Project Study

A Holistic Perspective on the Planning, Implementation, and Analysis of a Smartphone/Computer Application

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API:	Application Programming Interface
App:	Application for Computer or Smartphone
B2B:	Business-to-Business (Relationship)
B2C:	Business-to-Customer (Relationship)
DB:	Deutsche Bahn
EU:	European Union
IAP:	In-App Purchase
IRR:	Internal Rate of Return
JS:	JavaScript (Scripting Language)
MEAN:	Mongo-Express-Angular-Node
PCI:	Payment Card Industry
PDF:	Portable Document Format
PHP:	Hypertext Preprocessor (Scripting Language)
SDK:	Software Development Kit
TC:	Train Claim
VAT	Value Added Tax
VAT-ID	Value Added Tax Identification Number

I.III Symbols

N/A:	Not available / not applicable

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1. Introduction

1.1 Goal of the Study

During our studies the general idea of starting and owning a business became a constant thought on our minds. The idea of simply working on projects that did not serve the purpose of generating profit for others, but for ourselves was one of the most influencing points when it came to the motivation for this paper.

We intend to show and document our journey to the establishment of an application deemed to be used on smartphones or computers. We decided to use this special market due to the special qualities it depicts in general and specific to us. The application market is full of innovations that show rapid user growth whilst using little capital to fuel this growth. The sometimes extreme value creation can be seen on examples like *Instagram* and *WhatsApp*[1]. As already mentioned not only the general small use of capital and potential high yield did lure us into this field, but also the one of the authors history and experience with programming namely of websites and smartphone application. To further the understanding of markets, gain experience and increase personal profits, the idea was born to apply the task of studying and implementing a computer/smartphone based application´s launch within a project study. The main goal of this study is not only the documentation of processes like market research, feasibility studies but also the use of different tools to implement and program a successful application that serves profitable purpose.

2. Initial Idea Train Claim

2.1 Concept

Applications on Smartphones and Computers can serve various purposes, some serve as time-killers like small smartphone games and others depict the solution to either complex or time consuming tasks that annoy the user. Whilst gaming applications majorly earn their profit with one time sales or in the case of smartphones advertising, service applications

[1] (The Economic Times, 2014)

usually use either a licensing fee (in the case of computers), a pay-per-task structure or a one-time sale like gaming applications.

In this case, the idea was to create a tool that simplifies the process of getting a refund for a late running train. Usually, this process is either rather complex or takes time, time that is often not available, especially concerning the time consuming delay experienced in the first place. The idea behind TC is the connection of the nowadays almost self-evident use of internet-connected smartphones and highly user unfriendly process offered by the Companies providing travel by train. The major basis for this approach is the European legislation[2] passed in 2007 that ensured passengers´ rights, more precisely guaranteed every individual experiencing a delay of more than 60 (120) minutes a refund of 25% (50%) of their initial ticket price. This legislation applies all over the European Union and is enforced by their member states. The German *DB* provides a standardized form, the passengers´ rights form[3], that depicts the baseline for the idea.

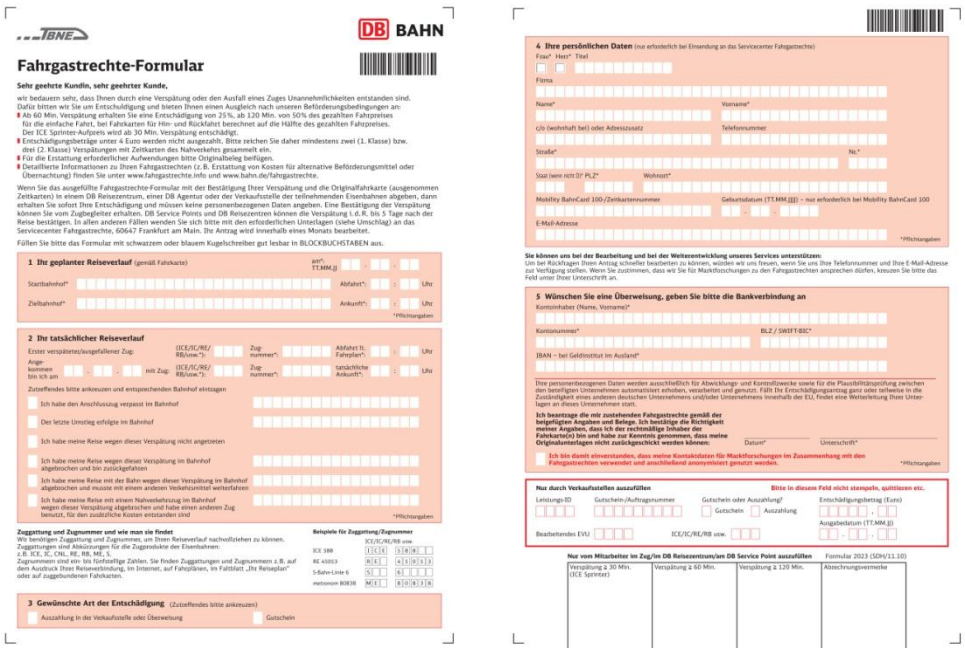


Fig. 1:Passengers´rights form (*DB*)

The user enters his specific data concerning his persona and individual delay situation via smartphone, uses the touchscreen to sign the document and then sends the whole document to the *DB* using the TC application on his smartphone. The function of the app is to create

[2] (European Parliament, 2008)
[3] (Deutsche Bahn AG, 2013c)

the individual PDF file with a smartphone, providing an individual signature using the touchscreen technology, taking a photo of the affected ticket that serves as the copy of ticket demanded by *DB* as well as sending the whole document to the *DB* in the appropriate fashion. However, not only the technical part has to be assessed, other factors including the market situation, feasibility of the project, and other risks like legal problems also play a big role.

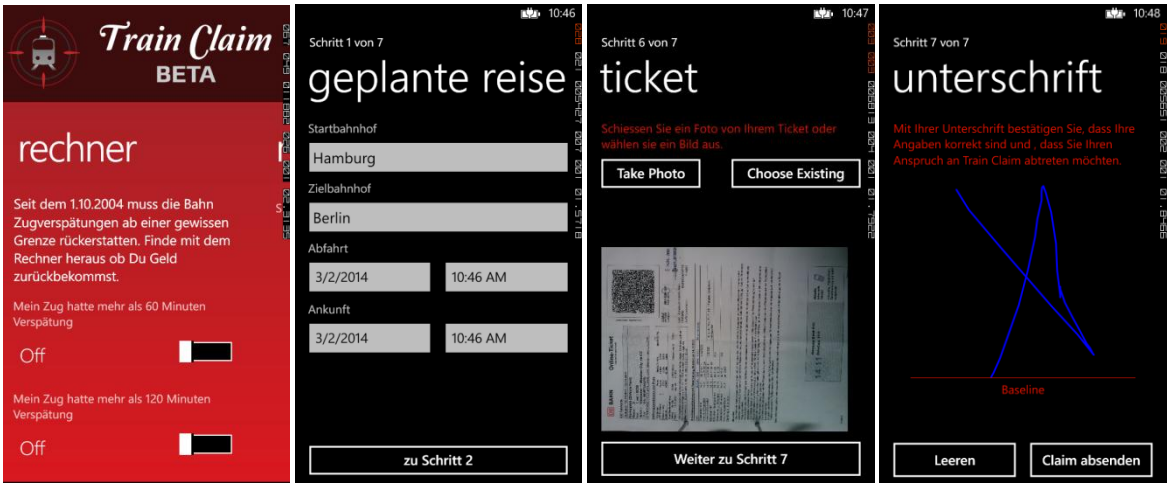


Fig 2: Screenshots of the Windows Phone Application TC

2.2 Market

With regards to the EU Directive every country had to introduce policies to ensure the passengers´ rights on a domestic level. TC aims to place a service on the market that ensures comfort and easy accessibility whilst demanding restitution for shortcomings by train companies. That being said, a major decision for the further development of the TC idea will be the choice of one (Germany) or even more markets that should be targeted. To facilitate a better understanding of the different countries or to be more precise their respective companies dominating the railway system have been assessed and researched for strategic fit.

Country	Approximate Market Size	Competition	Technical Obstacles	Opportune Market
Belgium	Small	Strong	None	No
Bulgaria	Small	None	Cyrillic Language	No
Germany	Large	None	possibly	Yes
Finnland	Medium	Strong	None	No
France	Large	None	Possibly	Maybe
Italy	Medium	Strong	None	No
Netherlands	Small	None	Original Ticket	No
Austria	Medium	None	Original Ticket	No
Sweden	Medium	Strong	None	No
Slovakia	Small	None	Original Ticket	No
Slovenia	Small	None	Original Ticket	No
Spain	Medium	Strong	None	No
Czech Republic	Small	None	Orignial Ticket	No
Hungary	Small	None	Original Ticket	No
United Kingdom	Too Many Different Actors on the Market Prohibit a Feasible Approach			No
Denmark	Small	n/a	n/a	No
Estonia	Small	n/a	n/a	No
Greece	Small	n/a	n/a	No
Ireland	Small	n/a	n/a	No
Latvia	Small	n/a	n/a	No
Luxembourg	Small	n/a	n/a	No
Poland	Small/Medium	n/a	n/a	No
Portugal	Small	n/a	n/a	No
Romania	Small	n/a	n/a	No
Cyprus	No Railway	n/a	n/a	No
Malta	No Railway	n/a	n/a	No

Fig. 3: Overview of European Train Markets

From the findings portrayed in Appendix I, different crucial obstacles or reasons have been identified that severely suggest not including those markets into further research concerning

a possible market entry. These reasons are best divided into two categories: either, the market is too small and the efforts to adapt the application would exceed the rational use, or the policies used by the respective railway travel provider simply make a technical implementation of the idea impossible. Sometimes there are other obstacles like an already very user friendly possibility to apply for a refund, that would equate to a very strong competition. Many of the European markets are filtered out as shown in Figure 3 and do not make economic sense. The only market left, the original market Germany and its neighbor state France both pose a similar potential, however the French market is dismissed as it is very time consuming to get an insight into the legal complications of this market for a Munich based team.

2.2.1 Competitors

The main competitors to TC as an app are the websites that do offer collection services such as refund.me and flightright.de. However they do not really compete in exactly the same branch as they focus on flight delays whilst TC only services in the railway branch of Germany. Refund.me however does offer a service for trains, but this service differs in its nature from the service provided by TC as the business model of the website is collecting receivables from refunds as mentioned above while TC offers an easy way and a small fee to help the user claim his own refund.

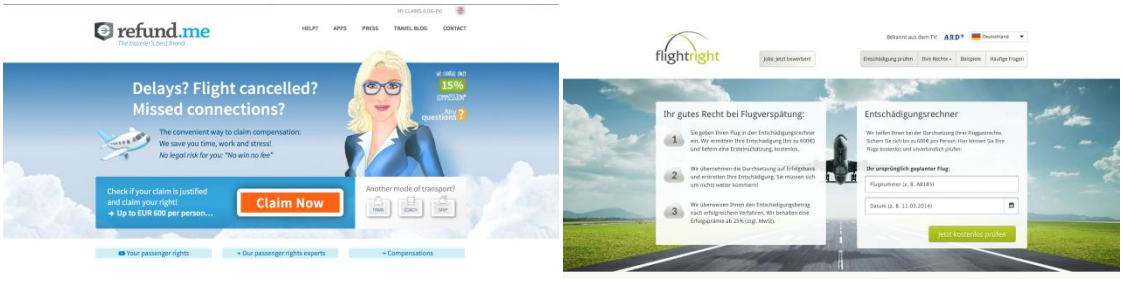


Fig. 4: Screenshots of TC´s Competitors Web Presence[4][5]

The websites do not emphasize or even offer their railway services as the monetary sums that can be collected are almost always too little to make a non-automated process worthy of offering, a point where TC´s automated smartphone process stands unique. Competition is also present in the form of the traditional ways offered by the *DB* to claim a refund: Going to a *DB* Service Center or sending the passengers´ rights form with an included

[4] (Flightright, 2009)
[5] (Refund.me, 2013)

photocopy to the *DB*. However it is difficult to set them into comparison with TC as they are essentially for free and also are exactly the points TC aims to improve.

2.2.2 Target Group

Every product tries to specify a certain group of people that it wants to address; this is not different in the case of TC. In TC´s case the major target group are the people that frequently travel by train, and in many cases are severely dissatisfied with the customer service offered by *DB*. The app aims to pool its customers from travelers that are reliant on their daily, weekly and sometimes monthly railway routes. Disgruntled customers that miss important meetings or other events are the major focus of the app. Another group that should be mentioned is the young generation that is increasingly fond of integrating technical gadgets like apps and websites into their daily lives and task.

2.2.3 Unique Selling Proposition

Another question to be answered in the context of an application is the general issue of why somebody should use the product. With TC this answer is the same as to why it was originally created: It makes the process of gaining a refund faster and less complicated. Since the user only needs a smartphone and is able to claim his refund even while he is still aboard the train, the application has a big advantage and attraction to everybody sitting on a delayed train with only limited time. Simplicity and Time are the major selling points of the service.

2.2.4 Forecasts & Potential

Nevertheless, the German market still needs to be assessed closely, especially concerning its precise market size and legal requirements. To get an estimate of the market potential for an application like TC it is important to identify the customer. In the Case of TC the customer is practically every person that experiences a delay of more than 60 minutes while travelling with the long distance lines from *DB*. Fortunately the railway sector is closely scrutinized under the public eye and a lot of data is available. The two most important sources used in the calculation of the potential market are the Website *Zugmonitor*[6] that provides historical and real-time data on trains and their positioning as well as their delays combined with the official statements from *DB*[7].

