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Beyond apps: the next frontier in consumer engagement

4.1 Executive summary

The very success of the app-based smartphone user experience is now threatening to hasten its demise. The near-exponential growth in the number of apps available to download is testament to the success of the app model and the innovation this has unleashed.

However, user engagement is increasingly polarising around a handful of key apps, which presents a challenge for new apps in terms of discovery and gaining new customers, and threatens to undermine the economics of the app ecosystem.

Smartphones and apps have succeeded in fragmenting the mobile internet experience into literally millions of apps, but consumers and the leading mobile apps (largely social/messaging-based) are in the process of rebundling the mobile experience around a handful of dominant platforms. Users are downloading fewer apps, while spending more time on the leading messaging platforms, which are in turn building a broader range of services into their core offerings.

This rebundling of the mobile experience coincides with the advent of artificial intelligence (AI) driven applications and machine-based messaging services (chatbots). The key question is whether there is the potential to create a new platform for consumer engagement, or will the development of chatbots/AI serve to further entrench the dominance of the current leaders in the app/platform space?

Over time, the confluence of developments in deep machine learning, advanced data analytics and messenger services opens the door to potentially all-embracing platforms that can provide targeted (and relevant) services and content to users in a holistic manner. However, this remains some way off. There remain challenges for example in training computers to process and respond to language (natural language processing). For now at least, the use of chatbots is likely to be focused on specific use cases and narrow applications.

It is too early to discuss the end of the role of smartphones as the hub for consumer engagement, given their near ubiquity and the utility of mobility. However, there are a number of applications where screenless alternatives are already emerging. If intelligence sits in the cloud (rather than on a user terminal), relatively 'dumb' terminals can serve as the user interface. Devices such as Amazon Echo and Google Home highlight this potential, with use cases in areas such as Internet of Things (IoT) applications and the enterprise space, using voice rather than screens as the key means of user interaction. This could indeed be the emergence of a new platform for consumer engagement, with simple user interfaces that rely on fast and reliable connectivity to access AI-powered services residing remotely in the cloud.

For operators these developments could offer opportunities to play a more active role in the changing mobile ecosystem. The increasing relevance of big data and analytics reinforces the need for effective privacy safeguards and a secure way to authenticate identity. Similarly, dumb terminals require pervasive and high-speed connectivity to connect to cloud services, and growing use of speech and messaging-based interfaces opens the door to partnerships with other players looking to challenge the dominant players in the smartphone ecosystem.

4.2 The rise of the app store and the unbundled internet

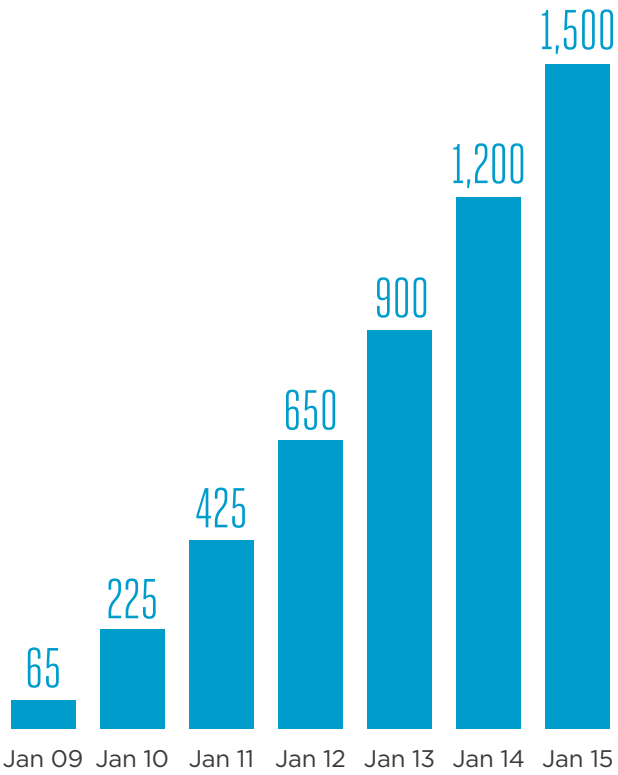
The defining trend of the smartphone era has been the growth of the app economy and the widespread adoption of apps as the key way users engage with services and consume content.

The number of apps available has seen near-exponential growth across the two main operating systems over recent years, with Apple offering more than 1.5 million apps as of mid-2015, and Google slightly ahead with 1.6 million.

Meanwhile, user engagement on mobile devices has increasingly focused on apps at the expense of the mobile browser. In most markets across the world, apps have already become the main medium for digital media consumption. Data from the US shows now that apps account for the vast majority of time spent on mobile devices. Indeed, mobile apps now account for the majority of time spent on all digital media (including desktops).

