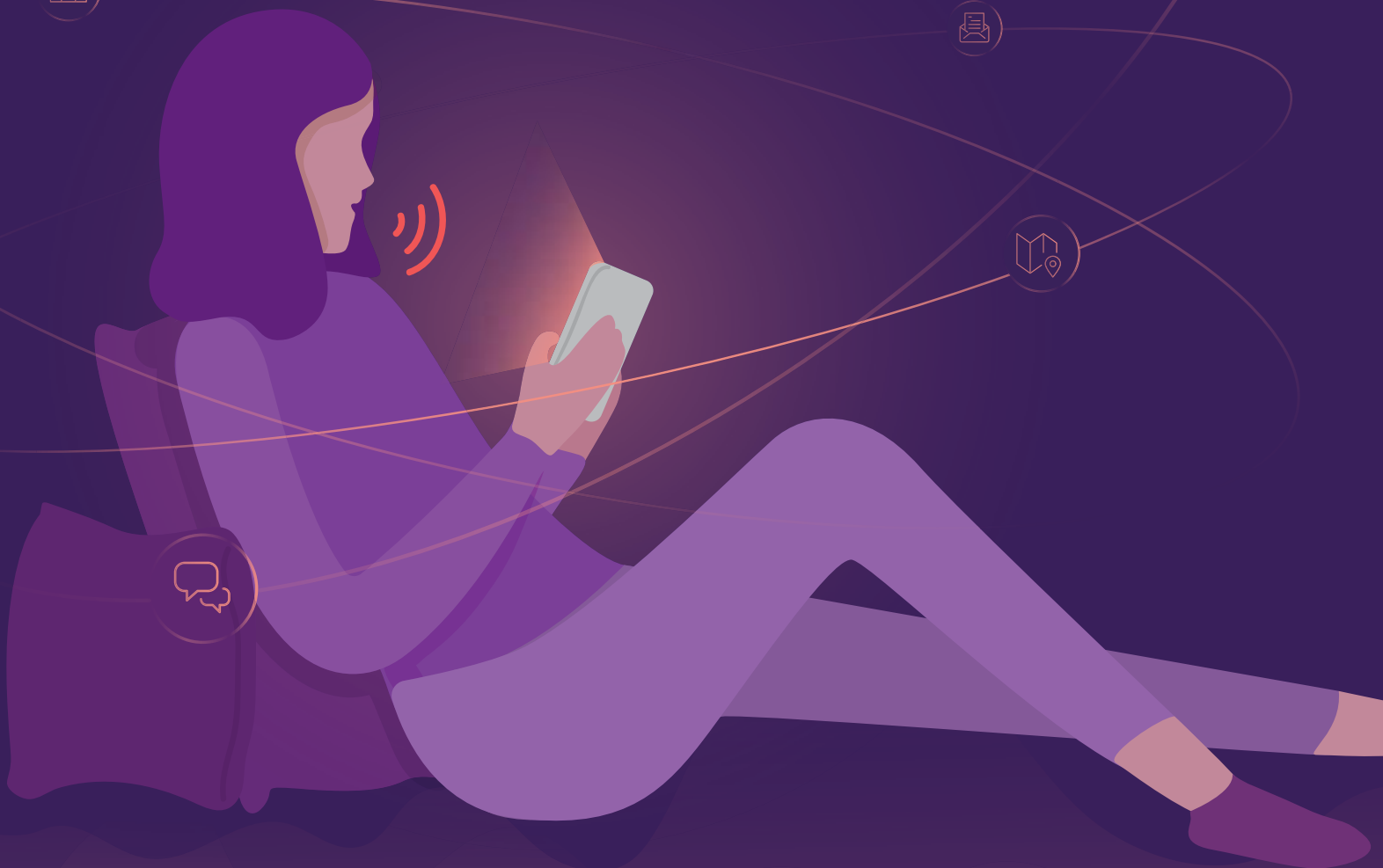# Rise of the Machines: How AI-Driven Personal Assistant Apps Are Shaping Digital Consumer Habits

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Introduction

Over the past year, Verto Analytics has published critical research identifying and tracking rapidly-emerging trends in consumer behavior, particularly on mobile devices. Our audience measurement services are geared to not only quantify, but to also understand how digital usage is evolving. From the rise of multitasking to the continued influence of cross-device behavior on digital usage, one thing is clear: consumer habits are changing faster than before, aided by an increasingly novel technologies and shorter device innovation cycles. The prevalence of Internet access, the rise of social media, e-commerce, and now, most recently, mobile apps, have all shaped how consumers behave with digital devices.

