Value expansion and sense making

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Abstract
The primary purpose of companies is to create value. Companies use competitive analysis to develop their value proposition. Performing this analysis manually is a time-consuming task. Automating the process of identifying and expanding value proposition, as well as categorizing it, would bring benefits for industries. This paper aims to summarize and systematize the results of previous research on a mechanism for automatically identifying companies’ value proposition. This is a novel task and with this work the author hopes to show feasibility and set a baseline. To narrow down the task, air transportation domain was selected. The goal of the research was to obtain insights and systemize values; to achieve it, the author utilized a bottom-up data-driven approach. The first step was to create a corpus of values. 96 respondents conducted a survey with open-end questions; 796 start-ups were identified and 96 annotators labelled start-ups’ landing pages by annotating values. The next step was structuring data for a deeper understanding of values by examining annotations and organizing values into taxonomies. The practical use of the results includes machine learning training material for automation of value-related tasks.

Keywords Machine learning · Value proposition · Aviation · Taxonomy

1 Introduction
Value creation is one of the primary goals of any business entity (Li 2007; Hillstrom 2018). Companies use comparative analysis to define their value proposition. However, identifying values manually is a time-consuming task. Automated value recognition tools can be regarded as a compelling issue in the business context. This paper aims to propose an algorithm for automatically identifying companies’ value proposition. The task of automating of values identification and expansion has not been conducted before; this paper is providing a baseline. To narrow down task, there was selected the domain of air transportation. To create
a data set, start-up companies were selected. Start-ups provide a good source for values: they are the first to pick up innovative business ideas. Start-ups provide an open access to their data as they are looking for funding. Texts of landing pages of start-ups bear clear and noticeable value proposition to reach possible investors.

Aviation domain was chosen for implementing the value identification task as one of the industries with an unmet need for value expansion. International Air Transportation Association’s (IATA) Industry Affairs Committee (IAC) Report “Future of the Airline Industry 2035” (IAC 2017) clearly recommends: “The argument for the wider value of aviation as the ‘internet of transportation’, with seamless switching at the national and global level. There is the potential for airlines to take advantage of advances in automation, new transport modes, and consumer attitudes. Companies that control data will have an advantage over existing competitors in developing new niches”.

This paper contributes to the gap of data on value proposition in air transportation by constructing a corpus of value annotated texts of air domain start-ups. In the search for competitive advantage after recent liberalization, air transportation needs to create internal value together with capturing and delivering value for consumers. For air transportation, traditional leading values are quality, price and speed and it has been dominating from the 1950-ies (IATA Passenger Surveys and reviews 1991–2019; Aviation Benefits Report 2019).

Existing and new customer preferences’ identification has been conducted by industry actors through the passenger surveys and aviation experts’ interviews. For example, IATA undertakes passenger surveys every year. The methodology it uses includes multiple answers and direct answers with the preset questions. This research methodology uses a bottom-up data-driven approach to identify values: annotators were performing the annotating task using their own perception of value.

IATA does not use the term “value” and does not make any visible effort to identify values specifically, though it might be possible via survey results analysis. No known efforts were made to ask respondents to identify values using their own words. Also, no known researches were conducted to recognize values analyzing existing value proposition offered by industry players.

**Tasks and methodology.** The methodology of this research utilizes a bottom-up data-driven approach. To create an algorithm of automated value identification and expansion, the following tasks were performed:

- exploring linguistic approaches in Aviation English: literature review
- identifying value: a literature review on values as a part of value proposition
- gaining deeper understanding of value perception: a survey with open-ended questions
- quantitively extracting a wide variety of values from data: value corpus construction and annotation
- value assignment as a synonyms map to a single concept: assign value from particular to general values: *luxury, soft, spacious* to *comfort*
- value representation: one-word approach, semantic and lexical analyses
hierarchically structuring values: organizing values into taxonomies

**The obtained results.** It was hypothesized that it is possible to quantitively extract wide variety of values from data. The author looked through the values manually and automatically and supported it.

This research significantly expanded the number of values in the air transportation industry as there were typically below five mentioned in the IATA surveys: *speed, safety, cost*. Through the experiment, there have been identified 100+ more values, e.g., *capacity, smart, service*. A corpus of values in the air transportation industry was created.

Identified values were organized by the means of taxonomies from the viewpoints of customers and operators.

A methodology was created for identifying values in texts.

Training materials were evaluated on how to utilize values in practice.

Limitation of one industry—the air transportation domain—can be applied to this research.

**Practical use.** The usefulness of automated value recognition in the aviation domain was ensured by getting feedback from air transportation industry. Three expert interviews of European airports top managers were conducted. A Latvian local airline utilized a Value Proposition in Air Transportation taxonomy for designing their new strategy for products and services at their online store.

2 Related work and literature review

To explore the concept of value, there was studied the notion of values and the extraction of values from it as part of the value proposition. To understand the directions of linguistic research in the field of aviation, the author reviewed the literature and supplemented the existing large-scale study on aviation linguistics with the recent trends.

2.1 Notion of value

Classical taxonomies assist in categorizing reality (Goodman 1978) into fundamental types—whether plant kinds or atom types; examples are Mendeleev’s periodic table of elements or Linnaeus’ categorization of plants. However, a taxonomy of values is not thought to be about existing or even realistic entities. In many instances, what matters is not what is true, but what is thought to be true. Classical taxonomies assist in categorizing reality into fundamental types—whether plant kinds or atom types; examples are Mendeleev’s periodic table of elements or Linnaeus’ categorization of plants. However, a taxonomy of values is not thought to be about existing or even realistic entities. What matters is not what is true, in many instances, but what is thought to be true.

The World Values Survey (2019) and the European Values Survey (2017) are the examples of empirical studies which aim to explore people’s believes on what is a
value for them whether it is explicit or implicit opinion investigating people’ preferences. The main focus of the studies of this kind is the effort to provide data for sociologists and politicians about what people like, what they consider to be important, what are their views and their preferences about specifically their lives and general believes. While those studies are very interesting for many purposes, this paper concentrates on a narrower issue of the same kind: the aim is to identify values specific for one industry—air transportation.

A value taxonomy distinguishes amongst different kinds of objects which are considered to possess value. Since (Parfit 1984), it is customary to distinguish between three main kinds of substantive views about value. Among those three two belong to monistic types of values: Hedonism is identifying what is good in general or “good-for” and pleasure over pain creates a positive balance; whereas theories of desire (examples involve Aristotle’s De Anima and Passions of the Soul by René Descartes) associate values with the desires satisfaction. The third type of applicable theories stands clearly pluralistic: (Parfit 1984) called it as an “objective list view, which ascribes value to a variety of different types of things (e.g. to friendship, love, freedom”).

