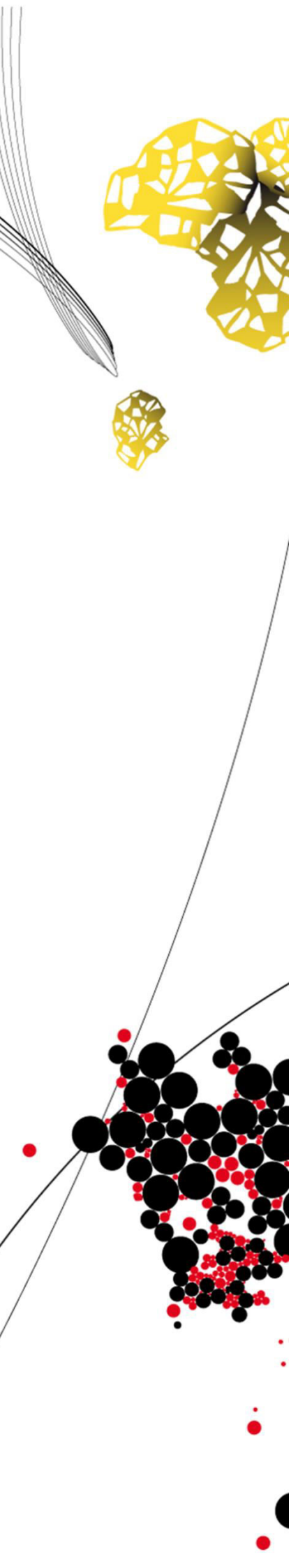

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# New Venture Creation within the Mobile Application Industry: An Examination of Success Factors for Start-Up Companies


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## Foreword and Acknowledgements

This thesis is part of the master programme 'Business Administration' at the University of Twente. The successful completion of this study results in the award of Master of Science (M.Sc.). The present paper deals with factors that may influence the financial success of new venture creation within the mobile application industry.

Nowadays, mobile applications are becoming more and more essential for our daily life. The use of mobile applications enables us to communicate, work, or play games while on the move. However, in the selection of a mobile application, users always have the problem to decide between many different apps for the same purpose. Many of them are free of charges, other apps cost a relatively small amount of money. The obvious two questions to ask here is how to operate within the mobile application industry in order to prevail against the competitors and how to achieve financial success, or success in general, at such low prices? Especially the increasing competition intensity within the mobile application industry opens up a wealth of opportunities for app developers and app founders, but also threats – threats related to the survival of existing app companies as well as new ventures within the app industry.

This thesis pursues a two-fold goal: firstly to figure out which factors have an effect on organizational performance, and secondly to provide an impetus for further research due to the fact that the existing literature is not much reporting about success factors for new ventures within the app industry.

There are many people, whom I would like to thank. First of all, I would like to express my very great appreciation to my supervisor Jeroen Kraaijenbrink for his valuable and constructive guidance during my Master Thesis. I'm also appreciative for his advice and assistance in keeping my progress on schedule. Secondly, I would like to thank my second supervisor Isabella Hatak for providing me with feedback and useful critiques and suggestions to my research work. Furthermore, a big thank you goes to Kajanth Balasingham for his SPSS support. Last but not least, I would like to thank my family and my girlfriend for their support during the project and my whole time at the University of Twente.

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## Abstract

The development of new venture creation over the past years has revealed the tremendous potential within mobile application industry. It is remarkable how quickly apps for mobile devices changed the behaviour of people regarding communication, working and playing during the last eight years. However, the constantly growing number of mobile applications leads to higher competition intensity among app developers and app founders. Furthermore, the survival rate is very limited and only a few mobile applications will be considered as financial success and generate enough revenue in order to meet obligations. Especially the high failure rate of software start-up firms indicates the difficulty for new ventures to survive. In the academic literature, there are several studies with the focus on success factors for new venture creation. Unfortunately, the empirical results are partly too general and therefore only useful to a limited extent for new venture creation within the mobile application industry. This research contributes to filling this gap by analysing potential success factors for new venture creation within the mobile application industry.

The theoretical framework of this paper is based on different literature sources, which analysed success factors for new venture creation. Due to the fact that the existing literature is not much reporting about the mobile application industry and related success factors, an online research survey was conducted in order to analyse the key to success. Based on literature review, a research model was built to test the relationships between Exogenous Market factors, Endogenous Opportunity Factors, characteristics of the Entrepreneurial Team, Resources, Revenue Models and organizational performance in the form of financial success.

An online questionnaire was used to gather the necessary data to be able to find a valid answer to the main research question of this thesis. The participants were app developers and app founders from the Apple App Store as well as from the German app developer directory. A total of 109 responses was received, of which 108 were useful for the analysis. New variables and scales were developed for the online survey to measure the different relationships. After assessing the collected data regarding reliability and validity, correlation and logistic regression analyses were performed. Five out of six hypotheses were refuted by the outcome of the analysis part. In other words, among the 21 possible success factors identified in the literature, one meta-factor reveals a significant negative relationship with financial success: Market Growth Rate.
Interesting findings were identified with respect to the approach of monetization. The outcome shows that the choice of Direct Revenue Models positively influences a start-up's financial success within the mobile application industry. Also Combined Revenue Models indicate a positive and significant result in relation to financial success. Generally, it is recognised that classical payments achieve faster cash flow.

This research contributes to theory and practice in several ways. First of all, the outcome offers new insights into the mobile application industry and successful new venture creation. Specifically, the thesis provides empirical evidence of the impact of Market Growth Rate, Direct Revenue Models, and Combined Revenue Models on financial success. Secondly, the newly developed variables provide the opportunity to analyse other industries with respect to organizational performance and expand the research on new venture creation. Thirdly and finally, the findings of this study also enrich new venture creation in

practice as well. Especially, the importance of the selection of different Revenue Models for mobile applications is clearly proved.

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# 1. Introduction and Research Design

## 1.1 Background

Nowadays, there are many people who want to start a new venture within the mobile application industry due to emerging technologies such as cloud infrastructure platforms, enhanced web development tools and smartphones, which make it even quicker and easier to implement new business ideas (Bosch, Olsson, Björk & Ljungblad, 2013). Noteworthy examples are the success stories of WhatsApp, Uber and Instagram; which show the enormous potential and the opportunity of quick commercial success specifically for the mobile application industry.

The mobile application industry, originating in 2008, is very striking, as applications for mobile devices have changed the behaviour of people regarding communication, working and leisure over recent years. Organizations meet this development by creating value from mobile applications. They, for example, satisfy new demands, improve their efficiency and competitiveness, and support the exchange of knowledge (Unhelkar & Murugesan, 2010). In 2014, the EU app economy had the following benchmark data: 406 thousand professional app developers; 667 thousand direct app economy jobs; 1 million direct and indirect jobs; €16,5 billion in revenues; 19% of global app economy revenues and 12 % annual growth (Pappas & Voskoglou, 2014). Only one year later, the number of app developers in the European Union increased by 108,4% to 846 thousand full-time app developers and direct and indirect jobs increased by 100% (VisionMobile, 2015). This increase, in combination with the annual growth rate of 12% from 2014, indicates that the mobile application industry can be defined as a rapid growth industry. This consequently means that the complexity of the market will increase over the next years and companies within the mobile application industry have to match the constantly changing market conditions and the increasing intensity of competition.

But what is specific about the mobile application industry? Mayer (2012) describes mobile applications as a new business opportunity for entrepreneurs. The mobile application industry is a global one due to the reason that people can download all available apps in the App Store of their respective provider wherever they are. This means, in most cases, an app developer intends to design a new application for several countries. As compared to 2011, the download rate of mobile applications increased by 458% until 2014, which indicates the impressive potential of the app economy (Statista, 2015a).

By analysing the market structure, the mobile application industry reveals low entry barriers. In order to design a mobile application, only a few things are required for starting the development: a computer/ laptop, knowledge about programming language, a little amount of money for the development software, and the annual amount of money for the store fee, for example for the App Store of Apple, you have to pay 99$ per year (Cuadrado & Dueñas, 2012).

However, it seems that the mobile application industry is kind of a lottery in respect of business success or failure. The App Store of Apple and Google Play Store provide approximately 2,9 million apps (Statista, 2015b). The category of games has the largest share

with 22,16%, in numbers more than 600.000 mobile games (Statista, 2015c). This underlines how many applications are available for the same purpose. Thus, it is quite difficult for app developers to be the number one in terms of download and usage rate.

Moreover, there are also a lot of hobbyists, who do not have an interest in generating revenue by developing a mobile application. They offer apps for free to the users, which could lead to price pressure for professional app developers. In 2014, the download rate of free applications was 127.7 billion times. The download of paid apps was 11.1 billion times. However, this data should be interpreted carefully due to the fact that many free apps contain of so-called "In-App purchases". The average price for a single app in Europe is about €2,69, which is not that much in comparison to computer software (Statista, 2015c). This further proves how difficult it must be to reach commercial success with a mobile application development.

Despite the considerable potential of the mobile application industry, there are numerous start-ups which are not able to overcome the market challenges and fail in the end. The failure rate of software start-up firms is estimated to be 90 per cent. Furthermore, only two out of ten start-ups survive their first years (Giardino, Wang & Abrahamsson, 2014). According to van der Meulen and Rivera (2014), less than 0.01 percent of consumer mobile applications will be considered as financial success and generate enough revenue to meet obligations. Furthermore, Apple applies a 70/30 compensation rule, which means that app developers only get a 70 percent cut of their app sales (Curran, McKelvey, Curran & Nadarajah, 2015). Besides, the analysis by van der Meulen and Rivera (2014) also shows that many mobile apps are not designed to generate revenue. There are many mobile apps available with the aim of building brand recognition or to increase product awareness.

As a result of the high failure rate, the following question arises: How should one build up a business within the mobile application industry in order to be successful? Song, Podoynitsyna, van der Bij, and Halman (2008) introduced factors that lead to success or failure of new technology ventures. According to their findings, only eight out of 24 meta-factors are homogenous and significant in terms of successful performance of new technology ventures: Market Scope, Industry Experience, Marketing Experience, Financial Resources, Firm Age, Patent Protection, Size of Founding Team, and Supply Chain Integration. But to what extent do these factors have a positive effect on new venture performance within the mobile application industry? And what about the other 16 meta-factors? Maybe there are some factors, which are applicable for the mobile application industry in particular, but not for new technology ventures in general.

In addition, given the specificities of the mobile application industry, the consideration of different revenue models plays an important role regarding the achievement of financial success. As already mentioned above, free apps can contain of hidden costs, which appear in form of so-called "In-App purchases". One of the first steps in developing a new mobile application should be thinking about where the revenue will come from. There are different revenue models that app developers can use for their business, for example free apps but with ads (In-App advertising), Freemium (gated features), paid apps (cost money to download), In-App Purchases (selling physical/ virtual Goods), Paywalls (subscriptions), or Sponsorship (incentivized advertising) (Munir, 2014). These are the most commonly used revenue models for mobile applications. Of course, most app developers use multiple

revenue models for their business. Unfortunately, there is no empirical study on best practice regarding how to select the right revenue model in order to achieve success within the mobile application industry.

## 1.2 Research Objective

As mentioned in the previous section, a research gap has been identified: There is no empirical evidence of success and failure factors within the mobile application industry. Furthermore, the choice of different revenue models plays a major role in terms of commercial success of a new mobile application. Therefore, the purpose of this research is to analyse whether the success factors, that are found in other industries, are valid or not for the mobile application industry. The analysis also considers revenue models that entrepreneurs had to choose before they have started building a mobile application. There are also discussions on the Internet of interesting questions about which revenue model is more successful than others and what are the advantages and disadvantages of various revenue models. It could also be possible that the revenue model one has to choose depends on the app category, which means, for example, that mobile games require different revenue models than social-network applications.

In order to examine success factors for the mobile application industry, Song et al. (2008) has been used as theoretical framework for this paper. Song et al. (2008) have defined 24 meta-factors for new technology ventures, which were tested with regard to organizational performance. These factors are identified based on a meta-analysis. This kind of analysis has the advantage that all the existing literature on a given topic can be included, instead of only using the most influential and best-known articles. This leads to a broader examination of possible success factors. The 24 meta-factors are divided into three main categories: Market and Opportunity; Entrepreneurial Team and Resources. These three categories and its associated meta-factors are explained in more detail in the theoretical framework part.

The present master thesis contributes to existing literature and knowledge since the current literature is not extensive in regards to creating a new venture within the mobile application industry and which factors lead to its financial success. The goal of this paper is to compare the findings from current literature with the results of the online survey to evaluate the importance of the success factors based on the model by song et. al (2008) and the advantages and disadvantages of the most commonly used revenue models within the mobile application industry. This research is practically relevant because it provides start-up firms and young, inexperienced business developers the possibility to learn from other success factors and draw the right conclusion based on the final recommendation. Due to the constantly changing external environment and market conditions it becomes more and more important to react on certain challenges as quickly and appropriately as possible. In addition, entrepreneurs can use the final recommendation of this paper as a guideline for starting their own business and to shape their characteristics and goals towards the success factors identified in this study.

## 1.3 Research Question

The key research question that derives from the introduction and the problem statement is the following:

*What are the factors that influence the financial success of start-up companies within the mobile application industry?*

## 1.4 Definition of Key Terms

To avoid misunderstandings, the following section shortly defines the key terms of this thesis, namely: early-stage development, start-up company, new venture creation, mobile application industry, entrepreneurs, success and failure.

**Early-Stage Development**:
The early-stage development consists of the first three phases of the life cycle stages of the successful ventures: development stage, start-up stage and survival stage. The first stage can be defined as a progressive development from an idea to a promising business opportunity (Leach & Melicher, 2011). The second phase is the start-up phase. This phase involves the time when the new venture is developed and organized and the initial revenue model is put in place (Leach & Melicher, 2011). The most difficult phase of the early-stage development is the survival phase. The survival phase describes the time when revenues start to rise and the company is able to pay obligations, but not all of the expenses (Leach & Melicher, 2011).

**Start-up Company:**
In order to find the most suitable definition, different keywords, such as firm, venture, and start-up were analysed. Ries (2011) defined start-up companies as human institutions designed to deliver a new product or service under uncertain conditions. Start-up companies generally have limited resources in terms of people and funding (Bosch et al., 2013). For this research, the definition of start-up companies will be modified as follows: A company can be seen as a start-up as long as the venture is operating in the start-up phase. The start-up phase is the period between the development of a new product and the first sale (Crowne, 2002). As already stated in the previous definition, the start-up phase is followed by the survival phase. Once a new venture is located in the survival phase, the company cannot be seen as a start-up company anymore (Leach & Melicher, 2011). The achievement of the different development stages cannot be generalized in terms of years.

**New Venture Creation:**
According to Weick (1979), new venture creation can be defined as follows: “To organize is to assemble ongoing interdependent actions into sensible sequences that generate sensible outcomes” (Weick, 1979, p.3). However, new venture creation is not only about the experienced individuals, but also about “the organization which they create, the environment surrounding the new venture, and the process by which the new company is started” (Gartner, 1985, p.696). It is also noted that a new venture evolves over time and is not instantaneously produced (Gartner, 1985).

**Mobile Application Industry:**
The Mobile Application Industry was originated in 2008 with the introduction of the first Apple iPhone. The first App Store is based on the Apple iTunes Store, which was established in 2003 (Pon, 2016). Over the years, the mobile application industry has been extended because of the entry of Google, Microsoft, and Amazon. However, the Apple App Store and the Google Play Store are still among the largest mobile application marketplaces in this industry (Statista, 2015b). In 2015, the global revenue of mobile apps was €36.1 billion (Statista, 2015d).

**Entrepreneurs:**
An entrepreneur can be defined as an "individual who establishes and manages a business for the principal purposes of profit and growth. The entrepreneur is characterized principally by innovative behavior and will employ strategic management practices in the business" (Carland, Hoy, Boulton & Carland, 1984, p. 358). There are several reasons for people who want to be an entrepreneur, for example being your own boss, achieving financial independence, or enjoying creative freedom and using your own skills and knowledge (Collins, 2002).

**Success and Failure:**
It is not easy to determine the success of firms (Jenning & Beaver, 1997). Business success has been interpreted in many different ways. The definition of success also depends on study backgrounds and purpose of scientific researchers (Lussier & Pfeifer, 2001). In addition, Lussier and Pfeifer (2001) state that small companies are more likely to fail than large enterprises and a new venture is more likely to fail than an established firm. In accordance with the definition of Combs, Crook and Shook (2005), "organizational performance is affected, in part, by the sum of the firm's operational performance across many different value chain activities" (Combs et al. , 2005, p. 275). For this study, the outcome of the different value chain activities will be measured by financial success, which is defined as the ability to generate enough revenue in order to meet obligations and establish the business in the market.

Finding a comprehensive definition of failure is a problematic and complex issue. Academic studies on failure show the use of different terminologies, such as closure, exit, or survival (Liao, Welsch, & Moutray, 2008). According to Cardon, Stevens, and Potter (2011), there are two types of failure: failure of an entrepreneur and failure of a firm. For this paper the following definition is used: Failure means that the company is unable to fulfil the necessary obligations for the operating business and therefore not able to survive and establish the business in the market.

