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Abstract:

The private aviation is not as exclusive and financially unreachable as it used to be. There are many companies that are trying to offer the best deal on the requested flight, let people to buy positioning flights for discounted prices or to share the private jet flight with someone else.

But there are still many challenges these companies did not solve – such as truly sophisticated sharing of the flights, not leveraging the full potential of automation, lack of focus on selling of the positioning flights, complying with aviation regulations, etc.

There is still no company that offers a single-point-of-access to the full private aviation experience – from chartering the flights to sharing one with others to joining a positioning flight.

The goal of this thesis is to identify the most pressing problems of online brokerage of private flights and propose a new platform solving these problems in a complex, sophisticated way.

1. Table of Contens

2. Acronyms

AOC	Aircaft Operator certificate
ATPL	Air Transport Pilot Licence
BMC	Business Model Canvas
BM	Business Model
CEO	Chief Executive Officer
CPL	Commercial Pilot Licence
EU	European Union
FAA	Federal Aviation Agency
FBO	Fixed Base Operator
MIT	Massachusetts Institute of Technology
MSP	Multi Sided Platform
P2P	Peer to Peer
PA	Personal Assistant
PPL	Private Pilot Licence
UML	Universal Modelling Language
UAE	United Arab Emirates
UK	United Kingdom
USA	United States of America
VIP	Very Important Person

3. Introduction

3.1. Background

3.1.1. Private jets

After the Second World War, which catalyzed the development of the aviation, a lot of both individuals and businesses started to see the potential of the air travel. The ability to be physically present to meetings obviously offered a competitive edge, but especially early after the Second World War, there simply was not enough commercial flights to cover the need and flexibility required for frequent business-related flying.

William Lear, an American inventor, and businessman came up with the first business jet in 1963 [w1]. Since then, tens of thousands business people, celebrities, and politicians started to use business jets, now commonly referred to as private jets, since they do not only serve to business purposes anymore.

Even now, when there are far more commercial flights than ever before, businesses who regularly charter private flights for their top executives produce 219% higher earnings grow than the companies that stick to commercial flights [o4].

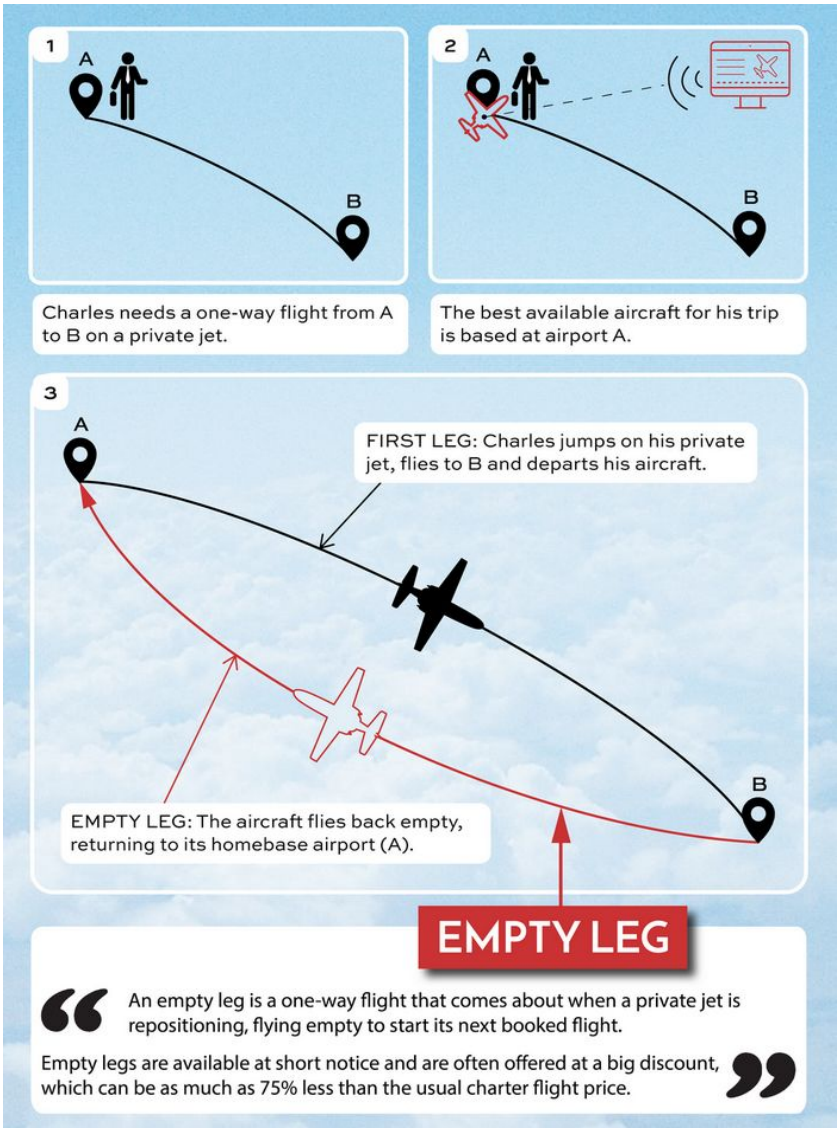
The current number of operational private jets is just above 21 000 [o2], serving more than 2 million flights annually [o3].

3.1.2. Positioning flights flights

When a private jet is hailed, it usually has to fly to another airport to pick up the flyer. And in a case of most flights, it flies back to the base empty. Positioning flights are used for getting the aircraft to the airport of departure requested by the customer. "*If an aircraft that is currently on the ground in Paris is booked for a flight from Geneva to London, it will need to fly to Geneva to collect the passengers and to start the flight.*" **[w26]**. You can see an an example in Figure 3.1 **[w27].**

These flights with no one onboard are called "positioning" or "empty leg", or "non-revenue" flights, with the above-mentioned names being interchangeable. These flights take up to 40% of all the private jet traffic **[w7]**.

FIGURE 3.1



3.1.3. Economical context

To make up for the non-revenue positioning flight, operators usually charge the customer for all the flight time and all expenses related to providing the chartered flight - that means also at least the part of positioning flight.

In past 5 years, new businesses emerged to render positioning flights not only not lossy, but even profitable without the need to charge the customer responsible for the creation of the need for a positioning flight. This is usually achieved though selling the positioning flights on various websites.

Some of these will be a subject to an analysis as a part of this thesis, because of there is a lot of obstacles that still need to be overcome. These businesses are investigated in detail in Chapter 6.

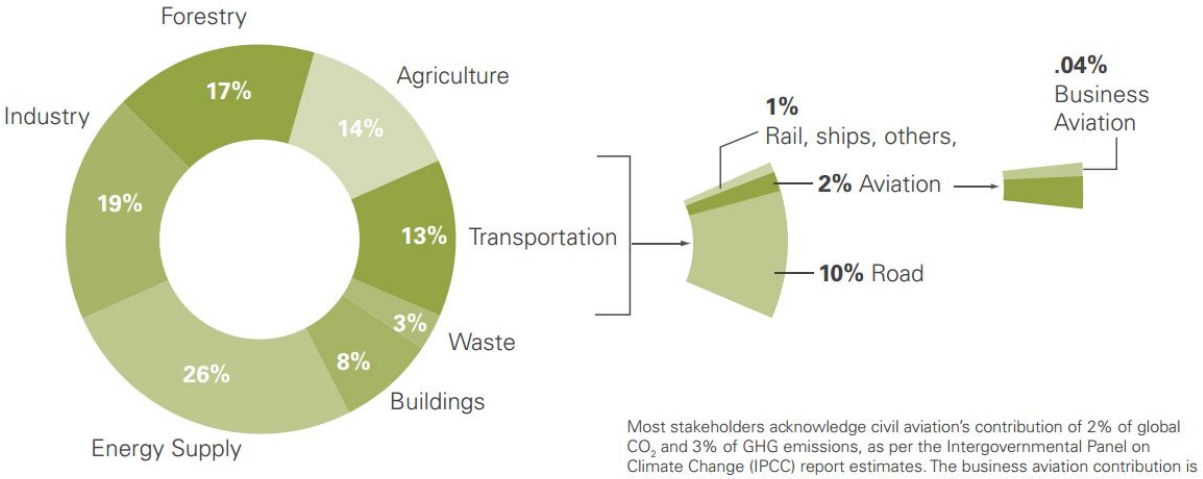
3.1.4. Ecological context

Every flight (regardless the generated revenue) means that the aircraft has to burn fuel. However, the business aviation accounts only for about 5% of aviation carbon footprint **[w2]** , as seen in Figure 3.2 **[o5]**, which is 0.04% of total carbon footprint.

Although decreasing of the footprint should be one of the objectives in general, the ecological context of the business aviation is neglected in this thesis, due to its very limited impact on the total carbon footprint.

FIGURE 3.2

Contributors to Global Emissions



Most stakeholders acknowledge civil aviation's contribution of 2% of global CO_2 and 3% of GHG emissions, as per the Intergovernmental Panel on Climate Change (IPCC) report estimates. The business aviation contribution is estimated at 2% of aviation emissions or 0.04% of global emissions.

Source: "Business Aviation Commitment on Climate Change," GAMA/IBAC, 2010

3.2. Motivation

As mentioned above, in Europe, positioning flights account for approx 47% of flights. Ranging from €3.000 to €10.000 per flight hour (see pricing at Section 6.4), there is a huge potential for revenue. There are already companies that offer the positioning flights to individuals through different business models (Section 6.10.2).

One of the biggest obstacles of selling positioning flights to the individuals that would use them instead of chartering a new flight is that positioning flights - at least to some extent - loose the core feature of private jets: the flexibility.

Unlike the new flights, the positioning flights' main purpose is to get the aircraft to the chosen airport to enable another chartered flight. This limits the possible departure time to a significantly smaller window and discussion over other options, i.e., aircraft type, onboard services, etc. is off the table - meaning that not all the positioning flights will not find any buyers in the traditional customer group.

But there is another customer group who might be interested, enabled by the availability of the internet: regular travelers, who wish to try out the luxury provided by private jets - either on a special occasion, such as bachelor party or simply as a substitute for the first or business class on airline flights.

This customer group has two advantages over the previous one in terms of booking of private flight - neither the exact time nor the need to have a perfect privacy is the top concern for them.

Elimination of these two limitations enables another way of selling the positioning flights - sharing by multiples parties. Of course, this idea is not new, few companies already tried this in one way or the other (see Chapter 6), but most of them consider in only and addition to their business model, not a core feature. Also, available ways of buying these flights demonstrate the lack of focus on this part of operations.

But sharing of the flights only amplifies some of the promlems related to the standard charter, such as a lot of communicatio overhead, enriched by many (based of the size of the jet) different people communicating and trying to agree on the terms of flights.

Existing companies already showed that the negotiation part can be quite simplified using automated web interface. Now the next step is to facilitate communication among many different users who want to share particular flights.

Furthermore, none of the companies really include the positioning flight into the whole private aviation experience, thus degrading its potential via isolation from the rest of the operations. The single-point-of-access approach is currently unprecedented and proposal how to change this is also part of the outcome fo this thesis.

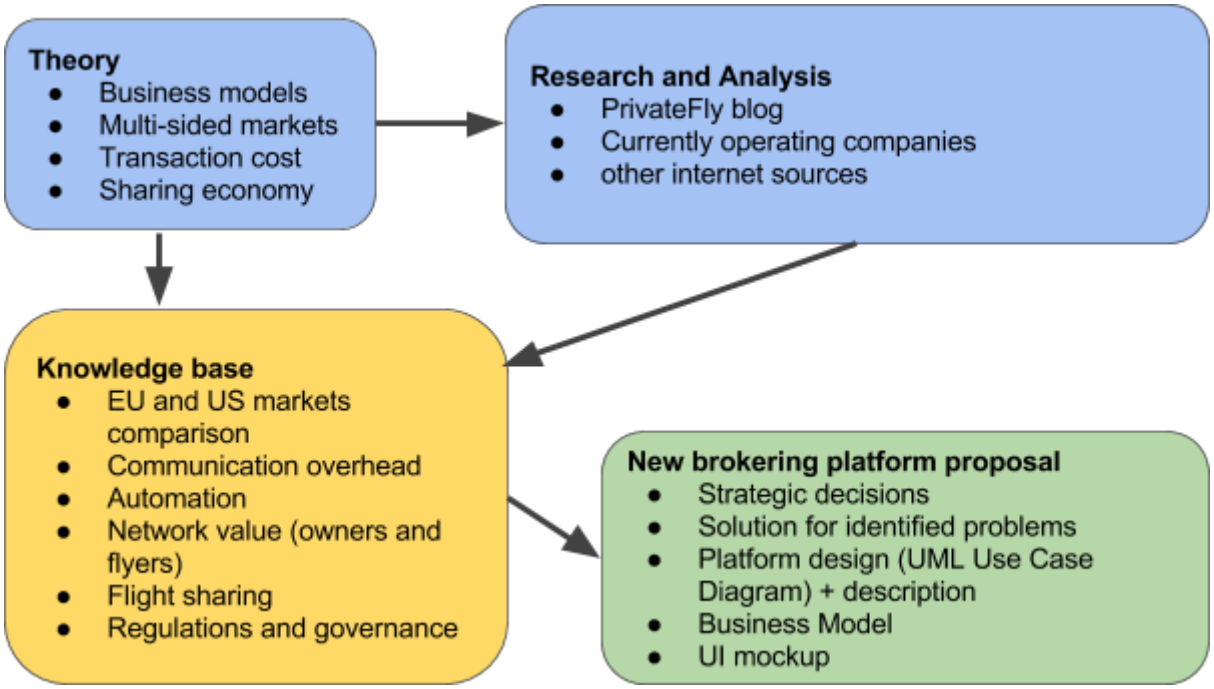
3.3. Objective

The main objective is the analysis of the private aviation industry in the context of sharing economy and network value with a focus on the positioning flights, used as a knowledge base proposal of a new platform serving for brokerage of both charter and positioning flights using the principles of sharing economy.

With the main objective in mind, the following secondary objectives should be completed:

- Identify the problems of the brokerage in private aviation in general
- Identify the problems of flight sharing in relation to governance and regulations
- Propose solutions for the identified problems with focus on sharing of (positioning) flights
- Propose a platform that provides a single point of access for full private aviation experience

4. Methodology



4.1. Theory

The theoretical basis for this thesis has four pillars that are interconnected in the different views on the private aviation:

- business models,
- multi-sided markets,
- transaction cost, and
- sharing economy.

The business models are a basic tool to describe an operation of any organization or to design a new one. In this thesis, the Business Model Canvas (BMC) is used to do this. The main advantage of the BMC approach is the simplicity and straightforwardness of this visual-based business modeling tool.

As for the two-sided markets, the private aviation industry is a perfect example

of one, with flyers on one side and operators on the other. Furthermore, one can investigate the network value from both aircraft and flyer point of view and its effect on the pricing of the services.

The transaction cost, in this case mostly in form of time invested in chartering the flights is one of the main issues in the brokerage industry to this day and a lot of companies are trying to address this issue. Currently, there is a lot of communication overhead in the process of chartering of the private flight and in the brokerage of the positioning flights as well.

Finally, the sharing economy is an emerging trend both in private aviation and sharing of services in general, driven mostly by the rapid growth or the usage of the internet and social media, that allow instant communication with a broad network of people.

4.2. Research and Analysis

The author will start with the analysis of the private aviation industry in general with a focus on on-line brokerage services, discussing them in the context of the theory topics mentioned above.
The author will gather knowledge private aviation from following sources:

- analysis of the PrivateFly online blog about the industry in general,
- analysis of both existing and canceled private aviation companies,
- research of other internet sources focused on private aviation.

PrivateFly is private jet charter company, currently operating in 19 countries in Europe, North America and UAE. On their website, they - among other things - frequently post to their blog **[w15]**. The posted articles commonly have a clear marketing purpose, such as promoting new services, interesting offers, etc., but roughly 10% of the currently available articles contain interesting industry insights.

Besides PrivateFly, the are many other companies focusing on the brokerage in private aviation - the analysis of their operation, successes and/or failures gives a valuable insight into the challenges and opportunities of the industry.

Combined with other internet sources, these two are great sources for creating a basic knowledge base on the topic of the thesis.

Based on the analysis of all these sources in combination with the theoretical background, the author will be able to create a knowledge base that focuses mostly on:

- EU and US markets comparison
- Communication overhead
- Automation
- Network value (owners and flyers)
- Flight sharing
- Regulations and governance

4.3. New brokerage Platform Proposal

After creating the knowledge base, the author will use the acquired knowledge for a proposal of an online brokerage platform for private jets with sharing economy principles and focus on solving the shortcomings of the existing companies.

This proposal will consist of the introduction of new features, UML use case diagram with the detailed description, proposed business model and mockup of UI.

4.3.1. Framework

As Andrei Hagiu of MIT says in in the preface of Strategic Decisions for Multisided Platforms **[a16]**, " *building and managing a winning platform isn't easy*". There are many aspects and different view to consider while designing one. Hagiu calls them "challenges" and are the backbone of the successful approach to building a multi-sided platform:

1. How Many Sides to Bring on Board
2. Multisided Platform Design
3. Multisided Platform Pricing Structures
4. Multisided Platform Governance Rules

This approach is described in a relatively short paper (12 pages) but is systematic and concrete enough to be used as a theoretical framework for the design of a multisided platform.

