Customer segmentation in airlines strategic network planning

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Abstract

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This research is aimed at analyzing the current level of customer segmentation data, used by airlines to complete strategic network planning processes. Rapid recovery of airlines passenger traffic leads to a great change in airlines network planning and market analysis processes. It requires more analysis of existing and new possible approaches to provide consumer's data for airlines.

Author has observed current methodology and data channels for airlines customer segmentation, framed base theories, used to define consumer decision making behavior and related this theory to aviation industry. Based on the data obtained, the author decided to develop a theoretical model of the new future programmable solution aimed on forecasting possible customer's demand in different regions, based on segmentation approach.

Research also provides possible business plan to launch described software on aviation market and evaluation of future challenges and opportunities. This report consists of 23 pages, 12 figures and 1 table. Implementation plan is described by 6 basic aspects, that should be followed to enter the market with new possible solution. Outcomes of this study follows main trends of digitalization in aviation industry and lead to further development and researches, aimed on prediction of consumer's behavior.

Key words

Customer segmentation, network planning, decision making, software development, aviation market, digitalization, forecast.

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1   Introduction

Aviation Industry has become one of the most developed, rapidly growing and widely discussed topics in the world. Despite the effects of COVID 19 pandemic, according to IATA press release No: 10, Airline Industry is approaching full recovery by the year 2024. International passenger numbers, according to the same press-release, are going to reach 101% share of 2019 year's results in 2025, including 11% increasement of passengers share of European region. It is the result of restriction-free movement within the EU (IATA Press Release 1.03.2022).

This flights increasement tendence is providing for Airlines more and more opportunities of network development and opening new routes. "Routes-online" network concluded, that only in April 2022 50 new Airline routes were launched in the world. It is important to mention, that "Routes-Online" has chosen only 50 routes from the whole database, consisting of much more new developed routes (Routes 2022). More and more Airlines are starting to open new destinations, trying to follow the increasing demand of passengers. For example, Finnair has just launched new direct flights from Helsinki to Seattle, increasing number of trans-Atlantic flights between American and Scandinavian region. Eurowings is leasing Finnair Airbus A350s to operate between 5 German's and American's airports (Simple Flying 05.2022).

Around 20 new Airlines were launched already during year 2022, covering different regions and destinations. One of the most important process for new Airlines and already operational is Network planning. This ongoing process encompasses usage of internal Airline data and external industry data and different economic trends to provide a profitable network strategy. Airline network planning also consists of developing and continuous optimization of individual routes (not only City Pairs, but also airways and waypoints). Network planning works in strong cooperation between Revenue Management, Scheduling, Market Profitability and Marketing.

Very important stage of Network planning is Passenger Route forecasting. Its goal is to predict or estimate what can be achieved by operations between two airports in future. There are many techniques and tools nowadays to forecast passenger's data, including different econometric or approaches, however most airlines, according to "Routes-Online" are spending short limited time do complete evaluation by themselves, mostly relying on airports, tourist/travel agencies and other stakeholders to provide this data (Routes Online 23.11.2016). One of the possible aspects for passenger route forecasting model can be the Customer Segmentation.

Well-known practice of understanding your customer and the ability to segment it according to a number of criteria brings a lot of profit for modern World-Market. Modern aviation industry needs a lot of Customer Segmentation data to provide different offers for different regions and complete decision making according to new routes launches more accurately. An increase in demand for air

transportation among different consumers with different needs and expectations makes airlines to answer the following question: "Is current airlines network planning modeling supported by sufficient and achievable customer segmentation considerations?". If not – "How to increase and simplify segmentation's positive impact on airlines network planning?"

This research is aimed on analysis of how airlines are using customer segmentation approach in their network planning and routes development processes. Evaluation of current consumer segmentation usage efficiency and development of new modern and simplified approach to bring better customers segments understanding are considered as main objective for this research. This thesis looks a bit further into the future of airlines market segmentation methods and tools. It overviews the possible future needs for airlines, trying to predict the consumers purchase behavior. Rapidly increasing passenger demand on flights and new routes development is bringing for this research strong actuality and readiness for implementation in the industry.

Main thesis objective is to create theoretical model of new programmable solution monitoring customers demand forecast among regions. Methods and considerations, used in methodology and modeling part are based on review and analysis of current segmentation impact on airlines network planning. Background review is supported by theoretical frame of current theory models, used to understand consumer's purchase behavior and put it into one visual form. Described theoretical frame is transformed into authors personal methodology of software development and implementation

2 Theoretical frame.

2.1 Customer segmentation as a part of Airlines strategic network planning.

Customer segmentation is continuous process of grouping customers according to their behaviour, demographic data and other criteriums. Customer segmentation mission is to answer the question: "How and why customers buy?". It allows companies to create more specific offers and marketing strategies for different consumers in one or several regions. Airlines, as strong market players, also use customer segmentation approach in their whole market strategy. Historically, airlines were segmenting customers based on only demographics (Expert Journal of Marketing 2019). However, modern consumer has changed within the markets. Modern customers are very different in their consumption behaviour, ways of buying different products and services. It makes companies to segment consumers into different segments according to more criteriums, to reach concrete and most suitable groups for their market strategy.
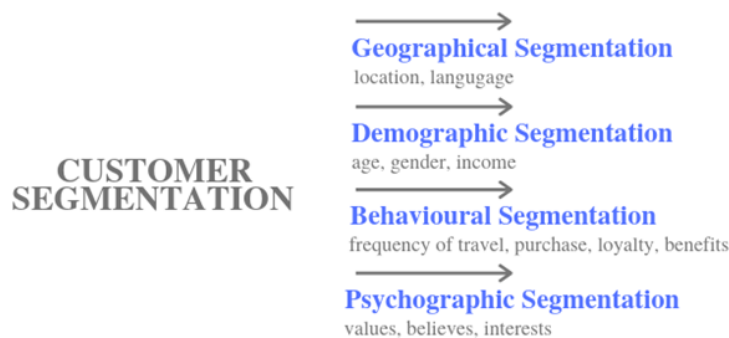

Figure 1. Traditional customer segmentation (Expert Journal of Marketing, 2019)

Traditional customer segmentation model, published by Kotler and Keller is describing geographical, demographic, behavioural and psychographic variables as basic for companies' consumer markets segmenting (Figure 1).

Companies are usually evaluating different customer segments according to mentioned basic 4 and trying to determine one of the most attractive segments. To do it properly, companies look at their objectives, mission and vision and decide if a certain segment has a potential to become targeted.

Aviation industry is one of the most complex spheres in modern world, where traditional customer segmentation viewpoint is not popular enough. Airlines concentrate mostly on behavioural aspects, trying to divide consumers into groups according to their way of interaction with airlines, motivation to purchase flights and what is most important – their price sensitivity (Expert Journal of Marketing 2019). Based on this point, so called "days before departure" purchase can be good enough indicator

of passenger's price sensitivity. This model is very simplified and can be observed in Jet Blue's customer segmentation model (figure 2) (CAPA 2014).
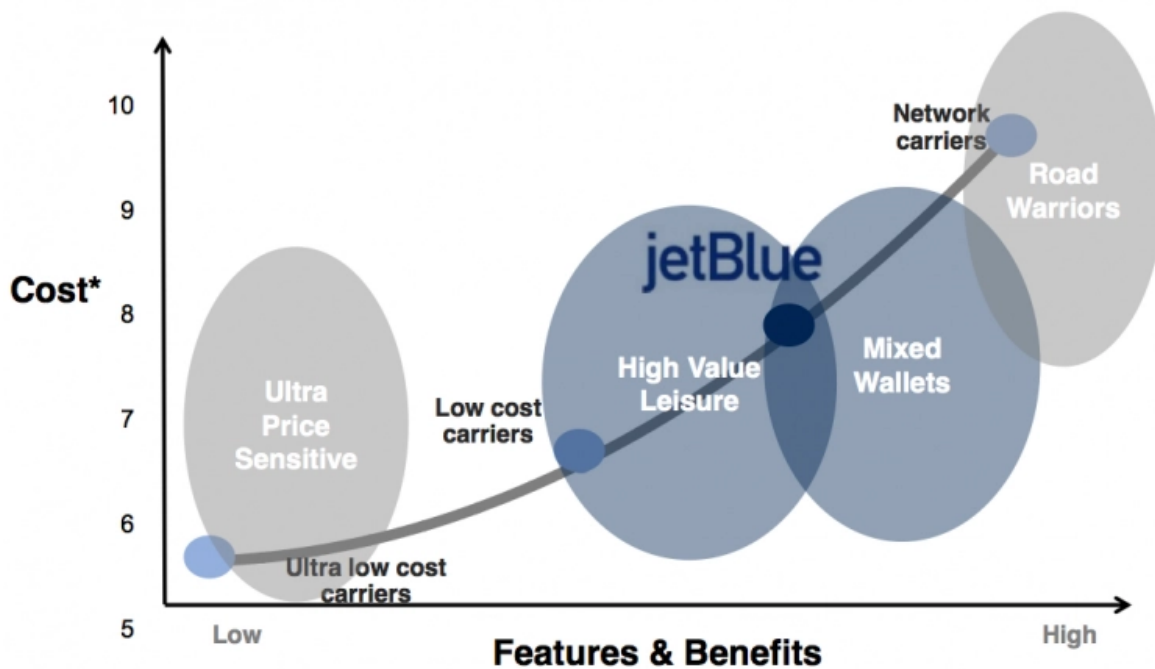

