeps up with competition, but the look and feel of its products is consistent across. In 2011, the company launched a project code-named "Kennedy" to redesign Google and provide a consistent design language. Three months after Larry took over, Gmail was redesigned with a newer and slicker look. Various design leads from different groups would come together on a regular basis to ensure that they were following similar principals across Google. The company's design principals began to focus on mobile and touch, critical for the transition from the PC era to the Smartphone era.

Following years of development, during I/O in June 2014, Google unveiled a completely new design language for Android, Chrome OS, and all web apps called "Material Design". Material Design is a set of design criteria/rules inspired by studies of paper and ink. The key areas of focus in material design are surfaces, edges, light, dimensionality, and movement – the combination of these attributes create a look and feel that is three-dimensional, animated and smooth.

Figure 48: Old Gmail look and feel (left) compared to Gmail experience with Material Design (Right)



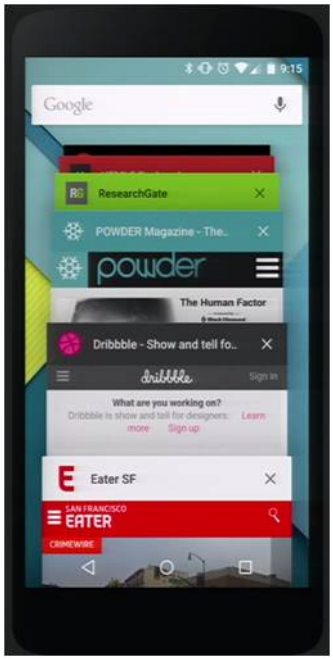
Source: Google

Material Design has provided Android 5.0 Lollipop, deemed by the company as the largest and most ambitious release for Android, with an immersive look and feel. But we believe Google's ambitions behind Material Design extend beyond just providing a better UI within its mobile OS. We believe the company's longer-term vision is to extend a set of design criteria followed by all Google apps (and third-party apps) across various platforms in order to create a consistent user experience.

Through the Polymer Project, Google is encouraging third-party developers to leverage the elements of Material Design by providing these developers with the basic building blocks and APIs. This push is not only to encourage developers to deliver a superior user interface experience – but allow for more seamless transition between apps (both web and native apps) across all sorts of devices.

We have already begun to see this effort in Lollipop, where the user can view web pages/apps outside of chrome app in the Overview (previously called Recents) (**Figure 49**). This feature should bring further visibility to web content and un-silo the web from the browser app.

Figure 49: "Overview" From Android 5.0 – Blurring App & Web Content



Source: Deutsche Bank, Company Reports

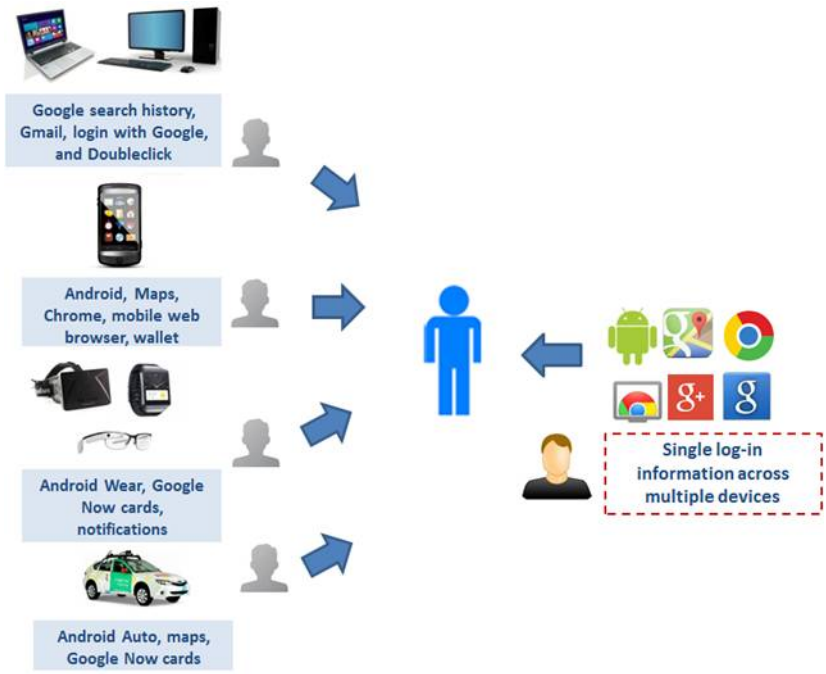
Identity Critical For The Connected Life

Identity has become a key battleground among the larger OS and app ecosystems globally. This trend was born out of necessity as users were increasingly signing up for more and more software applications on PC and smartphones, and a single sign-in is the only way for the app developers to unify the experience across multiple devices in the smartphone or Connected Life eras.

Google's strategy around identity has evolved from Google + to single-sign-on (SSO) across any and all Google services or apps, on any device (PC or smartphone). Android on-boarding requires a Google SSO account to access Play app store and various other Google services, upon activation of any new device. Hence over the past several years, Google has been able to build identity for the 1B+ MAUs across Android and the other various logged-in Google services (Gmail, Google +, etc).

In addition to SSO, Payment apps like Google Wallet, may play a key role in Identity across devices in the Connected Life era when it comes to transactions and shopping. We only need to look at the penetration in China of mobile payment solutions like Alipay (discussed below) to see how payments could be a competitive advantage (potentially gatekeeper) for many western companies.

Figure 50: User Identity Parameters



Source: Deutsche Bank, Company reports

Google Reach:
Android: 1B active devices
Google search: ~1B installs
Gmail: ~450m users
Chrome: 400m users

Pundits often criticize Google and Facebook for collecting too much information for advertising purposes, which is true to some degree, but Identity is more about creating a common frictionless experience across any device. Not only can Google or Facebook serve more targeted ads in front of users when they have identity data, but more importantly, there are many benefits towards personalizing the service that the users enjoy from identity. Google's recommendations in search results and across Google Now can be better curated with identity data. Facebook's newsfeed relies 100% on the user's social graph.

So as we move into the Connected Life era, a world marked by users engaging with dozens of devices throughout the day, all of which communicate with each other, identity is going to be a critical piece toward providing that personalized experience. Few companies have it, and those that do are well positioned, Google being one of them.

New Engagement Models For Connected Life

We've touched on a number of these new engagement models above, but specifically for Google, the Connected Life is likely to bring about many new opportunities for publishers and marketers to get in front of users throughout the day.

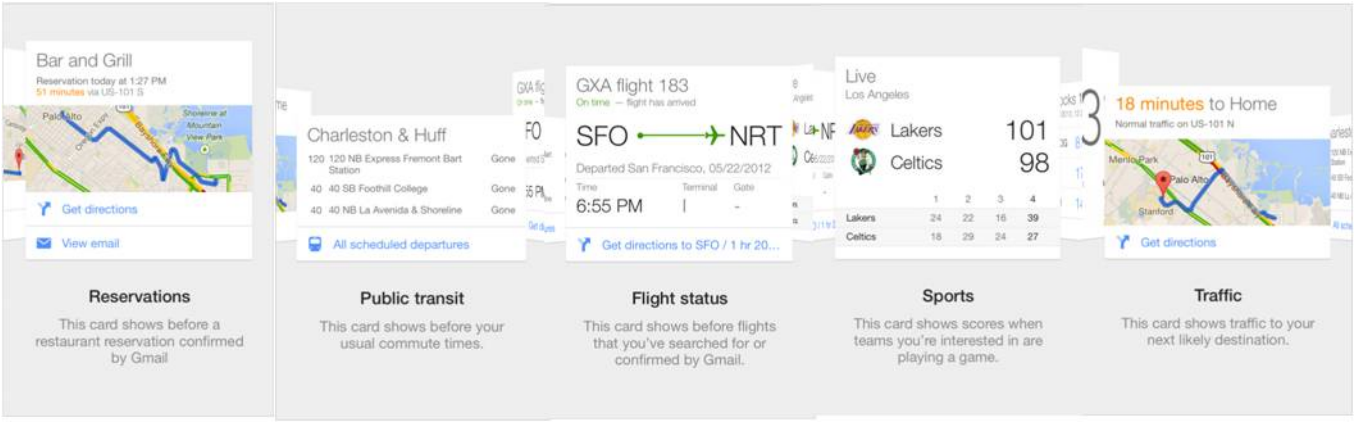
The technical underpinnings of this shift have already been laid down for the most part at Google, including: 1) indexing websites and apps, 2) ranking that content for best relevancy in any given context, based on a query or a predictive push, and 3) creating new ways to surface content across any device type in the Connected Life.

Google Cards & Enhanced Notifications

Out of all the major platforms, we believe Google is now by far the most active in the development and utilization of cards. Back in 2012, the company launched Google Now which used cards as its primary UI.

Google Now aggregates behavior and intent information on a user from various Google services and presents that information on an opt-in basis at the right time. Currently, Google Now provides users with a handful of Cards such as reservations, public transit, flight status, sports, and traffic (**Figure 51**) and only integrates with only a few Google products such as Gmail and Maps. For example, a user can search for a destination on Google Maps on his desktop and immediately upon opening the Google search app, he will be presented with the same route recommended on desktop. The service is much more native on Android with users being able to also activate notifications from Google Now to their home screen on Android devices.