This paper deals with some concepts of values in air transportation domain that can be explained by the following neutral examples, which are provided by (Brosch and Sander 2016): “(1) pleasure is good and pain is bad; mentions a positive and a negative general value (2) drugs are not good for you; refers to a relational value, “good-for” (3) this painting by Titian is beautiful; is about an aesthetic value (4) to rescue a girl is a brave action; mentions a specific value property (5) Mozart is nicer than Salieri; states a value relation (6) John is a good philosopher; is an example of an ‘attributive’ use of value predicates, as opposed to their ‘predicative’ usage in such statements as (1)”.

This following explanation of attributive and predicative practices is given by (Brosch and Sander 2015): “in the attributive usage, ‘good’ is a category modifier (“a good philosopher”, “a good knife”, etc.), but to use as a predicative, it is self-sufficient. At times, the plain grammar makes it unclear how a word was planned to be understood. Contract “x_is_a_ grey_building” with (6). In contrast to a preceding statement, (6) is not able to be interpreted conjunctively: This x_is_a_grey_building denotes it to be a building and x is grey. So, in this context “grey” was utilized predicatively. Though the phrase “John is a good philosopher” cannot require John to be good. “Good” there attributes “a philosopher”, it is not self-sufficient”.

The perspective that statement as (1)–(6) constitutes an evaluative claim is founded in the broad collection of notions about in what way those judgements vary from (purely) descriptive assertions like ‘joy is a state of mind; ‘some individuals may be drug addicts’; and ‘this picture weighs 6 kilos’. However, value assertions need to be separated out of what are known as deontic assertions, such as “You should honour your commitments” or “We must rescue her.” Though evaluative and deontic statements are compared to descriptive statements, here is a sense of action-guidingness and ’prescriptivity’ in the deontic which cannot be found in the evaluative, at least overtly. It is debatable if the latter contains an implied prescriptive character.
Though evaluative and deontic statements are compared to descriptive statements, here is a sense of action-guidingness and 'prescriptivity' in the deontic which cannot be found in the evaluative, at least overtly. It is debatable if the latter contains an implied prescriptive character. According to the so-called fitting-attitude analysis of value—FA analysis (Rabinowicz and Rønnow-Rasmussen 2004), which has garnered much attention recently, an object is valued only if it is fitting (suitable, warranted, required, etc.) for favoring. Whereas "favor" forms a placeholder for the pro-attitude, the term "fitting" refers to the analysis's normative component. As a result of this approach, value judgements might be seen as implicitly prescriptive.

Due to their lack of descriptive information, the terms 'good' and 'bad' have been dubbed thin ideas; more detailed value conceptions, on the other hand, have been dubbed thick ideas (Williams 1985). The nature of this contrast between dense and sparse evaluative notions is a point of contention.

Geach (1956) established the essential point that the predicative use of the term "excellent" is meaningless in comparison to its attributional usage. According to this interpretation, the obvious predicative usage of the form "a is good" is an incomplete expression that requires completion by specifying the category to which the item is intended to belong and within which it is deemed a typical example. Accordingly, "John is good" is a brief idea of "John is a nice person", possibly "a nice man", "The Eiffel Tower is magnificent" serves as a short idea to "The Eiffel Tower is a magnificent structure or "majestic tower", etc.

In some cases, goods with intrinsic value are in opposition to items with instrumental value, that is, objects that serve as means to another desired object. An instrumental valuable item is an example of items which is valuable not just because of their own reason, but also for the sake of another. However, the category of value created for the sake of any other is fairly broad (i.e., long, non-final value). Additionally, it encompasses so-called contributing values. An item is contributing if it has intrinsic worth as a component—if it is a necessary component of anything that gains value as a result of its presence.

The concepts of instrumental and auxiliary value are somewhat challenging. For instance, it is not self-evident that a means to an end is a justifiable end in and of itself. (Moore 1903; Lewis 1946; Rønnow-Rasmussen 2002). Indeed, FA analysis enables the distinction between basic values and true instrumental value: instrumental value is assigned to an entity when and exclusively when its usage as a means to an end is suitable. In comparison, the definition of final value FA states that an object gets final value if and only if it is suitable for it to favor it for its own reason.

Olson (2005) gave the following definition of instrumental values: "An instrumentally valuable object owes its value to the ultimate value of what it is for." But derived values do not exclude finite values, as seen in the example of the diamond ring. The final cost (in this case, the inner one) of the ring is determined by the cost of its stone. Sentimental values can also be defined in a similar way. Rønnow-Rasmussen (2011) offers an example of such values by describing an engraved donation—an inscription made on an inexpensive ring—but it is this inscription that makes the ring valuable in the eyes of its owner.
But some concepts of good or bad are not expressed by attributive words. It is enough to name the subject to induce the attitude. One of the examples is the innovations that address concept of human flight.

Human flight has always been positioned as a dream, as the goal of progress, as a symbol of freedom. Therefore, when describing technologies that allow human flight, the need to convince of the value of human flight, to describe human flight as something good, necessary, valuable, and important disappears. The connotation of the term “human flight” is already positive due to the traditional view of human civilization on the possibility of flying.

A similar attitude can be observed among survey respondents if they are asked about values. The answers will be descriptive words like “good, cheap”, as well as listing the desired objects or actions: video games on the plane, disinfection, lunch (Zervina et al. 2020).

From this it can be concluded that the intuitive connotation of many entities is of value to the majority. This is something that marketers and copywriters need to consider when promoting products. Though, (Smith 2003) Geach claimed that categories such as “state of affairs”, “event”, “thing”, etc. are too general to play the role of category-fillers in value statements: they do not provide standards that allow us to identify their exemplary representatives, the real-life usage of connotations makes marketers estimate the comprehension of consumers, not the researches.

Thus, values in studies are ordered into domains such as monistic and pluralistic, attributive and predictive, thick and thin, pleasure, economic, prudential, aesthetic, moral, instrumental—mentioning some frequently encountered.

This paper makes no conceptual distinctions and limitations of the domains of value air transport industry is interested in, as the scope of this research is to expand the number of values regardless of their belonging to different kinds.

Hackings (1999) claims that any study of concepts and categorization presupposes the obvious, but in reality, they operate only inside a current matrix and reflect a current development of scientific ideas. In the discussion part, the semantic principles of taxonomic categories are argued.

### 2.2 Value proposition

Lanning and Michaels (1988) were the first to use the phrase “value proposition” into an official paper created for the consulting firm “McKinsey and Co”. The author of this paper adopts the concept of value proposition as “a clear, simple statement of the benefits, both tangible and intangible, that the company will provide”.

Almquist in 2016 conducted a substantial step forward in value proposition theory and presented value proposition as a strategic company goal focused to differentiating values for customers. A suggested set of value was called Elements of Value (Fig. 1), where categories are based on the classic Maslow’s Hierarchy of Needs (Almquist 2016).