Figure 2. Jet Blue customer segmentation (CAPA center of for aviation, 2014)

This simple customer segmentation model shows consumer understanding based on their price sensitivity and comparison between costs and service that passenger will get on flight. It helps Jet Blue, based on their data and statistics, to understand what is their customer pricing segment and then choose the business model. It also shows, that low-cost airlines (LCC) are having a big target group with a great impact on the whole airline industry. Full-service Airlines are starting to bring more flexible offers for different customer segments, trying to save their market share from LCC corruption. Most of them are starting to target previously uncovered pricing segments, bringing brand new extreme cheap offers with no features and benefits for passengers. For example, Lufthansa has introduced low-cost ticket class "economy light' targeted to fight with low-cost carriers. Less free baggage, limited seat selection, no meal-service and no flexibility for ticket is reducing costs for airline and prices for passengers. However nowadays, it is not enough to divide customers only by price sensitivity.

More and more Airlines are starting to launch new model of customer segmentation, including more customer needs understanding. The basic 9 criteria were developed and implemented into airlines customer research (AmplifyXI 2022). These criteria are creating the customers visibility for airlines, bringing them more insights about real customer's needs. Simply, airlines are trying to answer question: "What different customers types need from their trip?". Author has created the matrix of customer critical needs, based on current traditional customers segment groups in aviation (Appendix 1). On the other hand, Lufthansa Group has completed another unique approach. In 2019 company presented their vision on proper customer segmentation (figure 3).

Figure 3. Lufthansa Group customer segmentation (Expert Journal of Marketing, 2019)

Lufthansa has divided customers into 6 concrete groups, trying to determine the most important needs for each segment. This approach helps to clearly understand different customer's needs in different groups and works as visualization of current Lufthansa market strategy. In cooperation with price sensitivity approach, it helps a lot to build proper customer understanding. It brings more personalization into airlines offers to different markets, making it key element for airlines all over the world. One of the possible customer segmentation journeys was done by author based on Lufthansa Group offers (Appendix 2).

Different companies, agencies and other stakeholders are ready to support modern airlines with a lot of data about passengers' flows. For example, Direct Data Solutions (DDS) from IATA is supporting airlines with tons of passengers' volumes data across all regions. One of possible disadvantage of such tool is lack of current customer segmentation data and customer understanding overall inside. It is mostly about numbers, data and comparing this data between different scenarios. Airlines can use this tool in cooperation with different additional stakeholders, who can help them to complete

proper market analysis before entering the market. Everything starts from communication with airlines, already operating in selected region. Then come different companies, who offer private market analysis and evaluations for airlines. It is an effective approach., However it is full of additional external communications work for different airlines departments, bringing a lot of useless and no-profitable moves for airlines.

One of the biggest challenges for airlines, implementing describes customer segmentation approach, is behavior of their customers. Human nature brings variability in actions of the same individual client. A passenger, who could have been assigned to one category days ago, can change the whole range of needs and desires just within weeks. Modern social elevators are working not the same way, as it was traditionally taken, bringing consumer segmentation data short shelf life. What is more, today's external conditions dictate the influence of various contingencies to entire markets, industries. Airline industry has become one of the indicators of such sensitivity.

Comparing following indicators with the research question: "Is current airlines network planning modeling supported by sufficient and achievable customer segmentation considerations?" author concludes, that the answer is no. As was mentioned before, one of the strongest trends for years 2020-2022 is launch of new airlines and development of new routes between new city pairs. Models, described above, are bringing excellent customer understanding in network planning for airlines, however has a lack forecast element. Mentioned consumers unpredictable behavior is a big weakness of current airlines segmentation approach. In most cases Airlines first enter the market and then start to evaluate consumer segments demand on provided offers. Industry needs stand-alone solutions to predict customers segment's needs and expectations on different airlines offers. Same way there is a need to monitor segments sensitivity in a real time, reducing the negative consumers unpredictability effect to minimum. The main objective of this research is to find the way to predict demand among different customer segments before operations have started, that is why it is very important to build new theoretical model of possible decision to bring more forecasting possibilities for airlines. It will exclude a lot of additional interactions with stakeholders, who are providing data for airlines, narrowing their actions, meeting and communications into one specific predicted algorithm. Simply – airlines should have enough understanding about consumer groups in chosen region before starting any external actions. What is more, it gives airlines possibility to get access to different customers data channels in a shorter time.

2.2 Theoretical models

All lot airlines are trying to understand, how consumers investigate their products for the very first time and make decision rather buy it or not. According to "Stratos Jets" market review, over 82% of airlines tickets bookings are making online nowadays, excluding any other marketing and interaction channels [8]. 70% of customers do their research with smartphones, using websites or airlines booking applications. 90% of customers will use web services and websites to look for information about flights (Figure 4).
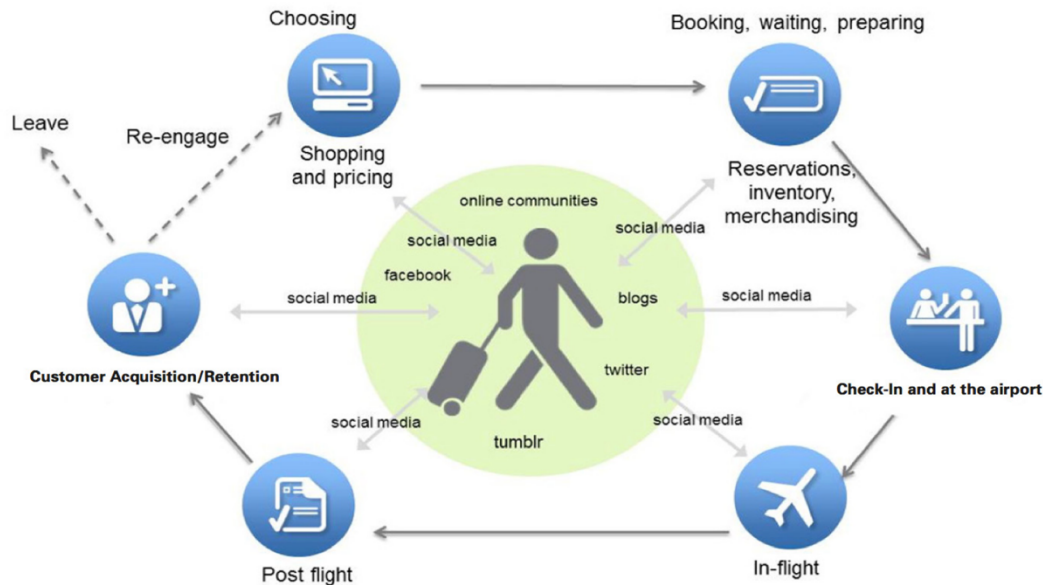

Figure 4. Online operations in airline customer journey (Denyse Drummond-Dunn, 2018)

Customer's decision-making process is becoming one of the key aspects to understand if the company's products are matching customers' expectations. There are a lot models, describing the customers decision-making process, however for this research author has chosen "Strategic online customer decision making model", developed by Alan D. Smith and William Rupp in year 2003, so called "Smith's and Rupp's models". It is represented in Appendix 3 and focuses on online sales and product purchasing. As was mentioned, Airline's customers are doing over 82% of bookings online, that is why "Smith and Rupp's" model perfectly describes this process. Smiths and Rupp's model visualizes customer decision making process as input – output model.

