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NO SUCH THING AS A FREE APP: A TAXONOMY OF FREEMIUM BUSINESS MODELS AND USER ARCHETYPES IN THE MOBILE GAME MARKET

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Abstract

Manuscript type: *Research Paper*
Research Aims: *The Freemium business model is becoming increasingly prominent in the current digital economy. In the mobile game market, total revenue from free to download apps is overtaking those from paid apps. The purpose of this article is to propose a taxonomy that examines and categorises the various types of Freemium business models.*
Design/methodology/approach: *This study uses the qualitative approach of logical partitioning to generate a Freemium business model's taxonomy through systematic observation of the existing business models.*
Research Findings: *The findings identify advertisement and microtransaction as two primary revenue sources for Freemium business models. The taxonomy also reveals different types of in-app purchases, the most dominant Freemium business model in the mobile game market. Further discussion connects the taxonomy to related issues such as user archetypes and 'user flows'.*
Theoretical Contribution/Originality: *This paper conceptualises a novel taxonomy of business model integrating various research streams and differentiating types of freemium business model. This paper also extends the existing archetypes of Freemium users by adding new categories, namely Remoras and Barnacles, to differentiate free users. Finally, this paper proposes a framework of user flows between the free and the paying state, arguing for a nonlinear flow.*
Research limitation/Implications: *The taxonomy addresses freemium business models in the mobile game market. Application of the taxonomy in a broader context will require further study.*

Keywords: Freemium business model, Microtransaction, Monetisation strategy, Mobile games. Qualitative observation, Classification schemes, Logical partitioning.

INTRODUCTION

> *"There's no such thing as a free lunch."*
> (Milton Friedman)

The quote above highlights the truth that there will always be a hidden price for goods and services provided for "free". Nevertheless, a business model that revolves around providing "free" products is becoming increasingly prominent in the current digital economy.

From mainstream online news media to big hit games, the nature of its practice in the app market is developing rapidly and showing seemingly universal application.

As an illustration, in the Google Play Store, not only has the total number of "free" apps significantly exceeded the total number of paid apps, but those "free" apps also attract a higher user download rate. Slightly more than 8 per cent of total "free" apps can attract more than 50000 downloads, while less than 1 per cent of total paid apps can pass that threshold. On the other side, more than 85 per cent of paid apps are only downloaded by 500 users or less, while less than 55 per cent of "free" apps fail to pass that threshold (Free vs paid Android apps, 2017).

Arguably, the higher adoption rate is due to the difference in business models between freely downloadable and traditional paid apps. Users have to make a one-time payment of a fixed price to purchase a copy of a paid app before they can download and use that app on their device. On the other hand, users can download and use the "free" apps without upfront payment, although these "free" apps will have to make money or monetise using other means.

Table 1. Number of downloads per app, free vs paid

Type of App	Number of Downloads per App			Number Of Apps
	0-500	501-50000	>50000	
Free	54.07%	37.90%	8.03%	2,556,535
Paid	85.38%	14.03%	0.59%	214,104

Source: Appbrain (2017)

Mobile games dominate the app market. The total revenue for the mobile app market, dominated by revenue from all game apps (81.4% of the total annual income), reached USD 50.4 Billion in 2016 and is forecasted to exceed USD 105.2 Billion in 2021 (Handrahan, 2017). Income from "free" apps

was estimated at 15% of total revenue in 2013 and forecasted to exceed 45% in 2017 (Worldwide Mobile App Revenue Forecast, 2016). More recently, it was estimated that the total monetisation value of the mobile games market grew 97% from 2014 to 2019 (Purnami and Agus, 2020).

Furthermore, it is important to note that the trend shows exponential revenue growth from in-app purchases. In contrast, paid apps revenue grows only logarithmically. This trend means that income from "free apps" is growing much faster than traditional paid apps. Soon the income from "free" apps will overtake the revenue from paid apps. Figure 1 shows a comparison between revenues from paid apps and free apps.
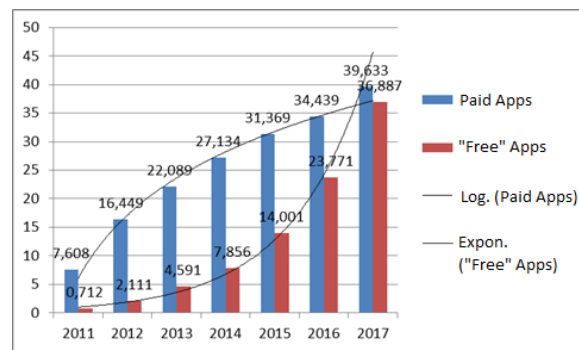

Figure 1. App store revenues from paid and "free" apps (in billion USD)
Source: Statista (2017)

As another example, in its first month only, Pokémon Go was already played by more than 15 million users and generated $US 200 million in revenue despite being downloadable for free (Molina, 2016). This kind of "free" business model started much earlier than the apps industry, but it re-emerged in its current state recently with better success due to its affinity to the apps market's needs (Wagner, Benlian, and Hess, 2014).

Fred Wilson, a venture capitalist, is credited as the first to describe this concept of making money from providing "free" goods and services as the Freemium business model in

his 2006 blog post (Huang, 2016). It is a radical departure from the traditional business model that consumers must pay to use or play. The application of Freemium business models in the apps market is so fresh and rapidly evolving that the first challenge is the lack of formal definition and boundaries of Freemium in which theoretical development may take place.

This paper aims to reconceptualise the Freemium business model by offering a new definition and developing a comprehensive taxonomy of Freemium business models by classifying how users "spend" money on a "free" product. This taxonomy aims to enhance the understanding of Freemium by revising and extending our knowledge of who are the users (aka user archetypes) and how do they spend (aka 'user flows').

Furthermore, the purpose of classifications is to help prevent the confusion of theories. A proper taxonomy will help with theory classification and use. This taxonomy will integrate the existing theories to explain the corresponding consumer behaviours, thus facilitating future theory building for Freemium user behaviour by ordering and structuring the phenomenon. Hunt (2010) highlights the importance of classification-oriented theories in the systematic investigation of social science phenomena, to structure and categorise types and subtypes of the objects for further study.

In sum, this paper will investigate and aim to clarify the definition of Freemium business models. Additionally, it analyses key features of different Freemium business models and organises them into a formal classification model. The authors hope to start an academic discourse on which business models are Freemium and which are not. Furthermore, the paper also distinguishes corresponding archetypes of Freemium users and identifies their specific

consumer behaviours.

This paper's primary method will be the logical partitioning approach, a systematic classification approach for minimal conceptual overlap, used by Jiménez, Voss, and Frankwick (2013) to classify the co-production of goods. They emphasised the importance of classification-oriented theories in organizing different research strands and reducing the overlap of names and definitions. Logical partitioning employs a deductive approach to systematically specifying different categories of a concept and then identifying its characteristic properties and labelling them accordingly. Finally, this paper ends by conceptualizing a less distinct boundary between the free and premium offering and more dynamic and nonlinear flow of users between the free and paying state.

