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INTRODUCTION

With the introduction of smartphones and tablets in the 2000s, there has been a rapid expansion of the mobile application market worldwide. In July 2008, 25 years after the Aspen Conference where Steve Jobs first predicted the creation of a software distribution system, the first mobile application store was launched by Apple. Within a week, over 10 million downloads were made on the Apple Store. Within 60 days, the Apple Store had over 3,000 applications available in 62 countries. Three months later, the Android Market was launched and soon became the second major mobile application platform.

In March 2012, the Android Market merged with Google's store and was renamed the Google Play Store. Google Play surpassed the Apple Store towards the end of 2014 as the biggest mobile app platform. This increased activity has resulted in sharp revenue growth. Global mobile app revenue is estimated to be over \$40 billion for 2015, and it expected to exceed \$100 billion by 2020. Even though Android has surpassed Apple iOS as the largest platform, iOS continues to generate more revenue.

This thriving mobile app industry has created a high demand for developers. In the US alone there are over 1 million software publishers, the mobile app developers are estimated to be around 680,000 in 2014. This industry continues to grow. The US Bureau of Labor Statistics estimates that software developer occupations, the larger umbrella that includes app developers, will increase by

17% from 2014 to 2024. Importantly, the majority of these developers work for companies that target the consumer market.

This fast-paced growth has resulted in a very diverse industry. While few app publishers are well established, the majority app publishers are startups. Furthermore, several large companies only develop one app and have over 50,000,000 downloads; other companies, have five or fewer employees and develop multiple apps that, collectively, reach the same size market. This diversity in the industry makes it difficult for companies to benchmark themselves against one another and little research has been published that provides meaningful information on performance and operations for the industry.

To address this issue, this report provides insights on app performance, user management, and business operations for consumer-facing app publishers. We examine four main categories: 1) app performance and user management; 2) revenue generation; 3) advertising; and, 4) operations expenses and developer staffing. To allow for comparison across firms, we assess performance by publisher size, app type, and market reach, among others. Our findings are based on our 2016 global survey of 338 developers and staff at firms who develop consumer-facing apps, as well as in-depth interviews with industry experts and findings in existing literature.



This report is produced by the Application Developers Alliance, a non-profit global membership organization that supports developers as creators, innovators, and entrepreneurs.

We promote the continued growth of the industry and advocate on behalf of our members on public policy and industry issues.

Our membership includes a global network of tens of thousands of developers with diverse skills, expertise, and interests; and hundreds of companies that depend on and work with developers.

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App Performance & User Management



APP PERFORMANCE & USER MANAGEMENT

From idea generation through measuring success (or lack thereof), app publishers must always keep the user in mind. This means having a focused strategy on how to acquire them, engage them, and measure them. Publishers use multiple channels for user acquisition, with variation based on company size, type of app, and available budget. Once acquired, the most successful apps engage with their users, and it tends not to matter what platform publishers use.

Key questions that are answered in this section include:

- What information do app publishers collect from their users (and what do they use it for)?
- How do app publishers communicate with their users?
- What are the most common, and the most successful, user acquisition strategies?
- What is the value of user engagement?
- What are the most common ways an app can fail (and how to avoid them)?



Collecting Data & Engaging Users

Collecting user information and tracking activity gives app publishers important data that can be used to maximize the user experience, encourage engagement, and improve the app based on patterns in user activity. Nearly all consumer-facing app publishers collect some sort of data on their users either by requesting users to input information or by tracking activity; most do both (Figure 1). Data gathered by tracking user activity is most commonly used for internal metrics such as revenue and advertising. Meanwhile, user activity data like the screens users access, the frequency of use, and the duration of each visit can inform development operations. For example, it can help to streamline user interface and user engagement (UI/UX), eliminate redundancies or unused features, and predict what features users want to see in future updates or new products.

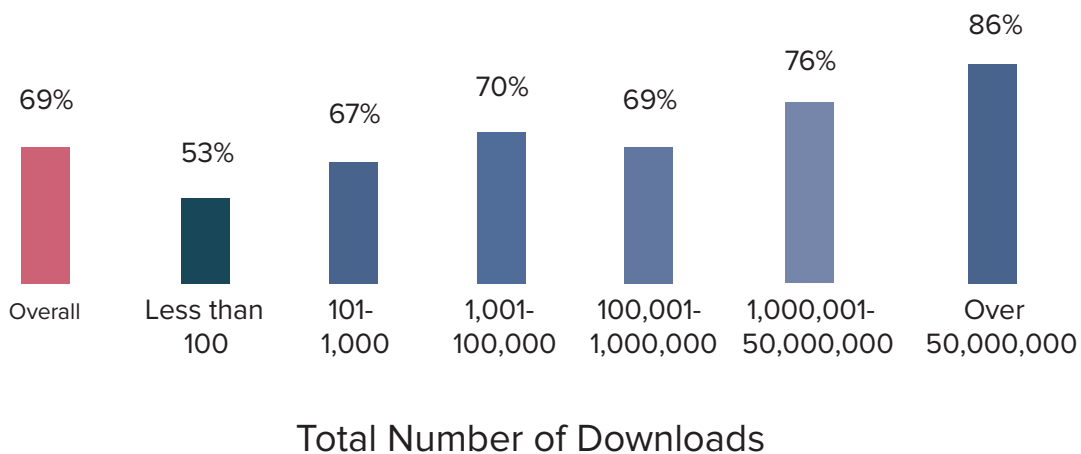
Tracking information helps to understand user behavior. Collecting and retaining user information allows for direct communication outside of the app. Having access to external channels of communication gives publishers more ways to effectively engage their users. Either through the app itself or via other channels, publishers communicate with users to share information on changes or updates and to provide notifications on new content.

Acquiring and sustaining the interest of users can be a challenge. Consumers access over 25 apps per month, according to a Nielsen report. With so many options available, apps compete for user time and engagement. Nearly all publishers that have a large market reach use push notifications to engage users (Figure 2). While it is not absolute, market reach and user engagement go hand in hand. One study found that 52% of people became aware of new apps through family members, friends, or colleagues who use those apps. Therefore, engaging current users drives market growth.

Figure 1. Over three-quarters of app publishers collect user data.

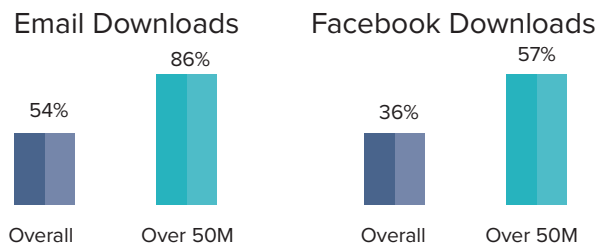


Figure 2. 86% of app publishers with over 50 million downloads use push notifications.



The most popular way to communicate with users is through the app itself, and 57% use multiple channels to reach users. Those channels include websites and blogs, emails, and social media. Of these, email is the most popular external channel, especially for publishers with over 50 million downloads, followed by Facebook (Figure 3). However, in order to capitalize on external communication such as email, it is necessary to collect contact information. Those not collecting data are disadvantaged in their ability to engage with users.

Figure 3. Email is the most common external channel for communicating with users.



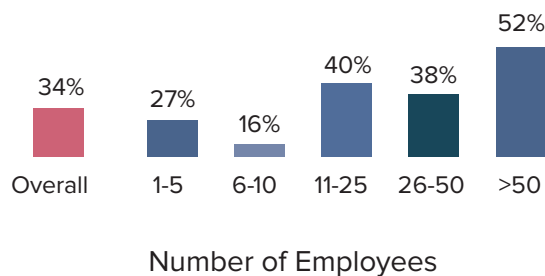
The first step in developing a new app, after an idea has been secured, is to conduct thorough market research to ensure there is demand for the product. It is an easy step to breeze through. Current market conditions or surface level research may indicate a potential market when in reality the window for entry has passed or the market is too niche. In fact, 33% of those who had abandoned an app indicate that failing to understand the market or to conduct sufficient market research was a primary reason an app had been abandoned after its release.

The next step is to design and build the app. An attractive user interface and well-constructed back-end are important to the success of an app. The most frequently used apps are ones that simplify users' lives, are easy to use, and have an appealing design. A well-presented app can be hard to achieve. In fact, 27% say that design issues caused an app to fail. In order to inform future designs, publishers who track user activity can use this data to identify elements of apps where users spend the most time, and alternatively, those where users are quick to abandon the app.