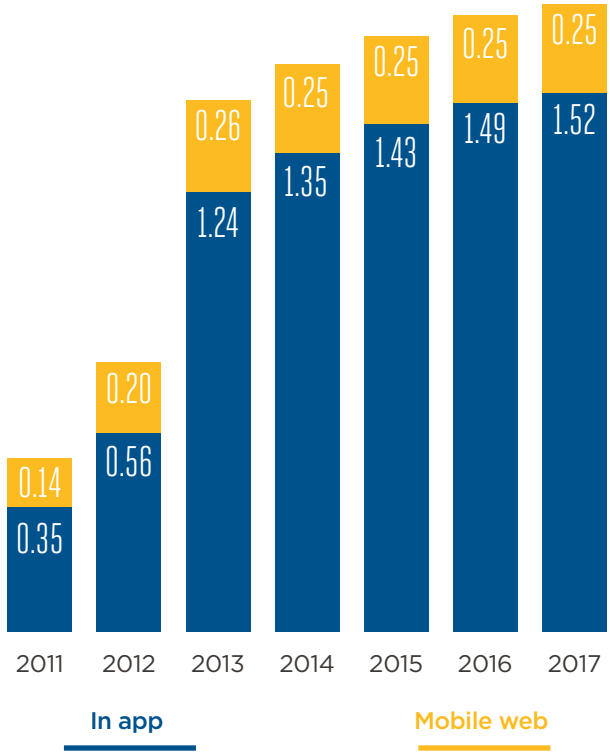
Source: Apple, Statista

1 Number of apps in the iOS Store (thousands)



Source: eMarketer, October 2015

Time spent per day on mobile devices (hours) 2



More striking than the general shift in engagement to apps is the fact that users are increasingly spending their time on only a handful of specific apps. Data from ComScore[1] shows that in the US half of all time spent on apps is on their preferred app, with 78% of their time spent their top three apps.

Source: SimilarWeb

1 Average app installs and usage

	Average number of apps installed on device*	Average number of apps used daily	Average number of apps accounting for 80%+ of app usage	Time spent on phone per day
US	37	12	3	5 hours
Worldwide	33	12	3	4 hours

*Apps installed does not include preinstalled apps

The current app store model and indeed the economics of the broader app economy therefore appear under threat, in part as a result of the success of the leading apps. Despite the ongoing growth in apps across the main app stores, the levels of downloads for new apps are falling, while engagement is increasingly and almost exclusively focused on a handful of the most successful apps. Acquiring new users is increasingly difficult for new apps, which over time is likely to have a significant impact on app store economics and will likely influence developer behaviour.

The challenge of app discovery and user acquisition for new services has to date served to reinforce the increasing dominance of the leading apps. The most successful apps globally (almost exclusively messaging or social-based) are all focused on building ever-wider ecosystems (app constellations), integrating a broader range of services into their platforms. As users become accustomed to using them on a regular basis, so their usage becomes more engrained.

1 The 2015 US Mobile App Report, ComScore, September 2015

4.3 New platforms: life beyond apps

The smartphone era has already seen one fundamental shift, with the mobile internet unbundled or fragmented into a vast range of individual apps, most of which performed one particular service or offered a specific type of content. The smartphone experience appears now to be undergoing another shift: services are now being rebundled into a handful of dominant platforms. This is the development of a new paradigm of service provision, 'beyond apps'. However, it is unclear at this point exactly how this future paradigm will evolve.

Source: Andreesen Horowitz

3 Looking for a third runtime

Central to this new scenario will be a change in how users find and experience content, with a shift away from the use of traditional apps, or at least a shift in the role of apps. There is a general question of where the future interaction will sit: in the smartphone era, interaction has tended to move up and down the mobile stack. The move up the stack into apps is being driven by the likes of WeChat and Facebook, with the contrasting move down the stack to the OS level driven by Google and Apple.

There are at least three possible scenarios for this future evolution and the development of a 'third run time':

- new and broader ecosystems based on the existing dominant messaging/social media platforms
- an expanded role for the push notifications panel, with targeted AI service provision, re-establishing the dominance of the OS
- new roles for messaging bots and AI-driven personal assistants as the future platform.

The first scenario is already becoming a reality, and is perhaps best demonstrated by some of the Asian messaging services. WeChat and Line have developed open ecosystems that allow a range of services to be delivered without leaving the core messaging app, including restaurant bookings, ordering taxis and money transfers. Baidu Maps also embeds a range of services in its maps, driven by the user's location.