LITERATURE REVIEW

Freemium Business Models

Alt and Zimmerman (2014), in their editorial for a special issue in Electronic Markets on Electronic Markets and Business Models, highlighted how business model innovations by Internet thinkers and practitioners had caught many traditional strategists unprepared. Freemium is fast becoming the app market's dominant business model (Koch and Benlian, 2017). Similarly, academics' understanding of the Freemium business model recognises this phenomenon but still plays catch-up to the rapidly evolving business models in the internet market.

A prior study by Huang (2016) has tried to conceptualise a construct for Freemium business models and proposed a measure. This study also attempted to define what Freemium is and what its characteristics are. The basic definition of Freemium, according

to that study, focuses on the two tiers, one is the basic free tier, and the other is the premium tier. Unfortunately, the study adopted a static approach is the conceptualisation of Freemium business models with an underlying assumption that Premium and Free users access distinctly separate content, and there is a clear boundary between the basic free tier and the premium content.

Furthermore, multiple studies have identified the challenge for "free" apps to find alternative revenue sources to monetise the offering to pay back the cost of development and provide a return on their product investment. Wagner et al. (2014) studied the conversion of free users to paying users in music as a service app, such as Spotify. Importantly, they differentiated Freemium from free trials which they consider part of product sampling. Subsequently, Koch and Benlian (2017) studied the effect of two different free sampling strategies, Premium-first and Free-first, on Freemium conversion rate. They focused on the form of Freemium where the app provides the essential function for free with additional subscription options for premium access. Users were given free access to the premium contents to increase their likelihood of conversion into premium users.

Unique to the context of games, Georgieva, Arnab, Romero, and de Freitas (2015) defined a Freemium game as a game that lets users play without paying any money but offers them options to purchase virtual goods to enhance their game experience. More recently, Hamari, Hanner, and Koivisto (2017) studied in-app purchase intention and identified sales of virtual in-game goods as one of the primary ways for Freemium games to monetise their apps. They also separate users' intention to use the service for free and the intention to make in-app purchases.

Earlier definitions focus on the dual-tier nature of Freemium with an assumption of a distinct boundary between free and premium offering (Huang, 2016). However, this distinction is not as central in more recent studies (Hamari, 2017; Koch and Benlian, 2017). This study revisits the assumption made by earlier studies on Freemium by arguing that the current Freemium practices have moved toward a more blurred boundary and dynamic interactions between the free and the premium elements. Given the rapid development of the Freemium business model, the earlier assumption becomes increasingly untenable. In some cases, paying and free users frequently cross the barrier and intermingle their access to free and premium contents.

On the other hand, relaxing this assumption enables more business model innovation to be included within the Freemium framework. Therefore, this paper proposes user flow as another important characteristic of Freemium. Table 2 summarises the four main features of Freemium from prior research that this paper expands and build upon.

Table 2. Summary of Freemium key characteristics from literature

Key Characteristics	Reference
Free Tier Premium Tier	Wagner et al. (2014), Huang (2016), Hamari (2017), Koch and Benlian (2017)
Monetisation	Wagner et al. (2014), Georgieva et al. (2015), Hamari (2017), Koch and Benlian (2017)
User Flows	Hamari (2017), Koch and Benlian (2017)

Customer Value Proposition

This study adopted the Customer Value Proposition (CVP) framework offered by Johnson, Christensen, and Kagermann (2008) to explain business model innovation as the basis for this classification work. They suggested a successful business model relies on the fit between the customer value proposition and the profit formula. Similarly, the CVP framework was also adopted by recent studies to explain the success of digital business models (Xu and Koivumäki, 2019; Taylor et al., 2019).

Furthermore, Teece (2010) suggested a similar approach in designing a successful business model in the internet industries. He argued that since digital products users have ways to get the proposed value for free, firms need to find innovative ways to extract value from them. Thus, innovations on how to earn revenue from capitalizing the customer value became the basis of a sustainable business model in the internet market. Therefore, this taxonomy will emphasise the role of monetisation strategy and how business converts the customer value proposition into sources of revenue in the app market.

An interesting issue is whether the Freemium model should be called a revenue model rather than a business model. Most business model frameworks indicate that the monetisation strategy is just one component of a business model (Al-Debei and Avison, 2010; Morris, Schindehutte, and Allen, 2005; Osterwalder, Pigneur, and Tucci, 2005). Amit and Zott (2001) defined revenue model as the specific modes in which a business model enables revenue generation. They argued that this definition shows that the business model and the revenue model are complementary concepts.

This paper's view is that monetisation strategy is so central for apps that it, for the most part, drives their business model. Chesbrough (2010) argues that revenue generation is the central theme for business model innovations in the technology industry. Furthermore, Baden-Fuler and Morgan (2010) showed that scholars define a business model in many ways and forms, in which revenue generation consistently features in most definitions. Even Amit and Zott themselves admitted that business models and revenue models are closely related and sometimes even intertwined (Zott and Amit 2010). Finally, the term "freemium business model" is more prevalent than "freemium revenue model" in the business literature (Huang, 2016; Voigt and Hinz, 2016; Holm and Günzel-Jensen, 2017; Rietveld, 2018). Therefore, considering that industry practice more often calls Freemium a business model, Freemium in this paper is called a business model.

RESEARCH METHOD

Logical Partitioning Approach

The primary method for this paper is a qualitative observational approach called logical partitioning. This procedure employs a deductive approach to systematically specifying different categories of a concept and then identifying its characteristic properties and labelling them accordingly. The approach was previously used by Jiménez, Voss, and Frankwick (2013) to classify the co-production of goods, which this paper uses as a reference.

Logical partitioning is suitable because it assumes that the number of classes is limited, and some knowledge about the objects already exists (e.g., academic literature). Logical partitioning has the advantage that its classification schemes are more generalizable than the grouping

procedure, the main alternative approach. The grouping method can be more robust to classify objects in a set of a specific database. However, practitioners might not be able to apply the result beyond that particular database. Since this paper aims to develop a formal definition for a broader context of applications, the logical partitioning approach is more appropriate than the grouping approach for this study.

The logical partitioning method involves asking a series of yes or no question to classify objects. Accordingly, the study formulates a series of such methodical inquiries to define Freemium and explore which business models are Freemium and which are not. These questions are summarised as flowcharts, and examples of each category are presented as illustrations. Even though the authors develop this classification of Freemium business models using the mobile game market as the focus, the authors would like to show how the readers can also use this taxonomy in a broader context in the internet market.