[6] (Süddeutsche Zeitung, 2013b)
[7] (Deutsche Bahn AG, 2013b)

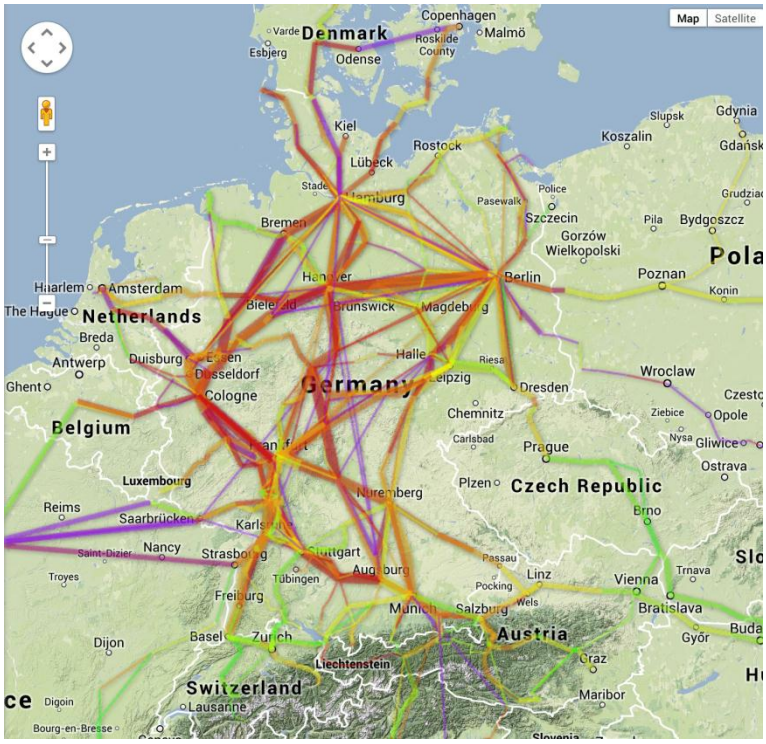


Fig. 5: Map of delayed Train Connections in Germany[8]

As shown in Appendix II.I, the values obtained from the *Zugmonitor*[9] were used to calculate a respective share of 60 minute and 120 minute delays that were actually caused by *DB*. Those values were then adjusted (Appendix II.II) as the passenger numbers in the official statements from *DB* differ from the passenger numbers given in the *Zugmonitor* document. Given the total number of passengers of 113mn people in 2012 and the total number of Trains obtained from the adjusting the *Zugmonitor* document, the average number of passengers per train can be calculated as depicted in Appendix II.III. With this number it is possible to generate the approximate number of passengers experiencing a 60 minute or even a 120 minute delay for the year 2012. Of course these values have been calculated in Appendix I.IV and are 3,882,640 (60 minute delay) and 509,394 (120 minute delay). This sums up to a total potential pool of TC customers numbering 4,392,034.

In conjunction with the discovered values, a survey has been executed, both online and in the field, to obtain a better picture on individual's stance towards using a smartphone application to apply for a refund. Of course this survey has been conducted in German,

[8] (Süddeutsche Zeitung, 2013a)
[9] (Rein, 2013)

especially the field part that has been performed at the Munich central train station. The survey does include a total of 92 opinions on 18 multiple choice questions, ranging from yes and no answers to accurate amounts of Euros for calculation purposes. Although the survey did give a lot of soft information on how the idea is perceived by the public, the part that is important in terms of potential market size are the answers given about whether or not people would use the service as documented in Appendix III.I Question 16. However, to make full use of the data available, to provide a quota that is valid, answers only qualify if they came from a person who suffered either a +60 minute or a +120 minute delay. Obtained and shown in Appendixes IV.I and IV.I. These values give an estimate on which percentage of people having the right to make a claim would actually use the application and are therefore potential customers. Nevertheless Appendix IV.III shows that there is a definitive amount of inaccuracy, as when compared to the real conversion rate that can be obtained in Appendix V.I[10] the observed conversion rate in Appendix IV.III is too high. This is crucial, concerning the fact that all estimates should be used with high caution and leads to the introduction of an adjustment rate within the calculations. This adjustment factor is a simple factor and has been obtained by the computations in Appendix V.II. Using and applying the beforehand derived adjustment factor to the respective quotas calculated in Appendixes IV.I & IV.I. The adjusted quotas are now multiplied with the total number of passengers and now give an amount of 1,875,612 potential users (1,646,701 for +60 min delays and 228,911 for +120 min delays). This number now can be used to deduct a monetary assumption for the yearly market potential by using the average price obtained from the survey (Appendix V.V) as a multiplier (Appendix V.VI). Altogether the market for TC lies at 3,023,375 €, a quite substantial sum.

[10] (Spiegel Online, 2013)

Fig. 6: Reasons for Train Delays in Germany[11]

Nevertheless, the whole market will not be harvested, definitively not if the Application is to generate profit to its creators. As this is one of the major goals in this process, a valid pricing strategy needs to be evaluated. The fact that there is no real competition in the market (the only competition would be to make the claim traditionally which does not cost any money) places TC in a monopoly situation that helps estimating an optimum pricing for the application.

To optimize the pricing strategy, the survey will be used to deduct a price-sales function as conducted in Appendixes VI.I and VI.II. Another function, the cost function is

[11] (Süddeutsche Zeitung, 2013a)

deducted by using the cost structure that one claim causes as shown in Appendix VI.III[12]. Since there are no real fixed costs, only variable costs are considered. With the creation of a revenue function by multiplying the price-sales function as introduced in Appendix VI.II with x, the basis for the optimum price is set. Now, both functions are differentiated to create the marginal cost and marginal revenue functions which are both equated to get the optimum number of sales (Appendix VI.IV), and therefore the optimal price of 2.09 € (selling to 27.47% of the people, even if they have not yet experienced a delay). Now, this percentage is applied to the earlier calculated amount of passengers who would be willing and eligible to make a claim. Appendix VII.I, V.II &V.III show how the total monetary sales volume amounts to 1,076,832 € whereas the profits only amount to 120,048 €, deriving a profit margin of 11.15 %.

2.3 Legal & Feasability

The case of TC poses a great deal of legal issues as the practical implication of a successful introduction to the market will be a considerable loss of money for the railway operator, the *DB*. Clearly, there is no law against making an effort to improve the user/customer situation in the railway business; however laws do provide frameworks which have to be considered when assessing the feasibility of such project. With the concept of TC three major aspects have to be evaluated in terms of making a claim with the *DB*. Firstly, the validity of a touchscreen signature on the passengers´ rights form. Secondly, the validity of the photograph taken with the smartphone that serves as a copy of the ticket for the delayed train. Last, but not least, the way these documents are sent to the *DB*. To begin with the more obvious issues, the second and the third do not pose big problems when it comes to realization. The photograph of the ticket has to be accepted since copies of the tickets cannot be distinguished from photographs in a sensible way; scanned documents are indeed just photographs with a scanner. Concerning the way those documents are to be sent to the *DB*, the postal way has to be used. Talks with the railway passengers´ organziation in Germany, ProBahn have yielded that there used to be the possibility of faxing the documents, however recent changes in the terms and conditions of *DB* rendered this impossible and therefore only leave the more costly, postal way. However, the first mentioned problem, the validity of the touchscreen signature is probably the largest legal

[12] (Smskaufen.com, 2013a)

issue, since a signature created on an electronic device does not count as a signature according to §126[13] BGB[14].

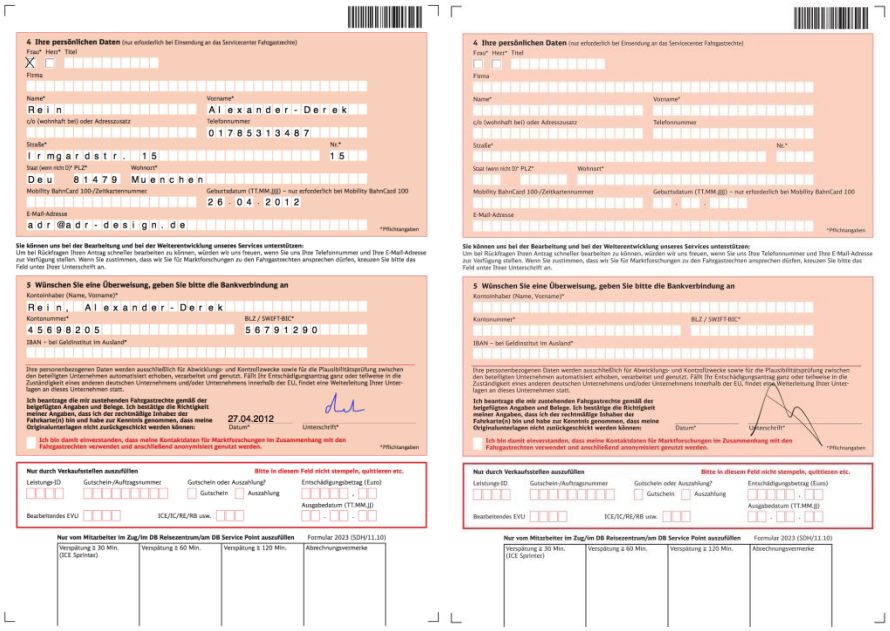


Fig 7: Real Signature vs. Smartphone Signature

This means that there are no means to force *DB* to actually accept a touchscreen signature, the corporation can simply change its terms and conditions stating that a touchscreen signature is not eligible and therefore render the whole endeavor useless.

2.4 Summary

The analysis of the market environment and the legal situation have both produced interesting insights about how the venture TC could succeed and fail in its purpose to serve people and generate profit. Although there is a seemingly substantial profit of 120,048 € to be generated from the idea, the cost of each claim is significantly larger than the profit derived from it. Although this is often found in businesses all over the world, in TC´s case, this is a crucial aspect. The severe problem becomes apparent when the cost/profit structure is set in relation to the legal problem that arises from the touchscreen signature. As stated above, there is a likely possibility that the *DB* will change their terms and conditions thus rendering each claim made by TC not eligible. This would result in a problematic situation where TC cannot fulfill the service it promised to provide, however at the same time TC would be liable to the third parties providing the postal and printing services as well as the

[13] (*Zivilrecht Wirtschaftsrecht*, 2013)p.57
[14] (Oberlandesgericht München, 2012)

respective app stores that enable the purchase. This causes an immense risk to TC as the app would be very reliant on external factors such as the policies of the *DB*. This would be manageable if the cost structure would leave enough profit per claim to cover the fees and expenses caused by each claim; however with the available pricing and cost opportunities, this risk stays substantial.

TC does indeed have a market, and furthermore technical feasible approach. Nevertheless, the huge threats associated when entering a venture that is highly related to only one large company and additionally causes negative financial effects to said company, make the enterprise very dangerous and unsafe. Moreover the legal situation that does not give a clear edge to either party in this faceoff creates a highly unsafe and unstable business environment that does not favor the implementation and launch of TC.

2.5 Lessons learned

The idea of TC and the analysis that followed it did disclose some weaknesses that led to some lessons that were learned and applied to the next idea:

- The more complex the service, the higher the chance of legal problems
- Cost structure matters big time
- High risk requires high return

However, these lessons as stated above did give some insight on what aspects a new venture should look at and additionally sparked a new idea in the project team that did consider those aspects.

3. Planning Mils

The analysis of the TC idea did frustrate a lot, nevertheless the lessons and experiences associated with it sparked a new, better idea. Mils, an application based service that provides a user friendly possibility to send traditional “material” mail from the comfort of a laptop or tablet.

3.1 Concept

Users can simply download the application to their device and upload a previously created word document or PDF File to the server and sent it for a small fee as a traditional letter. Using a worldwide network of distribution partners Mils does not only avoid the walk to

the post office, but also the conventionally high fees for international priority mail as it is able to print out the document in the recipients´ country (or a country close to it) and use the local postal services for delivery. In contrast to TC, there are competitors that are being assessed more closely in the market analysis. However, dissimilar to TC the legal situation is rather unspectacular and unproblematic giving the venture a clear advantage over the crucial legal issues of TC.

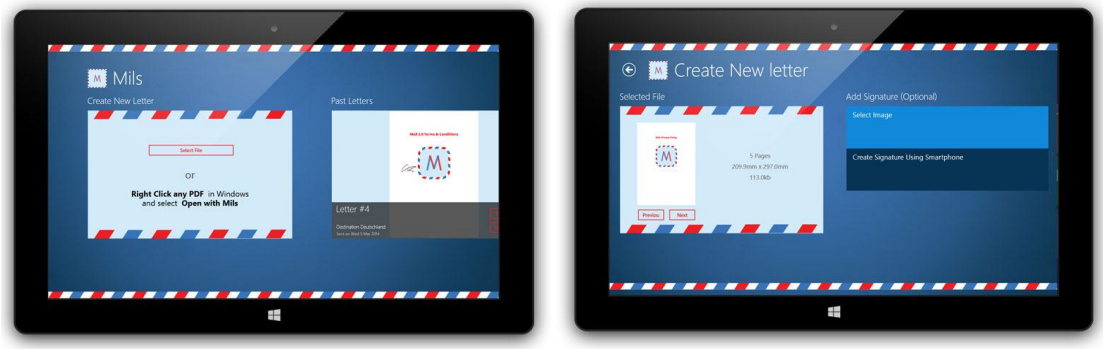


Fig. 8: Screenshots of Windows 8.1. App Mils

3.2 Market

Mils tackles a market that has lost its huge significance with the invention of the Internet and its respective mailing service, the E-Mail. However, sending letters is still part of the everyday lives of everybody and is rather uncomfortable compared to the email. To get a grip on how Mils is received by the public, analog to the TC case a survey has been implemented to get information about how many letters are send and how people would react to the service in terms of pricing. The basic evaluation can be seen in the Appendix VIII. However, firstly Mils needs to be assessed in terms of potential customers and how it differentiates from other services that might pose a competitive threat.

3.2.1 Competitors

Every product or service needs to provide some value to the user or customer, this is not different in the case of Mils. However, this value needs to be set in comparison to the other products or services available on the market. In the case of Mils the main competitors are the actual partners down the value chain.