Äyväri et al. (2017) provide a conceptual analysis on value proposition tools to be used in future empirical research and in building managerial insight. (Guo et al. 2019) examined the fit between value proposition innovation and technological
innovation (exploitative vs explorative) for the performance of start-ups in the digital environment. They conducted an on-site survey of 285 digital startup companies in one of the biggest digital economies and discovered that exploratory innovation strengthens the beneficial effect of value proposition innovation on start-up performance, whereas exploitative innovations weaken this beneficial effect.

For obtaining a deeper understanding on a philosophical ground of values as part of a value proposition concept and based on the semantic analysis of various meanings and uses of the concepts of "value" and "value proposition", this research has

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**Fig. 1** Heuristic model of value with examples of firms with elements of value (Almquist 2016)

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**Fig. 2** Definitions of values and the detachment of value proposition concept (author)
identified the dictionary definition from which the concept of "value proposition" subsequently emerged.

Figure 2 offers a chart of value definitions according to (Merriam Webster 2021) and a derivative of a value proposition concept in 1988 from the meaning of a value as «something intrinsically valuable or desirable».

This paper differentiates between semantic context of values in modern English and applies to a value as a part of value proposition defined first by (Lanning and Michaels 1988) as “a clear, simple statement of the benefits, both tangible and intangible, that the company will provide, along with the approximate price it will charge each customer segment for those benefits”.

This research adopts the following terms in the context of value as a “statement that clearly identifies what benefits a customer will receive by purchasing a particular product or service” (Rintamäki et al. 2007): Value, Value Proposition, Customer Value, Customer Value Proposition.

### 2.3 Linguistic analysis of aviation English

To understand the directions of linguistic research in the field of aviation and investigate if value proposition in aviation has ever been explored using text-mining techniques, the author reviewed the literature and supplemented the existing large-scale study on aviation linguistics with the recent trends.

Exploring the role and usage of English in aviation, it is important to comprehend that Aviation English (AE) is influenced by a large number of regulations, guidelines and standards. The formalization of Aviation English came both from technical English, traditional for the description of the technologies and mechanisms, and as the direct instructions of international aviation organizations—International Aviation Trade Association (IATA 2021) and International Civil Aviation Organization (ICAO 2021). Organizations, researchers and practitioners using non-standard terminology have a chance to be misunderstood by stakeholders, vaguely identify their statements and potentially lose communication; language-proficient aircraft maintainers can understand and follow aircraft maintenance manuals written in English (Latitude Aero 2021); furthermore, the language strategy must fit with organization’s value proposition to customers to penetrate various markets and coordinate among them (Neeley and Kaplan 2014).

The aim of the present review is twofold: (1) to update the bibliography of research papers; (2) to explore relevant research changes related to the topic of Aviation English and reflected in the existing bibliography created by (Friginal et al. 2019) in order to investigate if value proposition in aviation has ever been explored using text-mining tools. To accomplish the above goals, the author provides an updated bibliography of 2002–2021 studies on the English language and communication in aviation. The review deals with the articles focused on Aviation English across the main scholarly databases Web of Science and Scopus. The selected most prominent papers reflect the development of Aviation English and its dominant research areas. The research papers were selected with a Hirsch index of at least 4 for at least one author according to the Semantic Scholar rating. Publishing journal’s
impact factor was also taken into consideration. To identify changes and noticeable aspects of Aviation English studies, a semantic analysis of the papers’ keywords and abstracts was implemented.

It should be mentioned that Aviation English is a specialized domain that limits amount of research. Even broadening the domain to non-technical aviation papers including linguistics, management, and marketing gives the picture of a limited number of research. In July 2021, a highly reputable Journal of Air Transport Management published a paper “Innovation and value creation in the context of aviation: a Systematic Literature Review” covering a period of 1999–2018 and reviewing 57 selected peer-reviewed publications (Pereira et al. 2021).

As the result, a completed bibliography of language research in Aviation English from 2017 to 2021 is described in Table 1. This table provides bibliographic citations of the papers, primary foci from the abstracts and keywords. The presented bibliography research updates “Language and communication in aviation: an annotated research bibliography” (Friginal et al. 2019) covering 2002–2016 related research.

To indicate the changes in the domains of Aviation English research throughout the first two decades of the twenty-first century, a table based on the semantic analysis of keywords and research abstracts was developed. Table 2 presents domains of research for 2002–2021 based on the year of publishing.

Semantic analysis of keywords shows changes in the focus of research on Aviation English for domains in 2002–2016 and 2017–2021 (Fig. 3).

In 2002–2016, most of the research on Aviation English was conducted in pilots’ communication domain—29%. 20% of papers discuss documentation in English for air transportation. 17% of researchers analysed linguistics and 15% was interested in psychology. Business issues were examined in 7% of research papers only.

The 2017–2021 period shows much more attention to business matters and linguistic aspects of aviation English—both domains gain 33% of all the research. Pilot communication creates 5% compared to 29% from the previous period. Attention towards psychology and documentation has also decreased: 15% and 20% versus 10% and 5% correspondingly. Interest for technology experienced a slight increase from 12 to 14%.

“Aviation English” is a term that is commonly used, but the detailed view shows different domains united under this term. A Google request returns 400 million results. And communication between Air Traffic Controllers (ATCs) and pilots is the aeronautical radiotelephony communication (RT) domain has been recently referred as the only area of Aviation English usage. Today, the situation has changed.