The paper is used as a part of the theoretical background in Chapter 5, as a starting point for the analysis of the operation of currently operating companies in the private aviation, mostly in focus on the pricing and governance.

Ultimately, the main four points and their subpoints are used as a structure for proposing a new private flight sharing platform in Chapter 7, where the findings of the outcomes of analysis in the Chapter 6 serve as a base. Thanks to the concrete points of this theoretical framework, the author is able to organize problems of the current sharing platforms and recommend a solution in a structured manner.

4.3.2. Design

Once all the strategic decisions are made, the author can begin to focus on the design itself - he will start with modeling the whole UML Use Case Diagram, describing in detail all use cases in a top-down manner.

4.3.3. Delimitation

Since the actual implementation of the platform providing a brokerage service would be for multiple reasons (time constraints, technical complexity, manpower limitations) beyond the scope of this thesis, the author focuses on making a UML Use Case Diagram describing the platform, with mockup of the user interface.

5. Theory

5.1. Business Model

5.1.1. Defintion

The business model (BM) concept was considered ill-defined **[a2]** for a long time. Al-Debei et al **[a1]** take a look at the currently available definitions of the BM concept, ranging from "*Strategy that reflects the architecture of a virtual organization along three main vectors: customer interaction, asset configuration and knowledge leverage.*" by Venkatraman and Henderson **[a2]**, which is missing basics as both revenue sources and value propositions, through "*A description of roles and relationships of a company, its customers, partners and suppliers, as well as the flows of goods, information and money between these parties and the main benefits for those involved, in particular, but not exclusively the customer.*" by Bowman **[a3]** to concrete, yet not explicitly specifying (among other things) definition by Osterwalder et al. **[a4]** that the BM could be used not only for description but also for future planning "*A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value relationship capital, to generate profitable and sustainable revenue streams*".

Al-Debei et al **[a1]** suggest a methodology for the definition of BM concept:

- The definition should be comprehensive and general;
- it is not sufficient to define the business model only in terms of its components;
- the business model is defined for a single organization;
- the definition should synthesize the different points of view presented in earlier research.

Following this methodology, they ultimately build the BM concept definition piece by piece, using parts of previously used definitions, which is "*an abstract representation of an organization, be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational, and financial arrangements designed and developed by an organization presently and in the future, as well as all core products and/or services the organization offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives*" **[a1]**.

The author considers the last definition as the best fit for this thesis since it is compatible with both description of business models of current companies and using it for the proposal for founding a new one.

5.1.2. Business Model Canvas (BMC)

The BMC is a visual template for documenting or creating a new business model proposed by Osterwalder et al **[a5]**. "*The Business Model Canvas is presented as a shared language for describing, visualizing, assessing and changing business models. It is focussed on design and innovation, in particular by using visual thinking which stimulates a holistic approach and storytelling. The Canvas is a follow up of the Business Model Ontology **[a6]**. In this ontology, the elements are grouped into four pillars: customer interface (segments, relationships, and channels), product (value proposition), infrastructure management (activities, resources, and partners) and financial aspects (revenues and costs).*" **[a7]**

In this thesis, the BMC is used for the visualization of the business model of the newly proposed platform, followed by detailed description of key elements, based on the operations and featured discussed in the first part of Chapter 7.

5.2. Multi-sided platforms (MSPs)

5.2.1. How Many Sides to Bring on Board

5.2.1.1. Basic facts

"*Two-sided (or more generally multi-sided) markets are roughly defined as markets in which one or several platforms enable interactions between end-users, and try to get the two*

(or multiple) sides "on board" by appropriately charging each side. That is, platforms court each side while attempting to make, or at least not lose, money overall" **[a8].**

The first choice when building a new multisided platform is to decide how many sides the platform should serve. **[a16]** The are a couple of things to consider - number of parties in the industry, the aim of the platform, the difficulty to manage the relationships among the different sides, etc. The relationships are usually governed via the design of the platform (functionality), pricing and measures.

Also, each side included increases the overall complexity of the operation and quite possibly the pricing. It is important to make sure that the sides included are sufficient to drive enough revenue to make the operations viable. Then, during the strategic decision-making must be decided what percentage of revenue will be driven by each of the sides. This is very much dependent on the type of the platform and is discussed later in the pricing section.

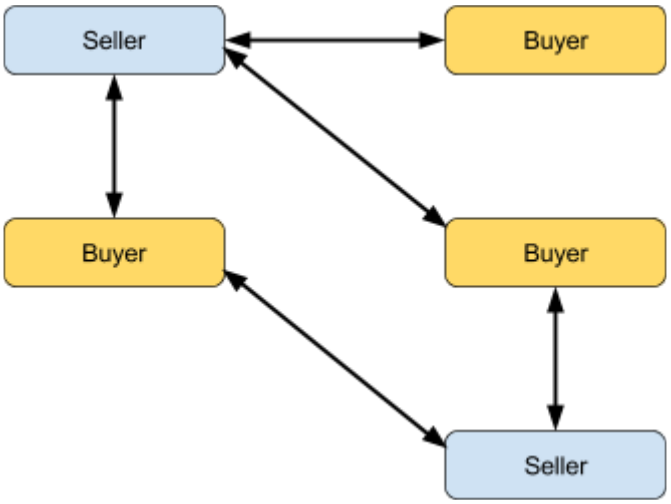
In many cases, the number of sides in the multi-side platform is simply given by the industry itself. In a standard buyer-seller relation, which is also the case of the private aviation, there are only two sides. There are many great examples of two-sided markets and their platforms that can serve as an inspiration.

- drivers and riders have Uber
- property ownes and tenants have Airbnb
- gamers and game developers have X-box, Sony Play Station, etc.

As seen in the examples, most of the two-sided platforms focus on reducing the information, search and transaction cost. In a case of private aviation, until just recently, the communication between the two sides was moderated by brokers, which made relationships and communication in the market quite complex, as described in the Section 6.10.

But now, the new multi-sided platforms rose, focusing on these issues. "MULTISIDED PLATFORMS (MSPS) are technologies, products or services that create value primarily by enabling direct interactions between two or more customer or participant groups." **[a16]**. Most prominent examples of such platforms in private aviation are Victor, JetSmarter and other companies mentioned in the chapter.

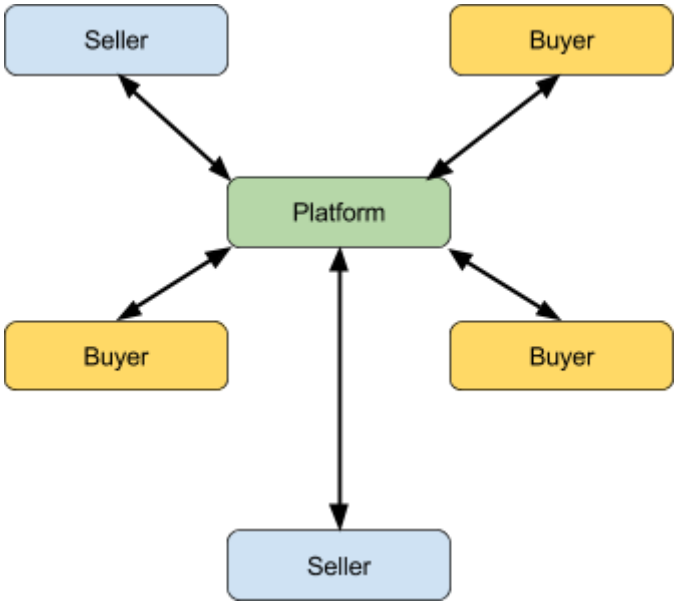
FIGURE 5.1



Generally speaking, the two-sided platform creates value by intermediating an interaction between two market sides. Originally, buyers and sellers communicated directly, often not everyone with everyone else (Figure 5.1).

Multi-sided platforms allow participants from both sides to communicate with a single node (Figure 5.2). Another difference is in comparison to the traditional buyer-seller scheme is that multi-sided platforms decrease the transaction cost and limit duplication. Especially the latter is important in the private aviation industry, as discussed in Chapter 6.

FIGURE 5.2



5.2.1.2. Network effects

The two-sided market is, by definition, a subject to network effects, both positive and negative, same-side and cross-side.

The basic direct and positive network effect is that "*[...]the utility that a given user derives from the good depends upon the number of other users who are in the same "network" as is he or her.*" **[a8]** For instance, the more people bought a telephone to their household, the higher value the whole network has because it allows more people to communicate.

"*The central feature of the market that determines the scope of the relevant network is whether the products of different firms may be used together*" **[a8]**. The larger the scope and the more firms involved, though, the more competition arises, which is considered a same-side negative effect (from their perspective).

In private aviation, just like ani any other two-sided market, there are there are two main groups that represent value - in this case, it's the number of operators (charter companies), which, by extension, corporate with the number of offered aircraft, increasing the network value for buyers.

The number of flyers - buyers - on the other hand, increases the number of potential customers in the pool, making the network more attractive to other sellers as well. This is known as indirect network effect **[a17]** and is the origin of the chicken-and-the-egg problem - especially in the early stages, it is hard to get enough users from both sides onboard, wich would increase the overall value of the network, driving more users to start using the platform. This proven deadly for otherwise successful BlackJet, for which the creation of a critical mass of users was one of the main reasons for the shutdown.

According to Metcalfe's law **[a21]**, the value of a network is N^2, where the N is a number of nodes (users) participating in the network. In the case of a platform for flight sharing, this is best applicable to the flyer side - where each new user is a possible new connection for the sharing of the flight. In reality, the value brought by each new user is a bit different - based on the frequency of flying, location, willingness to share, etc.

In combination with the first-mover advantage, this is one of the main reasons, why in multi-sided markets, there are often only a few big players with little to no competition. Perfect examples of this are credit card networks MasterCard and Visa, or an operating system Windows. More examples of two-sided markets in Figure 5.3 **[a10]**.

Network effects are also responsible for the constant or increasing returns to scale, unlike in traditional manufacturing or service businesses, which face diminishing return with a growing number of users.

On the side of the platform - operators - the network value is more just N, where N is the number of the aircraft. The reasoning is simple - there are no connections among the aircraft. Then, in reality, the value is also affected by the base, type, and other aircraft parameters.

FIGURE 5.3

NETWORKED MARKET	SIDE 1	SIDE 2	PLATFORM PROVIDERS
			Rival Providers of Proprietary Platforms
PC operating systems	Consumers	Application developers*	Windows, Macintosh
Online recruitment	Job seekers*	Employers	Monster, CareerBuilder
Miami Yellow Pages	Consumers*	Advertisers	BellSouth, Verizon
Web search	Searchers*	Advertisers	Google, Yahoo
HMOs	Patients*	Doctors	Kaiser, WellPoint
Video games	Players*	Developers	PlayStation, Xbox
Minneapolis shopping malls	Shoppers*	Retailers	Mall of America, Southdale Center
			Rival Providers of Shared Platforms
Linux application servers	Enterprises	Application developers	IBM, Hewlett-Packard, Dell
Wi-Fi equipment	Laptop users	Access points	Linksys, Cisco, Dell
DVD	Consumers	Studios	Sony, Toshiba, Samsung
Phoenix Realtors Association	Home buyers*	Home sellers	100+ real estate brokerage firms
Gasoline-powered engines	Auto owners	Fueling stations	GM, Toyota, Exxon, Shell
Universal Product Code	Product suppliers	Retailers	NCR, Symbol Technologies

*Denotes network's subsidy side

5.2.2. Multisided Platform Design

Every platform, multi-sided or not, must have a purpose - a functionality creating a value for both sides. This value is delivered via features. "*For most of these features, the decision whether to include them is amenable to a straightforward cost-benefit analysis: If the cost of building and implementing is less than the value created for the*

multiple sides served, include them. " **[a16]** In the case of a platform for sharing flight in private aviation, the value is reduced search and transaction cost.

5.2.3. Multisided Platform Pricing Structures

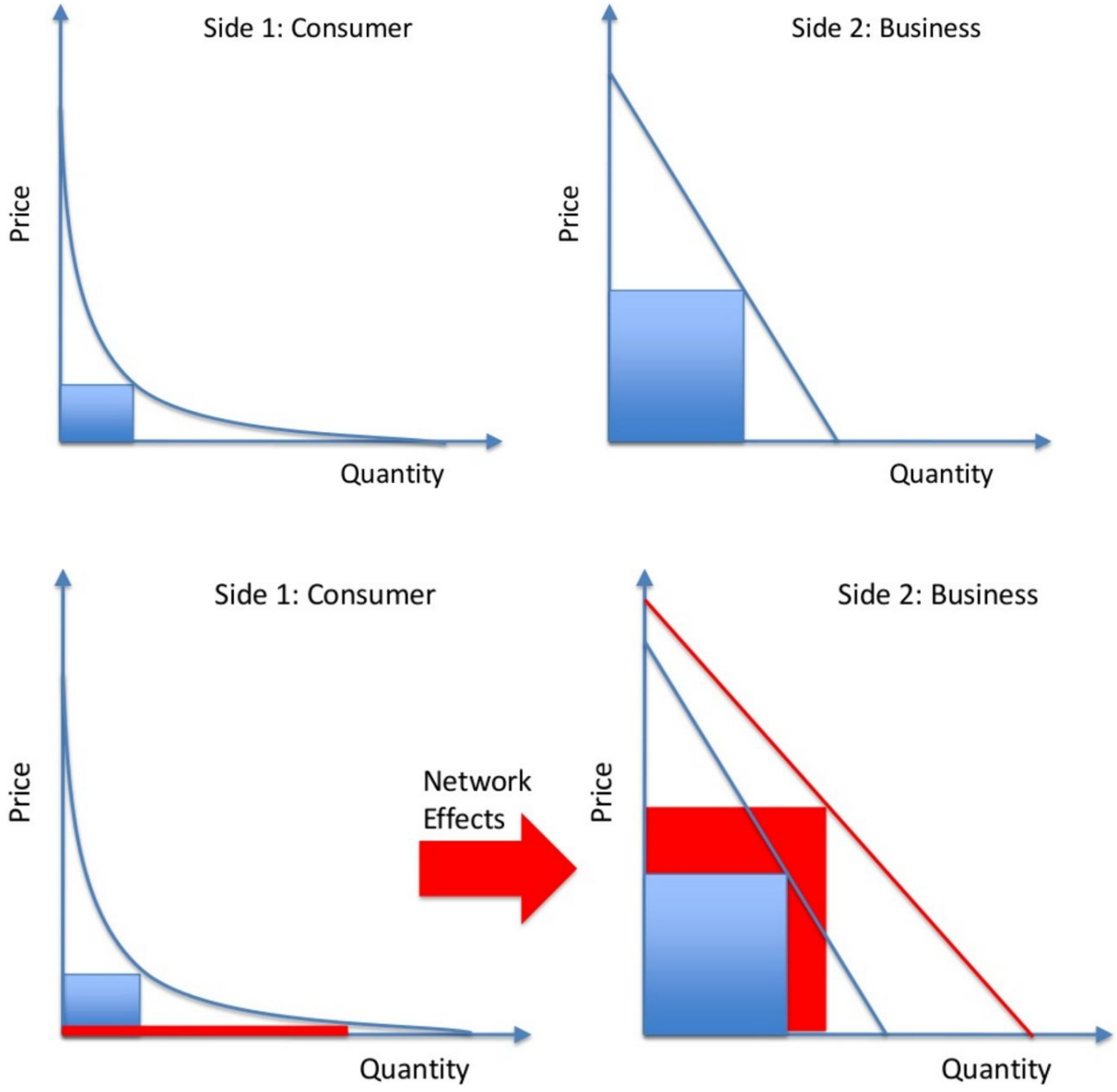
In multi-sided platforms, it is considered common that one of the sides subsidize the other. This could work as an incentive for the other side to get onboard, increasing the value of the network, fighting the chicken-and-egg problem mentioned above. The decision on pricing of each side (or giving it out for free) is the critical part of strategy during building an MSP.

"*Pricing to one side of the market depends not only on the demand, and costs that those consumers bring but also on how their, participation affects participation on the other side and the profit that is extracted from that participation. [...] In a two-sided market, pricing decisions will also include the elasticity of the response on the other side and the mark-up charged to the other side. Since the platform faces a similar computation on the other side, prices on both sides of the market depend on the joint set of demand elasticities and marginal costs on each side.*" **[a9]**

Following Figure 5.4 helps to illustrate most common pricing policy in two-sided markets: Subsidizing quality- and price-sensitive users. As seen below, a significant decrease of price for consumers driving higher demand causes greater profits (red areas combined) **[w33]**.

This is policy is will be used for some of the strategic decisions in the Chapter 7 when decicing on the pricing structure and governance rules for the offering of the positioning flights.

FIGURE 5.4



"If PDF document readerswere charged even a tiny amount, Adobe Acrobat Reader's immense user base would be much smaller, reducing document producers' interest and their willingness to pay a premium for access to readers. Readers, much more price sensitive than document producers, wouldn't pay for access to a bigger base of writers." **[a10]**

Another interesting aspect of many MSPs, which is certainly case of any online platform of for prvivate aviation as well, is the economy of scale - "*average cost of serving a customer (on a given side) or of enabling an individual transaction declines with the total number of customers that participate or transactions that are enabled.*" **[a16].** As in case of many SW products, the is "*up-front (fixed) development costs and low or zero*

marginal costs when they add users " **[a16]**, which is, among others, another reason for having only one, or just a few main players in each industry.