The question is, are we witnessing another disruption in consumer behavior?

Within the past few years, we've witnessed the rise of AI-powered apps, which harness cloud-based natural language processing (NLP) and machine learning to power a more sophisticated wave of apps and services. In many ways these apps, such as Amazon Alexa, are replacing and providing a next-generation user experience for digital content and everyday tasks. Many of these apps provide a more contextually-driven, seamless way for consumers to perform tasks like checking news, weather, or directions. And new apps and services are not the only ones making inroads into the AI space: existing user interfaces on both Android and iOS devices are also evolving quickly. It's not always easy to see these services as distinct concepts.

AI: The overall concept includes elements such as machine learning, natural language processing, and other intelligence produced by machines.

In this report, we explore how people actually use these AI-driven apps today. While AI-driven personal assistant apps are still very much in their early days, today's data on early adopters gives us an idea about the future of AI, and which apps might lead to mass market adoption.

MULTITASKING: Verto Analytics defines a multitasking session as one during which at least four different apps are used in the same session, and at least seven different "movements" (or, a shift from app to app) occur among these apps. To learn more about consumer multitasking, please see our February 2017 report, **Multitasking and Mobile Apps: New Ways to Measure Consumer Behavior**.

CROSS-DEVICE BEHAVIOR: Consumer activity that occurs on multiple devices simultaneously, eg., using a smartphone while also using a PC.

Hannu Verkasalo
CEO

User Growth for Personal Assistant Apps Shows Spotty Growth and Some Decline

In May 2017, Verto Analytics conducted its first Personal Assistant Apps Index, which ranked the most popular AI-powered personal assistant apps being used on smartphones, from Siri to Alexa.

Over the past year, the personal assistant apps sector has seen major user growth among certain apps, but this has also been accompanied by stagnation and even a decrease in users among some major players, such as Siri and S-Voice, the personal assistant app for Samsung devices. While Siri is still the top-ranking personal assistant app based on number of unique monthly users, between May 2016 and May 2017 Siri lost 7.3 million monthly users (nearly 15% of its total). User engagement with Siri has also dropped significantly over the same time period: the app's "Stickiness Index" (a metric we use to quantify engagement by comparing daily users to monthly users) dropped by nearly half — from 21% to 11%.

STICKINESS: Verto Analytics measures user engagement by answering the question, "How likely is a user to return to the service day after day?" Stickiness is calculated as average daily users over total monthly users (DUU/MUU).

While the Google-owned properties on our Index have enjoyed modest growth over the past year, emerging players like Microsoft's Cortana and Amazon's Alexa are quickly gaining traction. Although its user numbers are comparatively tiny, Alexa has seen a 325% increase in monthly unique users (from 0.8 million to 2.6 million) during the past year, and has more than doubled its stickiness rating, from 10% to 22%. Cortana has also seen a significant jump in monthly unique user numbers, from 0.2 million to 0.7 million (a 350% increase), with stickiness ratings tripling from 19% to 60%.

