Prevalent Business Models for the Apple App Store

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Abstract. Mobile applications, commonly known as apps, have become a significant line of business for IS commerce. There is an App for that! With this slogan Apple suggests that there is app out there for many uses and indeed for every circumstance within our everyday life. However, there is a lack of knowledge of what business models prevail in successfully developing and capitalizing an app. This paper aims to investigate prevalent business models. For this purpose, approximately 300 successful apps from the Apple App Store were analysed. Moreover, 10 semi-structured interviews were carried out with app developers who have successfully placed an app within the top charts of the Apple App Store. It is notable that content-driven apps entertaining users in combination with a 'freemium' or 'in-app' revenue model dominate the Apple app market. App developers clearly define their target group, specify their market cultivation, and try to avoid free apps.

Keywords: Apple, Business Models, App Store, Mobile, Apps.

1   Introduction

"There's an app for that." This Apple slogan [1] epitomizes the extensive portfolio of apps that can be found nowadays within the App Store, which offers apps for any conceivable situation. The emergence of Apple's iPhone in 2007 and the introduction of the App Store in the following year marked the beginning of this development [2]. Since 2007, the number of apps has increased steadily, resulting in the listing of more than 900,000 apps by June 2013 [3]. The adoption of mobile technologies has high economic potential, estimated at 27 billion US dollars in 2013 [4, 5]. It is not surprising that analogous distribution channels besides the App Store exist, targeting mobile operating systems such as Android, Windows Phone/Windows 8 or Blackberry. In particular, Google's Play Store achieves high revenues. However, despite offering 1 million apps – and thus more than the Apple App Store – the revenues of the Google Play Store are below those of its competitors [6, 7].

Within the App Store, mobile applications are structured into different categories. The store distinguishes between 23 different categories (e.g. books, business, education, finance, games and weather) of which developers can choose two to classify their apps. Not surprisingly, the number of applications in each category is

distributed unevenly. Games, with a 16.98% share in the US Apple App Store, represent the largest app category. Education, at 10.85%, is in the second ranking. The smallest categories include navigation (1.42%), catalogues (0.54%) and weather (0.43%) [8].

Besides the categories, there are listings of top apps called 'charts'. These are also differentiated, e.g. the highest numbers of downloads or the highest revenue apps. Especially in the category of cost-free apps, games dominate the highest ranks. However, games are also frequently among the top revenue applications. For example, the developers of the game "Candy Crush Saga" state that they realized a transaction volume of 195 billion US dollars by 2013; this game achieves revenues of approximately 800,000 dollars per day [7].

The app market is on an increasing trend and is becoming increasingly serious, with relatively high turnover rates. A major challenge for vendors/developers aiming for success in the app market (e.g. attaining high turnover, high margins and high sales) is understanding how the market works and which business models will promote success. The importance of this becomes clear when taking a closer look at the revenue rates. In November 2012 (20 days), the top 100 apps comprised 32% of total turnover, meaning that the rest of the apps, approximately 650,000 (long-tail distribution) represented only 68% of turnover [9, 10]. This illustrates that it is hugely important for app developers to be in the top list.

For this reason, in our research we concentrate on the identification of dominant factors of business models for mobile applications based on an Apple App Store analysis. A business model describes the principles governing how an organization creates, delivers and captures value throughout its business processes. Until now, there has been hardly any research that discusses business models specifically for mobile applications. Thus, there is a lack of information concerning factors influencing the business model, such as key success factors for the app creation process, the revenue model adopted, the target group, distribution, or the content/functions applied. Hence, the research problem can be formulated as follows: "A structured investigation of the Apple app market and existing business model is lacking, but is necessary to understand market mechanisms". This will help gain a better understanding of the mechanisms of the mobile app market and enable app vendors to profit from market insights and improve their own business models. Hence, the objective of this research is to determine which categories and factors of business models are prevalent for successful apps. We aim to answer the following two research questions:

(RQ1) Which categories of mobile applications are dominant?
(RQ2) Which factors of business models are prevalent for mobile applications?

