Agency for Digital Government

What is the cost of a free mobile game?

February 2024

2024

Summary

When playing mobile games, there might be more going on than meets the eye.

This report is based on an analysis of the most popular free gaming apps for iPhone in Denmark. The target group for the analysed gaming apps is primarily considered to be children and young people. These apps have been analysed in relation to which third-party services that, among other things, collect data for targeted marketing via these apps. In the analysis, all tracking, data collection, cookies, etc. have been rejected if possible. Only in cases where it has been a prerequisite for using the app, has this been accepted.

Extensive data transfer to many different third parties

In all of the analysed apps, third-party services collect data for marketing purposes. Facebook collects data from all of the apps in question. Google and AppLovin collect data from almost all (95%) of the apps analysed and Tiktok collects data from 40% of the apps analysed. This contrasts with the analysis "The prevalence of third-party services on Danish websites", which the Danish Agency for Digitization launched in September 2023, where e.g. Tiktok was only on two percent of the analysed websites.

This emphasizes that, despite appearing free to play and even if you reject all possible data collection, there is still a collection of user data. A collection of data that serves the game companies' advertisement-based business model.

Third parties from around the world - especially the US and China

Another key insight from the analysis is that data is collected by third-party services that reside in a number of different countries, reflecting the global nature of the free mobile games market. All of the games have US-based third parties collecting data for marketing purposes, and 90% of the games have third parties from China collecting data for marketing purposes. Different countries may have different rules, standards and guidelines for personal data protection, which means that user data may end up in countries that do not have the same level of protection as Denmark and the rest of the EU.

Children at the centre

The users of these apps will often be children, a particularly vulnerable group because they often do not have the same ability as adults to understand the implications that their consent has on the collection of user data.

Recommendations

The picture that emerges is that by using the most popular mobile games one is subjected to a significant degree of data collection from third parties that is not immediately transparent. However, as a user of such apps or as a parent of children using such apps, there are a number of precautions you can take:

- Be aware that nothing is completely free
- Check your own or your children's app permissions
- Consider alternative apps
- Review and delete unused apps
- Use the App Privacy Report

Recommendations are discussed later in the report.

Contents

Introduction

1. Introduction

Is a free app really free?

In today's digital age, mobile technology has become an indispensable part of our lives and smartphones like the iPhone have changed the way we communicate, work and are entertained. Children are avid users of mobile technology, including games, and their inability to understand the implications of this data collection leaves them vulnerable. The data collected can be used to build in-depth profiles of children's behaviour and interests, which can lead to more efficiently targeted advertising.

It is important to understand that data collection is not necessarily problematic in itself. Data can be used to improve the user experience, ensure that illegitimate users do not overwhelm the app and to customise services according to individual preferences. However, it can be difficult for users, including parents and children, to assess how the data collected is being used. Previous studies have shown that the combined privacy policies of the apps on a typical person's smartphone are 250,000 words long and take more than 30 hours to read.[1]

The business model of free-to-play games

Mobile gaming, once a niche, has evolved into an industry that entertains millions around the world. However, this development has also raised pertinent questions about the collection and use of user data, as well as the ethical boundaries that game developers and advertisers operate within. As players immerse themselves in virtual worlds, complex patterns of data can be built that can be used to gain insights into user behaviour, interests, etc. in the real world. These data and insights can then be used for multiple purposes, such as improving the gaming experience, retaining users for longer or targeting them with ads. The amount of data being collected depends on the business model of a particular app, as this data can be its primary source of revenue.

---

[1] https://www.forbrukerradet.no/side/250000-words-of-app-terms-and-conditions/

Business models of mobile games

Microtransactions (in-game purchases)

Mobile games may offer virtual goods or services that players can purchase with real world money. This is commonly referred to as "in-game purchases" or "microtransactions". Players use their real money to acquire things like weapons, characters, cosmetic items, virtual currency or in-game progress.

Data collection and advertising

Some mobile games collect information about how players interact with the game. This can include player behaviour, preferences and gaming habits. This data can be used to improve the game, customise the gaming experience and increase the precision of targeted advertisements. These ads can be banner ads, videos or pop-up ads that appear during the game. When players interact with these ads, for example by viewing them or clicking on them, developers earn money from the advertisers.