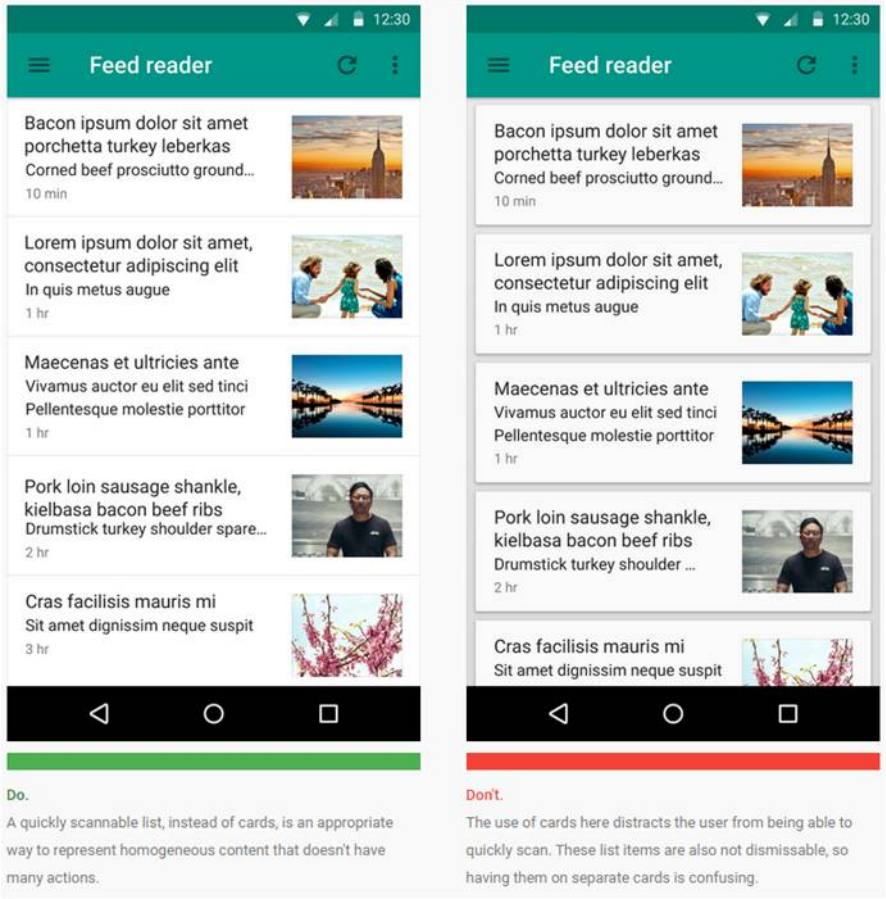
Figure 51: Sample Google Now Cards



Source: Deutsche Bank, Google

Although the company built Google Now entirely on the concept of cards years ago, the company's commitment to the idea has become clearer in recent years through other products as well. As mentioned earlier, the layout of the new Android Lollipop (5.0) and Google apps are based on Material Design, a set of design specifications heavily leveraging cards. The company is also encouraging third-party developers to use the concept in the development of their apps and has laid out a set of guidelines for developers when thinking about deploying cards in the UIs.

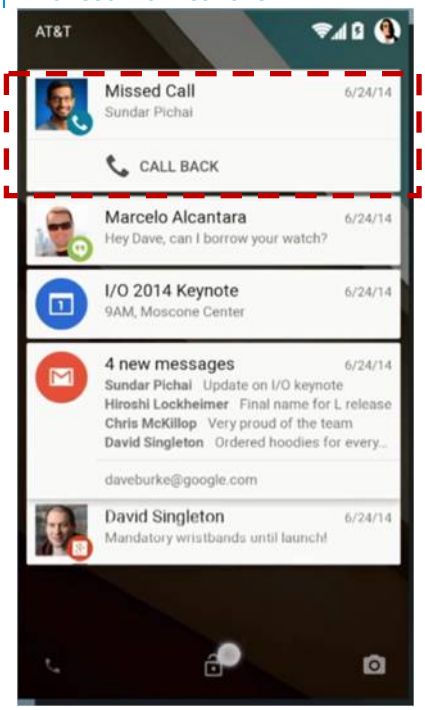
Figure 52: Sample of Do's and Don'ts when using cards in UI



Source: Deutsche Bank, Google

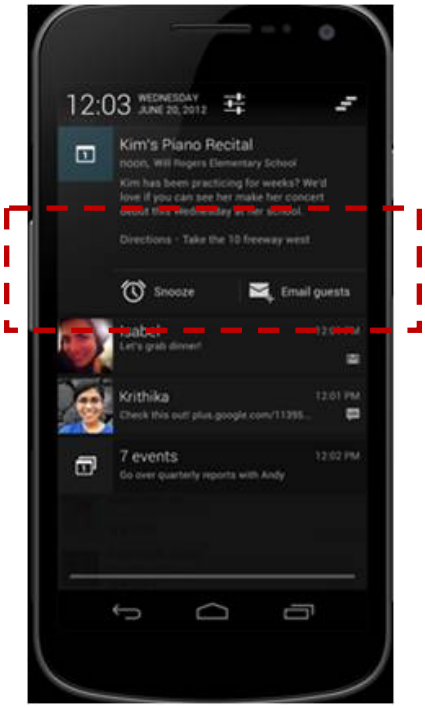
Both Android and iOS operating systems have developed sophisticated notification systems that app developers can use to engage with users on smartphones, smart-watches, and other forms of connected devices for the future. In the latest version of Android Lollipop, Google launched enhanced notifications with several new functionalities.

Figure 53: Android Lollipop Enhanced Notifications



Source: Deutsche Bank, Google

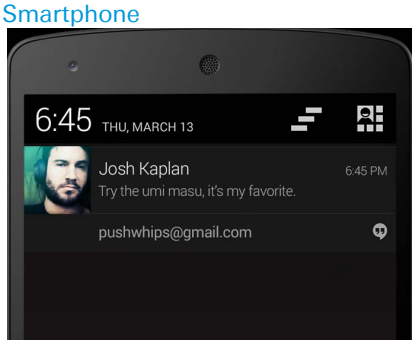
Figure 54: Android Lollipop Enhanced Notifications



Source: Deutsche Bank, Google

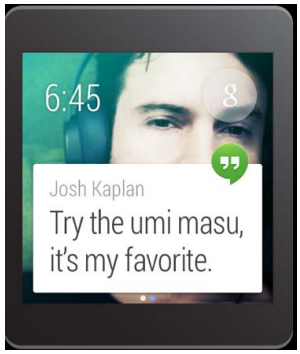
Notifications on Android Wear devices have similar functionalities as those on the smartphone devices. As shown in **Figure 55** and **Figure 56** below, when a notification arrives, in this case from the Google hangout messaging app, it is displayed on both the smartphone and the Android wear device. Users can perform a range of actions on the Android wear directly such as reply, view history, archive, and open on phone by swiping the notification to the right. Voice communication is used for inputs on the Android Wear and the functionality is somewhat limited compared to the smartphone device.

Figure 55: Notification on Android Smartphone



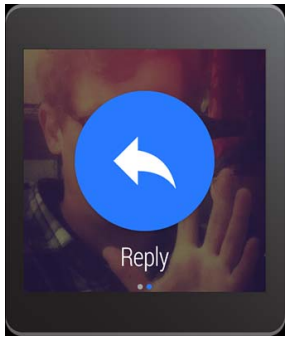
Source: Deutsche Bank, Google

Figure 56: Notification on Android Wear



Source: Deutsche Bank, Google

Figure 57: User Actions On Android Wear Notifications

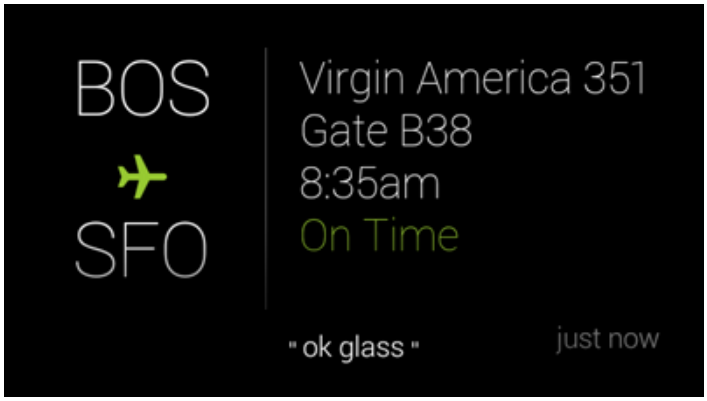


Source: Deutsche Bank, Google

Notifications on Google glass also work very similar to that on Android wear smartwatches given that they are built using the same APIs of Android Wear. An Android smartphone user with Google Glass and Android smartwatch will have the same experience on engaging with notifications on all three devices.

The form factor and input/output capabilities are different between Android smartwatch and Google glass but the underlying technical protocols are essentially the same.

Figure 58: Android Notification On Google Glass

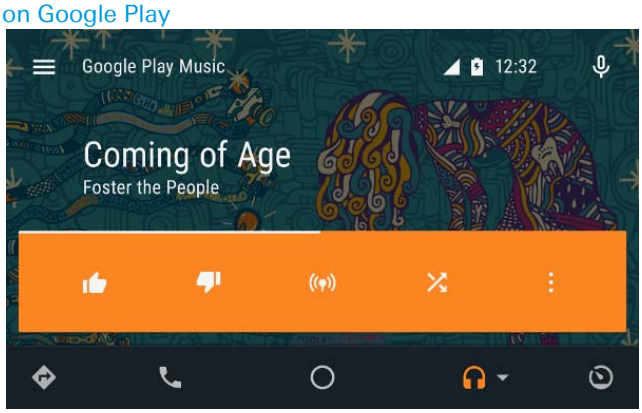


Source: Deutsche Bank, Google

Android Auto

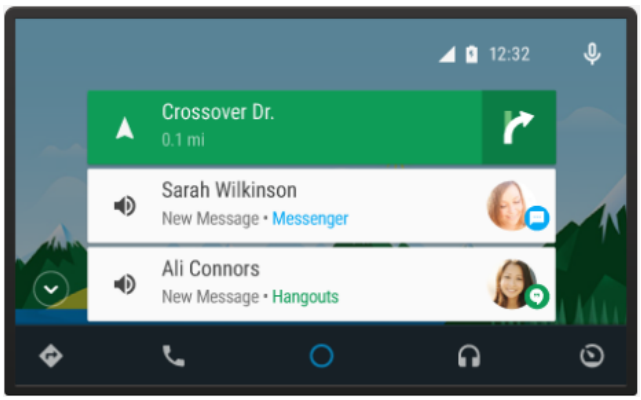
Android Auto is a custom OS layer built by Google and several members of the Open Automotive Alliance, specifically to enable connectivity and smart functionalities in vehicles. Google embarked on a similar strategy with its Open Handset Alliance originally, and is replicating that playbook in Auto. The benefits for developers is that they only need to submit one single APK to Android, and with very little additional work, their apps are available in the car. Users are presented with cards and notifications contextually in their vehicle dashboards, in the same UX as other Android launchers. Android Auto is still in very early stages and over 28 auto manufacturers including Chevrolet, Dodge, and Volkwagen have signed partnerships with Google to test Android Auto in their vehicles.