Hagiu **[a16]** advocated 3 basic principles:

1. *For each group, charge a higher price when the group in question has less price sensitivity.*
2. *If there is no priced transaction between the sides, then charge more to the side that stands to benefit more from the presence of the other side or sides.*
3. *If there is a priced transaction between two sides, then charge more to the side that can extract more value from the other side.*

These basic principles, in combination with learning from analysis of current companies in Chapter 6, are a sound foundation for a pricing strategy and will be used in Chapter 7, once the features are presented.

5.2.4. Multisided Platform Governance Rules

Governance rules define the boundaries for actions of the parties involved. "*Key part of the strategy should be some regulation of third-party actions, which clearly affect the value of the MSP's entire ecosystem and customer proposition. MSPs can regulate their various customers by resorting to nonprice governance rules, which fall into two major categories:*

- *Rules regulating access to the MSP: Who is allowed to join?*
- *Rules regulating interactions on the MSP: What are the various sides allowed to do?* **[a16]**

As for the access rules, in private aviation, most of them would include safety and licensing obligations for the operators' side and membership or initiation fee for the flyers. When it comes to the regulation of interactions, that is mostly a business decision. Both types of governance will be discussed in detail later on, especially in Chapter 7 as a conclusion from the analysis in Chapter 6, before deciding on governance for the newly proposed platform.

Furthermore, "*MSP executives should ask*: What are the *market failures that would prevent our ecosystem from functioning properly (or even lead to its collapse) and that we cannot eliminate through pricing? [...] There are three potential sources of market failures that warrant active governance by the MSP.*" **[a16]**, as Hagiu explains:

- *"insufficient information and transparency in the market with respect to the quality of the goods*
- *too much competition within one side of an MSP*
- *constituent might fail to take actions or investments"*

The first failure could be caused by the lack of feedback or overwhelming quantity over quality. The second one - too much competition on one side - is self-explanatory and could be the case for both flyers and the operators. And finally, the constituent failing to take actions is a real threat mainly from flyers, which was the case of the shutdown of BlackJet, where another risk surfaced - not the willingness to take the action, but the timing of it.

Each of these potential failures is obviously present in a case of a platform for sharing private flights and will be discussed in detail in the context of specific issues in the proposal chapter.

5.3. Transaction Cost

The roots of the term "transaction cost" are usually tied to two publications by Ronald Coase, a laureate of Nobel Price in Economics, The Nature of the Firm **[a18]** and The Problem of Social cost **[a19]**. Nowadays, we consider transaction cost, simply put, a cost of participating in the market.

In the publication The Problem of Externality **[a20]**, Dahlman differentiates between 3 types of transaction costs:

- Search and information cost
- Bargainning cost
- Policing and enforcement cost

Search and information cost is tied to looking up the product on the market, gathering information about the price, availability, etc. Bargaining cost is the sum of the cost for actually closing the deal - drafting a contract, negotiation, etc. And lastly, the profiling and enforcement cost is the cost of actually honoring the contract and/or enforcing it though a legal action.

When applied on brokerage of private flights, the search and information cost for both seller and buyer are significant. There are many sub-costs involved, as seen in Fiure 5.3 below. Especially in the original model with a high number of independent operators and buyers looking for the best price through multiple brokers and thus creating many requests to sellers for a single trip. This unnecessarily increases the search and information cost for all parties involved.

With the internet-based communication means of communication on the rise and possibility to centralize the communication among a number of both buyers and sellers, the access to information in order co search and compare the options is much simpler. Putting request or offer on such centralized place, i.e., internet forum, brokerage website, etc, represents a possibility to save a significant amount of search costs. Generally speaking, and as the examples in the Section 5.2.1.3 show, "*Successful MSPs create enormous value by reducing search costs or transaction costs (or both) for participants.*" **[a16]**. Private aviation market offers a great opportunity for muti-sided platforms and Victors and others shown, any people ale willing to seize it.

As for the bargaining cost in private flights brokerage, there is a potential for an improvement as well. In case of buyer-seller platform allowing easier access to the information, it is safe to expect the bargaining cost to drop too, simple due to the fact that most of the info about competitive offers is easily accessible and the real bargaining happens in fewer cases - buyers invest only into the best options, leaving some of the sellers that would usually get contacted as well out of the loop.

When it comes to the policing and enforcement costs, those would probably be too much affected by above-mentioned solution, hence not worth discussion in this thesis.

In conclusion, the transaction cost could be significantly decreased by common platform for both buyers and sellers, allowing simpler and faster searching of offers,

their comparison, and communication among interested parties. The main driver of cost reduction would be streamlining the whole process and access to information.

FIGURE 5.3

	Internal costs	External costs
Buyer (flyer)	Researching the market (operators, offers)	Communication and negotiation with sellers (usually mulitple for single trip, to get the best price)
Seller (charter or broker)	Aircraft purchase and maintenance costs, crew, internal communication	Communication and negotiation with buyers (time, route, services, price, ….)

5.4. Sharing Economy

According to Price **[a14]**, "*sharing is the most universal form of human economic behavior, distinct from and more fundamental than reciprocity [...]Sharing has probably been the most basic form of economic distribution in hominid societies for several hundred thousand years.*" Belk **[a11]** focuses more on the economic advantage "*Sharing is an alternative to the private ownership that is emphasized in both marketplace exchange and gift giving. In sharing, two or more people may enjoy the benefits (or costs) that flow from possessing a thing. Rather than distinguishing what is mine and yours, sharing defines something as ours.*" Sharing, as an opposied to individual ownership, however, is not the only type of sharing, as Belk observes **[a13]** "*There are, however, some things that we can share or give away without losing them—a song, a joke, a story, our bodies, things we put up on our Web sites, or music files shared on the Web*".

There is, of course, a huge difference in the conceptual dimensions of sharing, with 3 of them as main differentiation. The first one we all encountered in our lives is the way our parents share their home and belongings with us. Children commonly use their parents' things without an exchange for anything. "*These shared things are, in effect, joint possessions. Although the attendant bills, mortgages, and debts most likely legally belong to the adults in the family, everyone in the family may feel free to use most of the home and its contents. The children need not fear that they will be given an itemized bill*

when they leave to set up homes of their own. [...] Within the family, shared things are, de facto if not de jure, joint possessions. Their use requires no invitation, generates no debt, and may entail responsibilities as well as rights." **[a15]**. The second context of sharing a gift giving, where only the benefits of ownership are shared. And finally, there is also sharing of both the benefits and cost of the ownership, which is the foundation of the sharing economy. This utilitarian approach to sharing is - by some - not recognized as sharing per sé, since " *There is little sense of aggregate extended self, and we begin to worry about free riders and overusers as economic theory and Hardin's tragedy of the commons suggest. In other words, what appears to be sharing is actually more of a self-interested commodity exchange*"**[a15]**.

In recent years, people started to realize, that the Internet is a great place for sharing giving a birth to new phenomena, as Belk describes **[a13]** "*There are burdens to possession, as any homeowner can attest. And with the increasingly rapid pace of technological change, we may see a shift toward shared ownership*" and here are a lot of great examples of sharing online - from sharing knowledge in open encyclopedia, such as Wikipedia **[w11]**, through in some cases illegal P2P sharing of data, all the way to sharing accommodation with total strangers through Couchsurfing **[w12]**. The reason for this is, in fact, easy to identify: there are far more people you can connect to on-line with instetion of sharing then via using other means, or at leas significantly cheaper. As Belk **[a12]** states, "*sharing is a phenomenon as old as human kind, while collaborative consumption and the sharing economy are phenomena born of the Internet age*" and indicates that we may enter a new era of ownership by converting old ""You are what you own", to "You are what you share".

The uptake of sharing economy is best illustrated on the case of two so-called unicorns (start-up with valuation over 1B USD) using principles of sharing economy, Airbnb and Uber, with a lot of emmerging companies who try to copy their business models for use in otherindustries.

Airbnb basically took the idea of accomodation sharing for free from Couchsurfing and became the largest provider of accomodation in he world, without acually owning a single house or hotel - Airbnb offers more than 1 million guest rooms **[w13]**, in comparison with the greates hotel empires have around 200 000 (see Figure 5.4 below).**[o1]**

FIGURE 5.4

Uber, a car-sharing company, did in taxi industry something similar to what Airbnb did in accommodation. Since all their drivers are only contractors the company itself owns no cars, yet it is the largest taxi company in the world.

Both Airbnb and Uber, just as well as other companies, match Belk's definition of collaborative consumption as "*people coordinating the acquisition and distribution of a resource for a fee or other compensation*" **[a12]**. Furthermore, these companies are also a perfect example for business models for two-sided markets: Airbnb connecting accommodation owners and people who want to rent, Uber connecting drivers and riders.

Griffifth **[w14]** argues that sharing in an exchange for money is violates the core principle of sharing, but on the other hand admits that the revenue generated by these companies enabled the scale up to unprecedented size, which would not be possible in the case fo free sharing service: "*The sites required money to offer services that are effective and, as a result, their services have impacted more people than they might have otherwise. That's how, in most cases, for-profit sharing economy companies have outgrown their free counterparts*"

5.5. Aviation Regulations

There are two ways of looking at regulations of flight sharing - from the point of view of the chartering party or the pilot.

In a case of chartering party, the situation is usually quite straightforward - if you chartered a flight, you can bring anyone on the flight, as long as it does not cnflict with the ToC of the operator, who holds of the necessary lincences.

The situation is much more complicated in a case of sharing of flights by pilot themselves, due to there are limitations on their licenses. In general, there are two types of licences - private (PPL) and commercial (CPL or ATPL). As per the privilegies of the holders of the private license: "*The restriction is that the purpose should be non-commercial (i.e. non-remuneration or hire)"* **[w44].** This means that holders of PPL license cannot take passegers or cargo with the purpose of making money from it. It is common practise among PPL pilots to take their friends onboard for a flight to share the costs, as allowed: "*A private pilot may be reimbursed for aircraft operating expenses that are directly related to search and location operations, provided the expenses involve only fuel, oil, airport expenditures, or rental fees"***[w45]**. This is a common practise especially in a case of low-experience pilots who need to build their flying time before taking the next step in their training.

The restrictions mentioned in the previous article are the cause of problems with flight sharing in basically the same way Uber has problems with its "ride sharing. The problem there is that Uber is said to be " ride-sharing" app that allows people to cut costs on their rides. But in reality, it works as a taxi company without a license. Of course, there were always people driving pasengers for money without taxi license, but Uber has made is issue so serious, it ended up in a court in many countries.

In a case of flight sharing, many private pilots started to use flight sharing apps beond restrictions of ther licences and it led to shutting down at least two such companies in the US. More about these cases in Section 6.10.3.

6. Analysis

6.1. Comparison: Private Jets vs. Commercial Airlines

Flying private jets has two main advantages over commercial airlines - time efficiency and convenience.

You can charter a private flight independently on other travelers. That goes for every single aspect of the flight: the time and place of departure, the destination, the aircraft type and of course, extra services onboard. It is literally impossible to miss the flight because the plane is waiting just for you. Time efficiency is even more increased by the absence of the standard waiting times for security check.

Efficiency in terms of time usage is delivered through high comfort both in private lounges and onboard, with total privacy eliminating any disturbance caused by other travelers. In combination with other services, such as onboard satellite phones and WiFi, it is fairly easy to keep high work productivity even during the flight, which is the reason for the high popularity of the private jets among business people.
On the other hand, high flexibility of private jets is tied to their small size. This allows them to reach higher altitudes than large airliners do. In these high altitudes, there is far less traffic and lower air pressure allows higher cruising speeds **[w19]**.

One the greatest advantages of private jets in terms of flexibility is the fact that they can be served by far smaller airports, not just the large ones, commonly used by commercial airlines. "*Private jets have a much wider choice of airports to use than airline flights – ten times more airports worldwide in fact.*" **[w16]** In pure numbers, in Europe, there are about 300 of commercial airports, but more than 3000 that are able to serve a private jet. These smaller airports are also usually significantly closer to downtown areas. Travelers do not need to commute to the big airports, but rather choose some of the closer ones. These smaller airports are often positioned further from those used by commercial airlines, making the less prone to inaccessibility due to road traffic congestion. Furthermore, "*It's uncommon for the pilot of any aircraft be granted a straight in, no delay, approach to a large airport. So more often than not, a private jet (as with all other aircraft) will be put in a holding pattern, due to the sheer volume of aircraft moving in*

and out of a large airport. [...] often private jet pilots are given very complicated and long taxi instructions by unsympathetic air traffic controllers" **[w16]** This obviously diminishes the value added by using private jet instead of a commercial airliner.

On the other hand, at the small airports for private jets, the whole flying experience is significantly faster. "*Some airports are faster than others at handling business aviation and the waiting time can vary, but it only takes between 5 and 30 minutes from arrival*" **[w17]**. The FBOs[1] are focused on streamlining the process of getting the passengers both on and off the aircraft in such a fast manner, that some customers do not realize the steps that take a long time while traveling from a large airport. This applies to the security check, too. And in some cases, the security check can be omitted **[w17]**.

Another significant advantage of small airports is that they are less affected by the weather conditions. Although the amount of snow might be the same as at large airports, "*snow clearing and de-icing can often take place quicker than at major hubs. There is a much smaller area of taxiway and fewer aircraft to keep clear*" **[w18]**

Even airborne, the private jets can use their smaller size to outperform the commercial airliners. The construction allows them higher speeds and sharper turns, as well as changing the altitude - "*private jet charter flight plan allows for last minute changes of plan, finding gaps in the fog and rerouting the flight accordingly – not an option open to airlines*" **[w20]**.

6.2. Private Flyers

Flying on private jets had been always considered something only for the 1% of the riches people in the world. "*Yes, we see A-list Hollywood stars boarding a private jet on a regular basis, thanks to the paparazzi. And yes, high profile individuals do enjoy the privacy offered by private aviation.But in reality, most private jet customers are not royalty or celebrities. Over 50% of private flights are for business use.*" **[w22].**

It is not by accident that first private jets were in fact called business jets. Although chartered private flights are much more expensive that traveling with

[1] FBO stands for Fixed Base Operator. It refers to the private jet handling services at an airport. In some cases this will be a small lounge within a general airport terminal. In others, a large purpose-built facility offering a range of services for private jet customers, aircraft and crew. [w21]

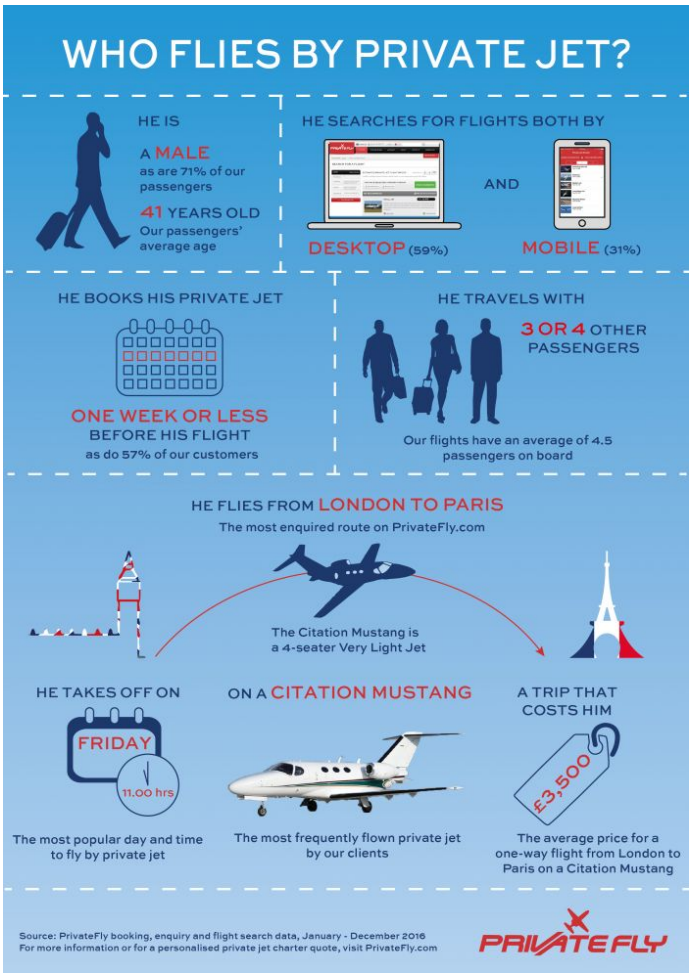
airlines, the same trips might take considerably more time. "*For a multi-leg or tightly-scheduled business trip, being able to fly to a bespoke itinerary (with a late evening flight home), means you can achieve as much business value in a single day as you could in 2 or 3 by airline*"**[w22]**. If you take into consideration that most of the business travelers are C-suite personas or top management with high salaries, saving (in some cases) only a coupe of hours by chartering a private flight in order to do a multi-leg trip makes a perfect sense.

"Some of the characteristics of the typical private jet user may come as a surprise to those outside the industry, particularly the popularity of more modest small jets and short distance flights. There's more crossover between the profile of the private jet user and the airline passenger than many might imagine." **[w23].** This might be caused by a couple of trends, one of them being that business people use private jets for hops to and from the major hubs, from which they take the flight across the ocean. This allows them to enjoy the benefits of the closeness and small airports closer to their final destination, in comparison to long a dreadful commuting to the large airports by car.