Subscriptions

Some mobile games offer subscription models where users pay a fixed amount, usually monthly or annually, to access exclusive content or features. This provides a steady source of revenue for developers and often removes ads or restrictions for subscribers. In some cases, this can come in the form of "umbrella" subscriptions, where either the platform owner or game developer offers a subscription solution, as seen in the games console market with e.g. Playstation Plus or EA Play.

Method

2. Method

Data foundation, approach, and relevant regulations.

The data in this report is based on analyses of the 24 most popular apps[2] in the "Free Games" category of the Danish version of the Apple App Store.[3] The target group for the analysed game apps is primarily children and young people, as the majority of the apps had the age label 4+ years in the Apple App Store at the time of selection. The remaining apps were labelled 9+ and 12+ years, and one app was labelled 17+ years.

Data about the apps in question is taken from the game's privacy report, which is available on the iPhone. This contains information about the use of the respective apps, including which third-party services are used and which resources the app uses, e.g. camera, microphone and location. This privacy report will be available and updated continuously as you use the respective apps.[4]

The analysis is based on apps from the Apple App Store, as both smartphones and tablets from Apple dominate the Danish market. More users use devices with the iOS or iPadOS operating systems than Android, which is the closest competitor.

Each app was downloaded and used for approximately 15 minutes by an employee of the Agency for Digital Government. This analysis of free gaming apps therefore only examines how a given app behaves when you actively use it, and thus not how it behaves when you have closed the app and put your device down. Generally, the person who played the 24 games has not given permission to cross-site tracking, access to resources or the use of cookies and similar technologies when asked. However, there may be cases where it has not been possible to use the app if you did not consent to, for example, the terms of use, and in these cases the person has

---

[2] Initially, 25 apps had been selected for analysis, but an error occurred in the analysis of one of those and was left out.
[3] The apps in question were selected as of 21 August 2023. See the list of analysed gaming apps in Appendix A.
[4] https://gs.statcounter.com/os-market-share/mobile/denmark

therefore accepted this. The results are therefore an expression of the situation where you have rejected everything that you would be able to reject if you were to continue using the app in question. This is because the purpose of the report is to show exactly the data collection that takes place, even if you have tried to avoid data collection by refusing the use of cookies and similar technologies.

In terms of tracking by third-party services, it is not possible to definitively see what data has been collected and what this data is used for. However, by examining the identified third-party services in detail, it is possible to see the overall purposes for which data is used and thus qualify whether the collection of data is for the purpose of e.g. targeted advertising or protecting against cybercrime. In this report, the focus is on the third-party services used to collect data for displaying and targeting advertisement.

Relevant policies

The cookie directive, which the Agency for Digital Government provides guidance on and supervises, also apply to apps. The cookie directive require that the owner of an app must obtain consent from the visitor before using cookies and similar technologies, unless cookies and similar technologies are used for technically necessary purposes on the app. You can read more in the Agency for Digital Government's guidelines on cookies here: https://digst.dk/sikkerhed/digitale-tilsyn/tilsyn-med-cookieom-raadet/cookievejledningen/

It is important to remember that the cookie directive only apply to the actual collection of information from the visitor's terminal equipment, such as a tablet or smartphone. If personal data is involved, the subsequent processing, such as where the data is stored and what the data is used for, must be done in compliance with the GDPR.

This report does not comment on the legality of the results of the analysis. However, learning and insights from the analysis will be included in the Agency for Digital Government's future work supervision of apps.

Results

3. Results

On all the games analysed, there are third-party services that collect data for marketing purposes. At the same time, the international market for apps means that information about Danes can end up in numerous places around the world.

When looking at the purposes behind the various third-party services used on the analysed apps, it becomes clear that the majority of them are used to collect data for targeted advertisement and to serve ads through the analysed apps. In this way, user behaviour and interactions can be analysed in order to determine user interests and preferences and to display targeted ads accordingly.