Benchmarking Success

App publishers are constantly developing new products. In fact, over 1,000 new apps are submitted to Apple's App Store daily. The majority develop new apps at least once per year, with about a third developing new apps several times per year (Figure 4). However, this requires significant investment of both time and money. A successful app requires a solid value proposition, significant market research, meticulous design and construction, and targeted marketing and promotion. Skipping out on any of these steps can increase the risk of failure. Using survey data based on respondents' self-identified best apps and failed apps, we examine patterns in building successful apps.

Figure 4. Over half of all publishers develop a new app at least once a year. Larger companies develop new apps more frequently.



User Acquisition Strategies

After developing the app itself, the next challenge is to acquire users. Because there are so many apps available to consumers, publishers need a strategic and focused plan for user acquisition. While more traditional advertising and news coverage are common ways to increase the visibility of an app, social media is king; this is in no small part due to the fact that social media is a tool any publisher can quickly use. The majority of apps experiencing the fastest growth use social media as a primary user acquisition strategy (Table 1, next page). Regardless of the strategy used, promotion of an app is an important factor in its success; 22% cite lack of marketing and promotion as the reason why an app failed after its release.



Table 1. Social media is the most effective user acquisition strategy.

User Acquisition Strategy	Growth Rate					
	Overall	Zero or negative	1% - 5%	6% - 10%	11% - 25%	Over 25%
Social media	50%	28%	47%	57%	68%	50%
Organic growth	39%	31%	35%	49%	32%	17%
News/blog coverage	27%	22%	26%	28%	39%	0%
App store optimization	26%	31%	30%	23%	19%	17%
Advertising	25%	13%	27%	25%	32%	33%
Strategic partnerships	17%	6%	19%	15%	26%	50%
Referral program	15%	9%	17%	13%	16%	33%
Cross-promotion with other apps	11%	9%	11%	15%	6%	0%
Third-party platform/service	12%	6%	18%	7%	10%	0%
Through purchasing a corresponding product IoT/wearable	6%	3%	8%	8%	0%	0%

About 80% rely on multiple channels to attract users, many of those realizing at least some acquisition through organic growth. However, simply increasing the number of channels used to acquire users is not an efficient use of resources. Consumers are flooded with options for apps. In order to reach the intended market, it is necessary to understand which channels are most effective in reaching that market segment. This varies by app type: publishers who create games are more likely than others to use social media. Advertising is more common among entertainment apps compared to utilities or services apps (Table 2, next page). Once a user acquisition strategy has been identified, create a plan and stick to it. Organic growth is the cheapest way to increase a user base. However, an effective paid user acquisition strategy can generate momentum to jumpstart organic growth.



Table 2. User acquisition strategies vary by app type.

User Acquisition Strategy	Major App Categories				
	Overall	Games	Entertainment	Business, Finance or Productivity	Utilities or Services
Social media	50%	59%	40%	45%	56%
Organic growth	39%	36%	40%	45%	56%
News/blog coverage	27%	30%	23%	34%	30%
App store optimization	26%	33%	33%	22%	25%
Advertising	25%	26%	33%	19%	16%
Strategic partnerships	17%	13%	15%	23%	16%
Referral program	15%	19%	13%	22%	14%
Third-party platform/service	12%	16%	8%	10%	5%
Cross-promotion with other apps	11%	11%	18%	12%	7%
Through purchasing a corresponding product IoT/wearable	6%	6%	8%	2%	4%

Even with an aggressive user acquisition strategy, it can take time to grow a user base. The majority of publishers have released their best app within the last two years and the apps that have been in the market longer tend to have more downloads. However, this is not always the case. About 10% of the publishers' self-identified best apps that have been in the market for two years have under 1,000 downloads. This is not surprising. Since the market is saturated with so many options for consumers, it is difficult to obtain a large market share. So, while there are several high profile apps that have over 50 million downloads, 45% of publishers' best apps have generated only 1,000 to 100,000 downloads, and 26% have between 100,001 to 1 million downloads (Figure 5). On average, these apps are realizing slow to mild growth in user acquisition, with about half seeing less than 5% growth, and about a third with 6% to 10% growth.

Figure 5. Over 65% of publishers' best apps have under 100,000 downloads.

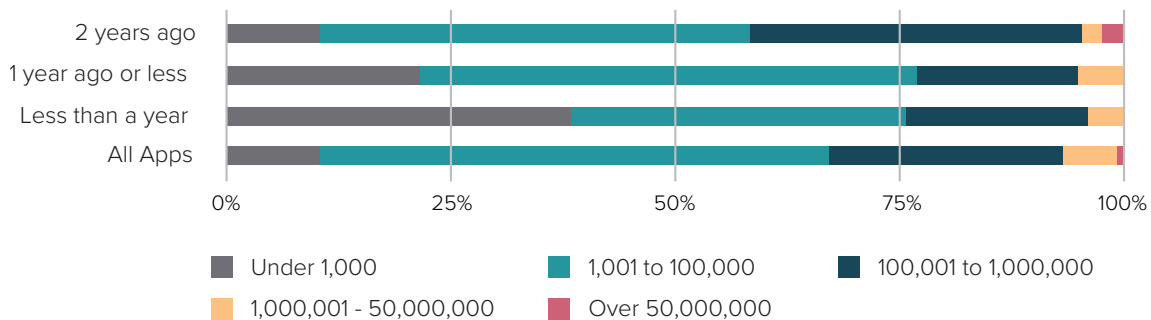


Table 3. App publishers that communicate with users via the app itself, email, website or Facebook have higher rates of user engagement.

Frequency of User Engagement	Most Popular Communication Channels				
	Overall	Through the app	Email	Website or blog	Facebook
Several times a day	7%	8%	10%	14%	7%
At least daily	21%	26%	27%	27%	23%
At least every few days	42%	52%	55%	52%	52%
At least once a week	57%	69%	70%	70%	68%
At least every few weeks	67%	78%	81%	82%	79%
At least once a month	78%	88%	89%	91%	90%
At least once every few months	86%	94%	97%	97%	94%
Only once or never	14%	6%	3%	3%	76%

User Engagement

Keeping users engaged can be just as daunting for publishers, if not more so, than acquiring them in the first place. In fact, about one in four installed apps is never actually used by the consumer. On average, the most successful apps have users that engage at least once a week. Apps that communicate with users through these channels see more frequent activity with about 70% of users engaging at least weekly. Importantly, the share of users that never interact with the app, or only use it once, is lower than average for those that engage their users through the app itself, via email, website, or Facebook, ranging from 3%-6% compared to the overall average of 14% (Table 3).





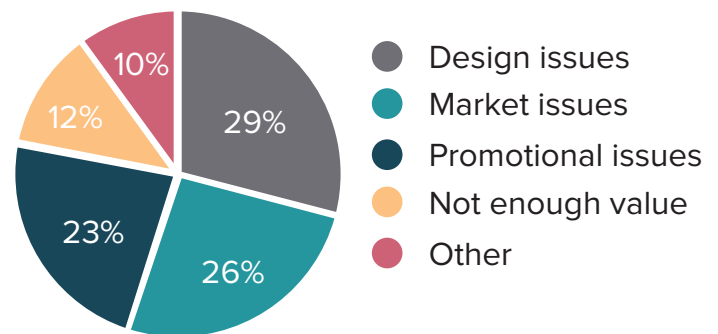
PUBLISHER INSIGHTS

“None of [my failed app's] competition was doing well either, so that was a way to tell there's not a market for it.”

With the sheer volume and frequency of apps that come to market, some are bound to fail. About one-third report having a failed app, the majority of which decide to abandon that the app within several months of its initial release. Many publishers do not consider a failed app to be the end either. Around 60% say that they have recycled an idea for an app rather than starting from scratch.

Ultimately, user engagement is an important factor for success. Communicating through one or more channels reminds users to check new content, reach the next level of a game, or use the app as a resource that can save time or money. Maintaining the interest of users has a compounding effect, as it increases engagement and stimulates organic growth.

Figure 6. Most common reasons why apps fail.



Revenue Generation



REVENUE GENERATION

Revenue is only one way to measure an app's success, but the point of any business is to make money. App publishers tend to diversify their revenue streams, particularly larger companies. Even for those that don't, there are several options. Paid apps aren't dead yet, despite what some say, and advertising isn't always the best route.