Subject	Monthly Unique Users [M]		Net Reach [%]		Stickiness [%]		Time Spent per User per Month [Hours]		Sessions/User/ Month [#]		Average Session Duration [Minutes]	
	May 2016	May 2017	May 2016	May 2017	May 2016	May 2017	May 2016	May 2017	May 2016	May 2017	May 2016	May 2017
Siri (for iOS)	48.7	▼ 41.4	22.60	▼ 19.24	21	▼ 11	00:39	▼ 00:14	14	▼ 5	02:53	▲ 02:59
S Voice	24.8	▼ 23.2	11.53	▼ 10.76	18	▼ 14	00:06	▲ 00:07	13	▼ 9	00:29	▲ 00:46
Cortana	0.2	▲ 0.7	0.10	▲ 0.32	19	▲ 60	00:11	▲ 02:31	14	▲ 177	00:51	00:51
Google Allo	n/a	▲ 1.0	n/a	▲ 0.46	n/a	▲ 43	n/a	▲ 02:30	n/a	▲ 122	n/a	▲ 01:14
Google Now Launcher	0.0	▲ 0.1	0.01	▲ 0.05	25	▲ 26	00:00	▲ 00:01	2	2	00:28	▲ 00:42
Google Home	4.5	▲ 4.7	2.10	▲ 2.20	7	▼ 6	00:04	▲ 00:05	5	▼ 4	00:55	▲ 01:28
Google Text-to-Speech	7.6	▲ 19.8	3.51	▲ 9.18	8	▲ 11	00:02	▲ 00:05	4	▲ 5	00:33	▲ 01:07
Amazon Alexa	0.8	▲ 2.6	0.37	▲ 1.21	10	▲ 22	00:07	▲ 00:18	6	▲ 16	01:10	▼ 01:07
HOUND Voice Search & Assistant	0.1	0.1	0.03	0.03	33	▼ 29	00:02	00:02	11	▼ 2	00:12	▲ 01:02

Going Beyond User Numbers: How Are Consumers Actually Using Personal Assistant Apps?

User numbers are useful to examine, but they don't tell the full story about consumer behavior. Just how prevalent are personal assistant apps in consumers' daily lives? What are these apps being used for, and how often are they actually being used?

Verto Analytics data shows that 44% of all smartphones in the U.S. (owned by adults ages 18 and over) had a personal assistant app that was used at least once in May 2017. While this is a greater share than the 34% of smartphones that had a search app (such as Wikipedia, Yelp, or the Google search app) installed and used during the same time period, it still significantly lags behind the use of website-based search: 87% of the smartphones in the U.S. had a web browser installed and used a search website during May 2017.
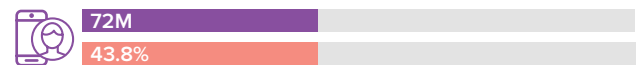
APP REACH IN SMARTPHONES (MAY 2017)

■ **Count of Devices [#]**   ■ **Reach [%]**

Total Smartphones
- 169M
- 100%

Phones with AI Apps
- 72M
- 43.8%

Phones with Search Apps
- 60M
- 34.3%

Phones with Search Websites
- 143M
- 86.8%

TIME SPENT ON SMARTPHONES (MAY 2017)

■ **Total Time Spent [hrs]**

All Apps
- 18.8B

AI Apps
- 14.6M
- 0.08% of Total Time

Search App
- 91.4M
- 0.49% of Total Time

Search Websites
- 369M
- 1.98% of Total Time
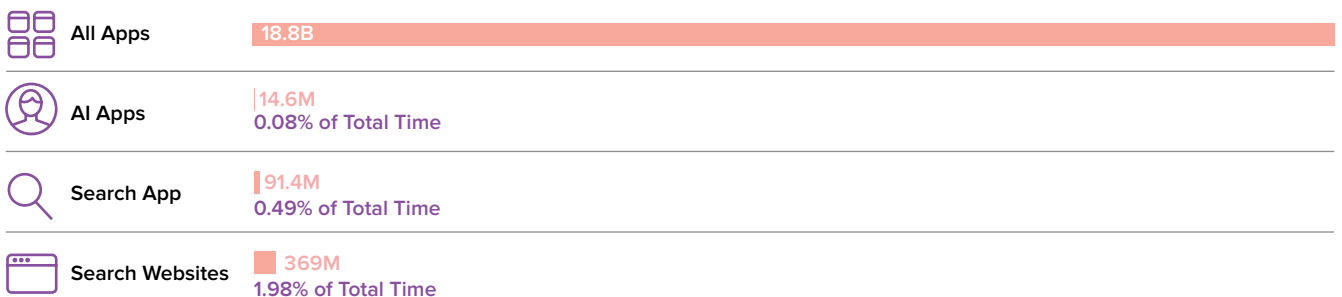
USER NUMBERS AND SESSION METRICS (MAY 2017)