The remainder of the paper is structured as follows. In section 2 we discuss fundamental business models, starting broadly with those in information systems (IS) in 2.1, then considering literature related more concretely to business models for mobile applications in 2.2. Next, in 2.3 we introduce the 4C-Net-Business-Model developed by Wirtz [11] as theoretical background to our research. This business

model provides a framework of categories in which apps are allocated (RQ1). Section 3 then presents the research method applied, including the data collection and method of analysis, subdivided into the Apple App Store analysis (3.1) and interviews with app developers (3.2). We present the results of our investigation in section 4, covering the dominant categories of mobile applications (RQ1) and the presentation of prevalent factors for app business models (RQ2). The article closes with a conclusion (section 5), providing limitations, implications for research and practice and an outlook for further research.

2 Fundamental Business Models

2.1 Business Models in Information Systems

The term 'business model', which originated in the 1970s and has gained significant importance during the 'New Economy' era, has been examined extensively by management literature [12–17]. Business models and 'entrepreneurism' have been discussed intensively as research objects in the context of 'electronic business' [18, 19]. Depending on the research focus, certain aspects of business models are distinguished. For instance, business models are viewed as architecture [20, 21], as method [22], or as representations of corporate strategy [23]. Ghaziani and Ventresca [24] analysed literature from 1975-2000 and found a shift in the association of the term business model from 'modelling the business', through 'modelling revenues', to 'value creation'. Weiner et al. [15] confirm this finding by illustrating the denomination of value creation in the publications of 12 authors. They consider that there is still a heterogeneous and changing understanding of the term 'business model', which is used extensively in academic and management literature.

In general, business models provide an overview of operational organization units and corporate business activities. In this article, we focus on business models in the context of e-business. In this research, we adopt Timmers' [21] definition of e-business as: "*the integrated execution of all automatable business processes of a company with support of information and communication technology*" [21]. In this context, Wirtz [11] defines a business model as "*the depiction of operational (production and) service systems within a corporation. A business model is illustrated in a simplified and aggregated way, which resources boil into a corporation and how internal business processes transform these into marketable information, products, and/ or services [...]*".

Krumeich et al. [17] suggest a comprehensive framework of business model components. It consists of five areas, namely the value creation model, the cooperation model, the value offering model, the value capturing model and the financial model. Further aspects discussed in the context of IS business models are the underlying technology, product life cycles and company growth, for example. In the context of mobile applications, technologies (e.g. the devices, the broadband Internet network, the software, transmission protocols) are major drivers for new business models.

2.2 Business Models for Mobile Applications

Researchers estimate that by 2016 one billion smartphones will be in use worldwide [25]. A comparable development is predicted with regard to tablet PCs. Besides user devices, such as smartphones and tablet PCs, applications (apps) are a driver for the noticeable transformation in particular. Since the introduction of the App Store by Apple, other providers, like Google and Microsoft, have begun to build up app markets of their own. Google's Play Store, which has recorded 50 billion downloads, has now surpassed former pioneer Apple (48 billion downloads) [26].

Researchers focused on 'mobile technologies' have provided some literature on this matter. Topics include the market structure of app stores as two-sided markets, corporate usage of enterprise app stores, the perception of app stores by software engineers, as well as the extraction of successful strategies for the marketing of apps [27–33].

Heitkötter et al. [30] point out that app stores depict two-sided markets, with market participants influencing each other and certain network effects coming into play. They suggest that a platform that offers a low number of available apps will not be attractive to users and developers. As a result, more applications will be developed for more frequently used markets. This results in a broader variety of applications, which makes the successful market even more attractive. Moreover, Hess et al. [34] examined the influence of app stores on business-to-business (B2B) markets and show that app stores are suitable for the exchange and use of apps in B2B-related contexts [34]. Enterprise app stores, however, should be viewed from a different perspective. Their main purpose is to provide a market platform and to offer a portfolio of licensed and individually developed mobile applications among users safely and efficiently. As we concentrate on the implications of business models for the development of mobile applications, we will not discuss the specific situation of enterprise app stores in more detail.

Bergvall-Kareborn and Howcroft [33] examined the perceptions of app stores held by software engineers. According to them, developers tend not to prefer a particular platform; instead, app developers make their decisions based on rational aspects, such as reach, eco-system and user's willingness to pay. Furthermore, the study shows that engineers perceive Apple as too controlling and inclined to censor, whereas Android displays a lack of coordination between hardware and software.