Hunt (2010) summarised three characteristics of classifications formulated with the logical partitioning approach. The first characteristic is that it generates monothetic classifications. Monothetic means that the classified objects must exhaustively display the defined attributes set in the taxonomy. The second is that it can create hierarchical multilevel schemata. The third is that the resulting classification will have no known examples or have scarce examples in more than one category. The important thing for consideration is the possibility of a particular type to exist based on the selected classification criteria.

Developing the taxonomy using the logical partitioning approach consisted of three stages based on the methods described by

Jiménez, Voss, and Frankwick (2013).

The first stage involved examining the characteristics of the existing top mobile game apps listed in the Google Play and iTunes Store marketplace from August 2016 to May 2017. The researchers downloaded 29 unique mobile game apps and observed their monetisation for generally three months. This process provided a rough understanding of the characteristics of the gaming experience and the monetisation strategy. The full list of the 29 top mobile game apps sampled from the app store is shown in Appendix 1. In the second stage, The researchers conducted a review of the relevant literature to obtain the current understanding of Freemium business models. In the third stage, the Freemium business models' basic characteristics were conceptualised from the first and second stages and then organised into a preliminary logical partitioning decision tree.

Additionally, a draft of this taxonomy was presented at several academic forums and generated useful feedback from the audience for improving the taxonomy. The final taxonomy presented in this paper has undergone multiple rounds of refinement through literature review and academic discourse. A similar qualitative process of the iterative taxonomy development process is also commonly used in the information system (I.S.) studies. Gimpel, Rau and Röglinger (2018) described a detailed step-by-step iterative process, as shown in Figure
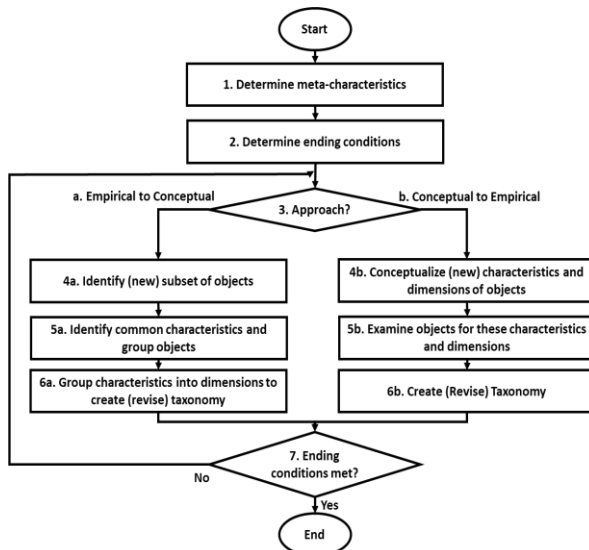
Figure 2. Iterative taxonomy development process
Source: Gimpel, Rau and Röglinger (2018)

Throughout the taxonomy development, the authors have self-assessed it on the five criteria to evaluate the quality of a marketing schema by Hunt (2010). The first criterion is the adequacy of the definition of the phenomena to be classified. The second criterion is the appropriateness of the properties or characteristics selected as the basis for the classification. The third criterion is that the identified categories must be mutually exclusive. The fourth criterion is that the classified categories must be collectively exhaustive. The final criterion is the usefulness of the schemata. These criteria have been very useful in providing direction during the development and refining of the taxonomy. The taxonomy was revised until it meets the ending conditions, and the researchers could see no more improvements based on the criteria.

Self-Reflexive Considerations

Alvesson and Sköldberg (2017) highlighted the importance of reflexivity to address how the researcher's personal views and experiences may play a role in interpreting the data. The idea is radical *transparency*, whereby the researchers disclose their relevant personal views and experiences so

that readers may assess if those appear to bias the interpretation. The first author considers himself an avid gamer in general and an active user of mobile games. He spent at least an hour every day, spread throughout the day, playing mobile games. He has a slight tendency to switch games, cycling through across genre. He rarely made any in-app purchase throughout his play. When he did, it was always a small purchase. He is non-competitive but hated losing. He plays mainly to de-stress from daily tensions. His attitude is slightly negative against in-app purchases in mobile games.

The second author is a long-time gamer. He plays mobile games for a quick diversion. Currently, he plays a lot of Clash Royale, one of the most popular mobile games. Playing this game several times a day gives him a personal feel for what it feels like to have high involvement with a game and intensely want better cards that users can only obtain through loot boxes, either won or bought. He occasionally makes in-app purchases when special value sets are available, i.e., the "3X value" (3 times value) or "5X value" special offers that the game occasionally makes available.

RESULT AND DISCUSSION

Defining Freemium

The taxonomy begins by defining the Freemium business model. Freemium business models are so rapidly evolving that any formal definition would require constant updates. Our definition of Freemium aims to exclude non-Freemium business model from contaminating the Freemium business model classification. In essence, this taxonomy defines what a Freemium is by defining first what it is not. Figure 3 presents the summarised logical partitioning that defines what is Freemium.
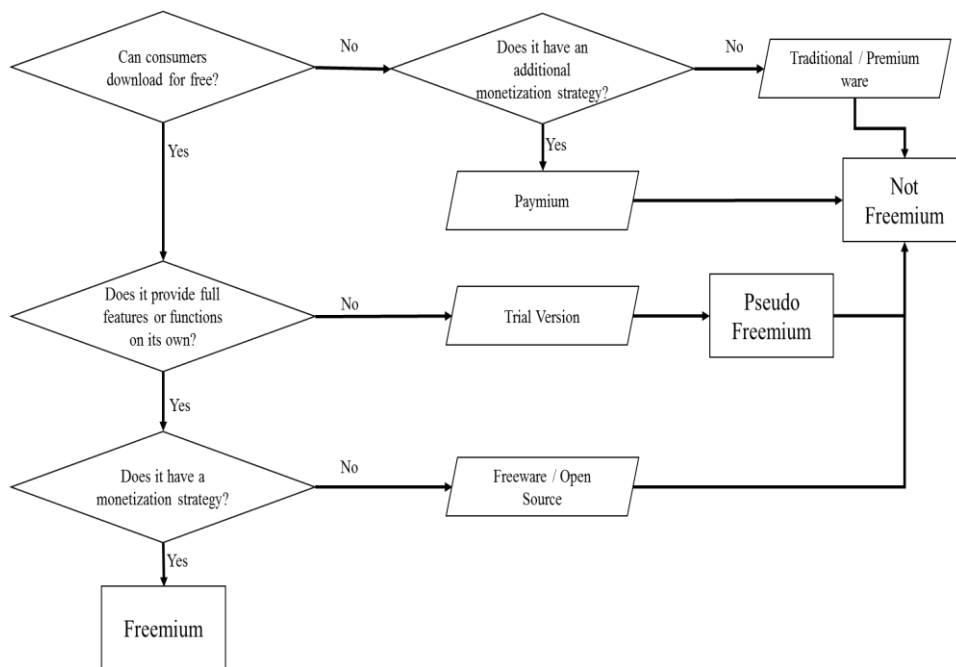
Figure 3. Defining freemium business models

The first question should eliminate the traditional premium business model. Thus, the question "Can the consumers download the product for free?" should be asked. If the answer is no, then it is the traditional premium business model. Apps in this category require users to pay upfront before product use for the purchase (or the license) of one version of the product. Contrarily, Freemium monetises in other ways aside from charging upfront payments.