To enter the process of purchase decision, customer needs to come through certain social-cultural influences and evaluate products websites marketing efforts. It creates customers motivation to start the decision-making process. During this process motivational and psychological factors are creating 3 main questions to consumer: How much do I really need it? Should I look around for a better choice? Where else can I get the product? Answering these questions customer finally moves to outcome stage, completing purchase and after-purchase actions (Smith, Rupp 2003). This

complicated model can be simplified using "Black Box" theory. It comes from software development sphere and can be easily transformed into market analysis form.

Black box model illustrates the overall process, service, request proceeding and other actions as one input-output model (Figure 5). Author takes existing model of consumer's behavior and adopts it to Black Box model. Input is illustrating incoming actions from customers or any other entry persons to start the processes inside the whole system, simply illustrated as a box. These incoming actions could be also defined as request into the system.
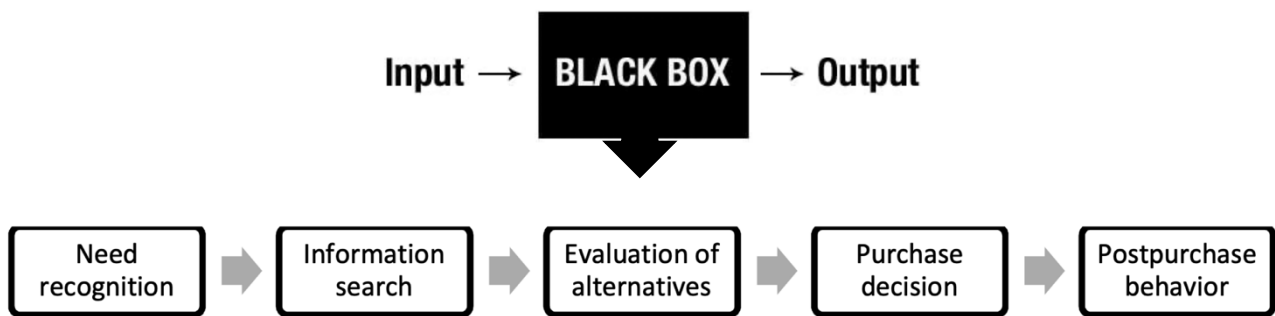

Figure 5. Black box model for customer's decision-making behavior (adaptive from Kotler et al. 2008)

Output flow is illustrating final decision to purchase product (flight). Figure 5 also shows, how simple black box model can be discovered as more complicated five-stages decision making algorithm. Input and output for this five-stage model is represented by "Need recognition" and "Purchase + Post purchase behavior" terms.

Going deeply into understanding of input stage, "Need recognition" stage should be explained clearer. Basically, it is the input stage of the whole black box model, bringing customer to go through certain criteria, what consumer him to final decision to entry the process stage (black box). This stage is described by Smith and Rupp, using 6 basic factors: Family factor, Friend's factor, social class, Age group, Economy factor and Cultural factor (Appendix 4). All these factors are compared with 4 different product cases, forming the matrix of consumers entry-factor, represented in Appendix 4. These criteria could help to understand what airlines should take in consideration, when starting to think by customer's way.

"Information search" and "Evaluation of alternatives" steps, according to Smith's and Rupp's model 2003, can be combined in one "process stage", focused on how customers are making decisions. There are 3 basic questions, that consumers set for themselves before making the purchase decision, based on psychological and motivation factors. The model basically includes: "How much do I really need this?", "Should I look around for better price?" and "Where else can I get the product?" However, author of this research decided to replace the last question with "What are additional expenses with this purchase?". This question matches aviation consumers much more accurately,

covering the airport transportation and additional fares like overweight fares, airport transportation expenses and so on. What I smore, as was mentioned, 90% of consumers are using web-services to search for flights products. That is why previous question "Where else can I get the product" is out of current interest.

Proper understanding of consumer's behavior (consumers definition) is the key factor for proper customer segmentation in Airlines. In year 2012, the question: "How airlines should define the customer?" was transformed into one simple theoretical model, called "5 W segmentation" (Expert Journal of Marketing 2019). This model sets 5 basic questions for company, who is trying to reach full customer understanding. When the company has answered on all 5 questions, it can easily define customer segments for different products and services and start to target them. Using provided data, author created table of 5 W segmentation theory for more visibility.

Table 1. 5 W segmentation theory

5 W segmentation theory	
Who?	Who is your customer? Who do you want to buy your products and services? Includes basic demographical aspects.
Where?	Where is your customer? Includes geographical aspect, business location and area concentration.
What?	What does your customer purchase? Includes analysis of most recent purchases of your targeted customer group, number of trips, after-purchase feedback and personal motivations.
When?	When does your customer buys? Includes time-measurable factors, such as year-clock cycle, seasons and so on.
Why?	Why chosen customer segment should choose your product? Includes compartment of companies offer and customer's overall needs. The last stage of customer segmentation process, where company must be able to define which customers segments match their products and services with the highest profit and efficiency.

These 5 questions are also intertwined with basic consumers criteria, used to choose the airline (Appendix 1). Together it builds clear vision for airline about customer segments they need to focus on. Despite the clarity od described steps, airline network planning process is still very complicated process with a lot of external work between different stakeholders and partner airlines. Figure 6 visualizes this process clearer, implementing previously mentioned "Black Box" model.

Input → **BLACK BOX** → Output

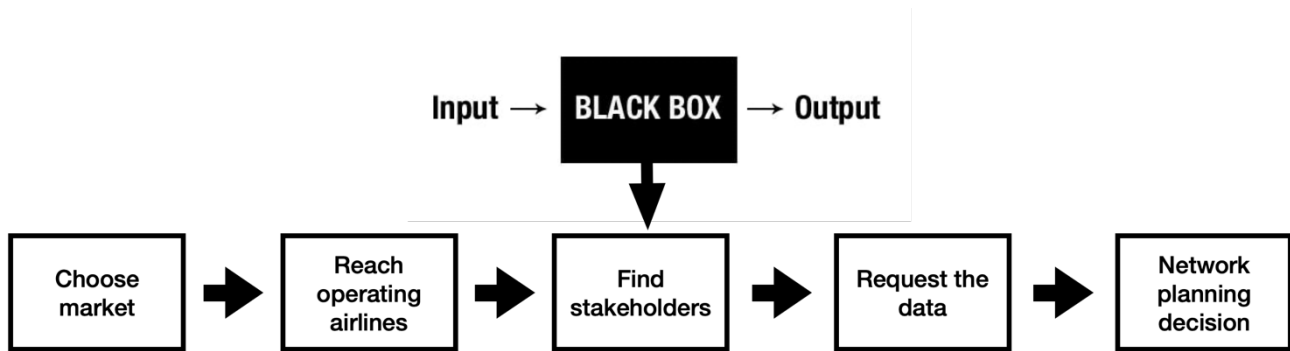| Choose market | → | Reach operating airlines | → | Find stakeholders | → | Request the data | → | Network planning decision |

Figure 6. Airline Network planning black box model

Proper customer segmentation could help airlines on the very 1st input stage, where airlines have to choose market the want to entry or improve. Nowadays, with the lack of customer segmentation data before entering the process Network planning (3-5 stages), airlines are forced to complete a big number of additional meetings, requests, focus-groups and cooperation between other airlines in chosen region. The percentage of successful actions in this model is very low and usually influences a lot on sales persons and representatives of airlines. That is why there has to be the solution of how to prepare airlines to enter the network planning process with an amount of information about different customer segments in region and their demand on suggested offers. It will reduce the number of mentioned actions, narrowing them into one effective strategy with the highest efficiency. The next chapter describes Theoretical Model of possible solution, aimed on building connectivity between airlines offers and customer needs in different regions in real time, bringing airlines instant forecast of customer segments demand. This new methodology can support airlines with additional consumers data even before operators start their approach to different stakeholders, describing new absolutely autonomous way to match airlines with their target customers.

3   New programmable solution development

Summing up all previous conclusions, theory and airlines current customer segmentation volumes, author has determined that nowadays there is no autonomous services provided for airlines customer segmentation forecasts. Basically, airlines are sending requests to get some data about passengers' volumes in different airports and regions, then different stakeholders in combination with airlines personal research are providing their service to determine customer segments for airlines. There is no instant self-service on airlines data market, that is why this research offers brand new theoretical model of web-based software, aimed on matching airlines with their target customers in different chosen regions, using both customers and airlines channels. That is why author developed new unique theoretical model of new programmable decision, called customer segmentation demand forecast software. The main objective of this web-based software is to predict for airlines current customer's demand among different consumer target groups in real-time.