The underlying marketing strategy is a crucial component for business models [23, 27]. For example, Liu et al. [27] state that a 'freemium strategy' is not only a financial model but also a marketing approach at the same time. 'Freemium' is a combination of the words 'free' and 'premium'. It describes a business model in which a core product is given away for free to a large group of users, while premium products are sold to a smaller fraction of this user base. Following this approach, new users usually do not have to pay for a service initially. Due to this, a 'freemium' strategy might help gain a larger user base quickly. However, at the same time it is not guaranteed that this will result in generating profits for the application provider. A further strategy to increase the reach and transaction value of mobile applications is suggested by Lee and Raghu [28]. They propose a country- and platform-specific price and portfolio

differentiation that increases the revenue of an app by satisfying different user requirements.

As another approach in developing business models of mobile applications, Yin et al. [29] and Liu et al. [27] analysed user feedback. They found that risk-averse users especially are strongly influenced by negative reviews by prior users, establishing a correlation between published user reviews and the success of a mobile application. However, the study also shows that the importance of user reviews is lower when applications are offered for free. Both perceptions clarify that user feedback is important in the development of successful apps.

This section has examined some relevant studies and concepts related to mobile application business models and the mobile market. Examples are the consideration of two-sided markets and the effects of a freemium revenue model. However, at the same time it becomes clear that research in this field is still at an early stage and that the identification of prevalent business models in this area is still missing.

2.3   The 4C-Net-Business-Model

The 4C-Net-Business-Model developed by Wirtz [11] is a well-known framework for e-commerce business models and should serve as the theoretical basis of this research. Wirtz [11] identified four different basic business models (Content, Commerce, Context and Connection) (see Table 1). He argues that this classification has its origins in the history of Internet companies. Most of these started as a company clearly focused on one of the business models by offering only one service. However, in line with increasing competition, companies extended and modified their business models. They aimed to exploit new income sources and diversify their corporate risk [11, 35].

Table 1. 4C-Net-Business-Model: Basic Business Models [11]

Basic Business Models	Description	Representations in e-commerce
Content	Collection, selection, systematization, compilation (packaging) and provision of content on own platform	e-information e-entertainment e-infotainment e-education
Commerce	Initiation, negotiation and/or execution of business transactions	e-attraction e-bargaining e-transaction e-tailing
Context	Classification and systematization of electronic information available via the Internet	e-searching e-cataloguing e-bookmarking
Connection	Interaction of actors in virtual networks, which would not be feasible in the physical world due to the amount of transaction costs or communication barriers	Intra-connection Inter-connection

One could remark that the value creation processes which take place within the enterprise are not part of the 4C-Net-Business-Model. To illustrate the value creation process within the enterprise, as well as the incentive system of the company, the model is divided into six equal partial models. This partition corresponds to the concepts suggested by Rayport and Jawoski [36], Johnson et al. [37] and Schwickert [38]. All of them state that partial models in e-commerce depict suitable representations of business models. In Table 2, the six partial models described by Wirtz [11] are summarized.

Table 2. Partial Models by Wirtz [11]

Partial Model	Description
Capital model (finance and revenue model)	Depicts what financial resources are brought into the corporation and what forms of refinancing are available. Differentiation between finance and revenue model. While the former provides information about how the company finances its activities, the latter reveals how the company realizes its profit [11].
Procurement model	Describes which production factors are procured from which supplier [39, 40].
Service offer model	Based on the segmentation of demand, the service offer model provides information on what service range should be offered to which demand segment or target group [11].
Service transformation model	Depicts the combination of products and services and their transformation into services offered [11].
Distribution model	Defines what products and services are transported to demanders with regard to method, time and price [11, 41, 42].
Market model (competition and demand)	Defines what actors and structures a company faces in a market. A separation into demand and competition ensues [11].

Following the definitions of 'e-commerce' and 'e-business' by Timmers [21] and Wirtz [11], business models of mobile applications could be generally classified as e-commerce-related. Wirtz [11] implies that every business model inevitably offers Internet-based services. In general, apps fit this definition. Hence, the 4C-Net-Business-Model seems to provide an adequate framework for structuring the mobile applications market. Furthermore, the business model categories offer concrete criteria by means of which apps can be allocated to a certain business model. Thus, we take the view that the 4C-Net-Business-Model is suitable for our planned investigation. In addition, the required data (functions/services) for the classification of apps into the business model categories can be accessed easily and publicly (e.g. app store description, website of the vendor, third party suppliers).

