Freemium as a Business Model

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1 Introduction to the Freemium Business Model

Digital companies and software providers widely adopt the Freemium business model. Its name merges two key words, “free” and “premium”, which reflects a strategy where businesses offer basic features at no cost while charging for advanced or exclusive functionalities (Huang, 2014).
The origins of the Freemium approach can be traced back to the 1980s, when software companies distributed limited versions of their products for free, encouraging users to pay for full access to all features (Segal, 2024). While the practice had been around for years, the actual term “Freemium” was only coined in 2006 by Jarid Lukin(Regan, 2022).
In this model, users are usually split into two groups: those who use the product for free and those who pay for extra features. Free users receive a limited value, of a product or service, without payment (Holm and Günzel-Jensen, 2017). These free versions usually have limits in terms of features, functionality, or how much you can use them compared to the paid options(Segal, 2024). The free offer serves as an entry level tier, that allows customers to experience the value of the product before making a financial commitment to it.
Users who choose a paid subscription typically unlock the full version of the product, gaining access to added perks. These can include things like no ads, offline usage, better performance, or access to exclusive content and support (Pereira, 2025).
Premium subscribers often get extras like an ad-free interface, offline functionality, unlimited use, or even exclusive content and support. The money earned from these users not only helps improve the premium offering but also makes it possible to keep the free version available for everyone else (Regan, 2022).

1.1 Distinguishing Freemium and Free Trials

Even though both freemium and free trials include the word “free,” they work quite differently when it comes to how companies make money (Walker, 2025). A free trial gives users full access to all features, but only for a short time, usually 7, 14, or 30 days. After that, access is cut off unless the user decides to pay, which can create pressure to buy because of the time limit. In contrast, freemium models let users stay on the basic version without any time restriction, which can appeal to a much broader group, especially those who aren’t ready to pay right away (Walker, 2025).

1.2 What are the advantages of the Freemium Model

One of the biggest advantages of Freemium is that it removes the initial cost barrier, making it easier for people to discover and try the product. This often leads to broader brand visibility and can significantly expand the user base (Walker, 2025). Free access also encourages sharing, which can lead to organic growth through word-of-mouth and social networks.

With no upfront commitment required, more people are likely to try the product, especially those who are hesitant to spend money before understanding the value (Walker, 2025). This approach can lower marketing costs and increase interest among the more cautious users.

Furthermore, this business model gives companies a chance to demonstrate their value early on. Users can experience the most important features for free, which helps them

build trust and familiarity with the product before upgrading (Holm and Günzel-Jensen, 2017). In some cases, the responsibility of learning the product shifts more onto the user. This reduces the need for the company to do the teaching about their product or service. (Huang, 2014).

Even non-paying users are important, to be more exact, their feedback and usage data help companies understand what users want, where to improve, and how to better draw the line between free and premium offerings (Holm and Günzel-Jensen, 2017). These insights can give a strong competitive edge.

On top of that, digital products tend to have low marginal costs, allowing companies to support many free users without major expense. Freemium can also enable quick market entry, and revenue from ads shown to free users can further support the model.

1.3 Disadvantages of the Freemium Model

Despite its benefits, the Freemium approach comes with several downsides.

Supporting a large base of free users can be costly. It demands ongoing investment in servers, customer service, and other infrastructure, even though these users may not generate any direct income (Holm and Günzel-Jensen, 2017). In some cases, this can stretch resources away from paying customers.

A common challenge is the low conversion rate. While the model hopes for 2-–5% of users to upgrade, many companies struggle to reach even 1% (Holm and Günzel-Jensen, 2017). Often, the free version is "good enough" for most people, or lacks the urgency to motivate an upgrade.

Another issue lies in how users perceive value. Developers may think the free tier is limited, but users might see it as sufficient. Or conversely, a free version might feel too stripped-down to attract anyone at all (Niemand et al., 2019). Finding that ideal middle ground is difficult and crucial for success.