All of the apps analysed use at least one third-party service to collect data for marketing purposes. However, this is not surprising as these apps are all free and rely on revenue generated from advertisement, or alternatively microtransactions and in-game purchases.

New acquaintances and familiar faces

Figure 1 shows an overview of the third-party services used to collect data for advertising.

Figure 1: Share of free gaming apps that send data to third parties
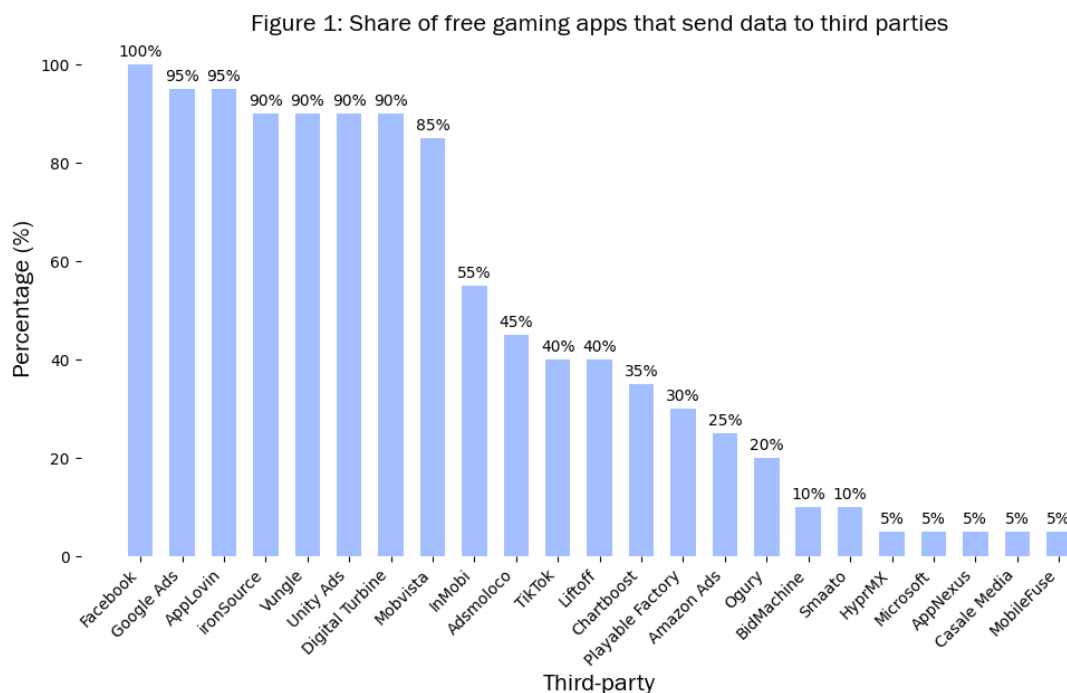
In a previous analysis of websites, "The prevalence of third-party services on Danish websites"[5], published by the Agency for Digital Government in the summer of 2023, it was shown that tech giants Google and Meta both have a strong presence. Google and Meta are also prominent in this analysis of free gaming apps. Facebook collects data for marketing purposes via all the apps studied, and Google via 95 per cent of the apps in question. In contrast, Amazon is only present on 25 per cent of the analysed apps.

When Facebook collects data through all the analysed apps, this data can be used by Facebook's parent company, Meta, to target advertising by building profiles of the users of these apps. In addition to advertising on the Facebook platform, Meta offers a range of advertising products through its other platforms such as Instagram. Because Meta owns multiple platforms, the company can reach many consumers, making their product attractive to advertisers.

Another prominent social media on the analysed gaming apps is TikTok. TikTok, owned by the Chinese company ByteDance, collects data on 40% of the apps analysed. Like Meta, ByteDance can also use data collected on apps to target ads and content on their own platform, TikTok. In comparison, TikTok's presence on the websites analysed in 2023 by the Agency for Digital Government was less than 5%.