Contrary to popular belief, the A-list celebrities and super rich people are only a minority of the private jets passengers. "*The critical mass of private jet users are successful business owners, families or groups happy to pay a premium for a better travel experience. And with the entry-level end of the private jet market becoming increasingly competitive, this is likely to become even more apparent in 2017.*" **[w23].** Among these customer groups, there is a clear trend towards using smaller jets. It allows to save money for regular travellers and for the newcomers - "*those who are looking for something more than today's congested airline experience*" **[w24].** - the smallest aircrafts are obviously the most accessbile ones: "*entry-level light jets and turboprops have witnessed sustained charter demand, gaining from both new entrants and those downsizing from mid-sized jets*" **[w24].**

In the Figure 6.1 **[w24].**, you can see the profile of an "average" private flyer, who is a middle-aged male, most likely using desktop for chartering, travels with few other passgeners, over the weekend, in a small-sized jet.

FIGURE 6.1



6.3. Comparison: Chartered vs. Positioning Private Flights

When you go for positioning flight instead of chartering a new one, you basically exchange some of the advantages for a lower price:

- You can still choose the time of departure, but it must fall into timeframe determined by the other flight scheduled for the aircraft
- The destination and aircraft type are fixed (and so are the options of onboard services)

Although there are quite possibly no positioning flights offered for the time and route traveller might need, it makes sense to al least check before chartering a new one. All the aspects of private aviation mentioned in the previous section and the usual luxury onboard made them seem as something inaccessible to common people. But especially positioning flights with their lower price could appeal to a whole new customer segment - travellers who want to use the private jet for a special occasion, i.e. honeymoon, celebration, etc. but would not be able to afford chartering a flight themselves. Since those people want to try out the experience itself and do not care about the type of aircraft, have a very flexible schedule or sometimes not even about the destination, they represent a great opportunity for operators to make money on originally non-revenue positioning flights.

There are even people who would be willing to experience the luxury of private jet with other people they do not know - creating another opportunity, this time for sharing the flight, just like people do with cars. This will be discussed in one of the following sections.

6.4. Pricing

6.4.1. Chartered flights

Pricing of the private aircraft flight is much more flexible than the pricing of an airline flight. The fact that many companies ae not 100% transparent about how they price their flights, a lot of people are what are they paid for and why are quotes from different companies on the same route differ and how the pricing works in general **[w32]**.

As per standard, the price usually includes **[w32]**:

- landing and handling fees at both departure and destination airport,
- flight time (both price and time dependent on the type of aircraft),
- crew salaries and expenses (meals, hotels, etc.),
- passenger taxes, and
- ground transport.

Because many of these may significantly differ, so do the ranges of quotes from different operators, in some cases by as much as 30%. Furthermore, some operators may charge extra fees, or even include the costs of positioning flight(s), if needed.

Following is an example of a price calculation by PrivateFly, for the return flight (the next day) from London City Airport to Frankfurt Airport for 5 passengers on Citation XLS based in London Biggin Hill **[w32]**.

As seen in the pricing table (Figure 6.2), in this case, the crew salaries are included in the flight time and extra crew expenses, such as hotel, are omitted. On the other side, the price includes positioning flights from and to the base - London Biggin Hill, although in this case, the extra cost is not that significant.

FIGURE 6.2

Outbound	
London Biggin Hill to London City (positioning)	11 (nm)
London City to Frankfurt Main	334 (nm)
Total Distance	345 (nm)
Flying Hours	1 Hrs 18 Min
Flying Cost for 1 Hr	£2,936
Flying Charge (Flying Cost for 1 Hr x Flying Hours)	£3,818
Landing Fee in LONDON CITY and FRANKFURT MAIN INTL	£1,600 + £273 = £1873
Number of Fuel stops	0
Total Fuel stop Cost	0
Total cost Leg 1	£5,691
Inbound	
Frankfurt Main to London City	334 (nm)
London City to London Biggin Hill (positioning back to home base)	11 (nm)
Total Distance	345 (nm)
Flying Hours	1 Hrs 18 Min
Flying Cost for 1 Hr	£2,936
Flying Charge (Flying Cost for 1 Hr x Flying Hours)	£3,818
Landing Fee in LONDON CITY	£1,600
Number of Fuel stops	0
Total Fuel stop Cost	0
Total Cost Leg 2	£5,418

6.4.2. Positioning flights

Because private aviation is a bespoke service by the definiton, the positioning flights lacking many of the flexibility can’t be sold for the same price.

If you decide to purchase a positioning flight, you cannot choose the neither the route, nor the aircraft, and the time flexibility is usually limited to a narrow time window, so the positioning flight fits the schedule of the person who chartered the

original flight. Also, the positioning flights are only one-way most of the time, although this might not be an issue in a case of highly popular events, such as Film Festival in Cannes or the Monaco Grand Prix, because there are dozens of private flights both directions every day.

For those reasons, operators often give up to 75% discounts **[w26]** on such flights, to make at least some extra money on flights that are not that appealing.

Another issue might be the fact that private flights are usually chartered on a rather such notice, so it's difficult to sell the related positioning flight(s).

Even whe the positioning flight is sold, problems might still arise - the person who chartered the original flight changes his or her mind abuut the time, changing the scheduling of the positioning flight as well. Or worse, he or she decides to cancel the flight, effecively canceling the positioninng flight too **[w26]**. This add an extra cost to the operator that has to allocate manpower to handle the extra communication, and even the costs of extra positioning flights in case they decide to honor the deal.

6.5. Flight Sharing

As discussed in the theory section, sharing is a behavior that is deeply rooted in all the people. Flying a private jet is using an expensive service, for which it makes sense to consider its sharing.

Sharing a flight means diminishing some of the advantages of private flying, such as the name-giving privacy. On the other hand, if the traveler ais for the flexibility and efficiency of using a private jet and does not mind the loss of privacy, the savings could be significant. The use of private jets is billed by flying time, regardless the number of people onboard. "*There's currently a lot of experimentation taking place with business models in our industry. In particular, we've seen a lot of media attention given to private jet shuttle or sharing services, which promise a 'private jet' experience, but on fixed routes and pre-defined schedules.*"**[w24]** Sharing of flights was probably happening from the very beginning of the business flying, at least to some extent, but the growing popularity of the internet as a communication platform certainly catalyzed the whole process. *"However, many business models have struggled with this, and there are quite a few drawbacks and commercial restrictions to offering this type of service. While you do have the luxury of flying by private aviation, you're still flying with strangers, and sometimes in closer*

quarters than you might be on an airline flight (depending on the aircraft you're flying on)." **[w25]**.

Depending on the type of sharing model the traveler might also have limited control over another important aspect of private flying - the flight plan, especially the departure time. "*When you book a private jet for yourself and your own traveling companions, you have the luxury of coming to the airport no more than 15 minutes ahead of the flight, plus having the option to make last minute itinerary adjustments. With seat sharing, you might find yourself still waiting around the airport for the other passengers to arrive, and no ability to change the time of the flight.*" **[w25]**. Despite these shortcomings, the sharing of privet flights is on the rise, supported by companies such as PrivateFly, which offer flight sharing as of the services.

6.6. Positioning flights

Positioning flights are used for getting the aircraft to the airport of departure requested by the customer. Positioning flights are available all year long, especially around major events, such as Monaco Grand Prix, Cannes Festival and/or during high season from and to major tourist destinations.

As chartering of private flights usually happens on a short notice, and for a specific time, operators are most likely unable to sell the positioning flights for full price to another customer. Interestingly enough, *"almost 40% of private jets are flying empty without passengers.*" **[w26]**. If you look at the operational costs for a private jet, you can see that positioning flights account for a significant portion of total operational costs.

Operators are trying to minimize these costs by selling the positioning flights, but there is a number of issues **[w26]**:

- positioning flights lack the flexibility of flight chartered in standard way: timing, aircraft type, routing, etc.;
- due to the previous issue, the positioning flights must be sold with a significant discount;
- positioning flights are usually available on short notice and only one-way

Positioning prices are very interesting for travelers that are interested in private jet experience but lack the funds. "*The discount can range between 30% and 75% off on the usual charter price. The exact price will depend on the route and the operator, and some operators are often prepared to offer exceptionally low prices. These prices can be close to airline prices [...] particularly when compared to premium seat airline fares.*"**[w26]**.

Selling a positioning flight is a bit of a risk for the operaror, too: it adds more communication overhead and all changes on originally chartered flight affects the positioning flight, too: "*And if the original customer decides to cancel altogether, this will probably mean the empty leg is canceled too. Obviously, the empty leg customer would receive a full refund if that happened.*"[w26]. In such case, the operaror also loses the money spent on communication with positioning flight buyer.

Current situation around empty flights is complicated and operarors seek for solutions.

6.7. Automation and use of modern communication technologies

As mentioned above, the emergence of the internet can help with sharing of flights, and by extension, the growth of private aviation industry. But there is another way the internet and modern hand-held mobile devices can advance the industry.

Now it is easier than ever to book a flight on last minute, without losing the ability to consider all the options, such as operaror, best route, aircraft types, etc. "*12% of our flights are for customers who book and fly within 24 hours, with some looking to take-off as soon as one hour later. [...] Sometimes this might be because the client's airline flight has been canceled. In other cases, it may be a medical emergency or evacuation flight.* " **[w28]**

One of the apps that allow this it the PrivateFly app. As the company has access to more than 7000 aircraft, which status is monitored on-line, it can take less than an hour between the first inquiry and take-off. What took long hours and many calls to different brokers can now be accomplished within second and a few clicks. In Figure 6.3, you can see a timeline for such a charter. **[w28]**

FIGURE 6.3

LAST MINUTE 'GO NOW' FLIGHT FROM IBIZA TO LONDON

Time since enquiry	Local Time	What's happening now?
0 minutes	11:00	A client in Ibiza Town sends a flight request via PrivateFly's iPhone app for Ibiza to London, departing ASAP.
1 minute	11:01	The Flight Team calls the client back within one minute to verify the requirement.
2 minutes	11:02	PrivateFly's technology pinpoints aircraft already at Ibiza and those due to arrive there shortly. Our technology is integrated with aircraft operators' scheduling software and identifies the best available aircraft.
10 minutes	11:10	The client receives an update and leaves by car for the short drive to the FBO (private terminal) at Ibiza airport, so they can be ready for boarding as soon as the aircraft is ready.
12 minutes	11:12	Six aircraft are available and quotes are submitted within 10 minutes (some within seconds). The client sees each quote immediately and chooses the most competitive aircraft, a Citation Mustang. The aircraft is already on its way in to Ibiza from Nice, due to land shortly.
14 minutes	11:14	The client confirms the booking, paying by credit card. The passengers have flown with PrivateFly before so we already have their passport details to pre-clear for security and immigration, saving time on landing.
40 minutes	11:40	The aircraft has landed in Ibiza. The Captain introduces himself to the client in the FBO lounge while the aircraft is prepared for departure. A flight plan is acknowledged with the authorities, with a take-off slot at 12:00 local time.
50 minutes	11:50	The passengers are taken directly to the steps of the aircraft and they board. The aircraft is now ready for take-off, with all checks complete.
1 hour	12:00	The aircraft takes off from Ibiza, heading north to London Luton. Our Flight Team liaise with the FBO at Luton, to arrange to have a car waiting at the other end for the passengers to make a quick exit.

Chartering flights through an online, especially through an app is still a quite new and lacks some of the features of the traditional way, with at least some calls and human interaction. "*With an app-only service, you can lose the VIP customer service and expertise that is still expected when booking a private jet.[...] With an app-only service, the risk is that you won't have a personal contact [...] ensuring that your flight is bespoke and everything goes without a hitch"* **[w28]** Furthermore, last minute chartering via app usually do not offer all the available aircraft for given route. "*Some apps don't allow you to book fully through the app and others limit the amount of choices you have for app services and booking.* "**[w29]**

Representatives of private aviation companies are confident that this kind of automation will dramatically change the industry within 10 years, despite the setbacks.

6.8. Geo-political context and regulations

Private, especially business aviation, it tightly tied to the geo-political situation in given region. One very important part of regulations is the agreement among EU states towards cabotage, "*a right to operate passenger flights within the domestic borders of a country, by an aircraft registered outside that country*" **[w30]**. "*Such flights are key activity drivers for business aviation within Europe, where the majority of flights are short hops. But these domestic point-to-points are only permitted due to EU members' cabotage rights since, in the interests of free trade, EU members are treated as a single state*".**[w31]**

There are some exceptions, such as Switzerland, but free cabotage within EU is an integral part of regulation for business aviation in Europe, since it mostly consist from small hops among major cities and aims for efficiency (minimum empty leg flights), often ending up as cabotage flight. "*an aircraft will become available for its next private charter in many different places – much like a taxi on the ground. [...] the aircraft's operator will look to sell a flight starting from their current position, in order to minimize empty flights, and improve efficiency*"**[w30]**

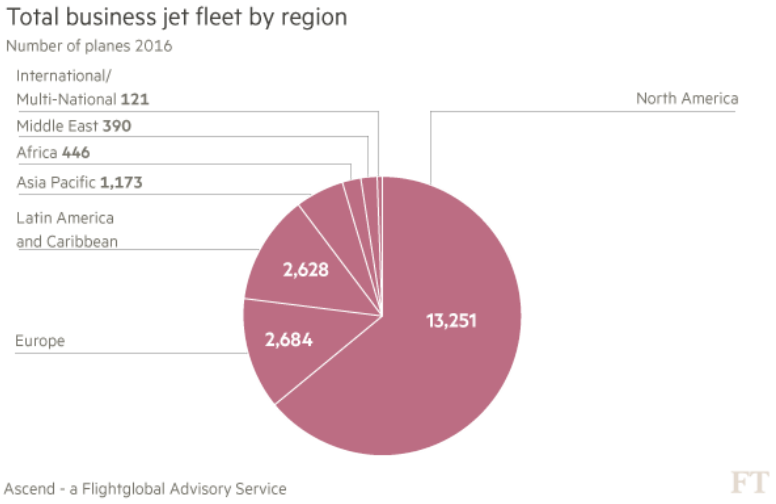
Since the Brexit vote in summer 2016, there is a heated discussion about what could UK leaving the EU actually mean for private aviation in Europe. This could threaten "operators operating elsewhere in Europe, but also those based elsewhere in the EU who currently operate on domestic routes within the UK. With London, the busiest city for private aviation in Europe, many non-UK aircraft find themselves here" **[w31]**. At this point, no one is sure, but business aviation in EU is highly dependent on cabotage agreement of EU states.

6.9. Current Market State

Private aviation market is a global market with many imbalances. As seen in the Figure 6.4 from Ascend - a Flitghtlobal Advisory Service from January 2016 **[w4]**, the largest portion of all private jets is to be found in North America -13 251 units. Far smaller markets are Europe and Latin America with 2 684 and 2628 units respectively, followed by the aggregated region of Asia and Pacific holding the 3rd place with 1 173 private jets.

Other markets account for just a fraction of the global market with less than 500 jets each.

FIGURE 6.4



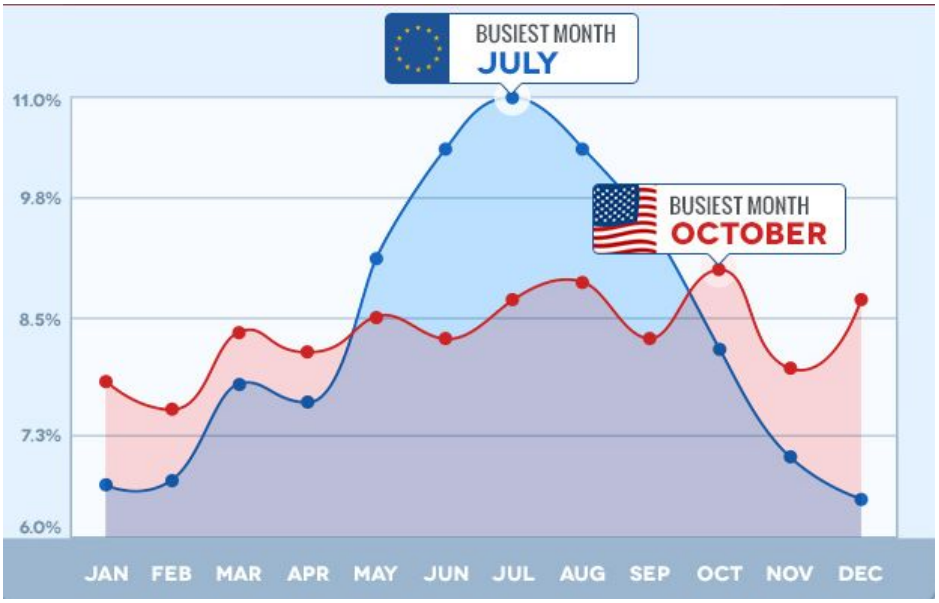
If we look at the long-term development and forecast by Honeywell mentioned on AvBuyer website **[w3]**, we can see that private aviation took a major hit during the financial crisis and is only slow getting back up. The ultra-fast growth in private jet deliveries seen before the year 2008 is most likely not happening again in this decade.

6.9.1. USA vs. Europe Market Comparison

For the sake of comparison of different environments, the author will focus on the differences between the USA and Europe markets.