Key questions that are answered in this section include:

- What are the most common revenue streams for different company sizes and types of apps?
- Are paid apps dead (according to app publishers)?
- What type of companies are more likely to rely on multiple revenue streams, and which do they prefer?
- How common is the use of in-app purchases and when do they make the most sense?
- What type of in-app purchases are most frequently used?



Revenue Streams

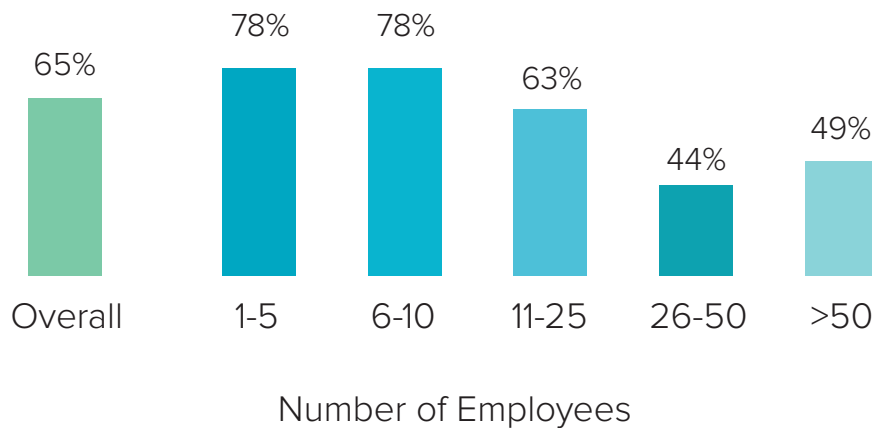
In general, app publishers recommend focusing on one revenue stream and doing it well, especially for those who are new to the industry. However, the best channel of revenue depends on a number of factors including the type of app and the publisher's business structure. There are a number of ways consumer-facing applications can generate revenue: through paid apps, advertising sales, subscription to a service, in-app purchases, and selling a corresponding product that the app interacts with.

App publishers, especially smaller ones, tend to rely on one revenue stream. (Figure 7) Nearly 80% of companies with under 10 employees generate the majority of their revenue through a single channel whereas over 50% of publishers with over 25 employees have more diversified revenue portfolios. Managing multiple streams can be more profitable, but it typically requires significant resources to optimize revenue across channels. Because larger publishers have more staff, they more often have diversified portfolios.

On average, the publishers that rely on a single revenue stream receive between 87% and 95% of their revenue through that one channel. However, the channel itself varies widely. A good rule of thumb to determine the best revenue channel is to know what others in the space are doing. Subscriptions can be a great business model; but if no one else in your space can make that work, it might not be the best option. Similarly, if you are the only paid app in your space, it is unlikely anyone will spend for it.



Figure 7. Most app publishers rely on one source of revenue.





Paid Apps Are Not Dead (At Least Not Yet)

Over 27% rely on revenue from paid apps as their primary revenue source. Despite this, trends in consumer preferences infer that paid apps are dying out. One estimate from eMarketer predicted that only 33% of smartphone users would pay to download an app. Another study estimated that 75% of consumers expect apps to be free. However, among publishers surveyed, a majority disagree that paid apps are dead (Figure 8). This view is, as expected, more strongly held by those who generate revenue from paid apps.

Figure 8. Are paid apps dead? The majority disagree.



The success of a paid app relies heavily on the type of app itself. For example, 45% of game publishers use paid apps to generate the majority of their revenue, while entertainment publishers rely more heavily on advertising as their main source of revenue (Table 4).

Table 4. Revenue streams vary by type of app.

	Overall	Major App Categories			
		Games	Entertainment	Business, Finance or Productivity	Utilities or Services
Majority of revenue from one source	65%	63%	68%	67%	72%
Main Source of Revenue					
Selling as a paid app	27%	45%	19%	30%	34%
Advertisements	23%	30%	44%	14%	15%
Subscription to a service	20%	0%	15%	25%	20%
Selling a corresponding product the app interacts with	16%	7%	7%	21%	17%
In-app purchases	14%	18%	15%	9%	15%

There is also variation in choice of main revenue stream for publishers who generate the majority of revenue on iOS versus Android (Table 5). In fact, 42% of publishers who generate the majority of their revenue from apps that run on the Android platform generate revenue from advertisements, that’s nearly double the overall average for all publishers. For those who generate about half their revenue from iOS and half from Android, 36% develop paid apps, compared to only 27% of publishers overall.

Table 5. Revenue streams vary by type of app.

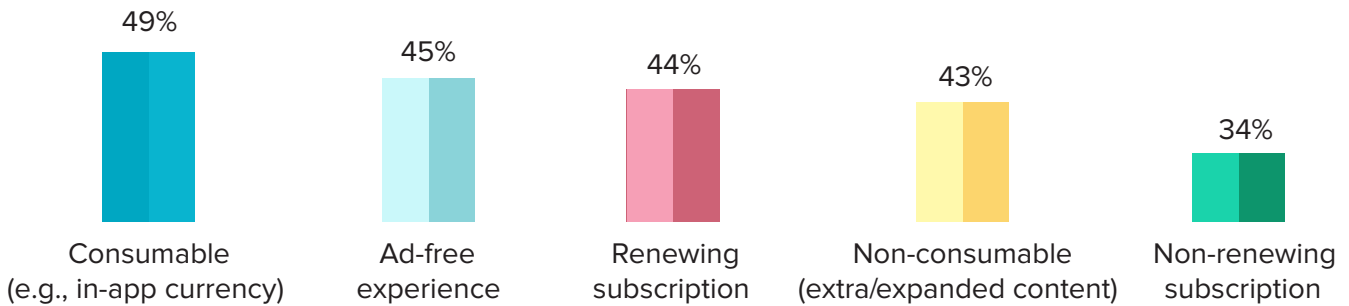
	Overall	Platform		
		iOS	Android	Both
Majority of revenue from one source	65%	68%	65%	62%
Main Source of Revenue				
Selling as a paid app	27%	30%	15%	36%
Advertisements	23%	14%	42%	20%
Subscription to a service	20%	23%	13%	20%
Selling a corresponding product the app interacts with	16%	17%	17%	9%
In-app purchases	14%	16%	12%	16%

In-App Purchases

As an alternative to a paid app, the in-app purchase model allows users to download the app for free, but pay for additional features and functionality. This “Freemium” model is often ideal, but it requires significant volume to actually work. A similar approach is to use in-app purchases, either with a free or paid app, to sell additional content or functionality. Two-thirds of app publishers incorporate in-app purchases into their applications, even as only 14% generate the majority of revenue from them.

Consumables, like in-app currency, are the most frequently offered type of in-app purchases, followed by an ad-free experience and renewing subscriptions (Figure 9). This pattern is consistent across iOS, Android, and Windows platforms.

Figure 9. Consumables are the most widely used type of in-app purchase.



Many publishers, especially those producing more than one app, employ a variety of in-app purchase offerings. About 60% of publishers who produce at least five apps incorporate multiple types of in-app purchases into their applications, 40% incorporate three or more types of in-app purchases (Figure 10).

Figure 10. Publishers with more apps use a larger variety of in-app purchase strategies.

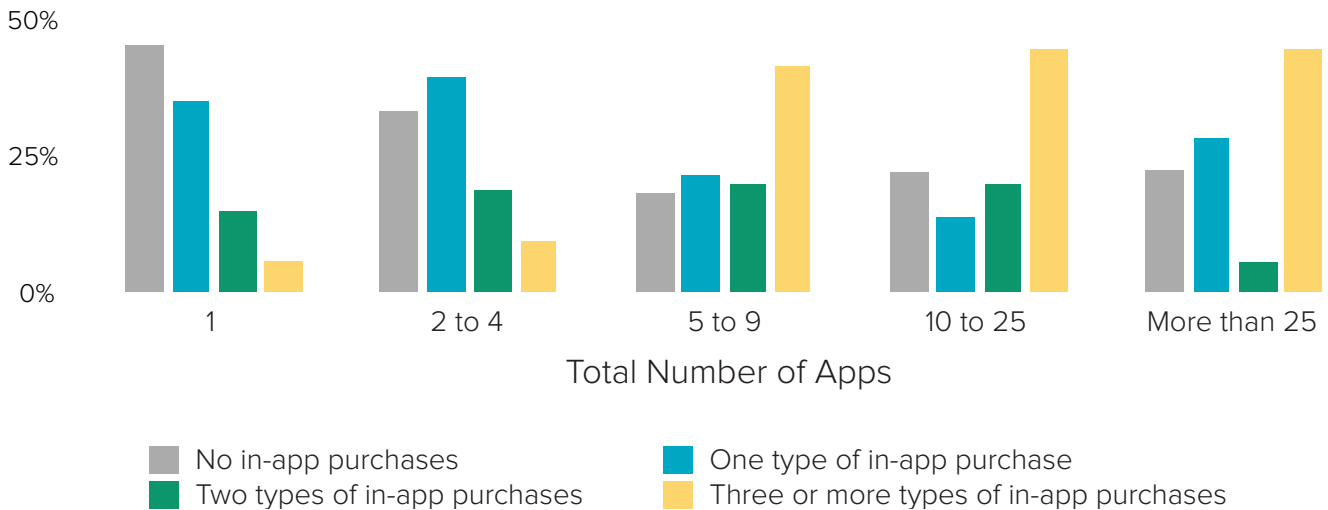


Table 6. In-app purchase offerings vary by app type.