	Avg Time Spent/User/Month [min]	Avg Session Length [sec]	Total # of Sessions/User/Month	Total # of Unique Users/Month
AI Apps	12.3	75	10	71M
Search Apps	93.5	112	93	59M
Search Websites	160	214	31	138M
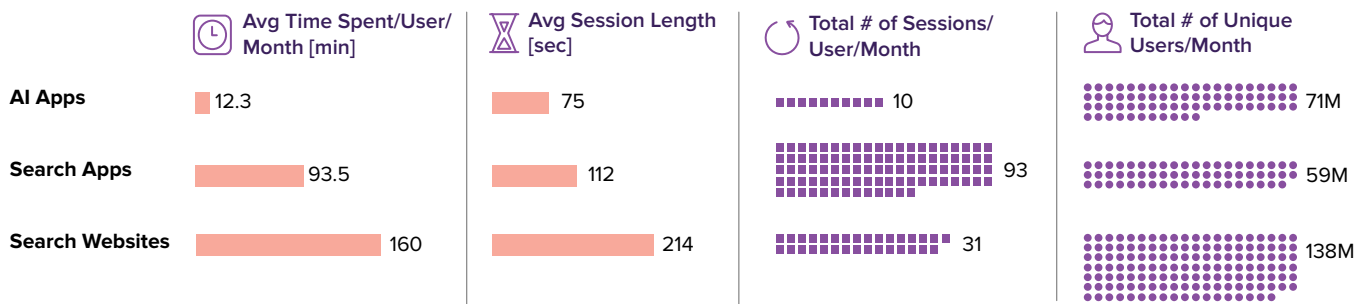
Despite the 44% app reach of personal assistant apps, Verto Analytics data shows that the amount of time consumers spend in these apps (as a percentage of total time spent in apps) is still tiny. Specifically, usage averages about 12 minutes per user, per month – or, less than 0.1% of the total time users spend in smartphone apps overall. In fact, during the past 12 months, consumers seem to have spent even less time using such apps: while the average number of personal assistant app users overall has remained relatively stable, the average amount of time spent per user has actually decreased over the same time period. We need to remember that the user base for these apps is still low, and the availability of content and use cases restrictive. It is therefore interesting to see how these engagement levels trend toward the future, as we assume more users will start to experiment with personal assistant apps.

PERSONAL ASSISTANT APPS: REACH AND TIME SPENT/USER/MONTH

— Users — Time Spent per User/Month
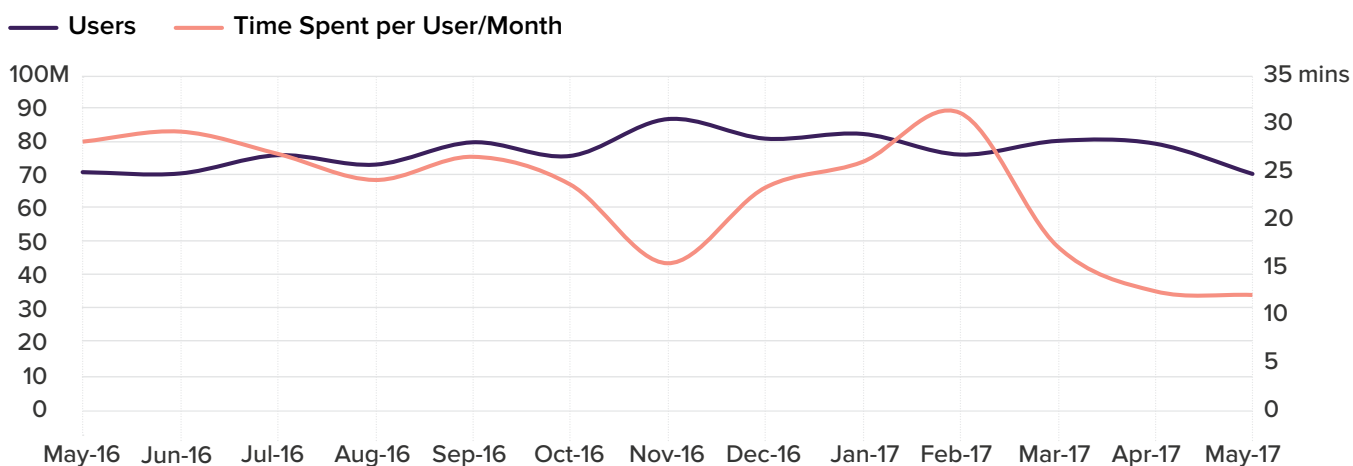
Which Apps Do Consumers Use Before and After Personal Assistant Apps?

