

EQUITABLE APP STORE SIMULATION
ATTEMPTS TO CHANGE APPLE APP STORE'S BLACK BOX

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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General Research Problem

How can an app store mutually, fairly, and transparently benefit consumers, developers, and platform owners?

As big tech companies have increasingly consolidated and dominated over recent years, their control over the consumer experience has become more and more complete. One way this has manifested is on smartphones, where users are largely limited in software to the selection available on that operating system's "app store": a platform that distributes software, both first and third-party, for consumers to use on their devices. One such app store is the Apple App Store. In 2020, it had over 2 million applications (apps) available (Appfigures, 2021) and 34 billion app downloads (Perez, 2021). It is a lucrative industry, with the developers behind these apps earning \$60 billion in 2021 (Apple Inc, 2022). However, despite these statistics, Apple has faced controversy over the practices that its app store uses. Their measures allow them to determine exactly what applications reach the store and how they can earn revenue.

In addition to restricting what apps can do, Apple earns revenue by taking a cut of all app and in-app purchases. By doing so, it has positioned itself to reap huge rewards from the platform. However, at what cost? The App Store as it stands is a black box with little regulatory oversight but many real-world consequences. Almost all of a user's experience on their smartphone is determined by what apps they use or do not use. Thus, having this control is fundamental to the way smartphones are interacted with and what they are used for. It also has important implications for the tens of billions of dollars in the mobile app industry. Developers, consumers, and regulators have all criticized the App Store and attempted to unpack the black box to understand Apple's motivations and decisions and reclaim some of the vast amounts of revenue Apple collects.

The research paper will look at these critiques and determine what might make the App Store unfair and why. It will also consider if Apple justifies or denies these inequities in a valid way. The technical report will then try to remedy these flaws and inequities by creating and testing a prototype app store that can mutually benefit developers, consumers, and platform owners.

Equitable App Store Simulation

Could an app store be created that demonstrably benefits consumers and developers without anticompetitive characteristics?

In 2008, Apple opened the iPhone App Store, with more than 500 free and paid apps (AppleInsider, 2008). A year later, they added support for in-app purchases (Kincaid, 2009), which came to be the primary source of revenue in the smartphone app industry and is also the subject of Apple's controversial 30% cut. Moreover, the app store as it stands today on major mobile platforms like iOS is highly restrictive and selective. Apple's dominance in app transactions allows them to do this. In response, regulators are starting to take aim at the App Store and alter its mechanics. How could a mobile application marketplace be created that levels

the playing field for developers? What would it look like when free from powerful corporate interests? Doing so may increase consumer choice, open developer expression, and pass on savings to users. There are many considerations to juggle— too liberal permissions would increase security risks and could dilute the quality of applications. In addition, there should still be a framework for the platform to earn revenue while not making deployment and release inaccessible.

This project would create a prototype app marketplace that increases developer equity and reduces the power of a centralized owner, and then use focus groups to research user behavior and interactions. The focus group participants would likely include actual app developers and product owners. Because of the difficulties of scaling, it would not be feasible to create an app store that could be used in practice. Instead, using a web app and cloud database, we would create a simulated “app store” where users can download “apps” or develop and deploy them. This store will include many tunable parameters including revenue cuts and approval mechanics as well as different ideas that may entirely differ from existing revenue structures. Participants will then play the role of developers and consumers with various goals and their evaluations will be collected and analyzed. Not all of these goals will be transparent and many may be conflicting— this simulates some of the lack of trust in the real-world environment. Participants may decide to cooperate or compete depending on their strategies and values. The simulation could also include security failure events to make risk assessments more complex. An ideal result will have a strong consensus on what satisfies both developers and consumers while still generating revenue. Using this data, we can evaluate the ideal app store parameters and inform regulatory decisions. Future work will help regulators shape the existing app stores into ones that are more competitive and beneficial to all groups.

Attempts to change Apple App Store’s Black Box

How and why are businesses, developers, and consumers attempting to reopen the black box of Apple’s App Store and reveal anticompetitive practices?

After the Epic Games v. Apple lawsuit, Apple Inc. has become well-known for its app store and software experience that some have said is deliberately restrictive and monopolistic. In this paper, we will answer the question of how Apple has created its app store to obtain advantages and the pushback, criticisms, and responses by various parties in recent years. We will also examine how the App Store has benefitted and hurt these parties as well as Apple itself. The parties include Epic and large-scale app publishers, and how they have opposed or bypassed the Apple store price structuring. It also includes smaller, independent app developers. Both types of these parties are affected by how Apple runs its app store. The paper will investigate Apple’s defense against these claims and how it keeps the black box closed as well as how it has changed its policies in response.