3 Research Design

To address our research objective, we conducted a single case study. A case study provides rich insights insight for a specific domain to make an original contribution to knowledge [43]. Case studies can be characterized by a focus in depth than on breadth [44]. Often case studies rely on multiple data sources an follow the approach of triangulation [45]. In this case study a quantitative analysis of apps listed in our research domain the Apple App Store is conducted in order to identify, what are prevalent (most frequent) business models. Furthermore, we enriched the findings with qualitative semi-structured interviews with ten app developers. This part of the research answers the question, why are prior identified apps successful?

3.1 App Store Analysis

First, we describe the descriptive quantitative analysis. The investigation is focused on Apple's mobile applications market and thus we chose the Apple App Store as our research object. Recent studies suggest that the willingness to pay for an app is higher among Apple customers compared to those of other apps stores. Equally, the ecosystem for payment transactions from Apple is more widely accepted [33, 46]. This indicates a more balanced structure between free and chargeable apps. Overall, the Apple App Store offers 23 different categories from which developers are free to choose two to distribute their apps. The Apple App Store supports the following revenue models: (1) direct purchase, (2) in-app purchase and (3) advertisements.

Apple has listings for bestselling apps, top apps (free) and top grossing apps. The exact algorithm used to rank apps is mostly unknown [47]. However, the platform used for analysis, Distimo5, identifies the number of downloads of an app [48, 49] as a central ranking factor for both paid and free apps to be ranked in the top listing [49]. Those apps listed in the top 100 have high popularity, which leads to higher downloads, lead in turn to higher revenues and satisfying the developers' individual qualitative needs. Hence, apps in the top listing are defined as successful. We should also note the influence of targeted promotion and user ratings of apps [50], which also have an effect on the list ranking; however, these are beyond the scope of this study.

The data collection was based on the App Store charts (top lists) of the second quarter of 2013 (evaluation date 09/07/13; 7.10 pm) for Germany, provided by Distimo. Based on these data, the top 100 apps from the top grossing, bestselling and top charts (free) lists were analysed by two independent coders. The process involved three steps: (1) duplicates in the three lists were removed before starting the analysis; (2) each coder classified the mobile apps to one of the 4Cs and partial model categories; (3) the frequencies of occurrence of apps in the business model categories were calculated.

For the classification in step (2), we used the description of an application in the App Store, official information from the publisher (website, app description) and data from external services such as App Annie or Distimo. The partial models outlined depict an adequate solution space to structure the developer interview results. Comparing the classification results consolidated the results of both coders. In the

case of mismatches, first the coders simply downloaded the app on their smartphones to evaluate the functions/services on their own. Then the coders discussed their coding results and usage experiences and tried to find the best classification for the app in cooperation. This was the case for 23 of 258 Apps (9%). If the coders were unable to find a common classification, the app was omitted from the data sample. This was the case for four apps, so at least 254 apps were used to build the database. The frequencies derived from calculation in step (3) of the occurrence of apps in Wirtz's [11] business model categories are used to draw conclusions concerning the prevalence of categories, i.e. those most represented (business models).

3.2   App Developer Interviews

Here we present the approach taken in the qualitative investigation. Interviews with app developers were necessary, as the information required for the partial model could not be completed solely with the use of publicly available data. Conclusions about the market, distribution and revenue models can be drawn using available data from the Apple App Store. Unfortunately, information on service creation, the service supply, as well as the underlying finance model cannot be derived from publicly available data. Hence, a qualitative approach was chosen to gain an understanding of the developers' opinions and their preferences in as detailed and unbiased way as possible.

Overall, 10 complementary semi-structured interviews with app developers (six from Germany, one from Canada, one from France, one from Serbia and one from Austria) were carried out. All had developed apps in the top 100 lists: Anytune, Komoot, Mau Mau Rommé, Mobitee, Nextr, Outdooractive, OwnCloud, Splittr TeacherTool and TopEleven, etc.

The interview guide contained questions related to the service creation, the service supply, as well as the finance model. The questions were derived from the characteristics of the partial model developed by Wirtz [4]. Overall, the interview guide contained 17 questions, for example: *Which business and revenue model is your app based on? How did you finance your business in the beginning? Did the type of financing influence your choice of a business model?* The interviews were undertaken by telephone or Skype (audio) and lasted approximately 30 to 60 minutes. The interview guide was evaluated and improved in a pre-test with three students who had experience in app development.