Verto Analytics conducted a funnel analysis of consumer activity to identify which apps consumers use before and after personal assistant apps. Based on the assumption that personal assistant apps are often used to search for information, we also conducted a second funnel analysis to compare which apps consumers use before and after using a search app or search websites.

Our funnel analysis of personal assistant apps reveals that Google-owned properties dominate consumer activity both before and after the use of personal assistant apps; Chrome, Google Maps, and the Google Play Store are the

FUNNEL ANALYSIS: In the context of this report, a breakdown of what app a consumer used immediately before and after the given app on which we are focusing: in this case, an app categorized as a "personal assistant app" as per Verto Analytics.

three primary apps used on both ends of the funnel. This may be partly due to the high number of Google-owned personal assistant apps in the ecosystem (as seen in the

Personal Assistant Apps Index above). We also noted this trend in our February 2017 report, Multitasking and Mobile Apps: New Ways to Measure Consumer Behavior, which pointed to the development of a Google-centric ecosystem of apps and services at the heart of consumer multitasking behavior. The presence of YouTube and Netflix also points to another interesting possibility: are Google's personal assistant apps being used in conjunction with devices such as the Chromecast and Google Home hub?

Looking outside the Google ecosystem, Safari, Facebook, and Facebook Messenger are among the top 10 apps consumers use before and after personal assistant apps, but comprise a far smaller share of overall activity. And, although Mark Zuckerberg made a well-publicized announcement launching Facebook Messenger as a platform for bots last spring, that platform plays a minor role in our funnel analysis: while Facebook accounts for about 4% of the share of apps used both before and after personal assistant apps,
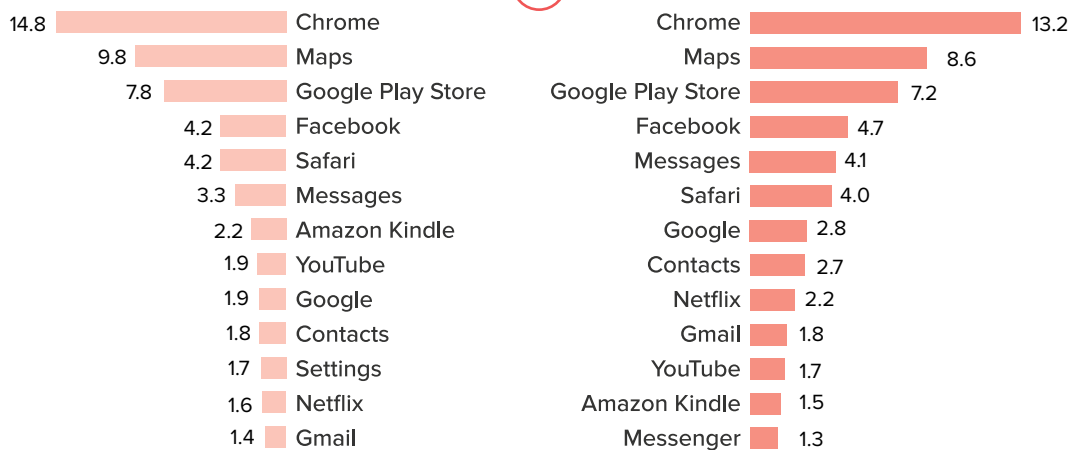
Personal Assistant Apps Used Largely for Entertainment, Navigation