In the second scenario, rather than having a screen full of apps, apps could sit more in the background and could push notifications. Notifications are evolving through the increased use of 'cards'. Cards can act as a new form of user interface, and it is increasingly possible to take actions within them. Examples here include digital assistants such as Google Now, where Google increasingly sends notifications to users on a push basis, and Apple's notifications on iOS 9 or Siri. This removes the need to access a specific app, but relies on analytics and user behaviour to infer what service or information a user may need. However, the utility of these notifications is rather limited.

In the next section we examine in detail the third option, which is the subject of increasing developer attention and general speculation.

Messaging and chatbots: AI as a new platform

Chatbots – computer programs designed to simulate conversation with human users – are the latest manifestation of the increasing focus of investors and developers on the potential use cases of AI. Chatbots can respond to people in their native language, either verbally or in text, and can interact with both humans and other machines. The AI component allows chatbots to respond to more complex situations and continuously 'learn' so as to improve their effectiveness over time.

Chatbots can be divided into two categories: those that serve a specific use case (ordering from a particular restaurant or a savings function such as Digit) and those that offer a more concierge-style personal assistant role (such as Pana).

Some of the existing personal assistants such as Google Now are push based (and rely on past user behaviour to pre-empt what the user may require), while Siri for example responds to specific queries. There is little difference between these early personal assistants and the new chatbots, with the former likely to be seen as merely one example of the range of potential chatbot use cases.

The terms 'invisible apps' and 'conversational commerce' have been coined to describe these new services that communicate with users via messaging rather than apps. Examples include the following:

Assist: a free chatbot focused on shopping and travel services that acts as an aggregator to allow a user to order a range of different services (food, clothes, travel etc.) from a broad choice of suppliers. Assist has no human interface and provides what it perceives to be the best answer to any specific question. It then ensures the delivery of the selected service.

Digit: an automated savings product that monitors a user's spending habits and income and then begins automatically deducting an amount to transfer into a savings account each month, based on what the user can afford to save.

Pana: a fee-based travel concierge service that allows users to book all aspects of travel in one location, including flight bookings, hotels and restaurant reservations.

Source: GSMA Intelligence

2 Personal assistant examples

	Company	Launch	OS availability	Device capability	Addressable market[1]	Strategy
Siri	Apple	October 2011	iOS	Smartphone, tablet, watch, TV, car	c.500 million	• Improve consumer ease of daily planning and search (via integration with third-party apps), with potential to target the home • Further retention tool across Apple ecosystem
Google Now	Google	July 2012	Android, iOS	Smartphone, tablet	c.1.7 billion	• Improve consumer ease of daily planning and search (via integration with third-party apps), with potential to target the home • Natural extension of Google strength in search, and in consolidating information (integrated with at least 120 third-party apps) • Cross platform although few users likely from Apple; most from Android (available on v4.1 and later, equivalent to 94% of Android's installed base)
Cortana	Microsoft	April 2014	Windows (global), iOS and Android (US and China)	Smartphone, tablet, PC	c.1.5 billion	• Improve consumer ease of daily planning and search (via integration with third-party apps) • Windows Phone base is low (less than 5% smartphone share) and relatively few app integrations • More likely play is to hook in existing Windows PC users who are on iPhone or Android for mobile • Further extension of Microsoft's new cross-platform and ecosystem strategy
M	Facebook	August 2015 (beta)	Facebook (proprietary)	Smartphone (Facebook Messenger)	c.800 million	• Improve consumer ease of daily planning and search (via integration with third-party apps) • Uses manual human oversight for all queries (unlike competitors). Play is to use these 'trainers' to help AI learn and improve • Reactions from beta broadly positive, but obvious questions arise in scaling this model to larger user base

The big questions with the rise of chatbots and the use of AI are: where will these new services sit and how they will be accessed? Specifically, can AI become a platform in its own right, or will it need to be accessed through other services or platforms?

The ongoing shift from app stores to messaging platforms as described previously is opening the door to new ways of engaging with users, namely through direct messaging rather than apps. While in some cases this may be done through the dominant messaging services (such as Facebook Messenger or WeChat) or new emerging platforms such as Slack, the ubiquity and simplicity of SMS means that basic text messaging can also become an alternative platform for consumer engagement (and one that implies a much greater degree of control of the customer relationship for the service provider).

However, the challenges for chatbots and AI that sit outside of the dominant messaging platforms will be the same one facing app stores today, namely discovery and gaining new users. A further dimension to this debate will be the role of the two dominant players in the OS space, Google and Apple. Although both have successfully monetised app stores, the potential shift away from apps raises questions as to the sustainability of aspects of their business models.

