The influence of uncertainty on consumer decisions. An explorative study on the acceptance of flexible time-range tickets in the airline industry.

Original Citation:

Nernst, Birte Freya
(2010)
The influence of uncertainty on consumer decisions. An explorative study on the acceptance of flexible time-range tickets in the airline industry.

Schriftenreihe des Instituts für Transportwirtschaft und Logistik - Verkehr, 02/2010. Institut für Transportwirtschaft und Logistik, WU Vienna University of Economics and Business, Vienna.

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Schriftenreihe des
Instituts für Transportwirtschaft und Logistik
Nr. 2 (2010 VER)

Nernst, Birte Freya

Der Einfluss von Unsicherheit auf Konsumentenentschei-
dungen. Eine explorative Studie über die Akzeptanz von
flexiblen time-range Tickets in der Luftfahrt

Herausgeber: die Professoren des Instituts für
Transportwirtschaft und Logistik
Diplomarbeit

Titel der Diplomarbeit:
The Influence of Uncertainty on Consumer Decisions
An explorative study on the acceptance of flexible time-range tickets in the airline industry

Der Einfluss von Unsicherheit auf Konsumentenentscheidungen
Eine explorative Studie über die Akzeptanz von flexiblen time-range Tickets in der Luftfahrt

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The Influence of Uncertainty on Consumer Decisions

An explorative study on the acceptance of flexible time-range tickets in the airline industry

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Vienna, January 2010
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List of abbreviations

CRS – Computer Reservation System
DP – Decoupling Point
IATA – International Air Transport Association
LF – Load Factor
SPOC – Single Point of Contact
1 Introduction

1.1 Initial situation and problem statement

In April 2009 the International Air Transport Association (IATA), which comprises 93% of scheduled international air traffic, published its new load factor data. The load factor (LF) represents the percentage of seats in an airplane which are actually used by paying passengers. In March 2009 the average load factor was 72.1% which is 5.4% below the level of March 2008. Furthermore, it has always been below 80% during the last years which implies that at least one fifth of the offered capacity remains unused.\(^1\)

In order to optimize capacity utilization and maximize revenue, airlines use so-called yield management systems. By using this method they try to sell the right capacity at the right time, for the right price to the right customer. Another effect is the induction of demand by offering discounted tickets in addition to regular ones.\(^2\)

An important element of the yield management process is market segmentation on the basis of the consumers’ willingness to pay. Traditionally airlines try to make customers with a high willingness buy more expensive tickets than customers with a lower willingness to pay. To achieve this goal, they use so-called fencing mechanisms which impose restrictions to passengers which they have to meet in order to receive a special offer, such as a minimum stay between outbound and inbound flight.

During the last years the internet led to an increased market transparency and the possibility to compare prices online. Due to this development airlines are not able to exercise this kind of price and product differentiation to the same extent any more. Furthermore, since some carriers have started to offer one-way flights, methods such as the differentiation on the basis of the passengers’ length of stay have become obsolete. Therefore, airlines are increasingly forced to find new ways of market segmentation.\(^3\)

One relatively new strategy to segment the market and cope with demand uncertainty are flexible products. In this case consumers buy a set of at least two alternative products and not one specific product. At some point of time between the booking and the consumption process the supplier then assigns the customer to one of the

\(^1\) Cf. IATA (2009), http://www.iata.org
\(^2\) Cf. Lindenmeier (2005), p. 5
\(^3\) Cf. Mang/Spann (2008), p. 1
alternatives and can thus improve capacity utilization. This is not only done by airlines, but also by tour operators and in the field of Internet advertising.\footnote{Cf. Gallego/Phillips (2004), p. 321}

In the airline industry a carrier would for example offer a flexible morning flight package which may consist of different flights serving the same market. At the moment the airline ‘Germanwings’ offers a flexible product called “Blind Booking”, for example. When booking a flight the consumers can choose their departure airport, the dates, and a travel topic such as “culture” or “party”. The destination remains unknown until the booking is completed.

Flexible products can represent a good possibility to address the low-price segment where competition from low-cost-airlines is high without having to reduce the prices for direct flights which might lead to a cannibalization of revenues. While consumers can benefit from relatively low prices, airlines are able to balance demand between different flights and at the same time avoid revenue cannibalization.\footnote{Cf. Mang/Spinn (2008), p. 2 f.}

Furthermore, this ticket type is especially interesting in the ongoing consolidation process of airlines in Europe. The number of multi-hub airline networks is increasing so that a number of destinations can be reached via several hubs. In this case the use of flexible tickets can turn out to be a reasonable strategy.

Another adapted variant are so-called flexible time-range tickets which do not specify the exact routing and represent a cheap alternative for time-insensitive passengers. Passengers have to be at the departure airport at a specified time and are guaranteed a latest arrival time at their final destination. The actual routing depends on the available seats on the different routings.\footnote{Cf. Interview Felix Badura (2009)}

So far flexible time-range tickets are not used by any airlines even though they could profit from a pooling of demand. One reason might be that they are not sure how to design the tickets in order to minimize uncertainty for passengers and at the same time maximize their revenue.
1.2 Research question and objectives of the study

The possibility of offering partly unspecified time-range tickets in the airline industry in order to balance demand has not been discussed very detailed in literature. Therefore, the author wants to focus on the concept, its objectives as well as challenges for airlines and consumers.

In order to be able to evaluate the underlying concept, it is necessary to judge how consumers value uncertainty in general. Therefore, the first research question is

- How do consumers value uncertainty?

The airlines on the supply side also have to cope with the problem of uncertainty. In their case the arrival of demand with regard to time and quantity is uncertain. They do not know when and how many tickets they will be able to sell for a specific flight in advance. Hence, in a second part the author wants to investigate

- How do airlines cope with demand uncertainty?

The third research question links the first two parts of the thesis with each other and refers to the idea of flexible time-range tickets in the airline industry. It includes the consumer perspective as well as the airline perspective in the question

- How can flexible tickets in airline industry be designed?

The author wants to find out how consumers judge uncertainty in this situation and what they are willing to tolerate for such a relatively low-priced ticket. Furthermore, it should be discussed how airlines can design flexible time-range tickets which are accepted by the consumers.

1.3 Course of investigation

The basic structure of the thesis is depicted in Figure 1.
The first part of this thesis contains the theoretical approach to the topic of how uncertainty influences consumer decisions. It is divided into two parts, one dealing with the consumer perspective and the other one dealing with the perspective of airlines. The part about the consumer perspective deals with the question on how consumers value uncertainty and gives examples of risk management techniques applied by them. The second subtopic explains the yield management in airline industry. First, the concept with its basics being load factor and revenue is illustrated in detail. Afterwards, other strategies to cope with demand uncertainty are introduced. Company risk management techniques such as the postponement strategy with examples from production and leisure industry are explained. There is a focus on flexible products in the airline industry. The author describes the concept, challenges, and the cases of flexible time-range tickets as well as the case study of Germanwings’ “Blind Booking”. The theoretical first part is based on a careful literature analysis of recent journals, books, theses, and web pages. The information about Germanwings is deducted from an interview with an employee of the company.

---

Figure 1: Course of investigation

Illustration by the author
The second part of the paper comprises the explorative study on the acceptance of flexible time-range tickets. After some theory about qualitative interviews, the objectives and the survey design are explained. Afterwards, the author summarizes the execution of the interviews. At the end of the chapter the collected data is analyzed and discussed.

The theory and course of action are derived from relevant literature such as books and online journals. The results of the study are extracted from a set of qualitative interviews conducted by the author.

In the last part, summary and conclusion, the most important findings are outlined and the research questions are answered. The paper is comprised by an executive summary.
2 Consumer decisions under uncertainty

2.1 Basic terminology

In common usage the term uncertainty denotes a state in which one does not know whether a proposition is true or false. This is the case whenever individuals do not know if a proposition is right or wrong or if they are oblivious to it.\(^8\) Urbany, Dickson, and Wilkie distinguish between knowledge uncertainty and choice uncertainty. Knowledge uncertainty is uncertainty with regard to the information about different alternatives while choice uncertainty is uncertainty about which alternative to choose.\(^9\)

Uncertainty is an umbrella term which includes risk and ambiguity. When having to make decisions under risk the probability for future situations is clear whereas this is not the case for decisions under ambiguity.\(^10\) Ambiguity exists whenever two individuals value the input or output of a system differently.\(^11\)

The term risk is not consistently used in economic literature. The word derives from the Italian word “risicare” which means to hazard something. A number of definitions describe risk as the possibility of negative deviations from an anticipated outcome, namely the risk of loss or damage, without contrasting it with possible benefits.\(^12\) One prerequisite to talk about risk is that people have to care about the outcome. They are only exposed to risk when they have a personal interest in what happens. In addition, the outcome has to be uncertain as mentioned above.

Situations which include risk can be manifold. For example, companies have to make decisions under uncertainty because they do not have full information about demand. Thus, they have to bear the risk to reach suboptimal decisions. For individuals risk can be involved in skydiving as well as a romance, for instance. Since individuals have to be self-aware to be exposed to risk, companies and organizations take risk through their members or employees.\(^13\)

Possible risk management techniques of consumers and companies are explained in chapter 2.3 and chapter 3.2.1 respectively.

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\(^10\) Cf. Gleißner (2008), p. 8
\(^11\) Cf. Renn (2008), p. 186
\(^12\) Cf. Wolke (2008), p. 1
2.2 Consumer decision theories

2.2.1 Classic theory

Most economic theories about choice under uncertainty are based on the concept of Homo Economicus, or Economic Man. He is a virtual player who has the following characteristics: He

- acts self-interested,
- acts rational,
- maximizes his own utility,
- reacts to restrictions,
- has fixed preferences,
- has complete information.

In economics a stakeholder acts rational if he either reaches the maximum goal-oriented with given resources or if he reaches a given goal with a minimum of resources. The rational behavior is caused by a scarcity of resources. Its topmost goal is utility maximization. Depending on the stakeholder and his target function almost every action can be regarded as personal utility maximizing. For companies the objective often is profit maximization while individuals may prefer to maximize spare time, for example.\(^\text{14}\)

The concept of Homo Economicus comes from economics where it can be distinguished between microeconomics and macroeconomics, the theory for individual economic entities and the total of economic activities respectively. The idea is mainly relevant for microeconomics since collective decisions result from the aggregation of individual decisions and not from independent behavior of a collective. Therefore, propositions about social issues result from the sum of individual decisions and actions. It is possible that there are effects in a collective which run contrary to the individual agents’ intentions. Furthermore, the concept of the Economic Man has changed over time and scientists have increasingly started to disprove it.\(^\text{15}\) The reasons as well as newer approaches are described in chapter 2.2.2.

The concept can also be found in the expected utility theory which was described by Bernoulli in the 18\textsuperscript{th} century and later reinterpreted by von Neumann and Morgenstern. Friedman and Savage approved their older finding in 1948 and added some new ideas. The orthodox points about consumer behavior when choosing among alternatives presented by them are:\footnote{16}{Cf. Friedman/Savage (1948), p. 281 ff.}

- Consumers have a consistent set of preferences.
- Preferences can be described by attaching a utility in form of a numerical value to the alternatives regarded as certain.
- Consumers choose the alternative with the largest utility among the options which do not involve risk.
- In the function depicting the utility of income, utility rises with income and the marginal utility is positive everywhere.

Figure 2 shows the utility function suggested in expected utility theory for risk-averse consumers.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{utility_function.png}
\caption{Utility function in expected utility theory\footnote{17}{Cf. Friedman/Savage (1948), p. 290}}
\end{figure}

\footnote{17}{Cf. Friedman/Savage (1948), p. 290}
In the original state the consumer is faced with a situation in which two conditions can happen with the same probability. Based on an initial income $I$, the consumer may experience a loss or a gain of equal amount which are represented by $I_1$ and $I_2$ respectively. Since risk-averse consumers judge a loss worse than a gain of equal amount, the difference between $U(I)$ and $U(I_1)$ is bigger than between $U(I)$ and $U(I_2)$. Therefore, the expected utility does not equal the utility of $I$, $U(I)$, but is lower, namely $U(I^*)$. The consumer would be willing to pay a maximum of $I - I^*$ for an insurance against the risk.\(^{18}\)

The enhancements to this utility function are also explained in chapter 2.2.2.