## 1.5 Outline
The thesis is organized in the following manner. The first chapter indicates the problem and my motivation for this study. In the previous section, the research objective and the central research question are formulated. Also the definitions of all relevant key terms are included in this part. In chapter two, a brief introduction of the mobile application industry, the theoretical framework, and the research model based on the hypotheses are given. The theoretical framework includes the success factors for new venture creation and the description of different revenue models. Based on this theoretical framework, the hypotheses are formulated and the research model is visualized with expected effects on financial success. The third chapter of this paper consists of the research methodology section. This part deals with the research approach, operationalization, data collection, response rates, and a first description of the survey outcome. The next section contains the evaluation of the survey data. Chapter 4 reports the outcome of this project and shows if the formulated hypotheses can be accepted or rejected. The final chapter provides a recommendation, based on literature and survey findings, which can be used for new business developer to learn from others' mistakes and therefore increase the chance to succeed and arrange the business in the market. Furthermore, the recommendation part

provides also a model, which can be used by entrepreneurs as a guideline in order to successfully master the initial obstacles normally faced by start-up companies. Finally, the paper will end with a limitation part and implications as well as a recommendation for further research.

# 2. Theoretical Framework and Hypotheses

The first section of this chapter starts with a brief introduction of the mobile application industry. This is followed by a literature review regarding the success and failure factors for new venture creation. Section 2.3 analyses different revenue models for the mobile application industry, also regarding the advantages and disadvantages. The last section outlines the research model and its associated hypotheses.

## 2.1 Mobile Application Industry

Today's world of smartphones and tablet computers is all about mobile applications. These mobile apps include application software for any mobile devices or mobile operating systems and provide quick access to data, which means huge time savings, especially for the business world. With the introduction of the first iPhone in 2008, the mobile application industry was originated. Of course, since the release of the first mobile phone, the manufacturers campaigned for their applications, such as a calendar, an alarm clock, a calculator, or simple games. However, these applications were still tied to the operating system of the mobile phone and inerasable. Furthermore, there was no competition between app developers and app founders, because most of them have worked for mobile phone manufactures, such as Nokia or Motorola. The 'new generation' of mobile applications is offered in different application stores, such as Apples 'App Store' or Androids 'Google Play Store/ Market place'. Both application stores are cloud-based markets where users of mobile devices can find apps for thousands of different uses. Many of those applications can either be downloaded for free or for a certain amount of money (depends on which revenue model is applied by the founder of the application). The most commonly known and most frequently used mobile applications are Facebook, Google maps and the weather channel application (Nielsen, 2010). A further advantage of mobile applications is the possibility to control cameras, action camcorders or drone remotely.

Between 2008 and 2013, the mobile application industry generated a turnover of ten billion euros per year with the development of programs for smartphones and tablet computers (Curran et al., 2015). In 2013, the Google Play Store reached more than 50 billion app downloads. The Apple App Store has handled over 15 billion downloads (Curran et al., 2015). These figures clearly prove the fact that mobile applications become more and more important for our daily life. People use mobile apps not only to get information about the weather or the latest news, but also to interact with the world or to communicate with the social environment. The forecasts for the upcoming two years (2016 and 2017) are by all means good and mobile applications are enjoying great popularity. By the year 2017, the download rate for mobile applications is expected to rise to 268 billion downloads. This is an increase of 49 percent compared to 2014 (Statista, 2015a).

As already mentioned above, the game category is the most popular app category in total. Next on the list are education, business, lifestyle, entertainment, tools, travel, books and music (Statista, 2015c). In addition to free apps there are, as already mentioned, fee-based apps. The costs for a paid app version are usually amounts between two or ten euros. There are of course apps that more than exceed the moderate price range. However these mobile applications belong to the minority. In a nutshell, the mobile application industry is more popular than ever and this is not going to change soon.

## 2.2 Success Factors in New Ventures

As stated earlier, the mobile application industry is kind of a lottery, where the success or failure is difficult to predict. Many developers are also not interested in financial success because of different intensions, like brand recognition or product awareness (Meulen & Rivera, 2014). The chance of commercial success is very limited due to a lot of hobbyists, who are developing apps "just for fun" and without commercial interest. However, one may well wonder if there are indeed factors which are crucial to the success and failure of start-up creation/ app development.

There are many studies on success and failure factors of new technology ventures. Zahra and Bogner (2000) explored the moderating effect of the competitive environment on new ventures, whereas McGee, Dowling and Megginson (1995) analysed the impact of business strategy and management experience on new venture performance. In order to cover all the different success and failure factors from different studies, Song et al. (2000) was chosen as the overarching framework.

The paper by Song et al. (2008) analyses factors that lead to success or failure of new technology ventures by conducting a meta-analysis. This type of analysis differs from narrative reviews by the quantitative character. The special character of a meta-analysis is the type of data, which consists of findings from previous empirical studies (Song et al., 2008). The paper identified 24 most widely researched success factors for new technology ventures. These factors are based on the findings of 31 different studies. The 24 meta-factors are divided into three major categories: Market and Opportunity; Entrepreneurial Team; and Resources. For this research, the categories were adjusted to the mobile application industry. Furthermore, the Market and Opportunity category is divided into exogenous factors and endogenous factors.

### 2.2.1 Market and Opportunity

Market and Opportunity describes both, market characteristics (e.g. environmental heterogeneity and environmental dynamism) as well as competitive strategies based on the work of Michael Porter (Song et al., 2008). This can be subdivided into two additional categories: Exogenous Factors and Endogenous Factors. Competition *Intensity*, *Environmental Dynamism, Environmental Heterogeneity, Market Growth Rate and Market Scope* are not suggestible by start-up companies and therefore defined as Exogenous Factors. Those factors that can be influenced by the start-up company, as part of their strategy, are *Internationalization*, *Low-Cost Strategy*, *Marketing Intensity*, *Product Innovation*, *Patent Protection*, *R&D Investment*, *Supply Chain Integration*, and *University Partnerships*. These meta-factors are categorized as Endogenous Factors.

#### 2.2.1.1 Exogenous Market Factors

The first factor of the Exogenous category is *Competition Intensity*. Chamanski and Waagø (2001) define this factor as the strength of interfirm competition within one industry. According to Porter (2008), the intensity of the competition depends mainly on the industry structure. Good indicators for competition intensity are the number of competitors, the industry growth rate, or the exit barriers (Porter, 2008). Moreover, the intensity of rivalry within an industry can also be destructive to financial success (Porter, 2008).

An additional factor is *Environmental Dynamism*. According to Zahra and Bogner (2000), Environmental Dynamism involves the rate and unpredictability of change within the industry. These changes in the firm's external environment come from the development of customer needs, entry or exit of competitors, or a shift in technological conditions (Zahra & Bogner, 2000). Naturally, these changes are accompanied with new opportunities, as well as threats for new ventures. Thus, entrepreneurs are forced to react to theses changes by "building and leveraging technological resources" (Zahra & Bogner, 2000, p. 140).

In addition, *Environmental Heterogeneity* is also part of the first category. This factor deals with the diversity of market segments and environmental complexity (Zahra & Bogner, 2000). The diversity depends on companies' decisions and the industry's natural conditions. Due to the fact that industries evolve over time and new business segments develop, a certain level of knowledge and expertise is mandatory in order to be competitive (Zahra & Bogner, 2000).

The next meta-factor is *Market Growth Rate*. According to Lee, Lee and Pennings (2001), the performance of entrepreneurs depends on the environmental munificence, which in turn is highly related to entrepreneurial success (Lee et al., 2001). In order to control the largesse of the environment and the copiousness of opportunities, *Market Growth Rate* can be seen as a useful indicator. This *Market Growth Rate* is defined as the increase of average firm sales within a certain industry (Lee et al., 2001; Bloodgood et al., 1996).

The fifth and last factor is *Market Scope*. This factor is defined by Li (2001) as "the variety of customers, their geographic range, and the number of products" (Li, 2001, p. 187). In accordance with McDougall and Robinson (1990), a broad product range can be seen as a critical component of new venture strategy. Therefore, *Market Scope* "is a variable that should at least be considered in any research" (McCann, 1991, p. 193).

All five factors offer the opportunity of analysing the attractiveness of the mobile application industry. According to Porter (2008), the attractiveness refers to the overall industry profitability. Nevertheless, the five factors mentioned above can be seen as Exogenous Factors due to the fact that start-up companies cannot influence them. Furthermore, it is proposed that all five factors positively influence start-up's financial success. On the one hand, the large number of app developers and the continually rising number of mobile applications lead to a strong competition between start-up companies. On the other hand, a high level of Competition Intensity can also affect app companies in a positive way due to an increasing motivation of app developers and app founders to become the number one with their app. Also the environmental factors play a major role due to the fact that new software ventures are more often faced with changes and unpredictability in their environment (Zahra & Bogner, 2000). Thus, the understanding of the environment is of great importance and can influences organizational performance. Based on these findings the following hypothesis is formulated:

*H1a: Exogenous Factors (Competition Intensity; Environmental Dynamism; Environmental Heterogeneity; Market Growth Rate; Market Scope) positively influence a start-up's financial success within the mobile application industry.*

#### 2.2.1.2 Endogenous Opportunity Factors

The first two factors that can be influenced by start-up companies are *Internationalization* and *Low-Cost Strategy*. Bloodgood, Sapienza, and Almeida (1996) describe *Internationalization* as the activities across national borders. The importance of this factor results from the fact that certain industries require an international presence to be more competitive. Furthermore, a global presence provides the opportunity for ventures to capitalize on its unique set of resources, such as new technologies or management team experience in global markets. It is therefore anticipated that *Internationalization* improves a start-up's financial success.

A *Low-Cost Strategy* includes the use of a cost advantage in terms of preferential access to certain raw materials, proprietary technology, or economies of scale/ scope which can lead to competitive advantage for your company (Bloodgood et al., 1996). The opportunity to purchase materials and components at lower costs and achieve resources that are not available in the home country enables ventures to be the low-cost leader in its industry (Bloodgood et al., 1996).

The study by Song et al. (2008) equates the definition for *Marketing Intensity* with the definition of marketing differentiation by the work of Michael Porter. This meta-factor considers to what extent "a firm is pursuing a strategy based on unique marketing efforts" (Li, 2001, p. 187). Furthermore, several researchers stated that *Marketing Intensity* becomes more and more important with regard to strategic decision by new ventures (Ostgaard & Birley, 1994; Romanelli, 1989)

*Product Innovation* describes the extent to which new ventures develop new products, and/or services and introduce them to the market (Li, 2001). This factor refers to the attempt of ventures to handle the increasing competition in the market (Li, 2001).

The protection of patents is just one important aspect when trying to improve the profitability (Marino & De Noble, 1997). The meta-factor *Patent Protection* is defined as the availability of venture's patents protecting product or process technology. Cost advantage strategy or differentiation strategy are useful in order to attract customers. However, *Patent Protection* is an essential factor, which also contributes to corporate growth (Marino & De Noble, 1997).

In order to ensure the venture's profitability and its innovativeness, *R&D Investments* are of great importance (Zahra & Bogner, 2000). The spending level of the venture's investment in internal R&D activities also guarantees ownership and control of key knowledge (Zahra & Bogner, 2000). However, high investments on R&D activities do not necessarily lead to frequent product introductions. "Internal bureaucratic inefficiencies, poor selection of research projects, and lack of attention to technology commercialization can weaken the venture's ability to develop or market such products" (Zahra & Bogner, 2000, p. 138).

The meta-factor *Supply Chain Integration* describes a venture's cooperation along different points of the value chain (George, Zahra, Wheatley & Khan, 2001). The integration involves different actors, such as suppliers, customers, alliance partners, or distribution channel agents (George et al., 2001; Georg, Zahra & Wood, 2002). Especially the integration of suppliers provides many advantages, for example, a shorter time to market, cost reduction,

an increase of product performance, or technical knowledge acquisition (Schiele, 2010).

The last factor includes the venture's use of cooperative arrangements with universities (Zahra & Bogner, 2000). On the one side, firms can benefit from *University Partnerships* in terms of new emerging technologies and new scientific discoveries (Georg et al., 2002). On the other side, universities can make use of financial funds in order to pursue important R&D projects and to increase the quality of the university concerning research and teaching (Georg et al., 2002). All in all, *University Partnerships* can be described as a win-win situation for both sides.

The Endogenous Factors mainly differ from the Exogenous Factors in terms of interference. Exogenous Factors cannot be influenced directly by the app founders, whereas the company itself can specify the degree of influence on *Internationalization*, *Low-Cost Strategy*, *Marketing Intensity*, R&D Investments, or Supply Chain Integration, as part of their strategy. These opportunity factors enable start-up companies to strengthen their position on the market and earn the benefit in form of financial success. For example, Internationalization allows app developers and app founders to cover a broader range of potential customer and be involved in cross-border activities. This, in turn, can affect start-up's financial success in a positive sense. Also marketing is an effective tool to increase product awareness/ recognition. The findings above lead to the following hypothesis:

*H1b: The Endogenous Factors (Internationalization; Low-Cost Strategy; Marketing Intensity; Product Innovation; Patent Protection; R&D Investment; Supply Chain Integration; University Partnerships) positively influence start-up's financial success within the mobile application industry.*

### 2.2.2 Entrepreneurial Team

The Entrepreneurial Team deals with the characteristics of the new venture team. These characteristics include the experience and capabilities in the area of marketing, R&D, or new venture creation of a single person, the expert knowledge of the whole start-up team and the size of the new venture team.

The factor *Industry Experience* refers to the existing knowledge on a certain industry of the firm's management team. According to Marino and De Noble (1997), management teams with several years of experience in related industries are more likely to anticipate and react to changing business conditions. New business founders can also benefit from their expertise in terms of the implementation of an adequate planning and controlling system for rapidly changing industries (Marino & De Noble, 1997). Ensley and Hmieleski (2005) conclude that the Industry Experience of management teams of university-based start-ups is less diverse than their independent counterparts. In this vein, *Industry Experience* represents a positive factor concerning the improvement of firms' growth and profits.

The factor *Marketing Experience* describes the level of expert knowledge of the company's management team in the area of marketing (McGee et al., 1995). The level of marketing experience also has an effect on the strategic behaviour of the new venture (Marino & De Noble, 1997; McGee et al., 1995). Gruber (2004) assesses marketing as a major key to the success of new ventures. He points out that the failure rate of new ventures can be reduced by up to 60% through a professional analysis of the target market (Gruber, 2004).

In addition to *Industry Experience, Prior Start-Up Experience* can be valuable for business founders as well. This kind of experience helps to overcome some critical challenges that are faced by start-up companies, especially during the early stage development (Marino & De Noble, 1997). West and Noel (2009) note that the success of new ventures can be influenced by knowledge gained through previous experience in new venture development. Business founders with prior experience are better able to anticipate problems before they occur and make decisions accordingly (Marino & De Noble, 1997).

Management teams with *R&D Experience* are more concerned about licensing of certain technical applications (McGee et al., 1995). This awareness can create a strategic advantage, which in turn ensures the company's competitiveness and financial success. In general terms, it can be said that the more experience a manager has, the easier the process of improving firms' performance will be (McGee et al., 1995). In addition, R&D experience can be useful for adopting a technological differentiation strategy (Klotz, Hmieleski, Bradley & Busenitz, 2014).

The *Size of Founding Team* includes the number of management team members of the venture (Chamanski & Waagø, 2011). Studies have shown that teams or partners start 50-70% of all new ventures (Kaiser, 2010). Furthermore, the number of management team members is generally associated with talent, resources, ideas, and professional contacts. The more members a founding team has, the more talent, resources, ideas and professional contacts they have (Kaiser, 2010). Therefore, it is generally believed that the Size of Founding Team has a positive impact on the firm performance.

The characteristics of the entrepreneurial team are of major importance for any industry. Specifically, the first three factors (*Industry Experience, Marketing Experience, Prior Start-Up Experience*) seem to be essential for the mobile application industry upon first look. The various experiences of the founder team allow them to draw the right conclusions from failure and generate a kind of competitive advantage. Based on these findings the following hypothesis is formulated:

*H2: The characteristics of the entrepreneurial team (Industry Experience; Marketing Experience; Prior Start-Up Experience; R&D Experience; Size of Founding Team) positively influence start-up's financial success within the mobile application industry.*

### 2.2.3 Resources

The Resource category specifies not only on firms' resources, but also on the capabilities and characteristics of new businesses. The resource category contains, the size, age, type of the firm, nongovernmental financial support and alliance (Song et al., 2008).

The *Financial Resources* are measured in terms of financial assets of the firm. Robinson and McDougall (2001) declare that the level of financial assets is an important factor for new entrants, especially with respect to the fields of entrepreneurship, industrial organization and strategic management. Additionally, the financial assets of the firm are also representative for venture size (Robinson & McDougall, 2001).

The characteristic factors, such as *Firm Age*, *Firm Size* and *Firm Type*, are analysed by Zahra, Matherne, and Carleton (2003). The Firm Age includes the number of years since the venture was founded (Zahra et al., 2003). In order to analyse the *Firm Size*, the number of employees serves as a meaningful indicator. It is generally to be assumed that larger ventures own more resources. This implies financial resources as well as human resources (Zahra et al., 2003). The last factor refers to the *Firm Type*. There are two different types of ventures, corporate venture or independent venture (Zahra et al., 2003). The advantage of corporate ventures is the access to sponsors' international distribution channels, which can speed up the internationalisation process. In the end, it is much harder for independent ventures, because of restricted resources and small reputation. In the first place, independent ventures need to build up the necessary infrastructure in order to enter international markets (Zahra et al., 2003).

*Nongovernmental Financial Support* is defined as the financial sponsorship from commercial institutes (Lee et al., 2001). At the beginning of a new venture creation, start-up companies do not have so many resources and are therefore depending on commercial institutes. In accordance with Lee et al. (2001), "sponsorship also enhances their legitimacy and prestige" (Lee et al., 2001, p. 622)

*R&D Alliances* implies the venture's use of R&D cooperative arrangements, such as "strategic alliances, acquisitions, licensing agreements, and outright purchase of technology from outside sources" (Zahra & Bogner, 2000, p. 139). This kind of strategy offers several advantages for new ventures, for example, the access to a large pool of technology capabilities, acceleration of the product development process, or the opportunity of knowledge transfer between firms (Zahra & Bogner, 2000; McGee et al., 1995). Further benefits of cooperative arrangements are the higher regularity of generating product hits, or the possibility to create a stable cash flow (Zahra & Bogner, 2000).