3.1   Software methodology

Black Box model, describes in paragraph 1.2 is historically represented in software development industry. It usually describes input and output data flow, and the hardware + software combination, used to complete user's request. Input and Output flow also represent the operation system (or any interaction model), which helps users to interact with the program code, implemented into the software and all hardware elements. It makes user experience easier and native, example – Microsoft Windows system. Previously mentioned airline's strategic network planning black box model can be transformed into the software model, representing Airlines as users, who are making request in software and getting the output. Figure 7 visualizes airlines request into software to calculate the demand of possible customer segments in chosen region.

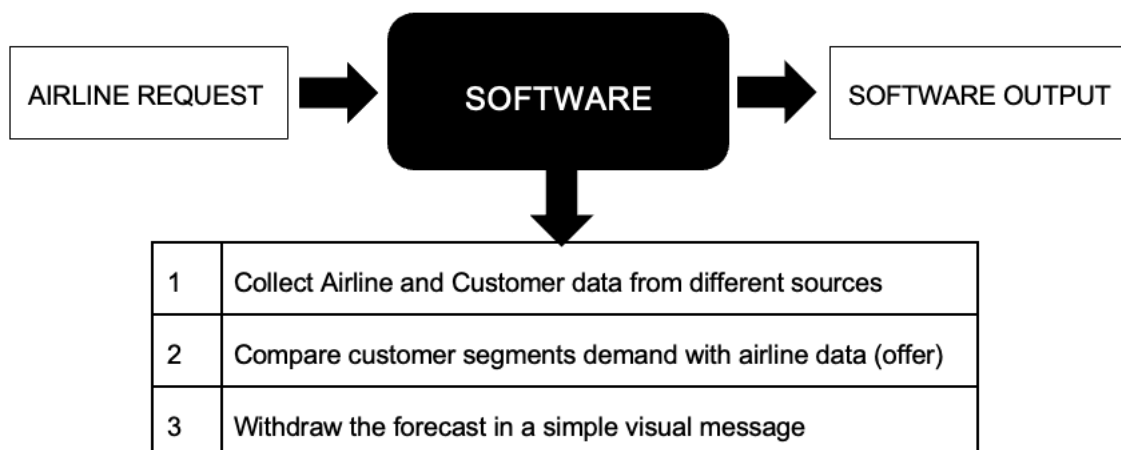|	
1	Collect Airline and Customer data from different sources
2	Compare customer segments demand with airline data (offer)
3	Withdraw the forecast in a simple visual message

Figure 7. Customer segments demand forecast software model

This is the primitive model of how software should work. It describes all the processes involved into final software output calculations and visualize user – software – user relationships. To launch this model and bring all processes to live, there has to be clear comprehension of each step, starting from answering the questions: "What should be inside airlines request?" and "How to collect and evaluate customers data?"

To answer the 1st question, let's get back to typic airlines consumer's criteria, used to decide what flight to purchase (Appendix 1). In the first scenario, Airline should provide:
- City-pair offer;
- Timing;
- Price segment (not concrete);
- Aircraft type;
- Aircraft configurations;
- Inflight services;
- Flight season.

Then software compares airlines data with customer's needs data and makes an evaluation of current airlines offer demand. It can be flexible, constantly changing output, depends on which volumes airline inputs. However, the second possible scenario is airline, who doesn't want to concentrate on price and timings firstly, but wants software to give probable customer requests, according to mentioned criteria in progressive interaction with customer segmentation inside the region. Then airline should cut off pricing, timing and season criteria from its request, what makes it harder to predict customers segments demand, but still possible.

2nd question is much more challenging and complicated. However, strong algorithmic solution was developed during the research process. To succeed in proper customer understanding, this new web-software should behave itself like the real airline customer. It brings us the new term – simulation. Software should simulate the whole customer's decision-making behavior. There are already several real-world examples of such software, trying to behave itself like the real customer. Most recent one – Airline Online simulation, developed for Aviation Degree programs and trainings, where customer decision making behavior influences on current demand on imagined airlines destinations [9]. The efficiency of this programmable decision was proved by Haga-Helia University of Applied Sciences team and was implemented into Aviation Business degree program. It shows, that such algorithms are already existing and even working, they just need proper real customer data and segmentation understanding. Simply – this algorithm has to learn how to behave like the real segmented customer in real region.

To start projecting customer's behavior on computer algorithm, developer should once again bring on table 3 main questions, that Customer asks him/herself during the process (Appendix 3). However, this time, lets change these questions, trying to predict, what specific airline customer will ask.

To bring it to more visual format, author has chosen the vision of marketing funnel model. However, funnel model on figure 8 is mostly related to airline customer decision making process and grabbing from existing theory only basic elements.

Figure 8. Customer decision making funnel

This visualization makes easy to understand that customer behavior could be replayed by program, using the final selection of the probabilities of consumer's answer to each of the question. "Where do I want to fly?" question makes it possible to prepare segmentation of customers, based on 6 basic factors, described by Smith and Rupp (Appendix 4) and will represent entry factor for each case. "What airline can offer it?" question already launches "process stage" and starts to evaluate different offers, according to 5 W rule and basic airline consumers decision criteria (Appendix 1). This is important step, where most of the airline offers and possibilities can be already filtered and sorted by described criteria. This stage is also representing "search" activities of customer The last "Is there any better offer?" question has to finally filter all similar offers and finalize decision between one airline similar offers. This stage is describing "research" activities of the customer.

3.2   Software model

For program code it will be more natural to answer on questions with "Yes" or "No", that is why consumer's decision-making process could be also visualized as branching algorithm (figure 9).

Funnel model should be taken into consideration to bring proper step by step flow; however, questions once again have to be chance into more specific once, that program can answer properly.
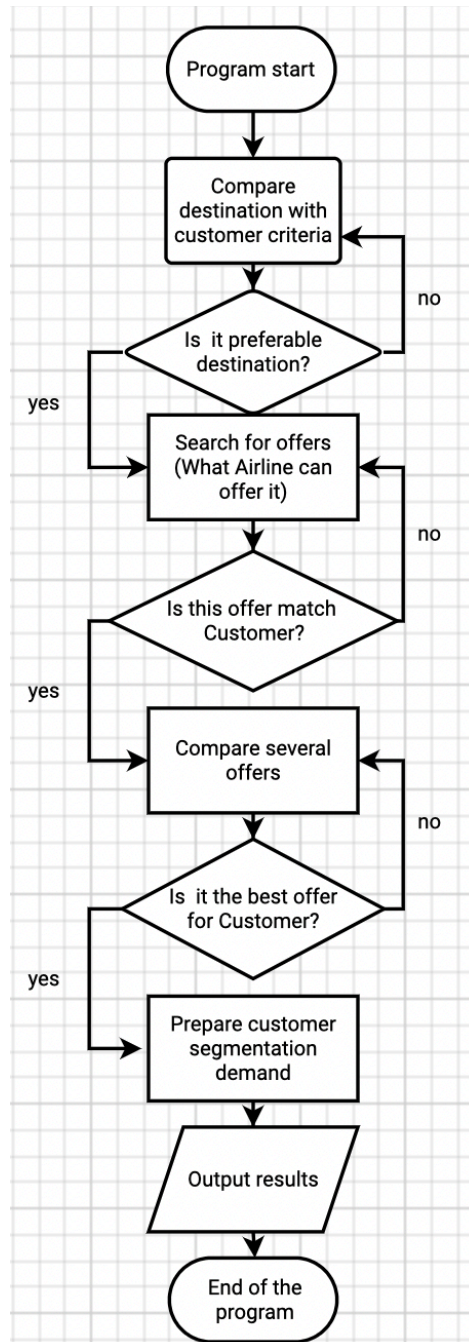

Figure 9. Customer segmentation branching algorithm prototype

Figure 9 represents first possible prototype for programmable decision, aimed on determination of customer segments with highest demand. This algorithm can be put on in cycle to go through the whole customer segments, created for chosen region. Program can calculate the percentage of

matches between different customer segment data and output results in a visual form. This decision can work in both mentioned scenario and help airlines to get proper and useful data.