2.2.2 Theories in behavioral economics

The concept of Homo Economicus was criticized by Kahneman and Tversky in 1979. The psychologists disproved the descriptive model for decision making under risk, the expected utility theory, and developed a new model, the prospect theory. With the help of hypothetical choice problems conducted with students and university faculty, they found out that in many cases preferences do not meet the principles of the Homo Economicus concept.\(^{19}\)

Kahnemann and Tversky have demonstrated that people are mostly loss-averse and under some conditions act in a way that seems irrational with regard to the Homo Economicus theory. According to them “a person is risk averse if he prefers the certain prospect (x) to any risky prospect with expected value x”.\(^{20}\) For example, if people have a 50-50 chance of gaining or losing money, most of them will reject the prospect unless they can gain twice as much as they can lose.\(^{21}\) In the expected utility theory risk aversion corresponds to the concavity of the utility function. With the help of their studies, the authors have found several phenomena which violate older findings. Among other things, they have proposed a revised value function.

\(^{19}\) Cf. Kahneman/Tversky (1979), p. 263
\(^{20}\) Kahneman/Tversky (1979), p. 264
Figure 3 depicts the value function proposed by Kahneman and Tversky.

![Diagram of value function in prospect theory](image)

**Figure 3: Value function in prospect theory**

The revised value function is also specified by deviations from the reference point. It runs concave for gains, implying risk aversion, and convex for losses, representing risk seeking behavior. Furthermore, the function is steeper for losses than for gains and the steepest part can be found in the reference point. This means that people feel worse if they experience a loss than they feel good when realizing a gain. This loss aversion is often summarized by the phrase ‘losses loom larger than gains’.  

Decisions under uncertainty are the most common consumer decisions in reality. Due to an increasing complexity in market and competitive conditions and the fact that marketing decisions are focused on the consumer, there is a need to describe and explain consumer decisions. Still, in marketing only the theoretical part which deals with consumer decisions under certainty is used to describe consumer behavior. For this it is common to use the expected utility theory even though its adequacy is contested.  

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2.3 Risk management of consumers

2.3.1 General theory

The behavior of consumers is often influenced by their risk perception. In many cases they are uncertain about the consequences their decisions and actions might have. The description of the prospect theory in chapter 2.2.2 has shown that consumers prefer minimizing risk to maximizing utility. Therefore, the consumers’ behavior is strongly influenced by their risk perception.

When it comes to managing risk, people have to judge the tolerability and acceptability of a certain risk. Whereas the term tolerability stands for activities which are worth pursuing in return for risk reduction efforts, the term acceptability refers to activities which imply low remaining risks and additional efforts to reduce risk are not judged necessary. The two terms can be visualized in a risk diagram as illustrated in Figure 4.

![Figure 4: Risk diagram](image)

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26 Cf. Renn (2008), p. 150
The diagram shows the probability of occurrence of a risk on the ordinate and the extent of consequences on the abscissa. Depending on both values, the different types of risk are shown in blue colors. Since they are often colored green, amber, and red, the model is also called the ‘traffic light model’. The diagram represents an oversimplification because in reality the distinction between intolerable, tolerable, and acceptable risks is not clear-cut. Still, it visualizes the need to make a judgment after having evaluated the situation.

When the probability of occurrence as well as the extent of consequences is high, the risk is likely to be intolerable so that it has to be banned. The other extreme is reached when both values are low and the risk seems acceptable. In this case no management action may be necessary even though research for a reappraisal at a later time can be done. Between the two extremes the risk seems tolerable when applying risk mitigation or management actions.27

The judgment process can be divided into two steps of which the first one is risk characterization. In this step a risk profile is created on the basis of risk estimates, uncertainty measures, social and economic implications, and risk perceptions, for example. Then the severity of the risk is judged. Indicators can be the compatibility with legal requirements, effects on equity or public acceptance. Afterwards, suggestions for tolerable and acceptable risk levels as well as options for handling risks are made. The second step is risk evaluation where ultimately the need for risk reduction measures is determined.28

The judgment depends on the different attitudes people have towards risk. It can also vary according to different circumstances:29

- People who are risk-averse are willing to pay a premium or penalty to avoid a certain risk.
- The opposite of risk-averse people are risk-seeking people who are willing to pay a premium or penalty to accept a certain risk.
- Risk-neutral people base their decisions only on the expected monetary value.

While the risk management process of companies has often been discussed in literature, individual strategies to cope with risk are harder to find. In chapter 3.2.1 the corporate risk management process is explained in detail. In the following the author tries to transfer the corporate risk handling strategies to individual consumers. This seems to be reasonable because all company decisions are made by individual persons who are engaged in risk handling techniques.

The risk handling strategies include risk avoidance, risk reduction, risk transfer, and risk retention. They are illustrated in Figure 10.

- **Risk avoidance**: If consumers want to avoid a risk, they can select a way in which they do not touch on it or fully eliminate it. For example, they can stop buying a product or refuse an innovation.
- **Risk reduction**: Risk reduction methods reduce the amount of risk consumers are exposed to, but they do not eliminate them. An example is the collection of additional information about a product or service.
- **Risk transfer**: Risk transfer includes all ways of shifting risks to a third party. This can for example be achieved by taking out insurance.
- **Risk retention**: When retaining a risk, consumers are aware of it and decide not to do anything about it. They take responsibility for their decision as well as any consequences.\(^30\)

Like in the corporate risk management process, the risks should be monitored regularly in order to find out if risk management techniques have to be revised.\(^31\)

### 2.3.2 Marketing research

In the mid sixties empirical marketing research was established and the research of consumer behavior became its main topic. In a strict sense, consumer research deals with the behavior of consumers when buying and consuming economic goods. In a broader sense, it describes the behavior of end consumers of material and immaterial goods which include voters, patients or worshippers, for example. This definition is strongly connected to marketing which is supposed to design exchange processes

\(^30\) Cf. Renn (2008), p. 174; Chapter 3.2.1
\(^31\) Cf. Chapter 3.2.1
through which individuals or groups satisfy their needs, especially relations between production companies and consumers.\textsuperscript{32}

In general, consumer behavior can be divided into three parts according to the so-called SOR (stimuli, organism, reactions) model. Consumers are faced with a number of stimuli from their demographic and socioeconomic characteristics or their social and economic environment. Typical impulses are age, income, reference groups, and price demands of suppliers which are all visible. The actual decision process takes place inside the organism and consists of activating and cognitive components. Activating components can be the consumers’ emotions, motivations, and attitudes while cognitive components are their percipience, thinking, and learning. At the end one can identify reactions, such as the purchase of a certain brand in a certain amount at a certain time.\textsuperscript{33}

Conflicts which arise in a decision situation are especially important for information processing. A conflict conditional upon cognitive aspects is cognitive dissonance. It results in an uncertainty of the individual and thus mostly in a delay in the decision process. With regard to product choice, perceived risk is one parameter which arises from conflicts in the decision process. It is difficult to operationalize this risk since it describes a feeling of insecurity of the consumer and cannot be measured by calculative values such as risk in statistical decision theory. One widely used technique to measure risk assumes that risk is based on two components, the negative consequences of a purchase and the perceived probability of the occurrence of consequences. Consumers have to judge both criteria on a rating scale and the values are multiplied to calculate the perceived risk afterwards. Expected negative consequences can be of financial, functional, psychic or social nature. Examples are early deterioration, excessive prices and the absence of appreciation or affirmation.\textsuperscript{34}

Kroeber-Riel and Weinberg make the hypothesis that if the perceived risk exceeds an individual tolerance limit, the consumers tries to reduce the risk. They use reduction techniques which affect the decision process.

\textsuperscript{33} Cf. Bänsch (1996), p. 4
For product choices with low involvement, no risk perception is assumed. If a risk is perceived when involvement is higher and decisions are easier, it can also be below the tolerance limit of the consumer and thus not relevant for the behavior. Therefore, newer theories suggest that consumers do not generally try to minimize risk.  

Techniques to reduce risk can be divided into techniques to reduce adverse consequences and those to abolish insecurity. Examples for the first category are:

- Purchase of smaller packages of new products
- Bargaining of rights of return or extensive guarantees
- Purchase from known distributors
- Purchase of the most expensive alternative
- Purchase of products with a seal of quality

Brand loyalty, that is the repeated and continuous turn towards brands with which the consumer had positive experiences, is the most mentioned strategy to reduce, control, or evade purchasing risk.

The latter technique to reduce insecurity may include different measures of the subjective information processing. These can be the avoidance of risk enhancing information to reduce the risk awareness, the search for risk minimizing information or the reinterpretation of existing information by the consumer. In this process the information reception is the higher, the more complex the product.

If a consumer decides to search for additional information, he has to make a decision on the type and complexity of the information source. Consumers are mainly looking for information concerning possible shopping facilities, available products and their characteristics. When making a decision, no matter whether it is an established plan or an individual decision, they do cost-benefit equations. These include for example financial and psychical assessments of costs and benefits, whereas the latter include restrictions on leisure time because of information search or the elimination of inconsistencies. Cost-saving information is everything that can be obtained easily.

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According to Kroeber-Riel and Weinberg, mainstream consumers prefer the following information sources:

- Sales conversation
- Advice from friends
- Information in magazines
- Shop windows
- Advertisements
- Internet

While the internet still has liability problems, personal communications can be seen as the most important source of information search. Still, the frequency and use of the information sources always depend on the industry, the product, the involvement, as well as the purchasing specifications.\textsuperscript{38}

3 Yield management in the airline industry

3.1 Concept of yield management

3.1.1 Basics of the concept

The term yield management or revenue management, as it is also called, describes a planning instrument used by service companies in industries such as the transport, tourism, and hotel industry. According to its wide application spectrum, there are many possible definitions of the term yield management in literature.\(^\text{39}\) Kimes defines yield management as “the process of allocating the right type of capacity to the right kind of customer at the right price so as to maximize revenue or yield.”\(^\text{40}\) It includes all methods which are intended to control capacity in order to maximize total revenue of a company.\(^\text{41}\) Due to high fixed costs in the airline industry, in the short run the maximization of revenue is an approximation of profit maximization.\(^\text{42}\)

The development of yield management was triggered by the implementation of computer reservation systems (CRS) in 1966 which allowed airlines to sell their tickets through decentralized distribution systems. Additionally, in 1979 the American air traffic was finally deregulated and airlines introduced flexible price and capacity setting. Due to the deregulation of prices, new competition such as low-cost-carrier and charter airlines entered the market. This led to overcapacities, price decline and price wars. With the help of yield management established airlines tried to maintain their market position and counteract rising demand for lower priced tickets. It helped them to find quota limitations for the different price segments to better skim the willingness to pay. According to relevant scholars, the introduction of yield management can lead to average increases in revenue of 5%.\(^\text{43}\) The potential of negative long-term consequences of yield management is often neglected. If customers do not perceive a significant product difference, but are faced with strong price differences, they may consider the pricing scheme as unfair. This can influence their attitudes, for example customer satisfaction and willingness to pay.

\(^{39}\) Cf. Lindenmeier (2005), p. 5
\(^{40}\) Kimes (1989), p. 15
\(^{41}\) Cf. Daudel/Vialle (1992), p. 35
\(^{42}\) Cf. Lindenmeier (2005), p. 5
Furthermore, purchase behavior such as cross-buying activities and repurchase tendencies can be negatively affected.\textsuperscript{44}

3.1.2 Requirements

There are some basic requirements for the implementation of yield management which are all met in the airline industry:\textsuperscript{45}

- Relatively fixed capacities: The objective of allocating the available seats to different market segments is only important as long as capacity cannot be adapted to demand fluctuations in the short-run.
- Ability to segment the market: An airline must be able to segment the market into different types of consumers, for example business and leisure customers.
- Perishable inventory: Like all services, flights are perishable. Unused capacities are not storable and cannot be used again in the future.
- Possibility to sell products in advance: Airlines are faced with uncertainty whenever tickets are sold in advance. For example they have to decide how many tickets can be sold at a discount or whether a group that wants to pay a low price should be accepted in case of waiting for a customer who is willing to pay a higher price.
- Demand fluctuations: Demand has to be subject to fluctuations such as variations by season, day of the week or time of the day. If there is no uncertainty concerning demand appearance, yield management would not be necessary.
- Low marginal sales costs and high marginal production costs: When a certain number of tickets is sold, the costs for selling another one are relatively low since fixed costs are catered for. Conversely, marginal production costs beyond the foreseen capacity are high since the extension of capacity is subject to high capital expenditures. In the latter case the airline would need another aircraft to transport additional passengers, which is very expensive, while in the first case there are only very low additional costs, for example for catering and kerosene.