For further analysis, the interviews were transcribed by a person not involved in the interviewing. As the interviews focused on textual-topical aspects, the transcription approach comprised transferring the audio data into normal written text. This approach increases readability through linguistic equalization and the improvement of syntax [51]. Two independent coders (the same coders as for the app classification) analysed the transcripts. They used coding to identify themes and hermeneutics to interpret and develop their understanding with a view to developing casual explanations. Analogous to the quantitative investigation, the coders compared and discussed their results to find commonalities [43].

4 Results

4.1 Analysis and Synthesis of Apps

In response to RQ1, a total of 254 apps were evaluated and assigned to the basic business model categories (cf. Table 1). Of these, 75.0 % (190 apps) were assigned within the Content category, 5.0 % (12 apps) matched the characteristics of Commerce, 1.0 % (2 apps) came under Context and another 6.0 % (16 apps) had the characteristics of Connection; 13.0 % (34 apps) could not be matched to any of the basic business models. The dominance of the Content category becomes clear (RQ1). Furthermore, it was not possible to allocate all the analysed apps to one of the 4C-Net-Business-Model categories. Apps that could not be allocated provided direct access to device functionalities, e.g. "Flashlight", "FileExplorer" and "FileConverter".

The analysis of the representations of the apps in e-commerce (see Table 3) yielded 163 apps related to e-entertainment, putting this category in first place, followed by e-information (19) and intra-connection (15). E-entertainment apps are mainly games, e.g. Angry Birds, whereas e-infotainment apps are those that provide information, e.g. weather apps. Intra-connection-related apps help the users to communicate with their already existing network (e.g. WhatsApp). These three categories can be seen as prevalent. With seven representations each, the categories e-infotainment and e-bargaining are less prevalent. The categories e-education (1), e-attraction (2), e-tailing (3), e-transaction (0), e-searching (2), e-cataloguing (0), e-bookmarking (0) and inter-connection (1) are not at all prevalent.

Table 3. Business Models for Mobile Applications

Basic Business Model	Representation in e-commerce (quantity in sample)	Example
Content	e-information (19)	Weather.com
	e-entertainment (163)	Angry Birds
	e-infotainment (7)	Flightradar 24 Pro
	e-education (1)	Teacher Tool
Commerce	e-attraction (2)	App of the day
	e-bargaining (7)	eBay
	e-transaction (0)	-
	e-tailing (3)	Amazon
Context	e-searching (2)	Co Pilot GPS
	e-cataloguing (0)	-
	e-bookmarking (0)	-
Connection	Intra-connection (15)	WhatsApp
	Inter-connection (1)	Skype (out)

For the three e-commerce categories to which none of the apps in our sample could be allocated (e-transaction, e-cataloguing and e-bookmarking), a small-scale test

established that there were apps in the Apple App Store with these e-commerce characteristics, but that there were not among those in the top listings. This indicates that the characteristics of the business model do generally exist in the app market, but that not all e-commerce models are prevalent.

Another aspect of prevalence concerns those apps comprising 13.3% of the sample (34 apps) which could not be allocated to any of the existing e-commerce categories. Here it is not an issue with the categories, but rather that the apps themselves are not prevalent in the market. We found that apps designed to customize devices, e.g. AppIcons or Ringtones for iPhone, could not be assigned to a category; such apps are content-centred, but they do not provide additional informative value or educational content, their purpose being limited to the customization of a device. There are also apps which give the user the possibility of file management across multiple devices, e.g. Dropbox, and which cannot be assigned as they are solely designed for hosting user-generated data. The association of productive apps such as iMovie is also problematic as they allow users to create their own content.

In the Commerce business model, it was not possible to assign app such as Passbook and DB-Tickets to any of the e-commerce categories. These apps enable users to identify themselves using electronic tickets bought beforehand. At the time of using the app, the transaction initiation and the payment transaction have already been completed, so that a classification in one of the existing subcategories was too vague.