2 Case Study: Spotify's Freemium Implementation

2.1 The Free Offering

Spotify offers basic music streaming for free, giving users access to a large library of songs. However, this free version has several limitations compared to the premium plans. Users hear ads between tracks and can only skip a limited number of songs. This version does not allow the possibility to download music or play songs in any order.

2.2 The Premium Offering

By subscribing to a paid plan, Spotify users can unlock additional features not available in the free version. The platform offers several premium options, such as Individual, Duo, Family, and Student plans (Pereira, 2024). Premium subscribers enjoy a range of perks, including listening without ads, the ability to download music for offline use, unlimited skips, and better audio quality. These plans also allow access across multiple devices, including phones and tablets.

2.3 Revenue Generation

The majority of Spotify's income comes from its Premium subscribers, though the company also earns money through ads shown to users on the free tier (Pereira, 2024). In 2024, revenue from Premium plans reached €13.82 billion, while ad-supported services brought in €1.85 billion, highlighting just how much more significant the paid tier is for Spotify's overall earnings (Pereira, 2024). Figure 1 gives a better visual of the revenue

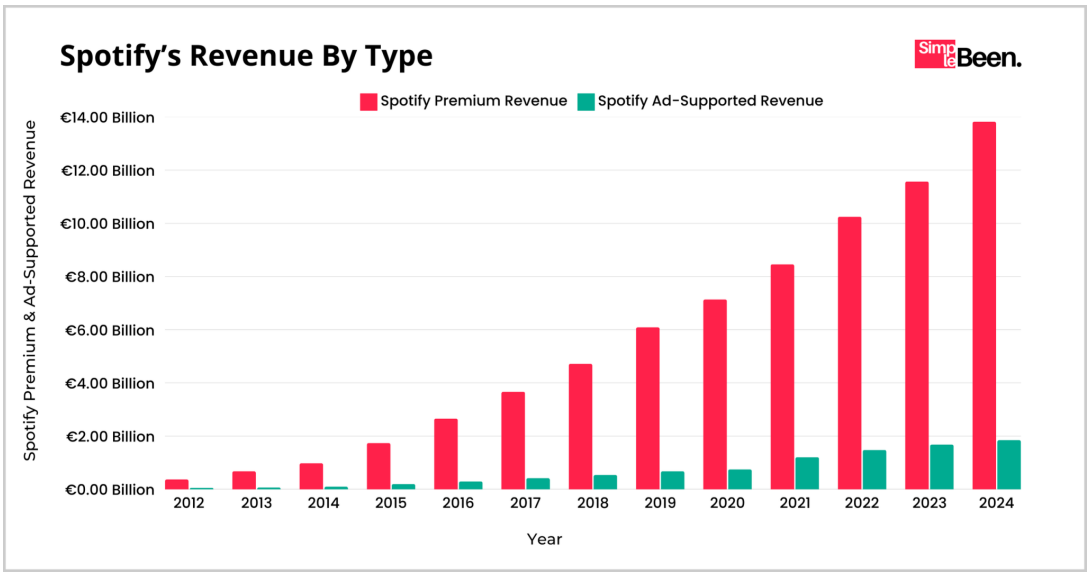

Figure 1: Spotify's Revenue by Type from 2012 to 2024, showing the split between Premium and Ad-Supported income.Source:(Shaikh, 2025)

generated throughout the years. The impact of the premium users is very large and important it makes the largest percentage of the overall revenue and there is a constant growth from 2012 till 2024. More importantly there is also depicted how much more premium users there are in comparison with the free users.