\textsuperscript{44} Cf. Friesen/Reinecke (2007), p. 34
3.1.3 Process

The basic structure of the yield management planning process is illustrated in Figure 5.

![Figure 5: Structure of the yield management planning process](image)

A data base is the first requirement for optimization. The data collection is mostly carried out by computer-based reservation systems. It includes information about customer behavior, bookings, and evaluates the customer value with regard to the company strategy.47

On the basis of that data future demand patterns are forecasted. For this purpose different forecast models such as regression or time series models can be used.

The optimization process can be divided into capacity and price control and aims at achieving high load factors and revenue at the same time. The possible instruments for both control mechanisms are explained in chapter 3.1.3.1 and 3.1.3.2.

At the end of the planning process the results have to be recorded and checked. In case of deviations from the program, price and capacity have to be adjusted in the short-run. In addition, the verification of the results serves as an update for the data base.48

3.1.3.1 Price control

The first part of optimization in the yield management process is price control. Here the market is segmented according to the consumer’s willingness to pay. This is the basis for introducing different tariff structures.

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46 Cf. Lindenmeier (2005), p. 12
Figure 6 shows how revenue can be increased by offering tickets with different prices instead of selling all tickets for an average price.

![Figure 6: Price differentiation](image)

In both charts the price for one ticket is plotted on the ordinate and the expected quantity of seats sold on the abscissa. The black line represents the demand curve. The figure on the left hand side shows the case of a single fare class. The revenue of the airline is illustrated by the blue box. The two big triangles at the top and to the right represent untapped revenues due to dilution and not accommodated demand. In the coordinate system on the right hand side revenue is much higher because of different ticket prices with different restrictions.

According to the first degree price differentiation following Pigou, consumers are supposed to pay a price depending to their willingness to pay; consumers with a high willingness to pay are supposed to pay more than consumers with a low willingness to pay. It is generally agreed that business clients are price-elastic but time sensitive while leisure travelers are price-elastic and time-insensitive. However, this individual absorption of buying power is not feasible.

In practice airlines use the second and third degree price differentiation and assign passengers to different segments according to consumer behavior. In the second degree variant airlines differentiate on the basis of quantity or service. For example they offer a discount for groups, frequent travelers or tickets for a flight with reduced service on board. Third degree price differentiation means that there is a differentiation depending

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on personal, spatial or temporal factors. Examples are discounts for students, special destinations or low season.\textsuperscript{50}

Restrictions consumers have to meet when trying to buy a certain ticket are called fencing mechanisms. Examples are minimum stays between outbound and inbound flight, booking lead times, or cancelation possibilities. They help to guarantee the effectiveness of the segmentation strategy and eliminate cannibalization effects between different tariffs.

There are two ongoing developments that hinder the implementation of these fencing mechanisms. First, market transparency is increasing due to the possibility of comparing prices online and fencing mechanisms are therefore judged as unfair by the consumers. Second, there is an increasing number of low-cost-carriers in the market which offer one-way flights. This makes it harder for airlines to differentiate on the basis of criteria such as the passengers’ length of stay.\textsuperscript{51}

Segment oriented price differentiation is based on a deterministic demand pattern. It is necessary to have a model which illustrates the booking process of stochastic demand in a way that optimizes revenue. Therefore, price differentiation has to be complemented with capacity control.\textsuperscript{52}

3.1.3.2 Capacity control

The second part of the revenue optimization process is capacity control. Its main objective is the revenue maximizing control of sales processes by accepting or declining booking requests for flights. Capacity control is supposed to help implementing price differentiation and balance possible negative effects.\textsuperscript{53}

The first component is fare and seat mix management. In the seat inventory control limited capacities are allocated to the different booking classes and booking limits are determined on the basis of demand forecast models. The problem for airlines is that seats can be sold to passengers with a low purchasing power early in the selling process

\textsuperscript{50} Cf. Friesen (2008), p. 81 f.
\textsuperscript{51} Cf. Mang/Spann (2008), p. 1
\textsuperscript{52} Cf. Friesen (2008), p. 83
\textsuperscript{53} Cf. Klein/Steinhardt (2008), p. 69
and might not be available for more significant passengers, i.e. passengers paying the full price, at a later date. In this case the more significant demand is displaced by demand of minor value and total revenue is not maximized. By contrast, if cheaper tickets were not sold, this could result in unused capacities and idle time costs.\textsuperscript{54}

Figure 7 illustrates the before mentioned allocation problem when capacity is limited with the help of an example.

![Figure 7: Structure of the allocation problem with limited capacities\textsuperscript{55}](image)

At time $t_0$ the airline receives a booking request for a ticket of €500. If the airline accepts the booking request, it receives €500. In case the request is rejected by the airline, there is a chance $p$ that there is a booking request at a price of €1,000 at $t_1$. There is also a probability $1-p$ that there is no demand at $t_1$ and the capacity is not used. Therefore, the airline has to trade the realization of €500 off against the uncertain revenue of €1,000. In this example the booking request at $t_0$ would have to be accepted as long as the revenue of €500 is higher than the uncertain revenue weighted with the probability $p$.

For real-life decisions this model has to consider the possibility of booking requests from different market segments and the allocation of more than one seat. Furthermore, the problem is not only limited to two time periods $t_0$ and $t_1$, but the booking process

\textsuperscript{55} Cf. Lindenmeier (2005), p. 18
lasts over a longer period of time. The allocation can thus be regarded as a sequential stochastic planning problem.\textsuperscript{56}

Keeping in mind the tradeoff between maximizing load factors and revenues, airlines use yield management systems in order to control booking processes automatically; manual intervention is only used in case of irregularities. In practice, booking classes with a lower value are closed or reduced when demand is high while they receive high contingents when demand is low.\textsuperscript{57} The availability of tickets sold at a discount price is controlled through a process called nesting. The idea is to reserve capacity for high-revenue passengers by making only subsets of seats available to lower-valued passengers. While it is always possible to buy more high-fare tickets, there is only a certain number of low-fare tickets available. When no more full-fare seats are available, a flight has reached its overbooking level.

For example on a flight with 100 seats all seats are available to full-fare passengers, 60 to moderate-discount passengers and 30 to deep-discount passengers. Then the number of seats exclusively protected for full-fare passenger is $100-60=40$ and the number of seats protected for full-fare and moderate-discount passengers is $100-30=70$.\textsuperscript{58}

The second instrument used for controlling capacity is overbooking management. Overbooking describes bookings which are accepted in excess of the capacity limit of a flight. It is used to avoid spoilage costs for unused capacities which can arise due to cancelations, re-bookings, and no-shows. No-shows are passengers who booked a ticket for a flight, but do not appear to check in or cancel their reservation. Reasons can for example be a late arrival at the airport, delay of a feeder flight, the booking of several flights for safety reasons, or a forgotten cancelation.\textsuperscript{59}

When overbooking flights airlines have to face the problem of oversales in case more passengers want to make use of their seats than there is capacity available. In this case airlines have to deny boarding for some passengers. They are confronted with denied boarding costs for phone calls, board and lodging, compensations, and costs for

\textsuperscript{56} Cf. Lindenmeier (2005), p. 19
\textsuperscript{58} Cf. Smith/Leimkuhler/Darrow (1992), p. 15
alternative transports for their customers. In the European Union the denied boarding compensations are subject to an EU-Regulation, for example.\textsuperscript{60}

Figure 8 illustrates the definition of the optimal overbooking rate.

![Diagram of optimal overbooking rate](image)

**Figure 8: Optimal overbooking rate\textsuperscript{61}**

From an economic perspective the optimal overbooking rate can be found in the maximum of the net earnings curve. Net earnings are defined as the earnings for additional reservations sold minus predicted denied costs. Airlines want to minimize denied costs as well as spoilage costs. If the overbooking rate is too low, airlines have to pay spoilage costs while they have to pay denied costs when the overbooking rate is too high. Therefore, the objective is to keep the number of denied boardings close to zero and at the same time avoid unused capacities. However, in practice the optimal overbooking rate is below its theoretical optimum because in this case passengers would have to be refused frequently.\textsuperscript{62}

\textsuperscript{60} Cf. Maurer (2006), p. 360 ff.


\textsuperscript{62} Cf. Maurer (2006), p. 364
The optimal overbooking rate depends on several criteria:63

- Historical no-show behavior: The historical no-show behavior on the same route, at the same time, and in the same booking class is an important determinant for predicting the overbooking rate.
- Ratio of business and leisure travelers: Since business travelers tend to have higher no-show rates, flights with a high number of business passengers should have a high overbooking rate.
- Frequencies: Routes with higher frequencies have a higher number of re-bookings and can therefore be overbooked more.
- Remaining time until departure: The number of re-bookings and cancelations is usually the lower the shorter the remaining time until departure. Consequently, the overbooking rate has to decline accordingly.

It is possible to reduce the no-show rate with flight-checks; passengers are called prior to departure and asked for a confirmation for the flight. Other methods to adjust capacity can be an aircraft change to a smaller or bigger airplane according to demand and a flexible spatial partition of economy and business class. Alternatively, passengers can be upgraded or downgraded if the seat configuration cannot be adjusted at short notice.64

3.2 Strategies to cope with demand uncertainty

3.2.1 Risk management of companies

Companies are confronted with different types of risk. One challenge is to make decisions under imperfect information and therefore uncertainty. It implies the risk to reach a wrong or suboptimal decision. Risk management helps a company to trade anticipated revenues off against the associated risks when having to take important decisions. It clarifies the complexity of a risk and its single components. In this way, it provides the basis for handling risk which helps to secure the survival of a company.65

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64 Cf. Maurer (2006), p. 365
The structure of the risk management process is illustrated in Figure 9.

![Figure 9: Risk management process](image)

In the following the four sub-processes of the risk management process are explained in succession even though in practice they represent an interlinked system.

The first step in a risk management process is risk identification. All risks and the potential for loss and damages as well as their interdependencies are measured systematically. The objective is a timely, fast, complete, and economical collection of all risks that can influence the target system. The most important identification methods are auditing, supplier ratings, checklists, failure modes and effect analyses, and quality circles. Frequent mistakes in this sub-process are a wanting reference to the company strategy and a risk identification system that is not focused and hierarchical.

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66 Cf. Veselenak (2009), p. 60
The second sub-process is risk assessment. The risks identified in the first phase are evaluated based on their estimated probability of occurrence and the potential impact. The objective is to find the main risks which are characterized by a high probability and a high extend of damage. Mistakes may occur due to double counts of risks when they are not clearly defined, insufficient transparency or inappropriate quantitative specifications. Furthermore, risks get less transparent the bigger the organizations and hinder their assessment.\textsuperscript{69}

In the risk handling process companies take steps in order to optimize their risk position. In this process it is important not to minimize all risk because otherwise companies might forgo chances. The objective is to reduce the risk to an acceptable residual risk which does not exceed the company’s risk tolerance. Frequent mistakes are that the residual risk is not defined right and that only insurance solutions are considered.\textsuperscript{70}

The four basic strategies to control risks are depicted in Figure 10.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{risk_handling_strategies.png}
\caption{Risk handling strategies\textsuperscript{71}}
\end{figure}

\textsuperscript{69} Cf. Gleißner (2008), p. 224
\textsuperscript{70} Cf. Gleißner (2008), p. 225
\textsuperscript{71} Cf. Gleißner (2008), p. 159
The functionality of the strategies is explained in the following. Normally companies use a mix of the four alternatives: 72

- Risk avoidance: In this case risks with a high probability are avoided. An absolute use of this technique is not possible since every corporate activity bears some sort of risk. In order to avoid risk a company can for example back out of a project or business segments or change concepts or specifications.