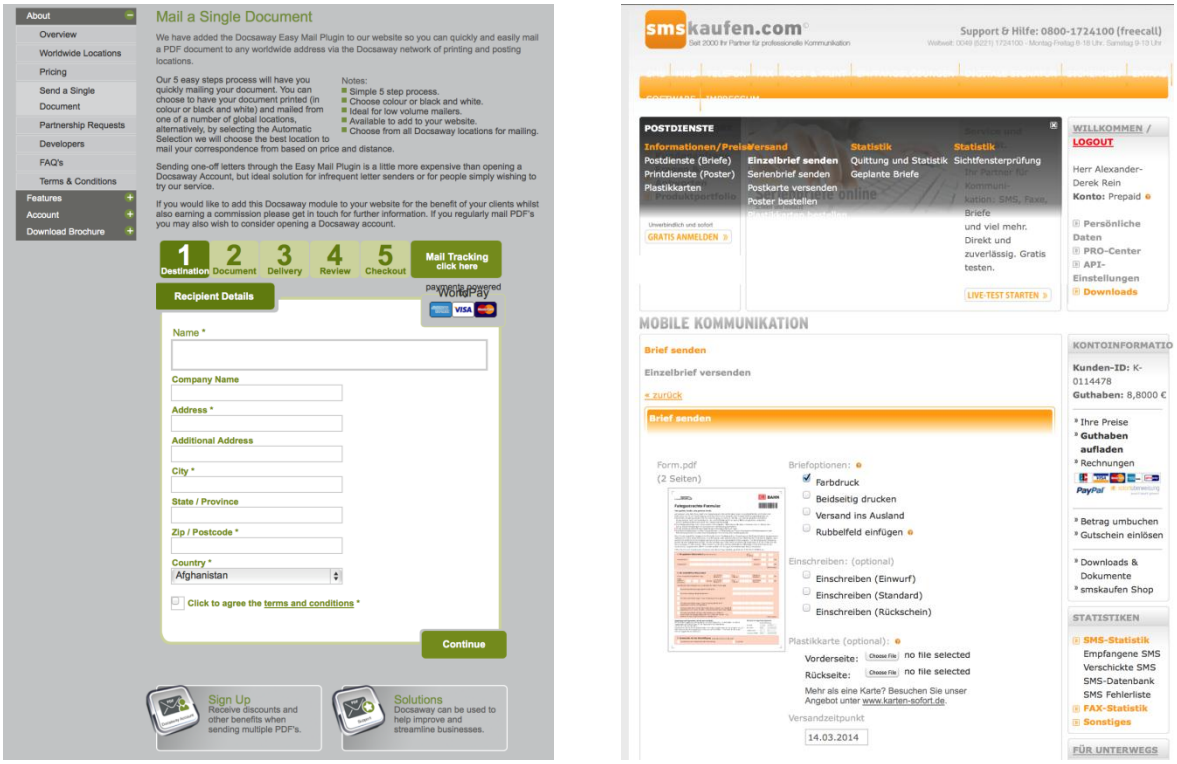


Fig. 9: Main Competitors' Mailing Websites[15][16]

Competitors are for example the Websites that are partners to Mils and serve as an intermediary to some of the international printing locations featured in the application or the *Deutsche Post* who installed their *E-Post* service that enables users to either send a verified E-mail or a letter directly from the computer to its Germany based recipient for a very low price[17].

The websites on the one hand prove to be a strong competitor in some cases as they sometimes also feature printing locations in more the than one country and are often cheaper than the service that Mils offers. However their main flaws are the fact that they are not really easy to find, especially when it comes to finding the right website for the right country. This is time consuming and not user friendly.

[15](Smskaufen.com, 2013b)
[16](Docsaway, 2013)
[17](epost.de, 2014)

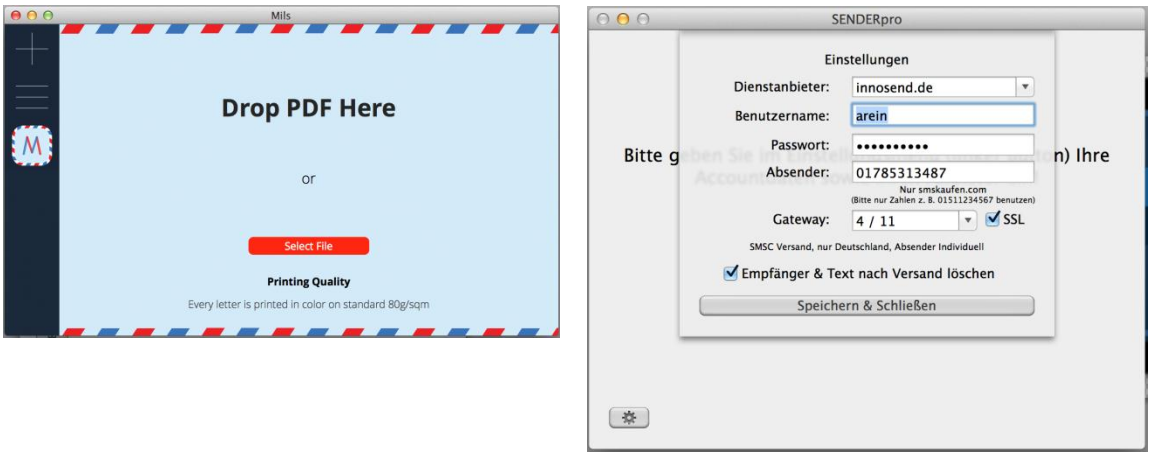


Fig. 10: Mils Client vs. SMS Kaufen Client

The above mentioned *E-Post* service by the *Deutsche Post* is another competitor that should be taken seriously. They offer a cheap and secure possibility to communicate throughout Germany that is in terms of legal sustainability globally unmatched. However, their service is limited to Germany and the user has to identify himself via the *Postident*[18] procedure at a post office.

A third and not to be underestimated competition is the traditional postal system itself. It is a commonly used, cheap and viable option to using the digital alternatives whilst achieving the same ends. Its major upside is the cost factor that is really low, however concerning the speed of the letters when it comes to recipients in countries other than the addressor's country, the traditional system proves to be extremely slow in comparison to Mils.

3.2.2 Unique Selling Proposition

The app Mils seeks to outgun its two competitors with key features such as a very user friendly interface, a simple and understandable system that always finds the fastest way to send a letter and last but not least an integrated touchscreen signature that enables the user personalize his letter. Although Mils has weak standing in Germany as the *E-Post* has a very thought-through process and cheap pricing behind it, Mils´ advantage is the worldwide implementation where its signature feature proves to be unique only to be reinforced by the wide network of printing locations that enable a quick and efficient delivery. Although being the highest concerning pricing, Mils individual features together with a very friendly user face and professional design should overcome this downside.

[18] (Deutsche Post AG, 2013)

3.3 Legal & Feasibility

Mils is not as delicate of a subject in terms of legality as TC was, however specifically when being serious about launching a product some things have to be considered.

3.3.1 Payment

Regarding the way the customer pays, two possibilities are available: On the one side there is the IAP which would have been used for TC, a service that is offered by the app stores. The user can easily pay the fee to the store, which in turn process payments to the app developer after charging a fee of 30 % of the price. Payment will be made through the payment details given to the app store by the user. A major downside of this option is that only fixed steps of prices are possible and the large 30 % that the app store takes. An upside is that the developer does not have to consider any VAT as it is processed by the respective app stores.

On the other side, credit card billing can be used, an accepted method of payment when it comes to services purchased over the internet. Its major downsides are the fact that VAT needs to be considered as well as the problem of integrating the billing into the application. A fixed amount of money will be charged with every purchase together with a percentage of the price. When comparing both methods to each other over different prices, the following graph results.

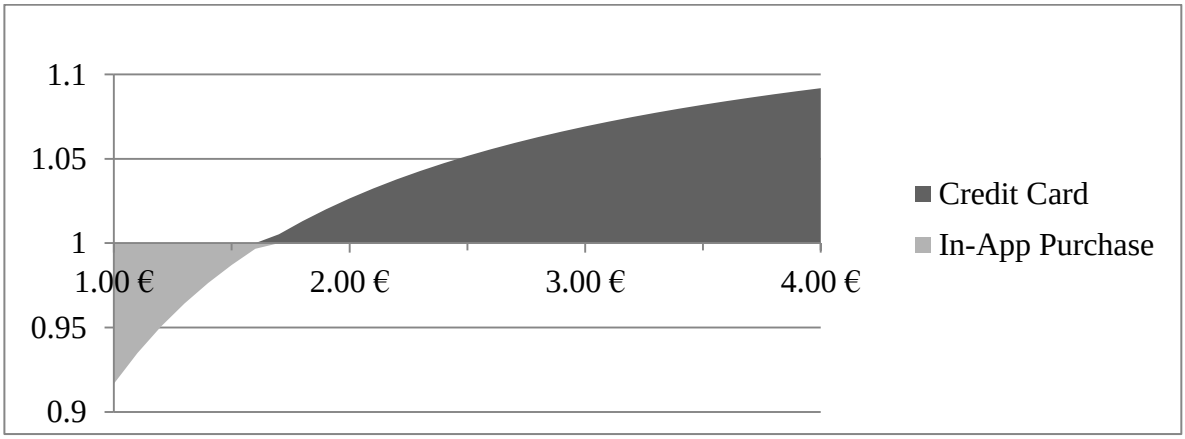


Fig. 11: Price of In-App Purchase vs. Price of Credit Card Billing from a Customers Perspective

Clearly showing how the dark grey area representing the credit card billing is especially cheaper for higher prices and the light grey area representing the IAP is more efficient for lower prices, the graph gives information about which of the both alternatives is best suited

for Mils. In the case of Mils with most prices higher than 1.60 € the credit card billing is preferred and will be taken as means of payment.

3.3.2 VAT

Mils is a business, and as business certain rules apply to it. In the case of Mils a very interesting point has been the issue of VAT. In Germany, where Mils is based, every business has to add VAT to its product that is to be paid by the consumer. Whether or not this VAT needs to be charged and then paid to the tax authority was subject to lengthy process that included talks and discussions with tax advisors. The result is that as long a private consumer is resident of the EU, VAT needs to be processed to the authorities whilst there is no need to do this in the case of non-EU residents. Concerning businesses, this is similar. German businesses purchasing services from Mils are charged the same as end-consumers but can later claim their money back from the taxman. For non-German but EU based business there is a possibility implemented in the app, where business can enter a so-called VAT-ID that upon being checked will enable them to purchase the service less the VAT. If a business is not from the EU it pays the same as every private customer without EU residency is unlikely to be able to claim their VAT back from the authorities. Although it would be possible to lower the price for non-EU customers, the pricing stays the same for everyone, ensuring a higher margin when selling to people outside of the EU.

3.4 Financial Model

To generate a perspective on how the app will spread and how often it will be downloaded a market model is created to assume a possible course of events for the future. Unfortunately neither the Mac App Store nor the Windows Store issue any statistics on the specific downloads or the retention rate of the respective apps. Luckily the Mils team has previously launched the application *Track My Life*, a utility app that is used to track the users movements and tell him about the time spend travelling, at work or for leisure. The assumption is that this app has a similar spread and more important a similar share of active users to that of Mils, which of course cannot be guaranteed. Appendix IX.I shows the download numbers and the active users for *Windows Phone* of said app. These values were set in comparison with the approximate windows phone user numbers that have been derived from annual sales numbers (Appendix X.I)[19][20]. Hence, having an estimate on how

[19] (Canalys, 2012)

many people were downloading the app per *Windows Phone* user, this can be applied to the *Windows 8.1* user numbers[21] (Appendix X.II) and *Mac OS 10.9 Mavericks* user numbers (Appendix X.III) that have been approximated beforehand by using absolute numbers, growth indicators[22] and market shares[23]. Experience was used to approximate an optimistic, a realistic and a pessimistic scenario. The Result of the realistic scenario is the following cumulative download and active user chart. With the Scenarios and therefore download numbers the average percentage of active users per download that has been taken from the *Track My Life* has been applied.

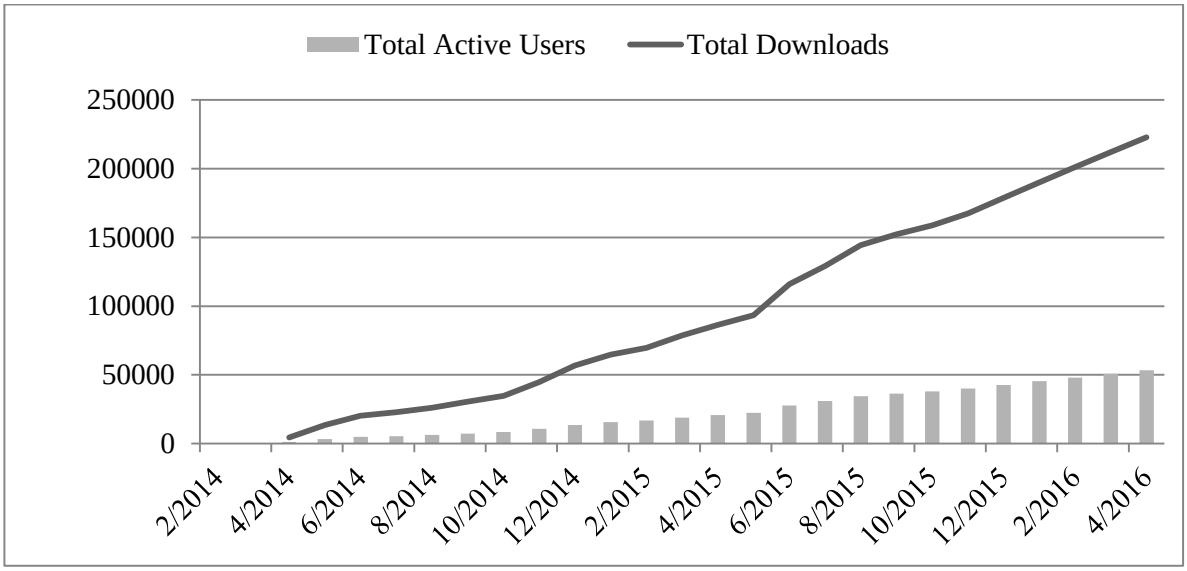


Fig. 12: Total Downloads and Total Active Users (Mils)

Having an estimate of active users per month, the next step is to evaluate the survey on how many letters are approximately sent per month and more importantly how many people would actually send a letter via Mils once they are presented with the possibility. Since there are multiple destinations possible and different opportunity costs applicable, two extreme cases have been created that are one the one side highly unfavorable and on the other side highly favorable in terms of sales. Applying the pricing information extracted from the survey to these cases leaves one with two different sales functions as depicted in the graph below, each approximating a share of letters sent per user at a given price.