Figure 59: Android Auto User Engagement With Music on Google Play



Source: Deutsche Bank, Google

Figure 60: Android Auto Message Notification On Home Screens



Source: Deutsche Bank, Google

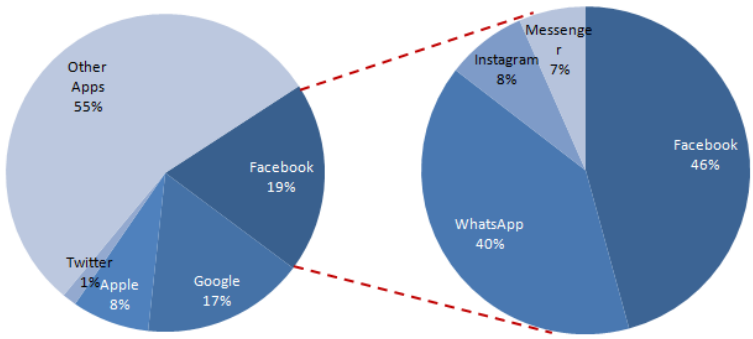
Facebook

The King Of Identity

Facebook's competitive strength entering the Connected Life era stems from: 1) FB has the richest Identity set of any company globally, and can use this to improve user experience for its core apps, third-party apps and marketers across any device, 2) its massive user base – 1.4B core FB, 600m+ Whatsapp, 500m+ Messenger and 300m+ Instagram – easy to leverage this into new devices, 2) its highly engaging services – the average user opens these apps between 10-40 times per day, and 3) unlike those competing on the OS level, Facebook's ecosystem attempts to bridge the gap across iOS and Android, making it one of the few one-stop shops for developers to get distribution to any mobile user, regardless of geo or device. Facebook's motivations are similar to Google, provide incredible experiences that keep users engaged (for free) and monetize via advertising and payments. Unlike Google, Facebook's products are designed to keep you within their reach for longer periods of time.

From a "sessions" standpoint, Facebook controls around 19% share of daily engagement with the average user.

Figure 61: Facebook Sessions Share



Source: Deutsche Bank, Company reports, Sessions share excludes China users, Session share is estimated by property for each company. Google sessions include Mail, Maps, Chrome, Search, Messenger, and OS Commercial sessions, Facebook includes FB, WhatsApp, Instagram, Hangouts, Apple includes Safari, Maps, iMessenger, and OS sessions.

The company's strategy of adding more highly engaging apps across different consumer use cases (social, photos, messaging and eventually payments and others) has created a broad portfolio of touch points with mobile users. FB's $7B in mobile ad revenue in 2014 represents around 37% of total mobile advertising globally, and given their sessions share of 8% (solely for core FB), it's no surprise that the company is embarking on: 1) monetization for other apps at FB, aside from core, 2) continuously trying to increase engagement across all apps, and 3) is now branching out to third-party app developers to serve native ads via LiveRail/FAN.

Figure 62: Facebook "Is Switzerland" In The Connected Life Era

Source: Deutsche Bank, Company Reports

Facebook Reach:
Facebook: 1.4B MAU
Messenger: 500m MAU
Instagram: 300m MAUs
WhatsApp: 650m MAUs

In light of this strategy, the question we often ponder is whether FB is over-earning or under-earning vs. it market share of engagements? Clearly heading into 2013 the company was under-earning in mobile. But now, for core FB at least at $7B in mobile revenue, an equilibrium has likely been reached.

Looking ahead, the next phases for FB are monetizing other properties outside of the core app, and extending the reach of the entire platform into the Connected Life. FB arguably has the greatest opportunity to increase its share of sessions given how broad the user base across its many apps. App linking should help move users from core FB apps to other third-party apps and back more seamlessly. It also helps reduce friction for those developers advertising on FB newsfeed. Parse helps developers build apps and has many features that help push content to other apps. FB has been experimenting with email and push notifications for years, and should be in a position to extend those to third-party app developers using Parse's enhanced notification software (scheduling, targeting, etc) importantly across both iOS and Android.

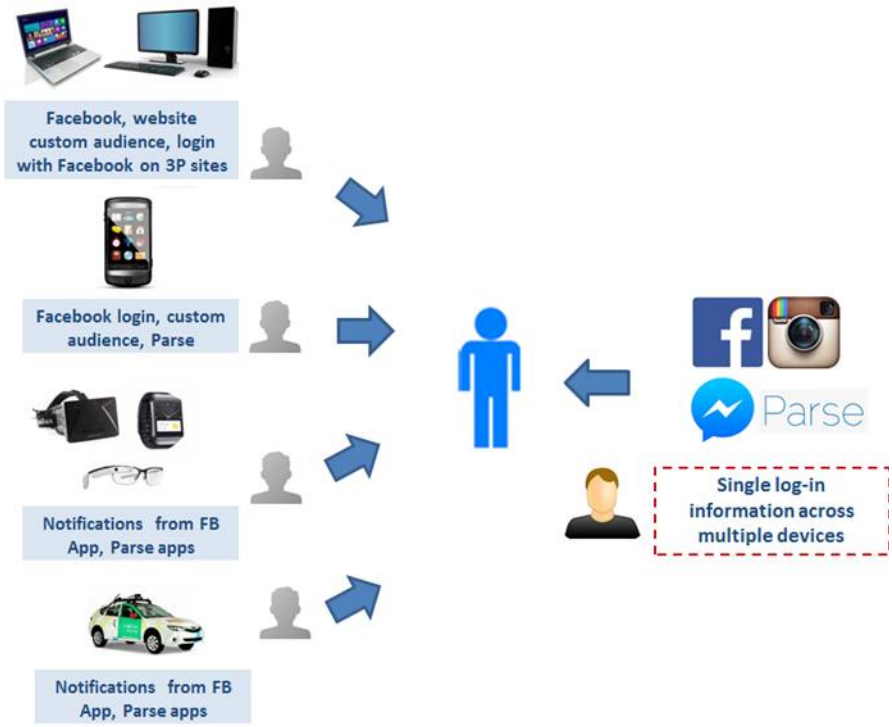
Identity Is A Killer App For FB

We've discussed how important identity is in the Connected Life era as users access digital services from many new screens, and FB is arguably one of the best positioned companies globally. In order to have comprehensive identity data, internet media companies need to have a large user base cross devices on both iOS and Android ecosystems. In the desktop world, cookies enable user tracking and present a comprehensive picture of identity. However, in the connected Life, where consumers use multiple devices running on a number of platforms, building comprehensive identity profile is challenging

technologically. As shown in **Figure 63** below, several devices in connected era have different underlying data collection mechanism to track user behavior. Hence, it makes mapping users across screens very challenging.

Very few companies have their owned & operated assets that span across all the devices in the connected life. Google and Apple hold a strong position with the control of the OS layer underlying multiple devices in the connected life era Facebook meanwhile has its products used across devices and therefore can map user identity between devices.

Figure 63: Cross Device Identity

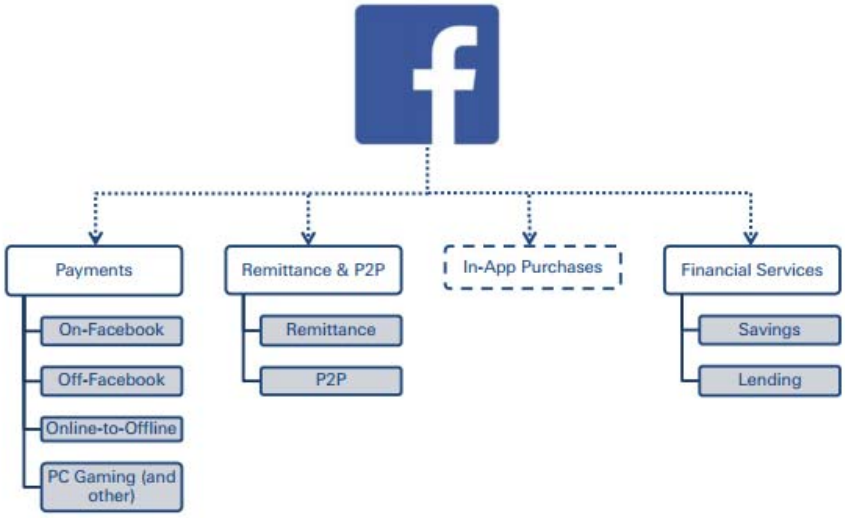


Source: Deutsche Bank, Facebook

Facebook Payments – Another cog in the connected device ecosystem

In addition to a strong user identify graph, Facebook also has a unique competitive position in payments. We discussed the key broad areas for Facebook in our Sept 26 research note titled "Exploring Facebook's Potential Payment Opportunities". They key areas we highlighted are: 1) Core e-commerce and physical (POS) transaction processing through a FB Wallet (on and off FB), 2) peer-to-peer money transfer and cross border remittance, 3) in app purchases, and 4) financial services such as savings and lending. **(Figure 64).** For more details on each bucket, refer to our Sept 26 research note.

Figure 64: Facebook Payments Opportunity



Source: Deutsche Bank, Facebook

The Off-FB Reach Playbook – Atlas, LiveRail, FAN

One of the major pushes for FB in 2014 was developing its off-FB advertising strategy. Unveiled initially at April's F8 developer conference, Facebook rolled out FAN (the Facebook Audience Network) its third-party ad network. The important differentiators for FAN vs. commodity ad tech are several-fold: 1) FB has more identity data (discussed above) than any other company globally hence should be able to drive better targeting and campaign performance over time than peers, 2) FAN is an easy one-click set up on the side of core FB advertising (not coincidentally similar to how Google's Adsense Network can be enabled inside Adwords with a single click of a checkbox), 3) Atlas, which is ad serving (importantly not ad rep-ing), hopes to move the digital and mobile advertising space off "last click attribution" and establish more value for "upper funnel" impressions in the conversion funnel, mostly because FB and FAN have an abundance of that kind of inventory, and 4) Liverail brings with it tier 1 publisher relationships, which historically had been for the purpose of daisy-chaining video ad networks, but is re-upping with publishers for ALL VARIETIES of inventory across video, native, core display, etc.

This stack is going to be second to Google in terms of global scale and importance, and is likely to create a strong sucking sound around pulling budgets out of the many other ad tech offerings in the market over the longer term.

When we look forward to the Connected Life era, serving ads onto small screens is only going to increase in terms of complexity, and having a strong set of data assets in place is going to be critical. FB is at the top of the list in terms of companies that are well positioned for this new era.