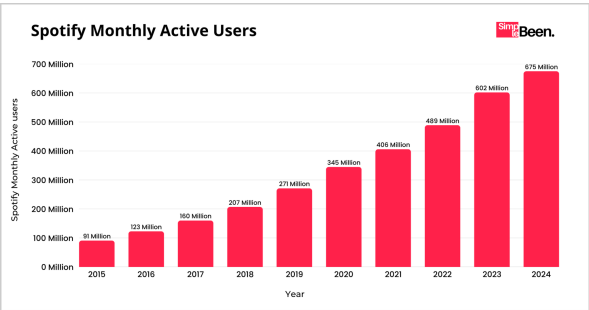

Figure 2: *
Spotify Monthly Active Users by Year (2015–2024)

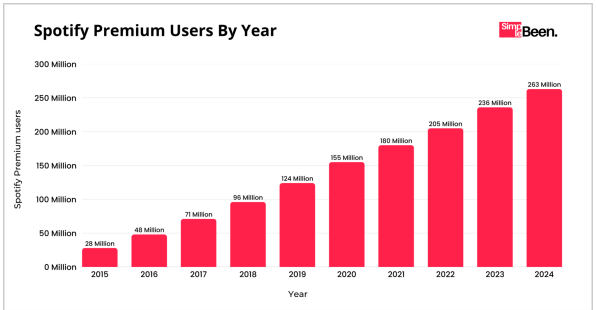

Figure 3: *
Spotify Premium Users by Year (2015–2024)

Source: (Shaikh, 2025)

We can see this in the following figures 2 and 3. As of 2024 Spotify had a massive 675 million monthly users and 263 million of them are Premium subscribers as of 2024 (Shaikh, 2025). As seen in Figure 3 also the amount of the Premium subscribes has had

a positive growth from 2015 to 2024. This is the reason why it can be considered that Spotify has successfully implemented the potential of the fremium model.

2.4 Strategic Implementation Aspects

Spotify has long focused on expanding its user base before turning a profit, even operating at a loss for several years to support this strategy (Holm and Günzel-Jensen, 2017). To attract users, the company relies heavily on cost-effective methods like word-of-mouth, referrals, and search engine visibility (Vihovde Reime, 2011). A standout element of its marketing is the annual "Spotify Wrapped" campaign, which gives each user a personalized summary of their listening habits, including favorite artists and total minutes streamed. Often, this comes with a custom message from a top artist, creating a more personal, community-driven experience within the app.

Despite its popularity, Spotify also faces financial pressure due to its reliance on licensing deals. The company must pay substantial fees and royalties to record labels in order to legally stream music (Vihovde Reime, 2011).

3 Simulation Concept: Modeling Conversion Dynamics

To simulate the Freemium business model, the Mesa framework on Python was used (code can be found in Appendix A. This simulates the model using agent-based modeling. It is divided into two components: `UserAgent` class that models the individual user decision and the `FreemiumModel` class that manages the overall simulation. Each user is represented as an instance called `UserAgent`, this is just inherited from the Mesas base Agent class. When initialized each user contains a unique ID, which is a reference to the overall model. Furthermore it has a parameter called `freemium_value`, that has the role of representing how generous they perceive the free service to be. Each user starts as a "free" one, uses the product actively, and carries the same `freemium_value` throughout the simulation.

For each simulation step, if the user has churned (meaning it stopped using the service), nothing happens. Otherwise, the next action of the user depends entirely on the value of `freemium_value`. In the case where this value is high (above 0.8), it means that the free version offers so much value that the user sees no reason to upgrade, so they stay as part of the free version. Furthermore in the case where the value is low (below 0.2), the user finds free tier too limiting and quits the product or service. Lastly, in cases where the value falls in between, there is a 4% chance that the user will conver to a premium subscription at each time step. This is supposed to simulate a gradual but realistic conversion rate (falls between the expected 2–5%).

The more general simulation is under the control of `FreemiumModel` class, that also inherits from Mesa's Model class. It starts by setting the number of users to simulate and defining the shared `freemium_value` that will be passed to each agent. To activate the agents in a random order for each step, `RandomActivation`, was used.