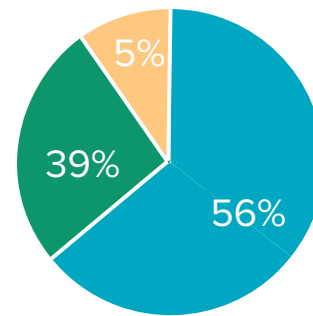
	Overall	Popular App Categories			
		Games	Entertainment	Business, Finance or Productivity	Utilities or Services
Offer in-app purchases	68%	76%	68%	59%	68%
Consumable (e.g., in-app currency)	49%	64%	41%	29%	18%
Ad-free experience	45%	42%	52%	35%	41%
Renewing subscription	44%	25%	33%	39%	41%
Non-consumable (extra/expanded content)	43%	42%	41%	37%	36%
Non-renewing subscription	34%	25%	11%	22%	33%

Additionally, in-app purchase offerings vary by app type. Almost 80% of publishers with games as part of their portfolio offer in-app purchases. Moreover, 64% of these publishers offer consumables. In contrast, the majority of publishers that develop entertainment apps use ad-free experience as an in-app purchase offering (Table 6).

In terms of platform preference, Android and iOS continue to dominate the market. Android has passed iOS in its number of users, though iOS still generates a larger share of revenue, accounting for 56% and 39% respectively (Figure 11). While most generate revenue from multiple platforms, nearly 30% rely on revenue from only one platform, the majority of them operating on iOS.

Figure 11. iOS generates more revenue than Android.

Share of Revenue



- ▶ iOS
- ▶ Android
- ▶ Windows



Advertising



ADVERTISING

Advertising can be one of the most lucrative yet stress-inducing endeavors for a business, and is a practice that is still the subject of much debate, consternation, and development. CPM and CPI are the most common pricing models, but there are several viable options to choose from. Regardless of model, diligence is crucial: app publishers must be able to dedicated resources to monitoring and planning advertising strategy to prosper.

Key questions that are answered in this section include:

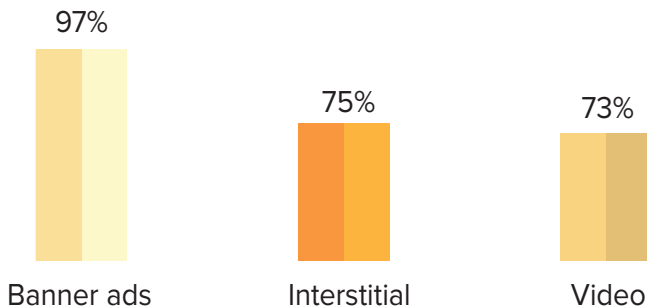
- When is advertising a cost-effective strategy for app publishers?
- What type of ads are most common?
- What are the most popular pricing models?
- How frequently are app publishers monitoring their rates and changing their strategies?
- What are the habits of publishers who enjoy above-average CPM rates?



Ad Strategies

For app publishers that rely on ad revenue, the most successful programs are monitored often and the ad strategy is changed at least once a year. The three most common types of ads are banner, interstitial, and video ads. Publishers largely rely on all three to generate revenue (Figure 12).

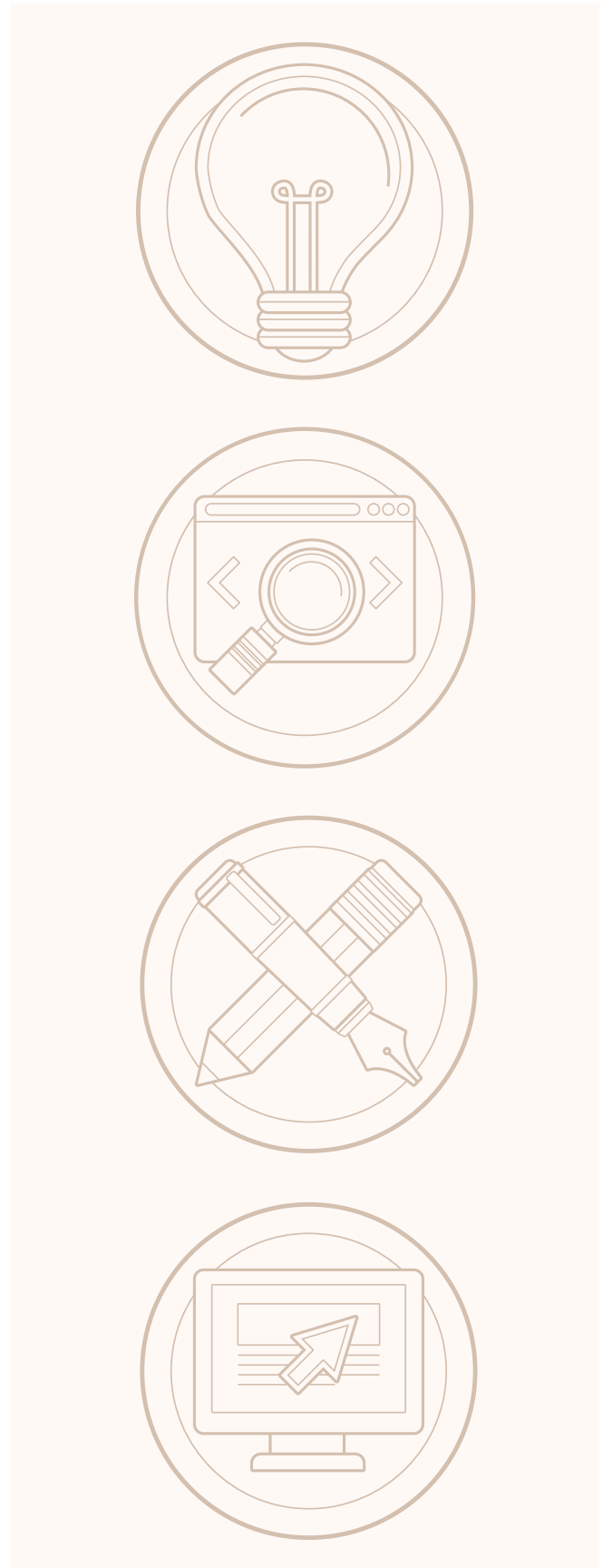
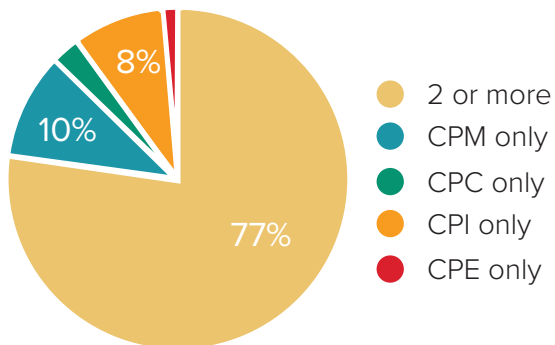
Figure 12. Nearly all app publishers with ad revenue use banner ads.



The four most common pricing models for generating revenue through advertisements in consumer-facing applications are cost per mille (CPM), cost per click (CPC), cost per install (CPI), and cost per engagement (CPE). Of these, CPM generates the most revenue, accounting for about 32% of ad revenue on average, followed by CPI, CPC, and CPE averaging 28%, 25%, and 15% of revenue respectively.