The potential explanation of this could be the following: in 2004, the first edition of ICAO Language Proficiency Requirements (LPRs) claimed that “the sole object of ICAO language proficiency requirements is aeronautical radiotelephony communications, a specialized subcategory of aviation language corresponding to a limited portion of the language uses of only two aviation professions—controllers and flight crews” (ICAO 2004). This predetermined the initial interest of researchers in communication between pilots and ground crews.
| Year | Article | Primary focus | Keywords |
|------|---------|---------------|----------|
| 2021 | Laosrirattanachai and Ruangjaroon (2021). Corpus-Based Creation of Tourism, Hotel, and Airline Business WordLists. LEARN Journal: Language Education and Acquisition Research Network, 14(1), 50–86 | A lack of technical vocabulary is a major problem for English for Specific Purposes (ESP) learners in a foreign setting. In this paper, authors argue for using word lists to help learners expand their technical lexis repertoire. Therefore, authors propose English word lists in three disciplines constructed from compiled corpora—the Tourism Business Word List (TBWL), the Hotel Business Word List (HBWL), and the Airline Business Word List (ABWL). The three word lists were derived from the vocabulary and technical terms appearing in the Tourism Business Corpus (TBC), the Hotel Business Corpus (HBC), and the Airline Business Corpus (ABC) | Corpus linguistics, hospitality word list, tourism business word list, hotel business word list, airline business word list |
| 2021 | Barakat et al. (2021). Applying deep learning models to twitter data to detect airport service quality. Journal of Air Transport Management, 91, p.102003 | This research introduces a general framework for measuring Airport Service Quality (ASQ) using passengers’ tweets about airports. The proposed framework considers tweets in any language, not just in English, to support ASQ evaluation. This work uses a large dataset including tweets in two languages (English, Arabic) from four airports. Also, to extract passenger evaluations from tweets, the framework applies two different deep learning models (CNN, LSTM) and compares their results. The two models are trained with both general data and data from the aviation performance | Sentiment analysis, Deep learning, Airport service quality ASQ, Twitter |
| Year | Article                                                                 | Primary focus                                                                                                                                                                                                                                                                                                                                 | Keywords                                                                                          |
|------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| 2020 | Bo et al. (2020). Limited interval-valued probabilistic linguistic term sets in evaluating airline service quality. Journal of the Operational Research Society, 1–17 | To avoid information loss in the normalization process of PLTSs, this paper proposes the concept called limited interval valued probabilistic linguistic term sets (l-IVPLTSs) by introducing the membership degree. First, authors present the concept of l-IVPLTSs, and provide the basic operation laws and aggregation operators for l-IVPLTSs. Then, the membership degree is determined by the deviation degree based on a programming model. Furthermore, the extended possibility degree and the PROMETHEE II method under the limited interval-valued probabilistic linguistic environment are given, based on which, the whole multi-criteria group decision making (MCGDM) process with l-IVPLTSs is presented | Limited interval-valued probabilistic linguistic term sets; possibility degree; PROMETHEE II; multi-criteria group decision making; airline service quality evaluation |
| 2020 | Hwang et al. (2020). Who will be your next customer: A machine learning approach to customer return visits in airline services. Journal of Business Research, 121, 121–126 | This study aims to estimate the probability of customers' return visits to airline services using a machine learning approach on the received feedback comments and satisfaction ratings regarding the previous usage of the service. By considering the sentimental features in the comments with seven classifiers, the results show an accuracy of 83.42% for predicting the customers’ return visits. A higher word count of feedback written by the customers can lead to a higher degree of prediction accuracy | Return visit Machine learning Review comment Airline service |
| Year | Article                                                                 | Primary focus                                                                                                                                                                                                 | Keywords                                                                                   |
|------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 2020 | Messner (2020). The impact of language proficiency on airline service satisfaction. Journal of Travel & Tourism Marketing, 37(2), 169–184 | Language assumes a key role in the dyadic interaction between service providers and customers. When the provider cannot adjust its language to customers', such that customers do not receive the service in their primary language, they may perceive the service provider as dissimilar and unsympathetic, potentially leading to critical evaluations of the service experience. Within the context of the airline industry, this study demonstrates that when customers are being served in English and English is not their primary language, language proficiency affects their satisfaction with the service. National culture is a boundary condition of this effect | Airline industry; customer service and satisfaction; English language proficiency; linguistic alignment |
| 2020 | Zervina et al. (2020b) Value Creation in Air Transportation: Beyond Price, Quality, and Speed. In Reliability and Statistics in Transportation and Communication. RelStat2020, 14–17 /10/ 2020, Riga, Latvia (p.119). Springer Nature | Primary purpose of companies is to create value; in aviation traditional dominant values are price, quality, and speed. New values are increasingly being adopted by companies to enhance their profitability and resilience. Companies delivering strong performances on more elements than competitors will attract more customers and can price higher than rivals do. In this research, authors investigate mechanisms for new values adoption. They aim at investigating value adoption by conducting annotations of 1,000 start-ups' landing pages in the field of air transport for identifying value proposition. Results have been analysed for linguistic and semantic identification: a Semantic Taxonomy of Values in Aviation as a semantic categorization was developed | Value proposition; air transportation, taxonomy, semantics |
| Year | Article | Primary focus | Keywords |
|------|---------|---------------|----------|
| 2018 | Mizufune and Katsumata (2018), November. Joint Classification Model of Topic and Polarity: Finding Satisfaction and Dissatisfaction Factors from Airport Service Review. In 2018 IEEE International Conference on Data Mining Workshops (ICDMW) (pp. 856–863). IEEE | This paper proposes a model developed based on Latent Dirichlet Allocation (LDA). It incorporates both a document dataset and the polarity of the document, for example, a positive and negative evaluation, as input data. In the empirical analysis, it was applied to international airport user reviews, in which the quality of services is evaluated. The results show that the proposed model can classify reviews into topics as effectively as the original topic model, and that its user evaluation forecasting ability is also good. Furthermore, this study examined the automatic generation of a polarity dictionary by the model | Airport service, reviews, dictionary, sentiment analysis |
| 2017 | Borowska (2017). Avialinguistics: the study of language for aviation purposes. Peter Lang GmbH | Book presents the first comprehensive description of avialinguistics. The author analyses this new interdisciplinary branch of applied linguistics that recognizes the role of language for aviation purposes. She provides an integrated approach to Aeronautical English and proffers insights into aviation discourse, discussing its current linguistic errors and providing suggestions for aviation English communication improvement | Aviation English, Applied Linguistics, Discourse Analysis |
New research objectives were initiated in the recent decades by commercialization of air transportation competition. The Chicago Convention on International Civil Aviation, adopted in 1944, introduced the bilateral frameworks of air services agreements (ASAs) between governments that have regulated international air travel ever since (ICAO Appendix 5 2021). National airlines serving routes from each region, airlines charging similar fares, and airlines sharing markets and revenues defined the international air transport market that grew. Airports were also operated by the government.

The international airline industry’s regulatory structure has been characterized by gradual deregulation of airline markets since the late 1970s. This pattern started in 1978, when the domestic market in the United States was deregulated (ICAO Appendix 5 2021). In the 1980s, the United Kingdom, Canada, Australia and New
Zealand followed the trend, culminating in the European Union’s complete legalization of airlines in April 1997 (Bieger and Wittmer 2006). As a result, airlines have greater flexibility in how they distribute their capital, both in terms of space and time. The global air transport system has become much more competitive and dynamic as a result of deregulation (Lumbroso 2019), though airports have not been liberalized to the same extent as airlines.

In the early 2000s, research keywords still reflected the regulation of the aviation industry, and its main concern was about official communication between pilots and controllers. Starting from the middle 2010s focus was moving from research of purely operational flight communications to the use of Aviation English as the language of a whole group of aviation professionals. The increase in interest in linguistic research could be explained by the collection of sufficient data for the years from the introduction of ICAO language requirements.

Value proposition was not mentioned in the reviewed research as a key word or an abstract entry. This allows to conclude that linguistic analysis of the value proposition in aviation domain is still the unmet need for the industry; this type of analysis is beneficial as it permits the automation of values identification and numerical expansion.