The important question is "How to provide data for this algorithm?". It is now clear, how airlines could input their data into the system, however what about other channels? To make more visual, lets build the model of data flow for the system (figure 10).

EXTERNAL DATA CHANNEL

AIRLINE DATA

CHANNEL

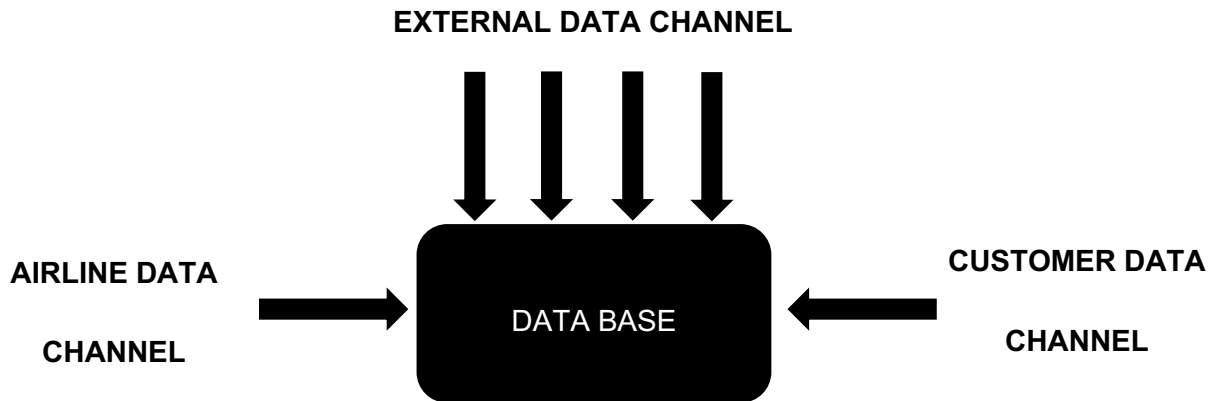DATA BASE

CUSTOMER DATA

CHANNEL

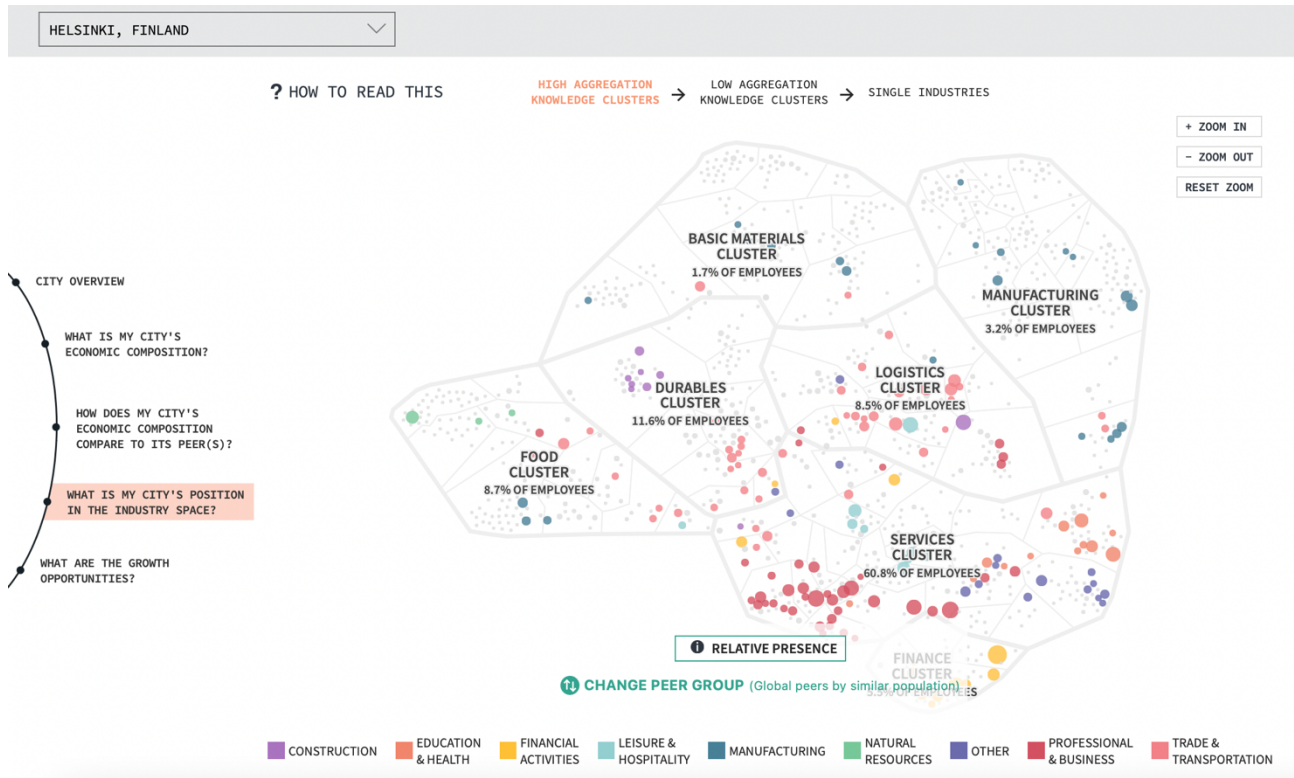Figure 10. Segmentation software data channels

This model describes 3 main channels for future data base. External data channel is combination of different PESTEL factors, influencing the market in concrete region. Developers team should take in consideration all external factors and current world crisis, changes and other different cases. Customer data channel is also describing business model of the whole concept that can be found in next paragraph. Basically, the only way to provide quality consumers data is to make customers provide this data by themselves. That is why the software should have input channels from airline and their customers in the same time. All these acts could be also supported by different developer teams, providing their own research and personal findings about different markets and regions. Target advertisement data is also having a big role in customer data channel. Recently developed "cookie-files" are able to provide different sort of user-data from variable resources, streams, websites. Each click of airline's consumer on any website or application, related to aviation market, can be noticed, measured and put inside algorithms.

Lufthansa Group segmentation model (figure 3) was chosen as the basement for software customer classification. Program will put percentage of demand between these 6 customer groups into the final output for airline. Appendix 1 also provides more information about Lufthansa Customer segmentation understanding. Software output data should be turned into readable visual form. It is very important to make this output very simple but informative in a same time. After analysis of current

segmentation services on market, Metroverse tool was taken as prototype for possible visual output model [10]. This is the project of Harvard University, that provides very useful economical and in-dustrial overview on different cities (figure 11). Farther cooperation with Metroverse development team could bring more understanding about segmentation data collection methods and code archi-tecture to visualize information and forecasts (figure 12).

Figure 11. Metroverse visual segmentation output example (Metroverse Growth Lab 2022)

Future programmable solution should have a similar visual-interactive form, as Metroverse City po-

sition in the industry space map. Similar visual interaction with specific clusters will contribute to a more efficient analysis of created forecast report for airlines. Future software should use 2-level interactive map, where the main consumer segments of the aviation market will be shown at the top level. By scrolling, using will be able to dive to the second level, where each consumer segment could be divided into same industrial sector map, demonstrating key representatives of each con-sumer segment in specific region.