Our funnel analysis suggests that consumers are largely using personal assistant apps for navigation (via Google Maps) and possibly for accessing entertainment content in the home, as evidenced by the presence of apps like Netflix and YouTube. This behavior is especially apparent when we compare our funnel analysis of personal assistant apps with our funnel analysis of search apps, where the presence of Google Maps is minimal.
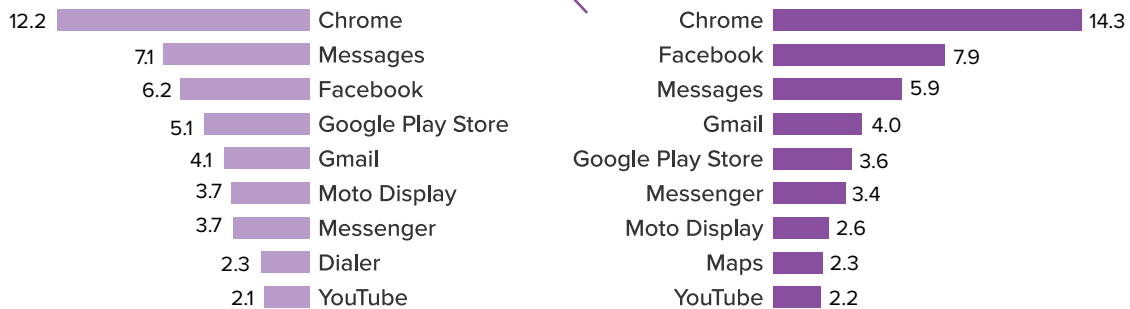
Facebook Messenger only accounts for about 1% of the apps used immediately following personal assistant apps. For now, at least, the Facebook Messenger bot ecosystem seems to be a closed one, with little interaction with other personal assistant apps.

FUNNEL REPORT (MAY 2017)

Before Personal Assistant App [%] → → After Personal Assistant App [%]

Before Personal Assistant App [%]		After Personal Assistant App [%]
14.8	Chrome	Chrome 13.2
9.8	Maps	Maps 8.6
7.8	Google Play Store	Google Play Store 7.2
4.2	Facebook	Facebook 4.7
4.2	Safari	Messages 4.1
3.3	Messages	Safari 4.0
2.2	Amazon Kindle	Google 2.8
1.9	YouTube	Contacts 2.7
1.9	Google	Netflix 2.2
1.8	Contacts	Gmail 1.8
1.7	Settings	YouTube 1.7
1.6	Netflix	Amazon Kindle 1.5
1.4	Gmail	Messenger 1.3

Before Search App [%] → → After Search App [%]

Before Search App [%]		After Search App [%]
12.2	Chrome	Chrome 14.3
7.1	Messages	Facebook 7.9
6.2	Facebook	Messages 5.9
5.1	Google Play Store	Gmail 4.0
4.1	Gmail	Google Play Store 3.6
3.7	Moto Display	Messenger 3.4
3.7	Messenger	Moto Display 2.6
2.3	Dialer	Maps 2.3
2.1	YouTube	YouTube 2.2

Who Uses Personal Assistant Apps?

Verto Analytics data shows that women (54% of total user base) use personal assistant apps slightly more frequently than men. And interestingly, we see a trend toward personal assistant app usage in older age groups, especially adults in the 45-54 and 55+ age groups.

In fact, Verto data shows that the personal assistant "superuser" – someone who spends more than twice the average user's monthly time spent on personal assistant apps – is a 52-year-old woman who spends 1.5 hours per month with personal assistant apps.
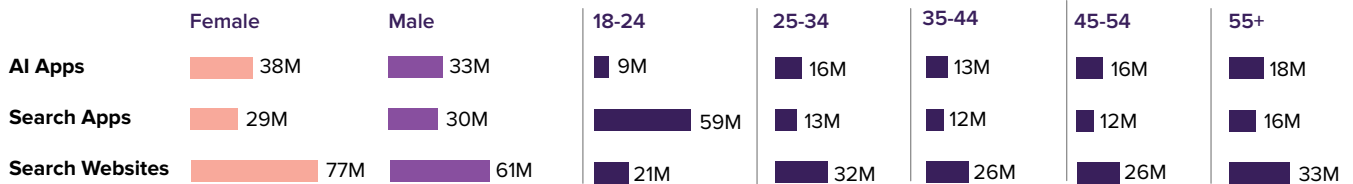
SUPERUSER
▶ 52-year-old Female
▶ Spends 1.5hr/Month on AI Apps