3 Methodology and research design

The outlines of the methodology and the research design were first presented in the conference proceedings (Zervina et al. 2020a). The authors of the research took a preliminary survey as the basis of the experiment. In that survey, participants were asked to list values they expect from the aviation industry. The next step was to identify and increase the number of values. To do this, the authors created a special website, where the same survey participants annotated 796 startup web pages for values. At the end of the experiment to determine the level of perception of values after annotation, the participants completed another survey, where they again indicated the values that they expect from aviation.

After data sets were collected, two taxonomies were constructed: Air Transport Value Taxonomy and Semantic Taxonomy of Values in Aviation. A one-word approach is adopted for constructing Semantic Taxonomy of Values in Aviation: one value–one word.

The final phase was conducting interviews with 18 respondents: 3 industry professionals and 15 students. They examined the concept of taxonomy creation and its application to the aviation sector.

3.1 Participants

To aggregate generalized insights regarding the value proposition for air transportation industry, 96 students from a transportation university were recruited. They represent a related, but yet distinct, variety of transportation-related majors: aviation
management, information technology, and logistics. The participants ranged in age from 20 to 42 years.

Numerous respondents admitted several years of working in a variety of professional jobs, counting thirteen aircraft technicians (1–15 years), fourteen participants with managerial background (1–5 years), twenty-one from computer-related field (1–5 years), and sixteen supervisors (1–7 years). The majority of respondents claimed not to be aviation professionals (79 respondents) and 65 heard of Value Proposition concept, but had not constructed one before; 35 admitted to complete some trainings that included value proposition in the education materials. Nobody identified themselves as experts in management or marketing of aviation industry.

The results of the research were presented to three experts from the aviation industry: two commercial directors of international airports and one head of the computer department of an international airline. After reviewing the research results, the experts were interviewed.

### 3.2 Procedure

The experiment consisted of five stages (Fig. 4):

A total of 796 start-ups in the domain of aviation were chosen, and their landing pages served as the research foundation for the Value Proposition study. 96 participants—undergraduate and graduate students in information technology, aviation, and management—participated in a preliminary survey, post-survey, training, and annotation of start-up landing pages. A unique webpage was established to facilitate the conduct of surveys, two-level training, and annotation. Industry specialists re-evaluated the annotation quality.

A preliminary survey is used to ascertain the degree of competence of untrained participants and to define the volume and structure of the value proposition prior to the education process. The respondents were informed of the value proposition’s fundamental premise. Following that, they were instructed to provide as many values as possible; the values should be consistent with the Air Transportation business.

After the participants were briefly (10 min short training not to interfering with the respondents’ own perception of values) told the value proposition concept, they were offered two trainings. Training 1 shows five relatively simple examples of how to determine Value Proposition on start-ups landing pages. Training 2 presents five landing pages where the Value Proposition cannot be easily identified due to its vague expression or non-standard ways to promote their start-up, e.g., video.

![Fig. 4 Procedure stages](image-url)
The participants have options to identify a landing page as not a start-up, can state that the value is very difficult to identify, and can name the page as not from the air transportation industry. Also, they are asked to click a Like button if they think this start-up clearly delivers the Value Proposition.

To conduct the survey, a webpage was created by the authors with the interface including training and survey parts as reflected in Fig. 5.

10 interviews with students were conducted online on a chat platform, five student respondents were interviewed face-to-face, and three industry experts were interviewed face-to-face. Interviews with students were conducted to validate how smoothly the annotation process went. Interviews with industry experts aimed to receive valuable perspective on the research results.

3.3 Taxonomy development approach

Two taxonomies have been developed based on the received data: Air Transport Value Taxonomy and Semantic Taxonomy of Values in Aviation.

3.3.1 Air transport value taxonomy

Air Transport Value Taxonomy was developed on the Pre-Survey data. The aim of a preliminary survey was:

- to collect data on expected values from aviation domain
- to understand the level of expertise for non-trained on start-ups participants
- to determine value proposition volume and structure before the education process
- to receive data on the respondents’ perception and wording on values
The respondents were told about the basic concept of value proposition. Also, they were given some examples of Value Proposition such as typical ones: affordability, quality, speed; less typical: eco-friendliness. After that they were asked to list as many values as they can, that they expect to be provided by the Air Transportation industry.

To evaluate comprehensiveness and contextual factors, the author adopted empirical-to-conceptual approach (Nickerson et al. 2013): if the researcher has little understanding of the domain but significant data about the objects is available, then starting with the empirical-to-conceptual approach is appropriate, that is shown in Fig. 6:

Following the empirical-to-conceptual approach, the author identified a subset of objects (terms) that wished to classify: e.g., low priced, friendly, multiple destinations, Wi-Fi on board. These objects were value propositions from the surveys. Next, the author identified common characteristics of these objects. The characteristics were logical consequences of the meta-characteristic. Thus, the authors started with the meta-characteristic and identified characteristics of the objects that follow from the meta-characteristic. Once a set of characteristics had been identified, they were grouped formally using statistical techniques. The resulting groups formed the initial dimensions of the taxonomy.
3.3.2 Semantic taxonomy of values in aviation

Language is inevitably and inextricably a fundamental component of business-to-customer communication. The effectiveness of this communications depends greatly on the correct usage of words semantics i.e., the meaning of the word. To address this concept, the authors choose semantic tactic for the developing of Semantic Taxonomy of Values in Aviation.

As stated by Famer and Mairal Usón (1999), semantic theory proposes: a group of words with interrelated meanings can be categorized under a larger conceptual domain. This entire entity is thereby known as a semantic field or a semantic domain.

To analyze the semantic domain of Values in Aviation, the NarraText generic/global taxonomy (NarraText 2015) was adapted (Fig. 7). The NarraText generic/global taxonomy is designed to provide a near-comprehensive generic taxonomy that can be applied to the lexicon of any domain:

The analysis of the Twitter profiles’ annotation of aviation domain start-ups shows that more than 50% of all the values identified can be captured by one word (Zervina et al. 2021). The one-word approach to value identification is beneficial as it provides simplification and efficiency. It allows for a more fine-grained analysis; e.g., a phrase individual entertainment can be annotated as a two-word value or one-word value. Even as a two-word value, authors provide its analysis as a conjunctive one-word approach: each word makes sense as a value, but as a phrase it is more specific and provides possibilities for constructing a hierarchical model. The hierarchy is based on an attributive expression. In grammar, an attributive expression was determined by (Bolinger 1967) as a word or phrase that modifies the head noun, e.g., in individual entertainment the word individual

![Fig. 7 NarraText generic/global taxonomy (2015)](image-url)
is an attributive word. It could be *individual entertainment, seat, approach, glass or responsibility*, though *individual* provides value to those nouns. Alternatively, a phrase *cheap flight* creates one value—*cheap*, reflecting the idea of affordable air transportation since the word *flight* is very general in the aviation domain. In this way, the authors consider a phrase *cheap flight* delivering one value—*cheap* and omit the word *flight*.