The second question should exclude Trial apps. Thus, the question "Does the downloadable product provide full functions on its own?" should be asked. If it doesn't, then it is the trial model of a premium product. Trial version apps are the limited version of a premium app and always go in pair with the corresponding premium app. This business model shares some resemblance to Freemium. In one type of Trial version users are given free license to use a restricted version of the product but must pay to download the full version. In the

end, it is only a partial product for potential users to try before deciding to purchase the full premium product or not. Alternatively, Trial apps give users a limited time to access the full version, after which the app is no longer functional unless the user purchases the full version. Users not interested in paying for the premium version will have no reason to continue using the Trial version after the time limit has expired. As an illustration, a car test drive should not be considered a Freemium form of transportation. In mobile apps, limited function Trial apps or "lite versions" are intended to motivate the user to buy the full-price version and not continue using the app for free. Both apps developers and users often confuse trial with Freemium. True Freemiums should still provide sufficient motivation for the free users to remain using the app, past their initial trial of the product. Thus, this taxonomy argues that the "lite" or Trial version is a pseudo-Freemium and does not constitute a full Freemium business model.

The third question should exclude truly free apps. Thus, it asks, "Does it have a monetisation strategy in place?" If it doesn't, then it is a Freeware or open-source product and not a Freemium. This business model is the only one that indeed provides a full product for free. Apps in this category are entirely free with no monetisation strategy, such as small games or utilities provided by hobbyists, enthusiasts wishing to share, or people philosophically inclined that their software should be free. In some cases, the developer even made the license open source, so users can do more than using the app such as adapt or try to improve the product. However, freeware is rare for business use.

If all three questions are confirmed, then the product is Freemium. Freemium business models are neither free nor premium. It allows users to download the full version of the product for free, but it is not entirely free to use the product. As the saying goes, "there's no such thing as a free lunch." Freemium relies on other sources of revenue using additional monetisation strategies. Freemium business models can adopt a broad range of monetisation strategies in their products.

However, having a monetisation strategy other than the traditional upfront payment is not only limited to Freemium. One category branched from the premium business model by adopting the monetisation elements similar to Freemium on top of the sales of license. Some of the premium apps also utilise elements of the Freemium model on top of the direct purchase. Despite having an alternative monetisation strategy, this model is not Freemium since it does not provide its full product for free.

Thus, this paper defines Freemium as *a business model that provides a fully functional product for free without any upfront payment required but monetises by offering additional features or capabilities beyond the free basic functionality to generate revenue through microtransactions and ads*. This paper's premise is that the monetisation strategy itself is the essential characteristic that defines Freemium business models. The next part of the paper discusses how the different types of Freemium can be classified based on their source of revenue and monetisation strategy. Table 3 summarises the main attributes and examples.

Table 3. Summary of business model classification, with examples

Category	Main Attribute	Games	Non-Games
Premium	Upfront purchase of a license to full function	Minecraft, Game Dev Story,	MS Office 2003, Photo Lab PRO Photo Editor!
Paymium	Upfront payment for full function plus monetisation for extra features	Kingdom Rush Origins HD	Teleprompter Premium,
Trial Version	Free license to limited function, purchase premium version for full function	Game Dev Story Lite, Sonic 4: Episode II LITE	Photo Lab Picture Editor FX
Free	Free license to full function, no monetisation	Chess Master 3D Free, GameStart 2015	Gallery Zentertain
Freemium	Free license to full function with monetisation for extra features	See Table 4	

Classifying Freemium

After examining existing Freemium business models in the game app market, the authors argue that the main characteristics of monetisation strategies are the source of revenue and the degree of overt monetisation. Figure 4 presents the logical partitioning that classifies different types of Freemium business models.
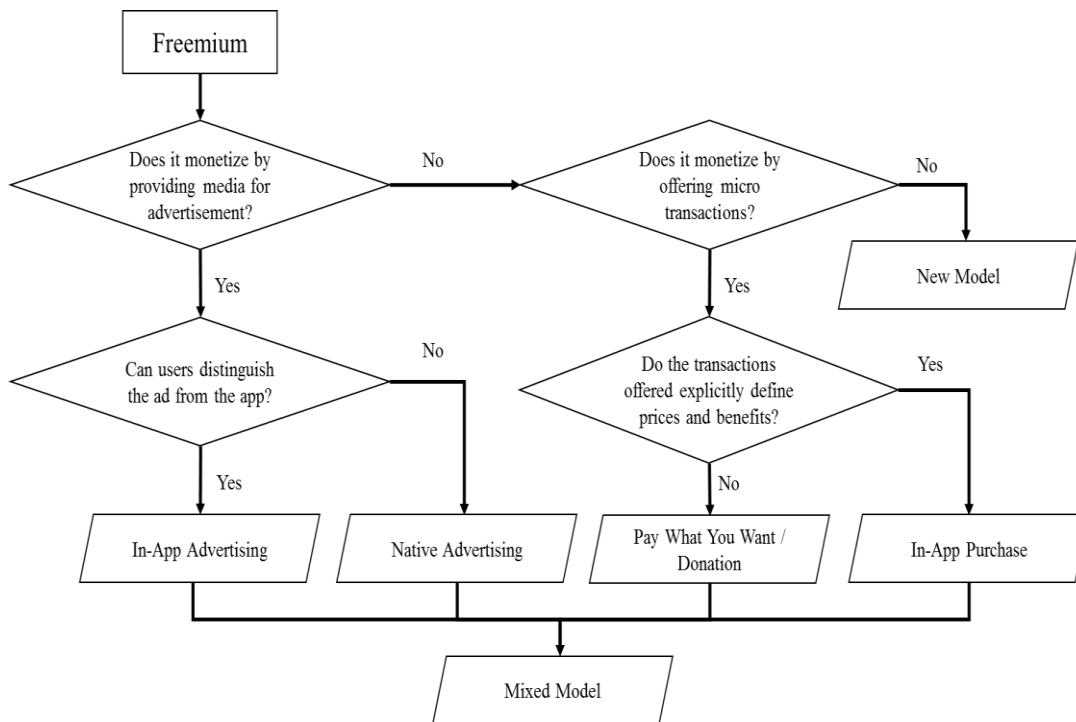

Figure 4. The classification of Freemium business models

Another arrangement of monetisation source is the "mixed models" that combines both ads and microtransactions. While it may seem an obvious thing to do, some apps prefer using either ads or microtransaction strategy only since mixing both revenue sources would require finding the right role and balance for ads and microtransaction. An interesting issue is whether enthusiast users who are more likely to pay for microtransactions would also be the one most irked by having to watch intrusive ads.