SUPERUSER: A consumer who spends more than twice the average monthly time on a given app or app category.
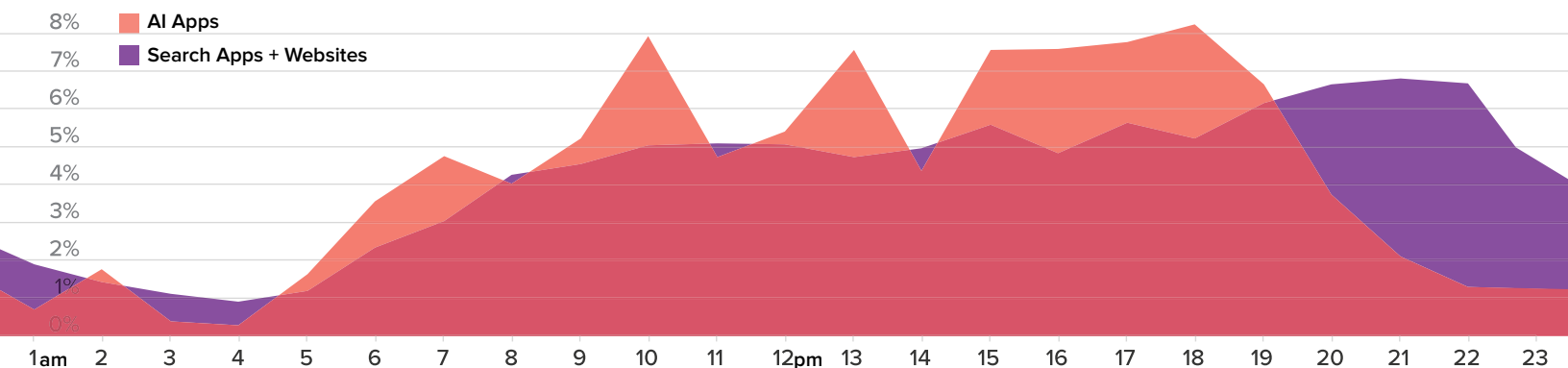
DEMOGRAPHIC BREAKDOWN

	Female	Male	18-24	25-34	35-44	45-54	55+
AI Apps	38M	33M	9M	16M	13M	16M	18M
Search Apps	29M	30M	59M	13M	12M	12M	16M
Search Websites	77M	61M	21M	32M	26M	26M	33M

A Day in the Life of a Personal Assistant App

We compared a typical "day in the life" of a personal assistant app with that of a typical search app or web browser (note: consumers spend far less time on personal assistant apps than search apps and web browsers; the chart below shows the percentage of total time for each category).

As shown in the chart below, personal assistant apps show distinct spikes in activity at 10am, 1pm, and a steady climb throughout the evening hours (2-7pm), before dropping off in the evening. In contrast, search activity (search apps as well as browsers) sees a continuous and steady rise throughout the course of the day, beginning at 5am and peaking at 10pm.

Since our earlier funnel analysis revealed that Google Maps is one of the most frequently-used apps both before and after personal assistant apps, it seems logical that personal assistant app activity spikes around commute hours and lunchtime: periods of the day when consumers are often on the go. And as consumers arrive home during the evening hours, their activities may switch to home-based devices, such as Amazon Echo or Google Home.