A one-word approach to value identification and expansion algorithm was adopted for constructing Semantic Taxonomy of Values in Aviation. The taxonomy was developed according to the proposition: one value—one word.

### 3.3.3 Comparison with IATA Airline taxonomy

To analyse industry best practices of categorization, the author performed a search of relevant classifications through the industry. IATA Airline taxonomy is the only widely known classification of aviation industry offerings to customers.

Constructed Air Transport Value Taxonomy and Semantic Taxonomy of Values in Aviation were compared with IATA Airline Taxonomy both quantitatively and qualitatively.

The IATA Airline Taxonomy (2019) is a code-set (Table 3) managed by Airlines through the Standards Settings Governance. The Airline Taxonomy is a shared language for Airlines to describe their products and services to Sellers and a way for Sellers to optionally request specific features in an Offer. It was adopted in October 2019 and according to the experts’ it is yet not of common usage by airlines.

Airline Taxonomy (AT) offers 4 major categories: Ground, Airport, Journey, and Flight and 108 basic level terms. Here is a top-down approach of IATA where taxonomy was created by a governing body and an operational focus of IATA for standardizing the descriptions and contexts of products and services. AT does not provide any weight for its categories, as it offers a universal approach to enlisting all existing product and services experts accounted, as it stated in AT Codeset in Table 3.

| Taxonomy ID | Parent ID | Name       | Description                                      |
|-------------|-----------|------------|--------------------------------------------------|
| 0000        |           | Airline    |                                                  |
| 0064        | 0000      | Flight     | Any Product or Service related to a Flight       |
| 00C8        | 0064      | Servicing  | Any Product or Service related to Servicing      |
| 012C        | 00C8      | Change     | Any Product or Service relating to Change        |
| 0190        | 00C8      | Refund     | Any Product or Service relating to Refund        |
4 Results

The obtained results include: significant expansion of number of values in air transportation domain; a unique corpus of values in air transportation has been created; identified values were organized by the means of taxonomies from the viewpoints of customers and operators. A baseline model was created for automatic identifying values in the text.

4.1 Values expansion and organization

Expansion of values number was detected comparing with the numbers found in the literature. Typical number of values in aviation does not exceed 5 values: speed, Fig. 8 Air Transport Value Taxonomy (Zervina et al. 2020b)
cost, comfort, safety, security. This research significantly expanded the number of values: 241 values from Pre-Survey data and 201 value from Annotation data.

Corpus of values has been created based on texts of Start-ups in aviation domain. This corpus is annotated for values recognition. Corpus consists of 796 start-ups landing pages and 14,923 annotations of value.

Two value taxonomies were developed: Air Transport Value Taxonomy and Semantic Taxonomy of Values in Aviation:

1. **Air Transport Value Taxonomy.** This taxonomy is developed from Pre-Survey data and is organized from the customer’s viewpoint as reflected in Fig. 8. The first edition of this taxonomy was presented in the conference proceedings (Zervina et al. 2020b).

   The taxonomy was modelled as a tree diagram. A term in the taxonomy is either an object term (e.g., seat), or an attitude term (e.g., friendly), or an approach term (e.g., no child on board, save time). Taxonomy groups of all levels contain all types of terms and are united by the same concept. Differentiating object terms from approach or attitude terms is natural in this taxonomy and does not influence on the concepts.

   Taxonomic classes, divisions, subdivisions, and categories (Fig. 9) were developed from the 241 values describing activities, procedures, objects, emotional experience and considering the context in which they could be possibly associated with in air transportation.

   By analyzing the terms and the context, five taxonomic classes, one subclass, three divisions, and eighteen categories have been developed. Each of the 241 lowest level terms fits into at least 1 taxonomic group. However, many of them belong
into more than one taxonomic group. Categories are not mutually exclusive. The grouping design is provided in Fig. 9.

Every group and each term present a number of people that name this value / group of values. The most frequent terms are:

speed 71; safety 60; comfort 53. The weight of each group is a sum of its components. The biggest group is Service with 356 and the smallest one is Ecology with 31. Terms that could belong to several classes are noted with a bullet of a corresponding class color.

2. Semantic Taxonomy of Values in Aviation. This taxonomy was developed on data from value annotation of aviation domain start-ups and presented by Fig. 10. It is organized from the operational viewpoint.

The first edition of the taxonomy was presented at conference proceedings (Zervina et al. 2020b). The authors modelled the Semantic Taxonomy of Values in Aviation as a tree diagram. A term in the taxonomy is either a noun term (e.g., seat), or an adjective/adverb term (e.g., private/fully), or a verb/participle term (e.g., no child on board, save time). Taxonomic groups of all levels are not tied to specific parts of speech and are united by the same semantic concept.

Differentiating object terms from activities or feature terms is intuitive in the taxonomy and does not influence the concepts. Categories are not collapsed by excluding partial synonyms as to preserve semantic difference might be important for marketers and customer service. Taxonomic classes and subclasses were developed from the 196 values describing activities, procedures, objects, emotional experience and considering the context in which they could be possibly associated with in air transportation. By analyzing the terms and the context, seven taxonomic classes and six subclasses have been developed. Each of the 196 lowest level terms fits into at least 1 taxonomic group. However, many of
them belong into more than one taxonomic group. Categories are not mutually exclusive, but this taxonomy is not aimed to provide overlapping semantic clustering.

Every group and each term present a number of people that name this value. The most frequent terms (stop words excluded) are: high (215); cost (160); simple (53). The weight of each group is a sum of its components. The biggest group is Attributes with 2455 and the smallest one is Status / Occupation (People) with 203.