Furthermore, Wirtz [11] describes the activity of context providers as the classification and systematization of information available on the Internet. Accordingly, only the Internet-based context is thematic. Apps that enable the user to navigate and which do not rely on map data available on the Internet are thus not included although they put the physical location of the user in a geographical context. Therefore, apps such as Navigon Europe and TomTom Europe could not be assigned to the Context basic business model.

In addition, apps such as Teamviewer, virtual private networking (VPN) monitoring software to access remote machines, cannot be classified precisely within the intra-connection or inter-connection categories of the Connection basic business model. The communication itself is solely a supporting aspect for problem elimination where e-monitoring is concerned.

The most important insight from the App Store analysis is the dominance of the entertainment-centred and content-driven basic business models. In particular, we note the predominance of games, clearly recognizable in the Content business model and comprising over 70% of all the apps analysed.

Table 4. Results of the App Developer Interviews

Partial Model	Description	Results grounded in the developer interviews of the following of Apps (exemplar quotations)
Capital: Gross Model	Differentiation between direct (purchase) and indirect proceeds (in-app purchases, merchandising); indirect proceeds forms are dominant, banner ads and sponsoring are used for free apps; freemium strategy is	LiteGames, Mobitee, "One good thing about our high priced App is that [buyers] are less inclined to give it a bad review as they paid that much." (Anytune).

widespread

Capital: Financing Model	Successful apps are rarely financed through private commitment; predominantly companies are behind the financing	Anytune.
Procurement Model	Rudimentary production factors are purchased; optional ones are commonly created, acquired or gained from open source databases by the developer.	TeacherTool, Mobitee, Outdooractive, komoot, "Our maps are based on the cadastral survey data" (Outdooractive).
Service creation Model	Focus on creation of the app; high cost for first copy, later predominantly low (8 developers); native development; software tests are a lot more complex on Android; customer feedback is rated highly important during development.	Splittr, TeacherTool, Lite Games, ownCloud; Outdooractive, Mobitee, Anytune, TeacherTool, nextr; Top Eleven, Lite Games; Mobitee, "With a cross-platform app you cannot release such amazing features" (Mobitee).
Service Offer Model	Free apps require higher quality in order to be noticed and used; majority (59%) of complex apps (games) provide a tutorial.	TeacherTool, Top Eleven, "Also, a factor for success is that people can view a tutorial" (TeacherTool).
Distribution Model	No focus on just one app store; average prices are around €1.67; frequently apps are supplied for iPhone as well as iPad (Plusapps).	Anytune, nextr, Mobitee, Top Eleven, "The application works on iOS, Android, Windows Phone and Blackberry" (Mobitee).
Market: Competition Model	High competition in the category e-entertainment, especially games; successful games require high investment; competitor activities have an influence on the company's decisions.	TeacherTool, Mobitee, Anytune, Top Eleven, "The games market is the most competitive" (Splittr).
Market: Demanders' Model	Focus on consumers, no B2B or B2C; geographical (EU and US high), platform (IOS high) and content dependent (games, networks high); willingness to pay above average with navigation apps; customer analysis through social media; customer segmentation through price – serious interest above limit of €1.	Anytune, Mobitee, Top Eleven, Lite Games.

4.2 Analysis and Synthesis of Interviews with App Developers

To identify key success factors influencing business models (RQ2) in the app market, we analysed the interviews with app developers with regard to the partial models defined by Wirtz [11]. Table 4 presents an explanation of the partial models derived from the interviews with the app developers, together with references to the developer interviews (apps) in which the results are grounded and partly exemplar quotations. We would stress here that this is an exploratory approach, as the statements were determined on the basis of 10 qualitative interviews. From the developers' statements, the gross capital model prevails; at the second-order level in-app purchases and the 'freemium model' could be identified. Advertising, as a revenue stream, is mainly used in the context of free apps. Moreover, from the developers' statements concerning service creation, it is clear that successful apps are developed by companies and are also financed by them. The creation of native apps has priority. This is ascribed to the fact that successful apps are predominantly

represented by games and that these are only adequate in terms of usability due to their increased performance when developed as native apps.

The costs of establishing the service are normally restricted to the development of the app (first copy). According to the developers, production factors are typically purchased, although optional production factors are frequently self-made or derived from Open Source web services. The interviews further clarified that another dominant factor for a successful business model is the quality of apps; this is particularly important in the case of free apps. The access costs for the users are low and if the apps are not convincing (high quality), they are quickly uninstalled. Moreover, quality is also linked to the user ratings for the apps. The app rating was generally considered to be important, as a positive rating could lead to an enhancement in popularity.