The model creates the specified number of users and registers them into the scheduler. To track simulation outcomes, a `DataCollector` is set up to monitor the number of active users in the free and premium categories, as well as the number of users who have stopped using the service entirely. This is achieved through internal helper methods that count

users with a specific status and usage flag. Every time the `step()` method is called, all agents perform their decision logic, and the data is recorded for that round.
To observe how different `freemium_value` settings influence user behavior, a separate function called `run_and_plot` runs the simulation for ten steps and plots the resulting user distributions over time.

Underlying Behavioral Assumptions

The following assumptions capture the strategic challenges of Freemium design, especially in terms of feature balance and conversion rates:

1. **Decision Based on Perceived Value:** A user's decision to remain on the free plan, upgrade, or leave is driven by their perceived `freemium_value`.
2. **High Freemium Value (Too Generous):** If `freemium_value` > 0.8, users find the free tier so valuable that they remain free and do not convert.
3. **Low Freemium Value (Too Restrictive):** If `freemium_value` < 0.2, users perceive the free tier as too limited and churn (`uses_product = False`).
4. **Balanced Freemium Value:** For values between 0.2 and 0.8, users continue using the free version, and each has a 4% chance per step to convert to premium (`status = premium`). This approximates real-world conversion rates (2–5%).

Performance Criteria Modeled

The simulation uses a `DataCollector` to track:

- **Free Users:** Active users with `status = "free"` and `uses_product = True`.
- **Premium Users:** Converted, active users with `status = "premium"`.
- **Inactive Users:** Users who stopped using the product (`uses_product = False`).

4 Simulation Scenarios and Outcomes

The graphs display how many users remain free, convert to premium, or churn. There are three simulations that model different business outcomes: first where the free version is too generous, second where the free version is too limited and third with a more balanced value. The outputs in Fig.4-6 provide a visual of how the basic structure of the Freemium business model, it helps to explore strategic decisions that can be taken in the future.

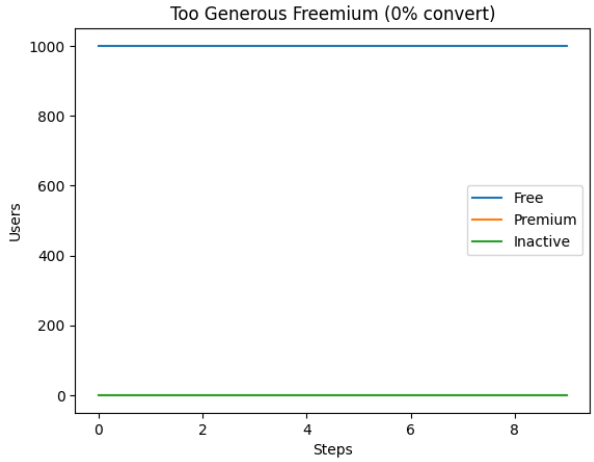

Figure 4: Balanced Freemium (2–5% convert): gradual increase in premium users with steady decline in free users. No churn observed.

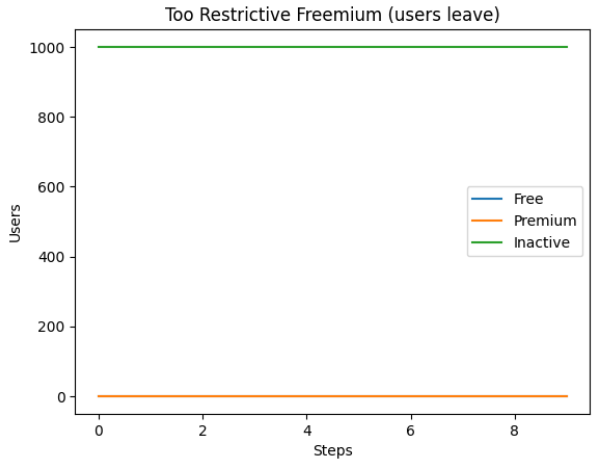

Figure 5: Too Generous Freemium (0% convert): all users remain on the free tier; no incentive to convert.