Google recently launched a new virtual assistant, Google Assistant, which can be accessed through both voice and messaging. Google Assistant has been integrated into two additional consumer interface products – the chatbot messaging app 'Allo' and Google Home. The latter is designed to allow control of smart devices in the home.

Google has also announced plans to develop Instant Apps, an attempt to bridge the experience gap between the mobile web and apps. Instant Apps allows use of an app without downloading it in full, to fulfil certain single-purpose functions such as watching a video or completing a purchase. This may in part help address the problems of discovery for app stores highlighted previously, as well as increase the relevance of search on mobile devices.

Microsoft is also entering the space and appears committed to chatbots and the development of artificial intelligence, despite the ill-fated experiment with its Twitter chatbot 'Tay'. Having lost out in the development of the smartphone ecosystem to both Google and Apple, the use of speech and/or messaging interfaces could allow Microsoft to re-establish a presence in the post-app environment.

Microsoft launched its Cortana personal assistant in 2014; its adoption has been limited given its reach in the smartphone market. However, Microsoft still has a significant presence in the enterprise space, where PC and laptop usage remains high. Even there though, the company's position could be under threat, given the growing range of computing technology that does not rely on a mouse or keyboard for interaction. The scope to use a voice- or messaging-based interface to a personal assistant could be particularly attractive to support a number of productivity-focused functions. Microsoft has clearly stated its intention to open Cortana to a broad range of developers, with plans for a Cortana app store and bots that are platform independent.

The rise of AI: is this the dawn of the machine age?

A key driver of the evolution of chatbots and other AI applications, and their effectiveness to deliver services, will be the pace of development of the intelligence and the ability to deliver a holistic range of services. While AI is appealing in principle (and in practice having attracted over $1 billion of venture-capital funding in the last year), the reality still lags behind the potential as portrayed in science fiction. As noted succinctly by Benedict Evans:

> **"The challenge in plugging an AI into a 'conversational' chatbot interface is that you don't have HAL 9000 but are in some sense pretending to the user that you do"** [2]

The issue is whether the AI can answer all the questions that can be put to it, or even to have an answer before the question is even posed. In this context, Mark Zuckerberg's challenge to himself for 2016 – to build an artificial intelligence that is able to run his own home – is particularly pertinent:

> **"I'll start teaching it to understand my voice to control everything in our home — music, lights, temperature and so on."** [3]

2 "Chat bots, conversation and AI as an interface", ben-evans.com, March 2016

3 Mark Zuckerberg, Facebook.com, January 2016

Although the technology is close to achieving many of these things, the fact that this challenge is actually necessary underlines the point that the tech is still evolving. The combination of VC funding and the investment from the established internet players suggests that progress in machine learning will continue to be rapid. However, the prospect of true artificial intelligence, based on enabling machines to learn by themselves, still seems some way off. Facebook's AI lab is for example focused on developing a form of artificial commonsense for machines. This would involve 'making an "educated guess" based on a comparison of detailed mathematical descriptions of known and unknown responses when it comes across an image or text that it does not understand'[4].

The nearer term reality is that AI may be most effectively deployed in narrow enough scenarios or in specific services, where the current limitations of AI will not be exposed. For example, a number of the chatbot services currently in the market rely on significant human input to verify the machine outputs or in some cases answer specific questions or fulfil a particular request. For the foreseeable future this would appear to limit the scope for AI and chatbots to develop as platforms in their own right, but rather as services that are accessed through established messaging platforms.

Implications beyond the smartphone: IoT and the screenless world

The success of the app ecosystem has cemented the central role of the smartphone as a hub for accessing and controlling a range of services, expanding well beyond communications and content consumption. A good example of this is the smart home: a range of service providers are focused on smartphone (or tablet) apps that allow users to manage security, heating and lighting.

However, in an eventual post-app environment the need for a screen comes into question. With intelligence located in the cloud rather than relying on the computing power of a device, a relatively simple device can act as the interface between the user and the cloud-based service. Several examples highlight the scope for developers and other players in the IoT space to consider developing new platforms and interfaces for their AI-based services, beyond the current smartphone focus:

- The updated version of Amazon Echo, Alexa, appears to lack (for now) the intelligence of some of the other AI-based assistants such as Siri or Google Now, but the key development is the ability to build services and ecosystems that do not rely on a smartphone as a central hub or interface.
- Google has announced the launch of Google Home, a similar product to Alexa that allows access to Google Assistant and will be used to control connected devices in the home, such as speakers and Google Nest.
- Sony has announced a concept product, Xperia Agent, a desktop AI-driven personal assistant that can respond to voice and hand gestures. The device can move and project information onto a flat surface, and is designed as a control hub for the home or office. Though this is some way from being a commercial product, it highlights the real opportunity for screenless interactions in the not too distant future.