The dissemination of apps in different app stores, something constantly pursued by the developers (76% of the apps examined were offered in at least one app store besides the Apple App Store), could also lead to an enhancement in popularity. For strategic decisions, the behaviour of competitors and demanders was considered to play an important role by most of the developers. The developers stated they addressed specific target groups and implementing marketing selectively (willingness to pay is high in the USA, Europe and for IOS users; willingness to pay is low in emerging markets and for Android users). In line with this, apps are frequently offered in English. Moreover, there is customer segmentation through the price of the app: customers willing to pay €1 or more exhibit greater interest in paying in the future also (a point made consistently by the developers). In this case, the customers expect clearly improved performance (e.g. service) and quality.

5   Discussion and Conclusion

Based on the framework from Wirtz [11], we identified prevalent business models for e-commerce through the analysis of 254 apps taken from the Apple App Store top listings (top charts (free), bestselling and top grossing) (RQ1). Furthermore, ten semi-structured interviews were conducted with developers of successful apps (RQ2).

Concerning RQ1, we identified the high popularity of content-based business models. In particular, there was a prevalence of the category e-entertainment, followed (albeit at a considerable distance) by the categories e-infotainment and intra-connection. We found that games are dominant in the e-entertainment category. Furthermore, it was determined that the 4C-Net-Business-Model is unable to represent all the forms of apps in our sample.

In an additional step of the analysis, the underlying partial models (influencing factors for business models) were examined with the help of app developers (RQ2). From the interviews, it is apparent that the freemium strategy and in-app purchases in particular are established primarily with native app development in the e-entertainment category. The freemium strategy first increases the popularity of an app and only in the second step is revenue generated through purchase, for example of a Pro version. Similar to the freemium model, in-app purchases facilitate the purchase of additional services or digital goods and have the greatest revenue potential. There

are also apps provided for free, which generate revenue through advertisements. For these apps, the focus is on quality to ensure long-term use and generate positive ratings, which are critical factors for the success of these types of apps.

The suitability of respective strategies depends on each individual case: the platform, type of app and the target group. In particular, the combination of the freemium strategy with simultaneous portfolio diversification potentially presents a remarkably successful strategy for app developers.

Within the scope of this paper, it has been possible to derive the prevalent app categories (RQ1) and influencing factors (strategies) of business models for successful app development (RQ2). On the one hand, this can help developers to orientate themselves in the market and provide guidance on decision making. On the other hand, the results also fill a gap in the business model literature and the economics of mobile information systems. This explorative research is a first approach to shedding light on the underlying business model of mobile applications.

The findings presented have some limitations. First, this research focuses on the Apple App Store (IOS) and the German market, which limits its meaningfulness for apps in general. Moreover the listings of the top apps were extracted in a single day, which limits the representativeness of successful apps. In addition, two coders performed the classification in the App Store analysis and also the coding of the interviews. Therefore, the results may be liable to subjective interpretations. However, the nature of mobile applications, especially the distribution channel via 'app stores', constitutes only minor disparities compared to traditional e-commerce applications. Furthermore, the interdependencies between hardware and software, as well as the aspect of mobility, are usually not considered in traditional e-commerce contexts. For instance, geo-data enable new business models. Apps can be used on- and offline, although business model definitions need to be extended fundamentally so that the offering of corresponding services does not necessarily require an Internet connection. Finally, we did not include an examination of the influence of targeted promotion and user ratings of apps in app stores, which may limit the expressiveness of the findings [50].

This study shows the need for additional research, in particular focusing on the influence of app ratings and the possibility of feature apps and their influence on business models. Likewise, future research could extend the study sample to other app stores, as well as collecting observations over a longer time period. This would make it possible to rate the sustainability of certain business models and validate or reject models. Moreover, the question of whether the prevalent business models of the Apple App Store also pertain to the Google Play Store could be the subject of a future research project. It would also be conceivable to conduct a similar study on a considerably larger scale, extending the sample size, conducting a greater number of guided interviews and analysing more apps, as well as differentiating between the categories of the listings: top charts (free), bestselling and top grossing.

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