The analysis also shows that there is certain third-party services with a significant presence on apps, which are not necessarily present on websites. One of these is Mobvista. Mobvista is a company based in China that provides mobile advertising services and solutions.[6] Mobvista has offices in the US, Europe and Asia, and its services and solutions can be used on apps all over the world. One of Mobvista's major services is Mintegral. Mintegral is Mobvista's mobile advertising platform that specialises in providing solutions to monetise ads. When users interact with ads delivered by Mobvista's services or use an app where Mintegral is embedded, data is collected to optimise targeting, measure ad performance and improve overall effectiveness.[7] In this analysis, Mintegral is the most used Mobvista ser-

[5] https://digst.dk/media/28985/tredjepartstjenesters-udbredelse-paa-danske-hjemmesider.pdf
[6] https://www.mobvista.com/en/about-us
[7] https://www.mobvista.com/en/what-we-do/mintegral

vices. In addition, Mobvista has the GameAnalytics service, which is an analytics tool for game developers, and Nativex, which specialises in creating global marketing solutions.

The example of Mobvista helps to illustrate the underlying expertise that characterise the third-party services used for advertisement on mobile devices. Mobvista is not a well-known company in Denmark, which can make it difficult for consumers, authorities and other actors to recognise who is collecting data, what it is used for and where it might end up.

Looking at Figure 1, there are many third-party services that, like Mintegral, are used for advertising through mobile devices. These include AppLovin, ironSource, Unity Ads and Vungle. Thus, it is clear that there is a broad portfolio of mobile advertising services used by the most popular free-to-play games. The fact that these are specialised in mobile advertising is also the reason why they are not prominent in the analysis of websites and is likely why they are not as well-known as e.g. the major social medias.

Gaming in a global perspective

The market for free gaming apps is characterised by international actors. This may be because it is relatively easy to create an app on the other side of the globe and make it available in the Danish version of the Apple App Store. Third-party services are also characterised by large, international players, with tech giants in particular playing a crucial role.

Figure 2: Share of free gaming apps that send data to third parties by geographic location of the third-party service
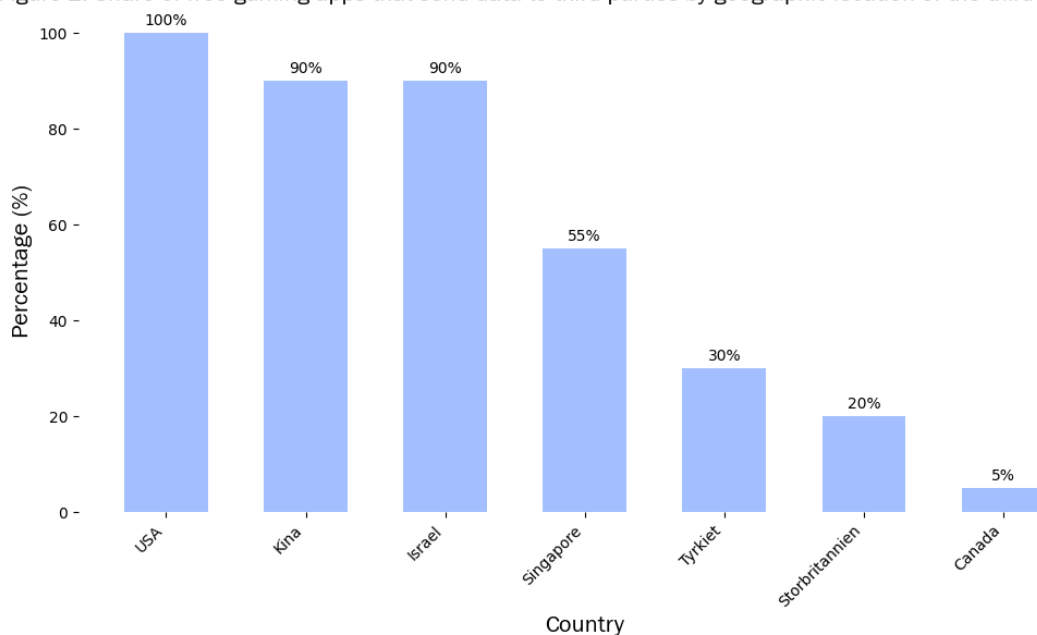
Figure 2 shows the countries from which the third-party services present on the analysed gaming apps originate. Looking at Figure 2 it becomes clear that the USA, China and Israel dominate. Furthermore, it shows that none of the third-party marketing services used comes from companies headquartered in the EU.