[20] (IDC, 2014)
[21] (Stern Online, 2014)
[22] (Cisco Systems Inc., 2014)
[23] (NETMARKETSHARE, 2014)

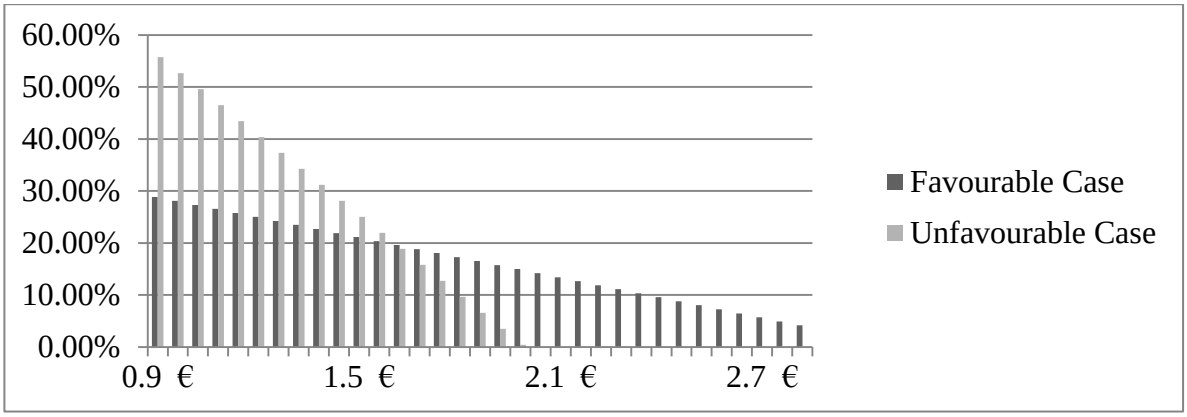


Fig. 13: Sales Functions of the for Financial Model Base Cases

Now, given the approximate active users per month, the approximate letters sent per month (depending on case) and the approximate percentage willing to use the service, it is possible to mold a financial forecast including all variable costs such as the cost of really sending each letter and the money due to the credit card billing company, the very low fixed costs consisting of app store fees and the charge for servers and domains, as well as VAT. Hence, for a short impression of the return possibilities the figure below shows the average monthly profits over a 2 year course.

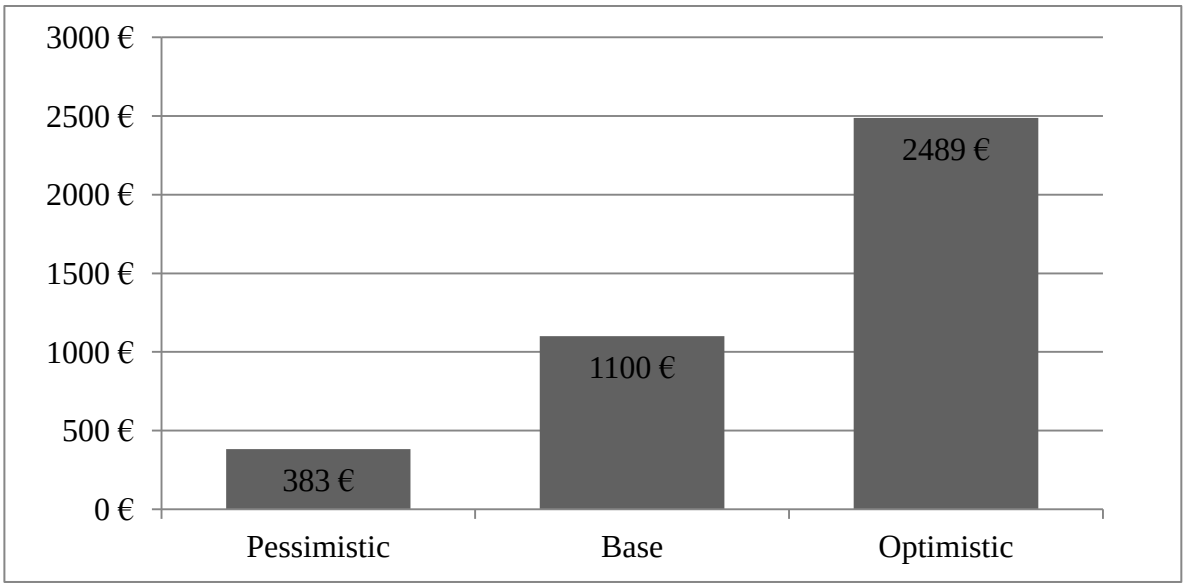


Fig. 14: Forecasted average monthly Returns (Mils)

4. Implementing Mils

Planning an app concept is one thing, and certainly of importance, however the implementation of the planned concept is a vital and deciding part of the success of the

service when introduced to a marketplace. In the following segments different aspects of the implementation will be explained, especially when obstacles appeared and could be removed successfully.

4.1 Implementation Process

The following key tasks were required during the implementation process. For some of the key tasks there is a dedicated description below.

- Planning
    - User Interface Mockups
    - Investigation of Programming Interfaces of Printing Partners
    - Survey of Applicable Payment Providers
    - Elicitation of Duties Arising out of the the Fact that Letters are Stored on Mils' Servers
    - Check of the Compliance with the App Store Guidelines
- Design
    - Logo and Corporate Identity Creation
    - Realization of Each Website and App Mockup into a Pixel Real Design
    - Setup of Default Video Templates, Letterheads and Social Media Profiles
- Implementation
    - Specification and Software Design
    - Selection of Programming Languages and Tools
    - Creation and Adaption of Required Libraries
- Beta
    - Bug Identification
    - Survey of Usage Statistics
    - Localization
- Release

4.1.1 User Interface Mockups

In order to plan the user interface for the Mac OS X and Windows 8 apps and the website mockups were created using Balsamiq mockups[24].

[24](Balsamiq, 2008)

Mockups are crucial to every development process that includes a user interface as they allow to create and edit previews of the user interface fast. Hence, this allows to identify and resolve design and usability issues. Moreover, designers can base their work on the mockups and therefore require less help.

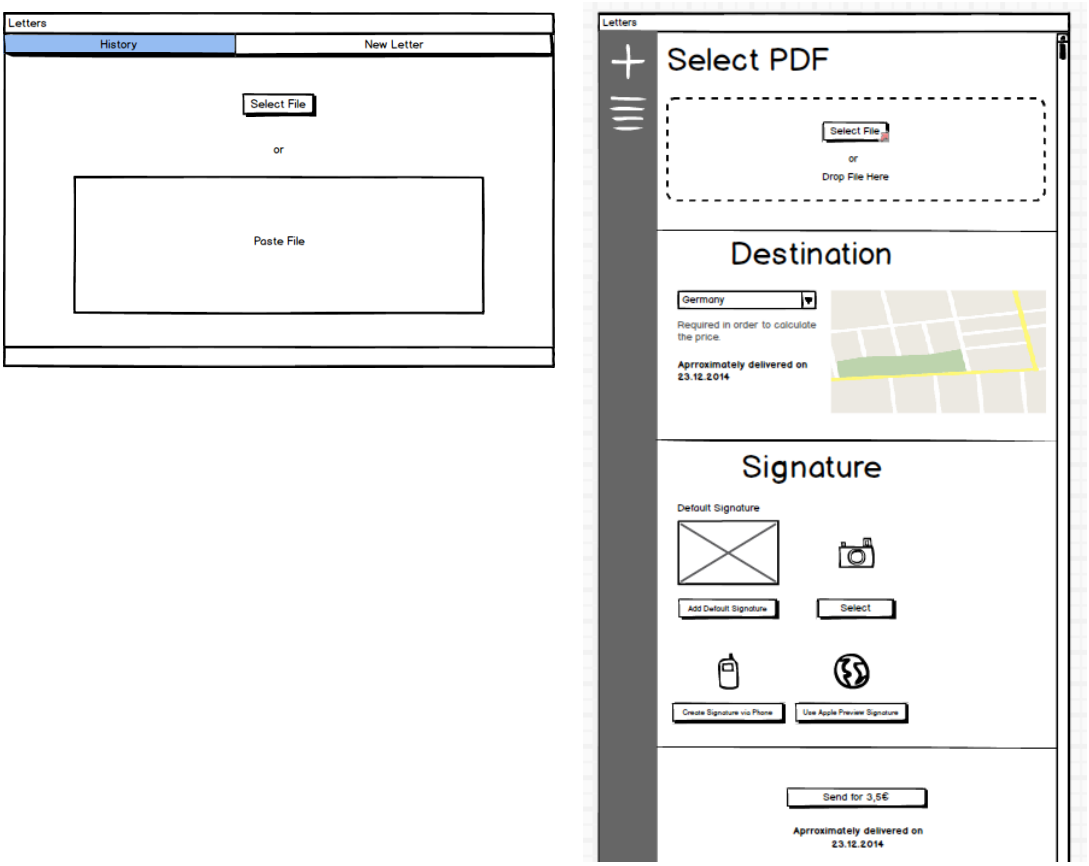


Fig. 15: Example of Mils' Iterative User Interface Creation Process

4.1.2 Selection of Programming Languages and Tools

Mils is built on top of the state-of-the-art MEAN Stack [25] which consists of Javascript as the main client and server side programming language, Node JS on the server side with the Express JS middleware, Angular JS as the client side framework and MongoDB as the database.

Yet the added programming languages Erlang and php were added to the MEAN appliance in order to serve dedicated tasks: Erlang satisfies the concurrency requirements and php is part of a module introduced in order to overcome the deficiencies of one printing providers' API which capsule into an adapter pattern.

[25](Karpov, 2013)

4.1.3 Creation and Adaption of Required Libraries

A major obstacle during the development process was the lack of payment processor options. Many payment processors provide Software Development Kits (SDK) for Android and iOS. However, no payment processor provides SDKs for Mac OS X and Windows 8. Only Paypal provides a Windows 8 SDK. However, PayPal's solution is built on top of a WebView which does not fulfill Mils' usability requirements.

Processing credit card data is subject to the obligations of the PCI Security Standards Council[26]. In order to be PCI compliant many duties have to be fulfilled. Payment processors' SDK usually make PCI compliance a breeze.

Hence, Mils needed to leverage a PCI compliant SDK. Since there was no Mac OS X nor a Windows 8 SDK open source SDKs were required.

Only Braintree Payments [27] open sourced their Android, iOS, and Windows Phone SDKs. Hence, Braintree's iOS SDK was ported to Mac OS X and the Windows Phone SDK was ported to Windows 8. This was quite a tedious and time intense process. The Mils port was open sourced as well.

Further libraries created or extended were the Windows 8 Google Geocoding Client which was required for localization purposes, Unirest for Windows 8, and Express Mailer, an email middleware for Express JS.

4.2 Partnering

Mils only provides a software implementation of a service, its material components, the actual printing and sending of the letter will be executed by multiple partners.

4.2.1 Distribution Network

As the service provided by Mils is in a higher price category than its competitors it is important to keep the main advantages of the application in mind and reinforcing there impact by focusing on a high level of execution. The idea to combine the different advantages that different printing stations and websites have is a major selling point of Mils and is key to generating sales. Implanting this was not as easy as it sounds as many different partners from different countries with different interfaces had to be integrated in

[26](PCI Security Standards Council, 2006)
[27](Braintree Payment Solutions, 2008)

the automated selection process that Mils uses when assigning the optimal printing location for the recipients address.

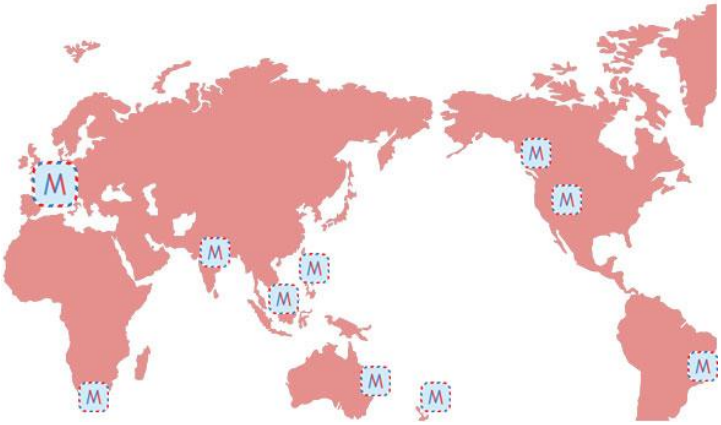


Fig. 16: Mils´ Worldwide Distribution Network

Not only the technical side did require a lot of time, also the negotiations about the price of printing and postage charged by the partners for each letter did cost their share of effort and time. Fortunately Mils was able to secure lower prices with all the targeted printing partners and in some cases websites that do provide a small network of printing locations. Not only the fact that Mils now uses 23 printing locations all over the world, but also the fact that the negotiations helped reduce the big shortcoming Mils bared in the form of high pricing. Hence, the created global distribution network offers the customer the ability to generate a fast, efficient and cheap printing station that will fully service his needs. This is a definite plus that Mils has over its competitors who often only serve one country, like for example the E-post, or only provide a grid that is much smaller and cannot count as a global network, like the one Mils offers.

4.3 Marketing

Mils is rigorously dependent on users downloading the app and is most likely to increase its earnings by extending the spread of the app and its service. It is crucial to get as many people in contact with the idea and as many people to actually download the app. The simple reasons for this are the facts that the higher the number of potential customers or users is, the higher will be the absolute number of letters send via the app as the relative share of people who are willing to actually pay the price for the service will stay roughly the same. In order facilitate high download numbers and a wide spread amongst the target group Mils seeks to implement the following strategies.