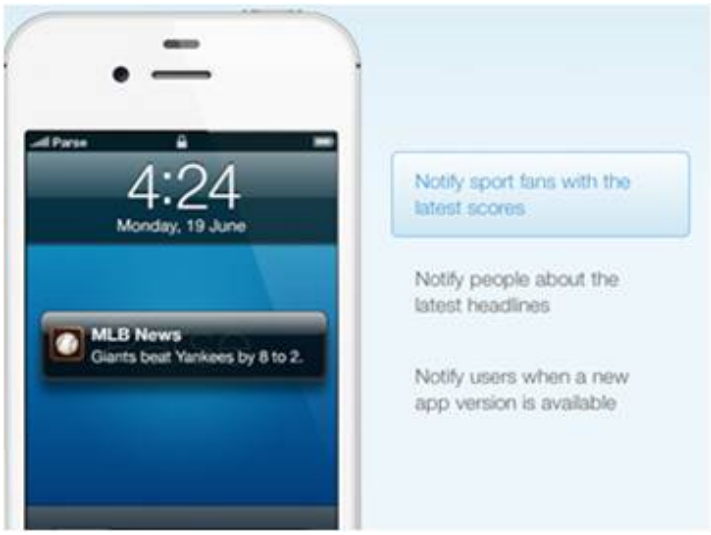
Parse – SAAS for App Developers

Parse is a set of cloud based SDKs that enable app developers build mobile apps easily in a fast and efficient way. The company was launched originally in 2011 as a set of tools for mobile app development and Facebook acquired the company in 2013 for $85m.

In simple words, Parse is a SaaS company with a set of tools to facilitate mobile app development and distribution. Parse eliminates all the heavy lifting activities required in app development such as infrastructure management, maintenance, storage, and enables developers to focus on the app design experience. More importantly, developers can use Parse SDKs to build apps for both iOS and Android platforms.

After being acquired by Facebook, the company has rolled out a number of enhancements to its SDKs. Developers using Parse can now incorporate new features that drive user engagement in addition to using Parse for core back end tools. Specifically, Parse can enable social login for the app by linking with Facebook account management. Using Parse SDKs, app developers can also build push notifications for their apps. Currently over 500k apps are already built using Parse up from over 60k apps in 1Q13.

Figure 65: Parse Push Notifications



Source: Deutsche Bank, Parse

App Links – The connective tissue

At its F8 developer conference earlier this year, Facebook announced the launch of AppLinks.org, a new initiative to make deep linking between native apps easier for developers. AppLinks is an open and accessible standard available to developers for free. In simple terms, it is basically a set of deep linking APIs built by Facebook that developers can layer into their code to enable seamless navigation from other apps to theirs. This is similar to the http protocol for web that enable navigation on browsers. Once app developers include AppLink tags in their code, it gets published into a central repository.

AppLinks is important for Facebook because nearly 2.4B clicks are generated by the content shared on Facebook on a weekly basis from the Newsfeed, according to the company. The vast of majority of these clicks direct the user to browser from the Facebook app to load the content, resulting in subpar user experience and often times results in user abandoning the navigation after going to mobile browser. For example, when a Facebook user clicks on a Yelp review shared by a friend on this Newsfeed, the current implementation takes the user to the Yelp page on mobile browsers. For developers, AppLinks presents a seamless way to enable deeplinking across platforms (on iOS,

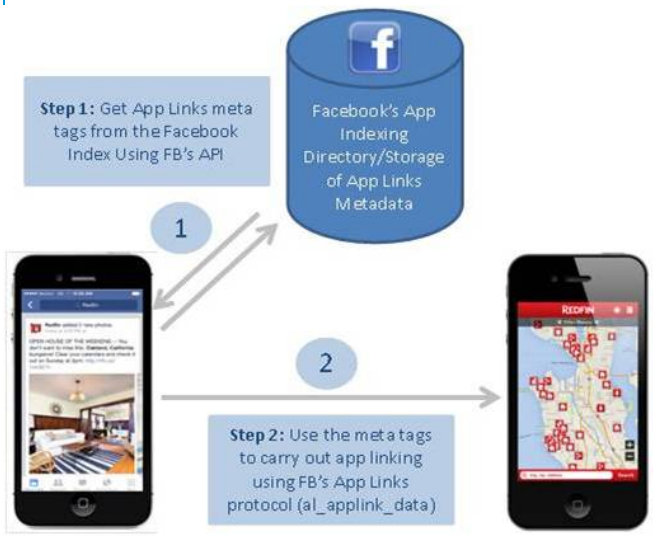
Android, and Windows). Facebook noted that over 3B applinks have been created as of August 2014, in less than four months since launching.

Figure 66 and **Figure 67** below illustrates the basic working principle of AppLinks. We have discussed about AppLinks extensively in our June 2014 Industry report ""Deep" Dive On App Search – The Next Frontier In Mobile".

Figure 66: Meta-tags Can Be Crawled From The App Developer's Website

Source: Deutsche Bank, Facebook, Redfin

Figure 67: Meta-tags Can Be Obtained By Poking Facebook's Own Index



Source: Deutsche Bank, Facebook, Redfin

Alibaba

Keep An Eye On YunOS

Alibaba's motivations are likely similar to Google's in that the company aspires to create an ecosystem of free products that are monetized through its core strengths (commerce, advertising and payments) and in contrast to Apple and Xiaomi, not really compete directly in the hardware space (at least today). The company has embarked on a multi-year project to build out YunOS as a competing ecosystem to the various other large players in China. The strategy takes advantage of Alibaba's strength in brand, distribution, and commerce. Alibaba Group (and affiliated entities) owns the #3, #4, and #5 most popular mobile apps in China in Alipay, Taobao, and UCWeb. It also owns portions of leading vertical players including: Youku in video content, Autonavi (100% owned) in mapping, Weibo in social, Shenma and Quixey for web/app search and many other core utility apps.

YunOS wraps all of these services together in a bundled offering, and we expect many Connected Life products to enter the market, not just smartphones but wearables, tablets, connected TVs and others. Youku recently introduced its first tablet, and plans on rolling out streaming boxes and wifi routers powered by YunOS (although the initial ship was stock AOSP). The company is also working with hardware OEM Meizu on smartphones and other devices.

From a software perspective, YunOS is actually quite a bit more complex than the typical AOSP forks. Alibaba has wisely built out a number of proprietary elements over the past couple years, similar to what Google offers in the Play Mobile Services layer, which are not available in standard AOSP code. The company has several thousand engineers working on this problem, across Aliyun, UCWeb and partners like Quixey (discussed below), starting from scratch. So while Xiaomi has been successful to date with its ecosystem, Alibaba is likely to be a big competitor tomorrow in Connected Life.

Figure 68: Alibaba's Connected Life Ecosystem

Source: Deutsche Bank, Company Reports

Alibaba Key Assets:
Taobao/Tmall: 300m buyers
Mobile MAU: 200m
Alipay: 300m users
UCWeb: 500m users

Distribution - Taobao and Tmall

Alibaba's consumer facing ecommerce apps Taobao and Tmall are the key underlying assets for the company's competitive positing in the connected devices ecosystem. With 307m active buyers and 217m mobile MAUs as of 3Q CY14, Taobao and Tmall generate nearly USD 360B in ecommerce GMV. The unique strength of these assets is that the consumer behavior is highly commercial (users come to Taobao to shop) and they are superior to offline the equivalent experiences. These are logged in shoppers with personalized recommendation, so TB and TM not only are great distribution channels for devices in the Connected Life era (~80%+ mobile shopping market share), but help solve for Identity, similar to Alipay.

Identity – Alipay, and to a leser degree Weibo

Alipay is an authenticated, secure, logged in experience, and a huge step forward for YunOS's ability to map identity across devices in the Connected Era. Alipay is the leading mobile and online payments company in China, with over $875B in TPV processed in 2014. Alipay is the leading mobile payment provider in China with ~80% market share in terms of total transaction value, followed by Tenpay and Lakala according to iResearch data. Nearly 80% of all Alibaba's ecommerce transactions on Taobao and Tmall are settled through Alipay. Alipay is more than a digital wallet for consumers and it is increasingly used as a substitute for cash transactions. For merchants, Alipay provides escrow services to settle transactions with buyers upon delivery.

Alibaba also invested $586m in Weibo in early 2014 for 18% ownership. Weibo is a leading microblogging site similar to Twitter in China with ~500m users.

Alibaba admittedly trails Tencent in social, but similar to Alipay, Weibo logged in users brings YunOS a lot of identity data for the Connected Life era

Content – Youku, Evergrande

Over 80% of internet users in China claim to have watched VOD in the past year, hence there is likely significant demand for a tailored experience from Youku and YunOS. In 1Q14, Alibaba invested $1.7Bm in Youku together with Yungfeng Capital in exchange for 18.5% ownership. Youku is a leading video streaming service with over 500m MAUs and 800m daily video views. This is a strategic investment by Alibaba to expand its portfolio of consumer facing assets into new media formats. Recently, Youku announced that the company is launching three hardware devices, Wifi router, smart TV box, and an Android tablet, enabling new consumption channels for its video content. The new devices will run on top of Alibaba's YunOS. The connected devices market in China is still at a very early inning but already there are over 30m smart TV shipped every year, according to Digital TV Research. Sports content is also a big differentiator in China, and Alibaba's ability to do immersive sponsorship, promotion and specials with Evergrande (China's leading men's professional football/soccer squad) shouldn't be under-appreciated.

Utility Apps – Maps - AutoNavi

Google Maps is one of the anchor tenants of the Play Mobile Services suite of apps, and Alibaba's equivalent is AutoNavi is one of the leading mapping service in China with over 100m active users as of mid-2014 using its mobile app, accounting for nearly ~30% market share in China for mapping services.

Utility Apps – Browser, App Store, Web Search - UCWeb

UCWeb is the leading mobile browser in China and India with over 65% market share, according to iResearch. The company was launched in 2004 as a mobile browser and soon became well known for its light app capability and faster pageload in low-end smartphones, consuming very little data. Alibaba acquired UCWeb in June 2014 and the company has since then has expanded into a number of areas including mobile search, gaming and app store. UC Browser has over 500 million users around the world. The browser also has over 34% market share in India.

Utility Apps – App Search - Quixey

Quixey is a leading app search engine company and Alibaba invested $50m in the company as a strategic investment on October 2013. Quixey is well known in the US for its leading app search engine which competes against Google app search (which is much more complex than web search, see our June report titled "Deep Dive On App Search" For details). Quixey also has its own deep linking standard AppURL that enables seamless app to app navigation in mobile. The company recently announced a global developer partnership which brings any developer's content from any region to various app search engines in countries like China, India and the US. Quixey is powering app search for YunOS and Shenma.