AI Apps
Search Apps + Websites

8%
7%
6%
5%
4%
3%
2%
1%
0%

1am 2 3 4 5 6 7 8 9 10 11 12pm 13 14 15 16 17 18 19 20 21 22 23

Personal Assistant Apps Today

Based on Verto Analytics data, we've observed the following trends about consumer behavior with personal assistant apps today:

1 Phone-based personal assistant apps, such as Siri and S-Voice, are slowly falling in popularity, with one exception: navigation and maps (as our funnel analysis showed). Are consumers turning towards specialized hardware devices for other activities? The current buzz around dedicated assistant devices such as the Google Home and Amazon Echo imply that the consumer market may be more comfortable with dedicated assistant devices – at least for home use.

2 Consumers behave differently with personal assistant apps compared to other types of apps. For example, while the reach of personal apps is about half that of search websites, the average consumer spends significantly fewer sessions and accrues less time per month on personal apps than on search websites, as seen through much shorter session durations.

3 Verto Analytics' demographic data shows that the personal assistant apps users base skews towards older women, and our day-in-the-life analysis shows a spike in personal assistant apps usage during the morning, lunch, and evening commute hours. Are personal assistant app "superusers" relying on these apps to navigate them throughout the day? Regardless, we are seeing the greatest uptick in and engagement with personal assistant apps in a demographic population (older women) that does not conform to the usual early adopter user base.

4 Personal assistant apps have not yet found their niche in the consumer market, meaning they do not yet play an important role in the daily digital life of the average consumer. While other mobile app categories, such as games and ecommerce, have carved out distinct, significant footholds in user behavior (as measured by the amount of time users spend with these categories of apps on a monthly basis), personal assistant apps, despite often being automatically installed on mobile devices, have not yet gained traction. However, early data from a newer breed of apps, such as Alexa and Cortana, show massive yearly gains in user numbers and hint at the potential for significant future growth, especially as the personal assistant apps and devices ecosystem continues to evolve, and as consumers develop a greater comfort level with AI-driven apps and services.

The Future of the Personal Assistant App Ecosystem

The personal assistant app landscape is quickly evolving, and many of the biggest technology companies — Apple, Amazon, Google, Microsoft, Facebook and Samsung, just to name a few — have already released a constellation of apps, services, and devices aimed at tapping into this emerging market with markedly different strategies. Facebook has chosen to focus solely on its bot-driven ecosystem on the Facebook Messenger platform, while Amazon has released one app and a series of devices to fit into different consumer environments and needs.

But, as seen in our Index rankings, amid the hype of new entrants like Alexa and the declining user base of Siri, one notable major player has secured an interesting foothold in the ecosystem: Google. Google already owns a number of different apps featured on our Index, including Google Allo, Google Now, and Google Home, which have all enjoyed modest growth in monthly unique users and engagement over the past year. This multi-app strategy has not yet been adopted by any of the other players on our Index; it's possible that Google will try to consolidate its personal assistant app catalog and user base as it faces growing competition in this sector. And with the addition of its own home automation device, Google's multi-app strategy may in fact be the path to market dominance.

As the personal assistant app landscape continues to mature, it will inevitably drive the evolution of user interfaces and home screens and voice-guided interaction mechanisms; the whole paradigm of how consumers use mobile (and other) devices is rapidly changing. And especially over the next year, as new players continue to enter the market, consumer behavior will ultimately dictate which apps, services, and devices succeed.

About Verto

Verto Analytics provides a consumer-centric measurement solution for monitoring the complex behavior of cross-device consumers on every device, app, and platform they used throughout the day. We provide data and insights that inform marketing, competitive intelligence, media buying, and product strategy and development.

The data and analysis used in this report are products of **Verto Watch,** which offers syndicated research on the cross-device consumer accessible 24/7 from an online reporting portal. To understand the motivations that drive consumer behavior, we use **Smart Poll** to combine survey research with behavioral metrics by using passive cross-device metering of our opt-in panel of consumers. **Audience Profiles**, our newest product, combines behavioral, demographic, device usage, and competitive insights and allows us to visualize a day in the life of that user or audience segment.

Verto Methodology

Verto Analytics' single-source, passive measurement methodology is based on behavioral data gathered from a panel of consumers that owns and uses multiple devices. We measure from the point of consumer interaction across all platforms, media, content, and devices. Our panelists, who are compensated for their participation depending on their demographics, opt in to install a measurement app on their digital devices.

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