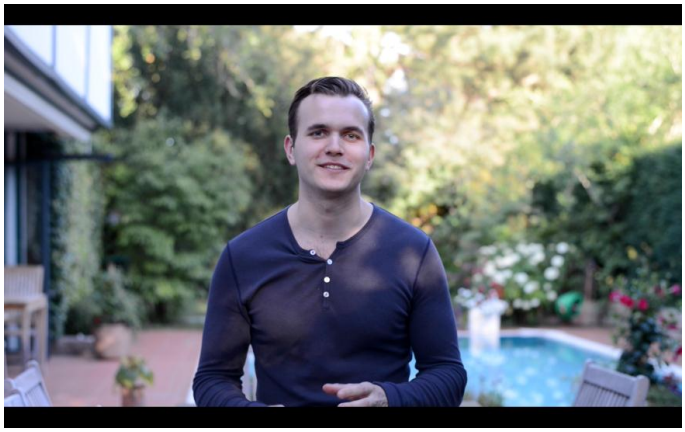


Fig. 17: Footage from an explanatory Video

4.3.1 App Stores

The app stores are the places where the app is offered and downloaded. Naturally the perception of the app within the app store is very important to the download numbers. App stores give users the possibility to rate an app and write a review about their experience using the service. Logically Mils aims to generate a very high average rating in order to gain trust in the application and its service offering as well as augmenting the probability of achieving a high ranking amongst the other apps offered in the app stores.

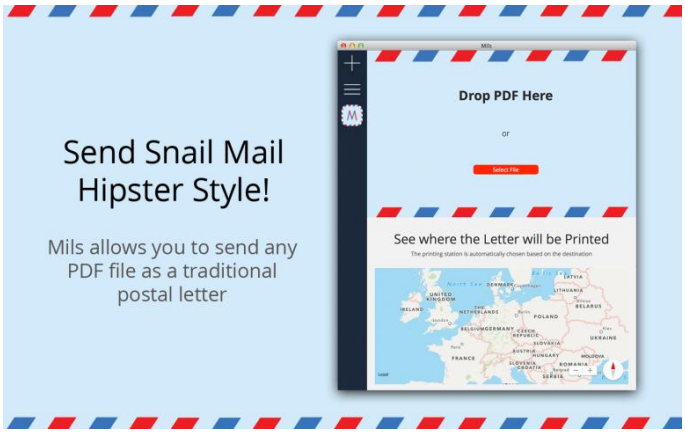


Fig. 18: Screenshot for the Mac OSX App Store

To promote very good ratings and top rankings high technical implementation and a very user friendly interface have been implemented. A small gadget to help especially the rankings is a window that pops up inside the application once the user has send a letter, asking him about his experience. Any user rating that is lower than 5 stars will be only visible to the Mils admin; but when the user rates the app with 5 stars he will automatically asked to share his experience in the app store. This way mediocre or bad ratings can be

taken in as input whilst keeping them from app store, very good ratings however will have an increased likelihood to be submitted to the app store and hence help the public image of the service.

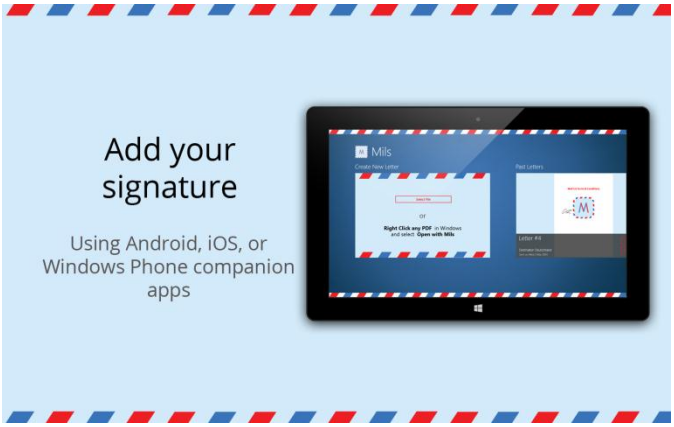


Fig. 19: Screenshot for the Windows 8.1 App Store

Last but not least Mils hopes to be featured in the respective app stores front page. Although this process is not directly impressionable by the Mils team, it can create an environment fostering the probability that the app stores´ editorial offices come across the app and feature it Again high technical standards and usability play a big part, but in this case features like the implementation in multiple languages can also increase the applications chance to be featured.

4.3.2 Internet

Not only for apps but also for almost every product and service the internet is nowadays known to be one of the most important platforms when it comes to promoting sales. Mils uses ordinary means of marketing like having its own website explaining the service and press releases over the website and partners websites.

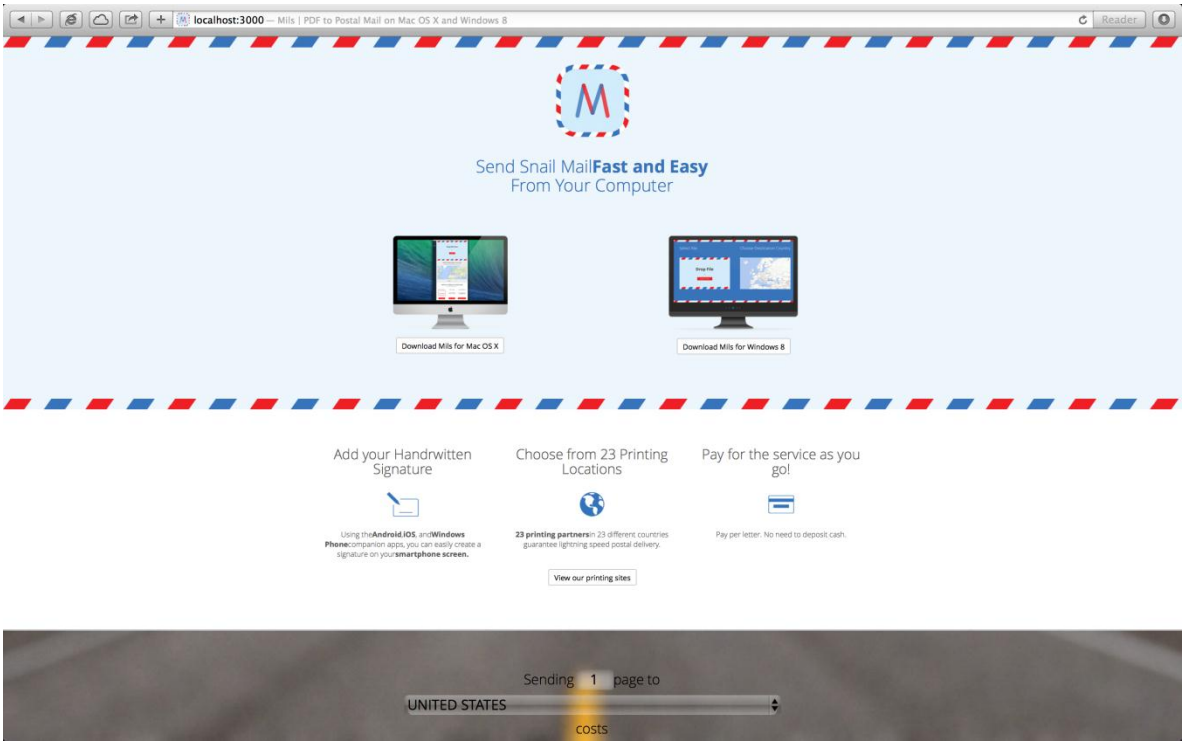


Fig. 20: Home screen of the Web Presence of Mils

However experience in past ventures has shown that especially tech-savvy, young people who are essentially Mils target group are best reached with articles from independent bloggers who focus on apps exclusively or software and web design. Indeed, just like in the example of the editorial offices of app stores it is not possible to force an article or a recommendation by these blogs. Nevertheless in the case of blogs and tech journals it is achievable to address the bloggers or editors personally with a little video showing them through the app whilst pointing out special features that distinguish the app from others or especially complicated processes that have been solved elegantly. Combining this with background information from the app, its story of origin and insights about its founders has been proven to be successful and worth the time, as many technical writers enjoy the open and friendly approach.

Another measure to spread the word of Mils is the creation of open source fragments that were necessary for a clean implementation of the application. These fragments are often downloaded by other users and integrated in their own applications and operate as references to Mils, creating another bit of diffusion in the tech community.

Competitions just like a website and blog articles constitute another possible platform of promotion. Winning prizes and asserting itself against competition causes a big

deal of trust and publicity for a product or service. Mils already submitted its app to one competition, namely the European Appcup[28] 2014 by Microsoft. Regrettably the deadline for the submittal was a little too early in the development stage causing Mils to compete with an unfinished app and consequently not being able to qualify for the finals in Brussels. Nonetheless, Mils will further target competitions similar to the Appcup as a being a finalist or winning prizes would trigger a boost of downloads immediately and strengthen trust in the service.

Fig. 21: Screenshot of the Video Pitch Submitted to the Appcup

4.3.3 Video

Targeting digital natives, Mils tries to use strategies renowned to be successful when promoting products. One special way is directing a guerilla marketing video that will spread virally all over the computers, smartphones and tablets of the digital community. Logically, given the fact that Mils is not planning on using a larger sum of money on this, the project is highly unlikely to have spread similar to successful paragons like grasshopper.com´s[29] THE NEW DORK – Entrepreneur State of Mind[30]. However, especially explanatory videos serve a doubled purpose of spreading the word as well as explaining the service and reassuring potential customers about the functionality. In contrast to a funny video, that often has a higher chance of being spread around the web, the explanatory video still has this second effect on the dynamics of the product or service advertised and therefore preferred when the chance of becoming a rising star in the internet

[28] (Microsoft, 2014)
[29] (Grasshopper, 2003)
[30] (Pantless Knights / Seedwell, 2010)

is rather low. Consequently the video´s concept is the display of functionality whilst portraying possible situations where the app could crucially improve the users life and comfort. Mils already carried out shootings of several parts of this video and is currently cutting the footage, hoping to finalize the product shortly after the app is launched in the app stores.

4.3.4 Multi-language support

Enabling multiple languages to be chosen when using Mils has been mentioned above, as a measure to increase chance of being featured in the app store. But this is only one consequence and it even has a greater span of good results.

Having an app translated into different languages is a very time consuming and in many cases costly venture. Most apps only have an English version, in some cases a second language is provided if the developer has another native tongue. Mils will offer 6 different languages:

- Spanish
- English
- Portuguese
- German
- French
- Italian

Together they make up almost 18 % percentage of the world's populations native tongue. Moreover the majority of the world will be able to understand the app as the internationally used languages like English and Spanish are included. This causes a great extension in customer base as for example South Americans without any command of English will be able to understand and use the app. Of course, these people are not our target group as digital natives often have a very good knowledge of English as the Internet is dominated by it. However, the second, and probably the most important factor is the trust that is generated by the application. Apart from helping people with weak English simply better understand the app and its functionality it also shows them that there has gone a lot of work and effort in the making of the service and thus fosters the apps credibility. The anticipated consequences are higher download numbers and higher sales.

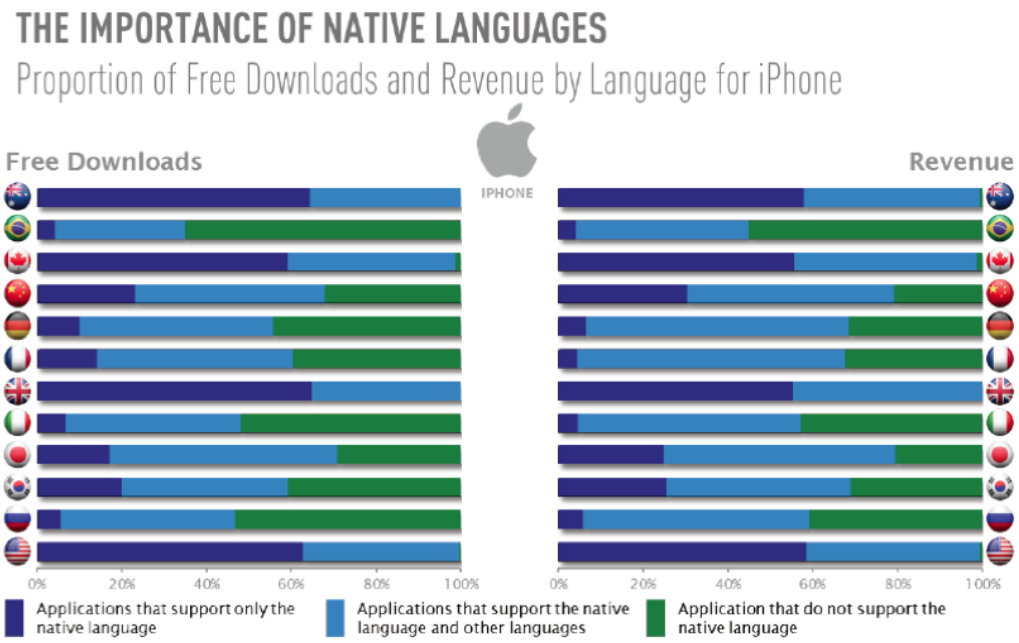


Fig. 22: Localizing can be Crucial in order to Succeed in the App Stores [31]

Although the upsides of multiple languages implemented in an app are diverse and strong, there are downsides to it. Especially the cost of time and money needs to be assessed closely before gearing up for such venture. Mils used a network of friends and business contacts to facilitate a cheap, yet time consuming translation process and therefore dodged the monetary issue. Another point worth considering is the hassle of updating the application as complexity increases with the translations used.

4.4 Economic Review

Mils is a venture that was created mostly by using internal resources. Its concept relies mainly on the use of skills and knowledge acquired beforehand or whilst working on the project by members of the development team itself. This causes every earned euro to look like a big financial success as hardly any initial costs accrued. However, since this paper aims to set out an objective perspective on the business case of Mils, the time worked on the application will multiplied with a low average of opportunity cost to produce an estimate of what outsourcing the creation of the venture would have cost. The sum is roughly around 20,000 € and could probably be higher.