A monetisation strategy becomes more overt as the users perceive increasing intrusiveness to their game experience. Users may label these strategies as "pay-to-win" or "pay-to-progress" and consider them irritating. An extreme form of overt monetisation would be when the users perceive the Freemium app to be more costly than a similar Premium app, either financially or otherwise.

Some Freemium business models are more overt in monetizing their app than others. Thus, this study classifies ad-based and micro transaction-based Freemium business models further based on its degree of explicit monetisation. The in-app advertising model is the Freemium model that explicitly monetises by asking users to view the ads it hosted. Grewal, Bart, Spann, and Zubcsek (2016) proposed a framework that features third-party apps as one mode of delivery for mobile advertising. Furthermore, they mention it requires the advertising firm to pay for the ad, but in return, it expanded the ad's reach to carefully targeted audiences (e.g., players of similar games). One typical example is when app users have the option to watch videos to earn items or in-game currency. Alternatively, the app can also include a content lock ad, where a part of the app content is blocked until the user views an ad (e.g., an ad before a tutorial video).

This advertising type is more intrusive to the gaming experience since viewing the ad is not by choice. Chou and Wang (2016) highlighted the intrusiveness of "interstitial ads" that appeared mid-task in mobile game apps. They contend that it adds a sense of incongruity which undermines satisfaction with the play session.

Conversely, the native advertising model is the Freemium model that monetises by ads less explicitly so that the users cannot clearly distinguish the app from the ad. This form of Freemium includes subtle sponsored content or product placement within the app. This type of advertising is part of the branded content domain (Bellman, Potter, Treleaven-Hassard, Robinson, and Varan, 2011). In the specific context of games, this kind of advertisement is called advergames. Kuo and Rice (2015) highlighted how advergames defined as "games in which branded content is embedded" are distributed for free.

Furthermore, they pointed out that the ad messages are often difficult to distinguish from the game content in these games, masking their persuasive nature. This sort of advertising is also less intrusive to the gaming experience than In-app advertising. Some examples of these native advertising apps include the Chipotle Scarecrow app on iTunes and most Lego® game apps.

In the micro-transaction-based group, the Pay-What-You-Want (P.W.Y.W.) or the donation model is the Freemium model that does not have explicitly defined prices and benefits. This model provides microtransactions options with flexible size of payments, and each transaction is independent of any purchase of virtual goods. The "pay what you want" option allowed buyers to have absolute control over the transaction price, including paying nothing if that is what they want (Marcus

2015, Marett, Pearson, and Moore 2012).

In essence, apps in this group use microtransactions other than the in-app purchase model. Marcus (2015) highlighted that P.W.Y.W. payment option is becoming increasingly popular in real-world applications, especially for cultural services and digital goods. These apps encourage users to make payments by appealing to their sense of altruism or a tie-in with a particular cause. Sleesman and Conlon (2017) refer to both "pay what you want" and charitable giving as prosocial behaviour. In both cases, the user determines the amount of money they pay or donate willingly in return for the product's use. Some notable examples include Mekorama and Proun. Marett, Pearson, and Moore (2012) emphasised that social factors, such as loyalty and fairness, have a dominant role in the amount users are willing to pay for such business models.

Alternatively, an app may use crowdfunding campaigns via a third-party platform such as Patreon and set donation targets to release additional content updates. Johnson and Cui (2013) described how sellers could use external reference price strategies in P.W.Y.W. (i.e., a minimum price, a maximum price, and a suggested price) to influence buyers' chosen prices. If the total user contributions achieve that specified target of funding, the app will release the new contents. The app may also reward top contributors with extra perks. Schmidt, Spann, and Zeithammer (2014) highlighted how the seller could use P.W.Y.W. as a price-discrimination mechanism in monopolistic and competitive markets. If used effectively, users with more engagement and commitment to the app will price-discriminate themselves willingly.

The final classification is the In-app purchase model. The app uses microtransactions with a fixed price tied to a particular offer and features no ads in this category. Currently, this category is the most dominant model in the mobile game market. Roma and Ragaglia (2016) found that apps with the in-app purchase option are more successful concerning revenue and adoption than paid apps and apps without in-app purchases. However, this model uses a more overt monetisation than the P.W.Y.W. / Donation model and has the risk of being perceived by users as more intrusive to the gameplay. Since In-app purchase is the dominant model in the mobile game market, it will be classified further in the next section. Table 4 summarises the main attributes and examples.

Table 4. Summary of Freemium classification, with examples

Category	Main Attribute	Games	Non-Games
In-App Advertising	Intrusive ads	Doom & Destiny Free, Craft Exploration Survival	Yahoo! News, Alibaba, Facebook
Native Advertising	Embedded ads	Lego game apps, Chipotle Scarecrow, Iron Man 3 (tie in with the movie)	Google Mail, Dulux Visualizer
Donation/Pay What You Want	Implicit microtransactions	Mekorama, Proun, Dwarf Fortress	Firefox, Wikipedia
Mixed Model	Mixed source of revenue	Asphalt 8, The Walking Dead: No Man's Land, Game of War: Fire Age,	The Economist
New Model	Other sources of revenue	None found	None found
In-App Purchase	Explicit microtransactions	See Table 5	

Sub-Classifying In-App Purchase

The logical partitioning continues by classifying the popular in-app purchase model further into sub-categories. Georgieva et al. (2015) and Hamari et al. (2017) identified sales of virtual goods as one of the primary revenue sources for in-app purchases. Further examination identified six sub-groups of in-app purchase, namely Currencies, Cosmetics, Loot Boxes, Durables, Consumables, and Subscriptions, based on the type of virtual goods offered by the in-app purchase. Figure 5 presents the logical partitioning that classifies the six types of in-app purchase.
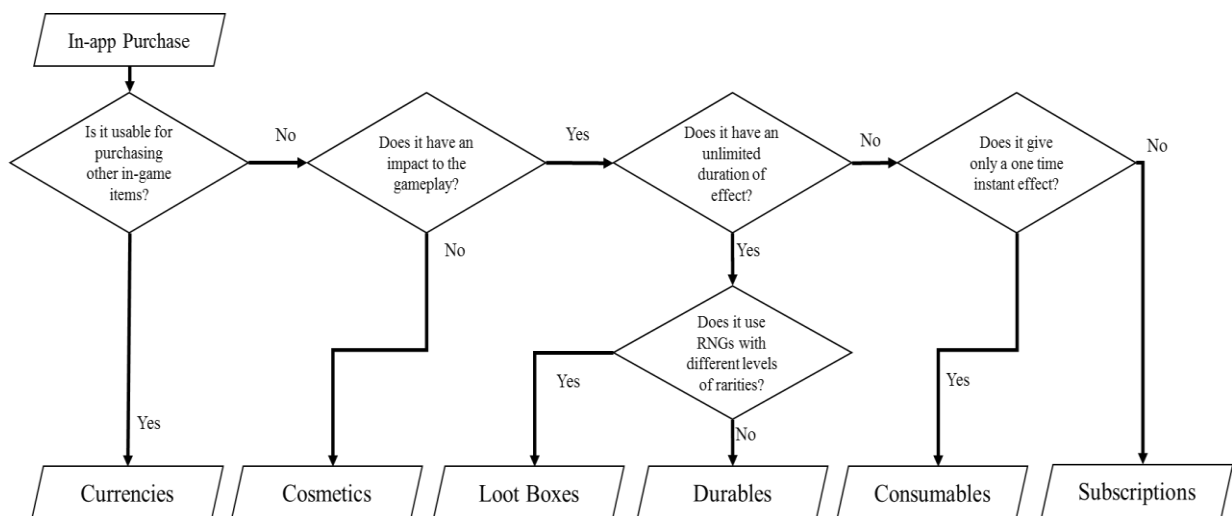