### 4.2 IATA and value taxonomies

IATA Airline Taxonomy was proposed in 2019 and is the only known taxonomy in aviation domain aimed at categorizing offerings in aviation. Comparing the IATA taxonomy with the value-based taxonomies separates the scope of each of them. Comparison of specific categories is also a benefit (Bove 2002), highlighting the difference in approaches between the values assumed by the industry and the values that are expected (as in the Taxonomy of Values) or identified from

| IATA Taxonomy 1st level categories | VP Taxonomy 2nd level cat. | IATA Taxonomy 2nd level cat. | VP Taxonomy 2–4th level cat. |
|-----------------------------------|---------------------------|-----------------------------|-----------------------------|
| Ground Journey                    | Service                   | Meal                        | Comfort                     |
| Flight Airport                    | Affordability             | Beverage                    | Pax Environment             |
|                                  | Flight                    | Medical Equipment           | Mobility                    |
|                                  | Ecology                   | Escort                      | Ease of Use                 |
|                                  | Health&Safety             | Loyalty                     | Flexibility                 |
|                                  |                           | Upgrades                    | Functionality               |
|                                  |                           | Charity                     | Restrictions                |
|                                  |                           | Purchases                   | Necessary Things            |
|                                  |                           | Cabin Baggage               | Communication               |
|                                  |                           | Checked Baggage             | Attitude                    |
|                                  |                           | Seat                        | Approach                    |
|                                  |                           | Assistance                  | Special Treat               |
|                                  |                           | Lounge                      | Entertainment&Pleasure      |
|                                  |                           | Terminal                    | Gaming&Multimedia           |
|                                  |                           | Check In                    | Interior                    |
|                                  |                           | Boarding                    | Aircraft                    |
|                                  |                           | Security                    | Directions                  |
|                                  |                           | Medical                     | Health                      |
|                                  |                           | Escort                      | Safety                      |
|                                  |                           | Transport                   |                            |
|                                  |                           | Parking                     |                            |
|                                  |                           | Accommodation               |                            |
|                                  |                           | Insurance                   |                            |
|                                  |                           | Visa Services               |                            |
|                                  |                           | Book and Hold               |                            |

Total: 4 5 5 26 19
those proposed (as in the Semantic Taxonomy). The comparison results were first presented in proceeding (Zervina and Rubens 2021).

The author compared IATA Airline Taxonomy and Value Proposition in Air Transportation Taxonomy looking at numerical data in categories. Results are shown in Table 4.

There is an overlap with IATA taxonomy: categories are partially overlapping, but terms are different. This can facilitate industry implementation, as categories are quite familiar from previous taxonomies. So, it requires less department coordination.

Authors aim at developing VP taxonomy with the following important differentiations: customer-centric bottom-up development via customer questionnaires and interviews (versus top-down approach of IATA where taxonomy was created by a governing body), focusing on innovation and value (vs operational focus of IATA of standardizing the descriptions and contexts of products and services of multiple providers). Authors show that VP taxonomy is conductive to identifying novel innovation opportunities, which could then be integrated into existing operations by being aligned with the IATA’s taxonomy.

5 Discussion

The problem posed by this research was the potential to automate the identification of values and thus facilitate it and expand the number of values. Questions about the types of values, the principles and completeness of their categorizations remain open, but the baseline was established.

Taxonomies were developed based on semantic principles of constructing categories. Some of the presented classificatory categories and practices though they may appear inevitable are actually as (Hacking 1999) stated contingent and relative to the practice of classification in the context of social institutions and norms. As an example, the idea of entertainment during air travel seems to be constructed by marketers, however, according to (Hacking 1999), some constructed categories reflect real divisions, and so no need to be constructivists in the strong sense. Air Transport Value Taxonomy offers a separate category named “Entertainment & Pleasure” with 32 identified values. Thus, it supports the idea of a real-life requirement for this category as the taxonomy was developed based on a survey data set.

There is still room to distinguish between constructed kinds that reflect real categories and those that do not. Human beings start to present extra worries when evaluating the naturalness of their human kinds. That way there is a place for a question if the value, for example, of eco-friendliness is a human kind or a natural kind from the given world. And if it is possible to educate consumers to feel the necessity of proposed values.

Kinds in the social sciences, such as economics or sociology, are problematic, since the changing norms and practices of individuals and societies may also be held to be constitutive factors in kind membership, and these norms and practices may themselves respond to the classification of people into kinds (Stanford Encyclopedia of Philosophy 2017). That way, evaluation of taxonomy’s utility is difficult,
since there isn’t a recognized standard criterion. However, Wiegmann and Shappell (2005) have suggested that for an error check framework for taxonomies to be successful it should be able to satisfy the following main requirements or product criteria among others:

**Comprehensiveness.** For any given taxonomy, it is important to consider whether the framework is able to cover all of the relevant variables that it purports to cover. In the current context, this means that it should cover all the relevant categories related to the individual error event and its surrounding context. It also important that the framework is able to analyse both normal and abnormal situations since important lessons about error management might be obtained by not only focusing on critical events, but also normal everyday events where most errors are prevented from developing into serious consequences (Helmreich et al. 2001). Even though it is important that the framework is able to capture all relevant categories it is at the same time also important to avoid irrelevant categories (Wiegmann and Shappell 2002). The proposed taxonomies were revised by industry experts to align researchers’ categorization skills with practitioners’ expertise.

**Contextual factors.** Since errors and their capture do not happen in a vacuum but in the interaction between people and the general work environment—including the technological, psychosocial and organisational context—it is critical that the framework is able to capture the dominant characteristics of the context that affects performance (Kim and Elder 2011). The proposed taxonomies offer some terms to belong to different groups considering the potential context.

### 5.1 COVID-19 impact

Comparing results from pre/post survey gave the author a unique opportunity to see how the external factor (COVID-19) influenced the value adoption. Surprisingly, the results show that recent dramatic change in circumstances (COVID-19) has little affected the participants’ general idea on value proposition in air transportation; in particular health value was not explicitly mentioned (eight terms were named) and seems to have been simply accepted as a “new reality”. The hypothesis is that it is due to overly positive view (such as happened after WWII—baby boomers; art, style, and culture dramatic liberalization). However, the sampling is biased to participants that closely related to transportation area as well as age (millennials); this might not generalize to wider population and e.g., the overly negative reaction might be possible as was the case after WWI reflected in the phenomena like Lost Generation or Dadaism.

### 5.2 Industry experts on taxonomies

Three air transportation industry experts of a high level of expertise, two commercial directors of international airports and one IT head manager of the major airline, were asked to compare the developed Value Proposition taxonomy with IATA Airline taxonomy. They also shared their ideas about the way taxonomies can be
useful for industry and COVID-19 surprisingly little significance from respondents in April, 2020. Below there is a summary of the experts’ review:

**IATA and Value Proposition taxonomies difference.** Value Proposition taxonomy focuses on innovative values, reflects consumers’ requests for new technologies and attributes like speed, super-sonic, unmanned. IATA taxonomy is more conservative. Also, IATA AT offers top-down approach where taxonomy was created by a governing body and reflects the aviation industry ideas on products and services, while Value Proposition is created using bottom driven approach asking what consumers’ wants and needs are.

**COVID-19 and consumers’ expectations.** Experts admit that the inertia plays a great role in such conservative industries as air transportation. Consumers may still not realize their expectations for health issues. Also, little attention towards COVID-19 could be due to the well-known fact that in a pandemic, all industry participants (airports, airlines, handling companies, etc.) give priority attention to the safety issues for the health of passengers and employees; therefore, by all passengers / clients (including respondents), this is already taken for granted (the must) and is no longer perceived as a value (added value).