According to West and Noel (2009), any new venture needs different types of resources in order to be successful. These include financial, social, technological, physical and human resources. Based on the findings above the following hypothesis is formulated:

*H3: Resources (Financial Resources; Firm Age; Firm Size; Firm Type; Nongovernmental Financial Support; R&D Alliances) positively influence start-up's financial success within the mobile application industry.*

| Meta-factors | Definitions | Selected References |
|---|---|---|
| | **Exogenous Market Factors** | |
| 1.Competition Intensity | Strength of interfirm competition within an industry | Chamansji and Waagø (2001) |
| 2. Environmental Dynamism | High pace of changes in the firm's external environment | Zahra and Bogner (2000) |
| 3. Environmental Heterogeneity | Perceived diversity and complexity of the firm's external environment | Zahra and Bogner (2000) |
| 4. Market Growth Rate | Extent to which average firm sales in the industry increase | Bloodgood, Sapienza, and Almeida (1996); Lee, Lee, and Pennings (2001) |
| 5. Market Scope | Variety in customers and customer segments, their geographic range, | Li (2001); Marino and De Noble (1997) |

| | | |
|---|---|---|
| | and the number of products | |
| | **Endogenous Opportunity Factors** | |
| 6. Internationalization | Extent to which a firm uses cost advantages as a source of competitive advantage | Bloodgood, Sapienza, and Almeida (1996) |
| 7. Low-Cost Strategy | Extent to which a firm uses cost advantages as a source of competitive advantage | Bloodgood, Sapienza, and Almeida (1996) |
| 8. Marketing Intensity | Extent to which a firm is pursuing a strategy based on unique marketing efforts | Li (2001) |
| 9. Product Innovation | Degree to which new ventures develop and introduce new products or services | Li (2001) |
| 10. Patent Protection | Availability of firm's patents protecting product or process technology | Marino and De Noble (1997) |
| 11. R&D Investment | Intensity of the firm's investment in internal R&D activities | Zahra and Bogner (2000) |
| 12. Supply Chain Integration | A firm's cooperation across different levels of the value-added chain (e.g., suppliers, distribution channel agents, or customers) | George et al. (2001); George, Zahra, and Wood (2002); McDougall et al. (1994) |
| 13. University Partnerships | The firm's use of cooperative arrangement with universities | Zahra and Bogner (2000); Chamanski and Waag (2001) |
| | **Entrepreneurial Team** | |
| 14. Industry Experience | Experience of the firm's management team in related industries and markets | Marino and De Noble (1997) |
| 15. Marketing Experience | Experience of the firm's management team in marketing | McGee, Dowling, and Megginson (1995); Marino and De Noble (1997) |
| 16. Prior Start-Up Experience | Experience of the firm's management team in previous start-up situations | Marino and De Noble (1997) |
| 17. R&D Experience | Experience of the firm's management team in R&D | McGee, Dowling, and Megginson (1995); Marino and De Noble (1997) |
| 18. Size of Founding Team | Size of the management team of the firm | Chamanski and Waag (2001) |
| | **Resources** | |
| 19. Financial Resources | Level of financial assets of the firm | Robinson and McDougall (2001); Lee, Lee, and Pennings (2001) |
| 20. Firm Age | Number of years a firm has been in existence | Zahra et al. (2003) |
| 21. Firm Size | Number of the firm's employees | Zahra et al. (2003) |
| 22. Firm Type | The type of a firm's ownership (corporate ventures or independent ventures) | Zahra et al. (2003) |
| 23. Nongovernmental Financial Support | Financial sponsorship from commercial institutes | Lee, Lee, and Pennings (2001) |
| 24. R&D Alliances | The firm's use of R&D cooperative arrangements; for NTVs they also correspond to horizontal alliances | Zahra and Bogner (2000); McGee, Dowling, and Megginson (1995) |

**Table 1 - Definitions of Meta-factors (Song et al., 2008, p. 12)**

The outcome of the meta-analysis by Song et al. (2008) is that only 8 out of 24 meta-factors can be seen as success factors for new technology ventures. That means only eight factors are "homogeneous positive significant meta-factors that are correlated to venture performance" (Song et al., 2008, p. 13). One success factor is Market Scope, which is part of the Market and Opportunity category. Two success factors represent the Entrepreneurial Team category. The last five success factors were all part of the Resources category. These include, for example, Supply Chain Integration, Size of Founding Team, Firm Age, or Patent Protection (Song et al., 2008).

## 2.3 Business Models for Monetizing Mobile Applications

After analysing Opportunity, Entrepreneurial Team and Resource factors, the question arises as to how to generate Financial Resources, or how to generate money for possible R&D Investments or Alliances. Also Opportunity factors, for example, Internationalization or Product Innovation are associated with costs. Therefore, app founders/ app developers have to monetize their mobile applications. The decision-making process for revenue models can be influenced by the characteristics of the entrepreneurial team, such as Industry Experience, Marketing Experience, and Prior Start-Up Experience.

The following section includes different options for monetizing mobile applications. The revenue model is an important building block concerning the survival of a new venture. It is hugely important to find out which strategy fits best to your mobile application. On the one side, there are business models that generate revenue right off the bat (e.g. paid apps). These models are categorized as direct revenue models (Borghuis, 2009). On the other side, indirect revenue models generate high downloads first and profits later, for example through advertisement (Borghuis, 2009). The revenue model is a main component of any business plan. According to Hoffman and Novak (2003), a revenue model can be defined as follows: "Revenue models specify how a firm translates customer value into a revenue stream. In effect, they specify where the money comes from" (Hoffman & Novak, 2003, p. 26). The business model Canvas by Osterwalder, Pigneur, and Tucci (2005) also includes the revenue model as a separate and important building block. This element defines different ways of earning money, which result from a combination with a business model. If the customer is the heart of a business model, then turnover represents the arteries (Osterwalder et al., 2005). Nowadays there are numerous possibilities to monetize mobile applications. But the app publisher should carefully select the revenue model. The difficulty lies in generating the most revenue "without compromising the user experience and the quality of your app" (Salz, 2014, p. 119). An important aspect in the decision-making process is the analysis of countries' monetization potential (App Annie, 2015). According to the report by App Annie (2015), the relative success or failure of a business model strategy depends on the geographic region. At 70% in-app advertising holds the largest percentage of the total revenue in India, while 81% of the total app revenue is generated with app store revenue in Japan. Therefore, app founders have to find out the most suitable app business model for their target market (App Annie, 2015). The choice depends mainly on the app content, the quality and the engagement potential (Salz, 2014). The following paragraph outlines the most commonly used revenue models, which are divided into two categories, in more detail, also regarding the advantages and disadvantages.

### 2.3.1 Direct Revenue Models

These kinds of business models involve direct monetization. The revenue models that are listed below are categorized as direct revenue models. App founders and app developers who make use of direct revenue models are able to generate income through purchases of virtual goods, one-off payments, or by selling additional features and updates inside the mobile application. However, it should be considered that direct revenue models include the compensation rule of the App Store provider (Curran et al., 2015).

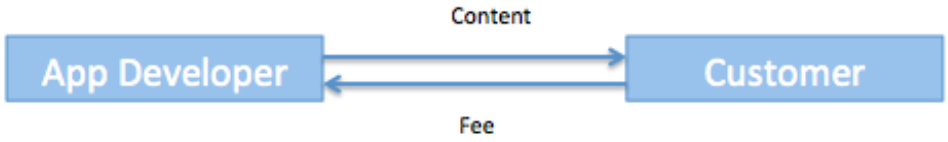


Figure 1 - Direct Revenue Model (Borghuis, 2009)

#### 2.3.1.1 Paid Apps

This revenue model is self-explanatory. This classical method requires a one-off payment for unlimited access (Ford, 2013; Salz, 2014). Users can buy an app with a classic one-time purchase on the App Store. Further updates are usually free. Typical app categories for this revenue model are navigation, productivity, or education (Tveten, 2014). However, the incentive for providers to deliver new rollouts is rather low. Although this revenue model is self-explanatory, it must be pinpointed that the success of this model depends on app founder's ability to point out why this app is better than the others (Munir, 2014; Salz, 2014). Summarising this model, it is becoming clear that marketing is an important aspect for being successful. You need to convince the users to buy your app instead of a free version (Munir, 2014).

The benefits for a paid app model are a cleaner interface because of less advertisement, direct revenues for each new download, and the fact that this model is well known by users and app founders. In addition, this model can also lead to highly motivated app developers and higher innovation since the users paid money for it and they expect only the best (Munir, 2014).

There are certain drawbacks of course, especially with regard to the profitability. There are various reasons for this: Most paid apps cost between 0,99€ and 10€. After applying the compensation rule (70% for the app developer and 30% for the platform), there is not much left in the end (Munir, 2014; Salz, 2014). Moreover, four out of five paid apps are downloaded less than 100 times (Salz, 2014). This would make it more difficult for the founder to reach financial success only with one app.

#### 2.3.1.2 Paywalls

The Paywalls business model is comparable to the IAP method. Paywalls can be described as a subscription where the users pay money at certain intervals to utilize the content of the app (Gohil & Dalvadi, 2015; Munir, 2014). This model is commonly used for apps in the news and publishing genre (Salz, 2014). These apps allow the user to see a certain part of the content but in order to avoid certain content limits and restrictions, the user needs to sign up for a subscription (Gohil & Dalvadi, 2015); Munir, 2014).

The app founders receive revenues in a continual flow, due to the reason that subscriptions usually auto-renew. The continual flow depends on founders' setting. This could be on a weakly, monthly, or yearly base. The subscription model also ensures a high level of motivation of the app developers and app marketers. This is because the users demand continuous high quality content or otherwise they will unsubscribe the contract (Munir, 2014). A further advantage of Paywalls is the fact that users who sign up for a subscription are more likely to be loyal and engaged users (Munir, 2014).

This subscription strategy is not suitable for all app categories. As already mentioned above, news, lifestyle, or entertainment apps are able to limit the content of videos or articles. That is why Paywalls are not suitable for games, productivity, or social networking apps (Munir, 2014). Moreover, one of the big challenges of Paywalls is to determine where and when to place a paywall. It is important to define the right limit for video and text content in order to attract users (Munir, 2014).

#### 2.3.1.3 Freemium

This business model is similar to the in-app advertising approach. A mobile application is offered for free in the App Store, but in order to get access to additional features or updates, the user has to pay for it (Munir, 2014; Oh & Min, 2015). This concept is also called Freemium, reflecting the spread between free and the premium version. As the users are very reluctant to spend money for an app without having the chance to test the utility in the first place, in-app purchases are very popular in the mobile application industry (Munir, 2014). Another version of the Freemium model is to provide the entire circumference of the offer for free for a limited time (Oh & Min, 2015). After the trial period, the user must decide whether he or she is happy with the functions of the free version or a premium upgrade is needed (Salz, 2014). In summary, this strategy is useful to attract users to pay for extra features. They first get the chance to test a stripped down version until they reach a certain level of addiction about the app to buy additional features (Salz, 2014). A well-known example for this strategy is the game Angry Birds. A stripped down version of this game is offered free of charge on the App Store. However, certain features are hidden and users are able to upgrade their free version for a small fee in order to get additional levels (Gohil & Dalvadi, 2015).

On the one hand, the advantages of the Freemium model are a higher chance to attract new users by testing the app before they buy and the opportunity to upsell new features or updates after the people get hooked (Gohil & Dalvadi, 2015).

On the other hand, in order to be successful, also disadvantages have to be taken into account. It is, for example, important to find the right balance of features which are offered for free and which are not (Munir, 2014). If the app offers too few features for free, the users will be disappointed and not interested in buying the premium version. The other way around, if the app provides too many features for free, the users do not see the necessity for an upgrade because of no extra added value.

#### 2.3.1.4 In-App Purchases (IAP)

The ideal solution to monetize your app is the implementation of so-called In-App Purchases. The IAP model works in a similar way to the Freemium version (Oh & Min, 2015). The

difference between the Freemium and IAP is that the IAP method provides individual features or add-ons instead of a single upgrade to the premium version (Salz, 2014). Users of IAP apps have always the option to buy physical or virtual goods after downloading the app from the App Store (Gohil & Dalvadi, 2015). Game developers can benefit most from it, especially those games that provide "virtual goods or in-game enhancements that need to constantly be refreshed" (Salz, 2014, p. 126). IAP are also well suited to productivity and utility apps that allure users with interesting features. A good example for IAP apps is Candy Crush. This game is offered for free on the App Store and users are addicted to play this game all the time. However, the play time is limited because of the amount of lives. If the player failed for five times, he or she has to wait for 30 minutes to get a new life. Or one could buy a new life in order to go on with playing the game. In case that you reach a point where there is nothing more you can do to finish a certain level, you can buy extra features to achieve the next round.

The IAP strategy is very suitable for eCommerce/ mCommerce brands. Instead of taking high risk, IAP allows app marketers to generate comfortable profits whereas the risk is low (Munir, 2014). App developers are able to generate a high profit margin with IAP, especially those who provide physical goods. They do not have the traditional expenses, such as rent or staff (Munir, 2014). The purchase of virtual goods may also even lead to deeper levels of engagement, which is particularly interesting to note concerning growing monetization strategy (Munir, 2014).

A disadvantage of the IAP model is the discount of 30% of the revenue for all virtual goods. This does not apply for physical goods or services purchased inside an app (Munir, 2014). Furthermore, government officials have consistently warned of IAP because of weak regulations in terms of child protection. The regulations do no prevent children from making accidental in-app purchases. Apps also indicate a lack of transparency, which leads to unsettled users about IAP (Munir, 2014). Besides this, the IAP model takes a considerable amount of time to understand the user's behaviour inside a certain app. This is necessary to determine the right place and time for offering the IAP (Salz, 2014).

The analysis of different kinds of direct revenue models for mobile applications shows that app founders and app developers only depend on their direct sales instead of the click behaviour of their users. Overall, it seems that users prefer Freemium or In-App Purchases for mobile applications, because they always have the possibility to upgrade the app or buy some additional features after testing the product for a certain period of time (Munir, 2014). This, in turn, leads to the suggestion that Direct Revenue Models provide a higher probability of achieving financial success. Therefore, the following hypothesis is formulated:

*H4a: The choice of Direct Revenue Models (Paid Apps; Paywalls; Freemium; In-App Purchases) positively influences a start-up's financial success within the mobile application industry.*

### 2.3.2 Indirect Revenue Models

Building on the previous section (2.3.1), this section includes revenue models where the mobile application is offered for free. The app generates revenue by offering ads, or by getting a percentage of the revenue from redeemed rewards. According to Borghuis (2009), indirect revenue models have already been used for a long period of time, for example, in

the publishing sector or when broadcasting radio shows. Indirect revenue models become more and more the standard, because of price pressure, increasing competition and the rise of the Internet and digitalization (Borghuis, 2009). Good examples of the successful implementation of indirect revenue models are Google or Facebook. Both companies offer their mobile applications for free and are still able to generate enough revenue to be financial successful. A general principle applies for indirect revenue models: "the revenue from advertising is directly proportional to the user base's size" (Moreira, Vicente Filho, & Ramalho, 2014, p. 3). From a customer's point of view, the main advantage of indirect revenue models is that they do not need to pay money for the download. This is why these models enjoy a greater popularity among users (App Annie, 2015).

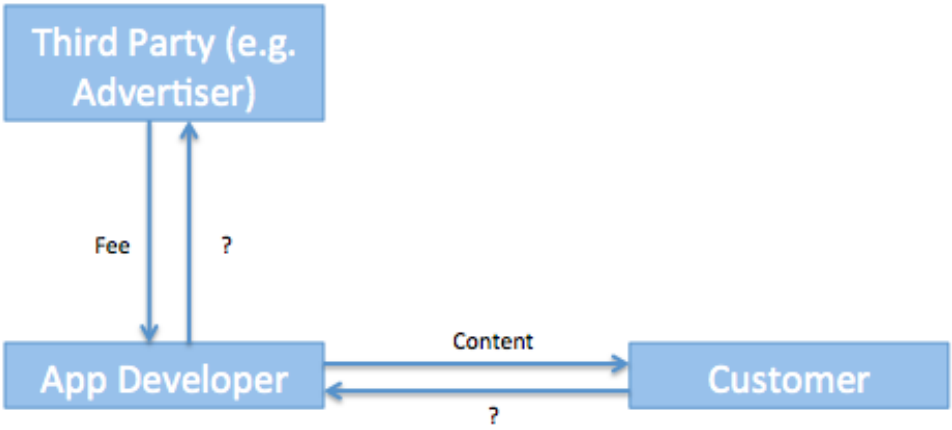


Figure 2 - Indirect Revenue Model (Borghuis, 2009)

#### 2.3.2.1 Free, But With Ads

One common practice is to offer the app for free and generate revenue only by placing advertisement (Rakestraw, Eunni & Kasuganti, 2012) Digital advertisement is the most known solution. With the usage of this business model, the app founder removes the cost-barrier to purchasing. The objective is to achieve a sizable user base in order to collect data about users' interaction (Munir, 2014). The data, in turn can be sold to app publishers who are willing to pay for targeted ads in your mobile application (Hoffman & Novak, 2003). One of the best-known examples is Facebook. In order to use the Facebook app, the users do not have to pay for it directly. However, Facebook makes money by selling highly targeted ads (Munir, 2014). In a nutshell, free apps with advertisement include several advantages and disadvantages.