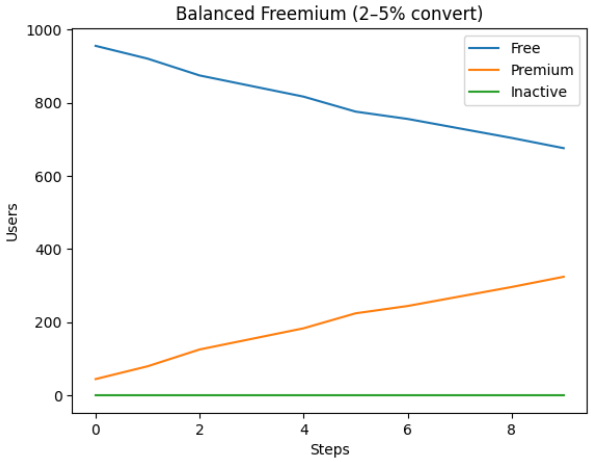

Figure 6: Too Restrictive Freemium (users leave): all users churn due to lack of perceived value in the free tier.

5 Conclusion

In conclusion, the Freemium business model is a very interesting one with high potential if used and implemented correctly. The primary appeal and strategic advantage of the Freemium model is its ability to attract a significantly larger initial user base by removing the upfront financial barrier. This large reach helps catapult brand exposure and can lead to viral growth through word-of-mouth, referrals, and network effects (Huang, 2014).
There is a forever delicate limbo between the premium and free offerings, this means that companies that would want to partake in such a model need to have a very good plan on the versions that the free and paying users are going to get.
Furthermore, this agent-based simulation demonstrates core dynamics of the Freemium model. By adjusting the `freemium_value`, one observes impacts on user retention, churn, and premium conversion.
As mentioned above, the simulated model further highlights that success requires a careful balance in offering enough to keep users but holding back just enough to inspire upgrades. This conceptual framework, even though very basic and has not given a time frame, gives us a general understanding of how it works and how businesses can use such a model and make it better to fit their specific needs.

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A Simulation Code

```
from mesa import Agent

class UserAgent(Agent):
    def __init__(self, unique_id, model, freemium_value):
        super().__init__(unique_id, model)
        self.status = "free"
        self.uses_product = True
        self.freemium_value = freemium_value

    def step(self):
        if not self.uses_product:
            return
        if self.freemium_value > 0.8:
            self.status = "free"
        elif self.freemium_value < 0.2:
            self.uses_product = False
        else:
            if random.random() < 0.04:
                self.status = "premium"
```

```
from mesa import Model
from mesa.time import RandomActivation
from mesa.datacollection import DataCollector
import random
import matplotlib.pyplot as plt

class FreemiumModel(Model):
    def __init__(self, num_users=1000, freemium_value=0.5):
        self.num_users = num_users
        self.freemium_value = freemium_value
        self.schedule = RandomActivation(self)

        for i in range(self.num_users):
            agent = UserAgent(i, self, self.freemium_value)
            self.schedule.add(agent)

        self.datacollector = DataCollector(
            model_reporters={
                "Free": lambda m: self.count_users("free"),
                "Premium": lambda m: self.count_users("premium"),
                "Inactive": lambda m: self.count_inactive()
            }
        )

    def step(self):
        self.schedule.step()
        self.datacollector.collect(self)
```

```
    def count_users(self, status):
        return sum(1 for a in self.schedule.agents if a.status == status and a.uses_p

    def count_inactive(self):
        return sum(1 for a in self.schedule.agents if not a.uses_product)

def run_and_plot(freemium_value, title):
    model = FreemiumModel(freemium_value=freemium_value)
    for _ in range(10):
        model.step()

    data = model.datacollector.get_model_vars_dataframe()
    data.plot(title=title)
    plt.ylabel("Users")
    plt.xlabel("Steps")
    plt.show()

# Run three scenarios
run_and_plot(0.9, "Too Generous Freemium (0% convert)")
run_and_plot(0.1, "Too Restrictive Freemium (users leave)")
run_and_plot(0.5, "Balanced Freemium (2{5% convert)")
```