**Benefits for the industry.** These taxonomies are extremely useful for the following purposes: to understand the essence and systematization of services/services, to formulate KPIs by directions, to distribute areas of responsibility between all the links in the value chain. Also, the unexpected finds and formulations of values that were not previously in sight are of great interest for marketers. Good perspective can be seen in using VP taxonomy in Project Management.

### 5.3 Value shift

Value shift is one of the mainstream trends in today’s economy. A commitment to sustainability calls for paying more attention to the environment protection and low resources consumption, as well as strong human rights standards set the course for diversification and tolerance.

Automation of value identification and expansion utilises startups as a source of data. The novel startup values allow to investigate if consumers’ demand for the industry represent what (Schwartz 2012) called universalism value? Recent shifts in values, supported by United Nations, away from entertainment and toward social responsibility, from consumerism to eco-friendliness, and away from one-day-objectives toward sustainability turn researchers toward the discussion of humans as rational agents. One of this research aims is to explore how and to what extent value shift from individual to group values is reflected in the values consumers expect from the air transportation industry.

The semantic analysis of values disclosed by Air Transport Value Taxonomy that group values consist 4.5% of all the values which is reflected in Table 5.

Despite the fact that the majority of respondents were young people who are defined by their preaching of values such as concern for society, minorities, and the environment, the percentage of respondents who shared group values was rather low. Of course, one may argue that this proportion is greater than zero. However,
Table 5 Individual and Group values

Air Transport Value Taxonomy

| Good-for-you (individual) values | Good-for-all (group) values |
|----------------------------------|-----------------------------|
| Examples:                        | 1. eco-friendliness 22      |
| Private 7                        | 2. low-emissions 1          |
| Flexibility 6                    | 3. co2-friendly 1           |
| Customizability 2                | 4. small emission 1         |
| Adjustable                       | 5. a commitment to sustainability and to acting in an environmentally friendly way 1 |
| Worldwide 5                      | 6. environment friendly 1   |
| Accessibility 2                  | 7. less air pollution 1     |
| 24/7 1                           | 8. green 1                  |
| Transfer 2                       | 9. minimum fuel consumption 1 |
| Customer Management 1            | 10. fuel efficient 1        |
| Check-In Skips 1                 | 11. zero-fuel aircraft 1    |
| Clean Airplane 1                 | 12. fuel capacity 1         |
| Automate Customer Service 1      | 13. socially friendly 1     |
| Treat Customers 1                | 14. LGBT friendly 1         |
| Without Fanaticism 1             |                             |
| Less Formality 1                 | Total: 35 values            |
| Minimum Time Passage 1           |                             |
| Total: 747 values                |                             |

Fig. 11 Value orientations reported by left-wing, center-neutral, and right-wing participants for themselves (Gluck et al. 2019)
there has been no research into aviation values, and so there is no possibility to com-
pare it against.

But if to consider more general studies and pay attention to universalism—under-
standing, appreciation, tolerance, and protection for the welfare of all people and
for nature (Schwartz 2012)—then the results of these studies indicate the modest
role of group values (universal) for respondents. For instance, in 2019 160 Austrian
university students reported their political orientation and completed a value survey
for themselves (Gluck et al. 2019). Figure 11 provides the results of the survey with
universalism included.

Despite the different survey methods and specific (aviation) versus general (self)
domain, the results were similar. The difference in survey methodology underscores
the importance of similar findings. In the case of a survey of the values expected
from aviation, the respondents themselves formulated the values, not referring them
to one or another semantic category previously formulated by the interviewers, for
example, “ecology”. Therefore, the respondents could not form an opinion under the
influence of the names of the categories. They might not mention group values at
all.

In the case of a survey of Austrian students in 2019, respondents expressed in
advance their attitude to the already formulated values, one of which was universal-
ism. What could have influenced their choice of answers, made them think about
how to evaluate socially approved concepts.

Perhaps the value shift from individual to group values is not yet so obvious. The
following studies can be aimed at elucidating the dynamics of the transition from
individual values to group values: is such dynamics really traced and how it will
manifest itself in the future.

Due to the reason that various industries use different terminology and may have
varying foci, the use of the obtained data is limited by air transportation industry.
This limitation is applicable to particular data and their categorizations. However,
this restriction does not apply to the process for automated value identification.
This method is applicable to all industries. Additionally, the data collected can be
used in linked transportation industries due to the similar nature of the customer
expectations.

6 Conclusion

This paper’s goal was to develop a mechanism of automated value identification and
expansion. As creating values is a primary task for any business entity, automation
of value search around the industry is beneficial for the companies.

To achieve this goal, the author conducted the following tasks:

• literature reviews on linguistic approaches in Aviation English and on values as a
  part of value proposition
• a survey with open-ended questions to gain a deeper understanding of value per-
  ception
• value corpus construction and annotation by quantitively extracting wide variety of values from data
• value assignment as a synonyms map to a single concept
• value representation: one-word approach, semantic and lexical analyses
• values were organized into taxonomies for categorization and hierarchically structuring purposes

As a result, two taxonomies—Air Transport Value Taxonomy and Semantic Taxonomy of values in aviation were constructed reflecting customer and operational perspectives correspondingly. Different perspectives were achieved due to different methods of data collection: a value survey for the consumer approach and a value annotation of the texts of start-up pages—for the operational one.

The discussion section proposes to consider the categories of values in the context of modern ideas about the social matrix. Also, this section expresses views on the marginal impact of the covid pandemic on values in aviation. It also expresses the opinion that despite global trends and the efforts of social trend-setting organizations like UN to promote sustainable group values, this study did not confirm the demand for such values in the eyes of consumers and the aviation industry.

Proposed taxonomies make value navigation an easier task. Strategy makers, marketers, and industry analysts can utilize value categorization for business or research purpose.

Automation of value identification and expansion is a novel task that has never been addressed before. This paper proposes a baseline for it. The ability to operationalize rapid identification and adoption of new values allows corporations not only to improve profitability, but even to become resilient to unexpected external factors that suddenly impose new values.

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**References**

ADREP (2013) International Civil Aviation Organisation. 2013 taxonomy, (2013). Available from: http://www.icao.int/safety/airnavigation/AIG/Pages/ADREP-Taxonomies.aspx

Almquist E (2016) "The Elements of Value", Harvard Business Review, pp. 46–53 (2016)

Aviation Benefits Report (2019) Online at: https://www.icao.int/sustainability/Documents/AVIATION-BENEFITS-2019-web.pdf

Äyväri A, Jyrämä A (2017) Value proposition tools for living labs. J Service Theory Pract 27(5):1024–1039

Barakat H, Yeniterzi R, Martín-Domingo L (2021) Applying deep learning models to twitter data to detect airport service quality. J Air Transp Manag 91:102003
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