Figure 5. The sub-classification of In-App Purchase

The first sub-classification of in-app purchase is virtual Currencies, which is the basis of the in-game economy. In-game Currencies involve purchasing virtual currencies that the players can use for other transactions within the app. Game apps may have multiple types of currencies with differing availability of earning it for free. Some currencies can only be obtained via in-app purchases or as a bonus for in-app purchases.

The taxonomy can classify the rest of the in-app purchase sub-groups based on the type of virtual goods. Cosmetics are in-app purchases for virtual goods that do not have any direct impact on the gameplay. This type of virtual goods may not have any in-game functionality but provides psychological value and social value. Some users may opt for a personalised in-game look for in-game characters using Cosmetics, such as character skins or costumes, to fulfil aesthetic values or show off preferences (Musabirov, Bulygin, Okopny, and Sirotkin, 2017).

For virtual goods that directly impact, the taxonomy distinguishes those with permanent effects from temporary effects. Loot Boxes are virtual goods with permanent effects that use a random number generator (RNG) in the purchase. The RNG introduces uncertainty in the purchase of relatively permanent in-game objects using a set of predetermined probabilities (i.e., characters in Summoner Wars, summoning Fire Emblem Heroes, cards in Hearthstone). Furthermore, the outcomes commonly have different levels of rarities (e.g., common, uncommon, rare, or ultra-rare). This form of In-app Purchase is also known as "Complete *gacha*", an evolution of "*gashapon*" a vending machine for collectables highly popular in Japan. Also known as "loot crates," the user may need to pay for repeated draws to get the specific hero or item that is desired. At the time of this writing, there is the extraordinary development that new regulation in China requires the odds to be declared for this type of in-app "gambling" (Gartenberg, 2017).

This paper classifies virtual goods with a permanent effect that does not use RNG as Durables. Durables involve the straightforward buying of relatively permanent in-game features, such as an ad-removal option or barracks upgrade. In essence, it is any virtual goods with unlimited duration of effect and no randomisation in its purchase. As it is considered relatively permanent, and users can directly pay for the items they want, users will not make too many repeat purchases.

For virtual goods with temporary effects, they are classified further based on the duration of the effect. If the effect is one time and instant, this in-app purchase is classified as consumables. It involves purchasing items with specific instant effects or functions within the app, such as boosters or potions. These effects can boost the users' in-game performance or restore game attributes such as hit points or stamina. Due to the instant consumable nature, users will be more likely to make repeat purchases than other types of in-app purchase.

If the gameplay effect lasts within a specific duration before it requires renewal, this in-app purchase is a subscription. Subscriptions involve the purchase of license or functions within the app with a definite time limit or expiry. This type also includes various time specified boosts, such as increased resource production or immunities from attacks. The user must repurchase the subscription after the time limit ended. In some cases, users can set the subscription to auto-renewal. Thus, the in-app purchase occurs automatically. Table 5 summarises the main attributes and examples.

Table 5. Sub-classification of In-App Purchase, with examples

Category	Main Attribute	Games	Non-Games
Currencies	General use-no time limit, some may be multi apps	PokéCoins, Clash of Clans gems	Facebook Credit
Cosmetics	Decorative, no functionality	in-game skins and decorations	customisable skins or display
Durables	Permanent effects, non-recurrent purchase	Ad removal, Fire Emblem Barrack upgrades	Ad removal
Loot Boxes	Random number generated, different levels of rarities	Fire Emblem Heroes	Lotteries
Consumables	One specific use, Instant effect	Pokemon Go potions, Subway Surf Keys	Pay per view
Subscriptions	Time-limited access to extra functions	World of Warcraft, Clash of Clans Shields	The Economist, Wall Street Journal, Todoist

Overall, while the three levels of logical partitioning described in the previous sections forms a comprehensive system of Freemium business model. Taken together, the system represents a taxonomy of Freemium business models based on the monetisation strategies identified in the mobile games market during the observation period. Figure 6 compresses the three levels of logical partitioning into the full taxonomy.
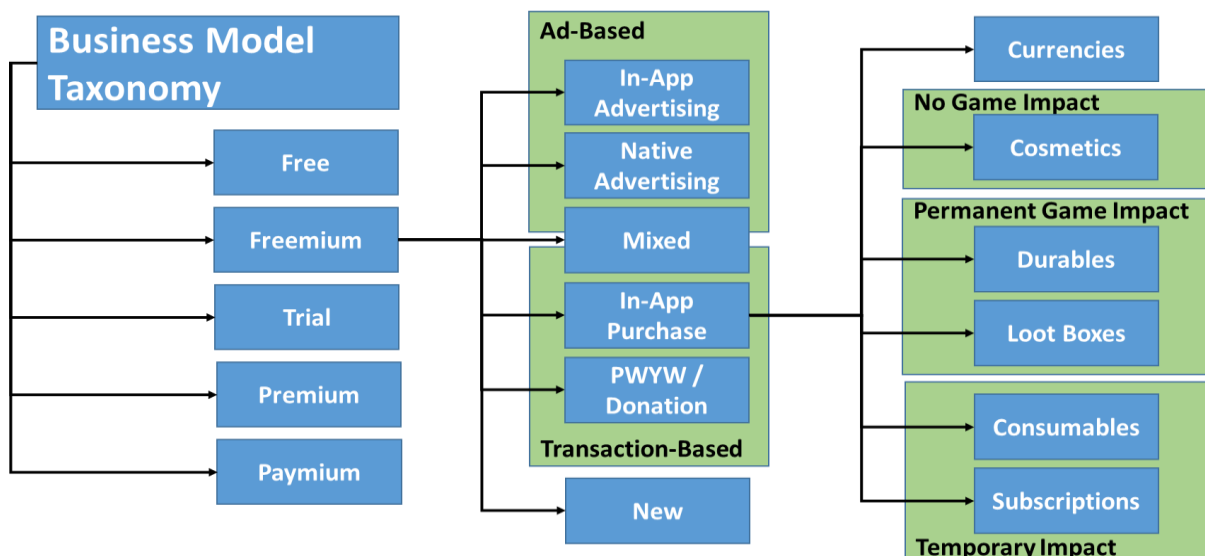

Figure 6. The full taxonomy of business models in the mobile game market

Freemium User Archetype

Different users react to Freemium differently. Some will pay, some will pay a lot, and some will not pay anything. Thus, this section extends the discussion by examining existing user archetypes and adding new user types unique to the Freemium context. Prior studies on Freemium described two groups of Freemium users, paying and free users. Lovell (2011) proposed a user typology of Whales, Dolphins, and Minnows that focus only on paying users. This classification captures the difference in willingness to pay among the paying users. The term "whales" has become part of the vernacular for describing users who pay big money for a Freemium game.