To calculate an objective number, a value to set Mils in comparison with other ventures that an investor could be interested in the IRR is used and calculated for the three

[31] (Calvin, 2013)

scenarios mentioned above. The values are supposed to show the spread of risk and the earning chances that are inherent with the concept of the app. The chart below clearly shows that the risk is quite highly scattered, but shows a little edge on the positive side.

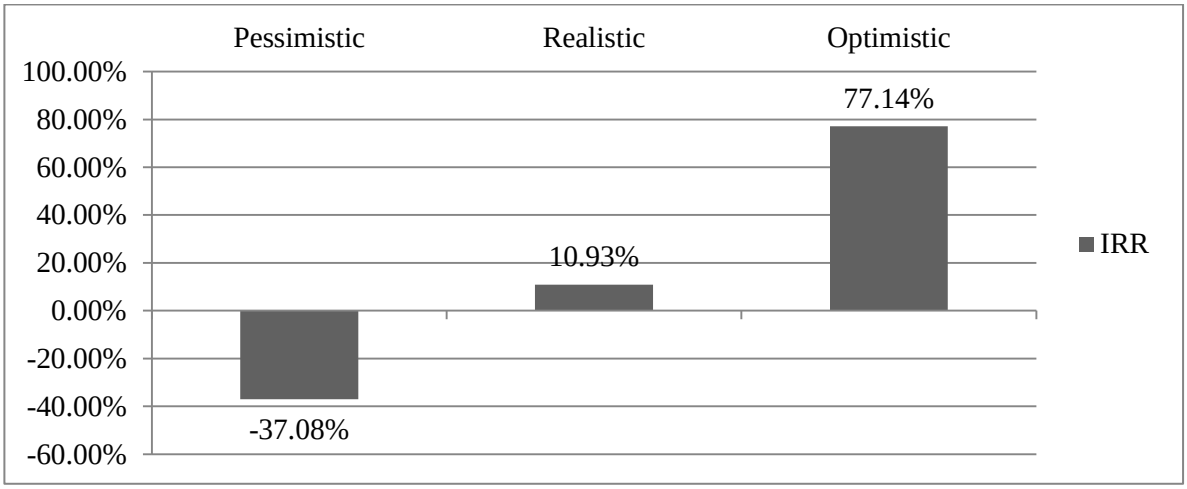


Fig. 23: IRR Scenarios (Mils)

5. Taking Mils to the Next Level

Mils is currently in the late stage of development, yet it is important to think about the future and constantly ponder on how the service could serve customers better to increase revenue. Different concepts could be adapted, additional services offered and the businesses, which are not targeted in Mils initial phase, could be targeted.

5.1 Future Developments

Since the original concept and launching structure of Mils targets mainly private users and the future development also includes businesses as customers, both will be treated separately.

Business customers pose as a great stream of revenue as businesses, more than most private people still do a lot of traditional mailing, for example to advertise their products to consumers. Mils aims to integrate services into its offering that enable businesses to send large quantities of standardized mailings to various customers with an easy and simple process. The key to this is ensuring businesses do not lose a lot of time doing this, so implementation is once again key to this feature. Another service to draw businesses to Mils is the offering of premium services where the customer pays an additional fee in exchange or individualized envelopes for example. However, these services need to be

closely assessed how, and at what price they are achievable with each partner in Mils´ distribution network. Naturally, the large amounts and sums business would process through Mils will cause the service to offer discounts. Whether those discounts will be facilitated through milestones e.g. if a business exceeds 500 letters per month a 10% price cut will be given, or if the businesses buy contingencies of letters and hence can decrease their cost per letter by efficiently using their contingent up to the last letter, is still open to discussion.

Private customers, especially digital natives are the group targeted after the initial launch of Mils and are considered its base. Mils starts with a simple service, a computer app installed on a Windows or Mac computer and is simply structured. The future of the B2C sector of Mils is to be extended however, especially regarding the platforms offered. Mils seeks to implement three smartphone apps that service the customer on a mobile basis, enabling the user to send a letter virtually from everywhere. The concept of said smartphone app is a big point of discussion as two general concepts are possible: an app that copies the concept of the computer app where files will be uploaded to the server and send, and a more individual app that enables each smartphone user to compose a letter on his smartphone thus creating a pdf that can be send. Of course, whilst the second alternative seems to be the friendlier and better for the user, the drawback are a time consuming and possibly costly conception and implementation of the application, especially when covering the big three smartphone platforms. However, the easier first alternative might fail to service any need as it is uncommon to have pdfs or files on your smartphone available.

Applicable to both B2B and B2C, the extension of the distribution network is a factor that will play a big role in the future of Mils and is important to keep an efficient and utility bringing app in the app stores.

5.2 Lessons Learned

Over the course of the conception, planning and implementation of Mils, the team discovered a fair share of problems that could have been avoided or anticipated and thus better handled. Three general issues were identified and were fundamental to the developments team learning process.

Firstly, the cost sensitivity of the consumer should not be underestimated. Although it is often portrayed in the media that consumers oftentimes pay ridiculous prices for

overvalued products, especially when introducing a new product the consumers perception of the product or service and their approximation of the value should be estimated very carefully. Initial thoughts and estimates from Mils were much higher than the actual results extracted from the undertaken survey and hence Mils had to work harder on cutting down prices, mainly by overthinking payment, its own margin and the cost of the distribution partners. A step that could have been implemented easier and more time efficient if the beginning approximations had been more modest.

Secondly, if a project and this will be the case with almost any project is dependent on partners, planning should include eventualities and time delay caused by the partners. Working with partners often brings benefits to a product or service; this is especially the case with Mils´ international distribution network. However the time plan should always consider possible shortcomings on terms of time and quality to avoid not meeting project deadlines. During the implementation of Mils, the work with the billing company had been extremely frustrating since the company worked on a slow schedule and did not give a full account of documents that Mils needed to provide and therefore caused a time delay of the planned launch. Luckily in Mils case this was not crucial, however it is a problem that could have been evaded and will be in the future

Thirdly, never underestimate the effort it takes to launch a product, and never confuse launching with simply creating a product. This slogan basically became apparent over multiple incidents in the programming of the app as well as the workings related to it. The problem with launching a product, or in Mils´ case an app, is the fact that the consumer expects the product to work properly and to do this often and always. Similar to creating a car that just drives compared to what todays cars are able to do, the gap between an app that sends a pdf as a letter and an app the offers this service to consumers is wide. Of course, the car has many more factors to obey and concern than the app, however the principle is the same.

6. Appendix

Appendix I

Analysis of European countries and their respective passengers´ rights policies regarding train traffic

With regards to the legislative change by the European Parliament every country had to introduce policies to ensure the passengers´ rights on a local level. TC aims to place a service on the market that ensures comfort and easy accessibility whilst demanding restitution for shortcomings by train companies. That being said, a major decision for the further development of the TC application will be the choice of one or even more markets to enter to ensure a high reception and use of the app whilst securing well performing high quality service.

The key to sustain these criteria is the analysis of the different countries, their respective major railroad companies' as well as their own special way of dealing with the customers´ claims for refunds and restitutions. Going through the different countries, the first goal is to identify the major participant in the market of personal transportations and their individual dealings with restitution claims, analyzing the specific and strategic fit to the task provided by the application concept.

Belgium

The Belgian train business is dominated by the state-owned Belgian rail that has historically operated the railway system in Belgium since 1835. Belgian Rail facilitates a refund service beginning with 20 delays at 20 minutes each or 10 delays at 30 minutes each going up to 60 minutes after which you actually get a 100% of your ticket refunded[32]. The system is clearly not affected by the European Directive since its passengers´ rights are already on a very high standard. To file a claim for repeating delays (i.e. 10 x 30 minutes) one has to fill in a form that is available online and can then proceed to send this form via postal services to Belgian Rail and will then receive his money[33]. In the case of the 60 minute delay it is possible to use the provided contact mask on the Webpage where you can

[32] (NMBS/SNCB, 2013a)
[33] (NMBS/SNCB, 2013b)

apply for your refund online[34] . Since Belgium is a rather small country and probably will not amount to many delays over 60 minutes and already has a rather efficient user friendly customer service system, the strategic fit of TC to this market is marginal. The app would receive little recognition as it would not be of great assistance when filing for repeated delays and would not place a significant change to online application form when filing a 60 minute-claim and therefore it is highly unlikely to generate an income from this market.

Bulgaria

Like in Belgium, the railroad services are entirely operated by the Government owned Balgarski darzhavni zheleznitsi (BDZ) which translates to Bulgarian State Railway. The refund scheme is according to EU standards and demands a claim via postal services with an attached valid ticket. Although the TC could provide a huge benefit in customer comfort and speed of the restitution process, the mere effort to translate and use of Cyrillic writing combined with the small market potential of the rather small railroad system with 34.11 mln. passengers in the year 2006[35]. (*DB* had 1.854 bn passengers in 2006[36]) makes Bulgaria non-eligible as a candidate for a market introduction of TC.

Germany

In Germany, the *DB* poses as the main force when it comes to the passenger railroad business. It is a state-owned entity and currently the largest railroad and railroad infrastructure company throughout central Europe. The passengers´ rights with the *DB* are closely oriented to the European directive and compensate according to it. To make a claim the customer has different options ranging from either doing it personally on the train/point of sale/service center or via a filled in form [37]and the copy of a valid ticket. Accordingly, the discomfort of these methods lie within their time comsuming form and therefore pose as a good possibility for an market entrance of the TC application. Furthermore Germany´s position as one of the leading economies of the world as well as its high technological standards serve as a good basis for a smartphone oriented business model. A closer look on the German railroad system will reveal its true strategic fit to the application as well as potential problems regarding legislation and business case.

[34] (NMBS/SNCB, 2013c)
[35] (Bulgarian State Railways, 2013)
[36] (Deutsche Bahn AG, 2013a)
[37] (Deutsche Bahn AG, 2013c)

Finnland

The Finnish railroad company VR-Yhtymä uses two different ways to deal with each refunds and compensation. When demanding a refund, it is possible to fill out an online form where all personal details as well as the delayed train and other important information are needed[38]. Concerning a claim for compensation (i.e. Hotel or Taxi bills) one has to use the old fashioned printable PDF-form and send it to VR in order to get their money back. Of course the receipts for the refunds as well as information about the particular late train have to be attached.[39] Since Finnland is very customer friendly in this regard, especially when it comes to the often demanded refunds for train delays, TC would face a great difficulty in gaining customers and therefore sales.

Italy

Unfortunately the online-presence of the Italian Trenitalia is not very clear on the subject of refunds, as they are not clearly stating their policies regarding the process on their webpage. However they mention the possibility to claim refund and compensation via their login and password secured online purchase management[40], rendering it impossible to get a detailed overview as an outsider with no valid Trenitalia ticket. It is however very likely, considering the fact that they use a login to secure this information, that they, like some other European railway companies, use some form of online form or online application to settle refunds and compensations. Again, this country does not fit the TC strategy.

Netherlands

Nederlandse Spoorwegen, the passenger railway operator does offer refunds beginning with a delay of 30 minutes which is less time than the European directive demands. However it remains unclear how much each passenger will get refunded as the website is inconclusive about it.[41] The biggest problem for TC in this country would be the strict ruling that only original forms will be processed as TC´s major selling point would be the strategy of using cheap postal or telefax services to deploy the demanded information on printed copies of the PDF refund forms in order to improve customer comfort whilst making a claim. With the NS´s policy to reject every form that is not an original obtained at a train station or sent

[38] (VR Group, 2013b)
[39] (VR Group, 2013a)
[40] (Trenitalia, 2013)
[41] (Nederlandse Spoorwegen, 2013)

to the passenger after a telephone call[42], the mere cost for TC to perform all these steps would easily outweigh almost every financial gain made by a claim, and would therefore place no financial use for TC or the passenger.

Austria

Very similar to its big neighbor Germany, Austria´s passenger railway operator ÖBB (Österreichische Bundesbahnen) refunds according to the European legislation and uses almost the same application scheme. The passenger has to fill out a form, available online [43]and at sales or service points, and send it to the responsible service entity via postal services with an attached original ticket and other proofs of delay. The similar scheme, although the major difference that in contrast to Germany´s *DB* the ÖBB demands an original ticket, together with the same language might serve as a possible reason to consider entering the Austrian market with TC. Further evaluation of the problems will show whether and how it is possible to make an Austro-German market entrance.

Sweden

An online form provided by SJ, the Swedish passenger railway operator, serves as the application for a refund for delayed trains.[44] It also suggests that it is possible to demand refund or compensation directly at the train station or a service point or indirectly via a non-official letter with attached original proofs of delay. Like in many other countries, the existence of an online form poses a great problem for an market entrance of TC.

Slovakia

In Slovakia, like in Austria and Germany, a form is filled in and then sent to the service address. Like in Austria an original ticket needs to be attached to it. Although similar application methods are used, Slovakia, as a rather small country with a different language and the additional problem of the original ticket, place a too big effort to overcome, which inevitably leads to the conclusion that Slovakia is not a target market.

[42] (Nederlandse Spoorwegen, 2013)
[43] (ÖBB, 2013)
[44] (SJ AB, 2013)

Slovenia

The Slovenian railway company Slovenske železnice does not state a specific procedure to claim a refund or compensation. Nonetheless they do state in their passenger charter that an assertion should be made "in writing or other means"[45] which should be addressed to a specified service point. The passenger charter is unclear on whether tickets (original or copies) should be attached to the assertion. Although the Lack of structure and precision combined with the high level of difficulty to find out about getting a refund might serve as a good reason to enter this market, Slovenia as a country, like many others is very unfit for the TC application, as it is not very big.

Spain

According to the Spanish railway company renfe, claims can be made either by post, email, telefax or telephone. They do not specify the proofs that are needed to fulfill the criteria of a valid claim. [46]However they also reference the passenger to the possibility to use the online form for complaints for refunds and compensations.[47]That being said, it seems quite interesting to find out about the actual refunding process as it might actually prove to be very flexible, which naturally is good for a smartphone application like TC. Especially when it comes to future markets this might be a valid country of choice.