- Risk reduction: The objective of risk reduction is not the elimination of the source of a risk, but its limitation through proactive steps. For example, companies can check their computer systems for breakdown avoidance or forecasts more frequently. Alternatively, different activities can be combined to achieve diversification.

- Risk transfer: Risk transfer means that the risks of a company remain in its portfolio, but potential losses of assets are transferred or reduced by conclusion of a contract. The classic measure is the closing of an insurance contract.

- Risk retention: If the other risk handling strategies are not feasible, the residual risk has to be borne by the company itself. Reasons can be that a risk is not recognized or that it is not possible to hedge against it. Furthermore, it can be cheaper to retain a risk than to hedge it. How risks are dealt with always depends on a company’s risk perception and its general policies.

Due to ever-changing environmental conditions, the risk situation of a company has to be revised regularly. The risk monitoring or control process contains a variance analysis in which the achieved risk position is compared with the objectives. Possible discrepancies are analyzed to determine their reasons. In particular with regard to internal reporting systems, clearly defined process structures are necessary for an ongoing improvement of a company’s risk portfolio. 73 Difficulties may result from insufficient documentation, unspecific task assignments, inadequate use of available information, or problems in the management of a project. 74

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3.2.2 Stock-keeping

Another strategy to balance demand is stock-keeping which means the purposeful bridging of time disparities of objects. Companies may hold stock to be able to cope with uncertainties and variations in supply and demand. Storage can act as a buffer between the supply side and the customers and thus allow for a good customer service when the supply chain is not working properly.

In addition to the processes related to storing and removing items from stock, the inventory level is the most important indicator in stock-keeping. Since storage costs are usually high, companies are increasingly trying to reduce the level of stock without affecting their service level. Inventory management has been improved with the help of just-in-time solutions, requirement planning, and overall electronic commerce, which allows for a fast materials flow through the supply chain, for example.\textsuperscript{75}

The different functions of stock-keeping are listed in Figure 11.

![Figure 11: Storage functions](image)

- Some products have to be stored during the production process, for example for desiccation, fermentation or ripening.
- With the help of the adjustment function, dissonances between input and output flows can be balanced. For example, some raw materials are only available in one season.
- As abovementioned, uncertainties such as plant shutdowns or delivery delays can be offset with the security function.

\textsuperscript{76} Cf. Kummer/Grün/Jammernegg (2006), p. 216
• The speculation function can be used whenever future changes in market conditions like rising prices are expected and the company wants to hedge against it.
• If companies make use of economies of scale and get larger amounts at lower prices, storing goods has a cost reduction function.
• It is possible to make use of the sorting function when certain components are accumulated at the same spot to continue their processing together.
• Provision means that storages can serve as places where goods are made available for the consumer, for example in supermarket shelves.77

The security function of stock-keeping cannot be applied in the airline industry since services are generally not storable. However, flexible tickets would allow shifting demand from heavily to less demanded flights, thereby preserving demand.

3.2.3 Postponement strategy

3.2.3.1 Concept

The postponement concept describes the process of delaying activities until the latest point in time possible. This delay allows a company to get more information and therefore reduce or eliminate risk and uncertainty of their activities.

The concept was first introduced by Alderson in the marketing literature in 1950. He suggested the strategy to reduce uncertainty due to doubtful customer demand by delaying product differentiation such as form, place, and time.78 Later on, Bucklin extended the concept to distribution channels and discussed where, when, and who should hold inventory in order to reduce costs and risks.79 In the meantime the idea has been extended to all sorts of promotion, logistics, purchasing, manufacturing, and distribution channels.80

An important decision in every supply chain process is the positioning of the decoupling point (DP). It is the point where customers place their order and forecasts are replaced.

by order-driven activities. In a production process it means the change from standardization to customization, for example. Postponement usually moves the DP closer to the end user in order to improve efficiency and effectiveness of the supply chain. Still, it is important to find the right balance between standardizing upstream activities and postponing downstream activities until orders are received. An optimal DP changes whenever market conditions change.  

The main ideas of the postponement strategy are visualized in Figure 12 once again.

The graph shows that the forecasting error gets significantly lower the shorter the time until sale. The objective is to postpone the DP as long as possible in order to profit from a more precise forecast. The example is taken from the textile industry where the forecasting error is still ±40% 26 weeks before the season starts, ±20% 16 weeks before, and only ±10% at the beginning of the season. This shows that a delay in product differentiation can significantly reduce rejects resulting from forecasting errors.

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81 Cf. Yang/Burns (2003), p. 2078
In the production industry it can be distinguished between postponement through product design and postponement through the designs of the material flow. The first variant can be divided according to the production steps into

- Labeling,
- Packaging,
- Assembly, and
- Manufacturing postponement.  

Examples of these four variants as well as an example from the leisure industry will be presented in chapter 3.2.3.2.

### 3.2.3.2 Examples

A well-known example from the production industry is the postponement strategy introduced by the clothing company Benetton. Since their marketing campaigns are based on color, the DP has to be geared towards the dyeing process. Traditionally they used to dye the yarn first and then knit the garments. In order to be able to react to consumer demand quickly and at short notice, they postponed the dyeing process. Demand for the different sizes could be forecasted more easily and thus Benetton decided to knit the garments first and then dye them according to the latest trends the consumers were willing to buy. It helped the company to reduce inventory and write-offs and improve customer service.

Labeling postponement is often used by companies which sell a product with different labels or brand names in different languages. In the food industry, for example, cans are not labeled with the tag containing the store brand of a supermarket until an order has been received.

Foreign markets may also be addressed with the help of different packaging. In addition, packaging postponement can be used whenever different packaging ordinances necessitate different materials, sizes or disposals. For example, Gillette’s razors are packed to order from a limited amount. This facilitates outsourcing to third parties as for

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instance done in the UK. It helps being close to the consumers, quickly delivering customized products, and reacting to new display mixes.\textsuperscript{86}

Assembly postponement is for example used by Dell Computer Corporation. Traditionally, personal computers were made-to-stock, meaning they were assembled, shipped to a retailer, and held as stock. By contrast, Dell produces standardized component parts which are stored in a few centralized locations. When customers place an order, the computers are assembled to order and directly shipped to them. This reduced lead times and improved customer satisfaction.\textsuperscript{87}

If a company applies manufacturing postponement, (almost) all production steps from production to labeling are realized decentralized and customer specific. The central company is in charge of research and development and the purchase of raw materials. A typical example is The Coca-Cola Company which produces its syrup in a central location for the whole world. Afterwards, it gets diluted with water and bottled in different regions of the world.\textsuperscript{88}

Postponement has also been expanded to leisure activities such as theater. Some theaters offer subscriptions for a given number of plays during one season. The audience is informed about title and/or time after buying the subscription. The German theatre Thalia offers a fixed subscription for eight productions, for example. Customers can choose between dates from Sunday to Thursday or Friday to Saturday; it is also possible to predefine a certain day of the week. The actual dates are only released to the customers after having taken out the subscription, but before the season starts. Then, tickets can only be changed for a fee. A short time before season starts the theatre has better information about demand and is thus able to allocate the audience based on more information and better forecasts.\textsuperscript{89}

\textsuperscript{89} Cf. Thalia (2009), http://www.thalia-theater.de
3.2.4 Flexible products in the airline industry

3.2.4.1 Concept

A flexible product is a “set of two or more alternatives serving the same market such that a purchaser of the flexible product will be assigned to one of the alternatives by the seller at a later date.”\textsuperscript{90} The opposite is a specific product in which case a customer in the airline industry would buy a ticket for one specific flight. A flexible product always consists of at least two flights which serve the same origin-destination. Depending on the design of the ticket the customer is informed about his actual routing between some weeks and a day before departure, but he is guaranteed one of the alternatives. Gallego and Phillips use the invented example of an airline which offers three different morning flights from New York to San Francisco. All three flights have different departure and arrival times, but the route is always the same. Therefore, customers may buy a ticket for each one of the flights. Additionally, the airline offers a flexible product for the morning at a discount. In this case customers are guaranteed one of the flights, but they do not know which one when booking that special ticket. The advantage for the airline is that it can observe the demand for each flight and can then assign the passenger to one flight according to availability of free seats.\textsuperscript{91}

One real-life example is the offer “Blind Booking” by the airline Germanwings which is explained in section 3.2.4.3 in detail. The concept of flexible tickets is also common in other industries such as Internet advertising and by tour operators, but this paper focuses on the airline industry.

The main advantages of flexible products are higher capacity utilization and demand induction:

- Capacity utilization can be improved because airlines assign their customers to a specific flight after demand uncertainty has mostly been resolved. This allows them to hedge against capacity unbalances.
- Flexible tickets can be sold at a lower price compared to specific products since they are regarded as inferior by most consumers. Thus, they induce demand from people who would not buy a specific ticket for the full price.

\textsuperscript{90} Gallego/Phillips (2004), p. 321
\textsuperscript{91} Cf. Gallego/Phillips (2004), p. 321
By contrast, flexible tickets can also lead to reduced revenue when cannibalizing the demand for higher priced tickets.\footnote{Cf. Gallego/Phillips (2004), p. 323}

In order to generate additional revenue it is important for the airline to choose an appropriate limit for selling flexible tickets. In an example with two flights and the offer of a flexible ticket at a discount, significant increases can be achieved when this limit is met.

Gallego and Phillips applied the so-called consumer-choice model in which the benefits from offering a flexible ticket depend on its discount. On the one hand, if the discount is too low, the benefit for the consumers is too low. Consequently demand is inadequate to justify the introduction of a new ticket type. On the other hand, if the discount is too high, cannibalization of higher priced tickets outweighs the benefits of flexible products.\footnote{Cf. Gallego et al. (2004), p. 3}

With the help of simulation experiments, Petrick, Gönsch, and Steinhardt showed that flexible products within airline capacity control can lead to significant increases in revenue. They compared two scenarios: In the first one the airline assigned their passengers immediately after booking whereas this was done later in the second scenario. This temporal separation between sale and resource allocation in the latter scenario is called pooling. It gives airlines more opportunities to use their capacities in an optimal way. The simulation experiments helped to quantify the profitable effects of this flexibility.\footnote{Cf. Petrick/Gönsch/Steinhardt (2008), p. 18 ff.}
Figure 13 shows the results for the simulation in which the revenues from immediate allocation have been contrasted with the revenues from an allocation 20 days before departure.

The chart shows that airlines can increase their revenues by 0.4% on average when the forecast is good and deviates from the expectation by 10% at the most. When the maximum forecasting error is less than 50%, revenues can be increased by 1.7% due to the flexible control. The data suggests that the benefit is the higher the worse demand can be predicted. With regard to the forecasting quality, the figure suggests that an increasing forecasting error implicates a decline in revenue for immediate allocation. In contrast, the model for allocation 20 days before departure absorbs a large part of the revenue decline.96

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Another factor that influences total proceeds is the allocation time used in pooling. This correlation is illustrated in Figure 14.

![Figure 14: Different allocation times for a maximum forecasting error of 50%](image)

The chart shows that in the case of immediate allocation the revenue is the same regardless of the time at which the ticket is being bought. In the case of pooling, revenue is the higher the closer the allocation time is to departure. By postponing the allocation time to five days before departure compared with 25 days prior to departure, revenue can be increased by 0.5%.

These results show that the additional flexibility achieved by pooling can lead to higher profits within capacity control. The greatest advantage over immediate allocation can be achieved when demand forecasts are relatively poor and the allocation of flexible demand is only done a short time prior to departure.

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97 Cf. Petrick/Gönsch/Steinhardt (2008), p. 20
3.2.4.2 Flexible time-range tickets

Flexible time-range tickets are a special variant of flexible products. The concept is based on the achievements of Gallego and Phillips and has been extended by the Institute for Transport and Logistics Management of Vienna University of Economics and Business.