Twitter

Silky Fabric

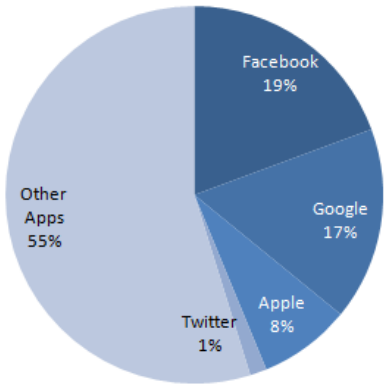
Twitter's position in the Connected Life is similar to that of Facebook and is based on a large and highly engaged audience, unlike Google and Apple who control the underlying OS layer. Twitter's motivation is slightly different than Facebook, it aspires to be the largest source of real-time information globally (similar to a search engine but for real-time content) and is a little more open to traffic flowing off its properties vs. walling users in. Twitter's active follower model (unlike the more passive social graph) coupled with its bite-sized 140 character card-based medium likely means that Twitter may be in a positon to push content easier across multiple screens in the Connected Life era than most. Like Facebook, the strategy for Twitter is increasing engagement and centrality to the mobile experience, and wrapping that approach with advertising.

For Twitter, we view the company's strengths in the Connected Life era across three key areas:

- **Twitter Is All-In On Cards:** Not surprisingly, Twitter was a pioneer in developing a card-based approach to content presentation. Anyone can post any kind of content on Twitter, including text, video, call to action formats, deep-linked content, just about anything and it will be accessible on most devices. This unique approach gives Twitter a huge leg up on most publishers in the Connected Life era.
- **Identity:** Twitter has interest graph data on its 284m active MAUs across both iOS and Android platforms. This information is one of the most valuable datasets in all of mobile. Unlike some messaging apps and social networks, Twitter gleans much more information on users based on who they follow and what kind of content they consume. Recently the company also launched Digits to enable simple login process for third-party app developers (a popular approach in international markets where SMS is easier to authenticate).
- **Reach:** Twitter's 284m global active MAUs is relatively small compared to 1B active Android users and 1.4B Facebook MAUs but is still one of the leading properties globally. The company also has another 500m UVs viewing their content without logging into Twitter. Finally, Twitter also owns a leading mobile ad exchange MoPub that interfaces with over 1B unique iOS and Android devices.
- **Developer Tools:** Twitter also offers various tools for developers through its new Fabric initiative. Crashlytics provides crash data and other app analytics to developers, and is used by many leading apps including Square, OpenTable, and Waze.

In terms of share of sessions, Twitter is currently very small compared to Google and Facebook and most of it is coming from sessions on its core app. This is largely a function of the smaller user base despite having engagement levels that are comparable.

Figure 69: Twitter Sessions Share

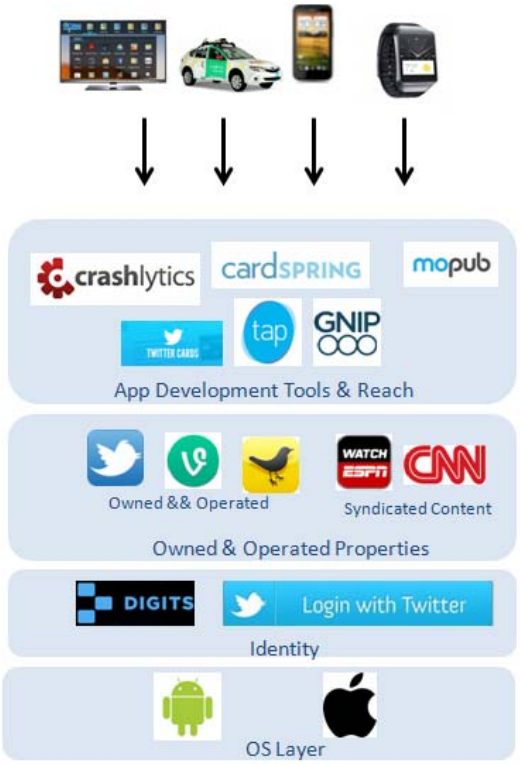


Source: Deutsche Bank, Company Reports, Sessions share excludes China users

Figure 70 illustrates the set of Twitter capabilities and assets that are critical for the company to build its competitive position for the Connected Life era. Twitter's strategy in the last two years has been solely focused on improving its core product and growing its user base. The company has been actively launching new product enhancements to grow and re-activate MAUs for the core Twitter product. Recently, Twitter has also explored new initiatives to improve the experience of its 500m UVs coming to its properties without signing on.

Given the breadth of content being created on Twitter every day, coupled with the centrality to many media (news, sports, celebrities, etc) and its 140 character asset-lite approach, Twitter should be in a position to push content to many different screens and user experiences in the future. The company still has a lot of work ahead in expanding the user base, but its core experience is one of the best positioned where the world is headed.

Figure 70: Identity + reach are key areas for Twitter In Connected Ecosystem



Source: Deutsche Bank, Company Reports

Twitter Key Assets:
284m logged in MAU
500m logged out users
MoPub reaches 1B devices

Twitter Cards

Twitter is one of the major card platforms today and perhaps one of earliest innovators in the space. This is likely not a coincidence as the "byte-sized" nature of Twitter's content lends itself to the concept of packaging them within cards pretty well, in our view.

Twitter first started experimenting with cards in 2012 as a tweet format to include URLs and attach new media experiences in tweets. The initial version of Twitter Cards included 1) summary cards that provide a summary to external weblinks and 2) photo cards include photos from Facebook, a URL, or directly from Twitter. In 2013, the company added more features to better cater to advertisers, including app install, lead generation, and pre-roll video formats to its cards.

Twitter Notifications

Twitter has been experimenting with notifications for a long time now in many different forms. The company is one of the few Internet companies that have a wealth of information about its users' interest graph. Given that Twitter users declare their interest graph on the platform explicitly by selecting the accounts they follow, the company can push targeted custom notifications in a more effective way than any other internet companies.

Twitter has been using push notifications already on smartphones in a number of innovative ways. First, the company uses push notifications selectively to re-engage with its user base by notifying users when new content relevant to them is tweeted by someone they follow. The company also uses push notifications to recommend new users to follow based on a user's interest

graph. Given the intrusive nature of these notifications, Twitter uses this form of push notifications very prudently to ensure that it doesn't spam users.

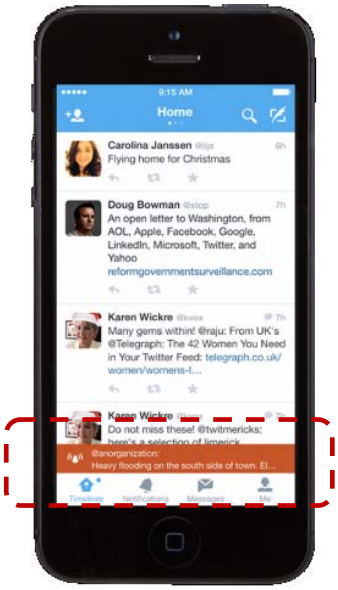
Second, Twitter has built several tools around notifications that users can customize to make Twitter experience better. When a user follows an account on Twitter, he can add notifications specific to the account and Twitter will send a push notification every time when the account posts new a tweet on Twitter **(Figure 71)**.

Finally, Twitter launched Twitter Alerts **(Figure 72)** in September 2013 to send out time critical alert from government agencies and organization during times of crisis or natural disaster. Users that sign up for Twitter Alerts will be able to receive emergency information via a text message or push notification or directly on their timeline from government organizations during natural disasters or times of crisis. When a participating government organization tweets a message marked as Alert, Twitter sends out a push notifications to its signed up users. These alerts were used extensively during Hurricane Sandy and Boston Marathon bombings.

Figure 71: Twitter Notifications

Source: Deutsche Ban, Twitterk

Figure 72: Twitter Alerts



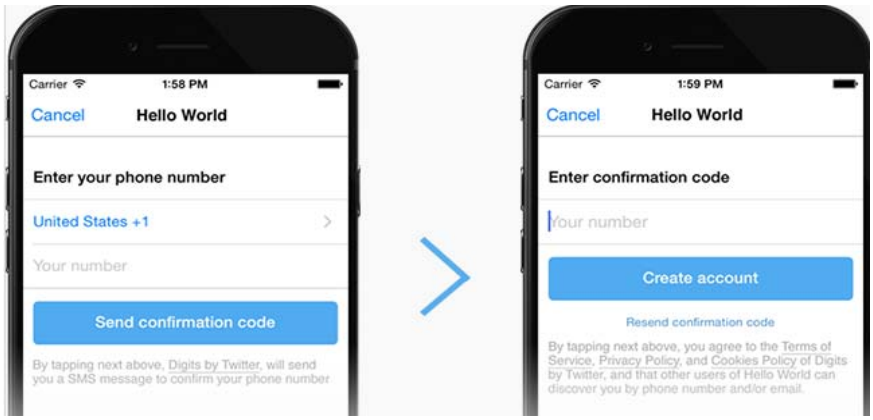
Source: Deutsche Bank, Twitter

Identity – The Interest Graph and Digits

As we highlighted in Facebook section above, having unique and comprehensive data on user "identify" is paramount for companies like Facebook and Twitter who are positioned to bridge the gap across both iOS and Android devices. Twitter is unique in that every user actively manages their own experience and that curation tells Twitter much about what kinds of things each user is most interested about. Unlike scrolling through pictures of friends and family, Twitter users are deeply engaged with content of all variety and engage with that content in ways that most other platforms don't enjoy. The company also has a partnership with Stripe whereby users at some point should be in a position to purchase products straight from ads in their timeline, establishing an important direct billing relationship with its users (a key factor for success in the Connected Life era), and this payment capability could be extended to any device via Twitter cards.

Further, at its recent Flight developer conference earlier this year, Twitter launched Twitter Kit for app developers. Twitter Kit includes a set of APIs called Digits that help developers manage their end user identify and login information in a simple way using mobile phone numbers. Offering a simple onboarding flow with little user input is important to ensure conversion in the sign up process as mobile users are often hesitant to provide their social login information to many apps. Digits uses SMS messages to validate the accounts instead of traditional login ID and password combination. **Figure 73** below shows the two step sign up process using digits.