Forecast diagram (figure 12) can be useful for fast SWOT analysis of selected market for airline (user). It will predict possible interest grow among all consumer segments, based on external data and factors.
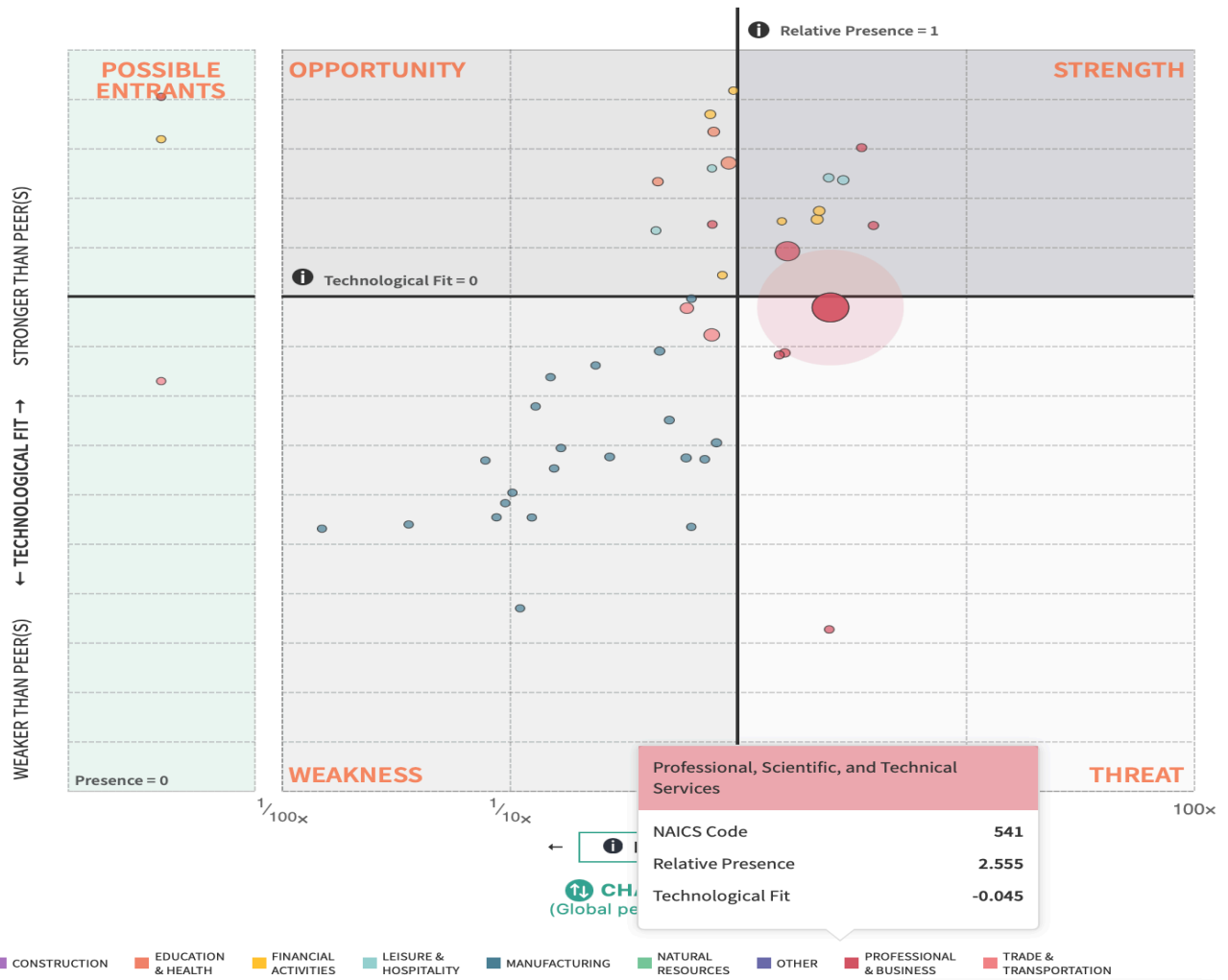
Figure 12. Metroverse forecast visualization example (Metroverse Growth Lab 2022)

The biggest difference of this future web-software is its instant output element and aviation industry orientation. There are several possible forecast models, like Momentive AI, which offers private market research for user and then visualize customer's demand forecast. However, it is mostly self-research platform, just tool, provided for companies to complete their own investigation. There is no automatization of the market research itself, what makes airlines network planning journey still complicated and overloaded.

3.3   Business plan, findings and implementation plan analysis

Business plan is a document that defines companies (service) objectives and how it achieves different goals. Web-software, described in previous paragraph, is also an object for future business plan realization. It is very important to understand basic elements of interaction with possible stakeholders, market and future consumers of described solution, as a ready-made product with its market plan, channel and revenue management. Vision of possible product is mostly corresponding to future

digitalization of aviation industry, as one of the main aspect of industries development and improvement. Possibilities for different airlines to collect instant data about possible customer segmentations demand is a key factor of future airlines network planning processes. Mission of the product is to help airlines to reach their customer in a better and faster way as well as to help airlines customers to bring their needs and vision directly to airlines.

Possible market entrance could start from developing test-region of Finland, to start evaluating market of flights from Helsinki-Vantaa airport to European destinations. Company, that provides software, should create a message to airlines customers, that makes them to provide their personal data for software. These data channel should be provided as a survey, including different questions regarded to described customers decision making criteria. Survey prototype will be developed in future researches and workshops. The message, that company could send to customers, should include arguments, regarding consumer and airlines connectivity. For example, one of possible press release titles can be: "Help airlines to provide your dream-trip", or "1st ever Tinder-model for airline's market". These approach helps to deliver to customer vision and mission of future service.

Core strategy of service will be the creation of constantly replenished database of different customers types and airlines offers, providing more and more quality forecasts, based on more and more entry data. All airlines' data input and all customers surveys + feedback forms provided by airlines personally will be stored in database for future usage. It will create data-crossing model, same as Direct Data Solutions from IATA, but concentrated on customer understanding and target offering. Pricing strategy is considered as subscription model with different levels of service. It makes very fast and easy entry-point for all airlines. On current stage, software does not provide any subscription service for usual airline consumers, but well-described message with strong airline connectivity and unique offering possibility will help to attract more and more reviewers.

Cost's stream consists of web-service hosting payments and additional stakeholders' payments to provide more data about current regional segmentations. Salary of teams, involved into development process, is also big part of future costs. More costs streams can be defined during future researches.

Implementation plan, according to Team Asana definition, describes basic steps should be completed to reach project's (product's) objectives. This plan includes strategy, process and action combining with scope to budget and beyond (Team Asana 10.2021). A team, that may develop new software prototype, has to follow implementation plan steps to success with service demand. First and basic step to start implementation (strategic) plan is definition of goals. Developers team should ask itself: "What are we trying to achieve with this project? What outcome we would like to produce?" (Team Asana 10.2021). The main objective of costumer segments demand forecast software is to create instant connectivity between airlines and their clients. Clients should have opportunity to reach

airlines in their region directly to share their needs and expectations without additional meetings and focus – groups. Same time airlines need to have opportunity to simulate and predict future consumer's demand on offers, they are going to provide for new or existing regions. Analysis of further sub-goals determines creation of huge consumer's database, accessible for all airlines in the world.

Figure 13. Implementation plan development steps (Team Asana 2021)

Research conduction step (figure 13) is launch of quantitative and qualitative actions, team should undertake to research regions, consumer's aspects and airline offers subtleties. Developers should create strong visibility of software theoretical model, described previously, connect it with real state of aviation industry and external factors. Further researches could include: continuous algoritmisation of consumer's behavior and decision making, using different mathematic models and approaches. There should be understanding of "How to build flexible structure of narrowing consumer wide considerations and actions into simple "yes" or "no" processes?". It is a very strong task for

future IT researches. Same time market research group provides data about current airlines market share in chosen regions and also investigates region's (city) economical composition and industry space position.

Well predicted risks are a key factor of successful service survival in aggressive market environment. More and more companies are producing their own digital services for airlines, fighting for aviation stakeholder's market. It is possible to determine several basic risks for possible software: huge market competition, code complexity and initial instability, initial lack of consumer's data and fast paced data flow channels actions. To make this service alive, development team should implement active and fast way of endless data update. Lot of employees will be involved in constant market monitoring through variable sources and insights. It will bring complexity in internal communications model for service developers. Lack of consumer's data due to initial period of software service is result of human factor, influencing possible respondents to delay the flow of information. Same tame automated target advertisement and cookie data flow channels requires lots of investment and development. Strength and possibilities for this future project follow from the probable overcoming of the described stages. What is more, there are lot of companies-enthusiast, ready to help such ambitious and future-aimed service. There is strong interest from IT specialists all over the world to bring more digitalization into Airline's industry, making it one of modern trends.

Project milestones are checkpoints to track development and research progress. It should be implemented as metrics, accessible for all members, involved in software development process. Future researches and publications could bring more visibility of time-bounded aspects for described processes. Same way responsibility and tasks is more specific future illustration of possible internal communications plan for developers' team. At least, there is confidence of creation several management positions, responsible for: data flow channel management, b2b customer relationships management (cooperation with airlines) and program development management.

Resources, already mentioned in this chapter, is foundation stone for this theoretical software model. It is important to reduce risks by determination of correct resource data and possible investments for project. It includes money, personnel, coding software, equipment and other physical and technical materials (Team Asana 2021). Future researches could bring more visibility for this aspect.