USA market is approximately four times larger than its European counterpart, both in a number of aircraft **[w5]** and the flights departed **[w6]**. Interestingly enough, although higher prices of jet fuel in Europe ($3.50 in Europe, $5.20 in the USA; per US gallon) and its taxation (none in Europe, $0.04 per US gallon in the USA), private flying in the USA is about 25% cheaper. This is caused by a larger market with more competition, less bureaucracy and lower airport fees **[w5]**.

FIGURE 6.4



Prices and size of markets aside, there is also a huge difference in seasonality. As seen in the section of PrivateFly infographic from 2013 **[w6]** in Figure 6.4, the USA market is more even in terms of monthly activity. In Europe on the other hand, there is a great peak in the summertime with stall over the winter. This is caused by the fact that in Europe, there is a lot of people who use private jets for leisure, but not the business. In the USA however, those customer groups are not that different.

When it comes to the number of airports private jets can operate on, it is 5 132 in the USA and about 3000 in Europe **[w7]**. These are a huge number in comparison to a number of airports operated by commercial airlines, which account for only about 10% of the number of airports for private jets **[w7]**.

6.9.2. Other Markets

Private aviation in China took an unexpected hit: the premier Xi Jinping started an unprecedented crackdown on corruption in China **[w8]** four years ago, due to which

"almost overnight it became unwise, if not outright dangerous, to flash one's wealth" **[w9]**. This caused a drop in new orders for jets, as people tend to make better use of those they already have or charter someone else's jet, rather than buy a new one and draw unnecessary attention to themselves.

The bad situation got even worse when the stock market crashed in the second half of 2015. This only put even stronger emphasis on making a good use of already owned aircraft.

The Middle East market is slowly but steadily recovering from the economic crisis, with annual growth of 12% in last year. Twenty years ago, private flying was a domain of only royal families and presidents, but in past 5 to 10 years, there was a significant shift toward corporate use as well, account for 70% or private aviation (30% being luxury leisure travel) **[w10].**

6.10. Charter and Brokerage industry

6.10.1. Brokerage of private flights in general

The traditional model of chartering or brokerage and positioning flights was a process involving many middle men and unnecessary complexity resulting in communication overhead. "*Traditionally, it's a very labor-intensive process: (flight) operator to broker, broker to personal assistant (PA), PA to boss. Using the phone and email to talk to multiple brokers is grossly inefficient [...]Customers know they're sort of getting ripped off along the way, so they're going through three brokers. So you have three brokers going to three operators, that's nine quote requests from one guy. It'll be 13 phone calls before the PA even gets the quote.*"**[w35]** says Clive Jackson, Co-Founder of Victor.

Plus, there is, even more, complication along the way for operators taking care of aircraft from different owners with their preferences and restrictions on how, when and where their aircraft can be used. "*Each contract is different. If an operator is managing 10 planes, each of the 10 contracts with owners is different in some way*." This means even once the broker is in contact with the operator, by phone or electronically, the owner much of the time still has to sign off on the trip, adding a layer of complexity that technology has yet to automate."

On the customer (flyer) side, it has one major disadvantage, and that is price "*non-automated booking handling brokers sometimes increase the margin up to 50 percent of the initial price,***[w36]**"

There are a couple of companies that already started to change the shape of processes the current private aviation market. Some of these companies are analyzed in the following section.

6.10.2. Companies disrupting the market

There are currently many existing companies that focus on brokerage and sharing of private flights. In order to identify and evaluate the advantages and disadvantages of different approaches, the author will take a look at the operation of these companies and use these findings as a foundation for proposed features of the new platform.

6.10.2.1. Victor

Victor is one of the most prominent companies focusing on brokerage of private flights. Based in the UK, it's considered "the Uber for private flights". It has more than 100 partners among private jet operators and works as the only middle man between the operator and the flyer - there are not third-party brokers involved. Victor has over 7000 jets in the operators' pool covering more than 40,000 airports in 157 countries.

It's is possible to request the quote through the website of a mobile app. The service fee for chartering the flight is 5%. The quote is ready within 60 minutes from the request. The company operates in full transparency - the flyers gets all the info about the aircraft, including the operator's name and the tail number. This gives the flyer an option to bypass Victor and go straight to the operator, avoiding paying the fee. According to Victor's website **[w41]**, this rarely happens.

Victor heavily focuses on the positioning flights - there are hundreds of them available on their website at any given time. Using empty leag flights entitles flyer to up to 75% discount. These flights have fixed schedule which is subject to change from Victor. In a case of change or cancelation of the positioning flights, the payment is fully refundable.

As for the seat sharing - Victor allows the passenger to offer the empty seats on

their flight to other passengers. If the seats are sold, the original flyer and Victor share the profit. These seats are not advertised on the website or the app - Victor includes them in quotes offered when other people request the same route in similar time. There is not service allowing sharing positioning flights.

6.10.2.2. JetSmarter

JetSmarter is a US-based company that - although is in the same business as Victor - operates in a very different way. Victor uses per-per-flight scheme, JetSmarter, on the other hand, is the member-only club.

To become a member, you must pay 3,000 USD registration fee and then 9,000 USD annual membership fee. For this price, the member gets access to the pool of 3000 aircraft from partner operators covering over 170 countries.

There are various services offered by JetSmarter, though both website and mobile app. The basic one is JetShutte - regular, scheduled flights on most requested routes. Using these flights is free and unlimited. PrivateCharter gives you an option to charter a flight with full flexibility, from time and route, through aircraft and crew, to special services onboard. Prices are available in seconds after requesting a flight.

JetSmarter also allows sharing flights and buying positioning flights. Once you charter a flight via PrivateCharter, you can offer unused seats to others. It's JetsSmarter's responsibility to sell these seats - you get a better price on your flight regardless there are other people actually flying with you or not.

The way JetSmarter is dealing with positioning flights in quite interesting - all positioning flights (over 2000 per month) are made available for free thought the JetShuttle. So in a case of JetSmarter, positioning flights are not sold to make more revenue but rather offered to members, creating additional value to the membership.

6.10.2.3. PrivateFly

PrivateFly is a UK-based private jet charter, operating in much fewer countries - only 19 (Australia, Canada, China, Czech Republic, France, Germany, Hungary, Italy, Netherlands, New Zealand, Poland, Qatar, Russia, Slovakia, Spain, Switzerland, UAE, UK, & US). On the other hand, they have access to over 7000 aircraft which can easily compare with bot Victor and is twice as much as what JetSmarter can offer.

Just as both these competitors, PrivateFly uses the web and mobile app. No

membership is required.

PrvateFly also sells positioning flights, there are hundreds of them available at any time. These work exactly like in the case of Victor - up to 75% discount, fixed times, subject to change, cannot offer to other people via the official service.

6.10.2.4. Wheels Up

Wheels up is a US-based private jet operator with around 70 private aircraft, mostly King Air and Cessna. Wheels Up is members-only, with an initiation fee of 17, 500 USD. Then flyers pay lower prices on for flights, via pay-per-flight of credit schemes.

Wheels Up enable he members to share the flights, but let's all the responsibility on them and is not involved in the process of sharing. Member can use the forum - Wheels Up Shared Flights Board - accessible via website or app, where they can communicate and agree upon terms of sharing the private flights by Wheels Up. That means that from the point of view of the company, only one person is actually chartering the whole aircraft.

6.10.2.5. Blackjet

Blackjet was US-based startup tat promised to bring Uber-like business model to private aviation. The idea was quite similar to the Jetsmarter's service JetShuttle - members pay annual fees (over 15,000USD) and then they can buy seats and "share" scheduled private flights. [w43] The company got funding from many angel investors and celebrities, such as Jay Z. [w42]

Due to multiple reasons, BlackJet operations were seized. The main reason for the failure was BlackJet's inability to attract enough members to make the operation cover its costs. As one of the former employees said, "*you can't fly somebody for $3500 coast-to-coast and guarantee them a seat when it costs you $20,000 to fly the plane*" [...] "*Many flights were already profitable, many were not*" **[w37]**

This is also what the CEO admitted when the operation was shut down "*We probably did more with less than anyone but it's a critical mass business***[w38]**".

6.10.2.6. Beacon

Somewhat similar problem was encountered by another flight sharing service - Beacon. This US-based company asked for 1000 USD deposit and 2000 USD per month for all-you-can-fly service. The goal was to let people charter flights and share seats.

Just like in a case of BlackJet, the company failed to reach the "critical mass" of customers soon enough, but for only one reason - seasonality. As the former CEO Wade Everly says, "*Beacon launched in September and I believed we had sold enough to cover our expenses but learned that we had not because three-fourths of our sales were to people who didn't want to start flying until a future date. Most of them wanted to wait until the summer to start flying.*"**[w39]**

The company officialy shut down early in 2015 and the CEO Wade Early now works in Wheels Up and Managing Director of New Ventures.

6.10.2.7. JetForMe

Jet For Me is a Turkish private jet charter platform strongly implementing principles of the shared economy.

There are two basic modes of operation - Charter and Flight Sharing. In the case of charter, you "Create flight": choose route, date, time, aircraft and then the sharing options: minimum and maximum number of other people you want to share the flight with. As the total price for the flight is fixed, the price for every flyer in determined by the total number of people flying. The flight is not "Guaranteed" and money charged unless the min and max limits are met.

The second mode, Flight Sharing, work similarly, but is focused on jet owners (or, theoretically anyone who has private flight scheduled). You just put in the flight you have planned with your aicraft, price and how many people you can take on board, so you save some money by sharing the ride with other flyers. As you are going to fly regardless if anyone joins, flight created in this mode are "Guaranteed" upon creation.
As this platform is very similar to platform author is planning on developing as a part of this thesis, it will be used as an example to point out some principles of usage and problems to be solved.

6.10.3. Banned companies

Just as the Uber promoted taxi-like services as ride-sharing, avoiding the requirement of proper taxi license, some flight-sharing companies tried to do the same thing in the skies.

The Federal Aviation Agency (FAA) banned operations of US-based companies Flytenow and Airpoller [w40], because their pilots do not have commercial licenses.

Although this is mostly of an issue of smaller, twin-engine aircraft and not business jets, this could be a start of new business models in the aviation in a couple of years.

7. New Flight Sharing Platform Proposal

7.1. Scope definition

7.1.1. Issues identified in the charter industry in general

7.1.1.1. Middle men (brokers)

The old way of brokerage of the private flights as described in Chapter 6 is slowly dying out because it's very ineffective and to some extent, creates more problems itself - communication overhead, added complexity to the negotiation and delays between quote request and actual quote.

The online charter platforms, such as Victor, mitigate this, saving the time of all parties involved. People still can ask for a quote from multiple charter companies, but the charter company is usually the only middleman directly in contact with the operator and the process it at least partly automated, bringing more benefits.

Giving one single point of access for flyers lowers the bar for possible new adopters, who might have reservation regarding complexity and time consumption of the old way of doing things.

Another benefit enabled by above-mentioned companies is the automation of the process. This is so important fact that it is discussed in a separate chapter below. And lastly, such companies usually provide transparent service (both in terms of flight information provided and the pricing).

7.1.1.2. Automation

Automation significantly reduces the resources (mainly manpower) required to charter a flight. Depending on the system, most of the charter process can be done automatically. Requesting quotes from different operators thought different brokers manually could take even hours. With (semi)automated charter system, this can be almost instantaneously.

Automation also allows the charter company to serve more customers (provide more quotes) at the same timeframe. Besides that, automation allows new ways of

chartering flights - such as wishlists of people that are all contacted with seconds, once the deal that might be interesting for them gets published.

Furthermore, automation is also absolutely integral part of any flight sharing service - manual communication with all the parties (operator and flyers sharing the flights) would be impossible to deliver required speed and flexibility.

The issue is the lack of the leveraging of the automation and modern technologies to bring a sophisticated solution that offers the users more than just a chartering a flight.

7.1.1.3. Transparency

Transparency is important for building the trust among customers. The old way of chartering flights through multiple brokers over the phone or email, comparing offers does not really offer enough transparency a people are still sometimes reluctant to go through this process although they might be interested in private flyings - simply because they are afraid they are not getting the best deal or are getting ripped along the way.

Another part of transparency is the ease of comparison of the offers - if you give people the chance to easily search, sort and compare the offers, they feel more comfortable with doing the decision. This is to some extent connected to the automation, which allows much simpler comparison than the old, “decentralized” way.

7.1.1.4. Lack of focus on positioning flights

This is more of a business decision than a real problem. Charter companies do not focus on selling positioning flights that much, as the resources invested in getting people to pay for charter generate much more revenue.

Another reason is that positioning flights generally attract another customer segment - people that are willing to sacrifice the flexibility for the experience and speed. Also, for selling one flight, you need, statistically speaking, larger audience, so there is better chance to find a person who might be interested in particular flight.

Automation, on the other hand, significantly reduces the resources needed for managing the offers of positioning flights, including their sharing, and offering the to potential customers. This could help companies to shift focus on positioning flights and

generate more revenue. The key, in this case, being attracting enough people interesting in positioning flights.

7.1.2. Issues applicable to flight sharing

7.1.2.1. Market segmentation

There are many different charter companies. Most of these aircraft (or their operators) are only accessible through one of the charter companies. This also adds to the segmentation of the target audience. This is not necessarily a problem, at least for the charter companies operating on a pay-per-flight basis.

In the case of flight sharing, the situation is quite different. Especially the number of the people in one network significantly affects the ease of sharing flights - the more people are given chance to share specific flight, the higher the chance of more people sharing particular flight. This has proven essential for charter companies operating on membership model for sharing flights that failed (most infamously known BlackJet).

7.1.2.2. Regulations

As mentioned in Chapter 6, some of the flight sharing companies had the problems that pilots exercise privileges beyond their licenses, which led to banning some of the companies.

This is not a problem to be solved by technology - only the change of rules or their interpretation can lead to elevation of the restrictions for private pilots.

7.1.2.3. Absence of sophiticated sharing platform

Currently, there really is not a single truly sophisticated platform for sharing flights, although it would technically only mean to put together working principles of already existing companies. The analysis of these principles, their interconnection, and the addition of a new feature that, in authors opinion, make sophisticated sharing platform, are discussed in detail in the following chapter.

7.1.2.4. Absence of focus on sharing of positioning flights

As of now, just as there are none truly sophisticated sharing platforms, none of the existing ones is focused on sharing of the positioning flights. The author sees this as a significant business opportunity being missed because the customer segment willing to sacrifice some of the flexibility of private flying are probably more likely to be willing to share the flight with others.

7.1.3. Scope definition

The proposal of new sharing platform for private flights, the author will focus on following including core features:

- both sharing and chartering private flights;
- offering and buying (and sharing) of positioning flights;
- and sharing own private flights,

while trying to focus on a solution for following risks:

- one of the constituents fail to take investment or action in relation to both timing and the willingness to actually participate;
- flyers feeling like they are possibly being ripped off;
- constituent exercising privileges beyond their pilot licenses.

7.2. The Four Challenges

In this section, the author will propose a new online platform for sharing flights in private aviation. The structure of “four challenges” by Hagiu **[a16]** will be used as a framework.

The platform will only server as a communication and transaction platform between the two sides - operating the private jets, neither owned or operated on someone else’s behalf, will not the part of the operations. The reason for this is two-fold:

- operating the aircraft would significantly extend the scope of operations, the cost structure and complexity, even more so operating of purchasing own
- the author believes that the sole focus on being the middle man among the different sides is good enough business case, as proved by currently operating companies focused solely on developing SW solution only on this

"*We like the idea that we have no aircraft because we're able to create efficiency for ourselves, and flexibility in this marketplace is a lot," Rotchin said. "Some routes are very busy some weeks and then they're not busy on other weeks. If you have [a fleet], you're always just figuring out what to do with your airplanes. We're figuring out what to do with passengers.*" [w34]

7.2.1. How Many Sides to Bring on Board

In the case of private aviation, the decision on how many sides to include in the MSP is determined by the industry itself. On one side, there are buyers - flyers who want to enjoy the benefits of private flight. On the other, there are sellers - charter companies and operators who manage the aircraft on behalf of their owners at times when the owners do not need them for themselves, which helps them at least break even on the costs.

The core focus of this thesis is to propose a platform that not only reduces search and transaction costs for both sides but also enables the operators to generate revenue from the position flights easier and help flyers to share their flights with others. This eliminates the added complexity and communication overhead (and increasing of the above-mentioned costs) by excluding the traditional brokers working as middleman, who do not exactly neither promote trust in not being ripped of, nor provide customers with flexibility and fast responsiveness enabled by online platforms, which is integral especially for the sharing features, which manage communication among many parties. The proposed online platform gives buyers single, transparent access point for all the partner operators.

The sellers side is, in the context of the proposed platform, comprised of following:

- operators who own and manage their fleet;
- operators who manage aicraft on behalf of someone else;
- flyers who chartered private flight and are willing to share it co reduce costs;
- and holders of commercial pilot license who want to reduce costs on their flights.

The initial incentive for the charter companies and operators for joining the platform is the possibility to generate revenue from the positioning flights. But as described in the following section, in order to keep the “single point of access” model for flyers who would fly anyway (below), the platform will also allow the flyers to charter the flight on the website, should the desired positioning flight is not available.