Most publishers that generate ad revenue incorporate more than one pricing model into their revenue strategy. Nearly 60% use all four models as part of their revenue portfolio. Just over 20% rely on only one pricing model to generate revenue, CPM and CPI are the most popular models, by far (Figure 13).

Figure 13. Nearly 80% use more than one pricing strategy to generate ad revenue.



Pricing models vary slightly by platform. For publishers who generate revenue from ads, CPM is the most widely used pricing model, this holds true across all platform types (Table 7). However, publishers who generate at least half their revenue from Android (i.e., “Android” and “Both”, in Table 7), CPI is more commonly used over CPC.

Table 7. CPM is the most widely used pricing model across platforms.

	Overall	Platform		
		iOS	Android	Both
CPM	81%	85%	76%	85%
CPC	77%	82%	72%	69%
CPI	77%	81%	76%	81%
CPE	61%	64%	54%	69%

App publishers generate more revenue when they monitor their advertising rates more often. Looking only at those who obtain revenue through the CPM pricing model, we see 23% of those with an above average CPM (as self-reported in the survey), monitor their advertising rates several times per day, compared only 7% of those realizing below average CPM (Table 8).

Table 8. Above average CPM rates are realized by those who monitor rates more frequently.

Frequency of Ad Monitoring	Above Average CPM	Below Average CPM
Several times a day	23%	7%
At least once a day	38%	23%
At least several times a week	73%	59%
At least once a week	92%	89%
Less than once a week	8%	11%





As a result, larger companies tend to be more effective at generating revenue through advertising. Nearly two-thirds (64%) of companies with over 50 employees monitor at least several times per week, compared to only 37% of companies with five or fewer employees (Table 9). However, regardless of publisher size, it's important to allocate resources to monitoring in order to maximize revenue. For publishers with multiple apps, it may make sense to invest in optimizing ads for only select apps that generate enough revenue to get the return on investment.

Table 9. The majority of app publishers monitor ad rates more than once per week.

Frequency of Ad Monitoring	Number of Employees					
	Overall	1 to 5	6 to 10	11 to 25	26 to 50	Over 50
Once a day or more	25%	25%	33%	19%	14%	28%
Several times a week	32%	12%	42%	69%	38%	36%
Once a week	28%	25%	17%	13%	48%	30%
Less than once a week	15%	37%	8%	0%	0%	6%

It is also important to change advertising strategies in order to maximize revenue. The majority switch up their strategy at least once a year. Because larger companies tend to have more non-developers on staff, they often have the capacity to change their ad strategy more frequently than smaller companies (Table 10).

Table 10. Larger app publishers more frequently change their ad strategy.

Frequency of Ad Strategy Changes	Number of Employees					
	Overall	1 to 5	6 to 10	11 to 25	26 to 50	Over 50
At least several times a month	18%	8%	33%	25%	29%	18%
About once a month	19%	20%	42%	13%	19%	16%
Several times a year	35%	25%	17%	50%	43%	42%
About once a year	17%	22%	0%	13%	10%	22%
Less than once a year	10%	25%	8%	0%	0%	2%

For publishers that rely on advertisements for revenue, investing in staff to manage advertising strategies may boost revenue. Looking specifically at those using the CPM pricing model, publishers that recorded above average CPM rates also changed their advertising strategy more frequently than those with below average rates (Table 11).

Table 11. 65% of app publishers with above average CPM change their ad strategy at least once per month, compared to 32% of those with below average CPM.

Frequency of Ad Strategy Changes	Above Average CPM	Below Average CPM
About once a week	8%	4%
At least several times a month	27%	17%
At least once a month	65%	32%
At least several times a year	81%	74%
Once a year or less	19%	26%



Business Operations & Staffing



BUSINESS OPERATIONS & STAFFING

The app industry, as part of the greater software industry, is experiencing significant growth. The Bureau of Labor Statistics (BLS) expects 17% growth in the number of software developer jobs in the US between 2014 and 2024. In such a growing market, both app publishers and developers need to understand how to create the best match. App publishers tend to spend around 50%-60% of their budget on staff (with larger companies able to spend more on non-developer staff). Meanwhile, the number one trait they look for from developers is passion.

Key questions that are answered in this section include:

- How much of their budget do app publishers spend on staffing, user acquisition, and other essentials?
- How do app publishers find developers, and what are the differences by geography and company size?
- What are consumer-facing app companies looking for in developers? What aren't they looking for?
- What are the main differences between how small and large companies hire?
- How common are independent contractors? Remote workspaces? International hires who never step foot in a company's headquarters?



Table 12 Staffing is the largest expense for app publishers.

Budgeted Operations	Number of Employees					
	Overall	1 to 5	6 to 10	11 to 25	26 to 50	Over 50
Staff (developers)	37%	48%	39%	31%	27%	28%
Staff (non-developers)	19%	18%	19%	20%	21%	20%
Office (rent/equipment)	14%	10%	15%	16%	15%	17%
Cloud and hosting storage	18%	18%	18%	20%	19%	17%
Marketing/user acquisition	19%	20%	16%	20%	19%	18%

Operations Expenses

The share of budgeted operations expenses is fairly consistent across firms of all sizes for overall staffing, office costs, cost and hosting storage and marketing, with staffing accounting for over half of the total budget. This is on par with the larger software industry whose payroll, on average accounts for 47% of expenses. The largest difference among app publishers is staff expenses for developer and non-developer staff. Where small companies spend the majority of their budget on developers as opposed to non-developers, larger companies spend a comparable amount on both (Table 12). It is not surprising that developers' wages are the largest share of expenses because they design and build the products that ultimately generate revenue for the firm.

Hiring Channels

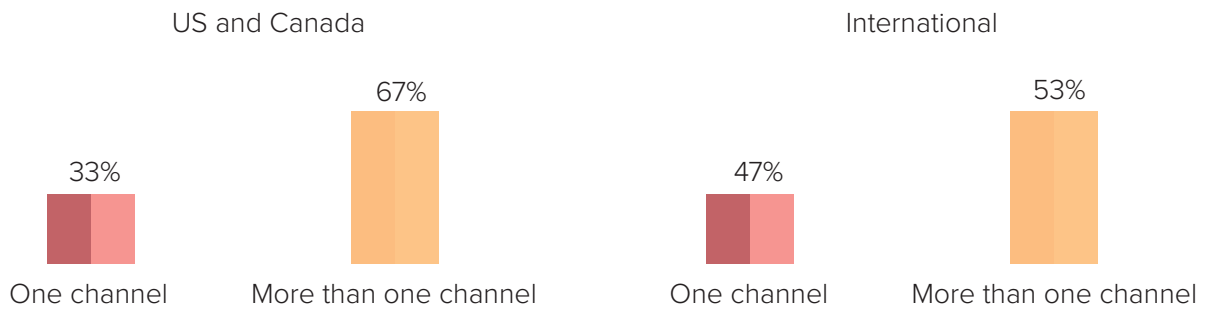
The most preferred method for finding developers to hire across all company sizes is through personal referrals (Table 13). This holds true across geographies as well. On average, 75% in the US and Canada, and 60% internationally use personal references when hiring developers. Many prefer this method because referral sources can provide valuable insights on work ethic and personality that cannot be found on a resume. In general, larger companies use more channels when looking to hire, with almost 70% of companies with 50 or more employees using at least three channels. Meanwhile, nearly 60% companies with five or fewer employees typically rely on only one channel to identify potential developers.



Table 13. Personal references are the most widely used channel for hiring developers.