This ticket type does not prescribe a specified routing and is offered to time-insensitive passengers at a discount compared to a specific product. Passengers have to be at the departure airport at a specified time and are guaranteed a latest arrival time at their destination. The airline assigns the passenger to a routing depending on the available seats on all connections later on. Besides a direct flight this can also be an indirect flight from the departure airport to the final destination where the passenger has to change planes at a different airport. When the ticket is designed for a specific route the maximum travel time from check-in to arrival should include:\(^99\)

- The average flight time from the departure airport to a hub,
- An average transfer time,
- The average flight time from the hub to the final destination,
- Waiting time for flights with available seats.

This concept allows airlines to balance demand by being able to distribute passengers to the connections with the lowest load factors.

\(^99\) Cf. Interview Felix Badura (2009)
Figure 15 illustrates the concept of flexible time-range tickets with the help of an imaginary example.

Figure 15: Possible routing Vienna - Gothenburg\textsuperscript{100}

The figure shows the possible routing when buying a ticket for a flight from Vienna (Austria) to Gothenburg (Sweden). Taking the perspective of Austrian Airlines, the carrier would always try to assign its passenger on the basis of available seats in the alternatives to the flight with the lowest marginal costs.

1. Therefore, the first choice would be the direct flight Vienna – Gothenburg with Austrian Airlines, represented by the yellow line on the map.
2. The second choice would be an indirect flight within the own strategic alliance, in this case Star Alliance, for example via Frankfurt (Germany), London (UK) or Stockholm (Sweden). These possibilities are marked with black dashed lines.

\textsuperscript{100} Illustration by the author
(3) The use of competing carriers is always the last choice and requires special deals between the airlines. In this case carriers from other alliances such as Skyteam could be used. Those possibilities are marked red.

Since flexible time-range tickets are not used by airlines so far, several questions are still unanswered by the market. These include for example:

- How much information do customers require at the moment of purchase?
- Do they want to know the possible routings and flights that are in a set of alternatives or does this confuse them?
- When do airlines inform their passengers about the actual routing?
- What is the difference in prices and the value of flexible tickets compared to regular products?

The possibilities of implementation and design of flexible time-range tickets are discussed in chapter 4 on the basis of qualitative consumer interviews.

### 3.2.4.3 Case study: “Blind Booking” of Germanwings

Germanwings is a German low-cost carrier based in Cologne. It was founded in 2002 and has been bought by Lufthansa in 2008. In summer of 2009 the airline served 65 destinations in Europe.¹⁰¹

Since November 2007 the company offers a program called “Blind Booking”. For a low price customers can decide when and from where they want to depart while their destination remains unknown until they have completed the booking.

They can chose one of the themes "Party", "Culture", "Metropolis Western Europe", "Metropolis Eastern Europe", "Shopping", and "Sun and Beach". The possible departure airports are Cologne/Bonn, Stuttgart, and Berlin. From each of these cities 9 to 17 different destinations are offered depending on the chosen theme. For example when booking a “Culture” flight from Cologne/Bonn the customer can get a flight to Athens, Barcelona, Budapest, Dresden, Dubrovnik, Istanbul, Krakow, Leipzig, Lisbon, Prague, Rome, Verona or Vienna.

The price for these flights is €19.99 or £13.99 per leg, consisting of €0.01 or £0.01 flight fare and €19.98 or £13.98 respectively for additional charges such as airport charges and taxes. Any additional charges are paid by Germanwings. For €2.50 per direction and passenger customers can exclude a destination, leaving at least three remaining choices. Therefore, for a theme with twelve possible destinations up to nine destinations can be excluded, leading to a price of €84.98 (€39.98 + 9x€5.00) for a return flight.\footnote{Cf. Germanwings (2009), http://www.germanwings.com}

![Germanwings' Blind Booking](image)

**Figure 16: Web page of Germanwings’ “Blind Booking”**\footnote{Germanwings (2009), http://www.germanwings.com}

According to Germanwings, “Blind Booking” is highly accepted by their customers and the number of bookings is increasing continuously since the introduction of the program. It guarantees adventurous people, who do not want to know where their journey leads them, a very cheap flight.
There is no clear defined target group, but it has been observed that most of the customers are between 16 and 30 years of age and that couples represent a large group of customers. The majority of customers does not exclude a destination or excludes only one. Approximately 25% of them exclude more than one destination. “Blind Booking” helps the company to optimize loads factor as well as revenues in the short run because the flight offers are only available 45 days prior to departure.104

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104 Cf. Interview Ivelina Entcheva (2009)
4 Qualitative analysis of flexible time-range tickets

4.1 Objectives of the investigation

The objectives of the investigation in the form of a qualitative analysis are twofold. First, the author wants to find out if flexible time-range tickets are accepted by customers and what their restrictions are. Second, the obtained results are supposed to provide an indication on how the tickets can be designed by airlines in order to find purchasers.

The following questions concerning flexible time-range tickets should be answered:

- Is there a demand for the tickets and who are the potential customers?
- What are their fears and how can they be alleviated?
- What information do customers require prior to booking?
- What features do the tickets need to have?
- When and how can airlines resolve the uncertainty regarding the actual routing?

4.2 Survey design

4.2.1 Interview type

The author decided to conduct qualitative interviews which are mainly used in explorative studies. They serve the purpose of developing typologies and classifications, describing empirical data and social processes as well as obtaining hypotheses. The samples are usually smaller than in quantitative social research. In return, the interviewees are supposed to answer in detail and the results are evaluated more intensively.105

Interviews are any form of communication between two or more persons. They are the most used technique in social research. Depending on the type of communication used, there are three types of interviews: The personal face-to-face interview, the phone interview, and the questionnaire. The author decided to use personal face-to-face interviews because that way it is possible to react to the interviewees’ answers and create a more personal atmosphere.

Furthermore, it can be distinguished between standardized interviews and non-standardized interviews. In standardized interviews the questions are posed with predetermined answers and in a fixed order while non-standardized interviews require only minimal specifications and the rest is determined by the course of the conversation. The problem arising from standardized interviews is that the interviewer does not receive information which goes beyond the predetermined answers. This type of interview is mainly appropriate when previous knowledge about the object of research exists. For these reasons, the author decided to conduct non-standardized interviews. The less structured interviews are, the better they are to record qualitative aspects.\textsuperscript{106}

The less structured interviewing techniques are guided interviews, focused interviews, and narrative interviews, which all belong to the group of qualitative interviews. For the analysis of flexible time-range tickets, the author held guided interviews. The interviewer draws upon a guideline to study the interviewees’ opinions and reactions. The guideline comprises several topical aspects which are dealt with during the interview. It helps the interviewer to address all relevant aspects and ensure the comparability of the results. The questions are open and the order is not predetermined.\textsuperscript{107}

The questionnaire has to meet the following criteria to the highest degree possible:\textsuperscript{108}

- **Objectivity**: Objectivity means that the results obtained are supposed to be independent from the person who applies the measuring instrument.
- **Reliability**: The reliability of a measuring instrument indicates if the results are reproducible.
- **Validity**: Validity specifies the precision with which a test actually measures the attribute which it is supposed to measure.

### 4.2.2 Procedure

The author decided to use theoretical sampling for the procedure of the interviews. Glaser and Strauss describe the term as follows: “Theoretical sampling is the process of data collection for generating theory whereby the analyst jointly collects, codes, and

analyzes his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges.”109 The objective of theoretical sampling is to discover different categories and their properties in order to determine the correlation with a theory. 110

The author started her research with some basic questions about the concept of flexible time-range tickets she wanted to investigate. She did not want to focus on a complete set of questions since important aspects could have been neglected otherwise. In this way, the crucial points and different categories emerged with the selection of new interviewees and their individual standpoints. They were used to determine the interrelation with the theory afterwards. Hence, the research process proceeded in bow-shaped repetitions in order to generate theory. This was done until theoretical saturation had been reached. Saturation means that no additional data to develop properties of a category can be collected.111

The interviews had the following structure whereas the questions have been developed during the course of investigation. The sequence of question blocks has been constructed following Diekmann112:

The interviewer started with a brief introduction about the topic of the thesis and the purpose of the interview. The first question was general and examined the interviewee’s risk attitude. It served as an ice-breaker question leading to the subject matter:

- Imagine you were given the choice between two scenarios to win money: In the first one you win €450 for sure and in the second one there is a 50% chance that you win €1000 and a 50% chance that you win nothing. What would you prefer? Why?

Afterwards, the interviewer addressed the travel sector starting with general questions and then addressing more and more detailed questions about the interviewee’s flying behavior:

109 Glaser/Strauss (1973), p. 45
Have you ever booked a journey without knowing important details before you left? For example when you were leaving, where you were going, or where you were going to stay. Give examples.

How often do you fly on average per year? What is the main purpose of your flights?

Do you normally book flights on your own? How do you book flights? Are you familiar with the booking processes? Do you think you have good knowledge of the structure of the different offers?

What is your most important criterion when purchasing flight tickets? For example price, reputation of the airline, departure/arrival time, stopover times.

The part about flexible time-range tickets only started after the more general questions since the interviewee’s attention curve is higher at that time. Before discussing flexible time-range tickets in detail, the author presented the concept to the interviewees with the help the following example:

At the moment airlines are thinking about the introduction of a new ticket type which is a bit (~10%-20%) cheaper than current discount prices. When you buy a ticket, the airline informs you about when you have to be at the airport and when you will arrive at your destination at the latest. However, you are not told which exact flight you will be assigned to.

For example, if you buy a ticket from Vienna to Lisbon two months prior to departure, you will be told to be at the airport check-in at 8 a.m. at the latest and the airline promises you an arrival time no later than 3 p.m. This is about two hours later than in a predetermined connection with one change of planes. Only a short time prior to the day of departure, the airline assigns you to a flight within the given timeframe. It can either be a direct flight, if there are seats available, or a connecting flight, meaning the transfer from one airplane to another via one of the airline’s hub airports (e.g. Munich, Frankfurt or Zurich). If there are available seats on the direct flight, you might even be in Lisbon much earlier. In any case, you will arrive no later than the promised time unless there are unexpected flight delays.

The conversation about flexible time-range tickets was supposed to answer the following questions:
What are the first thoughts that come to your mind when you hear about the concept?

What do you want to know to consider buying flexible time-range tickets?

Depending on the design of the ticket, would you be willing to buy it? If yes, why? If no, what are your fears? How do you judge this ticket in comparison to a direct flight or a connection flight?

What information do you want to receive when you book the ticket?

Do you want to know the possible routings in the set of alternatives of the flexible ticket that you buy?

When would you like to be informed about your actual routing at the latest? For example one week before the flight, one day before the flight or at check-in? Why is it important for you to know it at the mentioned point of time?

How would you like to be informed about your actual routing?

Near the end of the interview, when the tension curve declines again, some socio-demographic data was collected by the interviewer:

- How old are you?
- What is your occupation?
- What is your annual travel budget?

### 4.2.3 Interviewees

The interviewees have been selected in accordance with the theoretical sampling approach by Glaser and Strauss. It implies an intentional selection of interviewees during the explorative phase. The author repeatedly chose new interviewees in order to obtain data which were helpful for answering the research questions listed in chapter 4.1. The number of interviewees was not predetermined and sampling was only completed when the author thought to have reached theoretical saturation with regard to the interviewees’ answers.

The author interviewed eleven persons between 23 and over 65 years of age who have all flown before and therefore could represent possible buyers of flexible time-range tickets. They are introduced in more detail in the following.
Adhe K.

- Age: 29
- Country: Indonesia
- Occupation: Management Reporting and Planning Analyst
- Flights/year: 10 (70% business, 30% vacation)
- Booking: Online on his own
- Most important purchasing criterion: Reputation of the airline and departure time
- Travel budget/year: €800
- Acceptance of flexible time-range ticket: Yes

Charles M.