Czech Republic

The dominating railway company in the Czech Republic, the ČD (České dráhy), uses the most common and before mentioned approach with online downloadable PDFs and orginal tickets as well as proofs of delay, all sent via postal services[48]. Like in the case of many other before mentioned countries the prospect of having issues with the original ticket joined with the small size and different language the Czech Republic is no target railway market for TC.

Hungary

The passenger transport Branch of the big MAV railway company, the MAV-START handles their claims by offering a downloadable PDF Refund form on their web presence. Similar to many European Railway companies MAV-START also demands original

[45] (Slovenske železnice, 2013)
[46] (Renfe, 2013b)
[47] (Renfe, 2013a)
[48] (České dráhy, 2013)

tickets. On top of that the PDF document has to be signed by a railway official who provides his signature only in case of an actual delay. The difficulty of the signature of the official, the personal signature and the original tickets make it impossible to launch TC and Hungarian soil.

United Kingdom

Unlike most of the European railway system the British, seemingly the only ones, have a system with many operators in the sector of passenger transportation. Whilst one company is handling all the infrastructure many companies like Virgin Trains or East Midlands Trains [49]control different trains and different routes. The diversity of firms operating in the UK makes it very impractical to install and app similar to TC as one would have to program a different process for each railway company and their respective way of refund application. This is simply not practical and not feasible for an application like TC that has not been established yet.

Denmark, Estonia, Greece, Ireland, Latvia, Luxembourg, Poland, Portugal, Romania

All these countries and their respective passenger train operators did not have any specific details about how a refund of compensation claim would work. Although it would be possible to find that out in a deeper research, the main goal for TC are very big entities which ensure a high passenger and therefore delay/claim amount, leaving those countries as a second or third choice option anyway and therefore make the effort to evaluate the processes not logical. However on a later stage after a successful market entrance especially those countries might provide a loose and flexible framework that could lead to easy and undisputed in-app sales. But for now, their evaluation is of little importance.

Cyprus, Malta

Unfortunately both countries do not possess any working railway traffic anymore and are therefore no subject to a TC market approach. Malta´s last railway route was closed down in 1931[50], whereas trains on Cyprus were shut down in 1951[51] although a cargo line for Cyprus Mining Corporation went on operating until 1974.

[49] (Rail.co.uk, 2013)
[50] (Wikipedia.org, 2013b)
[51](Wikipedia.org, 2013a)

Appendix II

Market Data (TC)

Appendix II.I

Data from Zugmonitor.de	Total train delays	60 min delays	120 min delays
Total	27,898	24,662	3,236
Percentage	100%	88.40%	11.60%

Approximated quotas	Total train delays caused by DB*	60 min delays caused by DB (approx.)	120 min delays caused by DB (approx.)
Total	24,297	21,479	2,818
Percentage	100%	88.40%	11.60%

*given in the Zugmonitor document

Appendix II.II

Adjustment factor	1.113

New quotas	Total train delays caused by DB	60 min delays caused by DB (approx.)	120 min delays caused by DB (approx.)
Total	27,036	23,900	3,136
Percentage	100%	88.40%	11.60%

Appendix II.III

Average number of passengers per train	Number of Trains	Number of passengers	Passengers per train
Total	808,229	131,300,000	162.45

Appendix II.IV

Passengers affected by delays	Trains delayed 60 minutes	Trains delayed 120 minutes	Passengers delayed 60 minutes	Passengers delayed 120 minutes
Total	23,900	3,136	3,882,640	509,394

Appendix III

Survey

1.Welcher Altersgruppe gehören Sie an?	Total	Percentage
18 - 25 Jahre	51	55%
26 - 40 Jahre	15	16%
41 - 55 Jahre	11	12%
56 Jahre oder älter	15	16%
Abstentions	0	0%
Sum	92	100%

2.Sind sie männlich oder weiblich?	Total	Percentage
Männlich	55	60%
Weiblich	37	40%
Abstentions	0	0%
Sum	92	100%

3.Wie oft nutzen Sie die DB?	Total	Percentage
0 bis 5 mal pro Jahr	42	46%
6 bis 20 mal pro Jahr	28	30%
21 bis 50 mal pro Jahr	8	9%
51 mal oder öfters pro Jahr	12	13%
Abstentions	2	2%
Sum	92	54%

4.Fahren Sie mit der Bahn eher kurze oder lange Strecken?	Total	Percentage
Kurze Strecken	46	50%
Lange Strecken	45	49%
Abstentions	1	1%
Sum	92	100%

5.Wie oft erleben Sie Verspätungen der Deutschen Bahn?	Total	Percentage
0 bis 5 mal pro Jahr	53	58%
5 bis 15 mal pro Jahr	20	22%
16 bis 30 mal pro Jahr	10	11%
31 mal oder öfters	8	9%
Abstentions	1	1%
Sum	92	100%

6.Haben Sie innerhalb des letzten Jahres eine Verspätung von mehr als einer Stunde miterlebt?	Total	Percentage
Nein, gar nicht	41	45%
Ja, einmal	26	28%
Ja, 2 bis 5 mal	17	18%
Ja, mehr als 5 mal	8	9%
Abstentions	0	0%
Sum	92	100%

7.Haben Sie innerhalb des letzten Jahres eine Versptätung von mehr als zwei Stunden miterlebt?	Total	Percentage
Nein, gar nicht	73	79%
Ja, einmal	11	12%
Ja, 2 bis 5 mal	6	7%
Ja, mehr als 5 mal	2	2%
Abstentions	0	0%
Sum	92	100%

8.Haben Sie innerhalb des letzten Jahres eine Situation erlebt in denen die Verspätung der Deutschen Bahn Sie dazu gezwungen hat in einem Hotel zu übernachten oder ein anderes Transportmittel (z.B. Taxi) in Anspruch zu nehmen?	Total	Percentage
Nein, gar nicht	76	83%
Ja, einmal	10	11%
Ja, 2 bis 5 mal	5	5%
Ja, mehr als 5 mal	1	1%
Abstentions	0	0%
Sum	92	100%

9.Sind Sie sich bewusst, dass es möglich ist bis zu 50% Ihres Geldes bei längeren Verspätungen zurück zu bekommen?	Total	Percentage
Ja	60	65%
Nein	30	33%
Abstentions	2	2%
Sum	92	100%

10.Haben Sie schonmal einen Rückerstattungsanspruch geltend gemacht?	Total	Percentage
Ja	21	23%
Nein	69	75%
Abstentions	2	2%
Sum	92	100%

11.Wenn ja, wie haben Sie Ihren Anspruch geltend gemacht?	Total	Percentage
direkt im Zug	4	4%
an einem Schalter / in einem DB Reisezentrum	11	12%
per Post	7	8%
Abstentions	70	76%
Sum	92	100%

12.Wenn ja, wie lange hat es gedauert den Anspruch geltend zu machen?	Total	Percentage
5 bis 10 Minuten	5	5%
10 bis 30 Minuten	12	13%
30 Minuten oder Mehr	5	5%
Abstentions	70	76%
Sum	92	100%

13.Wenn nein, warum haben Sie ihren Anspruch nicht geltend gemacht?	Total	Percentage
Ich war mir meines Anspruchs nicht bewusst	17	18%
Das Geld war den Aufwand nicht wert	12	13%
Der Aufwand war zu hoch	8	9%
Das Rückerstattungsverfahren war zu kompliziert	7	8%
Abstentions	48	52%
Sum	92	100%

14.Benutzen Sie ein Smartphone?	Total	Percentage
Ja	73	79%
Nein	18	20%
Abstentions	1	1%
Sum	92	100%

15.Wenn ja, haben Sie ihr Smartphone jemals benutzt um Dienstleistungen oder Produkte zu erstehen?	Total	Percentage
Ja	54	59%
Nein	31	34%
Abstentions	7	8%
Sum	92	100%

16.Wären sie daran interessiert Ihren Rückerstattungsanspruch mit einem Smartphone geltend zu machen?	Total	Percentage
Ja	62	67%
Nein	28	30%
Abstentions	2	2%
Sum	92	100%

17.Wenn ja, wieviel wäre Ihnen ein solcher Service wert?	Total	Percentage
1€ pro Rückerstattungsanspruch	43	47%
2€ pro Rückerstattungsanspruch	11	12%
3€ pro Rückerstattungsanspruch	9	10%
4€ pro Rückerstattungsanspruch	4	4%
Abstentions	25	27%
Sum	92	100%

18.Aus ihrer persönlichen Sicht, wie zufrieden sind Sie mit dem Kundenservice der Deutschen Bahn?	Total	Percentage
Sehr zufrieden	4	4%
Zufrieden	30	33%
Unzufrieden	29	32%
Sehr unzufrieden	16	17%
Keine Erfahrungen	13	14%
Abstentions	0	0%
Sum	92	100%

Appendix IV

Specific evaluation

Appendix IV.I

Willingness to use app given an experience of a +60 minute delay

		Total	Percentage		Average Yes
Never	Yes	24	61.54%		61.54%
	No	15	38.46%		
Sum		39	100.00%		
		Total	Percentage		
Yes,once	Yes	17	65.38%		65.38%
	No	9	34.62%		
Sum		26	100.00%		
		Total	Percentage		
Yes, 2 - 5 times	Yes	15	88.24%		88.24%
	No	2	11.76%		
Sum		17	100.00%		
		Total	Percentage		
Yes, more than 5 times	Yes	6	75.00%		75.00%
	No	2	25.00%		
Sum		8	100.00%		
Total		90		Average Yes*	74.51%

*only if a delay has been experienced

Appendix IV.II

Willingness to use app given an experience of a +120 minute delay

		Total	Percentage	Average Yes
Never	Yes	47	66.20%	66.20%
	No	24	33.80%	
Sum		71	100.00%	

		Total	Percentage	
Yes,once	Yes	8	72.73%	72.73%
	No	3	27.27%	
Sum		11	100.00%	

		Total	Percentage	
Yes, 2 - 5 times	Yes	6	100.00%	100.00%
	No	0	0.00%	
Sum		6	100.00%	

		Total	Percentage	
Yes, more than 5 times	Yes	1	50.00%	50.00%
	No	1	50.00%	
Sum		2	100.00%	

Total	90	Average Yes*	78.95%

*only if a delay has been experienced

Appendix IV.III

Claims made given the right to make a claim

		Total	Percentage	Average Conversion
Yes,once	Yes	7	28.00%	28.00%
	No	18	72.00%	
Summe		25	100.00%	

		Total	Percentage	
Yes, 2 - 5 times	Yes	6	35.29%	35.29%
	No	11	64.71%	
Summe		17	100.00%	

		Total	Percentage	
Yes, more than 5 times	Yes	5	62.50%	62.50%
	No	3	37.50%	
Summe		8	100.00%	

Total		50		36.00%

Appendix IV.IV

Willingness to pay related to answers regarding a +60 minute delay

		Total	Percentage	
Never	1.00 €	20	76.92%	1.38 €
	2.00 €	3	11.54%	
	3.00 €	2	7.69%	
	4.00 €	1	3.85%	
Sum		26	100.00%	

		Total	Percentage	
Yes,once	1.00 €	11	61.11%	1.67 €
	2.00 €	3	16.67%	
	3.00 €	3	16.67%	
	4.00 €	1	5.56%	
Sum		18	100.00%	

		Total	Percentage	
Yes, 2 - 5 times	1.00 €	10	62.50%	1.50 €
	2.00 €	4	25.00%	
	3.00 €	2	12.50%	
	4.00 €	0	0.00%	
Sum		16	100.00%	

		Total	Percentage	
Yes, more than 5 times	1.00 €	2	28.57%	2.57 €
	2.00 €	1	14.29%	
	3.00 €	2	28.57%	
	4.00 €	2	28.57%	
Sum	0	7	100.00%	

Total		67		1.61 €

Appendix V

Combination of Survey and Market Data

Appendix V.I

Actual conversion rate

Claims made (2012)	900,000
Potential Claims (2012)	4,392,034
Conversion rate	20.49%

Appendix V.II

Adjustment factor

Real conversion rate	20.49%
Obtained conversion rate	36.00%
Adjustment factor	0.57

Appendix V.III

Adjusted rates for willingness to use app

	60 min	120 min
Original rate	74.51%	78.95%
Adjustment factor	0.57	0.57
Adjusted rate	42.41%	44.94%

Appendix V.IV

Application of adjusted rates (120 min and 60 minutes)

	60 min	120 min
Total passengers	3,882,640	509,394
Adjusted rate	42.41%	44.94%
Respective potential users	1,646,701	228,911
Total potential users		1,875,612

Appendix V.V

Average price	1.61 €
1 €	43
2 €	11
3 €	9
4 €	4
Abstentions	25
Sum	92

Appendix V.VI

Total yearly market potential

Total potential users	1,875,612
Average price	1.61 €
Total yearly market potential	3,023,375 €

Appendix VI

Optimum Price

Appendix VI.I

Data for regression analysis

Delays	No Delay	1x 60 min delay	2 - 5x 60 min delay	5+x 60 min delay
Price	1.38 €	1.67 €	1.50 €	2.57 €
Absolute	67	25	41	7
Percentage	100%	37%	61%	10%