All of the analysed apps use third-party marketing services located in the US. This is due to the use of third-party services from Meta and Google in particular, as well as other players such as AppLovin and Vungle, which are also American. Of the analysed apps, 90% use Chinese third-party services for marketing, particularly Mobvista and TikTok. Israel's position on the list is solely due to the presence of ironSource.

Therefore, it is important to be aware of where in the world the services in question are located since personal data about Danes may end up in countries that do not have the same level of protection that exists in Denmark and the rest of the EU.

Concerns surrounding children as users

Free-to-play gaming apps have a high proportion of children and young people as users, as children often play on smartphones. In line with how social media is ostensibly free, the analysed apps have the collection of user data and ultimately the user as their product. This leads to a business model where the embedding of third-party modules for data collection can be used for targeted advertisement across services beyond the individual app. Furthermore, as monetisation is based on continuous and recurring user activity, elements such as time-based game mechanisms are a popular method to manipulate user behaviour, effectively making the business model influence game design. Purposefully designing for retention allows third parties to collect data and continuously update profiles used for targeted advertisement. It is fair to assume that children are more vulnerable than adults when being manipulated by design choices that can influence behaviour, and it should not be taken for granted that children and young people have the sufficient understanding of the complex role they play in the business model of free gaming apps.

Recommendations

4. Recommendations

What can you do as a mobile app user to see if third parties are collecting data?

As a consumer, navigating the thousands of apps available can be difficult when it comes to finding the balance between user experience, price and privacy.
Here are five precautions you can take as a consumer when playing games, checking your horoscop<e or anything else via apps on your smartphone.

Keep in mind that nothing is completely free

It is important to understand that even if an app is free to download, developers can still make money by collecting data about you. Be aware of the permissions you give when you install the app in question and consider whether it is worth it. You are typically paying with your data when the app itself does not cost anything.

Check your app permissions

Review your own and possibly your children's app settings and check what permissions each app has. If an app requests access to information, you can switch it off here. You can access it in "Settings" and then check your respective apps to see if you have allowed tracking, as well as access to your camera, GPS and microphone. However, you should be aware that this might change or impair the experience of the respective apps.

Consider alternative apps

If you are concerned about the data collection that happens on apps, consider using alternative apps that are known to be more privacy-friendly. Sometimes paid versions of apps can also be an alternative, as they are less reliant on advertising revenue and therefore may collect less data or none at all.

Review and delete unused apps

Take the time to go through the apps you and your children may have installed and delete the ones you do not use. There is a risk that the apps you

have installed are collecting data even when you are not actively using them. By deleting them, you avoid this.

Use the App Privacy Report

On your iPhone or iPad, you can access an App Privacy Report that provides insight into how your apps use your data. You can access it under "Settings" > "Privacy & Security" > "App Privacy Report." However, be aware that this information can be complex and is best understood with more in-depth knowledge.

Appendix A: Analysed gaming apps

The following apps, selected as of 21 August 2023, have been analysed and form the basis of the report:

- Idle Lumber Empire - Wood Game
- Family Island™ — Farming game
- Tile Busters
- Block Puzzle
- Dragonscapes Adventure
- Tap Out - Take 3D Blocks Away
- Weapon Craft Run
- Skip-Bo
- Geometry Dash Lite
- Pipe Connect Puzzle Art
- Idle Bank Tycoon: Money Empire
- Stumble Guys
- Happy Match Cafe: Line Puzzle
- Paper.io 2
- MONOPOLY GO!
- Family Tree! - Logic Puzzles
- Brain Test: Tricky Puzzles
- Roblox
- Chrome Valley Customs
- Tic Tac Toe - 2 Player XO
- Figgerits - Logic Puzzles Game
- Magic Tiles 3: Piano Game
- Alice's Dream: Merge Island
- Parking Order!

digst.dk