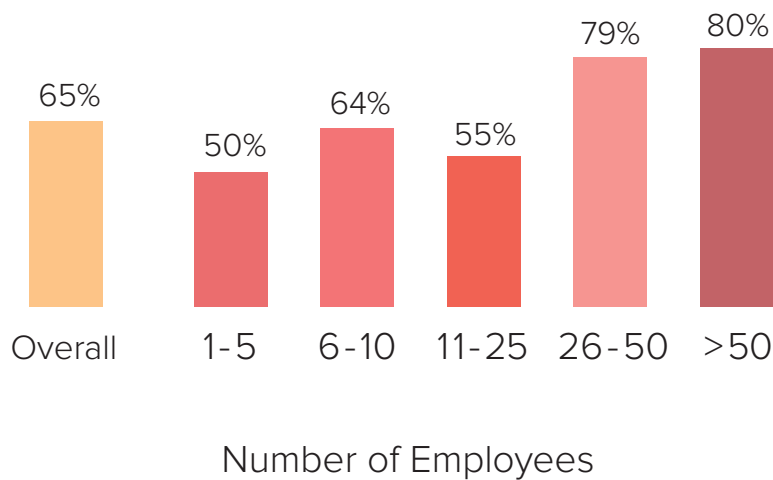
Channels used for hiring developers	Number of Employees					
	Overall	1 to 5	6 to 10	11 to 25	26 to 50	Over 50
Personal references	72%	74%	81%	65%	64%	70%
LinkedIn	49%	29%	47%	45%	64%	72%
Industry job board	37%	17%	29%	43%	56%	60%
Headhunter	32%	13%	24%	38%	51%	53%
General online job board	27%	6%	16%	33%	38%	56%
Craigslist	26%	13%	19%	33%	38%	38%

Figure 14. Over 75% of app publishers in the US and Canada use more than one channel to find developers to hire.



Overall, app publishers in the US and Canada employ more channels when looking to hire developers, with about two thirds using more than one channel (Figure 14). Some channels are used significantly more in the US and Canada, such as Craigslist, industry job boards, and headhunters. Craigslist is used by 29% in the US and Canada compared to only 5% internationally, industry jobs boards are used by 40% in the US and Canada and 20% internationally, and headhunters are used by 35% in the US and Canada compared to only 16% internationally.

Figure 15. 65% require app developers to pass an onboarding test before they are hired.



How App Publishers Hire

Many publishers require on-boarding tests to ensure developers meet a certain skill set. Overall 64% require onboarding tests, which is consistent among both national and internationally based developers (Figure 15, previous page). Larger companies are more likely to have a formal onboarding test compared to small companies.

Some publishers hire developers as employees; others hire developers as independent contractors. Nearly half do both. However, a mixed staffing model, with both employees and contractors, is more common in the US and Canada than it is internationally (Table 14).

Table 14. Mixed staffing models are more common in the US and Canada.

Employment Model	Overall	US and Canada	International
Employees	32%	30%	40%
Independent contractors	22%	22%	25%
Both	46%	48%	35%



A model that uses at least some independent contractors is popular among publishers because hiring developers on an as-needed basis offers more flexibility and versatility. This is especially true for smaller companies who typically do not have the staff resources to employ a full portfolio of talent using only the employee model. Few firms with five employees or fewer use an employee-only model (17%), while 41% hire developers as contractors and 43% use a mixed model approach (Table 15).

Table 15. Smaller firms use contractor models; larger firms use employee models; mixed staffing models are common across all firms.

Employment Model	Number of Employees					
	Overall	1 to 5	6 to 10	11 to 25	26 to 50	Over 50
Employees	32%	17%	29%	48%	49%	41%
Independent contractors	22%	41%	19%	10%	8%	10%
Both	46%	43%	52%	43%	44%	49%

Developers can work from almost anywhere. However, the majority of companies still prefer that developers work in the office. This is true for both US and Canada as well as internationally. However, this is largely determined by the staffing model. Over two-thirds of firms that hire developers as employees prefer that they come to the office to work. In contrast, 80% who hire developers as independent contractors prefer the developer work remotely, either from home or a shared workspace (Table 16). As a result, smaller companies tend to have more developers working remotely than larger firms.

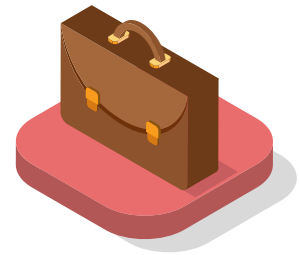
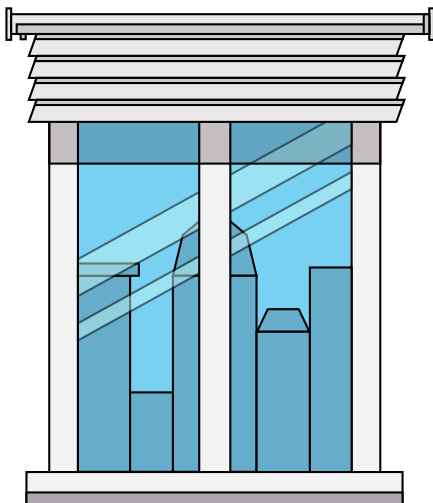
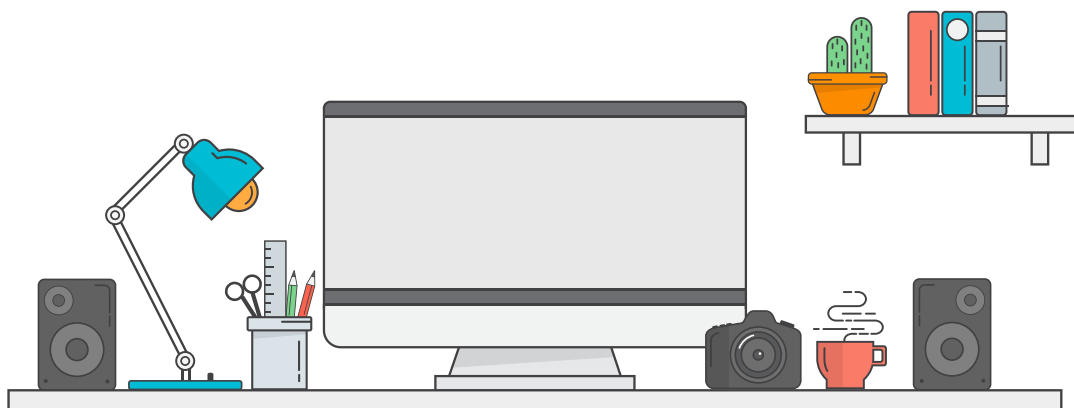


Table 16. Developers most often work from the office.

Where Developers Work	Employment Model			
	Overall	Employees	Independent contractors	Both
In the office	55%	78%	20%	56%
Remote from a shared workspace	16%	10%	21%	18%
Remote from home	29%	12%	59%	26%



Even with remote work, most firms hire locally. About 50% exclusively hire local candidates. Another 32% have no concern for region, whether local, national, or international. That leaves fewer than 20% of publishers who hire primarily outside of their own region. This could be because hiring locally alleviates challenges with time zones and allows more frequent in-person meetings if necessary. Despite advanced technology, in-person meetings are still largely preferred by most business executives. In a 2009 Forbes study, business executives “overwhelmingly agree that they are necessary for building deeper, more profitable bonds with clients and business partners – and for maintaining productive relationships with co-workers.”



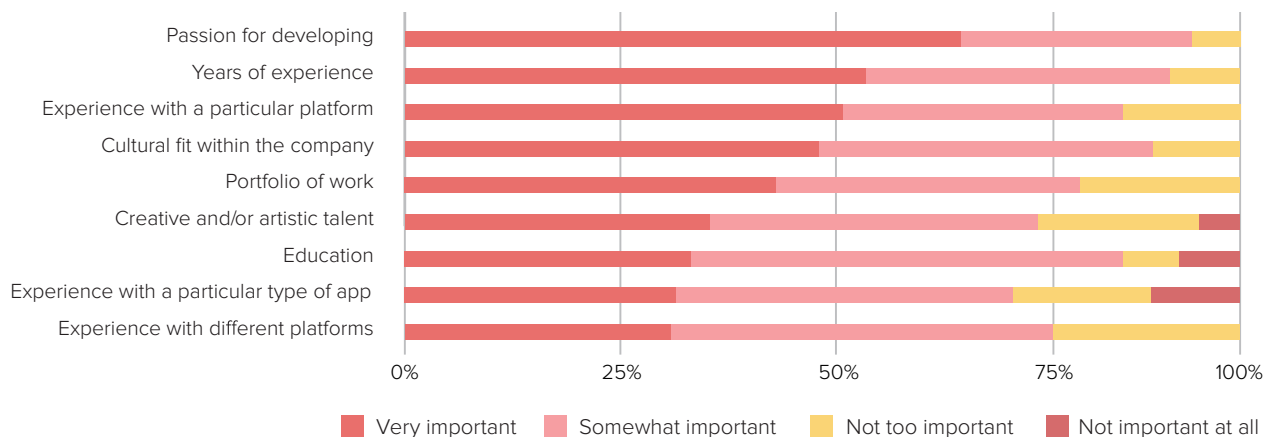


Developer Traits

Passion and experience are the top two characteristics that app publishers look for in developers (Figure 16). Passion is crucial, especially for those at small companies. Because of the nature of the business, there can be large ebbs and flows in the economic success of a publisher. Passion is what keeps developers on board during hard times. When asked to define passion, some examples given include programming independently, having previously launched an app, or having contributed to open-source coding projects.