- Age: 65+
- Country: Canada
- Occupation: Professor
- Flights/year: 12 (80% business, 20% family visits)
- Booking: Online on his own
- Most important purchasing criterion: Price
- Travel budget/year: €70,000
- Acceptance of flexible time-range ticket: Yes
<table>
<thead>
<tr>
<th><strong>Christoph M.</strong></th>
<th><strong>Dr. Frauke K.</strong></th>
<th><strong>Heide N.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="" alt="Christoph M." /></td>
<td><img src="" alt="Dr. Frauke K." /></td>
<td><img src="" alt="Heide N." /></td>
</tr>
</tbody>
</table>
| ● Age: 33  
● Country: Austria  
● Occupation: Logistics manager  
● Flights/year: 15 (90% business, 10% vacation)  
● Booking: Secretary or friends  
● Most important purchasing criterion: Departure and arrival time for business, price for vacation  
● Travel budget/year: €6,000  
● Acceptance of flexible time-range ticket: Yes | ![Dr. Frauke K.](image) | ● Age: 46  
● Country: Germany  
● Occupation: Chemist  
● Flights/year: 2 (vacation)  
● Booking: Husband books flights  
● Most important purchasing criterion: Reputation of the airline  
● Travel budget/year: €5,000  
● Acceptance of flexible time-range ticket: No | ![Heide N.](image) | ● Age: 66  
● Country: Germany  
● Occupation: Retiree  
● Flights/year: 2 (family visits)  
● Booking: Online on her own  
● Most important purchasing criterion: Price and airline  
● Travel budget/year: €5,000  
● Acceptance of flexible time-range ticket: No |
<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Country</th>
<th>Occupation</th>
<th>Flights/year</th>
<th>Booking</th>
<th>Most important purchasing criterion</th>
<th>Travel budget/year</th>
<th>Acceptance of flexible time-range ticket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia M.</td>
<td>47</td>
<td>USA</td>
<td>Division Vice President, Logistics</td>
<td>8-12 (mostly business)</td>
<td>Online on her own</td>
<td>Time for business flights, price for pleasure flights</td>
<td>€150,000</td>
<td>Yes</td>
</tr>
<tr>
<td>Nicole S.</td>
<td>24</td>
<td>Germany</td>
<td>Student</td>
<td>1 (language vacation)</td>
<td>Online own her own</td>
<td>Price and security</td>
<td>€300</td>
<td>Yes</td>
</tr>
<tr>
<td>Dr. Ralf N.</td>
<td>55</td>
<td>Germany</td>
<td>IT Consultant</td>
<td>12 (90% work, 10% vacation)</td>
<td>Online on his own, complex connections in travel agency</td>
<td>Fast and direct connection, for private flights also price</td>
<td>€8,000</td>
<td>Yes</td>
</tr>
<tr>
<td>Name</td>
<td>Age</td>
<td>Country</td>
<td>Occupation</td>
<td>Flights/year (%)</td>
<td>Booking</td>
<td>Most important purchasing criterion</td>
<td>Travel budget/year</td>
<td>Acceptance of flexible time-range ticket</td>
</tr>
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</tr>
<tr>
<td>Sebastian S.</td>
<td>23</td>
<td>Austria</td>
<td>Student</td>
<td>7 (50% education, 50% vacation)</td>
<td>90% online</td>
<td>Price</td>
<td>€2,000</td>
<td>Yes</td>
</tr>
<tr>
<td>Sonja F.</td>
<td>34</td>
<td>Austria</td>
<td>Finance Director</td>
<td>10 (80% business, 20% vacation)</td>
<td>Online on her own</td>
<td>Departure and arrival time</td>
<td>Mostly bonus flights</td>
<td>Yes</td>
</tr>
<tr>
<td>Wolfgang W.</td>
<td>55</td>
<td>Germany</td>
<td>Graduate merchant</td>
<td>4 (70% business, 30% vacation)</td>
<td>Online on his own</td>
<td>Price</td>
<td>€2,000</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Figure 17: Interviewees**

Illustration by the author
4.3 Execution of the interviews

The eleven interviews have been conducted during a time period of one month. During each interview the interviewer tried to be neutral and non-directive so as not to influence the interviewees. The situation was usually informal since the interviewer knows the interviewees in person.

The questionnaire only served as a guideline and the questions were answered randomly in a discussion about the interviewees’ attitudes. Especially after the first interviews, the questions asked had to be adjusted to include new results and ideas. Furthermore, the presentation of flexible time-range tickets has been completed with a well-defined example because otherwise interviewees had difficulties in imagining the concept.

During all interviews the author took notes and summarized the results afterwards.

After nine interviews, no new findings about the topics discussed occurred. The interviewer conducted two more interviews in order to certify this result of theoretical saturation and then passed on to the analysis of the collected data which is described in chapter 4.4.

According to Diekmann, there are three major problems connected to qualitative interviews:\textsuperscript{114}

- Selection of the sample: The method of qualitative sampling always bears the risk that important aspects are missing due to the fact that the sample is chosen randomly. However, the interviews are only supposed to provide first ideas about the acceptance and the design of flexible time-range tickets and do not demand a complete evaluation. Therefore, qualitative sampling provides sufficiently accurate information.

- Reliability and validity of the data obtained: These parameters are explained in chapter 4.2.1. Since the findings are subject to subjective evaluations of the interviewees in a specific situation, it is always hard to obtain exactly the same results again. The same applies for the attributes the interview is supposed to measure. Still, this is not necessarily a disadvantage for the results obtained, because every reaction can be helpful for the interviewee. It is always better to

test the interviewee’s answers in a real-life situation, but since the tickets do not exist so far, this is not an option.

- Data evaluation: When it comes to evaluating the data obtained, it is always better to include a process of verification. In this case the results could be verified by using focus groups, for example. Furthermore, it helps to find out varying perspectives and cross-check ones ideas. Afterwards, the characteristics and their importance can be quantified with the help of a quantitative study. In a conjoint analysis researchers can simulate a realistic purchasing situation to get an overall evaluation. This study focuses on the qualitative interviews itself and leaves further verifications to future studies.

Furthermore, Diekmann describes three types of error sources in interviews. Their importance for the interviews is explained in the following:115

- Characteristics of the interviewees: In society almost every social activity and attribute is evaluated depending on characteristics such as level of education or class affiliation. When answering questions in an interview, there is often a systematic bias by means of the so-called social desirability effect. In this case interviewees adjust their answers according to their personally perceived maximum of positive evaluations of actions and opinions. The author tried to avoid this source of error by posing neutral questions. In addition, the bias is probably reduced by the fact that the interviewer knows most of the interviewees in person and the interviewees trust her with the answers.

- Characteristics of the questions: The formulation and wording of the questions as well as their sequence can also have a considerable influence on the answers and reactions of the interviewees. Therefore, the author has been careful to use neutral expressions only and adjusted the sequence of questions according to each interviewer.

- Characteristics of the interviewer and the interview situation: Characteristics of the interviewer such as gender, clothing, and age as well as his or her behavior can have influences on the answers of the interviewees. In general the results are less biased the smaller the social distance between interviewer and interviewee is and therefore do not seem to have a big impact in these interviews. Also there

has not been any impact of third persons since during none of the interviews a third person has been present.

4.4 Analysis of the collected data

In the following the findings of the interviews regarding acceptance by potential customers as well as their fears and requirements are described:

Acceptance:
The result of the interviews conducted by the author is that most of the interviewees would buy flexible-time range tickets if certain requirements are met by the airline offering the ticket.

According to the answers of the interviewees, the concept is most attractive for people going on vacation because they are not in a hurry and have time to wait and take another flight if necessary.

However, there seems to be a tendency that the concept will not be used for business travelling since in that case customers are not flexible regarding time. They often have meetings in a different city and therefore have to arrive at a predetermined time. Since flexible time-range ticket only guarantee the latest arrival time and include waiting time, business travelers could lose a lot of time while waiting for their assigned flight. For them it is difficult to arrange meetings when they do not know their actual arriving time. Furthermore, people might be more likely to buy a flexible time-range ticket if they are not travelling alone because they are not as time-sensitive with regard to waiting time then.

For older people the concept does not seem to be as attractive because for them it can be exhausting to wait at the airport and to deal with uncertainty regarding actual flight arrival time. Depending on their mobility they might have to rely on a pick up at their destination and this is easier to arrange when the flight details are specified far in advance.

People want to trade off the additional time consumption against the savings of the flexible tickets compared to a ticket for a certain flight. According to one respondent, the offer is not attractive if the saving is less than €20, for example. Furthermore, it
might be more attractive for expensive flights, because the saving is higher in that case. For tickets below €100, the amount saved is not very high and therefore will always be weighted off against the prescribed time frame. If the timeframe was long, people are not likely to buy the ticket.

The fears of potential customers:
With the help of the interviews the author found out that people have different fears when it comes to buying a flexible time-range ticket. Some worries of the interviewees are explained in the following.

Some potential customers fear to change planes at a specific airport, for example because they had a bad experience with it in the past or because they consider it as being too big. Therefore, they want to know the possible routings before they buy the ticket. The same applies for the range of possible carriers which operate the flight. Again, people might have had a bad experience personally or the carrier can have a bad reputation in general.

For some potential customers collecting miles for a bonus program, such as the Star Alliance, is very important. They fear that they could not get miles for the flight when they are assigned to a flight with an airline which is part of a different strategic alliance or does not offer this service. The same applies for the use of lounges at the airport. Since the use of those lounges is usually restricted to members of one specific strategic alliance, they are worried not to be able to use it in case they fly with a carrier of another or no alliance.

Furthermore, it seems to be very important for the customers to have a SPOC (single point of contact) person, no matter with which airline their actual flight may be. They want to be able to ask questions about the airline’s policies, for example. Furthermore, some people are worried not to know where to check in and which terminal at the airport of departure to go to.

When it comes to arriving at the airport of departure, people are worried that they may not be able to check in their luggage right away and have to keep it with them because
they have been assigned to a later or no flight at all. Another issue is that different airlines might have different luggage allowances so that they might have too much luggage with them at check-in. In this context they also fear that the airline might collect additional fees at the airport, for example for checking their luggage.

Other people fear that the airline could not have an available seat for them even though they have bought the ticket. Others seem to fear to be forgotten because they have not been assigned to a certain flight. They do not want to get an inferior connection to their destination than other passengers who have paid the same amount as they did.

During the flight, the provision with meals and drinks is a crucial point for some interviewees. They are worried that they do not receive an adequate service depending on their actual flight.

According to the interviews, some potential passengers fear that there will be no indemnity if they do not arrive in the prescribed time frame. Some even seem to have higher demands for indemnities than for a normal direct flight. Concerning this scenario, another fear is that the hotel shuttle of the passengers is not informed about their actual routing and does not pick them up at the right time. People who want to use public transportation seem to be worried that they arrive too late so that the trains or buses do not operate anymore. If they might have to take a taxi instead, the price advantage of the flexible time-range ticket could get lost.

The requirements of potential customers:
According to the concept of flexible time-range tickets explained by the interviewer to the interviewees, they know the price, their airport of departure, their destination as well as the earliest departure and latest arrival time when buying a ticket. Some interviewees mentioned that they want to get more information in order to consider buying the ticket. Their wishes are listed in the following.

When it comes to deciding whether to buy a flexible time-range ticket, some people want to know the possible routings in the set of alternatives. Especially since they want to avoid some airports for changing planes, a number of potential passengers want to be
able to exclude certain connections. Several interviewees even said that they would be willing to pay more for the ticket if they can do so. Others want to have the opportunity to express their wishes regarding the routing or want to know the probability of receiving a direct flight versus a flight with one stop. Furthermore, it appears to be important to buy the ticket within a certain strategic alliance in order to earn miles for the flight. If people do not know if they earn miles or not, they are less likely to buy the ticket. In addition, some interviews said that they want to make a wish where to sit on the airplane. The most important trade-off has to be made between price saving and additional time consumption and therefore potential customers want to know how much additional time the flight may take. During the whole booking process people want to have a contact person to address when there are problems with the technical execution or questions about the ticket type and conditions of the airline.

Other important details seem to be the terms and conditions of the airline. These include luggage allowances, guarantees as well as cancellation policies. A few interviewees stated that they expect additional discounts, refunds or other offers if the airline misses its promise of latest arrival time.