However, this framework does not capture the variety of the non-paying segment, most Freemium users. Lovell (2011) grouped all free users as freeloaders. Additionally, the three paying user archetypes only exist in the transaction-based and the mixed business models. Ad-based Freemiums are populated strictly by free users.

This paper also proposes two new archetypes of non-paying users, namely Remoras and Barnacles, to capture the complexity of being a free user. Sometimes called a suckerfish, the remora can attach itself and free ride on larger fish, or detach and move on its own. Even though Remoras and Barnacles are freeloaders, Remoras are less of a freeloader by providing some benefit back to the app, such as clicking ads, spreading positive word-of-mouth, and identifying and reporting bugs, and building an in-game community. Remoras are also not as irrevocably opposed to the concept of paying for in-game virtual goods. Some Remoras may even evolve into paying users in the future.

In contrast, Barnacles are pure parasites and do not provide any support in exchange for using the app for free. They have an inherent aversion to paying for in-game virtual goods and viewing ads to support the app. They are the ultimate free riders and firmly believe that Freemium apps should be completely free. They are philosophically or psychologically-opposed to spending money on free-to-play apps. Arguably, Barnacles also exist for premium apps. As Teece (2010) mentioned, digital products users have ways to access paid contents for free. In the app market, users can do jailbreak or sideloading to install pirated paid apps. Thus, Barnacles would also be more likely to use pirated traditional paid apps. These two free user archetypes exist in all forms of Freemium business models. Figure 7 presents a full logical partitioning classification of user archetypes.
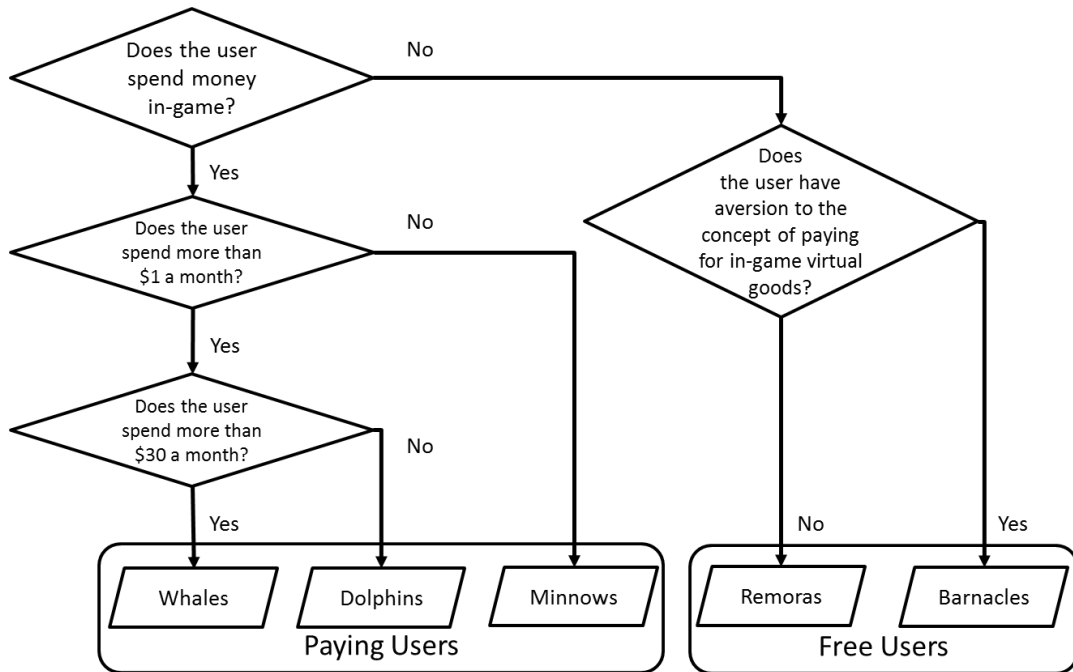
Figure 7. Adapted classification of Freemium users

Freemium User Flows

Finally, the concept of user flow as an essential characteristic of the Freemium business model is addressed in this section. After expanding the definition of Freemium and including more business models within the Freemium classification, this paper argues that the taxonomy can extend the framework proposed by Huang (2016) to describe the Freemium adoption process better. Thus, this section discusses a newly conceptualised framework based on the premise of a less rigid boundary between free and premium tiers.

The majority of prior research on Freemium focuses on the one-way conversion of free users into paying users (Wagner et al., 2014; Koch and Benlian, 2017; Hamari, 2017). In his study, Huang (2016) conceptualised the Freemium business model adoption flows linearly from potential users to free and paying users, and from free users to paying users. While it is agreed that converting free users into paying users is a significant concern for any Freemium app marketers,

this paper argues that focusing only on the conversion process would paint a linear, one direction, and static flow of Freemium users.

After excluding the Freemium business model's trial version, this study addresses the bigger picture of Freemium user flows beyond the conversion process. Firstly, it is argued here that in the Freemium business model, no potential user can convert into paying users without becoming a free user first. Direct conversions from potential users to paying users are only present in the trial or lite version apps, which this study excluded from the Freemium business model. In this conceptualisation of the Freemium user flow, all paying users will start as free users and then convert into paying users. For example, a paying user in the in-app purchase business model will first download the app and spend some time playing the game for free before deciding to spend real money to get an ultra-rare character or purchase a personalised skin.

Aside from user adoption and conversion, the framework adds two more processes that

describe the dynamics of user flow in the Freemium business model. The first process is the reversion, which is the direct opposite of conversion, from paying users back into free users. The indistinct boundary between free and paying content present in the Freemium business model's current forms means that paying users can and most often do stop paying, thus becoming free users again. The focus on converting free users into paying users overlooks the need to stop those converted paying users from reverting into free users.