In terms of experience, employers are less concerned with a developer’s experience with a specific type of app than they are with the developer having experience with a specific platform or language because technical skills are largely transferrable across app types. When hiring, publishers look to fill knowledge gaps within the company; if the founder is already a full-stack developer, then finding someone with breadth of experience isn’t as important. If there’s already a creative type person on board, another creative type might not add much value.

Figure 16. Passion is the most important quality in a developer, followed by experience.





The characteristics that employers look for in developers vary somewhat by the individual’s role within the company. As expected, HR and operations staff are more focused on resume qualifications, such as education and experience. Meanwhile, developers and founders find personal qualities more important; passion and cultural fit ranked as two of the top three characteristics they look for in developers (Table 17). Passion is also important because it implies a sense of curiosity and a willingness to learn and keep up with trends. With new technology evolving daily, it is important to stay ahead of the curve to produce new and innovative apps that, in turn, drive growth within the company.



Table 17. Top Three Most Important Characteristics Considered When Hiring a New Developer.

Role in Company	Most Important	Second Most Important	Third Most Important
Developer	Passion for developing	Years of experience	Cultural fit
Founder	Passion for developing	Experience with a particular platform/ language	Cultural fit
Sales/Marketing	Passion for developing	Years of experience	Cultural fit and portfolio of work (Tie)
HR/Operations	Education	Years of experience (tied with education)	Passion for developing

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APPENDIX 1: METHODOLOGY PROFILES OF RESPONDENTS

Methodology

This report is primarily based on findings from our online survey of developers and staff at companies that publish consumer-facing apps as well as data collected from in-depth interviews and previously published literature.

Our quantitative analysis is based on a March 8 - April 28, 2016 global survey of 338 of developers and staff at companies that publish consumer-facing apps. The survey data was collected using an online survey questionnaire constructed by the Application Developers Alliance with assistance from ndp | analytics which was distributed to app developers and other staff at firms that publish consumer-facing applications. Responses came from both US and Canada, as well as international-based developers and staff, with the majority located in the US and Canada (84%). Respondents produce the majority of their revenue-generating apps on iOS and Android platforms. ndp | analytics used the data to generate statistics and identify patterns and trends in-app performance, user management, and operations among respondents.

The report contains direct quotes from leaders at companies that publish apps. These perspectives on the industry were obtained through in-depth phone interviews conducted by the Application Developers Alliance in April and May 2016.

Findings from the quantitative analysis, in-depth interviews, and third party literature were synthesized to produce the insights on app performance and business operations for consumer-facing app publishers. These insights allow publishers to compare their own performance and operations to others in the industry.

Profiles of Respondents

Tables below show the distribution of survey respondents by publisher size, geographic location, type of app, and role in company.

Table 1. Distribution of respondents by number of employees.

Number of Employees	Number	Share
1 to 5	120	36%
6 to 10	58	17%
11 to 15	40	12%
26 to 50	39	12%
More than 50	81	24%
Total	338	100%

Table 2. Distribution of respondents by geographic location.

Location	Number	Share
United States/Canada	283	84%
International	55	16%
Total	338	100%

Table 3. Total apps by category, share of respondents producing apps by category.

Type of App	Total Apps		Total Respondents	
	Number	Share	Number	Share
Games	486	14%	87	26%
Entertainment	420	12%	67	20%
Business/ Finance/ Productivity	575	17%	104	31%
Music/ Photo/ Video	104	3%	43	13
Social Networking/ Messaging	171	5%	42	12%
Food/Drink/ Hospitality	170	5%	51	15%
Health/Fitness/ Medical	254	8%	65	19%
Shopping/ Retail	310	9%	57	17%
Navigation/ Travel	204	6%	43	13%
News/Books/ Magazines	82	2%	32	9%
Education/ Reference	260	8%	49	14%
Utilities /Services	244	7%	78	23%
Other	89	3%	25	7%

Table 4. Distribution of respondents by role in company.

Role	Number	Share
Developer	157	46%
Founder	102	30%
Sales/Marketing	36	11%
HR/Operations	21	6%
Other (please specify)	22	7%
Total	338	100%

APPENDIX 2

Survey Question and Selection Options	Number of Employees				
	1-5	6-10	11-25	26-50	Over 50
What is your job title?					
Developer	38%	43%	53%	62%	52%
Founder	58%	28%	25%	8%	5%
Sales/Marketing	2%	24%	13%	15%	11%
HR/Operations	2%	2%	8%	10%	14%
Other (Please specify)	2%	3%	3%	5%	19%
Overall, how many downloads do you have across all of your apps?					
Less than 100	9%	3%	3%	5%	1%
101 - 1,000	25%	22%	10%	10%	4%
1,001 - 100,000	43%	59%	50%	28%	30%
100,001 - 1,000,000	18%	14%	35%	51%	40%
1,000,001 - 50,000,000	5%	0%	3%	5%	20%
Over 50,000,000	1%	2%	0%	0%	6%
Please indicate the number of apps that you've published in each of the following categories:					
Games	38%	5%	11%	11%	6%
Entertainment	6%	11%	42%	11%	11%
Business/Finance/Productivity	8%	18%	8%	18%	24%
Music/Photo/Video	2%	6%	2%	6%	1%
Social Networking/Messaging	3%	5%	1%	3%	8%
Food/Drink/Hospitality	2%	3%	5%	6%	7%
Health/Fitness/Medical	5%	15%	4%	7%	7%
Shopping/Retail	3%	10%	7%	10%	13%
Navigation/Travel	6%	11%	2%	5%	5%
News/Books/Magazines	1%	0%	1%	6%	3%
Education/Reference	17%	3%	1%	6%	6%
Utilities/Services	5%	13%	8%	5%	7%
Other	2%	1%	7%	6%	1%

Survey Question and Selection Options	Number of Employees				
	1-5	6-10	11-25	26-50	Over 50
How long ago was your best app published?					
Less than a year	34%	31%	18%	28%	27%
1 year ago	21%	29%	20%	23%	23%
2 years ago	21%	21%	45%	33%	20%
3 years ago	12%	9%	13%	5%	9%
4 years ago	3%	7%	3%	8%	10%
5 years ago	7%	3%	0%	3%	9%
More than 5 years ago	3%	0%	3%	0%	2%
How many downloads does that app have?					
Less than 100	12%	7%	5%	3%	1%
101 - 1,000	23%	19%	10%	10%	6%
1,001 - 100,000	47%	59%	55%	33%	35%
100,001 - 1,000,000	16%	16%	25%	54%	36%
1,000,001 - 50,000,000	2%	0%	5%	0%	20%
Over 50,000,000	1%	0%	0%	0%	2%
What is the monthly user growth rate for that app?					
Zero or negative	13%	9%	5%	8%	7%
0% - 5%	50%	31%	45%	46%	51%
6% - 10%	26%	48%	38%	38%	31%
11% - 25%	9%	9%	13%	8%	9%
Greater than 25%	2%	3%	0%	0%	2%
Which user acquisition strategies have been most successful for that app? (Select up to 3).					
Cross-promotion with your other apps	9%	10%	23%	21%	6%
From the purchase of a corresponding product (IoT/wearable)	1%	7%	3%	21%	10%
Third-party platform/service	4%	10%	8%	23%	22%
Advertising	19%	24%	23%	23%	38%
Social media	48%	59%	50%	49%	51%
News/blog coverage	24%	21%	35%	28%	32%
App Store Optimization	28%	14%	25%	36%	28%
Strategic partnerships with other companies	13%	12%	20%	26%	22%
Referral program	13%	17%	15%	18%	16%
Organic growth	47%	60%	28%	26%	23%
Other (please specify)	5%	3%	3%	0%	1%