When having booked a flexible time-range ticket, the passengers want to be informed about in which terminal and at which airline they have to check in so that they do not have to run around the airport with their luggage before check-in. Here it is again of importance to have a SPOC person to approach when there appear to be problems. Most potential customers said that they want to be informed about the actual routing at least one day before the earliest departure time. The reason is that they want to organize their transportation to the airport, for example by ordering a taxi or selecting a railroad connection. Furthermore, they do not want to spend too much time waiting at the airport and be able to make changes if they want or have to do so. Some interviewees even said that they would prefer to know the flight details three days before departure.
A few people answered that they would also accept to receive the information only at check-in from the check-in staff when they are going on vacation. Again, this will depend on the money they can save on the flight. Some interviewees would accept it if they save at least 40% on the flight, for example. According to one interviewee, people travelling alone are more time-sensitive than people travelling in a group and therefore want to know it in advance so that they have to spend less time waiting at the airport.

Most people want to be informed about their actual routing either by email or telephone. However, some of them said that the internet might not be working. Most of them agreed that letters are not a good way because they take too much time and might get lost. Fax was not very well accepted either since the majority of interviewees did not have a fax machine.

Some of them want to be able to confirm the message, for example by clicking on a button in an email or telling the airline representative personally on the phone.

4.5 Discussion

In the following the author tries to answer the research questions posed in chapter 4.1 with the help of the finding of the interviews and her own conclusions.

- Is there a demand for the tickets and who are the potential customers?

According to the interviews, flexible time-range tickets seem to be accepted by a number of airline passengers if certain requirements are fulfilled by the airline. Some requirements are explained later on.

The new ticket type will only be interesting for people going on vacation while it will not be used for business flights, because in this case people are more time-sensitive. Furthermore, the target group should be defined as mostly younger people since older people seem to be less flexible. Another tendency appears to be that a flexible time-range ticket is more attractive for people who are not travelling alone, because then they have company while they possibly have to wait for a flight.

The airlines always have to make sure that there is an adequate balance between the discount of the flexible ticket compared to a specified ticket and the additional time
their customers have to take into consideration. The concept seems to be more attractive for higher priced destinations, because then the absolute saving is bigger.

- What are their fears and how can they be alleviated?

Some potential customers do not want to change planes at specific airports, for example Amsterdam. This problem can be solved by the airlines by informing the customers during the booking process about possible routings. They could include the probability or load factor of each possibility so that people can evaluate the probability of having to change at a specific airport. Furthermore, they can introduce an additional feature to exclude certain connections by paying an extra fee. For example, Germanwings uses the same concept for excluding destinations in its “Blind Booking” offer which is explained in chapter 3.2.4.3. As a result, those people who are not willing to pay more to exclude a connection might have to accept the less popular routings. The software would always have to leave a number of choices, because otherwise the airline cannot balance demand anymore. On the other hand, the price would be very high when excluding many connections so that it does not pay off to do so anyway; customers could buy a regular ticket instead.

The same solutions could be used in order to avoid some passengers’ fears or aversions to fly with a certain airline.

Some people fear that they do not earn miles for their frequent flyer program when they are assigned to a flight with a carrier which is part of a different strategic alliance or has its own frequent flyer program. There are three possible solutions to this problem: First, airlines could restrict the idea of flexible time-range tickets to flights within one strategic alliance. On the one hand, this would change the concept enhanced by the Institute for Transport and Logistics Management at Vienna University of Economics and Business. On the other hand, for the airlines the cheapest and most convenient connection would be the one within its own alliance anyway. Second, it is possible not to grant any miles for flexible time-range tickets. For some customers collecting miles is especially important for long-range flights where they can earn more. For them it could mean that the price of the ticket has to be even lower to compensate this disadvantage. Third, airlines could offer miles to their customers no matter which airline actually carries out the flight. While this alternative includes extra costs for the
airline, it would probably represent the best alternative for its customers by offering an additional benefit. The problem of being able to use lounges at the airport can only be solved by means of the first alternative since it is usually connected to the possession of a frequent flyer card as well as a boarding pass. Alternatively, the airline could issue a confirmation that the ticket was bought with them to be able to use it with the frequent flyer card only.

Another fear of potential customers is that they might not know who their contact person is. This might be the case whenever the flight is operated by a different airline than the one issuing the ticket. Since the allocation to a certain flight is only done a short time before departure, the passenger cannot be informed about a contact person at that airline when booking the ticket. The easiest thing would be to have contact persons at the airline issuing the ticket who are responsible for all queries of customers of flexible time-range tickets. They must be able to inform about all general policies and special conditions of possible carriers. Starting with check-in, the airline operating the flight has to be responsible for its customers as well.

Other interviewees mentioned that they are worried not to know which terminal and check-in counter to go to at the airport of departure. This fear is causeless because as soon as the airline assigns its passengers to a specific flight, they will be informed about those details. The time and ways passengers should be informed about the actual routing is discussed later on.

With regard to their luggage, potential customers have fears that they are not able to check it in when they get to the airport, that airlines have different luggage allowances, and that airlines could collect an additional fee for checking it in. For the luggage allowances airlines should agree on the lowest common denominator and allow its passengers to check in as much luggage as the airline with the toughest restrictions allows for. They should be able to check it in 24 hours before the flight, providing they are already informed about their connection. Otherwise, there should be the possibility to bring it to a service desk which forwards it to the right airline when the connection is assigned to the passenger. If other airlines make their passengers pay for checking the luggage, passengers should receive a coupon so that they do not have to pay anything at
check-in. This would probably be the easiest thing, since the fees could vary greatly from carrier to carrier and a flexible time-range ticket should provide the same conditions no matter which airline actually operates the flight.

The disquiet not to get a meal or drink on board the aircraft should be solved in the same way. Airlines should agree on the lowest common denominator and only guarantee for the service which is offered by the carrier with the least service. Everything that is served in addition would mean an additional benefit for the passengers.

Furthermore, a group of interviewees was worried not to receive compensation if the promise of latest arrival is not met. Since certain indemnities are prescribed by law, these have to apply for flexible time-range tickets as well. Therefore, passenger should receive the same compensations as for specified tickets.

When it comes to arriving at the airport of departure, a major fear seems to be that passengers are not picked up by their hotel shuttle because they could not inform the hotel about their flight number or that there is no more public transportation available because it is too late. If airlines want to provide an additional service, they could introduce a service center that takes care of informing hotels, car rentals, or airport employees about the arrival of certain passengers to pick them up or assist them at their destination. However, the majority of people owns a cell phone and could also inform those groups of people on their own. Since customers know their latest time of arrival when booking the ticket, they are able to check public transportation possibilities before departure and can therefore organize other airport pick-up services if necessary.

- What information do customers require prior to booking?

The information customers get about a flexible time-range ticket according to the concept explained earlier are price, airport of departure, destination, earliest time of departure and latest time of arrival.

In addition, many interviewees said that they want to know the possible routings and be able to exclude certain connections. They also want to know how many hours additional
time the airline includes in the offer. For example, the time for a flight with one change plus an additional two hours.

In general, they want to know the whole terms and conditions of the airlines with regard to flexible time-range tickets. For example, they want to get information about the possibility to earn miles for the flight, know who their contact person is and whether they can chose a seat before check in. Furthermore, this should include information about when and how airlines inform their passengers about their actual routing.

- **What features do the tickets need to have?**

  The author reasons that flexible time-range tickets should have the following features in addition to the flight itself: They should include the check-in of luggage or a coupon to do so at other airlines that normally collect a fee for it. It should guarantee a minimum amount of food and drinks on board the aircraft no matter which airline operates the flight. Furthermore, they should have the same return policy like other discount tickets and allow for the same compensations. The price should include all services that are also granted to passengers who bought a ticket for a specific flight because otherwise it is hard to distinguish between the different passengers, for example on the aircraft.

- **When and how can airlines resolve the uncertainty regarding the actual routing?**

  According to the interviews, all potential customers would accept to be informed about the actual routing one day before the earliest departure time. Still, some preferred to know it three days or even up to two weeks in advance. The acceptance of not knowing it before check-in again seems to depend on the discount of the ticket. However, this is connected to an additional discomfort for the passenger. In this case they might have to carry their luggage to another check-in counter, maybe even in a different terminal, and wait for some hours, for example. Therefore, the author thinks that it would be better to inform the customers about their connection at least one day in advance and, if possible, already earlier.

  A good way to inform the passenger seems to be a personal phone call, because it can be confirmed right away. Furthermore, emails seem to be highly accepted. Since some interviewees prefer to be able to confirm the receiving of the information, airlines could
include a confirmation button in the email. This helps both sides to reduce the uncertainty related to flexible time-range tickets. It also has the advantage that they could check in online and receive the boarding pass in electronic form so that they do not have to do so at the airport and only have to turn in their luggage.
5 Summary and conclusion

This study about the acceptance of flexible time-range tickets in the airline industry consists of three main parts: The first one deals with the consumer side and explains different concepts of choice under uncertainty, the second one focuses on the airline side by explaining the concept of yield management as well as the idea of flexible time-range tickets, and the third one includes the qualitative study on the acceptance of the new ticket type. The main findings are summarized in the following.

Chapter 2 of the thesis deals with the topic of consumer decisions under uncertainty. The term uncertainty is defined as a state in which one does not know whether a proposition is true or false. At the same time it serves as an umbrella term that includes risk and ambiguity. Since every potential customer of a flexible time-range ticket has to deal with uncertainty, the author explains the most important consumer decision theories about choice under uncertainty in this chapter.

According to the classic theory, people behave like Homo Economicus. He is a virtual player who acts rational and self-interested and therefore his topmost goal is his own utility maximization. During the years this concept has increasingly been challenged and in 1979 Kahneman and Tversky disproved it. They found out that in many cases peoples’ preferences do not meet the principles of the Homo Economicus concept. Instead, they developed the so-called prospect theory according to which people are mostly loss-averse and in some cases act irrationally with regard to the old concept. This means that people prefer a certain prospect \(x\) to any risky prospect with expected value \(x\).

Risk can be interpreted as a subcategory of uncertainty and is defined as the possibility of negative deviations from an anticipated outcome without contrasting it with possible benefits. Therefore it is also of importance to explain how consumers deal with these situations.

First, they have to evaluate the situation and then they have to make a judgment about the tolerability and acceptability of the risk depending on the probability of occurrence and the extent of consequences. While acceptable risks do not require any action, tolerable risks should be reduced and intolerable risks call for prohibition or substitution. This judgment process is subjective and depends on a person’s risk perception, namely if the person is risk-averse, risk-seeking or risk-neutral.
Furthermore, the corporate risk handling strategies risk avoidance, risk reduction, risk transfer, and risk retention can be converted to individuals since they are the ones who take company decisions.

Research of consumer behavior in marketing research has found that perceived risk can arise due to conflicts in the decision process when consumers have the choice between different products. According to Kroeber-Riel and Weinberg, people use risk reduction techniques whenever the perceived risk exceeds their individual tolerance limit. Techniques can be aimed at reducing adverse consequences, for example the purchase of the most expensive variant, or at abolishing insecurity such as the search for risk minimizing information.

In chapter 3 the author explains the concept of yield management in the airline industry including different strategies to cope with demand uncertainty. Yield management, or revenue management, is a planning instrument used by service companies. It is often defined as the allocation process in which the right capacity is allocated to the right customer at the right price in order to maximize revenue.

There are some requirements for its use, namely a relatively fixed capacity, the ability to segment the market, perishable inventory, the possibility to sell the products in advance, as well as low marginal sales costs and high marginal production costs.

The yield management planning process starts by collecting data with the help of computer-based reservation systems. On this basis, future demand patterns are forecasted, for example by using regression or time series models. The actual optimization process can be divided into price control and capacity control. Price control helps to increase revenue by segmenting the market and using different prices compared to offering all tickets at an average price.

In order to guarantee the effectiveness of their segmentation strategy and eliminate cannibalizing effects between different tariffs, airlines introduced fencing mechanisms. Those are restrictions for buying a ticket, for example to require a minimum stay between inbound and outbound flight and booking lead times. Due to increased market transparency and LCC offering one-way flights, it is getting harder to enforce fencing mechanisms. Furthermore, price control has to be complemented with capacity control in order to optimize revenue by accepting or declining booking requests. Its first component is fare and seat mix management which tries to optimize the number of
tickets sold to the different consumer segments. In most cases, booking classes with a lower value are closed or reduced when demand is high while they receive high contingents when demand is low. The availability of discount tickets is controlled through a process called nesting. The second component is overbooking management and it prescribes how many passengers an airline accepts in excess of the capacity limit. In general, airlines want to avoid spoilage costs as well as denied boarding costs and therefore the optimal overbooking rate can be found in the maximum of the net earnings curve.