4 Conclusion and discussion

4.1 Discussion and reflection

This research illustrated modern aviation market needs modern stand-alone solutions to help airlines increase efficiency of their strategic network planning processes. Customer segmentation was recognized as one of the key factors for successful airline network planning, bringing more connectivity between airlines and their consumers. Current level of customer segmentation activities in airlines were found satisfactory, but not responsible to increasing data volumes and amounts, making airlines processes more complicated and longer. The research brought clear vision of future aviation customer segmentation model, transferring it into market with autonomous web-services. Primitive theoretical model of possible web-service solution was described and simulated in completed research. This new software has a potential for future researches and development, being true representative of aviation industry digitalized future. Research shows weakness of current airlines customer segmentation approach and transforms it into possibilities.

Still, proposed decision brings a lot of challenges in customers and airlines data channels creation and algorithmizing. However, developed theoretical models bring vision of possible assembling and coding directions to achieve fully working service. Visual model of forecast demand output is a great future potential way of market evaluation. Cooperation with Harvard University developers will bring more insights of possible segments visualization, using existing architecture of Metroverse service. This research is responding to current and future aviation industries requests and can be developed into deeper and more complicated project with possible investment from airlines.

Modern airlines market requires more digitalized and stand-alone solutions, cutting of tons of overloading stakeholders' cooperation's and additional steps. Described theoretical model of new possible programmable solution is the first step of future network planning maximizing for the whole Aviation market. The key outcome of this research is illustration of possible future of airlines digitalization processes. It is clear, that within years it will fully cover not only standard operations and internal actions of airlines, but also external market interactions, analysis and even consumer behavior prediction. However, there will be always space for human resources, supporting new autonomous models and providing real data for them. More and more job opportunities in IT sphere, market research and strategic communications could be represented.

Described model of possible programmable solution is a successful first try of creating an understanding of the seller-buyer connectivity algorithmization. It is example of consumer decision making theory being transformed into software development models. Black Box model is good transfer theory point for these two spheres. Consumer decision funnel theory, created int this research, brings connectivity with basic algorithm and block-scheme theories. The biggest challenge for this research

is way of providing customers data flow channels for future software. It was overcome by modeling of mutual interest possibilities from consumer's side. The way of surveys, feedback forms and software registration forms in cooperation with string marketing plan bring consumers understanding of future connectivity with airlines to provide their dream-offers and fares. Same way cookie data, used in target advertisement strategy, brings direct data from airlines resources and services.

This research could bring more code and algorithms examples, however due to short-time framework author decided to put these deliverables into future upcoming researches. Several articles and product researches are going to be completed to cover each aspect independently. More airlines data in cooperation with real customers surveys can bring more insights for new researches. Unfortunately, this research has a lack of qualitative data from real surveys, interviews with airlines representatives and focus groups. All these aspects will be completed in upcoming papers and studied. This topic has potential to become master-degree thesis with more deep investigation of consumers behavior aspects and bringing them into simple code. Future researches and projects can be based on answering the questions by this study. Table 2 demonstrates the relationship of unanswered questions and omissions to further researches opportunities.

Table 2. Further research questions

Omission	Question	Research type
Lack of airlines customers segmentation real data and weaknesses in this report	How to collect more beneficial and concrete airlines consumers open-source data?	Quantitative Inductive research
No real customers surveys, interviews and focus group provided for this study	How should we determine pain-points of customers' expectations? How to reach customers?	Qualitative research
There is no personal output visualization format demonstrated for software.	How to transform Metroverse output format into airlines customers segmentation forecast?	Mixed research
There is no proper software usability and market impact evaluation	How market reacts on new programmable customer segmentation forecast aspect?	Longitudinal research

This research brought more basic understanding and possibilities evaluations to start series of related researches and experiments. One of possible stakeholder and commissioner for such project could become Finnair. Digital approaches, high customer connectivity and rapid development processes are making this airline potential launcher and stakeholder of new software. Finnair's ambitions to cover more and more markets can be supported by new customer segmentation methodology.

This thesis research brought a lot of aviation market understanding for author, covering previously not clear aspects and possibilities. Investigation and study of basic customer segmentation rules and theory provides more skills competences in market/demand analytics. Connection of airlines market management positions with personal future ideas could bring to more unique and profitable industrial projects. In this study, engineerable and analytical skills of author met his new esales and marketing opportunities. Knowledges, skills and considerations, received during 1 - year study in Haaga Helia University of Applied sciences were used to succeed in chosen thesis research topic. There is a big potential of more researches and development process, answering on different questions, this thesis brings to the reader. Possible data flow channels, coding and algorithmizing processes will become the basement for future customer segmentation processes research network, bringing together authors and researchers all over the world to answer one specific question – "How to predict unpredictable consumer's behavior?".

4.2   Conclusion

Completed study achieved all set goals. Current customer segmentation analysis was completed according to real aviation volumes and reports. Theoretical frame, used in this thesis was successfully implemented into personal findings and modeling. Achieved results are matching future aviation trends and bring more visibility into next steps in consumer's behavior prediction and analytics. Chosen topic and research scope was supported by individual aviation representatives and enthusiasts. Customer segmentation is still an important aspect in airlines network planning and this research shows how this interaction can be improved. As a result, model of programmable solutions shows possibilities in automatization of airlines market research interactions and narrowing of needed stakeholders' communications and costs. New subscription method brings instant fresh data in affordable costs for airlines. Author has answered on the main research question: "Is current airlines customer segmentation level supports enough to bring successful strategic network planning for airlines in 2022?". This research has answered, that current customer segmentation approach and dataflow method is not enough to reach the maximum efficiency level of airlines network

development. However, increasing possibilities of using software, on the example of this study's developments, suggests a certain trend in the future of aviation – digitalization and automatization.

This short research has become the foundation for non-standard approach to research to explore possible improvements and innovations in airlines customer segmentation. On a larger scale it could bring more beneficials to the whole airlines strategic network planning process. Short time-frames left unanswered several important aspects and topics (table 2). However, author has created a chain of follow-up studies and researches, designed to answer the questions posed.

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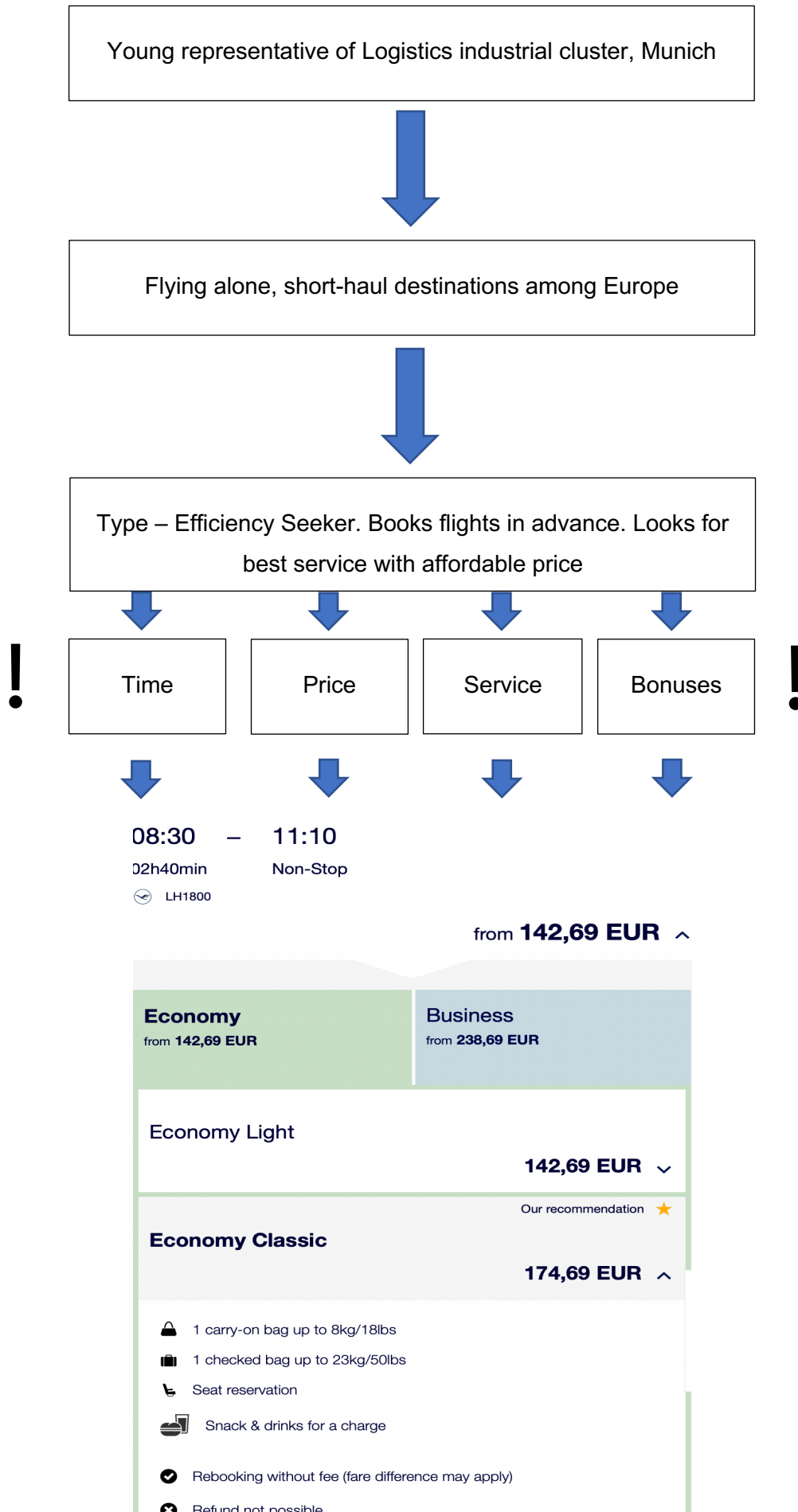
Appendices