On the one side, free apps with ads provide a high amount of data about users' in-app behaviour or location information, a quick development of a user base (because people love free apps), and the possibility to benefit from the growing advertising industry (Munir, 2014).

On the other side, the founder should consider potential disadvantages, for example, users may fell disturbed by ads, or the fact that in-app ads waste space on an already limited screen size (Munir, 2014; Rakestraw et al., 2012).

### 2.3.2.2 Sponsorship

Sponsorship is one of the latest methods to monetize mobile applications. The Sponsorship strategy includes collaboration between app founders and advertisers. The advertisers offer rewards if the users master certain in-app actions (Munir, 2014). In other words, "brands and agencies pay to be part of an incentive system" (Munir, 2014, p. 1). A practical example for Sponsorship can be explained as follows: Peter uses a fitness app to track his run on a regular basis. If Peter is able to finish his run within a certain period of time, the advertiser provides a reward, such as a coupon code for a certain product. The app founder in turn is generating revenue by getting a percentage of the revenue from redeemed rewards (Munir, 2014). Sponsorship allows you to integrate 'incentivized advertising' into the app without negative impact on users' satisfaction, quite the contrary, this business model enhances user engagement (Munir, 2014).

One advantage of Sponsorship is the adaptability for many different verticals (Munir, 2014). Another aspect that speaks for itself is the fact that the advertisement is relevant and related to an app's purpose. Thus, the users are more likely to pay attention on certain ads. This revenue model is a win-win situation for all involved parties: the app developer and marketers get a percentage of the revenue from redeemed rewards; the advertiser is able to use a greater advertising space; and the users benefit from small gifts/ coupon codes (Munir, 2014).

In terms of disadvantages, this revenue model has not yet been adequately tested. The success and results vary and need to be analysed further in order to make a qualitative assessment of the model. Nevertheless, it is quite important for mobile marketers to make the right decision regarding incentivize within the mobile application (Munir, 2014).

These kinds of revenue models entail certain disadvantages in terms of financial success. As already stated in 2.3.2.1, users may fell disturbed by ads and this, in turn, could lead to the avoidance of free apps with ads after some time. Furthermore, the app founder really depends on the users' click-behaviour. The apps generate revenue per click or by getting a percentage of the revenue from redeemed rewards. Based on these facts, the following hypothesis is formulated:

*H4b: The choice of Indirect Revenue Models (Free, But with Ads; Sponsorship) instead of Direct Revenue Models negatively influences a start-up's financial success within the mobile application industry.*

The table below shows a brief overview of all different revenue models and the associated advantages and disadvantages.

| | Advantages | Disadvantages | Selected References |
|---|---|---|---|
| **Direct Revenue Models** | | | |
| **Paid Apps**:<br>One-off payment to gain permanent access to the full version | -Cleaner interface because of less advertisement<br>-Direct revenues for each new download<br>-Well known by users and app founders | -Difficulty in reaching financial success because of the compensation rule | Ford (2013); Gohil & Dalvadi (2015); Munir (2014); Salz (2014); Tveten (2014) |

| | | | |
|---|---|---|---|
| **Paywalls**:<br>Subscription where users pay money at certain intervals to utilize the content of the app | -Revenues in a continual flow<br>-High level of motivation of the app developers and app marketers<br>-Users of Paywalls are more likely to be loyal and engaged users | -Not suitable for all app categories | Gohil & Dalvadi (2015); Munir (2014); Salz (2014) |
| **Freemium**:<br>App is offered for free/ Users have to pay to get access to additional features or updates | -Higher chance to attract new users | -Find the right balance of features which are offered for free and which are not | Gohil & Dalvadi (2015); Munir (2014); Oh & Min (2015); Salz (2014) |
| **In-App Purchases (IAP)**:<br>Provides individual features or add-ons/ Users have always the option to buy physical or virtual goods after downloading the app | -Generate comfortable profits whereas the risk is low<br>-Generate high profit margins, especially for those who provide physical goods<br>-Lead to deeper levels of engagement | -70/30 compensation rule for all virtual goods<br>-Bad reputation because of weak regulations in terms of child protection<br>-Lack of transparency leads to unsettled users | Gohil & Dalvadi (2015); Moreira, Vicente Filho, & Ramalho (2014); Munir (2014); Oh & Min (2015); Salz (2014) |
| **Indirect Revenue Models** | | | |
| **Free, But with Ads**:<br>Free download/ Generate revenue only by placing advertisement | -High amount of data about users' in-app behaviour or location information<br>-Quick development of user base | -Users may fell disturbed by ads<br>-In-app ads waste space on limited screen size | Hoffman & Novak (2003); Moreira, Vicente Filho, & Ramalho (2014); Munir (2014); Rakestraw, Eunni & Kasuganti (2012) |
| **Sponsorship**:<br>Collaboration between app founders and advertisers/ Advertisers offer rewards if users master in-app actions (incentive system) | -Advertisement is relevant and related to an app's purpose<br>-Win-win situation for app developer and the advertiser | -Model has not yet been adequately tested in terms of success | Munir (2014) |

**Table 2 - Overview of Direct & Indirect Revenue Models for Mobile Applications**

## 2.4 Research Model

The following figure summarizes the research model for this project. The research model includes the three categories based on Song et al. (2008) and the revenue models. The first four hypotheses are based on the assumption that Exogenous Market Factors, Endogenous Opportunity Factors, Entrepreneurial Team, and Resources have a positive impact on a company's financial success. As well, it is assumed that, on the one hand, the choice of direct revenue models positively influences a company's financial success within the mobile application industry. On the other hand, indirect revenue models negatively influence the financial success compared to direct revenue models.

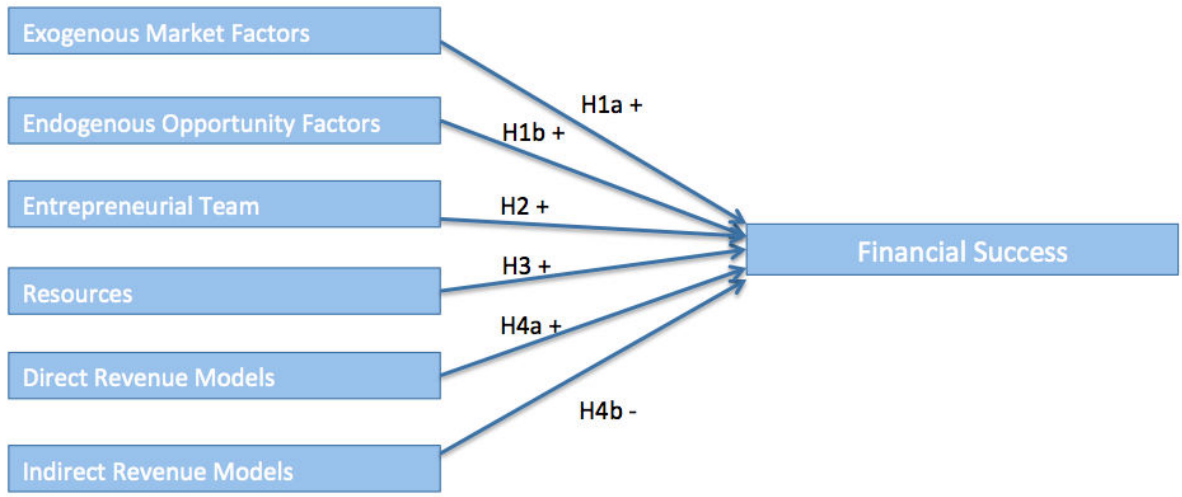


Figure 3 - Research Model based on Hypotheses

# 3. Research Methodology

After reviewing the existing literature regarding success factors in new venture creation and different revenue models for app developers, the following chapter describes the research methodology, which will be used in order to prove or to reject the hypotheses, and in the end, to find a valid answer for the main research question of this paper. First of all, the research approach is given in chapter 3.1. After that, 3.2 will explain the research measure in more detail. The last chapter 3.3 includes the sample and response rates for the research approach.

## 3.1 Research Approach

Since the literature on new venture creation is not yet rich enough to provide success and failure factors for new start-up companies within the mobile application industry, a quantitative study was undertaken to investigate the validity of the success factors by Song et al. (2008). The decision between a quantitative or qualitative research approach is predominantly driven by the research purpose. While quantitative research intends to explain causes and make predictions, a qualitative approach, on the other hand, aims to describe phenomenon or generate theory (Thompson & Walker, 1998). In general, the quantitative approach is a statistical analysis in comparison to the qualitative approach, which is an interpretive analysis (Thompson & Walker, 1998). For the underlying research problem, this project proposes to focus exclusively on a quantitative research strategy. Therefore, an online survey has been applied for this research. The reason for choosing an online survey instead of face-to-face interviews is that the survey approach enables the researcher to gather information more quickly. Furthermore, the dispersal of the app developers/ entrepreneurs makes it more or less impossible to realize face-to-face interviews.

### 3.1.1 Sampling and Selection Criteria

In order to get a reliable outcome for this project, selection criteria had to be set first. For this research, only app developers and the founders of mobile application companies were asked to participate in the survey. The difference between both is that a founder is not directly the app developer. This means that it might be possible that an app founder has no idea about programming language but he or she has a promising business idea for a mobile application and certain management skills. That is why the founder tries to find someone who is able to implement his or her idea into a mobile application. Therefore, both parties were appropriate for this quantitative research. In addition, there were no distinctions made between various app categories. Also the founding year was not taking into consideration regarding the selection of the survey participants.

The contact details of the participants were found on the App Store. For example, the Apple App Store provides information about the mobile application, such as the name of the respective company or the developer, the category the app belongs to, or an overview of all In- App Purchases within the mobile application. The participants of the online survey were randomly selected apps of the App Store.

### 3.1.2 Online Survey

After defining the sampling and selection criteria for the online survey, the questions were constructed. Afterwards, the quality of the questionnaire was tested by sending the link of the online survey to three fellow students. The reason for this procedure is that misinterpretation of questions would result in a measurement error. Therefore, variations in the answers were analysed. Furthermore, the goal of this pilot survey was to receive feedback for the existing questions and to improve or adapt certain questions to make the outcome more reliable. In the end, based on the improvement suggestions, the final questions for the online survey were completed. The pilot survey was also conducted via the Internet in order to test the method and questions under real conditions.

In the first part of the survey, the participants were asked to give information concerning the current situation of their company regarding its existence and, if the first question was affirmed, its financial success. In order to get valuable answers, a combination of open and closed questions was applied. In avoidance of misunderstandings regarding the interpretation of financial success, a definition of this term was given with the question itself. The last question of the first part was about the category the app belongs to. This question was to help analysing the results regarding a correlation between the app category and the chosen revenue model. The second part of the questionnaire included the evaluation of the success factors for new venture creation within the mobile application industry. The app founders and app developers were asked to rate the level of importance of each listed meta-factor. To ensure that the participants' responses are not too neutral, a 7-point likert scale was utilized. Furthermore, using a 7-point likert scale instead of a 5-point likert scale is more appropriate for electronically distributed and unsupervised questionnaires (Finstad, 2010). The third and last part of the questionnaire included the choice of different revenue models. The participants were asked to select the revenue model or a mixture of different revenue models, which was used for their mobile application. The final questionnaire is attached in the annex (Appendix 2).

## 3.2 Operationalization

This section is about all the variables that are used in the hypotheses. It is described how all variables are operationalized in the online survey. The constructs and scales are based on the work of Song et al. (2008) and therefore indicate the reliability of the scales.

### 3.2.1 Measurement of Organizational Performance

Organizational performance can be measured in different ways, such as return on investments or a firm's capital (Lee et al. 2001). However, these indicators seem to be inappropriate for start-up companies because new ventures do not create any profit during the early stage development. The most interesting phase for start-up companies is the survival phase. As already explained in chapter 1, the survival phase describes the time when revenues start to rise and the company is able to pay obligations, but not all of the expenses (Leach & Melicher, 2011). Therefore, organizational performance will be measured through financial success. The dependent variable is defined as the ability to generate enough revenue in order to meet obligations and establish the business in the market. Since, it is usually quite difficult to get revenue figures because of privacy policy, financial success is measured with a simple 'Yes' or 'No' question. In the survey, the participants were asked if they are able to meet all obligations.

### 3.2.2 Exogenous Market Factors

As already mentioned in the theoretical framework part, this variable is based on five items from the Market and Opportunity category by Song et al. (2008). The reason why Competition Intensity, Environmental Dynamism, Environmental Heterogeneity, Market Growth Rate, and Market Scope were summarized as one construct is that all five factors are market factors, which are not suggestible for companies and can be defined as Exogenous Market Factors. The five items were measured with a 7-point likert scale ranging from unimportant to important.

In order to test the internal consistency and ensure that all items measure the same concept or construct, Cronbach's Alpha was used for the first four variables. The importance of calculating the internal consistency relies on the fact that the validity must be determined first before starting other statistical test methods (George & Mallery, 2003). However, the result of Cronbach's Alpha must be interpreted carefully, as Cronbach's Alpha is only an estimation of the reliability of scale (Leider, 2016). The alpha value is strongly influenced by the number of items, which would mean that alpha could be improved by adding further items of the Market and Opportunity category.

The variable Exogenous Market Factors achieved an alpha of 0.766 that exceeds the suggested minimum value of 0.65 (George & Mallery, 2003). As table 3 shows, this value cannot be improved by removing individual items.

### 3.2.3 Endogenous Opportunity Factor

In order to measure the variable Endogenous Opportunity Factor, the items Internationalization, Low-Cost Strategy, Marketing Intensity, Product Innovation, Patent Protection, R&D Investment; Supply Chain Integration, and University Partnerships were used as one construct. Endogenous Opportunity Factor was measured with a 7-point likert scale ranging from unimportant to important. The outcome of the post-hoc analysis revealed a very low Alpha of 0.504. This is because of the fact that Song et al. (2008) measured all factors of the Market and Opportunity category as one variable. However, this study examines the assumption that Market factors are not suggestible by companies, whereas Opportunity factors are part of corporate strategy and therefore directly controllable by app companies.

The consideration of the last column of table 3 indicates that there is a chance to improve Cronbach's Alpha by eliminating individual items. In this case, Low-Cost Strategy and Product Innovation were excluded in order to improve Cronbach's Alpha to .679. As already described in the theoretical framework part, Low-Cost Strategy is about the use of cost advantages as a source of competitive advantage. However, this seems to be not applicable for the mobile application industry. For example, app developers and app founders are not able to get a special discount for the store fee. Therefore, it makes sense to eliminate Low-Cost Strategy for new ventures within the mobile application industry.

### 3.2.4 Entrepreneurial Team

In order to measure Entrepreneurial Team, the five factors (Industry Experience, Marketing Experience, Prior Start-Up Experience, R&D Experience, Size of Founding Team) were selected as one construct. Entrepreneurial Team was measured with a 7-point likert scale

ranging from unimportant to important. The results regarding the reliability are summarized in table 3. The alpha value of 0.624 certifies that the selected scale can be recognized as a weak construct. However, the last column of table 3 indicates the chance to improve Cronbach's Alpha by eliminating an individual item. In this case, Size of Founding Team was excluded in order to improve Cronbach's Alpha to .681.

### 3.2.5 Resources

In order to measure Resources, the six factors (Financial Resources, Firm Age, Firm Size, Firm Type, Nongovernmental Financial Support, R&D Alliances) of Song et al. (2008) were selected as reliable and pre-existing scales. Resources was measured with a 7-point likert scale ranging from unimportant to important. The result regarding the reliability is summarized in table 3. The alpha value of 0.748 certifies a sufficient internal consistency of the six items.

### 3.2.6 Revenue Models

In order to measure indirect and direct revenue models, the literature was scanned for pre-existing scales. However, no directly applicable scales/ questions could be found. Therefore, new questions have to be constructed for the online survey. The participants were asked to select between six different business models (Paid Apps, Paywalls, Freemium, In-App Purchases, Free, But with Ads, Sponsorship). Given that most mobile applications use more than one Revenue Model, app founders and app developers were able to select a combination of different models.

| Variable | Number of Items | Items | Cronbach's Alpha | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| **Exogenous Market Factors** | **5** | | **.766** | |
| | | Competition Intensity | | .771 |
| | | Environmental Dynamism | | .670 |
| | | Environmental Heterogeneity | | .732 |
| | | Market Growth Rate | | .713 |
| | | Market Scope | | .722 |
| **Endogenous Opportunity Factors** | **8** | | **.679 (.504)** | |
| | | Internationalization | | .669 (.419) |
| | | (Low-Cost Strategy) | | - (.582) |
| | | Marketing Intensity | | .678 (.455) |
| | | (Product Innovation) | | - (.417) |
| | | R&D Investment | | .631 (.435) |
| | | Patent Protection | | .586 (.594) |
| | | Supply Chain Integration | | .599 (.395) |
| | | University Partnerships | | .625 (398) |
| **Entrepreneurial Team** | **5** | | **.681 (.624)** | |
| | | Industry Experience | | .618 (.556) |
| | | Marketing Experience | | .578 (.527) |

| | | | | |
|---|---|---|---|---|
| | | Prior Start-Up Experience | | .604 (.494) |
| | | R&D Experience | | .656 (.556) |
| | | Size of Founding Team | | - (.681) |
| **Resource** | **6** | | **.748** | |
| | | Financial Resources | | .764 |
| | | Firm Age | | .670 |
| | | Firm Size | | .679 |
| | | Firm Type | | .692 |
| | | Nongovernmental Financial Support | | .751 |
| | | R&D Alliances | | .709 |

**Table 3 - Post-hoc Analysis of Variables/ Items**

## 3.3 Sample and Response

The next step was to create a database with e-mail addresses of app developers and founders of mobile applications. Unfortunately, there was no directory for this purpose on the Internet. Therefore, a new list had to be created. The procedure for this was very time-consuming but simple. As mentioned before, all App Stores provide information about the app developer (in most cases the name of the developer/ founder or the company).