The second half of the sellers side belongs to private individuals, who want to cut the costs on the flights they already plan on taking. In the case of the flyers, it’s the segment of people who utilize the flexibility and the speed of private aviation, but do not necessarily need to have absolute privacy and are willing to share the cabin with others in order to cut the costs.

Finally, there might be pilots/owners of light jets who fly them themselves and would like to cut the cost by sharing the flight with other flyers. This is, of course, possible, as long as the aircraft falls into one of the supported categories and the pilot holds appropriate license, as discussed in the section 7.2.4.

As for the buyers side - it is comprised of two segments:

- the “fly-anyway” flyers, who are willing to share the flight and the cost with others, but fly even if no one joins them;
- and the “fly-maybe” group of flyers, who want to try private aviaton, but only if it’s heavily discounted in comparison to standard prices.

The former group is most likely regular flyers who are willing to share the flights, as the privacy itself it not their primary concern.

The latter group includes people who wan to enjoy some of the benefits of the private aviation, but it normal circumstances, it is not financially accessible for them. Buying the positioning flight, or sharing a charter, or even sharing a heavily discounted positioning flight could enable them to fly privately.

The platform, if transparent and sophisticated enough (see next section), could also attract a new customer segment, somewhere in the intersection of the abovementioned groups - flyers currently using business or first class in commercial airliners. With the implementation of sharing economy principles, the flight tickets for private jests can occupy the same price range as those for the higher classes in airliners. The key focus for attracting this customer group in the transparency and simplicity of booking known from airlines websites.

For attracting the critical mass of users from both sides and overcoming the chicken-and-egg problems, multiple governance measures need to be put in place as described in the Section 7.2.4.

7.2.2. Multisided Platform Design

7.2.2.1. Selling Positioning Flights

The very core feature of the whole platform and this thesis is to help operators to generate revenue from the positioning flights, or to generate revenue from more positioning flights than now, to be precise.

Nowadays, this feature is not as unique as it was a couple of years ago - many charter companies offer heavily discounted positioning flights what is significant value proposition is the next point - sharing the positioning flights.

7.2.2.2. Sharing Positioning Flights

As mentioned in the previous paragraph, many companies try to sell positioning flights. There are some hiccups, though. A lot of these websites are not user-friendly, has poor response times on those deals (not the priority in comparison to charters), and most importantly, not a single one of these companies offer a simple way to actually coordinate sharing of the specific flight with others.

Positioning flights have inherent limitations - fixed route, schedule and aircraft type, just to name a few. Plus there is always the risk of re-scheduling due to changed schedule of the fight that required the positioning one in the first place. The significant discounts (up to 75%) on those flight do not necessarily outweigh those risks for some of the people. Especially not the “fly anyway” segment.

But if there is a simple way to share the price of the positioning flight on pay-per-seat basis, it is possible that it could attract a whole new customer segment - fun flyers who just want to try out private jet, or get a great deal and exclusive experience for a very low price on the flight they would normally take on regular airliner - sharing it with hundreds of other people as well. Today, there is no such service and if you want to share any flight with other people, you need to find them yourself.

The mechanic of the sharing is simple: flyer indicates the interest in the flight - the number of the seat and the maximum price when they are willing to pay (meaning they can require a certain number of other people to share the flight with) and if there are enough people interested, the flight is officially booked from the operator.

For the “fly anyway” customers, it’s much easier - they can charter the flight for themselves and then offer some of the remaining seats for sharing. If someone is interested and buys the seat for the offered price, their money goes to the pockets of the person who originally chartered the flight, reducing the cost in exchange for limited privacy.

7.2.2.3. Chartering of the Flights

Chartering flights is a base feature of the proposed platform. Of course, the chartering could be done externally and the platform used only for the sharing, but one of the core concepts of this platform is the single point of access - allowing users to manage all aspects of their private flying experience via one platform.

Having the chartering feature available also enables implementation of some advanced features described in the section about the “Sophisticated Platform” concluding the whole premium-level customer experience expected in private aviation.

7.2.2.4. Sharing Charter Flights

Building on the chartering of the flights, the second-level feature is the sharing, which is the second core concept of the proposed platform.

Offering the seats on the flight is of course, in no way mandatory - it would limit the user base only to people willing to share their flights, possibly significantly reducing the possible network value. Allowing the people to offer their flight to sharing, though, with only few clicks, handing over all the extra communication, negotiation, etc. to the platform, could significantly increase the not only the number of people willing to share the flights, but, consecutively, the number of people who could afford to fly privately.

Alongside the sharing of the flight by "fly anyway" customers described in the previous paragraph, the platform offering both chartering and sharing of the flights could also provide another feature - Share Charter. The user could "charter the flight" with the condition of that given number of other people wold join them. These flights would be offered in the shared flights pool with "Not guaranteed" flag until enough people show interest in the particular flight. Once that happens, the flight is actually chartered.

This feature allows the entry on whole new customer segment - people who want to fly privately, are willing to share the flights, but cannot find another people who would fly with them (or there are no flights interesting for these customers at desired time and date).

7.2.2.5. Sharing Own Flights

Once the functionality for the sharing of the flights is implemented, why not to allow to operators to offer the flights for sharing - both on behalf of their customer, per their request, or just offer a positioning flight to increase the revenue from the flight that has to be flown anyway.

And lastly, if the pilot has required a license (see 5.5 Aviation regulations) and has appropriate aircraft available, they can offer the flight they are making as well.

7.2.2.6. "Sophisticated Platform" Features

Finally, there are a couple of features enabled by the above-mentioned first two levels of features, which could significantly enhance the overall user experience, the ease of

use, and ultimately, the revenue generated. Most of these features are directly enabled by the automated nature of the platform operations.

For instance, once the flight is chartered, the charter company could be automatically offered to post positioning flight(s) for others, of the chartered flight demands any, with most of the information pre-filled and ready.

Another feature using automation could be “Auto-charter”, i.e., a user indicates the interest in the shared flight, because it fits their travel plans. The flight is not yet guaranteed, so the user can pre-fill a charter request, which fills be posted in case the desired shared flight is not guaranteed with given time. This newly chartered flight can be also automatically offered for sharing to others, and possibly even let the charter company post the possible positioning flights.

And finally, users should be allowed to create a wishlist of their travel plans and receive notification, if and when there is a matching flight. Another level might be a premium feature of reserving a matching flight for 2-3 hours or even automatically buying them.

7.2.3. Multisided Platform Pricing Structures

There are two main pricing models used in the industry of private aviation - either pay-per-flight or monthly all-you-can- fly membership fees (or their combination).

There are two basic revenues streams - from jet operators for flights chartered and from the people for managing the sharing of the flights, which decreases the final price paid.

In te case of the MPS proposed here, the pay-per-flight make more sense, since the membership model is more applicable to business models with regularly scheduled flights and also more straightforward to calculate and to deal with - the charter companies are given the amount paid by flyer reduced by service fee.

The usual fee is around 5%, charged by Victor, for instance. The significant difference between the operation of companies like Victor (or most of those mentioned in the Analysis chapter) and the proposed platform is that this platform only focuses on connecting the two sides of the platform, not additional services, such as cabs or helicopter transfers, concierge, etc. That also means that in the case of this

platform, the full transparency is not an option. The core business is a connection of different parties, so if the name fo the operator or the tail number would be given to the customer before the confirmation, there is nothing stopping them from bypassing an going straight to the operator.

The nature of the whole business model also implies that the fees cannot be as high as in the case of Victor and others.

7.2.3.1. Chartering flights

The core feature of the platform, on which everything else is built, is the chartering of the flights. As mentioned above, as the whole added values in only in the decreasing of the search and transaction cost, and not additional services, the fee needs to be lower in comparison to companies who offer more value.

The industry-wide accepted standard is 5-10% of the price of the flight. In the case of the author suggest starting around 3%.

7.2.3.2. Sharing of Charter Flights by "Fly anyway" customers

In the case of sharing the flight, the situation is it more complicated. The standard service fee of 3% on te whole price of the flight is applied - but the administering of the sharing of the flight with the flyers is an additional service, which should be paid for.

The simpler scenario is when "fly anyway" customer charters a flight - in this case, they are willing to pay the full amount but can offer the free seats for a flat rate - let's say for $2000 on buying one of this seat would make the flight cheaper for the customer who chartered it.

Since there are not too many companies who offer this service, especially in a way this sophisticated, the fee on this feature can be higher, about 10%. Another reason for the higher fee can be the fact that selling each seat is actually significantly decreasing the final price for the original customer, even with the 10% fee on ever seat sold.

For instance: "Fly anyway" customer books a $10,000 flight on a 5-seat jet for them and their colleague. They need to fly to make it to the business meeting but do no mind sharing the jet with others, so they offer the remaining seats for sharing. The price on each eats offered for sharing would be $2,000. As it happens, our customer is

lucky and all 3 remaining seats are sold. For each of these, the platform owner gets 10% - $200 and the original customer the rest.

In pure numbers, the jet operator still gets $9,700 - the price of flight minus the 3% fee. This 3 % are earned by the platform, along with 10% on each seat sold - in this case, 3 times $200, making $900 in total. The customer who originally chartered the flight pays $4,600 instead of the full amount of $10,000 and each of the customers who bought the extra seats pays $,2000.

7.2.3.3. Sharing of Charter Flights in General

In the case of the flight that would be actually chartered only if there are enough people willing to fly, the calculation is much more straightforward - when the flight is created, the additional 5% fee for sharing is added to the total price of the flight, which is the price divided among the flyers.

The fee is 5% and not 10% due to the fact that in this case the flight is not confirmed yet by any of the fliers, for which the sharing would make a discount.

7.2.3.4. Sharing of Own Flights by Pilots or Operators

If a pilot shares their flight, each person who decided to hop onboard reduces the total cost of the flight covered by the pilot. So just like in the case of "fly anyway" customer, the fee is 10% on every seat.

The same goes for the operators who offer flights to share on behalf of their customers - this platform would allow them to save some of the costs they would pay anyway so the fee is also 10%.

7.2.3.5. Sharing of Positioning Flights

The positioning flights are usually heavily discounted - usually around 30-50%, sometimes up to 75%. To incentivize the jet operators to offer positioning flight as such, with the right discount, and not as charter flights with one or two flyers that eventually "do not show up", they would get the same discount on the fee as they put on the flight.

For instance, if the original price of the flight was $10,000, the fee would be $300. If the operator gives 50% to $5,000, the fee would be 50% of the 3% - $75 instead of $150.

The main reason behind this incentive is to offer as many super cheap flight as possible, which creates more value for the flyers, ultimately generating more revenue, as described in section 5.2.3.

Furthermore, the flyers who get to taste the experience of private flying are more likely to start chartering their own flights later on.

7.2.4. Multisided Platform Governance Rules

7.2.4.1. Operational Compatibility

In order to make sure that the platform can serve the seller, there must be some criteria met. This allows the platform to manage the offers in a real-time and automated manner on the website, without necessary additional manpower on the platform owner's side. These criteria can include:

- type of the aircraft (jet or turboprop commonly used in private aviation);
- base (or within operational distance) in served region (important especially in the early stages, when the platform may operate in some area, such as EU or US);
- guaranteed availability of offered time slots;
- quick responsiveness to charter requests, etc.

These criteria are most likely to develop as the platform develops itself. Furthermore, it is possible to group them based on priority - i.e., critical and optional, based on if the criteria met are an absolute must or just prerequisite for some of the features provided by the platform.

7.2.4.2. Aviation Regulations and Licences

Besides the criteria discussed in the previous section, which are tied to the platform itself, the aviation has many rules and regulations to be followed on its own.

Below are listed those directly related to the flight sharing platform such as the one proposed in this thesis:

- aircraft airwothiness;
- crew airworthiness;
- and commercial pilot licences.

Aircraft airworthiness is probably self-explanatory. It is set of rules that must be followed in order to legally operate the aircraft. This includes both pre-flight and regular maintenance, etc. Also included the licenses to flow in specific airspace (US, EU, etc)

The crew airworthiness in the responsibility of the operate. Besides the proper training and pilot licenses, the operator must ensure that there is available crew for any guaranteed timeslot offered for chartering into the platform. This is mainly an issue of crew duty hours, which are limited both in 24-hour and monthly periods in order to ensure the safety of the flights. These limitations also affect the scheduling of the flights, at least in some cases, i.e. return flight must be scheduled for the next day or another crew must be used.

One specific issue arose in relation to US-based flight sharing companies Flytenow and Airpooler. As described in Section 6.10.3, some of the flight sharing companies who allowed the pilot to share their flights ran into problems related to the fact that the pilot in questions did not have commercial licenses. Although the issue is now under investigation by FAA, the author thinks that at this stage, it is safer to all parties involved to allow only commercial pilots (CPL) to share their flights.

7.2.4.3. Safety Standards

As another level of protection of the flyers and also the brand reputation of the platform, especially in the early stages, only operators with excellent safety record should be partnered.

Although accidents in aviation are rare, there are usually many casualties at the same time and although the operator or the platform might not be responsible for it, as the case of a crash of the Concorde, even a single accident with bad timing can doom the whole company for good.

7.2.4.4. Market Failures Prevention

Hagiu points out [a16] three likely "market failures" that might endanger the operation of any MSP. These failures are following:

- "*insufficient information and transparency in the market with respect to the quality of the goods*;
- *too much competition within one side of an MSP*;
- *constituent might fail to take actions or investments.*

For the prevention of the first failure, Hagiu suggests using a rating system for basically outsourcing the quietly assurance from the MPS itself to users, in the case of this MSP, both sides. Flyers could rate the experience with operators, aircraft, and pilots, which would filter out the high-quality services from the low-quality ones. Furthermore, as an added incentive to achieve high-quality ratings, the operators might get added value, such as features, priority access to charter requests, etc.

Related to transparency and quality, as discussed in the previous section, there should be no feature simply allowing operators to easily sell positioning flights as charters. Although legal and common practice, explicit feature allowing this could impair relationship between both sides. Operators might offer a positioning flight as a charter upon request (there is not a way for MPS to check, anyway), but only if the same guarantees as for the charter flight are met.

As for the competition within one side of MPS - this is most likely not related to this particular case. The more flyers using the platform, the better, as it gives more chance to better prices on shared flights. In case the demand is so extreme the supply is not sufficient, it is likely that the operators would be more interested in joining, effectively battling the chicken-and-egg problem.

On the supply (seller) side, there might be competition, especially when it comes to the positioning flight during popular events, such as Cannes Film Festival, etc. In the case there would be a significant imbalance between supply and demand, with supply much higher, the MSP could place temporary limitation of offered flights to ensure

effective sharing (enough flyer for each flight). Another way might be allowing only some of the partners (i.e. height rated ones) to offer flight during this period. Everything in this paragraph is only speculative, though, and would require testing in real-life environment to confirm.

Finally, the most likely market failure for this MSP is that one fo the sides fail to take actions or investments. In the case of the platform for sharing flights, it's most likely risk on the side of flyers, as seen in many cases, most prominently the case of BlackJet.

Especially in the early stages, when it is needed to build the critical mass of users, it is important to focus on motivating them to not only join but actively use the platform.

There are two ways to look at this issue - the first one is timing. As the failure of BlackJet teaches us, the seasonality is an important factor, especially in Europe, as seen in the Figure 6.4 in Chapter 6. CEO of the BlackJet explicitly said that the failure to anticipate the behavior of the flyers and launching at the end of the season was one of the primary reasons for the ultimate failure, as there were no incentives for people to start flying as soon as possible and the company got too much behind the bills.

Besides smart timing of the launch during or before the main season, the could be another governance measure put in place - pre-paid packages with time restrictions, i.e. 4000 credits (USD for purchasing flights on the side) for 3000 USD with access to best-rated operators and some of the smart features, such as the auto-charter. This could minimize the risks of flyers not taking actions, at least in the first stage after the launch.

7.3. Design

After the scope definition and detailed description of the desired features, the UML Use Case Diagram the next step towards the actual implementation of the proposed platform.

Following you can see detailed description the Use Case Diagrams. Author beings with the high-level description actor-wise and then focuses on specific details that need to be discussed and described in depth.

7.3.1. High-level overview

In Figure 1, there is a high-level model of the use cases for the core features with a basic description, followed by detailed discussion of specific use cases later on.

7.3.1.1. Actor 1: Visitor

The *Unregistered visitor* is the very basic level of actor. There are only two use cases for this actor - to *View Scheduled Flights* (and the option to filter them, see Section 7) and to *Register* as one of the other actors to be able to interact with the platform further.

7.3.1.2. Actor 2: Registered User

The registered user, on the other side, has full access to the core functionality of the platform upon logging in:

- *Charter Flight* based on their preferences from one of the partner operators; or
- *Share Flight* they chartered with other users of the platform to save money on the flight;
- *Join Flight* that already exists - buy a seat on either someone else's charter flight or a positioning flight posted by an operator with significant discount; or
- Indicate that they want to *Share Flight*, but only if enough people pitch in.

Besides that, th registered user also has an option to *Manage My Flights*, essentially grouping the together to groups internally sorted by priority - descibed in detail in Sections 7.3.2.8 and 7.3.2.9.