Appendix VI.II

Approximated price sales function & revenue function

$$p = -0.018x + 2.42$$

$$r = -0.018x + 2.42x$$

Appendix VI.III

Cost structure & cost function

Postage		0.90 €
Print		0.33 €
In-app purchase	30%	0.53 €
No profit line		1.76 €

$$c = 1.956x - 0.0054x^2$$

Appendix VI.IV

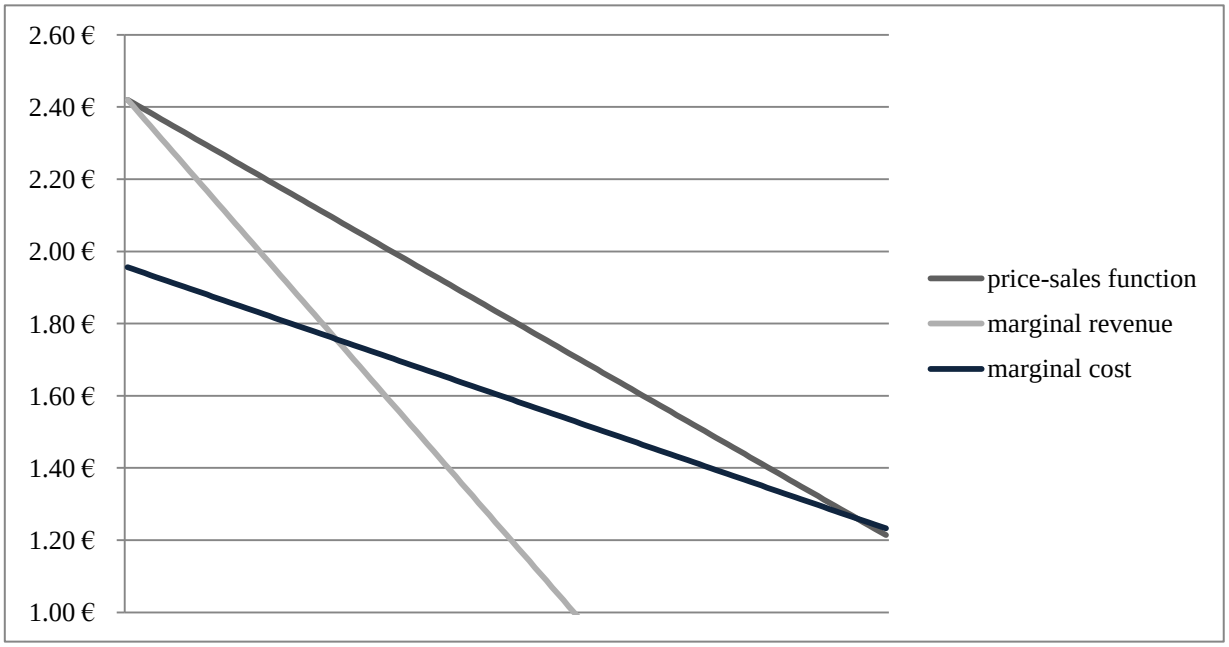
Optimum price

$$marginal\ cost\ = marginal\ revenue$$

$$1.956\ -0.0108x = 2.42\ -0.036x$$

$$x(percentage\ of\ passengers) = 18.41(27.47\%)$$

$$p = 2.09€$$



Appendix VII

Market Size and Potential Profit

Appendix VII.I

Potential monetary market value of Claims

Percentage	27.47%
Price	2.09 €
Eligible passengers	1,875,612
Total	1,076,832 €

Appendix VII.II

Cost Structure at 2,09 €

Price		2.09 €
Postage		0.90 €
Print		0.33 €
In-app purchase	30%	0.63 €
Profit per Claim		0.23 €

Appendix VII.III

Potential profit

Profit per Claim	0.23 €
Percentage	27.47%
Eligible passengers	1,875,612
Total	120,048.73 €

Appendix VIII

Survey (Mils)

Wie viele Briefe verschicken Sie jährlich (privat)?		Total	Percentage
	0 - 5 Briefe pro Jahr	71	66%
	6 - 10 Briefe pro Jahr	20	19%
	11 - 20 Briefe pro Jahr	10	9%
	21 oder mehr Briefe pro Jahr	6	6%
	Abstentions	0	
Sum		107	100%

Wie viele Briefe verschicken Sie jährlich ins Ausland (privat)?		Total	Percentage
	0 -5 Briefe pro Jahr	95	89%
	6 - 10 Briefe pro Jahr	9	8%
	11 - 20 Briefe pro Jahr	2	2%
	21 oder mehr Briefe pro Jahr	1	1%
	Abstentions	0	0%
Sum		107	100%

Wie viele Briefe schreiben Sie jährlich handschriftlich?		Total	Percentage
	0 - 5 Briefe pro Jahr	85	79%
	6 - 10 Briefe pro Jahr	15	14%
	11 - 20 Briefe pro Jahr	4	4%
	21 oder mehr Briefe pro Jahr	3	3%
	Abstentions	0	0%
Sum		107	100%

Folgendes Beispiel: Nehmen wir 1€ inkl. Porto, Kuvert und Druckkosten (am Rechner zu Hause) für einen Brief in die USA mit der Deutschen Post an. Der Brief braucht 5 Tage um sein Ziel zu erreichen. Schätzen Sie wie viel Sie im Schnitt bereit wären mehr zu zahlen wenn der Brief das Ziel in der Hälfte der Zeit (=2,5 Tage) erreicht.		Total	Percentage
	nichts	21	20%
	0,25€	7	7%
	0,50€	25	23%
	0,75€	1	1%
	1,00€	31	29%
	1,25€	6	6%
	1,50€	3	3%
	1,75€	0	0%
	2,00€	13	12%
	Abstentions	0	0%
Sum		107	100%

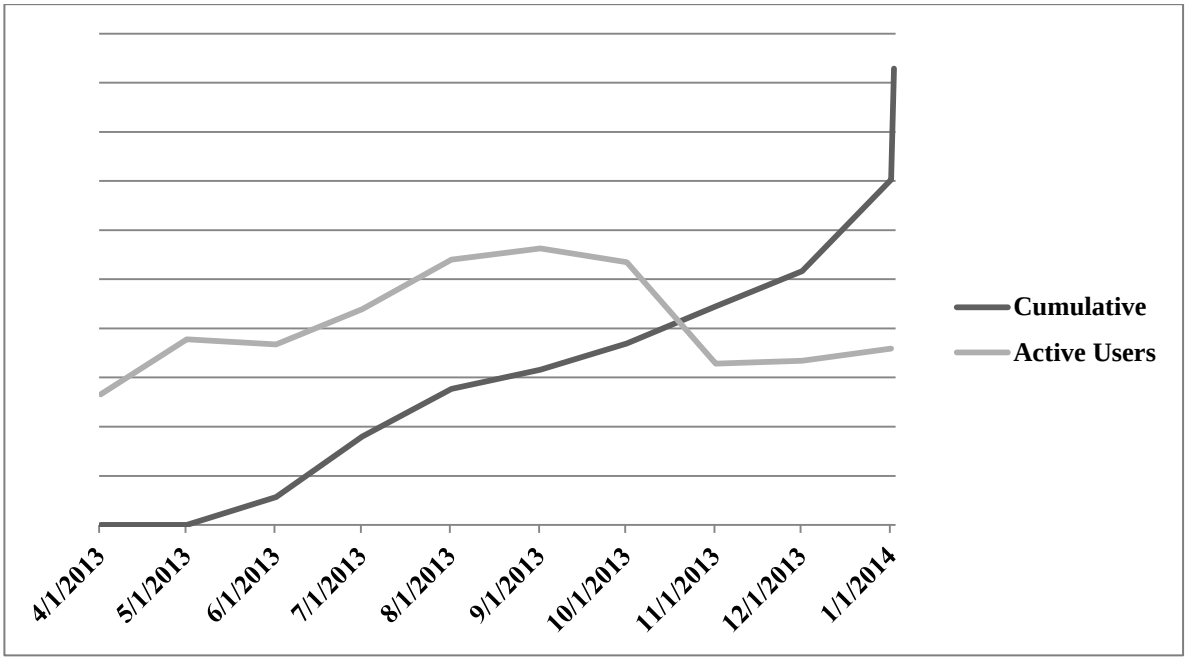
Mit unserer Software können Sie PDF/Word Dokumente als Brief drucken, kuvertieren und verschicken lassen. Zusätzlich können Sie ihre Unterschrift über unsere Android, iOS und Windows Phone Apps hinzufügen. Wie viel wäre Ihnen das pro Brief wert?		Total	Percentage
	0,00 €, Ich würde einen solchen Service nicht beanspruchen	31	29%
	0,50 € nach Deutschland, 2€ international	30	28%
	1,00 € nach Deutschland, 2,50€ international	28	26%
	1,50 € nach Deutschland, 3,00€ international	6	6%
	2,00 € nach Deutschland, 3,50€ international	11	10%
	2,50 € nach Deutschland, 4,00€ international	0	0%
	3,00€ nach Deutschland, 4,50€ international	0	0%
	3,50€ nach Deutschland, 5,00€ international	0	0%
	4,00 € nach Deutschland, 5,50€ international	1	1%
	Abstentions	0	0%
Sum		107	100%

Wie viel wäre Ihnen der gleiche Service auf dem Smartphone wert?		Total	Percentage
	0,00 €, Ich würde einen solchen Service nicht beanspruchen	35	33%
	0,50 € nach Deutschland, 2,00€ international	27	25%
	1,00 € nach Deutschland, 2,50€ international	28	26%
	1,50 € nach Deutschland, 4,00€ international	5	5%
	2,00 € nach Deutschland, 3,50€ international	9	8%
	2,50 € nach Deutschland, 4,00€ international	0	0%
	3,00 € nach Deutschland, 4,50€ international	2	2%
	3,50€ nach Deutschland, 5,00€ international	0	0%
	4,00 € nach Deutschland, 5,50€ international	1	1%
	Abstentions	0	0%
Sum		107	100%

Wie alt sind Sie?		Total	Percentage
	0-20	9	8%
	20-30	91	85%
	30-40	5	5%
	älter	2	2%
	Abstentions	0	0%
Sum		107	100%

Appendix IX

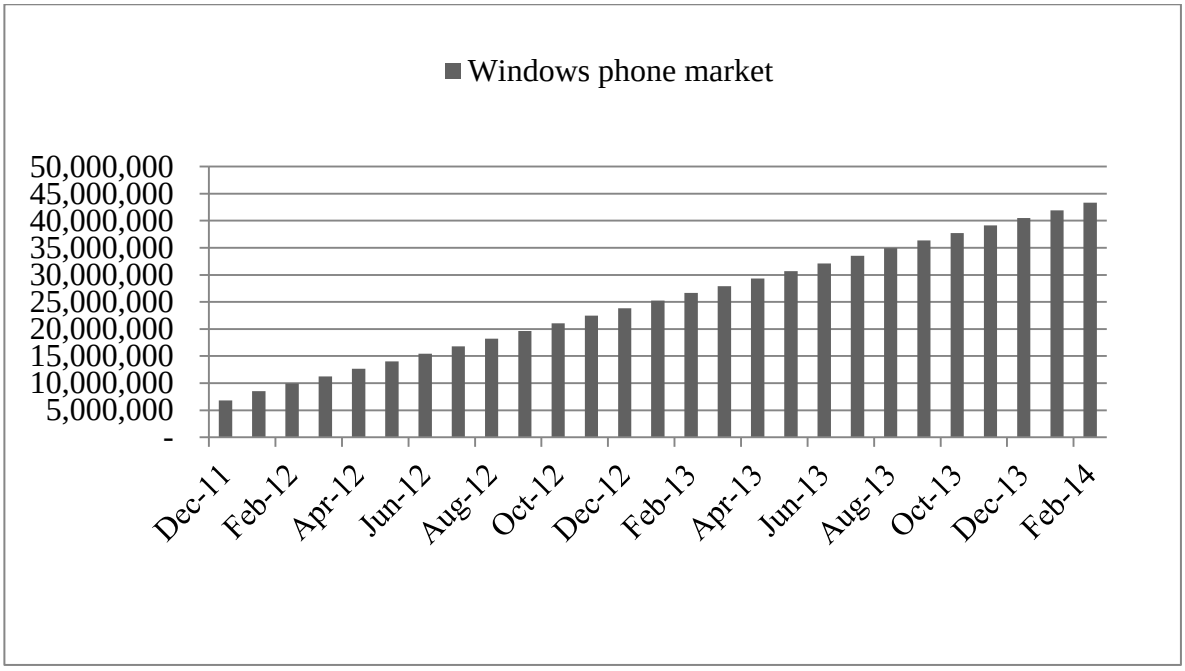
Proxy Data



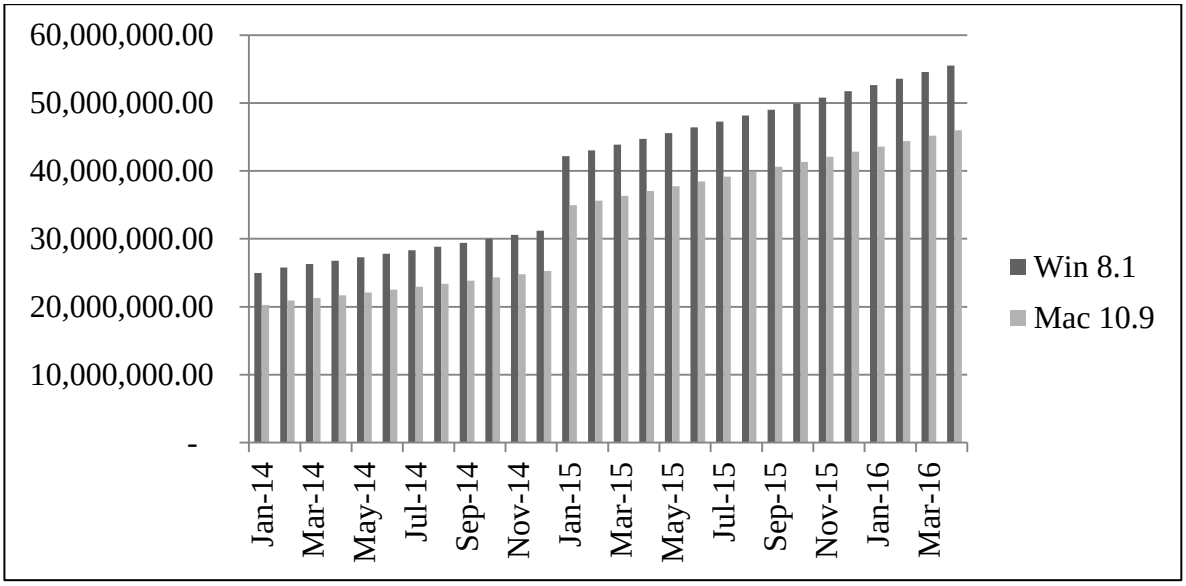
Appendix X

Market Data (Mils)

Appendix X.I



Appendix X.II



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