Because of several ongoing legal battles and evolving international policy, this project will need to rely on very recent evidence to provide the fullest picture. Evidence will include documents from court cases, trials, and hearings that can obtain insight into often opaque

company practices. Other evidence will include primary sources like newspapers and magazines that cover activities of the different actors, regulatory documents, and scholarly literature on the subjects. The *Epic Games v. Apple* court case features several arguments and counterarguments concerning the app store's potentially anticompetitive characteristics (Moreno Bellosso, 2021). It also includes rulings for each point that indicate the legal and regulatory attitudes currently emerging. These briefings will provide thoroughly well-considered arguments to help us analyze the black box. Through methods like content analysis, they can be organized into different categories. The rulings on the cases will also serve as a proxy for legal attitudes toward anticompetitive behavior. It will be necessary to choose a legal definition for "anticompetitive" in order to deliver this evaluation.

Besides large companies like Epic Games, which have a major business incentive to retain control of their marketplaces, there are also independent developers who face challenges. One of these is Apple's rigorous approval process that can sometimes seem arbitrary or unfair (Hestres, 2013). For example, Apple allows Patreon to maintain its own external store without fees but not other apps. We will investigate if the approval process is fair and if it should be changed. Looking at specific case studies of rejections and acceptances and applying various fairness theories will help determine this. The opaque nature of the process reflects much of the App Store as a whole.

The Apple App Store fits closely into the framework of a black box because Apple is able to keep tight control of its mechanisms. Unpacking how it works through evidence is key to this analysis. As well as in this paper, this is clearly what regulators have been attempting to do with recent court cases. Developers have also been speaking out about their experience with the application process and its flaws. On the consumer side of things, the black box model could also be applied: Apple provides limited transparency into how users' software operates behind the scenes and offers limited customization of features.

Finally, this paper will examine the relationship between the Apple app store and its consumers. By limiting the user's control within its platform, many have argued Apple's software experience among its various devices and services creates a "walled garden". This means that consumers have a seamless, enjoyable experience using their products but cannot leave to other platforms or devices (Hazlett, 2011). This paper will examine the policies that point to this and their effects. One way to see this is that the restricted options and prioritized apps within the app store trap the consumer into Apple. However, it could also be argued that this is what consumers wanted or are satisfied with— maybe it successfully keeps their experience safe and clean. Thus, the consumer relationship may be the strongest argument Apple has for its app store design.

All things considered, we do not know entirely which App Store mechanics are beneficial or integral to the system. This evaluation will help determine whether more regulation and changes are needed and where in order to make the application experience better for businesses, developers, and consumers. We will apply fairness theories to these concerns as well. It is an

incredibly complex task to balance the needs of all parties involved, but based on recent evidence, steps are being taken to change the App Store as it exists today.

Conclusion

At the conclusion of this research, I will show how developers and regulators have been working to expose the Apple app store and its practices and what recent efforts and activism have resulted in. I will also conclude whether Apple really is anticompetitive and why. Showing how the App Store benefits or harms the system and how the system has shaped the App Store in response will illustrate the multi-faceted system at play. The complex system of dependencies, uneasy relationships, and pushes and pulls will be increasingly opened by this research. This knowledge will be useful to other researchers, developers, and regulators by advising them of where changes have been made and still need to be made.

Further research could include many different ideas. One possibility is building on the simulated app store approach to further iterate and refine marketplace mechanisms. Another could take a legal or policy approach by establishing frameworks that govern these systems. On a similar note, one could more closely scrutinize the legal arguments surrounding this system to open the box from that angle.

Returning to the general research problem, understanding the flaws in current app store models informs what would make a better one. Although many developers and consumers benefit from the App Store, such as Epic Games which still generates large amounts of revenue from its mobile game transactions, it is not an optimal setting for those groups and may include barriers to entry to smaller businesses and under-resourced groups. As regulation evolves, it suggests the direction that changes are going. Likewise, by working backward from the goal, prototyping an ideal app store suggests the place that regulations should point to. These two ideas work in tandem to create a more equitable environment for digital goods and services.

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