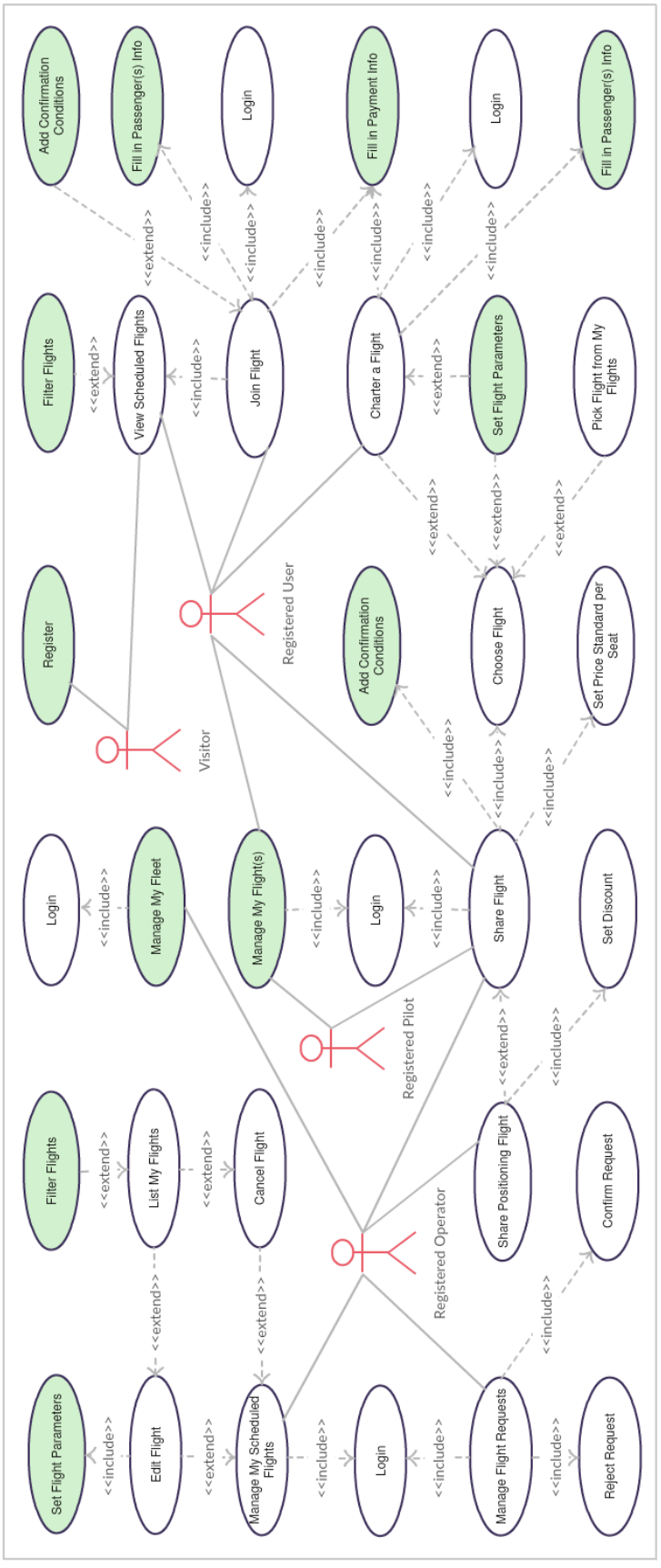


Figure 1: New Platform Proposal

7.3.1.3. Actor 3: Registered Pilot

Registered pilots have a single core use case available to them - *Share Flight* they are making. And, of course, to *Manage* them.

This group of users is actually a mix between the two sides - people who can fly other people, but use the charter feature themselves as well.

If they want to join or charter the flights from operators, however, i.e. because they want to travel with family and their aircraft is not large enough, they need to create another account on *Registered User* level.

7.3.1.4. Actor 4: Registered Operator

The operators are the second side served by this platform. Upon the finishing of their registration, the first thing they need to do is to make their aircraft available for charter via *Manage My Fleet* - see Section 7.3.2.11. Then, they can *Accept* or *Reject* incoming request for the charter.

Besides allowing the people to charter flights directly, operators can also post the flight of their customers for sharing on their behalf.

Sort of an extension of the sharing of the existing flights is the option to mark empty positioning flights with the "Positioning flight" flag and significant discount to make the revenue with minimal extra cost, as described in the Section 7.2.3.

7.3.2. Detailed Use Case Desciption

7.3.2.1. View Scheduled Flights

As mentioned above, the very basic feature. As shown in Figure 1, anyone who comes to the website can *View Scheduled Flights*.

Given there is enough of them and/or there a good deal available, this could be enough of a reason to register to enable the option to actually join some of the flights or to participate as an operator. There are 3 options for the registration (Figure 2), described in detail in the following section.

There is a possibility that there is going to be too many flights to navigate through. For that, there is a feature allowing to filter the flights by different criteria, as explained in Section 7.3.2.12.

7.3.2.2. Register

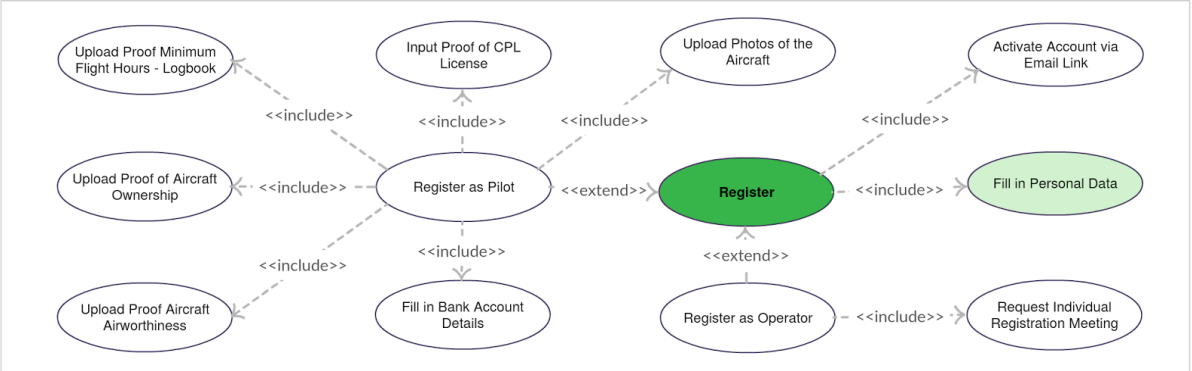
If the visitor wants to use any features of the platform, they need to register (see Figure 2) as one of the following:

- Registered User
- Registered Pilot
- Registered Operator

Visitor who wants to register as a user only needs to fill in their basic info needed for flying - as described in the Section 7.3.2.15 - and to confirm their email address, thus activating the account. Requiring all the info in the beginning also means that they do not need to till in their personal info every time they want to fly.

Registered user can *Charter*, *Share* and *Join flights*. In fact, most of the users of this platform will be on *Registered User* level.

Figure 2: Register - Detail



The registration for pilots is a bit more thorough - besides the basic info, they also need to upload many documents proving that they hold all required licenses, experience (given the number of flight hours) and own jet or turboprop:

- Proof of CPL License
- Logbook
- Proof of Aircraft Ownership
- Proof of Aircraft Airworthiness

Once all these documents are uploaded and manually reviewed, the pilot will be also asked to upload the photos of their aircraft. The pilot also needs to fill in the bank account information for receiving the payments. Then they can start Sharing their flights., but unlike the charter companies, they cannot receive charter requests.

Finally, the registration of operator is handled in a case-by-case manner, as there are a lot of different contractual details that needed to be resolved, there might be a possibility of connecting the reservation system of the operator and the platform via API, etc. After that, the operator can start to manage their fleet (Section 7.2.3.11), offer flights and receive requests.

7.3.2.3. Charter a Flight

This is a core feature of the whole platform (Figure 1) and it is quite straightforward. The flyer can request a charter by *Setting the Flight Parameters* (Section 7.2.3.13), *Filling in the Passenger Info* (Section 7.2.3.11), and *Filling int he Payment Info* (Section 7.2.3.16). That is “fly anyway” scenario and the flight is guaranteed right after the operator confirms the charter request.

From the operator point fo view, the process is also simple. Operators get request based on the current position and flight plans of the aircraft in their fleet. When a flyer makes a request, 3 operators with the best aircraft positioning and flight plans. Whichever reacts first, gets the flight. This provides the flyers with the fastest confirmation possible.

Once the flight is created, the flyer receives a suggestion to share the flight to save some money.

7.3.2.4. Share Flight

If the flyer decides to actually Share (Figure 1) their flight, it will he show in the list of scheduled flight as soon as it’s confirmed by the operator.

The flight is shared via an offering of individual seats for a price that is calculated through the formula: flight price/number of seats. When anyone buys the seat, the flyer who shared the flight will get a discount of an amount equal to 90% of the seat price.

Another case might be that flyer creates the flight as shared fro the start and also fill in the "Confirmation Conditions" (Section 7.2.3.7). The flight will have "Not Guaranteed" flag until the conditions are fulfilled.

Registered Pilots can also share the flights they plan to make and to cut the costs, in very much the same way as the *Registered Users*. The main difference is that they also need to fill in the price per seat (in the previous case, the price was set was automatically).

And finally, *Registred Operators* can share flights made outside the platform, on behalf of their customers, under the same rules and the same way as the *Registered Pilots* do - but unlike the, they are not limited to one flight at the time.

7.3.2.5. Share Positioning Flight

Sharing of the positioning flight (Figure 1) is similar to the standard sharing of the flight, the only difference is that the discount needs to be applied.
These flights are "Guaranteed" right away, but with limited possibility of cancellation.

7.3.2.6. Join Flight

Any *Registered User* can Join Flight (Figure 1). If it is the case of "fly anyway" flight, the only option is unconditional joining.

But, it the flight was created as shared, which means that the price is divided equally among the flyers, the user can *Add Confirmation Conditions* (see next section) for joining the flight. If these conditions are not met, the user does not join the flight.

7.3.2.7. Add Confirmation Conditions

As seen in Figure 3, there are two confirmation conditions. The first of them is time, which is always required. This condition allows the flyer to make sure that they get confirmation in time to prepare for the flight or make other arrangements otherwise.

The second - optional - applies to the case of flight created as shared. This condition is the minimal number of people joining, or the maximum price per seat, to put it in other words.

Figure 3: Add Confirmation Conditions - Detail

Any person creating the flight (or joining later) can specify the minimal number of the people whe is willing to share the price with. Once there are enough people with matching criteria, the flight is confirmed.

7.3.2.8. Manage My Flights

This is section (Figure 4) for the *Registered Users* and *Registred Pilots*. Here, they can list their planned flights and edit or cancel them, as well as check their status.

The most interesting part, however, is the option to *Manage My Advanced Booking*, (also Figure 4) available to the Registered users.

7.3.2.9. Manage My Advanced Booking

One of the "Sophisticated Platform" features is the Advanced Booking (AB), which allows you to group, prioritize and sequence your flights.

For instance: you want to fly from CPH to LTN on Friday evening. You see that there is a flight offered that would fit your schedule, but there are 3 more people needed to make it guaranteed. What you can you are to join the flight and add the condition to require confirmation 24 hours before the departure. Then you go to the AB section, create new AB, add the not guaranteed flight there and request to charter another one yourself - but you assign it the second priority. What you that means is that if the not guaranteed flight is not confirmed before 24 hours prior the departure, you will automatically charter another "fly anyway" flight yourself. You can even enable sharing of it, to cut the costs.

Advanced Booking is a sophisticated feature that enables users to use the full potential of the automation and the single-point-of-access approach for managing the whole private aviation experience.

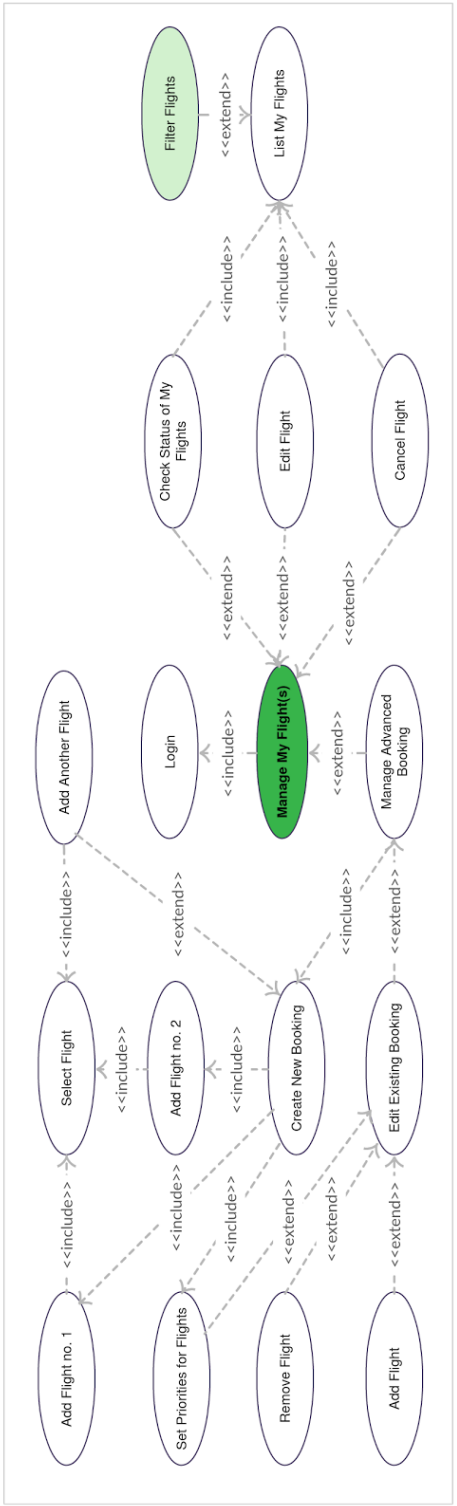


Figure 4: Manage My Flights - Detail

7.3.2.8. Manage My Scheduled Flights

Just as *Registred Pilots* and *Registred Users* have the *Manage My Flights* section, there is something similar for the *Registered Operators* as well.

Here, operators can list and filter the flights, edit their parameters and cancel them. This use case is show in Figure 1.

7.3.2.9. Manage My Fleet

In this section (see Figure 5), operators can manage the aircraft offered for charter - add new, edit, remove, etc. The important thing is set the base correctly, as this is partly used to determine if the aircraft is a good match for the newly requested flight.

Figure 5: Manage My Fleet- Detail

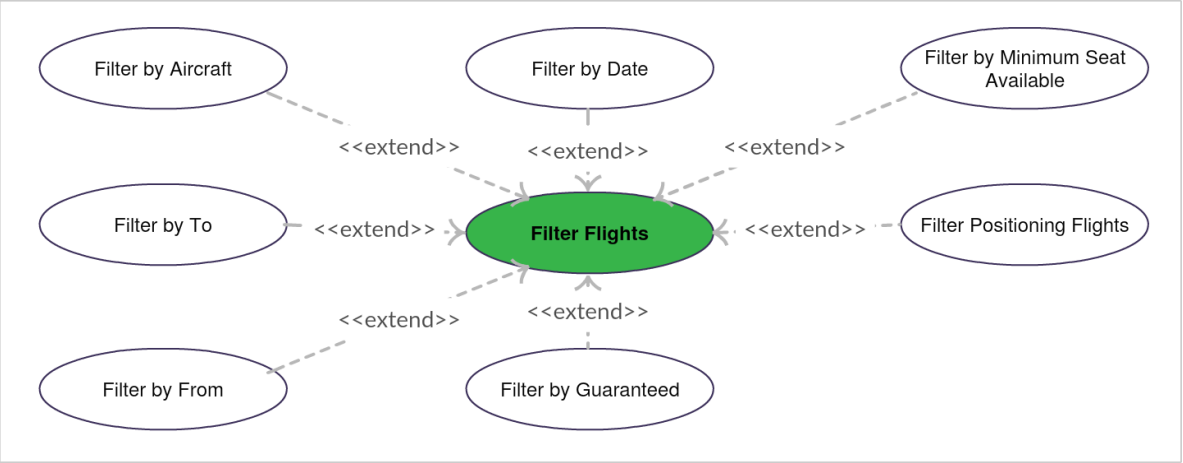
7.3.2.10. Filter Flights

Sometimes, there are too many flights scheduled. To view only the ones interesting for the user, the flights can be filtered (see Figure 6) based on following criteria:

- Airport of Origin, Destination Airport;
- Date and Time;
- Aircraft Type;
- Guaranteed;
- Positioning;
- and Minimum Number of Seats Available

None of these criteria are required and can and can be combined in any way through conjunction - logical AND.

Figure 6: Filter Flights - Detail



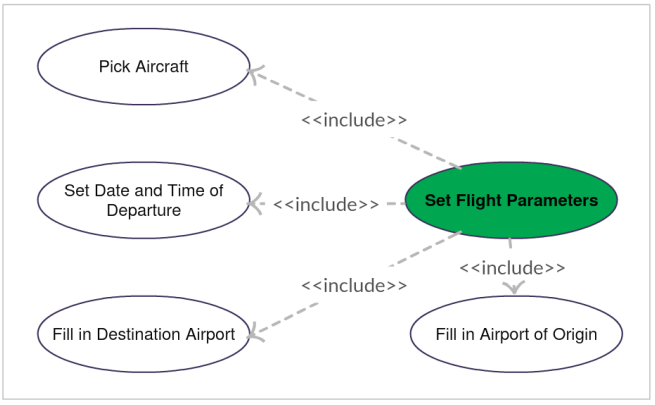
7.3.2.11. Set Flight Parameters

For each flight created, there always must be couple of basic flight parameters (See Figure 7) filled in:

- Airport of Origin, Destination Airport;
- Date and Time;
- and Aircraft Type.