4 "Facebook CEO Mark Zuckerberg sets personal AI challenge for 2016", ComputerWeekly, January 2016

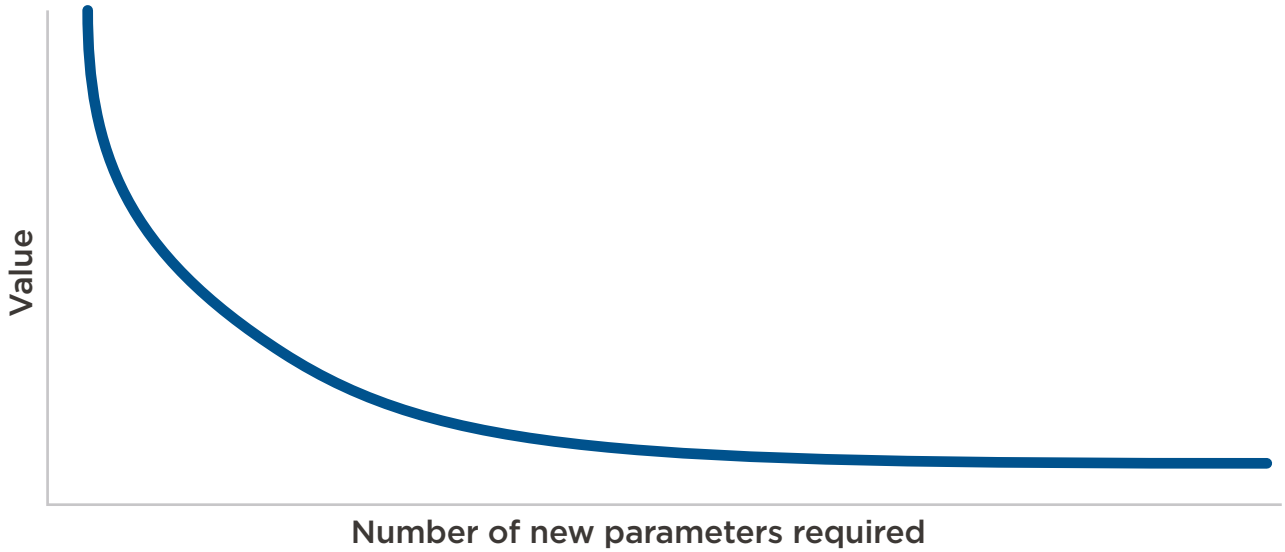
4.4 The industry at a crossroads

The smartphone engagement model is undergoing a fundamental shift. The growth of apps led to the unbundling of the internet, but the highly fragmented user experience of the app world is now seeing a rebundling of services and user engagement around new 'aggregators'. In large part this is happening around the now dominant social/messaging platforms, but the arrival of AI-driven chatbots opens the door to alternative scenarios. While we may be approaching the peak of the hype cycle around chatbots and AI, these related technologies are set to continue the rapid pace of development seen over the last 12–18 months.

The question of how quickly AI will develop is central to this debate; namely, how close we are to developing genuine 'intelligence', so that a user does not need to frame a specific question but rather is provided with the information or services that are required at that particular point. It is clear that the value of a service or chat interface to a user is inversely related to the amount of information that the user has to actively supply.

Source: GSMA Intelligence

4 Value of chat interfaces deteriorates without context



This would suggest that the existing internet platforms (app constellations) that already attract the majority of user engagement time (and as a result the most amount of user information) are best placed to be able to answer the question before it is asked. This high level of contextual awareness is likely to become the key differentiator going forward. The challenge for service providers is whether they have a route to gaining contextual information themselves or through partnership with other providers.

However, there are clearly specific use cases (particularly in the enterprise space, which has seen the rapid adoption of Slack) or applications (such as the intelligent home) that could see the development of both new platforms and new 'dumb'/screenless terminals as alternatives to the use of smartphones. This in turn may create opportunities for operators to play a more active role in the changing mobile ecosystem. The increasing relevance of big data and analytics reinforces the need for effective privacy safeguards and a secure way to authenticate identity. Similarly, dumb terminals require pervasive and high-speed connectivity to connect to cloud services, while the growing use of speech and messaging-based interfaces opens the door to partnerships with other players looking to challenge the dominant players in the smartphone ecosystem.