Appendix 1. Airline customer criteria matrix

Supporting source: AmplifyXl 2022

	Single tra-velers	Families with small children	Group tra-velers	Eldery tra-velers	Business travelers	Leisure tra-velers
Flight to desired destination	Critical	Critical	Critical	Critical	Critical	
Timing	Critical				Critical	
Price		Critical	Critical			Critical
Con-venience and access	Critical			Critical		
Flying com-fort				Critical	Critical	
Reputation						
Safety		Critical				
Services	Critical	Critical		Critical	Critical	
Flexibility			Critical		Critical	Critical

Appendix 2. Lufthansa customer segment journey example

Young representative of Logistics industrial cluster, Munich

Flying alone, short-haul destinations among Europe

Type – Efficiency Seeker. Books flights in advance. Looks for best service with affordable price

| ! | Time | Price | Service | Bonuses | ! |

08:30 – 11:10

02h40min   Non-Stop

LH1800

from **142,69 EUR** ∧

Economy from **142,69 EUR**	**Business** from **238,69 EUR**

Economy Light

142,69 EUR ∨

Our recommendation ★

Economy Classic

174,69 EUR ∧

- 1 carry-on bag up to 8kg/18lbs
- 1 checked bag up to 23kg/50lbs
- Seat reservation
- Snack & drinks for a charge

- ✓ Rebooking without fee (fare difference may apply)
- ✗ Refund not possible

Appendix 3. Smith's And Rupp's online customer decison making model

(Strategic online customer decision making. Alan D. Smith, William T. Rupp)
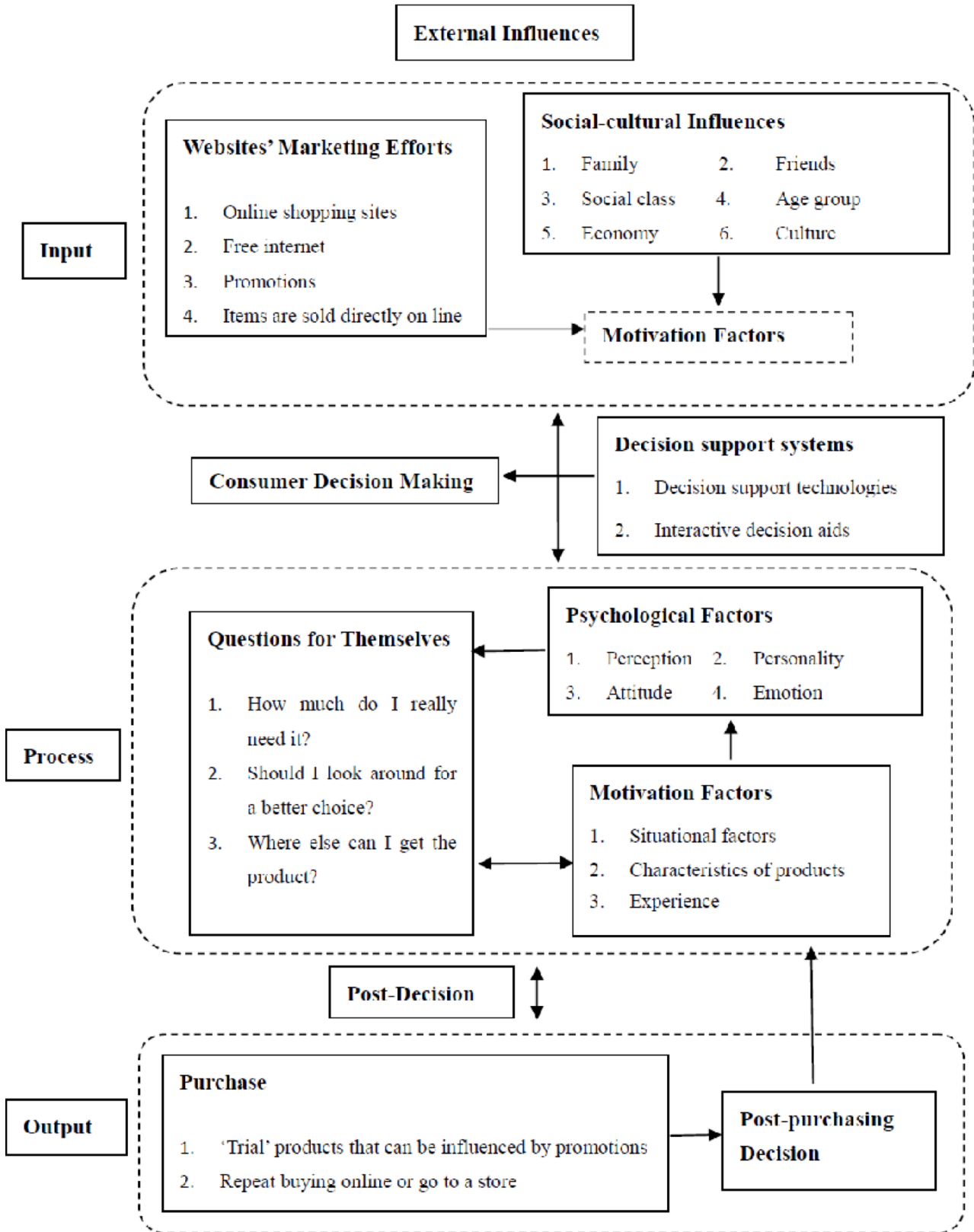
Appendix 4. Smith's And Rupp's online customer motivation criteria

(Strategic online customer decision making. Alan D. Smith, William T. Rupp)

Table I The basic factors defining the input stage of the model illustrated in Figure 1

	The product: online shopping Web sites	The price: of the online Web sites	Product promotion through: cross advertising	Where the product is sold: Internet
Family	All family members can use online Web sites. Children frequent them because they tend to have more time	Almost all Web sites are free for anyone to browse	Online Web sites promote to families by having Web sites aimed directly toward family. Websites may include coupons on family movies bought in stores	Online Web sites sell their products on the Internet
Friends	Friends influence consumers by relaying information on interesting Web sites they have bought from	Almost all Web sites are free for anyone to browse	Online Web sites promote to consumers" friends the same way they promote to anyone. With "buy one get one" sales. E-mails alerting them about sales, some of them even including coupons	Online Web sites sell their products on the Internet
Social class	Social class of a consumer also affects what Web sites if any, particular consumers are frequenting	Almost all Web sites are free for anyone to browse	Consumers who frequent Web sites and actually buy items are far more likely to receive coupons and e-mails about promotions	Online Web sites sell their products on the Internet
Age group	Consumers of a certain age group may tend to use the Internet more often	Almost all Web sites are free for anyone to browse	Older consumers who do not know how to use a computer are not going to get information concerning promotions	Online Web sites sell their products on the Internet
Economy	The type of economy we are in also greatly affects willingness and ability to buy	Almost all Web sites are free for anyone to browse	If the economy is not in good standing, fewer promotions and coupons will be sent to consumers	Online Web sites sell their products on the Internet
Culture	Those cultures that do not	Almost all Web sites are free	If there are cultures that do not believe in	Online Web sites sell their