Survey Question and Selection Options	Number of Employees				
	1-5	6-10	11-25	26-50	Over 50
How often do your users typically engage with this app?					
Several times a day	8%	3%	5%	8%	11%
Daily	13%	7%	18%	13%	19%
Every few days	22%	19%	23%	28%	19%
About once a week	7%	21%	15%	18%	20%
Every few weeks	9%	5%	3%	15%	15%
About once a month	11%	9%	20%	10%	10%
Less than once a month	8%	17%	8%	0%	4%
Only once or never	23%	19%	10%	8%	4%
Thinking across all of your apps, do you...					
Collect and retain user contact information?- Yes	51%	60%	83%	74%	75%
Track user activity to collect other data on your users? - Yes	52%	57%	78%	85%	84%
Use push notifications? – Yes	57%	64%	78%	87%	79%
How do you typically communicate with your users? Select all that apply.					
Through the app	43%	55%	70%	59%	72%
Website/blog	30%	22%	40%	56%	56%
Email	44%	34%	65%	74%	69%
Facebook	24%	26%	50%	49%	47%
Twitter	23%	24%	43%	44%	42%
Instagram	9%	10%	28%	33%	23%
We don't communicate with our users	30%	24%	10%	8%	12%
Other (please specify)	3%	0%	0%	3%	1%
How often do you develop new apps?					
Several times a year	27%	16%	40%	38%	52%
About once a year	33%	50%	25%	36%	16%
Less than once a year	32%	29%	33%	23%	26%
Never	8%	5%	3%	3%	6%
Have you ever abandoned an app after reaching market due to lack of users?					
Yes	34%	22%	35%	21%	42%
No	66%	78%	65%	79%	58%

Survey Question and Selection Options	Number of Employees				
	1-5	6-10	11-25	26-50	Over 50
How long would you give an under-performing app before abandoning it?					
A month or less	5%	8%	0%	13%	6%
Several months	49%	23%	50%	63%	59%
About a year	44%	69%	43%	25%	29%
Several years	2%	0%	7%	0%	6%
If/when faced with a failing app, would you recycle and improve the idea or start with a brand new idea?					
Recycle and improve the idea	51%	77%	64%	63%	53%
Start with a brand new idea	49%	23%	36%	38%	47%
Estimate the percentage of your company's revenue from each of the following sources:					
Selling as a paid app	26%	36%	21%	21%	13%
Share with >50% revenue from source	22%	34%	13%	10%	5%
In-app purchases	20%	13%	24%	27%	17%
Share with >50% revenue from source	12%	2%	15%	13%	6%
Advertisements	29%	13%	12%	13%	22%
Share with >50% revenue from source	26%	10%	8%	3%	11%
Subscription to a service	15%	17%	29%	23%	27%
Share with >50% revenue from source	11%	14%	20%	10%	15%
Selling a product the app interacts with	10%	20%	13%	17%	21%
Share with >50% revenue from source	8%	17%	8%	8%	12%
Do you agree or disagree with the following statement: "Paid apps are dead"					
Strongly disagree	27%	22%	23%	21%	10%
Somewhat disagree	31%	47%	28%	23%	43%
Somewhat agree	29%	21%	43%	49%	30%
Strongly agree	13%	10%	8%	8%	17%

Survey Question and Selection Options	Number of Employees				
	1-5	6-10	11-25	26-50	Over 50
Estimate the percentage of your company's revenue from devices running on the each platform:					
iOS	55%	55%	59%	56%	55%
Share with >50% revenue from source	48%	45%	50%	41%	48%
Android	39%	43%	40%	39%	36%
Share with >50% revenue from source	27%	21%	15%	21%	16%
Windows	5%	17%	13%	54%	10%
Share with >50% revenue from source	4%	0%	0%	3%	5%
What type of in-app purchases do you offer?					
Consumable (e.g., in-app currency)	24%	22%	30%	51%	46%
Non-consumable (extra/expanded content)	24%	16%	28%	49%	37%
Ad-free experience	20%	12%	30%	51%	48%
Subscription (non-renewing)	13%	14%	30%	41%	33%
Subscription (renewing)	18%	17%	33%	51%	44%
None	38%	43%	33%	15%	23%
Do you earn revenue from ads running in your apps?					
Yes	43%	21%	40%	54%	62%
No	58%	79%	60%	46%	38%
How many apps do you publish that use each of the following type of ads?					
Banner ads	88%	100%	100%	95%	92%
Interstitial	24%	25%	56%	81%	68%
Video (number of respondents)	88%	100%	100%	95%	92%

Survey Question and Selection Options	Number of Employees				
	1-5	6-10	11-25	26-50	Over 50
Please estimate the percentage of your company's revenue from the following sources:					
CPM (Average)	34%	43%	25%	34%	29%
Share with any ad revenue from source	67%	75%	75%	100%	92%
Share with the majority of ad revenue from source	25%	33%	13%	10%	6%
CPC (Average)	23%	17%	24%	25%	28%
Share with any ad revenue from source	55%	50%	81%	100%	94%
Share with the majority of ad revenue from source	16%	0%	6%	0%	6%
CPI (Average)	31%	34%	33%	22%	25%
Share with any ad revenue from source	61%	75%	88%	90%	86%
Share with the majority of ad revenue from source	24%	17%	19%	0%	8%
CPE (Average)	13%	6%	18%	20%	18%
Share with any ad revenue from source	35%	33%	69%	86%	82%
Share with the majority of ad revenue from source	6%	0%	0%	0%	0%
How closely do you monitor your advertising rates?					
Several times a day	12%	8%	6%	0%	16%
About once a day	14%	25%	13%	14%	12%
Several times a week	12%	42%	69%	38%	36%
About once a week	25%	17%	13%	48%	30%
Less than once a week	37%	8%	0%	0%	6%
How often do you switch up your advertising strategy?					
About once a week	0%	8%	0%	0%	10%
Several times a month	8%	25%	25%	29%	8%
About once a month	20%	42%	13%	19%	16%
Several times a year	25%	17%	50%	43%	42%
About once a year	22%	0%	13%	10%	22%
Less than once a year	25%	8%	0%	0%	2%

Survey Question and Selection Options	Number of Employees				
	1-5	6-10	11-25	26-50	Over 50
Please estimate the percentage of your company's annual budget that is spent on the following:					
Staff (developers)	48%	39%	31%	27%	28%
Staff (non-developers)	18%	19%	20%	21%	20%
Office (rent/equipment)	10%	15%	16%	15%	17%
Cloud and hosting storage	18%	18%	20%	19%	17%
Marketing/user acquisition	20%	15%	20%	19%	18%
How many developers currently work at your company?					
Average	3	5	7	11	32
Where does your company typically find developers to hire? Select all that apply.					
Craigslist	13%	19%	33%	38%	38%
Headhunter	13%	24%	38%	51%	53%
LinkedIn	29%	47%	45%	64%	72%
Industry job board	17%	29%	43%	56%	60%
Online job board (not industry specific)	6%	16%	33%	38%	56%
Personal references	74%	81%	65%	64%	70%
Other (please specify)	10%	5%	3%	0%	6%
Does your company require developers to complete a skills evaluation or an onboarding test?					
Yes	50%	64%	55%	79%	80%
No	50%	36%	45%	21%	20%
From which region(s) does your company typically hire developers?					
Locally	77%	83%	83%	85%	84%
Nationally	33%	36%	38%	41%	58%
Internationally	35%	22%	25%	26%	35%
Does your company typically hire developers as employees or as contractors?					
Employees	17%	29%	48%	49%	41%
Independent contractors	41%	19%	10%	8%	10%
Both	43%	52%	43%	44%	49%

Survey Question and Selection Options	Number of Employees				
	1-5	6-10	11-25	26-50	Over 50
Where do most developers at your company typically work?					
In the office	28%	52%	73%	74%	80%
Remote from a shared workspace	20%	22%	8%	18%	10%
Remote from home	53%	26%	20%	8%	10%
Based on your experience and what you know, how important are each of the following when your company evaluates a new developer candidate (Scale 0-3: 0 is not important at all, 3 is most important):					
Years of experience	2.36	2.53	2.53	2.62	2.50
Education	2.10	2.40	2.00	2.30	2.16
Experience with a particular platform/language	2.52	2.39	2.40	1.95	2.30
Experience with a particular type of app	2.14	2.27	2.20	2.43	2.05
Experience with many different platforms/languages/types of apps	2.14	2.28	2.15	1.95	1.93
Creative and/or artistic talent	2.23	2.40	1.97	2.11	2.11
Passion for developing	2.67	2.59	2.38	2.68	2.50
Cultural fit within the company	2.49	2.46	2.28	2.26	2.29
Portfolio of work	2.37	2.45	2.30	2.05	1.96