All of these parameters above must be always filled in, otherwise the creation of the new flight cannot be finished - as shown in Figure 7.

Figure 7: Set Flight Parameters - Detail



7.3.2.12. Fill in Passenger(s) Info

The passenger(s) info (see Figure 8) only consist of two main parts. The first one is the number of passengers, the second one are the actual personal adata about each of them (see the following section).

Figure 8: Fill in Passenger(s) Info - Detail

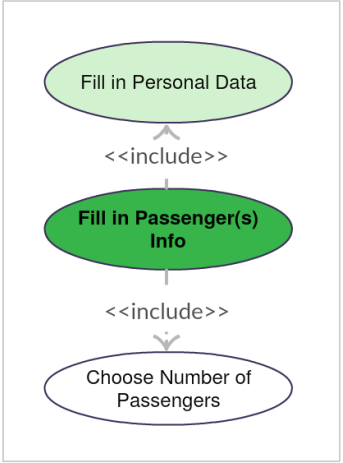
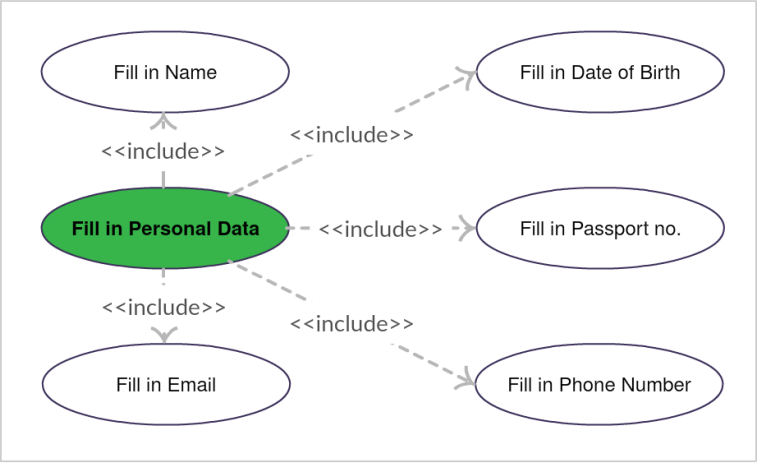


Figure 9: Fill in Personal Data - Detail



7.3.2.13. Fill In Personal Data

The goal is to collect all the legally required personal info about the passenger (Figure 9), and contact info required for communication, but nothing beyond that. Here is the list of the information each passenger must provide:

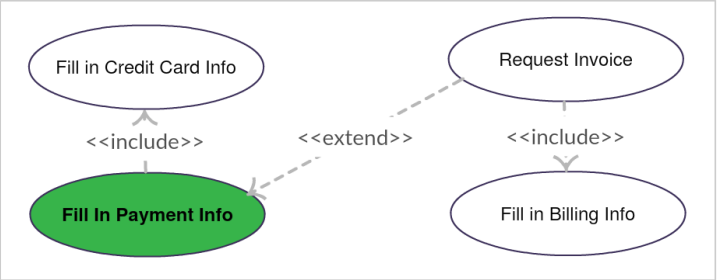
- Full Name,
- Date of Birth,
- Passport Number,
- Email Address,
- and Phone Number.

7.3.2.14. Fill in Payment Info

There are many ways to pay for services, but in the case of companies who operate in the private aviation industry, the credit or debit cards are the most commonly used.

Some of the clients also require an invoice sent to the company, on a different address via specific billing info, so it is important to give them that option (Figure 10).

Figure 10: Fill in Payment Info - Detail



7.4. Business Model

After putting together all of the pieces of the proposed platform in the previous sections, it was quite easy to fill in the specific blocks of the BMC to formally introduce the business model, shown in Figure 7.11.

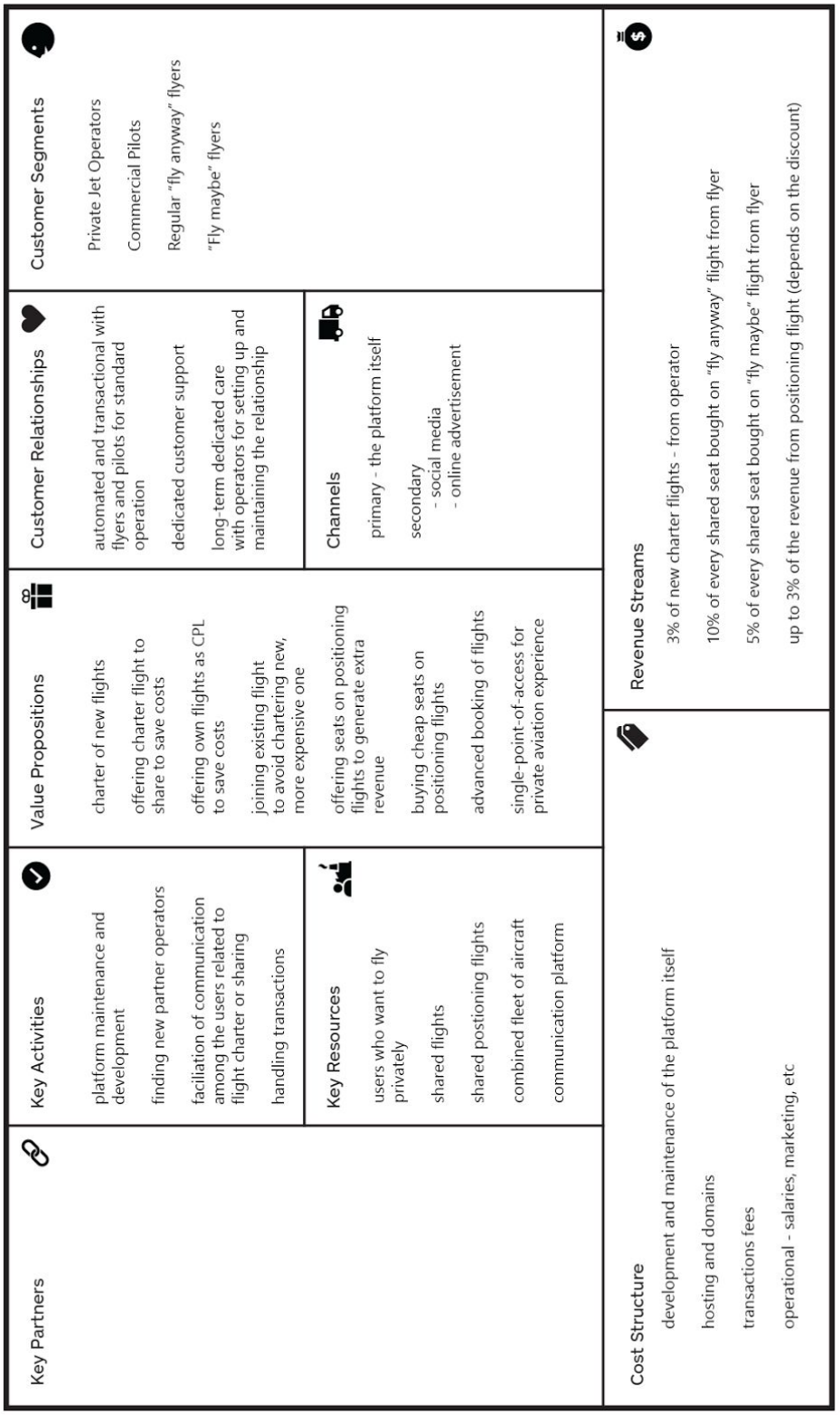
7.4.1. Customer segments

There are two equally important customer segments - flyers and operators - and then there is a third one, which is sort of a combination of both - commercial pilots.

The operators provide aircraft to chartering the flights by the flyers, which can be further divided into two categories wich a different approach to private aviation. The “fly anyway” flyers are people who regularly fly. The “fly maybe” category is made of people who want to fly privately, but could not afford it until now - flyers enabled by the sharing feature and offering of the much cheaper positioning flights.

The pilots who have a commercial license can also participate on the platform - they can offer seats on the flights they are making to cut the costs.

FIGURE 7.11


Key Partners
Key Activities
platform maintenance and development
finding new partner operators
faciliation of communication among the users related to flight charter or sharing
handling transactions
Key Resources
users who want to fly privately
shared flights
shared postioning flights
combined fleet of aircraft
communication platform
Value Propositions
charter of new flights
offering charter flight to share to save costs
offering own flights as CPL to save costs
joining existing flight to avoid chartering new, more expensive one
offering seats on positioning flights to generate extra revenue
buying cheap seats on positioning flights
advanced booking of flights
single-point-of-access for private aviation experience
Customer Relationships
automated and transactional with flyers and pilots for standard operation
dedicated customer support
long-term dedicated care with operators for setting up and maintaining the relationship
Channels
primary - the platform itself
secondary
- social media
- online advertisement
Customer Segments
Private Jet Operators
Commercial Pilots
Regular "fly anyway" flyers
"Fly maybe" flyers
Cost Structure
development and maintenance of the platform itself
hosting and domains
transactions fees
operational - salaries, marketing, etc
Revenue Streams
3% of new charter flights - from operator
10% of every shared seat bought on "fly anyway" flight from flyer
5% of every shared seat bought on "fly maybe" flight from flyer
up to 3% of the revenue from positioning flight (depends on the discount)

7.4.2. Value propositions

There is a long list of value propositions, a bit different for each customer segment. The first core principle is the single-point-of-access to the whole private aviation experience, meaning that the platform facilitates all the ways of flying privately, without the need to use another platform, which is the case of all of the currently existing companies.

The basic value proposition is the possibility of chartering flights with some of the partner operators. The second core principle of the whole platform is the sharing of the seats on the flights, which can come in many forms:

- the “fly anyway” flyers can cut the cost of the flight they would take no matter what or join another, conveniently scheduled flight shared by someone else
- the “fly-maybe” customers can indicate an interest in chartering of particular flight and charter it only if there are enough people to make the flight cheap enough or to buy a cheap seat on a positioning flight
- the pilots can share the flights they are making to cut the cost
- the operators can share seats on their positioning flights

7.4.3. Channels

The primary channel where everything is happening is the platform itself, but some of the offers can be advertised on social media, pay-per-click advertisements, etc.

7.4.4. Customer Relationships

For the flyers and pilots, under normal circumstances when everything goes right, have automated, transactional relationships that comprise of the common interaction with the platform. But private aviation is still an exclusive service, so dedicated support team has to be available to solve any issues or special wishes of the customers.

With operators, it's completely different story. From the very beginning, there is gonna be a lot of communication, negotiation, paperwork, most likely some API integration for booking systems, etc. Each of the operator partnership will most likely have a bit different terms, which implies highly tailored, individual approach.

Once all this is settled, though, the relationship will also mostly comprise of interaction with the platform itself - answering the requests, managing the fleet, etc.

7.4.5. Revenue Streams

As described in the Section 5.2.3, the only revenue streams are from flights or seats sold, based on the specific use case, with commission up to 10%.

The important thing to realize here is that the platform will only start making money once it's fully developed, up and running - there are no prepaid membership fees, which would help the platform to take of. This needs to be considered while planning and making the initial investment covering some of the costs mentioned in the next section - most of these (the most significant ones, such as development) need to be covered prior the launch itself.

7.4.6. Cost Structure

The costs can be divided into two groups: pre- and post- launch. The pre-launch costs are - just as in a case of an SW project - quite significant. Then for the costs that need to be covered both pre- and post-launch, there are also salaries, marketing, etc. These will also grow as the platform grows.

And finally, aside from the above-mentioned costs: the platform also needs to be maintained, the infrastructure, domains etc. will pose a high cost that will only grow over time, as more users join.

7.4.7. Key activities

For the platform to even launch, there obviously needs to be a lot of development done. Then the next step is acquiring partner operators who would like to participate in such project and be the first who will start offering their fleet via the platform - a process, which will, of course, continue after the launch as well.

After the initial development phase, the most of the manpower will be spent on the very core of the whole operation - facilitation of the communication among the users to sell as many flights and seats as possible.

7.4.8. Key resources

The key resources are in fact the outcome of the network effects - the accessto the network value of the flyers and the operators willing to participate on a platform that allows them to do it in easy and sophisticated manner.

8. Discussion

However the technology - mostly the internet - helped to improve how the operators and brokers in the private aviation industry operate, there is still a lot of potential for further development.

Before the research of the empirical evidence, the author started with exploring the theoretical background for the issues related to the brokerage in the private aviation and the topics relevant to the intended platform proposal - sharing economy, multi-sided markets, transaction cost, business models. This research had been proven handly especially in the later stage - proposal of the new platform and solution for the problems found during the research and analysis stage.

The author also focused on the governance and regulation of the aviation industry in general, as there are some legal issues present related to the sharing of flights by pilots without required licenses.

After establishing the theoretical background, the author moved to the research and analysis of empirical data available online, as that is the platform generally used for aviation brokerage. The first goal was to understand the industry in general, to confirm the assumption that there is fact trend to saving costs in private aviation in general, but, on the other hand, that this mean of transport is more and more perceived as accessible and the people actually are switching from business and first class in the airlines to small business jets.

Following this confirmation, the author focused on the positioning flights and the ways they are sold now. As it turns out, most companies are in the vicious circle of not focusing on the positioning flights because it does not bring enough revenue, which is partly caused by the very fact that these companies just did not give this enough attention in the first place.

Then, the author tried to do another round of looking into the market, especially in the current trends, etc, which proved quite useful (i.e., understanding the seasonality). In this stage, the author spent an enormous amount of time researching the jet ownership models and the jet market in general, which later proved useful for the purpose of this thesis.

The very core of the research and analysis phase was the research of existing companies focusing on either positioning flights, sharing of the flights, or both. The research of their websites and articles about them was the primary source of information for this thesis and quite useful in terms of discovering issues that should be fixed.

Unfortunately, the author did not succeed in scheduling interviews with representatives of any of the researched companies, despite he was in contact with many of them. This caused another delay in the project as a whole. The time management in this part could be handled much better,

Most of the issues were common for basically all researched companies - lack of focus on the positioning flights, not leveraging the potential of automation enough, etc. Above that, the author did not find a single company, that would provide what he considers a full private aviation experience through a single-point-of-access. Some allow sharing flights, some focus on positioning flights, but literally, none allows both charters and positioning flights both shared and bought in full.

Thanks to the special focus on flight sharing, the author discovered a number of issues that cause that the flight sharing is not as successful as it could be. Besides the lack of focus, there is a lot of market segmentation and in most cases, the flights shared are only provided by one operator on each website and, a bit unexpectedly, a couple of flight sharing companies were banned due to the fact that the pilots exercised privileges of the licenses they did not have.

Once these issues were isolated, the author was able to strat with the proposal of a solution. For that, he needed a framework he could use. This is where Strategic decisions for multisided platforms from Hagiu [a16] was used. Hagiu provides 4-part framework for decisions while building a multisided platform and was a great tool for giving the proposal a formal structure.

At this time, the author also accidentally discovered company JetForMe (Section 6.10.2.7), which is, in fact, close to what he wanted to propose. A lot of features are in fact exactly the same as what author started to propose at that stage. This was a very good proof of that the intended platform makes sense, but still, there were a lot of things to improve - the JetForMe allows sharing of flights, but not of positioning ones. There is no way to specify the max price you are willing to pay for

flight when joining (aka requiring more people to confirm), pilots holding proper licenses cannot share their flights, etc. Plus there are a lot of details that make, in authors opinion, the platform “sophisticated”.

The decision about the number of sides included was straightforward - this market is two-sided. Then author proposed a way of sharing of both chartered and positioning flights. Learning from the mistakes of companies that no longer exist, the author suggests allowing pilots of compatible aircraft sharing their flights as well, but only if they have a CPL. The proposed way of sharing leverages of the automation, which eliminates the need for prolonged negotiations among many travelers.

One of the most significant differences from JetForMe is the option to set a condition for confirmation fo the flights, which saves flyers time in repeated checking the deals and joining only if their conditions are met. On the top of this, the Advanced Booking is built, which is a feature that allows users to group their flights and set priority, which in combination with the confirmation conditions allows very simple but precise trip planning on a single platform where everything is available.

Then author proceeds to the pricing, which is inspired by the existing companies, but the charges to the operators are limited due to the fact that the platform itself is only for communication and chartering, but does not provide any extra services. The special focus is given to the price incentives demonstrated in Figure 5.4.

And finally, the author proposes some solutions to possible market failures - for example launching in the beginning of the summer to maximize revenue as soon as possible to avoid the fate of BlackJet.

The last two steps that were finished are the complete Use Case Diagram for all the features and uses proposed and a business model proposal using a BMC.

Unfortunately, due to time management issues and two major dead-ends taken, the author was unable to make the mockup of the user interface in given timeframe. But the project is really only in the beginning, as author plans to actually pursue the creation of such platform.

9. Conclusion

Despite the issues related to the dead ends and the unexpected complexity of the private aviation market that caused significant extension of the research phase, the author eventally managed to complete the objectives set in the Section 3.3. in a structured manner, backed up by both the theoretical background and results of analysis of the empirical data.

The outcome of this thesis will be used as a corner stone for the development of the proposed platform as a entrepreneurial venture by the author.

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