The first step of this procedure was to create a list with all names of mobile applications, which are available in the Apple App Store. There are more than 20 different app categories on the Apple App Store. Once all names have been listed, the next stage of this process was to search for the website of each listed app. In general, the website provides information about the app founder (contact/ e-mail address) and the marketplace for the respective mobile application. In almost all cases, the mobile applications were available on the Apple App Store as well as on the Google Play Store. In order to include app developers, a German website for app developers (http://www.app-entwickler-verzeichnis.de) was used to complete the database. This website provides more than 3400 contacts of app developers or freelancers. In the end, the list consists of 1364 e-mail addresses that are eligible for this study.

### 3.3.1 Gathering Data

In order to gather the necessary data for this study, a form was design with an online data collection tool, Google Docs. After finalising the questionnaire, the survey was put online and founders and app developers were invited to participate by email. The invitation was sent out bilingually, in English and in German in order to avoid misunderstandings (attached in the appendix 1). The email included a brief introduction about my person and the topic of the project. The table below (see table 3) presents the process of gathering data in much more detail. The first email was sent on the 14th of January in 2016.

| Date | How? | Response | Response cumulative |
|---|---|---|---|
| **Friday 14th of January** | Creating a first database of 549 contacts with businesses and app developers and first e-mail invitations with the link to the survey from | 7 | 7 |

| | | | |
|---|---|---|---|
| | student e-mail account. | | |
| **Wednesday 20th of January** | Expanding the existing database from 549 contacts to 864 contacts | 19 | 26 |
| **Thursday 21th of January** | First e-mail invitations to new addresses from student e-mail account. | 14 | 40 |
| **Monday 25th of January** | First e-mail invitations with the link to the survey from private Google account. | 22 | 62 |
| **Wednesday 3nd of February** | First friendly reminder was sent to all contacts from the student e-mail account | 28 | 90 |
| **Tuesday 9th of February** | Database was expanded for a last time to 1364 contacts and a further friendly reminder was sent from private Google account. | 30 | 110 |

Table 4 - Process of Gathering Data

As a first step, the Apple App Store was scanned for potential participants for the online survey. As a result of this process, 549 contacts were added to the new created directory and invited via email. After one week, the response rate was relatively low. Therefore, I decided to expand the existing database for the first time from 549 contacts to 864. The 315 new contacts were found again on the Apple App Store by considering sub categories of the App Store. However, a low response rate is the typical downside of online surveys (Fricker & Schonlau, 2002). Additional reasons for the low response rate are limited human resources, privacy policy, or the fact that the participation has no direct added value for the app developers/ founders. The database was expanded for a last time after two weeks from 864 to 1364 contacts in order to reach at least 100 responses. In total, the survey was open for 38 days. Unfortunately, approximately 90 invitations to participate were returned as undeliverable. The reason for this could be that some app companies no longer exist. Out of the remaining invited participants, 108 completed the online survey. This is a response rate of 7.92%. Table 4 indicates how the response rate is made up.

| Type of Response | Responses | Response Rate |
|---|---|---|
| **Total responses** | 109 | 7,99% |
| **Complete responses** | 91 | 6,67% |
| **Incomplete responses** | 18 | 1,32% |
| **Incomplete but useful responses** | 17 | 1,25% |
| **Complete but unusable responses** | 0 | 0% |
| **Useful responses for data analysis** | 108/ 1364 | 7,92% |

Table 5 - Response Rates

### 3.3.2 Independent Sample Test

In order to check the representativeness of this sample, a group of early respondents was compared to a group of late respondents. Early respondents were defined as the first 50% of the survey participants, while the late respondents group were defined as the last 50%. An independent sample t-test was run on the data as well as 95% confidence intervals (CI) for the mean difference. The idea of the t-test is that, if there are no significant differences between the two groups, it is more likely that the sample is representative. Table 7 shows the outcome of the independent samples t-test.

| Independent Samples Test | | | | | | |
|---|---|---|---|---|---|---|
| Variable | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | |
| | | F | Sig. | t | df | Sig. (2-tailed) |
| Exogenous Market Factors | Equal variances assumed | .405 | .526 | -1.183 | 94 | .240 |
| | Equal variances not assumed | | | -1.183 | 93.080 | .240 |
| Endogenous Opportunity Factors | Equal variances assumed | 1.444 | .232 | -.555 | 96 | .580 |
| | Equal variances not assumed | | | -.553 | 93.831 | .581 |
| Entrepreneurial Team | Equal variances assumed | .875 | .352 | -.241 | 98 | .810 |
| | Equal variances not assumed | | | -.241 | 95.745 | .810 |
| Resources | Equal variances assumed | .022 | .882 | -2.729 | 98 | .008** |
| | Equal variances not assumed | | | -2.729 | 97.675 | .008** |
| Direct Revenue Models | Equal variances assumed | 5.673 | .019 | 2.161 | 106 | .033** |
| | Equal variances not assumed | | | 2.161 | 105.668 | .033** |
| Indirect Revenue Models | Equal variances assumed | .345 | .558 | .293 | 106 | .770 |
| | Equal variances not assumed | | | .293 | 105.534 | .770 |
| Notes: ** p< .05 | | | | | | |

**Table 6 - Independent Samples t-Test of Early and Late Respondents**

The independent sample t-test revealed statistically significant difference (p≤.05) between early and late respondents for Resources and Direct Revenue Models. It was found that the frequency of Resources was significantly lower for early respondents than for late respondents with a difference of -3.76 times (95% CI, -6.49473 to -1.02527). The outcome for Direct Revenue Models was significantly higher for early respondents than for late respondents with a difference of 0.2037 times (95% CI, 0.01683 to 0.39057). There are many reasons for that which also vary. For the remaining variables, the independent sample t-test revealed no statistically significant difference between early and late respondents.

### 3.3.3 Descriptive Statistics

The outcome of the first question of the survey is shown in figure 4. This type of figure (histogram) was chosen in order to illustrate the founding year of the participating companies. It shows that most of the companies (n=83) were founded between 2008 and 2015. This is due to the fact that the mobile application industry was originated in 2008. It can be assumed that the other companies (n=25), which were founded before 2008, are a kind of a software company or marketing agency that extended their product/ service portfolio. Furthermore, by the examination of these figures, it can be deduced that 60 companies have been established for more than four years, whereas the other 48 companies have been operating on the market for four years or less.

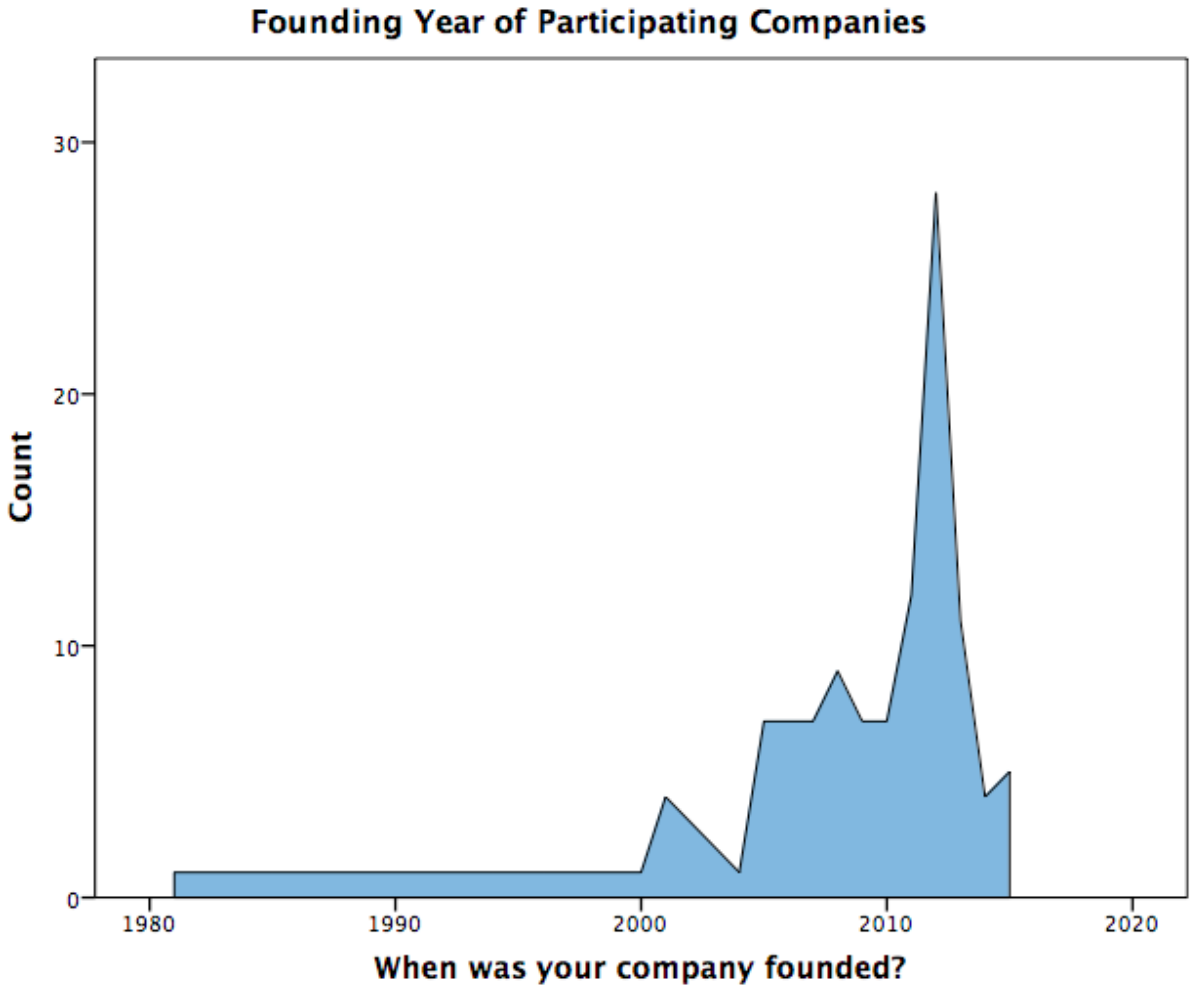


Figure 4 - Founding Year of Participating Companies

When evaluating the company details of the participating companies, the outcome seems to be surprising at first glance. Out of 108 participants, one company does not exist anymore. However, it must be noted that not only app founders/ app developers with apps still in the App Store were involved in the survey. Also freelancers and hobbyist developers took part in the questionnaire. In addition, not all mobile applications in the App Store have the aim of generating revenue. For example, apps in the category of Travel & Local are offered partially free of charge and can be seen as non-profit application. Frequently, cities have commissioned the development of mobile applications to draw attention of tourists to certain attractions. This would explain why 29.6% of survey participants have no financial success.

| Company Details | | | | | | | |
|---|---|---|---|---|---|---|---|
| Does your company still exist? | | | | Financial Success | | | |
| | | Frequency | Percent | | | Frequency | Percent |
| Valid | No | 1 | 0.9% | Valid | No | 32 | 29.6% |
| | Yes | 107 | 99.1% | | Yes | 76 | 70.4% |
| | Total | 108 | 100% | | Total | 108 | 100% |

Table 7 - Company Details

Figure 5 shows the outcome of the fourth question, which was about the app categories. About 30% of the participants are developing mobile applications for the Business or Games category. Education and Productivity have the third-, and forth-largest share with 12% and 11%. The remaining app categories of the participating companies/ app developers are Health & Fitness (10.2%), Photography (8.3%), Entertainment (4.6%), Lifestyle (3.7%), News & Magazines (2.8%), Social Networking (1.9%), Navigation (1.9%), Music (0.9%), Communication (0.9%), and Books & Reference (0.9%). The results were unsurprising due to the fact the category of Games has the largest share on the App Store (mentioned in chapter 1.1).

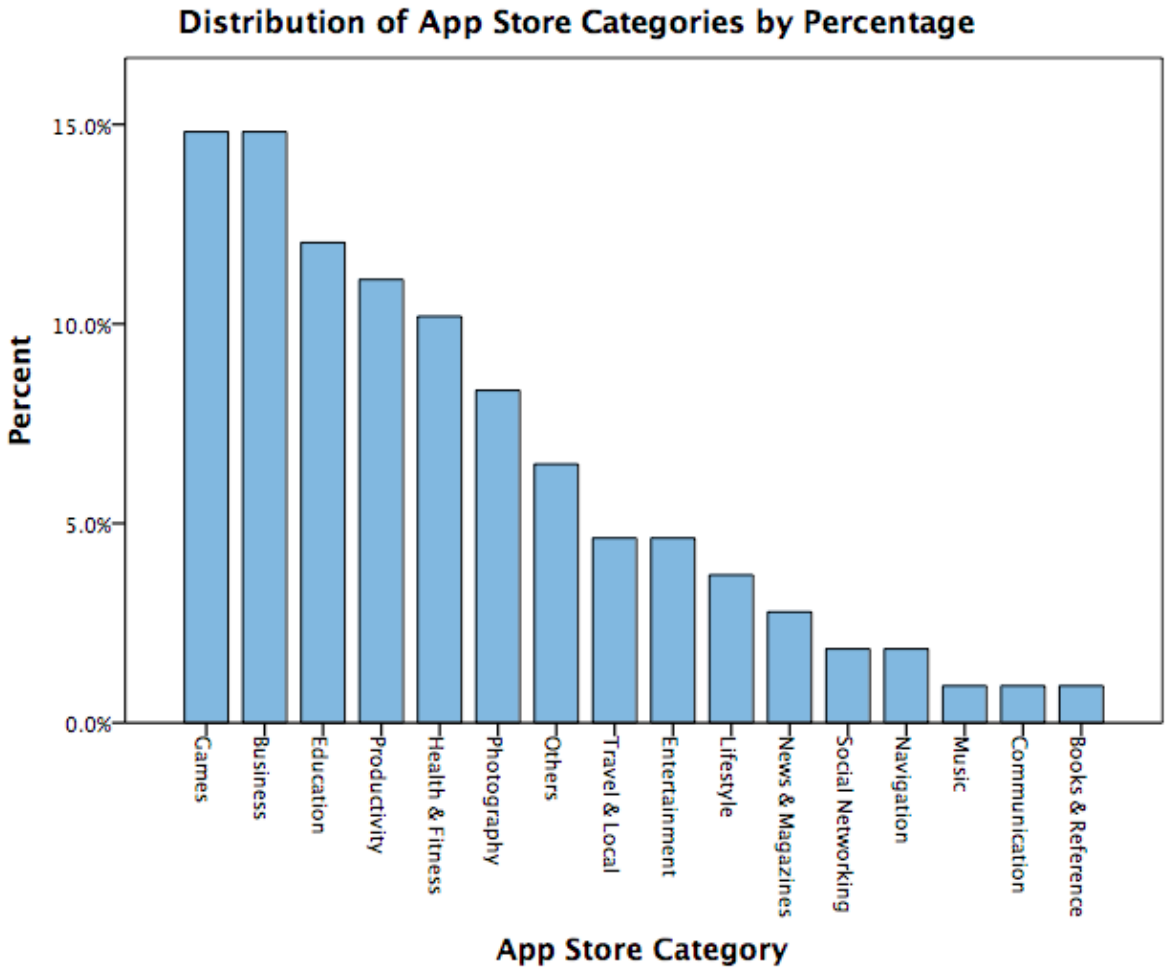


Figure 5 - Distribution of App Store Categories by Percentage

# 4. Results

This chapter contains the evaluation of the collected data and the analysis of the hypotheses, which in turn supports the argumentation for the main research question. The first paragraph (4.1) starts with a correlation analysis of the first four variables, including mean values and the standard deviation. This is complemented by the ANOVA test for the revenue models. The second part of this chapter deals with a regression analysis of all variables of the hypotheses. This section also covers first assumptions about the effect of the different variables regarding financial success. Furthermore, a moderating analysis was performed in order to test how different variables in combination affect financial success. The last paragraph shows an overview of all tested hypotheses in this study and summarises whether the hypotheses are accepted or rejected.

## 4.1 Correlation Analysis

A bivariate correlation analysis was conducted for all 24 meta-factors in order to evaluate the Pearson's coefficient. The correlation coefficient is a dimensionless measure of the degree of the relationship between at least two or more interval scaled variables. The typical value of Pearson's correlation coefficient lies between 1 and -1. At a value of +1, the relationship can be described as a completely positive linear relation. However, a value of -1 represents a negative linear relationship between the observed characteristics. There is a non-linear relationship or no relationship between the observed characteristics if the correlation coefficient has a value of 0 (Field, 2009). Moreover, a two-tailed test was chosen for the correlation analysis due to the reason that the nature of the relationship between the different variables cannot be predicted (Field, 2009).