The second process proposed is the rejection, which is the direct opposite of adoption, of free users back into potential users. This process starts when users stop using the app and ends by them uninstalling the app. Kim, Jung, Suh, and Hwang (2006) highlighted the connection between user segmentation and marketing strategy in e-businesses regarding customer lifetime value (CLV). They argued that building sustainable success requires building and maintaining loyal and valued customer relationships to reduce churn. With thousands of new apps submitted daily, and the limited device capacity, competition among game apps is fierce. It is an ongoing challenge to prevent existing users from uninstalling the apps. Users stop playing when they feel bored with the game, perhaps due to the lack of updates that refresh the game, while old and rarely used apps are often uninstalled to make room for new apps to download and try. For example, Pokémon Go was a big hit game with lots of users, but its user base fell from 28.5 million users at its peak in mid-July 2016 to only 5 million users by December 2016. Today, the goal of Freemium apps is a long and ongoing relationship with the user. For example, Supercell launched the game Clash of Clans in August 2012, but now more than five years later, the app still has loyal players and new players. It also keeps

refreshing with updates (now on version 9.24) and successfully monetises using microtransactions to be the number three top-grossing mobile game on iTunes as of this writing.

With these four processes at play (adoption, conversion, rejection, conversion), Freemium game apps' user flow becomes much more dynamic. Instead of linear progress, the flow can be cyclical in which user can go through several iterations between the three user states. Not only users can flow back and forth between free and pay user states, but they can also flow between free and potential user states. Figure 8 presents the full picture of this dynamic flow.

Figure 8. The dynamic and nonlinear flow of Freemium users

The newly conceptualised user flow can also be related to the new Freemium user archetypes proposed earlier, in a way that generates new managerial implications. Metaphorically, the different business models can be thought of as creating different ecosystems for each user type. Put in another way; each user archetype has its preferred ecosystem. For example, Whales may prefer no ads while Barnacles thrive on ad-based Freemium. Consequently, mobile game app marketers should always consider how their selected business model affects different user types.

Barnacles are highly unlikely to convert into paying users, while Remoras are more likely to convert into paying users and less likely to uninstall the app. While Barnacles can

evolve into Remoras, their inherent unwillingness to contribute makes it is more likely for them to stay as Barnacles forever. There is much more risk for Remoras to devolve into Barnacles than vice-versa. Thus, this paper proposes that, in addition to creating Whales, a key factor in improving monetisation for Freemium apps is the quick identification and conversion of Remoras into paying users (Minnows and Dolphins, as well as Whales).

This framework also suggests that Freemium apps must also be concerned about the reversion rates of paying users when considering the monetisation strategy. This study proposes that a less explicit monetisation strategy may be better at retaining paying users. Conversely, explicit monetisation strategy may be better at converting free users into paying users at the cost of higher user reversion and rejection rate. For example, explicit ad-based monetisation may appeal to Remoras while discouraging some Dolphins and Whales who would rather pay to play through more quickly than to spend time watching ads. Thus, mixed models must find just the right balance between ads and transaction-based monetisation to stop mass reversion of their paying users due to excessive ads and stop mass rejection by ad-viewing customers due to too strong of a need to pay to play. Complaints about a particular Freemium game's intrusive pay to progress or pay to win requirements are among the main types of complaints in public game reviews such as game reviews on Google Play on iTunes app store.

CONCLUSION

In sum, this paper highlights the unique characteristics of different freemium business models and argues against the use of "one-size-fits-all" approaches in the study

of freemium. The proposed taxonomy excludes free trials or "lite versions" and classifies the Freemium business models based on two criteria: the source of revenue and the monetisation strategy's explicitness. The selection of the two variables is because they determine how apps interact with different user types and influences how the users flow within the Freemium framework. The classification identified six types of Freemium business models and six types of in-app purchases. This paper also expanded existing user archetypes to include two free users types, Remoras, and Barnacles. The paper conceptualises a Freemium framework with a less distinct boundary between free and premium status; thus, more dynamic and nonlinear user flows.

The authors aim to provoke more scholarly discussion on the Freemium business model's boundaries with this taxonomy. Even though this proposed taxonomy is based on the mobile game market, it can also apply to the apps market's broader scope. However, the authors recognise that the deeper the taxonomy goes to fit the essential games market, the harder it will be to apply it to a broader context. Thus, application of the in-app purchase sub-classification beyond the context of mobile game apps may require some modification. Therefore, the authors encourage researchers interested in studying Freemium businesses to adapt, revise or extend this taxonomy, user archetypes, and user flows to create a better framework to guide future theory development and empirical research.

This taxonomy also recognises that the Freemium business model is at a growth stage, and its application is still developing rapidly. As newer Freemium business models emerge, this proposed taxonomy might no longer keep up with innovation's rapid pace. Despite the in-app purchase

model's current dominance, future business model innovations may emerge and replace it. Finally, the authors suggest marketing practitioners that understanding the match between your monetisation models and user types is the key to designing a successful Freemium strategy to keep ahead of the competition.

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Appendix

Appendix 1. List of Observed Apps

No	Apps	Observation Period
1	Candy Crush Saga	Jan 2017 to May 2017
2	Fire Emblem Heroes	Aug 2016 to Dec 2016
3	Pokemon Go	Aug 2016 to Dec 2016
4	8 Ball Pool	Jan 2017 to May 2017
5	Asphalt 8: Airborne	Aug 2016 to Dec 2016
6	Fruit Ninja® Free	Aug 2016 to Dec 2016
7	Modern Combat 5	Aug 2016 to Dec 2016
8	My Talking Tom	Aug 2016 to Dec 2016
9	N.O.V.A. 3: Freedom Edition	Aug 2016 to Dec 2016
10	Subway Surfer	Jan 2017 to May 2017
11	Summoners War	Jan 2017 to May 2017
12	Clash of Clans	Aug 2016 to Dec 2016
13	Angry Birds Go!	Jan 2017 to May 2017
14	Clash Royale	Jan 2017 to May 2017
15	Cooking Fever	Aug 2016 to Dec 2016
16	Hill Climb Racing	Aug 2016 to Dec 2016
17	SimCity BuildIt	Jan 2017 to May 2017
18	Smurfs' Village	Jan 2017 to May 2017
19	Sonic Dash	Jan 2017 to May 2017
20	Star Wars™: Galaxy of Heroes	Jan 2017 to May 2017
21	The Simpsons™: Tapped Out	Jan 2017 to May 2017
22	The Sims™ FreePlay	Jan 2017 to May 2017
23	Despicable Me: Minion Rush	Jan 2017 to May 2017
24	Game of War - Fire Age	Jan 2017 to May 2017
25	Jurassic World™: The Game	Jan 2017 to May 2017
26	MARVEL Contest of Champions	Jan 2017 to May 2017
27	Mobile Strike	Jan 2017 to May 2017
28	PewDiePie's Tuber Simulator	Jan 2017 to May 2017
29	Temple Run	Aug 2016 to Dec 2016