One strategy to cope with demand uncertainty is risk management. It is used to trade off the anticipated revenue against the associated risk of an action. It can be divided into four steps: First, the risks and their interdependencies have to be identified, for example through auditing or checklists. Second, it has to be assessed or evaluated based on its probability and quantitative effects. In a third step companies take steps to optimize their risk position; they can avoid, reduce, transfer or retain the risk. Finally, during the risk monitoring process the risk situation has to be revised regularly.

Stock-keeping, the purposeful bridging of time disparities of objects, can also serve the purpose of balancing demand. It can act as a buffer between the supply side and customer and help to provide a good customer service. Stock-keeping has a lot of functions, namely production, adjustment, security, speculation, cost reduction, sorting, and provision.

Another strategy is postponement, the process of delaying activities until the latest point in time possible. Since the forecasting error is lower, the shorter the time until sale, companies can reduce uncertainty because they have more information available. The decoupling point, normally the time at which customers place their orders, is moved closer to the end user.

Flexible products can also help to cope with demand uncertainty. They consist of a set of alternatives saving the same market and customers are only assigned to one of the alternatives after having bought the product. In the airline industry carriers can profit from a higher capacity utilization as well as demand induction by gaining new passenger who would not have flown for a higher price. An example is the concept “Blind Booking” offered by the carrier Germanwings, where customers can buy a ticket under a special motto and only know their destination after having booked. A special
variant of flexible products are so-called flexible time-range tickets. Its concept has been suggested by Gallego and Phillips and further elaborated by the Institute for Transport and Logistics Management of Vienna University of Economics and Business. They do not prescribe a specific routing and are offered to time-insensitive passengers at a discount. It helps airlines to balance demand by assigning passengers to the connections with the lowest load factors. This can either be a direct flight or a flight with one change. Passengers know their departure and arrival airport and are guaranteed a latest arrival time. The total travel time should include the flight time to a hub as well as to the final destination, a transfer time, and waiting time. Several more questions are still unanswered since flexible time-range tickets are not offered by any airline so far.

With the help of qualitative interviews, the author wanted to find out if this ticket type would be accepted by customers and what restrictions they have. Furthermore, the interviews were supposed to provide an indication on how the tickets could be designed. The research questions were:

- Is there a demand for the tickets and who are the potential customers?
- What are their fears and how can they be alleviated?
- What information do customers require prior to booking?
- What features do the tickets need to have?
- When and how can airlines resolve the uncertainty regarding the actual routing?

The author interviewed eleven persons between 23 and more than 65 years of age who all fly on a more or less regular basis. The findings with regard to the research questions are summarized in the following.
These findings suggest that airlines should try to introduce flexible time-range tickets in order to balance demand between flights with different load factors. However, in order to get more accurate results with regard to customers’ requirement for the booking process and the ticket itself, a quantitative analysis should be conducted. With its help carriers can find out which of the suggested details are most important for the acceptance by potential customers and how they have to develop the concept in order to take advantage of the benefits of flexible time-range tickets.
6 Executive summary

Flexible time-range tickets are a new ticket type for the airline industry which is offered to time-insensitive passengers at a discount. It does not prescribe a specified routing at the time of purchase and customers are assigned to a specific flight with ample capacity at a later date. This thesis shows who the potential customers of these tickets are, what prerequisites they have, and how airlines can inform them about their actual routing.

According to the interviews conducted by the author, the concept would be accepted by vacationers while business travelers are not likely to use it because they are time-sensitive. Furthermore, it might be better accepted by younger people who are not travelling alone.

The fears of the interviewees, which have to be taken into consideration by the airlines when designing flexible time-range tickets, are for example to change flights at a certain airport or travel with a certain airline they dislike. Other people mentioned that they want to earn miles for a frequent flyer program of a certain airline or to be able to use its lounges. It seems to be very important for most potential customers to have a SPOC and know all the terms and conditions of the designated airline in advance. This also includes luggage allowances and the provision with meals and drinks on board the aircraft. Finally, some of them seem to be worried about their pick-up at the arrival airport if they are assigned to a later flight.

In addition, airlines have to think about how to inform their passengers about their actual routing. Most interviewees would accept to be informed only one day before departure. The preferred medium of communication seems to be telephone or email in the form that passengers can confirm that they have received the information.

For the design of flexible time-range tickets airlines could still consider to conduct a quantitative study in order to find out which of the mentioned characteristics are important for the majority of potential customers. It could be helpful to create a scenario in which interviewees have to choose between different ticket types in order to check the likeliness of selling the flexible variant.

Therefore, based on the indicative results obtained in the qualitative interviews, airlines could use the market potential for flexible time-range tickets in order to induce demand.
Abstract

At the moment the airline industry has to cope with low load factors and especially network-carriers have to face low yields. This thesis introduces flexible time-range tickets as a new ticket type which does not specify the actual routing for a flight from A to B at the time of purchase. Therefore, it is offered to time insensitive passengers at a discount. A certain time prior to departure, passengers are assigned to a specific flight with ample capacity based on more accurate demand forecasts. The goal of the author was to find out if flexible time-range tickets would be accepted by customers and how they would have to be designed.

In order to answer these questions, the author provides a theoretical background about how consumers and airlines deal with uncertainty in the first part of the paper. It has been conducted on the basis of relevant literature such as recent journal articles, books and an interview with an airline representative.

The analysis itself consists of a qualitative study on the acceptance of flexible time-range tickets. It is based on eleven in-depth interviews with persons who could represent potential customers of flexible time-range tickets.

The author found out that flexible time-range tickets would be accepted by a number of potential customers if certain restrictions and requirement are met by the airlines. They could tap this market potential in order to induce additional demand and thereby improve revenues.
Bibliography


Interviews

Appendix

Interview in English

General question:

- Imagine you were given the choice between two scenarios to win money: In the first one you win €450 for sure and in the second one there is a 50% chance that you win €1000 and a 50% chance that you win nothing. What would you prefer? Why?

Questions about the travel sector:

- Have you ever booked a journey without knowing important details before you left? For example when you were leaving, where you were going, or where you were going to stay. Give examples.
- How often do you fly on average per year? What is the main purpose of your flights?
- Do you normally book flights on your own? How do you book flights? Are you familiar with the booking processes? Do you think you have good knowledge of the structure of the different offers?

What is your most important criterion when purchasing flight tickets? For example price, reputation of the airline, departure/arrival time, stopover times.

Presentation of flexible time-range tickets:

At the moment airlines are thinking about the introduction of a new ticket type which is a bit (~10%-20%) cheaper than current discount prices. When you buy a ticket, the airline informs you about when you have to be at the airport and when you will arrive at your destination at the latest. However, you are not told which exact flight you will be assigned to.

For example, if you buy a ticket from Vienna to Lisbon two months prior to departure, you will be told to be at the airport check-in at 8 a.m. at the latest and the airline promises you an arrival time no later than 3 p.m. This is about two hours later than in a predetermined connection with one change of planes. Only a short time prior to the day of departure, the airline assigns you to a flight within the given timeframe. It can either be a direct flight, if there are seats available, or a connecting flight, meaning the transfer from one airplane to another via one of the airline’s hub airports (e.g. Munich, Frankfurt
or Zurich). If there are available seats on the direct flight, you might even be in Lisbon much earlier. In any case, you will arrive no later than the promised time unless there are unexpected flight delays.

Questions about flexible time-range tickets:

- What are the first thoughts that come to your mind when you hear about the concept?
- What do you want to know to consider buying flexible time-range tickets?
- Depending on the design of the ticket, would you be willing to buy it? If yes, why? If no, what are your fears? How do you judge this ticket in comparison to a direct flight or a connection flight?
- What information do you want to receive when you book the ticket?
- Do you want to know the possible routings in the set of alternatives of the flexible ticket that you buy?
- When would you like to be informed about your actual routing at the latest? For example one week before the flight, one day before the flight or at check-in? Why is it important for you to know it at the mentioned point of time?
- How would you like to be informed about your actual routing?

Questions about the interviewees:

- How old are you?
- What is your occupation?
- What is your annual travel budget?
Interview in German

Allgemeine Frage:

- Stellen Sie sich vor sie hätten die Wahl zwischen zwei Szenarien um Geld zu gewinnen: In dem ersten Szenario gewinnen Sie sicher €450 und in dem zweiten haben Sie eine 50-prozentige Chance €1000 zu gewinnen und eine 50-prozentige Chance überhaupt nichts zu gewinnen. Was würden Sie vorziehen?

Fragen über den Reisebereich:

- Haben Sie schon einmal eine Reise gebucht ohne vor der Abreise wichtige Details zu kennen? Zum Beispiel wann Sie abfahren, wo Sie hinfahren, wo Sie wohnen?
- Wie oft fliegen Sie durchschnittlich pro Jahr? Was ist normalerweise der Zweck Ihrer Flüge?
- Buchen Sie Flüge normalerweise selber? Wie buchen Sie die Flüge? Sind Sie mit dem Buchungsprozess vertraut? Glauben Sie, dass Sie gute Kenntnisse über die Struktur der Angebote haben?
- Was ist Ihr wichtigstes Kaufkriterium für Flugtickets? Zum Beispiel Preis, Reputation der Fluggesellschaft, Abflugs-/Ankunftszeit?

Präsentation von flexiblen “time-range“ Tickets:

Zurzeit denken Fluggesellschaften über die Einführung eines neuen Tickettyps nach, der eine unwesentlich (~10%-20%) günstiger ist als derzeitige Rabattpreise. Wenn man ein Ticket kauft informiert die Fluggesellschaft einen darüber wann man am Flughafen sein muss und wann man spätestens am Zielort ankommt. Man erfährt jedoch nicht, welchen genauen Flug man letztendlich zugewiesen bekommt.

Wenn Sie zum Beispiel ein Ticket von Wien nach Lissabon zwei Monate vor Abflug buchen wird Ihnen gesagt, dass sie spätestens um 8.00 Uhr morgens am Check-in sein müssen. Gleichzeitig garantiert die Fluggesellschaft Ihnen, dass Sie nicht später als nachmittags um 15.00 Uhr ankommen werden. Das ist ungefähr zwei Stunden später als bei einem vorher festgelegten Flug mit einmal Umsteigen. Kurze Zeit vor dem Abflugtag teilt Ihnen die Fluggesellschaft einen Flug innerhalb des gegebenen Zeitrahmens mit. Dies kann entweder ein Direktflug sein, wenn Plätze verfügbar sind, oder eine Anschlussflug, der Transfer von einem Flughafen zu einem anderen über

Fragen über flexible “time-range” Tickets:

- Was sind Ihre ersten Gedanken wenn Sie von dem Konzept hören?
- Was möchten Sie wissen, damit das Konzept für Sie in Frage kommt?
- Je nach Ausgestaltung des Tickets, würden Sie es kaufen? Wenn ja, warum? Wenn nein, was sind Ihre Ängste? Wie bewerten Sie dieses Ticket im Vergleich zu einem Direktflug oder einem Anschlussflug?
- Welche Informationen möchten Sie erhalten wenn Sie das Ticket buchen?
- Möchten Sie die möglichen Verbindungen aus der Auswahl an Alternativen von dem Ticket, das Sie kaufen, wissen?
- Wann möchten Sie über die tatsächliche Verbindung spätestens informiert werden? Zum Beispiel eine Woche vor dem Flug, einen Tag vor dem Flug oder beim Check-in? Warum ist es für Sie wichtig es zu dem genannten Zeitpunkt zu wissen?
- Wie möchten Sie über die tatsächliche Verbindung informiert werden?

Fragen über die befragte Person:

- Wie alt sind Sie?
- Was ist ihr Beruf?
- Wie hoch ist Ihr jährliches Reisebudget?