The outcome of the bivariate correlation analysis was verified by analysing the Pearson's coefficient and the significance level of 0.01 and 0.05. The final result is summarized in table 8. In accordance with Field (2009), a correlation coefficient that is higher than 0.7 represents a strong relationship. With a correlation coefficient of 0.780 and a significance level of 0.01, Firm Type has the strongest positive correlation with Firm Size. This coefficient implies that a high rating of Firm Type is tantamount to a strong focus on Firm Size. Also Marketing Experience is positively correlated with Marketing Intensity with a moderate coefficient of 0.649 and a significance level of 0.01. This means that high Marketing Experience leads to high Marketing Intensity within a company. This makes sense, because high Marketing Experience allows founders and developers to pursue a strategy based on unique marketing efforts in a better way. The same applies to Industry Experience. The coefficient of Marketing Intensity and Industry Experience indicates a weak correlation of 0.318 and a significance value of 0.01. By analysing significant correlations between the Endogenous Opportunity category and the characteristics of the Entrepreneurial Team, R&D Investments and R&D Experience reveals a moderate correlation coefficient of 0.460 and a significance level of 0.01. This outcome indicates that the higher the rating for R&D Experience is; the more important R&D Investments become. There are also negative correlation coefficients, such as the coefficient for Industry Experience and Nongovernmental Financial Support. This relationship has a coefficient of -0.127, which means that the higher the rating for Industry Experience is, the less important Nongovernmental Financial Support is.

| Variable | N | Mean | Std. Deviation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Exogenous Market Factors** | | | | | | | | | | | | | | | | | | | | | | | | |
| Competition Intensity | 102 | 4.343 | 1.8800 | 1 | | | | | | | | | | | | | | | | | | | | |
| Environmental Dynamism | 100 | 3.650 | 1.9404 | .349** | 1 | | | | | | | | | | | | | | | | | | | |
| Environmental Heterogeneity | 97 | 2.959 | 1.7134 | .252* | .659** | 1 | | | | | | | | | | | | | | | | | | |
| Market Growth Rate | 104 | 4.519 | 1.7122 | .275** | .388** | .305** | 1 | | | | | | | | | | | | | | | | | |
| Market Scope | 103 | 4.680 | 1.6699 | .301** | .457** | .279** | .465** | 1 | | | | | | | | | | | | | | | | |
| **Endogenous Opportunity Factors** | | | | | | | | | | | | | | | | | | | | | | | | |
| Internationalization | 105 | 4.771 | 2.0440 | .247* | .291** | .162 | .271** | .221* | 1 | | | | | | | | | | | | | | | |
| Marketing Intensity | 102 | 4.314 | 1.8773 | .245* | .282** | .302** | .450** | .375** | .270** | 1 | | | | | | | | | | | | | | |
| Patent Protection | 103 | 2.126 | 1.7074 | .100 | .126 | .258* | .064 | .113 | .187 | .190 | 1 | | | | | | | | | | | | | |
| R&D Investments | 101 | 2.941 | 1.9278 | .043 | .135 | .064 | .117 | .231* | .173 | .193 | .408** | 1 | | | | | | | | | | | | |
| Supply Chain Integration | 102 | 2.216 | 1.7385 | .037 | .184 | .434** | .039 | .073 | .037 | .345** | .524** | .311** | 1 | | | | | | | | | | | |
| University Partnerships | 104 | 2.154 | 1.7941 | -.044 | .165 | .250* | -.106 | .014 | .147 | .030 | .561** | .315** | .490** | 1 | | | | | | | | | | |
| **Entrepreneurial Team** | | | | | | | | | | | | | | | | | | | | | | | | |
| Industry Experience | 105 | 4.619 | 1.9922 | .093 | .283** | .216* | .146 | .227* | -.008 | .318** | -.183 | .115 | .093 | -.059 | 1 | | | | | | | | | |
| Marketing Experience | 101 | 4.426 | 1.8833 | .139 | .365** | .279** | .333** | .251* | .112 | .649** | .161 | .325** | .296** | .005 | .463** | 1 | | | | | | | | | |
| Prior Start-Up Experience | 104 | 3.567 | 2.1622 | .101 | .287** | .267** | .120 | .275** | .122 | .236* | .161 | .293** | .178 | .235* | .243* | .410** | 1 | | | | | | | |
| R&D Experience | 103 | 4.262 | 2.0338 | .104 | .240* | .165 | .087 | .287** | .198* | .202* | .100 | .460** | .067 | .180 | .268** | .263** | .370** | 1 | | | | | | |
| Size of Founding Team | 102 | 3.245 | 1.8425 | .022 | .154 | .173 | .082 | .053 | .098 | .192 | .028 | -.098 | .086 | .204* | .296** | .173 | .019 | | | | | | | |
| **Resources** | | | | | | | | | | | | | | | | | | | | | | | | |
| Financial Resources | 105 | 4.305 | 1.9569 | .159 | .192 | .116 | .095 | .067 | .090 | .292** | .174 | .358** | .080 | .236* | .193* | .333** | .454** | .449** | 1 | | | | | |
| Firm Age | 102 | 2.451 | 1.6687 | .078 | .193 | .366** | .070 | .086 | .190 | .196* | .350** | .315** | .467** | .504** | .158 | .223* | .341** | .215* | .241* | 1 | | | | |
| Firm Size | 102 | 2.569 | 1.6320 | .159 | .112 | .284** | .081 | .140 | .152 | .193 | .179 | .276** | .441** | .248* | .149 | .179 | .276** | .216* | .108 | .668** | 1 | | | |
| Firm Type | 102 | 2.637 | 1.7280 | .118 | .170 | .334** | .114 | .115 | .147 | .231* | .126 | .253* | .395** | .257** | .232* | .218* | .216* | .241* | .148 | .624** | .780** | 1 | | |
| Nongovernmental Financial Support | 102 | 2.686 | 1.9999 | .007 | .138 | .110 | .073 | -.005 | .167 | .120 | .396** | .512** | .206* | .411** | -.127 | .158 | .228* | .096 | .410** | .209* | .146 | .056 | 1 | |
| R&D Alliances | 100 | 2.160 | 1.6801 | -.065 | .187 | .316** | .015 | .189 | .031 | .293** | .456** | .499** | .532** | .610** | .188 | .240* | .237* | .134 | .187 | .449** | .351** | .299** | .431** | 1 |

**Table 8 - Pearson Correlation Analysis**

The analysis of variance (ANOVA) has been applied for the Revenue Models in order to analyse whether there is a statistically significant difference between the group means and their associated procedures. The outcome of the ANOVA test is summarized in table 9 (F(94.6)= 28.500, p=.000). It can be noted that the significance level is 0.001 (p= .001), which is below 0.05 and, therefore, there is a statistically significant difference in the mean values of the four Revenue Models and the dependent variable financial success.

| Variable | Number of Items | Items | F | Sig. |
|---|---|---|---|---|
| **Revenue Model** | 4 | | 28.500 | .001 |
| | | Direct Revenue Model (n=61) | | |
| | | Indirect Revenue Model (n=13) | | |
| | | Combined Revenue Model (Direct + Indirect) (n= 29) | | |
| | | Others (n=5) | | |

Table 9 - ANOVA Revenue Model

## 4.2 Logistic Regression Analysis of the Meta-factors

After testing the internal consistency (3.2), the correlation of all included meta-factors (4.1), and the variance of the four groups for the Revenue Models, a logistic regression analysis has been applied as the next step. For the purpose of analysis, financial success was set as the dependent variable and the 22 meta-factors plus Revenue Models as the independent one. By analysing the coefficient beta, the following points should be considered about each variable of the hypotheses:

### 4.2.1 Exogenous Market Factors in relation to Financial Success

In the evaluation of the SPSS outcome of the first variable, the following conclusion can be applied: By analysing the beta coefficient of Market Growth Rate, the outcome reveals a beta coefficient of -0.434. This implies that Exp(B) is equal to 0.648. Thus, a unit increase in Market Growth Rate leads to a decline of 35.2% (0.648*100-100) in the odds of being financial successful. Thus, a high rate of the factor Market Growth Rate is associated with not being financial successful. The model explains 9.6% of the variance in financial success and shows with a significant F-ratio (.05) a relatively weak fit. When analysing the significance level, the result indicates that the Exogenous Market Factors variable has no significant impact on financial success. The justification of the latter is that the p-value is above the defined value of .05 (B= -.011; p>.05). Looking at the items individually, Market Growth Rate reveals a negative significant relationship with financial success (p<.05). The remaining items were not significant to the prediction of the odds of (not) being financial successful.

| Variable | Number of Items | Items | B | df | Sig. | Exp(B) | $R^2$ |
|---|---|---|---|---|---|---|---|
| **Exogenous Market Factors** | 5 | | **-.011** | **1** | **.754** | **.989** | **0.096** |
| | | Competition Intensity | .055 | 1 | .676 | 1.056 | |
| | | Environmental Dynamism | -.053 | 1 | .757 | .948 | |
| | | Environmental Heterogeneity | .185 | 1 | .324 | 1.203 | |
| | | Market Growth Rate | -.434 | 1 | .022** | .648 | |
| | | Market Scope | .204 | 1 | .268 | 1.226 | |
| **Notes: *** p < .01; ** p < .05; * p < .1** | | | | | | | |

Table 10 - Logistic Regression Analysis – Exogenous Market Factors

The next step was to control the different items for the different App Store categories. Due to the fact that the number of observations is less than or equal to the number of the model parameters, Productivity was the only App Store category which fulfilled the requirements for the conduction of a logistics regression analysis. When analysing the significance level, the result indicates that none of these items has a significant impact on financial success (see table 11). The justification of the latter is that the p-value is considerably above the defined value of .05.

| App Store Category | Items | B | df | Sig. | Exp(B) |
|---|---|---|---|---|---|
| **Productivity** | | -0,127 | 1 | 1 | 0,881 |
| | Competition Intensity | 16.642 | 1 | 1 | 16887653.74 |
| | Environmental Dynamism | 10.32 | 1 | 1 | 30319.473 |
| | Environmental Heterogeneity | 7.533 | 1 | .999 | 1868.592 |
| | Market Growth Rate | -19.615 | 1 | .999 | 0 |
| | Market Scope | 2.413 | 1 | 1 | 11.165 |
| **Notes: *** p < .01; ** p < .05; * p < .1** | | | | | |

**Table 11 - Exogenous Market Factors controlled on basis of App Store Category**

### 4.2.2 Endogenous Opportunity Factors in relation to Financial Success

Table 11 shows the outcome of the logistic regression analysis for the variable Endogenous Opportunity Factors. The beta coefficient for this variable is -.057. This implies that Exp(B) is equal to .945. Thus, a unit increase in Opportunity leads to a decline of 5.5% (.945*100-100) in the odds of being financially successful. However, the significance level indicates that Endogenous Opportunity Factors have no significant impact on financial success. The justification of the latter is that the p-value is above the defined value of .05 (B= -.057; p>.05). The model explains 7% of the variance in financial success and shows with a significant F-ratio (.05) a relatively weak fit

The outcome for each individual item in relation to financial success did not change the outcome. All six items were not significant to the prediction of the odds of being financially successful or not.

| Variable | Number of Items | Items | B | df | Sig. | Exp(B) | $R^2$ |
|---|---|---|---|---|---|---|---|
| **Endogenous Opportunity Factors** | 6 | | -.011 | 1 | .754 | . 989 | 0.07 |
| | | Internationalization | .028 | 1 | .814 | 1.028 | |
| | | Marketing Intensity | -.157 | 1 | .273 | .855 | |
| | | Patent Protection | .116 | 1 | .380 | 1.180 | |
| | | R&D Investments | -.167 | 1 | .199 | .847 | |
| | | Supply Chain Integration | .237 | 1 | .193 | 1.268 | |
| | | University Partnerships | -.077 | 1 | .635 | .926 | |

**Notes: *** p < .01; ** p < .05; * p < .1**

Table 12 - Logistic Regression Analysis – Endogenous Opportunity Factors

As already stated in the previous section, most of the App Store categories revealed that the number of observations is less than or equal to the number of the model parameters. This is why Education and Photography are the only two categories which fulfilled the requirements for the conduction of a logistics regression analysis. When analysing the significance level, the result indicates that none of these items has a significant impact on financial success (see table 13). The justification of the latter is that the p-value is considerably above the defined value of .05.

| App Store Category | Items | B | df | Sig. | Exp(B) |
|---|---|---|---|---|---|
| **Education** | | -2,018 | 1 | 0,999 | 0,133 |
| | Internationalization | 5,827 | 1 | 0,997 | 339,374 |
| | Marketing Intensity | 76,405 | 1 | 0,994 | 1,52111E+33 |
| | Patent Protection | -1,494 | 1 | 0,999 | 0,225 |
| | R&D Investments | -214,759 | 1 | 0,993 | 0 |
| | Supply Chain Integration | 118,213 | 1 | 0,994 | 2,18E+51 |

| | | | | | |
|---|---|---|---|---|---|
| | University Partnerships | -0,495 | 1 | 1 | 0,61 |
| **Photography** | | -2,023 | 1 | 0,458 | 0,132 |
| | Internationalization | 0,308 | 1 | 0,736 | 1,36 |
| | Marketing Intensity | -1,309 | 1 | 0,679 | 0,27 |
| | Patent Protection | 14,512 | 1 | 1 | 2006275,85 |
| | R&D Investments | 0,297 | 1 | 0,732 | 1,346 |
| | Supply Chain Integration | 8,026 | 1 | 1 | 3059,787 |
| | University Partnerships | -19,438 | 1 | 1 | 0 |
| **Notes: *** p < .01; ** p < .05; * p < .1** | | | | | |

**Table 13 - Endogenous Opportunity Factors controlled on basis of App Store Category**

### 4.2.3 Entrepreneurial Team in relation to Financial Success

The evaluation of the regression analysis for the Entrepreneurial Team variable results in the following outcome: The significance level of the logistic regression analysis indicates that the variable Entrepreneurial Team has no significant impact on financial success (see table 12). The justification of the latter is that the p-value is above the defined value of .05 (B= .036; p>.05). The model explains 1.2% of the variance in financial success and shows with a significant F-ratio (.05) a generally weak fit. The consideration of each item individually did not change the outcome. All four items were not significant to the prediction of the odds of being financially successful or not.

| Variable | Number of Items | Items | B | df | Sig. | Exp(B) | $R^2$ |
|---|---|---|---|---|---|---|---|
| **Entrepreneurial Team** | 4 | | .036 | 1 | .355 | 1.036 | .012 |
| | | Industry Experience | .135 | 1 | .300 | 1.144 | |
| | | Marketing Experience | -.017 | 1 | .905 | .983 | |
| | | Prior Start-Up Experience | .009 | 1 | .938 | 1.009 | |
| | | R&D Experience | .015 | 1 | .899 | 1.015 | |

**Notes: *** p < .01; ** p < .05; * p < .1**

Table 14 - Logistic Regression Analysis - Entrepreneurial Team

Table 15 shows the outcome of the logistic regression analysis for the variable Entrepreneurial Team on basis of the App Store category. When analysing the significance level, the result indicates that none of these items has a significant impact on financial success. The justification of the latter is that the p-value is considerably above the defined value of .05.

| App Store Category | Items | B | df | Sig. | Exp(B) |
|---|---|---|---|---|---|
| **Business** | | **-5.268** | **1** | **.999** | **.005** |
| | Industry Experience | -30.266 | 1 | .995 | 0 |
| | Marketing Experience | 7.558 | 1 | .997 | 1916,608 |
| | Prior Start-Up Experience | -8.443 | 1 | .997 | 0 |
| | R&D Experience | -55.851 | 1 | .995 | 0 |
| **Education** | | **-19.7** | **1** | **.995** | **0** |
| | Industry Experience | -1.168 | 1 | .304 | .311 |
| | Marketing Experience | 1.495 | 1 | .168 | 4.458 |
| | Prior Start-Up Experience | -0.476 | 1 | .36 | 0.621 |
| | R&D Experience | -0.184 | 1 | .807 | 0.832 |
| **Games** | | **8.262** | **1** | **.995** | **3874.24** |

| | | | | | |
|---|---|---|---|---|---|
| | Industry Experience | 13.543 | 1 | .998 | 761467.618 |
| | Marketing Experience | -2.984 | 1 | 1 | .051 |
| | Prior Start-Up Experience | 5.367 | 1 | .999 | 214.204 |
| | R&D Experience | -11.39 | 1 | .998 | 0 |
| **Photography** | | **.482** | **1** | **.554** | **1.619** |
| | Industry Experience | .052 | 1 | .919 | 1.053 |
| | Marketing Experience | -.346 | 1 | .759 | 0.707 |
| | Prior Start-Up Experience | .219 | 1 | .835 | 1.245 |
| | R&D Experience | -.308 | 1 | .49 | 0.735 |
| **Notes: *** p < .01; ** p < .05; * p < .1** | | | | | |

**Table 15 – Entrepreneurial Team Factors controlled on basis of App Store Category**

### 4.2.4 Resources in relation to Financial Success

In table 13, the results of the logistic regression analysis on the Resources variable are shown. The beta coefficient of Resources is -.002, this implies that Exp(B) is equal to .998. When analysing the significance level, the result indicates that Resources has no significant impact on financial success (B= -.011; p>.05). The model explains 18% of the variance in financial success and shows with a significant F-ratio (.05) an overall good fit.