Figure 73: Twitter Digits Log-in Flow



Source: Deutsche Bank, Twitter

Developer Tools - Fabric

The second important leg in Twitter strategy for the connected era is the developer tools. Many companies including Facebook and Twitter have been building mobile app development tools to grow their relationship with app developers deeper. Crashlytics is Twitter's strategy to penetrate deeper into mobile app analytics process. Crashlytics is a light weight SaaS offering for app developers to detect and fix app code related defects. It also offers an analytics solution with a number of key metrics such as MAUs, DAUs, and retention. The company hasn't disclosed any specific metric but noted that Crashlytics SDK has been embedded in thousands of apps.

MoPub / Tap Commerce

A key theme for both Facebook and Twitter in 2014 was building out their off-platform mobile advertising solutions. Twitter owns a number of key assets in this area including MoPub and TapCommerce. MoPub is Twitter's mobile ad exchange that helps app developers monetize their ad inventory. MoPub marketplace reaches over 1B smartphone devices and handles more than 130B ad requests every month. Similarly, Twitter acquired Tap Commerce, a mobile re-targeting company in June 2014 for $100m to enhance its ad tech offerings. Twitter should be in a good position to push marketing via Mopub and Tap commerce to any device in the Connected Life era.

Twitter Commerce – Buy Button, Offers & Cardspring

Extending the concept of cards whereby users can take any action inside a small piece of content served into their timeline, Twitter has started to experiment heavily with commerce related Tweet cards recently. In September, the company unveiled the Buy button on Tweet cards, which allow advertisers to generate purchase leads straight from a Tweet. Further, in late November, the company rolled out Twitter Offers, which also leverage Tweet cards and the CardSpring technology.

Apple

The Gold Standard

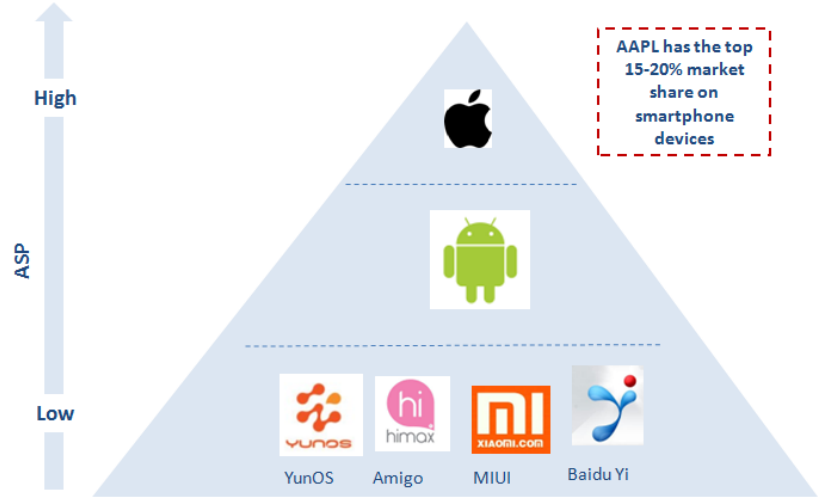
One can't really do a thought piece on the Connected Life without including Apple, but for a more detailed discussion on the company, refer to our colleague Sherri Scribner, who covers the IT Hardware sector for DB (and AAPL). For purposes of this piece we look at it from usage and traffic perspective and briefly summarize a few key points around Apple's approach and how it differs from some of the other companies mentioned above.

First, Apple's motivations are fairly straight forward, everything the company does pushes it towards the end goal of selling great hardware and software to consumers are premium prices, and offer the best wrapped experience across all their devices. The strategy has worked near-flawlessly for the past decade, as Apple has extended from solely PCs, to music players, phones, tablets and soon wearables. In short, Apple is attacking and dominating the high-end, and is adding many new business models onto its ecosystem, including payments, advertising, and services, in addition to the legacy hardware and software.

In the US market, Apple controls around 15%-20% market share of devices, and nearly 50% of the commercial activity on smartphones, well above the historical 5%-10% Mac PC market share average across the previous few decades. Apple's market share is lower in Europe (15-20% range) and much lower in emerging markets but globally Apple controls nearly 15-20% of the smartphone market share in terms of traffic. iPhones has been the key element in re-invigorating the Apple ascendancy over the past decade.

Importantly, by sticking with its strategy of competing only at the high-end of the market, not in the lower price tiers, Apple has been able to build a loyal enthusiast base that buy lots of other products and services through the app store. Apple has been very clever about shaping its ecosystem around the high-end, which allows the company to enjoy partnerships and influence that no other hardware company can achieve.

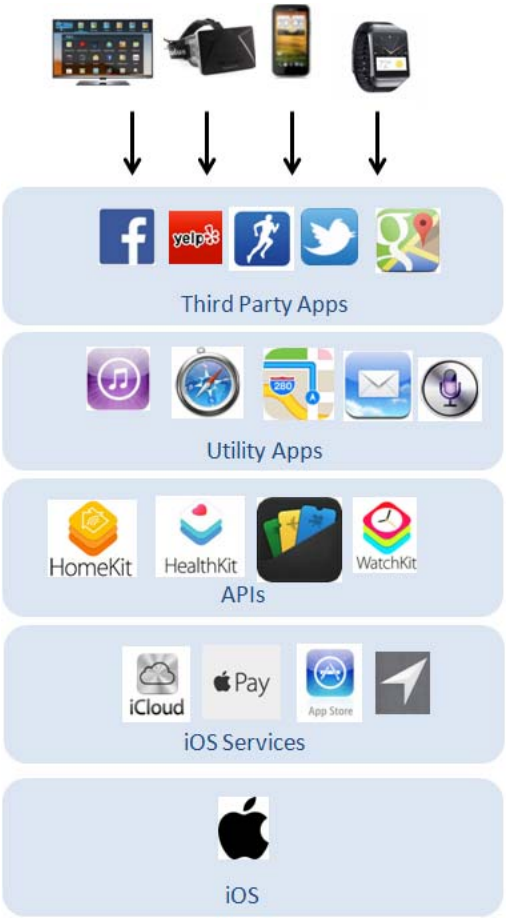
Figure 74: Apple Takes The Top 15-20% Of The Smartphone Hardware



Source: Deutsche Bank, Company reports

When we look at Apple's ecosystem, few have developed as strong a following across devices, software and distribution, and the company continues to move into new areas. Somewhat similar to Google's approach with Android, Apple is controlling the OS and the key touch-points with its users, but allowing third parties to build software and hardware on top. Apple keeps the critical pillars of its Connected Life ecosystem in-house, including iPhones, iPads, now headphones and potentially other wearables (Apple Watch in 2015). The company has also added to iOS layers of APIs and software development kits for connecting cars, healthcare items, and home appliances to its ecosystem.

Figure 75: Apple's Connected Life Ecosystem



Source: Deutsche Bank, Company reports

Apple:
~360m active iPhone devices
9m registered developers
75B app downloads

In order to communicate across Apple's Connected Life ecosystem, the company has built into the last several versions of iOS advanced notifications and a number of API tools.

Phone Likely Central To Apple's Ecosystem

Similar to Android, iPhone plays a central role in Apple's ecosystem. The next phase of devices, including the watch, other potential wearables or smart home appliances that Apple integrates with, will likely have the smartphone as the primary device tethered to edges of the ecosystem, illustrated below in **(Figure 76)**.

Figure 76: Apple's API & Ecosystem

Source: Deutsche Bank, Apple

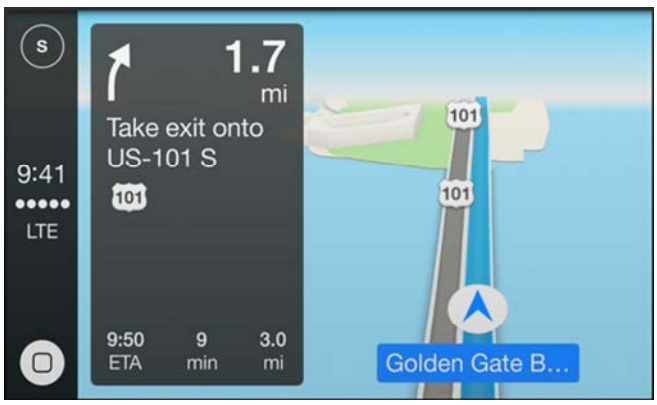
Apple CarPlay

Similar to Android Auto, Apple CarPlay helps deliver a smartphone experience to a car. In essence, CarPlay provides an auto-optimized version of the iPhone's user interface for the car's built-in dashboard display. The iPhone plays the role of the brains, face, and development platform and the car provides the display. Among other features, CarPlay allows users to get directions, make calls, send and receive messages, and listen to music through their car's built-in display **Figure 77** and **Figure 78**. While the apps are displayed on the dashboard, the iPhone is doing the computing.

Figure 77: Apple CarPlay

Source: Apple

Figure 78: CarPlay mapping functionality



Source: Apple

Apple introduced the initiative in the summer of 2013, originally as "iOS in the Car." CarPlay became available in select new cars in 2014 and is supported by over 25 automakers including Audi, BMW, Ford, Honda, Mercedes-Benz, and Toyota.

Apple Push Notifications

iOS devices have always relied on Apple Push Notification service (APNS) to send and receive notifications. APNS was launched in the summer 2009 in conjunction with iOS3. At its core, APNS transports and routes a remote notification from a given provider to a given device. The process works as follows, the provider—an app developer who sends push notifications—sends a notification to APNs. After an authentication process, APNs sends the notification to the user's device.

To illustrate below in **Figure 79**, after ordering a car from Uber's app, Uber routes the notification that the user's car has arrived to APNS. After a quick authentication, APNS routes this information to the user's smartphone, where it shows up on the homescreen.

Figure 79: "Your Uber is arriving now"

Source: Deutsche Bank

While this is a simplification, it illustrates the centrality that APNS plays in push notification for various iOS devices across the ecosystem. We note that in order to receive push notifications, an app developer must first register with the APNS, which is a relatively straightforward process. Additionally, the user must also opt in to receiving push notifications, which typically happens initially after downloading the app when a user registers.

Emerging Ecosystems

Xiaomi, Micromax & Others

We see a few China and India-based ecosystems thriving on the back of open source Android and their own suite of products and services. As we have mentioned above, Xiaomi is perhaps the most successful of these entrants, with and $4.4B in 2013 revenues and 5% market share in terms of shipments (per IDC). Xiaomi truly has capitalized on the Connected Life strategy, with a number of products across a variety of different use cases, including: smartphones, wifi routers (very popular to DL apps via wifi in lower cell connectivity emerging markets), fitness bands, headphones, streaming boxes, air purifiers and other devices.

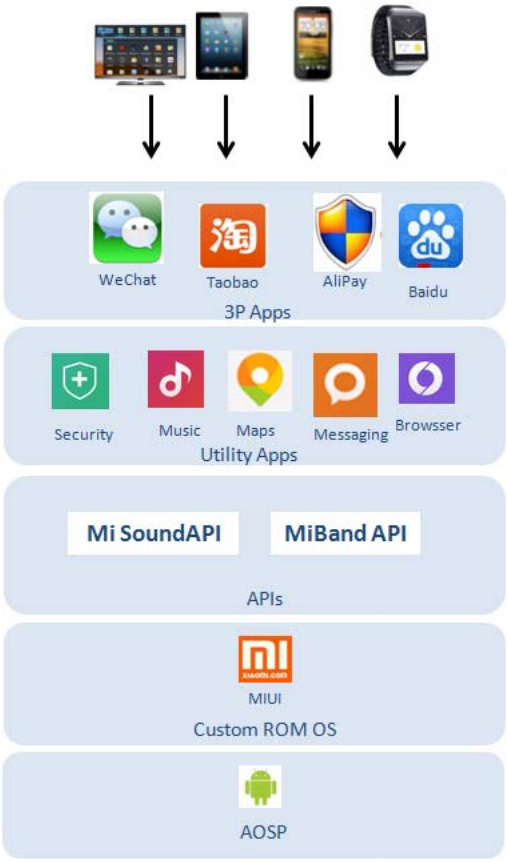
The strength of Xiaomi's strategy is their software and services centric approach, the company focused on building its custom ROM for years before moving into hardware (somewhat analogous to Google). Xiaomi pushes out new software every week or so, and unlike some other smartphone OEMs, has a direct relationship with its customers (a differentiator in the fragmented China market that they primarily compete in). Its smartphones (and other products) run Android and custom ROM, with lots of utility apps for security, popular themes, app store, etc.

Figure 80: Xiaomi Device Ecosystem

Source: Deutsche Bank, Company reports

Xiaomi is one of the most successful companies to come out of the "custom ROM" category created by open source Android, otherwise known as "forks". Xiaomi devices run the latest versions of Android, but Google provides only the core OS, none of the APIs or apps that run on top. Many others (OPPO, OnePlus, etc) have emerged in this space in China, but Xiaomi's combination of clever marketing, direct relationship with the customer, and software focus have allowed it to gain share. The company is on track to sell estimated 60m devices in 2014 and forecast to sell 100m device sales next year.

Figure 81: Xiaomi Software Stack



Source: Deutsche Bank, Company reports

Xiaomi is expected to sell 60m units this year and 100m in 2015

In India, Xiaomi was recently banned from selling devices as it hasn't signed licensing agreements with existing IP holders, a constraint that may exist in many markets outside of China, but we'd note that Xiaomi has had success in Singapore, Hong Kong and Thailand to date. Subsequently, the company won a temporary permission to continue selling in India a few days later.

India represents the next huge market opportunity for the Connected Life. Micromax is the one company that is showing the greatest progress thus far, with over 20% smartphone market share and growing faster than most OEMs. India is still around 70%+ feature phone but smartphone growth is exploding. The company has embarked on a similar approach as Xiaomi, using open source Android and its own custom ROM on top, and offering a number of devices including: smartphones, tablets, connected TVs, data cards and routers.

As mentioned previously, India is an approved Android market, and Google has a number of partnerships (including with Micromax) in place so it's going to be interesting to watch the space evolve.

Appendix 1

Important Disclosures

Additional information available upon request

Disclosure checklist

Company	Ticker	Recent price*	Disclosure
Google	GOOG.OQ	513.80 (USD) 15 Dec 14	1,2,6,7,14,15
Facebook, Inc.	FB.OQ	76.99 (USD) 15 Dec 14	2,6
Twitter, Inc.	TWTR.N	36.85 (USD) 15 Dec 14	1,6,7,8,14,15

*Prices are current as of the end of the previous trading session unless otherwise indicated and are sourced from local exchanges via Reuters, Bloomberg and other vendors . Data is sourced from Deutsche Bank and subject companies.

Important Disclosures Required by U.S. Regulators

Disclosures marked with an asterisk may also be required by at least one jurisdiction in addition to the United States. See Important Disclosures Required by Non-US Regulators and Explanatory Notes.

1. Within the past year, Deutsche Bank and/or its affiliate(s) has managed or co-managed a public or private offering for this company, for which it received fees.

2. Deutsche Bank and/or its affiliate(s) makes a market in securities issued by this company.

6. Deutsche Bank and/or its affiliate(s) owns one percent or more of any class of common equity securities of this company calculated under computational methods required by US law.

7. Deutsche Bank and/or its affiliate(s) has received compensation from this company for the provision of investment banking or financial advisory services within the past year.

8. Deutsche Bank and/or its affiliate(s) expects to receive, or intends to seek, compensation for investment banking services from this company in the next three months.

14. Deutsche Bank and/or its affiliate(s) has received non-investment banking related compensation from this company within the past year.

15. This company has been a client of Deutsche Bank Securities Inc. within the past year, during which time it received non-investment banking securities-related services.

Important Disclosures Required by Non-U.S. Regulators

Please also refer to disclosures in the Important Disclosures Required by US Regulators and the Explanatory Notes.

1. Within the past year, Deutsche Bank and/or its affiliate(s) has managed or co-managed a public or private offering for this company, for which it received fees.

2. Deutsche Bank and/or its affiliate(s) makes a market in securities issued by this company.

6. Deutsche Bank and/or its affiliate(s) owns one percent or more of any class of common equity securities of this company calculated under computational methods required by US law.

7. Deutsche Bank and/or its affiliate(s) has received compensation from this company for the provision of investment banking or financial advisory services within the past year.

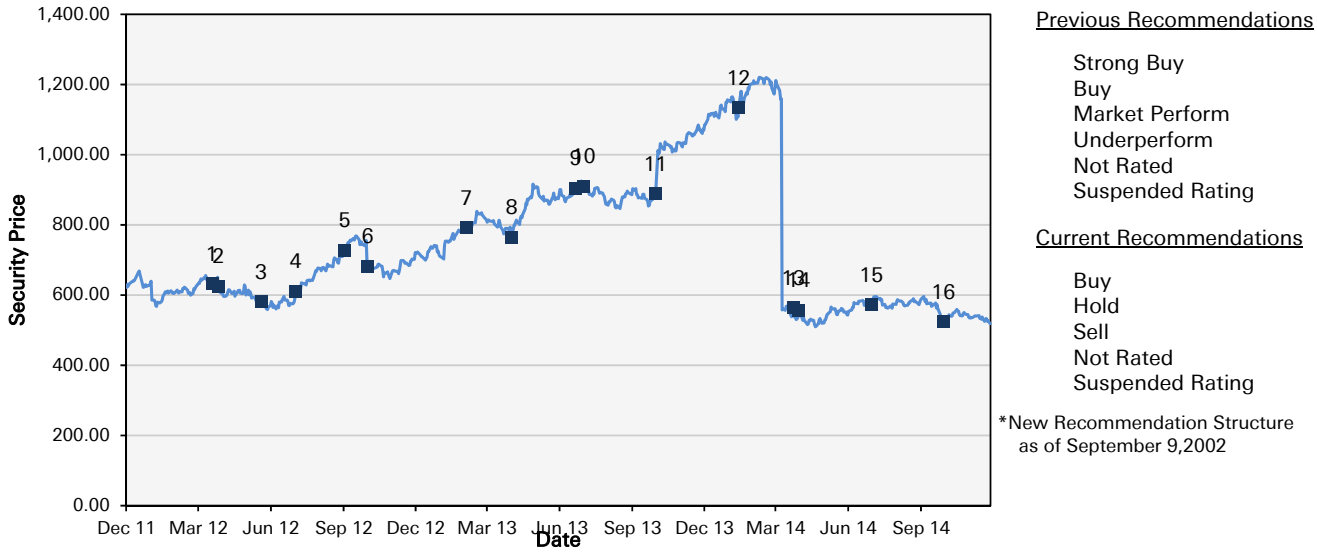
For disclosures pertaining to recommendations or estimates made on securities other than the primary subject of this research, please see the most recently published company report or visit our global disclosure look-up page on our website at http://gm.db.com/ger/disclosure/DisclosureDirectory.egsr

Analyst Certification

The views expressed in this report accurately reflect the personal views of the undersigned lead analyst about the subject issuers and the securities of those issuers. In addition, the undersigned lead analyst has not and will not receive any compensation for providing a specific recommendation or view in this report. Ross Sandler

Historical recommendations and target price: Google (GOOG.OQ)

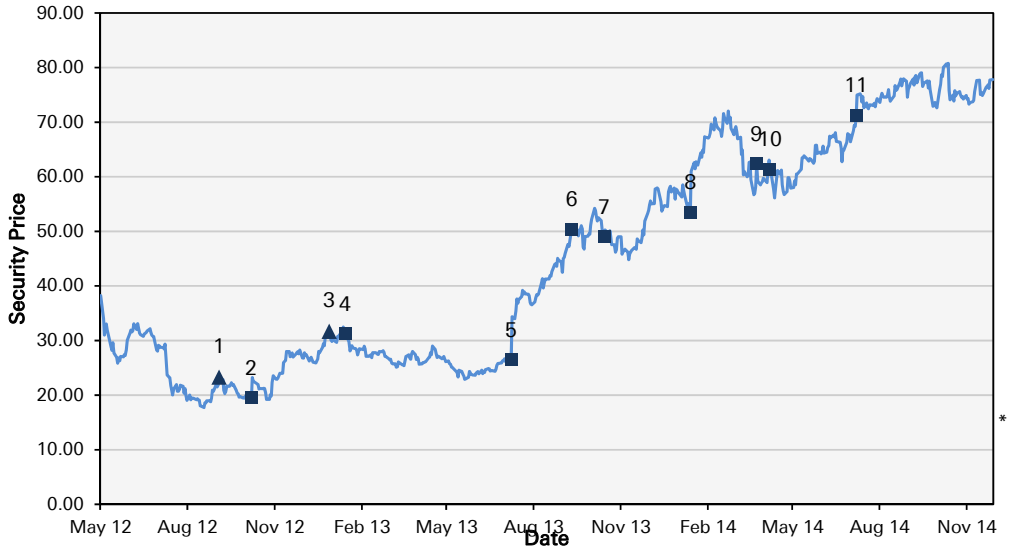
(as of 12/15/2014)



1.	04/05/2012:	Buy, Target Price Change USD649.00	9.	07/09/2013:	Buy, Target Price Change USD1,010.00
2.	04/13/2012:	Buy, Target Price Change USD675.00	10.	07/19/2013:	Buy, Target Price Change USD970.00
3.	06/06/2012:	Buy, Target Price Change USD662.00	11.	10/18/2013:	Buy, Target Price Change USD1,220.00
4.	07/20/2012:	Buy, Target Price Change USD686.00	12.	01/31/2014:	Buy, Target Price Change USD1,310.00
5.	09/20/2012:	Buy, Target Price Change USD890.00	13.	04/10/2014:	Buy, Target Price Change USD665.00
6.	10/19/2012:	Buy, Target Price Change USD850.00	14.	04/17/2014:	Buy, Target Price Change USD625.00
7.	02/21/2013:	Buy, Target Price Change USD935.00	15.	07/18/2014:	Buy, Target Price Change USD645.00
8.	04/19/2013:	Buy, Target Price Change USD930.00	16.	10/17/2014:	Buy, Target Price Change USD615.00

Historical recommendations and target price: Facebook, Inc. (FB.OQ)

(as of 12/15/2014)



Previous Recommendations

Strong Buy
Buy
Market Perform
Underperform
Not Rated
Suspended Rating

Current Recommendations

Buy
Hold
Sell
Not Rated
Suspended Rating

*New Recommendation Structure as of September 9,2002

1.	09/20/2012:	Upgrade to Hold, Target Price Change USD22.00	7.	10/31/2013:	Buy, Target Price Change USD61.00
2.	10/24/2012:	Hold, Target Price Change USD24.00	8.	01/30/2014:	Buy, Target Price Change USD75.00
3.	01/14/2013:	Upgrade to Buy, Target Price Change USD40.00	9.	04/10/2014:	Buy, Target Price Change USD76.00
4.	01/31/2013:	Buy, Target Price Change USD37.00	10.	04/24/2014:	Buy, Target Price Change USD85.00
5.	07/25/2013:	Buy, Target Price Change USD43.00	11.	07/24/2014:	Buy, Target Price Change USD90.00
6.	09/27/2013:	Buy, Target Price Change USD62.00			

Historical recommendations and target price: Twitter, Inc. (TWTR.N)

(as of 12/15/2014)

Previous Recommendations

Strong Buy
Buy
Market Perform
Underperform
Not Rated
Suspended Rating

Current Recommendations

Buy
Hold
Sell
Not Rated
Suspended Rating

*New Recommendation Structure as of September 9,2002

1.	12/02/2013:	Upgrade to Buy, Target Price Change USD50.00	3.	04/30/2014:	Buy, Target Price Change USD52.00
2.	02/06/2014:	Buy, Target Price Change USD65.00	4.	07/30/2014:	Buy, Target Price Change USD60.00

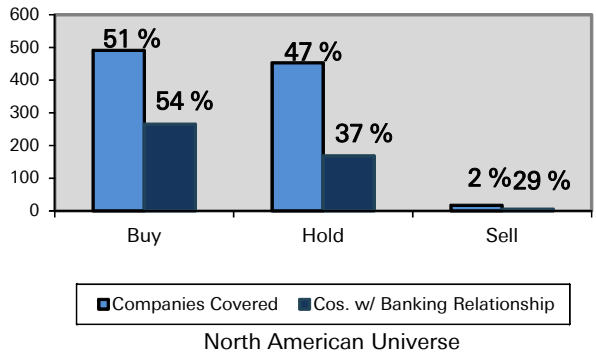
Equity rating key

Buy: Based on a current 12- month view of total share-holder return (TSR = percentage change in share price from current price to projected target price plus pro-jected dividend yield) , we recommend that investors buy the stock.
Sell: Based on a current 12-month view of total share-holder return, we recommend that investors sell the stock
Hold: We take a neutral view on the stock 12-months out and, based on this time horizon, do not recommend either a Buy or Sell.
Notes:

1. Newly issued research recommendations and target prices always supersede previously published research.
2. Ratings definitions prior to 27 January, 2007 were:

Buy: Expected total return (including dividends) of 10% or more over a 12-month period
Hold: Expected total return (including dividends) between -10% and 10% over a 12-month period
Sell: Expected total return (including dividends) of -10% or worse over a 12-month period

Equity rating dispersion and banking relationships



North American Universe

Regulatory Disclosures

1. Important Additional Conflict Disclosures

Aside from within this report, important conflict disclosures can also be found at https://gm.db.com/equities under the "Disclosures Lookup" and "Legal" tabs. Investors are strongly encouraged to review this information before investing.

2. Short-Term Trade Ideas

Deutsche Bank equity research analysts sometimes have shorter-term trade ideas (known as SOLAR ideas) that are consistent or inconsistent with Deutsche Bank's existing longer term ratings. These trade ideas can be found at the SOLAR link at http://gm.db.com.

3. Country-Specific Disclosures

Australia and New Zealand: This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act and New Zealand Financial Advisors Act respectively.

Brazil: The views expressed above accurately reflect personal views of the authors about the subject company(ies) and its(their) securities, including in relation to Deutsche Bank. The compensation of the equity research analyst(s) is indirectly affected by revenues deriving from the business and financial transactions of Deutsche Bank. In cases where at least one Brazil based analyst (identified by a phone number starting with +55 country code) has taken part in the preparation of this research report, the Brazil based analyst whose name appears first assumes primary responsibility for its content from a Brazilian regulatory perspective and for its compliance with CVM Instruction # 483.

EU countries: Disclosures relating to our obligations under MiFiD can be found at http://www.globalmarkets.db.com/riskdisclosures.

Japan: Disclosures under the Financial Instruments and Exchange Law: Company name - Deutsche Securities Inc. Registration number - Registered as a financial instruments dealer by the Head of the Kanto Local Finance Bureau (Kinsho) No. 117. Member of associations: JSDA, Type II Financial Instruments Firms Association, The Financial Futures Association of Japan, Japan Investment Advisers Association. Commissions and risks involved in stock transactions - for stock transactions, we charge stock commissions and consumption tax by multiplying the transaction amount by the commission rate agreed with each customer. Stock transactions can lead to losses as a result of share price fluctuations and other factors. Transactions in foreign stocks can lead to additional losses stemming from foreign exchange fluctuations. "Moody's", "Standard & Poor's", and "Fitch" mentioned in this report are not registered credit rating agencies in Japan unless Japan or "Nippon" is specifically designated in the name of the entity. Reports on Japanese listed companies not written by analysts of Deutsche Securities Inc. (DSI) are written by Deutsche Bank Group's analysts with the coverage companies specified by DSI.

Malaysia: Deutsche Bank AG and/or its affiliate(s) may maintain positions in the securities referred to herein and may from time to time offer those securities for purchase or may have an interest to purchase such securities. Deutsche Bank may engage in transactions in a manner inconsistent with the views discussed herein.

Qatar: Deutsche Bank AG in the Qatar Financial Centre (registered no. 00032) is regulated by the Qatar Financial Centre Regulatory Authority. Deutsche Bank AG - QFC Branch may only undertake the financial services activities that fall within the scope of its existing QFCRA license. Principal place of business in the QFC: Qatar Financial Centre, Tower, West Bay, Level 5, PO Box 14928, Doha, Qatar. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available to Business Customers, as defined by the Qatar Financial Centre Regulatory Authority.

Russia: This information, interpretation and opinions submitted herein are not in the context of, and do not constitute, any appraisal or evaluation activity requiring a license in the Russian Federation.

Kingdom of Saudi Arabia: Deutsche Securities Saudi Arabia LLC Company, (registered no. 07073-37) is regulated by the Capital Market Authority. Deutsche Securities Saudi Arabia may only undertake the financial services activities that fall within the scope of its existing CMA license. Principal place of business in Saudi Arabia: King Fahad Road, Al Olaya District, P.O. Box 301809, Faisaliah Tower - 17th Floor, 11372 Riyadh, Saudi Arabia.

United Arab Emirates: Deutsche Bank AG in the Dubai International Financial Centre (registered no. 00045) is regulated by the Dubai Financial Services Authority. Deutsche Bank AG - DIFC Branch may only undertake the financial services activities that fall within the scope of its existing DFSA license. Principal place of business in the DIFC: Dubai International Financial Centre, The Gate Village, Building 5, PO Box 504902, Dubai, U.A.E. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available to Professional Clients, as defined by the Dubai Financial Services Authority.

David Folkerts-Landau
Group Chief Economist
Member of the Group Executive Committee

Raj Hindocha
Global Chief Operating Officer
Research

Marcel Cassard
Global Head
FICC Research & Global Macro Economics

Richard Smith and Steve Pollard
Co-Global Heads
Equity Research

Michael Spencer
Regional Head
Asia Pacific Research

Ralf Hoffmann
Regional Head
Deutsche Bank Research, Germany

Andreas Neubauer
Regional Head
Equity Research, Germany

Steve Pollard
Regional Head
Americas Research

International locations

Deutsche Bank AG
Deutsche Bank Place
Level 16
Corner of Hunter & Phillip Streets
Sydney, NSW 2000
Australia
Tel: (61) 2 8258 1234

Deutsche Bank AG
Große Gallusstraße 10-14
60272 Frankfurt am Main
Germany
Tel: (49) 69 910 00

Deutsche Bank AG
Filiale Hongkong
International Commerce Centre,
1 Austin Road West,Kowloon,
Hong Kong
Tel: (852) 2203 8888

Deutsche Securities Inc.
2-11-1 Nagatacho
Sanno Park Tower
Chiyoda-ku, Tokyo 100-6171
Japan
Tel: (81) 3 5156 6770

Deutsche Bank AG London
1 Great Winchester Street
London EC2N 2EQ
United Kingdom
Tel: (44) 20 7545 8000

Deutsche Bank Securities Inc.
60 Wall Street
New York, NY 10005
United States of America
Tel: (1) 212 250 2500

Global Disclaimer

GRCM2014PROD033371