The examination of each individual item in relation to financial success contains the following information: The coefficient of Nongovernmental Financial Support is -0.310, this implies that Exp(B) is equal to 0.733. Thus, a unit increase in Nongovernmental Financial Support leads to a decline of 26.7% (0.733*100-100) in the odds of being financially successful. Thus, a high rate of the factor Nongovernmental Financial Support is associated with not being financially successful. Looking at the significance level, Nongovernmental Financial Support reveals a negative relationship with financial success that is almost significant (p<.05). The remaining items were not significant to the prediction of the odds of being financially successful or not being successful.

| Variable | Number of Items | Items | B | df | Sig. | Exp(B) | $R^2$ |
|---|---|---|---|---|---|---|---|
| **Resources** | 6 | | -.013 | 1 | .675 | .987 | .164 |
| | | Financial Resources | -.189 | 1 | .158 | .828 | |
| | | Firm Age | -.199 | 1 | .433 | .819 | |
| | | Firm Size | .482 | 1 | .133 | 1.620 | |
| | | Firm Type | -.064 | 1 | .766 | .938 | |
| | | Nongovernmental Financial Support | -.271 | 1 | .051* | .762 | |
| | | R&D Alliances | .180 | 1 | .301 | 1.198 | |

**Notes: *** p < .01; ** p < .05; * p < .1**

Table 16 - Logistics Regression Analysis – Resources

Table 17 shows the outcome of the logistic regression analysis for the variable Resources on basis of the App Store category. When analysing the significance level, the result indicates that none of these items has a significant impact on financial success.

| App Store Category | Items | B | df | Sig. | Exp(B) |
|---|---|---|---|---|---|
| **Business** | | **-1.129** | **1** | **1** | **.323** |
| | Financial Resources | -12.891 | 1 | .998 | 0 |
| | Firm Age | -8.75 | 1 | 1 | 0 |
| | Firm Size | 13.648 | 1 | 1 | 846113.876 |
| | Firm Type | -23.227 | 1 | 1 | 0 |
| | Nongovernmental Financial Support | -20.223 | 1 | .997 | 0 |
| | R&D Alliances | 20.768 | 1 | .998 | 1045821121 |
| **Education** | | **24.072** | **1** | **.995** | **28460269788** |
| | Financial Resources | -.543 | 1 | .436 | .581 |
| | Firm Age | 80.621 | 1 | .989 | 1.03105E+35 |

| | | | | | |
|---|---|---|---|---|---|
| | Firm Size | 666.86 | 1 | .988 | 4.11E+289 |
| | Firm Type | -544.131 | 1 | .988 | 0 |
| | Nongovernmental Financial Support | -284.67 | 1 | .988 | 0 |
| | R&D Alliances | 64.74 | 1 | .988 | 1,30689E+28 |
| **Games** | | **20.977** | **1** | **.993** | **1288203326** |
| | Financial Resources | 17.657 | 1 | .998 | 46617938,91 |
| | Firm Age | 26.417 | 1 | .999 | 2,97134E+11 |
| | Firm Size | 1.637 | 1 | 1 | 5.138 |
| | Firm Type | -25.199 | 1 | .999 | 0 |
| | Nongovernmental Financial Support | -5.871 | 1 | .999 | .003 |
| | R&D Alliances | -4.293 | 1 | 1 | .014 |
| **Photography** | | **2.222** | **1** | **.384** | **9.221** |
| | Financial Resources | 0 | 1 | 1 | 1 |
| | Firm Age | -2.551 | 1 | 1 | 0.078 |
| | Firm Size | 5.859 | 1 | 1 | 350.393 |
| | Firm Type | -3.782 | 1 | 1 | .023 |
| | Nongovernmental Financial Support | 24.848 | 1 | .998 | 61847583408 |
| | R&D Alliances | -10.177 | 1 | .999 | 0 |
| **Productivity** | | **-.593** | **1** | **1** | **.553** |
| | Financial Resources | 35.179 | 1 | .997 | 1.89768E+15 |
| | Firm Age | -54.554 | 1 | .998 | 0 |
| | Firm Size | 4.944 | 1 | 1 | 140.265 |
| | Firm Type | 86.235 | 1 | .998 | 2.83E+37 |
| | Nongovernmental Financial Support | -35.725 | 1 | .997 | 0 |
| | R&D Alliances | -67.773 | 1 | .999 | 0 |

**Notes: *** p < .01; ** p < .05; * p < .1**

**Table 17 – Resource Factors controlled on basis of App Store Category**

### 4.2.5 Revenue Models in relation to Financial Success

In table 14, a regression analysis is performed on the Revenue Models. The first order variable Revenue Models is divided into four second order variables: Direct Revenue Models, Indirect Revenue Models, Combined Revenue Models, Others. The outcome reveals the following assumption based on the beta coefficient and the significance level.

The coefficient of Direct Revenue Models, as shown in table 14, is 1.034, implies that Exp(B) is equal to 2.812. Thus, the choice of Direct Revenue Models leads to an increase of 181.2% (2.812*100-100) in the odds of being financially successful. Therefore the Direct Revenue Models are associated with being financially successful.

Furthermore, it will be assessed how Combined and Other Revenue Models relate to financial success. Combined Revenue Models contain direct revenue models linked to indirect Revenue Models. The most common combination is free apps linked to In-App Purchases. The coefficient of Combined Revenue Models is 0.799, which implies that Exp(B) is equal to 2.222. Thus, the choice of Combined Revenue Models leads to an increase of 122.2% (2.222*100-100) in the odds of being financially successful. Therefore the Combined Revenue Models are associated with being financially successful.

| Revenue Model | B | df | Sig. | Exp (B) |
|---|---|---|---|---|
| Direct Revenue Models | 1.034 | 1 | .000*** | 2.812 |
| Indirect Revenue Models | .154 | 1 | .782 | 1.167 |
| Combined Revenue Models (Direct + Indirect) | .799 | 1 | .047** | 2.222 |
| Others | 1.386 | 1 | .215 | 4.000 |

Table 18 - Logistic Regression Analysis of Revenue Models

The result of the logistic regression analysis shows a significant impact for Direct Revenue Models (B= 1.034; p<.01) and Combined Revenue Models (B= .799; p<.05) on a start-ups financial success. This result confirms the hypotheses H4a. The significance level of the Indirect Revenue Models and Others shows a p-value above 0.05. Therefore, it is not significant to the prediction of the odds of being financially successful.

An logistic regression analysis controlled on basis the App Store category was not possible for Revenue Models, due to the fact that the number of observations is less than or equal to the number of the model parameters.

## 4.4 Moderator Analysis

A moderator analysis examines whether a moderator M influences the relationship between an independent variable X and a dependent variables Y. When analysing the outcome of the correlation analysis, it can be determined that 78 out of 164 relationships show a significant correlation coefficient. Most of these relationships include items from the Entrepreneurial Team variable. Furthermore, as Mario and De Noble (1997) already said, the characteristics of the management team, such as Industry Experience or Prior Start-Up Experience, influence the ability to anticipate threats and opportunities and make an adequate decision.

For this project, it would be interesting, for example, to determine whether the relationships between Exogenous Market Factors, Endogenous Opportunity Factors, Resources and the dependent variable are influenced by the characteristics of the Entrepreneurial Team. In addition, the moderator analysis examines the impact of the Entrepreneurial Team variable on Revenue Models in general.

The coefficient of Revenue Models multiplied by Entrepreneurial Team (RMET), as shown in table 15, is 0.036, which implies that Exp(B) is equal to 1.037. Thus, a unit increase in RMET leads to an increase of 3.7% (1.037*100-100) in the odds of being financially successful. Thus, a high rate of the factor RMET is associated with being financially successful.

| Variable x Moderator | B | df | Sig. | Exp (B) | $R^2$ |
|---|---|---|---|---|---|
| Exogenous Market Factors x Entrepreneurial Team (EMET) | .000 | 1 | .928 | 1.000 | .001 |
| Endogenous Opportunity Factors x Entrepreneurial Team (OET) | .000 | 1 | .911 | 1.000 | .001 |
| Resources x Entrepreneurial Team (RET) | .000 | 1 | .945 | 1.000 | .001 |
| Revenue Models x Entrepreneurial Team (RMET) | .036 | 1 | .021** | 1.037 | .084 |

**Table 19 - Logistic Regression Analysis with Suggested Moderator**

The results of the logistic regression analysis, with Entrepreneurial Team as the moderator, indicate a significant impact for Revenue Models (B= .036; p<.05) on a start-ups' financial success.

## 4.5 Hypotheses Overview

The table below (table 7) gives an overview of all tested hypotheses in this study and summarises whether the hypotheses are accepted or rejected.

| Hypothesis | Description | Accepted/ Rejected |
|---|---|---|
| **H1a** | *Exogenous Market Factors (Competition Intensity; Environmental Dynamism; Environmental Heterogeneity; Market Growth Rate; Market Scope;) positively influence a start-up's financial success within the mobile application industry.* | Rejected |
| **H1b** | *Endogenous Opportunity Factors (Internationalization; Marketing Intensity; Patent Protection; R&D Investment; Supply Chain Integration; University Partnerships) positively influence a start-up's financial success within the mobile application industry.* | Rejected |
| **H2** | *The characteristics of the entrepreneurial team (Industry Experience; Marketing Experience; Prior Start-Up Experience; R&D Experience) positively influence a start-up's financial success within the mobile application industry.* | Rejected |
| **H3** | *Resources (Financial Resources; Firm Age; Firm Size; Firm Type; Nongovernmental Financial Support; R&D Alliances) positively influence a start-up's financial success within the mobile application industry.* | Rejected |
| **H4a** | *The choice of Direct Revenue Models (Paid Apps; Paywalls; Freemium; In-App Purchases) positively influences a start-up's financial success within the mobile application industry.* | Accepted |
| **H4b** | *The choice of Indirect Revenue Models (Free, But with Ads; Sponsorship) instead of Direct Revenue Models negatively influences a start-up's financial success within the mobile application industry.* | Rejected |

**Table 20 - Overview of Accepted and Rejected Hypotheses**

# 5. Discussion and Conclusion

The last chapter of this thesis includes the interpretation of the outcome of the empirical study regarding the theoretical and practical implication. Moreover, the conclusion outlines which consequences can be drawn with regard to new venture creation within the mobile application industry. Finally, limitations and further research will be explained in paragraph 5.3.

## 5.1 Conclusion

This thesis examined potential success factors for new venture creation within the mobile application industry. The six hypotheses are based on existing literature. On the one hand, it was assumed that Exogenous Market Factors, Endogenous Opportunity Factors, Entrepreneurial Team, Resources and Direct Revenue Models have a positive relationship with the start-up`s financial success. On the other hand, Indirect Revenue Models are associated with not being financially successful. In order to verify these relationships, an online survey was performed with 108 app developers and app founders. After testing the reliability and the validity of the collected data, a logistic regression analysis and a moderator analysis were conducted with the various variables. The results of the present study are summarized in figure 6 and 7.

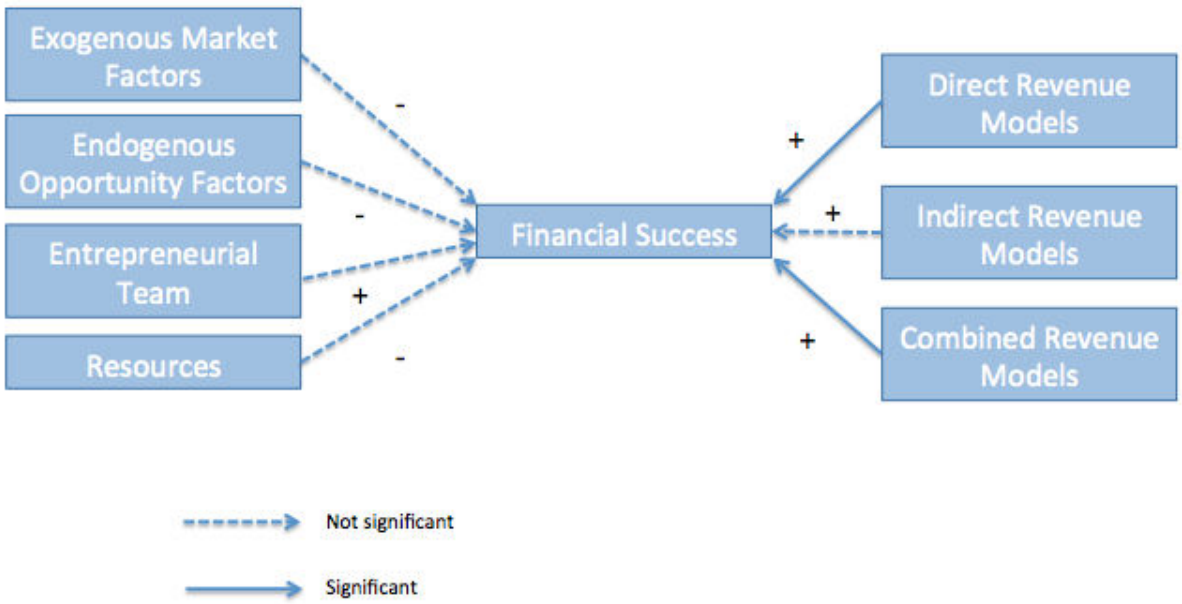


Figure 6 - Summary of Success Factors for New App Ventures

The outcome of the logistics regression analyses indicates that the first four variables (Exogenous Market Factors, Endogenous Opportunity Factors, Entrepreneurial Team, Resources) indicate no significant impact on the dependent variable and therefore hypotheses H1a-H4 have been rejected (table 16). Only the results for Direct Revenue Models and Combined Revenue Models show a significant effect on financial success. This outcome confirms the hypothesis 4a, which assumed that Direct Revenue Models positively influence a start-up's financial success within the mobile application industry. Also the outcome of the moderator analysis shows an interesting effect (figure 7). The following sections discuss the main findings of this research as well as which significance the results of

such an analysis has in terms of the formulated hypotheses. Based on these findings, the central research question can be answered: *What are the factors that influence the financial success of start-up companies within the mobile application industry?*

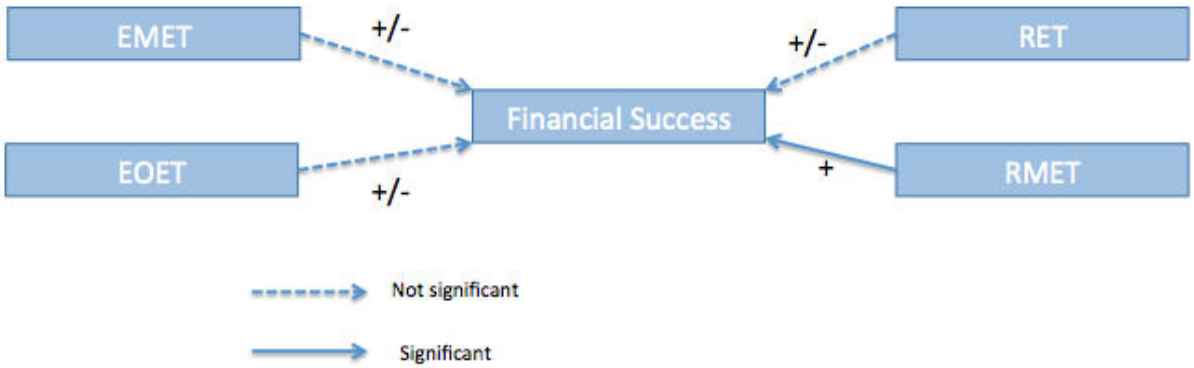


Figure 7 - Summary of Moderated Success Factors for New App Ventures

### 5.1.1 Exogenous Market Factors in relation to Financial Success

At the beginning of this research, and based on the existing literature, it was assumed that Exogenous Market Factors positively influences a start-up's financial success. The result of the logistic regression analysis shows that Exogenous Market Factors have a negative but non-significant effect on financial success. Thus, the respondents did not confirm the assumption regarding the positive relationship between Exogenous Market Factors and financial success. One of the reasons for the non-significant outcome could be the type of dependent variable, which was used in this research. In this study, organizational performance is only measured by financial success. This kind of dependent variable is one of the most commonly used measures that have been applied in other studies about organizational performance. However, it appears that financial success might not be appropriate as a performance indicator for new venture creation within the mobile application industry. Moreover, the use of a dichotomous dependent variable does not allow that much space for the interpretation. Either the company is financially successful and able to meet the obligations or not.

By looking at the results for each item individually, it can be noted that Market Growth Rate has a negative and significant impact on financial success. In effect, this means that a high Market Growth Rate within the mobile application industry restricts the largesse of the environment and the copiousness of opportunities for app ventures. Furthermore, Market Growth Rate has also a direct impact on Competition Intensity. This in turn can also be destructive to financial success and lead to further threats for new ventures as well as for established companies (Porter, 2008). Moreover, it can be expected that companies within the mobile application industry try to increase their market share by taking it away from competitors. The chance to regain market share after it has been lost is much smaller than the other way around.

### 5.1.2 Endogenous Opportunity Factors in relation to Financial Success

Next, it was hypothesized that Endogenous Opportunity Factors has a positive impact on financial success. Figure 6 indicates that Endogenous Opportunity Factors have a negative

but non-significant effect on financial success. Thus, the app developers and app founders did not support the assumption regarding the positive relationship between Opportunity and financial success. Also the elimination of Low-Cost Strategy and Product Innovation, in order to improve the internal consistency, is comprehensible. It seems highly questionable, for example, to describe Low-Cost Strategy as an important success factor for new venture creation within the mobile application industry. Low-Cost Strategy means the use of a cost advantage in terms of preferential access to certain raw materials, proprietary technology, or economies of scale/ scope. This kind of cost advantage is not accurate for app ventures. As an app developer or app founder, you do not need any raw materials or proprietary technologies to develop or launch a new mobile application on the App Store. The only thing you need is a computer/ laptop, knowledge about programming language and money for the store fee. Also Product Innovation does not appear as a success factor for the mobile application industry. In many industries, Product Innovation is tantamount to the venture's success. The reason why Product Innovation seems to be unimportant for new ventures within the mobile application industry is that app developers and app founders do not create a product which is completely new. In many cases, new mobile applications are based on existing apps in the app store. Usually, only minor modifications with respect to the revenue model or some new features are implemented. That is why decoding cannot be described as an innovation.

### 5.1.3 Entrepreneurial Team in relation to Financial Success

In order to test the relationship between the characteristics of the Entrepreneurial Team and a start-up's financial success, Industry Experience, Marketing Experience, Prior Start-Up Experience and R&D Experience were summarized as one variable. It was assumed that the characteristics of the management team have a positive impact on the organizational performance and are therefore also possible success factors for the mobile application industry. The reason why a positive impact on financial success was assumed is based on the fact that experience enables to draw the right conclusions from failure and generate a kind of a lead in knowledge. This especially applies in the mobile application industry, where competition intensity is very high. Management experience can help, for example, to overcome turbulent market conditions. The outcome of the logistic regression analysis shows that Entrepreneurial Team has a positive but not significant impact on a start-up's financial success. On the one hand, this result seems to be a bit surprising, since all experience values are useful for future activities. On the other hand, the non-significant effect confirms the first assumption that the mobile application industry is kind of a lottery. The insignificance of founders' experience could be a reason why so many new app developers and app founders enter the mobile application industry without any prior experience in this area.

### 5.1.4 Resources in relation to Financial Success

The evaluation of Resources in relation to financial success demonstrated a negative but non-significant outcome. Thus, the assumption that Resources positively influence a start-up's financial success can be rejected. This result means that due to the low entry barriers within the mobile application industry, different types of Resources are not of great importance in order to be successful.

When analysing each item individually, it can be determined that the outcome for Nongovernmental Financial Support is almost significant (p<.1) and has a counterintuitive direction. In other words, those app developers or app founders who received support perform worse. This is perhaps not that surprising, since these might be the kind of app for which there is no viable business model. By looking at the results of the firm characteristics (Firm Age, Firm Size, Firm Type), it becomes apparent that financial performance is not related to the age, size and type of the venture. A new venture that consists of only one employee can achieve the same success as a company consisting of 20 employees. A good example of this is the success story of the mobile game Flappy Bird. On further inspection, Financial Resources show a negative but non-significant effect on financial success. This result may be surprising, but it is, however, only a further proof that low entry barriers enable new ventures an easy entry into the mobile application industry.

### 5.1.5 Revenue Models in relation to Financial Success

Based on the existing literature, the approach of monetization was divided into two different groups: Direct Revenue Models and Indirect Revenue Models (Borghuis, 2009). It was assumed that Direct Revenue Models positively influence financial success while Indirect Revenue Models negatively influence a start-up's financial success within the mobile application industry. The reason for this assumption was the dependency on users' click behaviour. Whereas Paid Apps, Paywalls, Freemium, and In-App Purchases require a payment in order to get access to the app content, Indirect Revenue Models, such as Free, But with Ads and Sponsorship, really depend on the users' click behaviour. The outcome shows that Direct Revenue Models have a positive and significant effect on financial success. Indirect Revenue Models have a negative but non-significant effect on a start-up's financial success. On the one hand, the positive effect can be explained by users preference of Freemium apps and In-App Purchases (Salz, 2014). On the other hand, as the name suggests, app founders/ app developers generate revenue per download, or per In-App transaction. In addition, many users feel disturbed by ad banners and only in a few cases, app users will use the ad banners. Especially, free mobile applications try to generate revenue only through the placement of as much advertising as possible.

The analysis of different kinds of Direct Revenue Models for mobile applications shows that app founders and app developers only depend on their direct sales instead of the click behaviour of their users. Overall, it seems as if users prefer Freemium or In-App Purchases for mobile applications, because they always have the possibility to upgrade the app or buy some additional features after testing the product for a certain period of time (Munir, 2014). This, in turn, led to the suggestion that Direct Revenue Models provide a higher probability of achieving financial success. By looking at the results of Combined Revenue Models and Others, it can be noted that Combined Revenue Models have a positive and significant impact on financial success. In effect, this means that the implementation of both, Direct and Indirect Revenue Models, can be also a good possibility for mobile applications in order to be successful.

## 5.2 Discussion of Key Findings

By means of this research new findings were obtained about new venture creation in the mobile application industry. This research has empirically shown that the mobile application industry is kind of a lottery. The sole factor significantly affecting the start-up's financial

success in a positive way is the approach of monetization. Direct and Combined (Direct + Indirect) Revenue Models positively influence a start-up's financial success within the mobile application industry. The assumption that the Exogenous Market Factors positively influence financial success of new ventures cannot be accepted by implementing a logistic regression analysis. Also the analysis of the Endogenous Opportunity Factors factor did not proof the supposed impact on financial success. Furthermore, it is quite astonishing that the characteristics of the Entrepreneurial Team have no positive significance for new ventures' success. It is precisely because so many start-up companies fail during the early-stage development, Industry Experience and Prior Start-Up Experience seems to be urgently necessary for new app founders or app developers. As already mentioned in the first chapter of this thesis, entry barriers for the mobile application industry are very low. Therefore the outcome for Resources can be seen as comprehensible. After performing the regression analysis, the relationship between different types of Resources and start-ups' financial success can be stated as non-significant.

A far more interesting outcome reveals the logistic regression analysis of the different revenue models. The outcome shows that the choice of Direct Revenue Models positively influences a start-up's financial success within the mobile application industry. Also Combined Revenue Models indicate a positive and significant result in relation to financial success. Generally, it is recognised that classical payments achieve faster cash flow. However, this is only possible if the app is suitable for mass, and if enough users pay money for the mobile applications. The aim should be to keep the users active and engaged in the app. A good approach to reach this goal is the use of In-App Purchases. There is especially large potential for a combination of IAP and free apps but with ads (Salz, 2014). The integration of advertisement allows the app founder to generate revenue on a long-term and regular basis. But which model is the best and which is the safest? This question cannot be answered in general. It really depends on the app category as well as the scope of the application. In order to maintain the user base and generate further income, additional features to expand the mobile application need to be provided by the app developer at regular intervals.

By investigating Entrepreneurial Team as a moderator, this research has shown that different types of experience have no impact on the relationship between Market, Opportunity, and Resources and financial success. The assumption that the experience of the management team can help to deal with Exogenous Market Factors, Endogenous Opportunity Factors, or Resources cannot be proven. Entrepreneurial Team only positively influences the relationship between revenue models and financial success. This means that app developers or app founders, who already worked in this industry or have already gathered experience in the area of marketing and R&D, are more likely to make the right choice regarding the revenue models. In summary, it can be noted that the mixture and synergistic effects of both types of revenue models (direct and indirect) lead to a continuous cash flow. This may lead to the most monetization potential compared to classic payment in the long term. However, marketing activities should already be performed in the run-up to the publication of the app. This will increase the level of awareness and therefore make it more likely that the new mobile application will be successful.

In a nutshell, the mobile application industry can be described as an overflowing market. The number of new apps and mobile application developers is steadily rising and everyone tries

to get a piece of the cake. But who profits the most within the mobile application industry? The legend tells us that you only need a good business idea/ app idea in order to earn 'big money'. However, the reality is quite different. Only a handful of app developers are able to make big money with mobile applications. More than half of app developers worldwide (51,3%) do not even earn $500 per app per month (Pappas & Voskoglou, 2014). Within this group, there are many people who develop apps as a hobby or in order to earn a little extra income. In view of low revenues, it is usually not possible to maintain the development of an app. Therefore it is increasingly common that especially these firms do not put apps on the market to obtain a return, but to advertise their other products or services. Based on the collected data and the findings of this research, it can be confirmed that the app industry is kind of a lottery. Through the implementation of this research, it can be established that only the choice of revenue models influences a start-up's financial success within the mobile application industry. The variables Exogenous Market Factors, Endogenous Opportunity Factors, Entrepreneurial Team, and Resources cannot be described as success factors for the mobile application industry general or for certain App Store categories. It seems that most of the meta-factors by Song et al. (2008) are applicable for manufacturing companies rather than for developing software companies.

## 5.3 Scientific Implications

The paper provides several implications for theory and practice. These findings contribute to the mobile application industry in different ways, and specifically to the theory of new venture creation.

The first contribution refers to the paper of Song et al (2008). The paper categorizes the 24 meta-factors into 3 different groups: Market and Opportunity, Entrepreneurial Team, and Resources. However, a closer look reveals that in some cases, the allocation of the meta-factors is arbitrary. For example, they define Product Innovation as an opportunity, while R&D Investments or Patent Protection is considered as a resource. This is why some categorisations are not always entirely comprehensible. Therefore, a realignment of the existing allocation has been conducted for this research. The development of the new variables reveals good internal consistency by using Cronbach's Alpha. Furthermore, many of the 24 meta-factors are more appropriate for a producing industry than for a company which develops mobile applications. One example is the fact that no raw materials are needed to create a new mobile application. Therefore, the meta-factor Low-Cost Strategy, as already explained above, is not appropriate for this industry. The same can be said about the factor Product Innovation: In most cases, new mobile applications are based on already existing mobile applications. This leads to the conclusion that Product Innovation is not applicable to the mobile application industry neither. Rather, it should be considered that the choice of different Revenue Models is even more important than any of the 22 meta-factors. The approach of monetisation will not only determine the way to generate revenue. Instead, it is more a tactical instrument to attract potential customers to buy the mobile application. It can also be noted that Direct Revenue Models, such as In-App Purchases or Paywalls, generate comfortable profits in a continual flow and are more likely to push start-ups' financial success. This outcome is in line with the listing of advantages of Direct Revenue Models by Munir (2014) and Salz (2014).

In addition, the logistic regression analysis of the characteristics of the Entrepreneurial Team revealed that experienced founders or app developers are not more likely to reach financial success than inexperienced founders and developers. Therefore, the statement of McGee et al. (1995) does not apply to the mobile application industry. The outcome of this thesis is more in line with the outcome of Marino and De Noble (1997), who stated that the different forms of management experience are poor predictors of subsequent success in companies. A further factor that must be put into question is Financial Success. According to Lee et al. (2001), new ventures with inadequate financial resources face critical disadvantages during their early-stage development. However, as the mobile application industry does not require a high amount of money to start a business, besides the annual store fee of 99$, Financial Resources is of less relevance regarding the achievement of financial success. Overall, as already stated by West and Noel (2009), app founders and app developers need different types of resources in order to run their business, but it is much more important to have an innovative business idea to be successful.

Another contribution of this paper to the theory is that it can be stated that financial success is not appropriate for start-up companies in order to measure organizational performance during the early-stage development. What is appropriate, however, is the use of operational performance measures, such as sales/ download rate, the process, or technology development (Combs et al., 2005). Furthermore, many of the mobile applications on the App Store pursue the goal to attain brand awareness and brand recognition. This is why many of them can be seen as a "non-profit application". These kinds of mobile applications create indirect revenues derived from providing goods or services to the customers and users.

## 5.4 Practical Implications

The outcome of this research makes a significant contribution to practice and those people who are interested in creating a new venture. First, it was observed that success factors for new technology ventures are different to the mobile application industry. One of the most important aspects for app developers and app founders is to make a well-considered decision regarding the approach of monetization. In this, it is on the one hand important to analyse the app market of the respective country. On the other hand, the app category should also be included in the decision-making process. Thus, app developers and app founders are able to gather important information regarding the selection of the most appropriate Revenue Model for their app.

Moreover, the examination of various meta-factors shows that the mobile application industry is a kind of lottery. Therefore, it is important to have a good business idea, which can be implemented into a mobile application. Hence, analysing and evaluating your business idea are essential steps to assess the business opportunity and therefore the chance to succeed with your company. The more you know, the better your venture creation will work.

All in all, the outcome of this research provides a contribution to the existing literature concerning new venture creation within the mobile application industry. Furthermore, it is intended that this thesis will inspire other scholars to perform a closer examination of new venture creation within the mobile application industry and its associated success factors based on these findings.

## 5.5 Limitations and Further Research

As with all research projects, this study has several limitations. One limitation is regarding the survey data. The outcome of this study is based on data from surviving businesses and app developers because it is quite difficult to reach data from founders who failed with their business idea or mobile application. It should also be born in mind that the founding year of the companies was not taken into consideration regarding the selection of the survey participants. This means that it may be possible that some companies are not in the start-up phase anymore, but rather simply not successful due to the fact that they are not able to generate enough revenue to meet obligations. This could explain why the conventional success factors do not actually work for this study.

Furthermore, the sample size is quite small, however, it was difficult to convince more app founders and app developers to participate in the questionnaire. The reason lies in the fact that most of the app ventures usually consist of a small number of employees. Only big software companies would be able to deal with that, but due to privacy policy, they are not allowed to participate in the study and provide information about their company. In addition, as already mentioned in the methodology part, the sample solely includes app founders and app developers who are listed in the Apple App store as well as app developers from German app developer directory. This may mean that the sample has some bias, which in turn could affect the validity of this study.

A second limitation of this study is the choice of the meta-factors. The variables of this study only include the management aspect and do not consider any technical aspect. For example, the loading time plays a major role for app users. Almost 70 percent of the users reject apps which take more than 6 seconds to load (Kroker, 2015).

Furthermore, the definition of organizational performance is only related to financial success. The assumption for this research project was that the first goal of a new venture should be to meet the obligations and survive the early-stage development. A more suitable indicator would be operational performance, which can be used, for example, to measure companies' innovation level. Moreover, the choice of a dependent dichotomous variable attenuates the reliability of the outcome of this work. The implementation of a control variable as well as a dependent categorical variable with a subdivision into different revenue ranges would seem to be more reliable with regard to success factors for start-up companies within the mobile application industry. In addition, a longitudinal design might make sense to find out whether companies' financial success changes over time.

Finally, it is fair to conclude that further research is needed to prove the findings of this study. The next logical step would be to perform a qualitative research in order to gain a deeper understanding of the interplay of the different factors. An investigation, in the form of qualitative research (e.g. interviews), can validate the outcome regarding the two failure factors (Market Growth Rate and Nongovernmental Financial Support) as well as the reliability of the positive relationship between Direct and Combined Revenue Models and financial success. In addition, it is advisable for further research to focus only on a specific app category. This advice is based on the assumption that, for example, apps of the education category pay higher attention to University Partnerships than apps of the Lifestyle category. Also the difference in terms of revenue models should be taken into account. Many app developers and app founders of the Game category prefer the implementation of

In-App Purchases and Paid Apps whereas app developers and app founders of Fitness and Health apps favour Freemium and Sponsorship. This thesis has already made a start by comparing App Store categories. Unfortunately, due to the small sample size, the outcome reveals no significant outcome. This is why further research is mandatory.

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# Appendix

## Appendix 1 - Letter for online survey

**- - - - - - German version below - - - - - -**

Dear Sir or Madam,

My name is Fabian Dälken and I am a Master student of Business Administration at the University of Twente in Enschede (Netherlands). Currently, I'm working on my Master thesis which deals with "***Success and Failure factors for Start-Ups within the Mobile Application Industry***". In order to finalize my work, I need your help! Would you please help me by filling out this survey for my Master thesis? Of course, the participation is completely anonymous and confidential and takes no longer than 3 minutes.

P.S.: In case that you have developed several mobile applications, please correspond only to one App in the survey.

**Survey:**
https://docs.google.com/forms/d/1HsS3tOkR6fgaJQhg2psaA5JRUULBDWxCbRTsJZKAN84/viewform?usp=send_form

Many thanks in advance.

Best wishes,

Fabian Dälken

**- - - - - - German version - - - - - -**

Sehr geehrte Damen und Herren,

mein Name ist Fabian Dälken und Ich studiere Business Administration an der Universität Twente in Enschede (Niederlande). Aktuell arbeite ich an meiner Masterarbeit, welche sich mit Faktoren beschäftigt, die über Erfolg und Misserfolg in einem Start-Up in der App-Industrie entscheiden. Um meine Arbeit abschließen zu können, brauche ich Ihre Hilfe! Ich wäre Ihnen sehr dankbar, wenn Sie sich kurz Zeit nehmen würden und an der Umfrage teilnehmen. Die Teilnahme ist komplett anonym und dauert nicht länger als 3 Minuten. Die Ergebnisse der Umfrage werden streng vertraulich behandelt.

P.S.: Für den Fall, dass Sie mehrere Apps auf dem Markt haben, beziehen Sie sich bitte in der Umfrage nur auf eine App.

**Umfrage:**
https://docs.google.com/forms/d/1HsS3tOkR6fgaJQhg2psaA5JRUULBDWxCbRTsJZKAN84/viewform?usp=send_form

Vielen Dank im Voraus!

Mit freundlichen Grüßen,

Fabian Dälken

## Appendix 2 – Online survey

# Master Thesis - Survey

Examination of Success and Failure Factors for Start-Up Companies within the Mobile Application Industry

**When was your company founded?**

-The indication of the year is sufficient-

**Does your company still exist?**

- [ ] Yes
- [ ] No

**If your company still exists, are you financially independent?**

Financial independence is defined as follows: Generate enough revenue in order to meet obligations

- ◯ Yes
- ◯ No

**Which App store category does your mobile application belong to?**

- ◯ Games
- ◯ Business
- ◯ Social Networking
- ◯ Education
- ◯ Lifestyle
- ◯ Entertainment
- ◯ Books & Reference
- ◯ Health & Fitness
- ◯ News & Magazines
- ◯ Photography
- ◯ Productivity
- ◯ Shopping
- ◯ Travel & Local
- ◯ Navigation
- ◯ Communication
- ◯ Other:

**Which of the following factors were crucial to the success of your start-up creation/ app development?**

1= Unimportant; 7= Important

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Competition Intensity | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Environmental Dynamism | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Environmental Heterogeneity | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Internationalization | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Low-Cost Strategy | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Market Growth Rate | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Market Scope | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Marketing Intensity | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Product Innovation | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Industry Experience | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Marketing Experience | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Prior Start-Up Experience | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| R&D Experience | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Financial Resources | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Firm Age | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Firm Size | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Firm Type | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Nongovernmental Financial Support | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Patent Protection | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| R&D Alliances | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| R&D Investment | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Size of Founding Team | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Supply Chain Integration | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| University Partnerships | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**Which Revenue Model do you use for your App?**

-You can choose a combination of different Revenue Models-

- [ ] Free, But With Ads (In-App Advertising)
- [ ] Freemium (Gated Features)
- [ ] Paid Apps (Cost Money to Download)
- [ ] In-App Purchases (Selling Physical/Virtual Goods)
- [ ] Paywalls (Subscriptions)
- [ ] Sponsorship (Incentivized Advertising)
- [ ] Other: