

THE FUTURE OF AVIATION: ATTRACTING STUDENTS AND YOUNG PROFESSIONALS

Case: Maritime Industry Project Competition by SeaFocus Oy

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Elza Ken

Abstract

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Title of publication The Future of Aviation: Attracting Students and Young Professionals Case: Maritime Industry Project Competition by SeaFocus Oy		
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Abstract <p>In the modern globalized economy, aviation and aerospace are a vibrant sector that cultivates economic growth through job creation, technical innovation in daily operation, and environmental stewardship throughout its entire value chain, from inbound logistics to service. Recent studies foretell a booming demand for air transport, which should have a favorable impact on the job market. And yet, it inflames the already existing deficiency in skilled aviation professionals, mostly because students and young professionals do not find a career in aviation and aerospace appealing. The thesis aims to ascertain whether scaling up the adoption of the Intelligence Hunt, a maritime industry project competition, will attract the next generations to aviation and aerospace. It also aims to identify factors restraining students and young professionals from following a career path in aviation and aerospace.</p> <p>The thesis uses deductive inference and mixed methods research. Data collection relies on primary and secondary sources of data. The secondary data is collected from books, electronic articles, industry forecasts of personnel demand, and aviation research reports and statistics. The primary source is a survey questionnaire, which was applied for answering research questions. The findings are based on 92 valid responses.</p> <p>The main research findings point to a lack of awareness of career opportunities in aviation and aerospace and a lack of basic understanding of the industry. Research finds that one of the culprits behind asymmetric information between prospective employees and the industry is education systems. The results are in line with the theoretical framework.</p>		
Keywords Aviation, Aerospace, Skill Shortage, Economics, Students and Young Professionals, Project Development		

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ABBREVIATIONS

GDP – Gross Domestic Product

CO₂ – Carbon Dioxide

IATA – the International Air Transport Association

ICAO – the International Civil Aviation Organization

SARPs – Standards and Recommended Practices

NGAP – the Next Generation of Aviation Professionals

ATCO – Air Traffic Controllers

ATSEP – Air Traffic Safety Electronic Personnel

STEM – Science, Technology, Engineering and Mathematics

UNESCO – the United Nations Educational, Scientific and Cultural Organization

MR Technologies – Mixed Reality Technologies

NGAP/2 – Second ICAO NGAP Global Summit

ALICANTO – the International Association of Aviation and Aerospace Education

ACI – the Airports Council International

YAPP – Young Aviation Professionals Program

GAT – Global Aviation Training

ITQI – IATA Training & Qualification Initiative

1 INTRODUCTION

The introductory chapter aims to familiarize the reader with the research topic. More specifically, it starts with the background study, a section devoted to the significance of the research and the author's motivation, followed by a description of thesis objectives, research questions, and possible limitations. Thereafter, theories that have laid the groundwork for this thesis are presented in the theoretical framework. Theory development and research design are defined afterward. The overall thesis structure is outlined at the end of the chapter.

1.1 Research Background

The aviation sector plays a decisive role in the global economy and its prosperity, upholds social development, and significantly contributes to the reduction of environmental impacts. Multiple examples can demonstrate the scope of industry effects on the quality of life.

According to estimates by Oxford Economics and World Bank (as cited in ATAG 2016, 5), the total economic impact of the aviation industry had reached USD 2.7 trillion in 2014, equivalent to 3.5% of world gross domestic product. The aviation industry supports 62.7 million jobs worldwide (Oxford Economics analysis, as cited in ATAG 2016, 4). Figure 1 portrays a snapshot of the composition of employment in aviation and GDP impact in 2014. Direct jobs involve airports, airlines, air navigation service providers, and the civil aerospace sector. Indirect jobs include supply chain activities linked to the air transport industry, for example, airport construction companies, aircraft component suppliers, manufacturing companies selling their goods in airport retail stores. Induced jobs signify the spending of directly or indirectly employed in aviation on the private consumption of goods and services. (ATAG 2016, 14.) Moreover, aviation is a trade and e-commerce facilitator that allows the globalization of production. Its speed and reliability enable transportation of high-value, fragile, and perishable commodities. (IHLG 2017, 23-24.) In 2017, the total volume of the cargo carried by air was 53.9 million tons of goods worth USD 5.6 trillion, representing approximately 35% of world trade by value (IATA 2018, 48).

For the social benefits, air transport is a lifeline to access sustainable livelihoods, safe communities, health and humanitarian aid, educational opportunities, travel and leisure, et cetera. Aviation promotes social integration and inclusion of all vulnerable groups, migrant communities, and people living in remote and low-density rural areas. (UN 2016, 12; IHLG 2017, 30-31.)

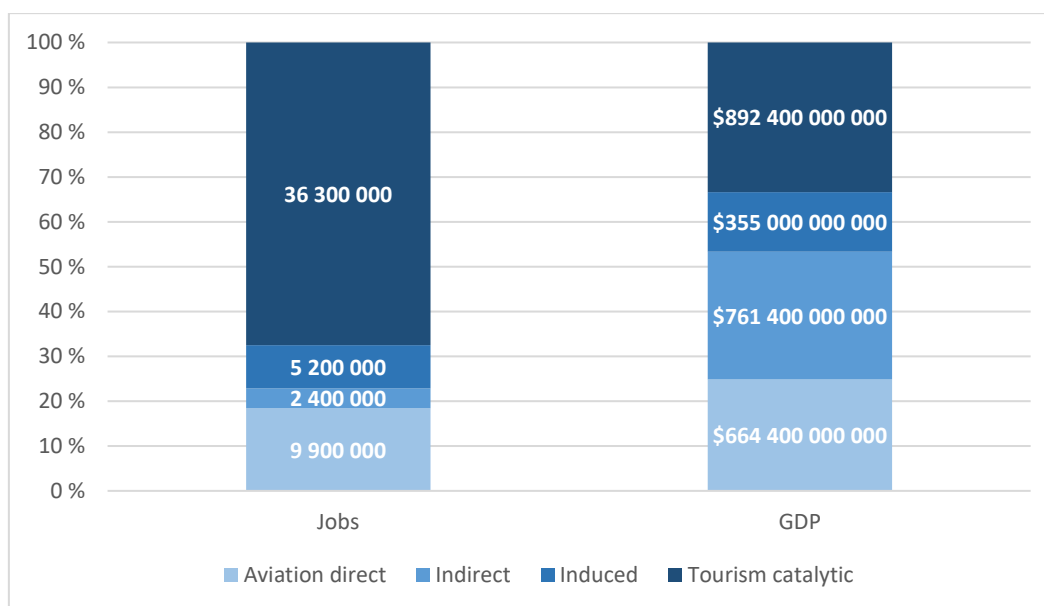


Figure 1 Aviation's global employment and GDP impact, 2014 (based on Oxford Economics, as cited in ATAG 2016, 4)

The thriving aviation sector continues to push for accelerated progress in fulfilling its commitments for carbon-neutral growth from 2020 and a 50% cut in carbon footprint by 2050, as compared with 2005. The industry is persistent in sustainable aviation fuel deployment, with an annual average rate of the fuel efficiency of 1.5% until 2020. (IATA 2018, 42-43.) What is more, airlines pledged to help eradicate illegal wildlife trafficking (IATA 2018, 44). In accordance with the figures provided by the International Air Transport Association (IATA Economics, as cited in ATAG 2016, 7) for 2015, airline operation produced under 2% of the total carbon dioxide emissions from human activities. Approximately 80% of CO₂ is emitted from long-haul flights of more than 1,500 kilometers, for which there is no substitute for transport modes (ATAG 2016, 7).

Aviation is a highly cyclical industry that heavily influenced by and sensitive to business cycles. Thus, its growth relates to global economic conditions. For years the aviation sector has been characterized by skills shortages and surpluses as passenger demand has fluctuated in a cyclical pattern. (Australian Government 2018, 2.) The outlook for the upcoming decades is promising. Nevertheless, there is economic hardship on the way. The latest update to IATA's 20-Year Air Passenger Forecast shows that the current numbers of passengers could double to 8.2 billion by 2037 (IATA 2018). Within the same period of time, Boeing has predicted that global demand for additional pilots and technicians will exceed 1.5 million, including 754,000 new aviation maintenance technicians and 790,000 new pilots (Boeing 2018). The projected expansion and renovation of the global aircraft fleet (Figure 2) are being jeopardized by a shortage of qualified aerospace engineers. An aging global

population is partly the reason for that. The record number of maintenance, repair, and overhaul technicians will be eligible to retire by 2027. (Prentice, Costanza & Smiley 2017, 2-4.) Hence, the next generation has an opportunity to enter the workforce and fill job openings. Nonetheless, the shortfall remains. This is due to the fact that high school students deciding on their career preferences, students pursuing a specific major or undertaking further studies, recent graduates, and young professionals do not choose career paths in the aviation and aerospace industry anymore (ICAO 2009, 4; Johnson 2018). The sector will face unprecedented hurdles if the situation continues to worsen.

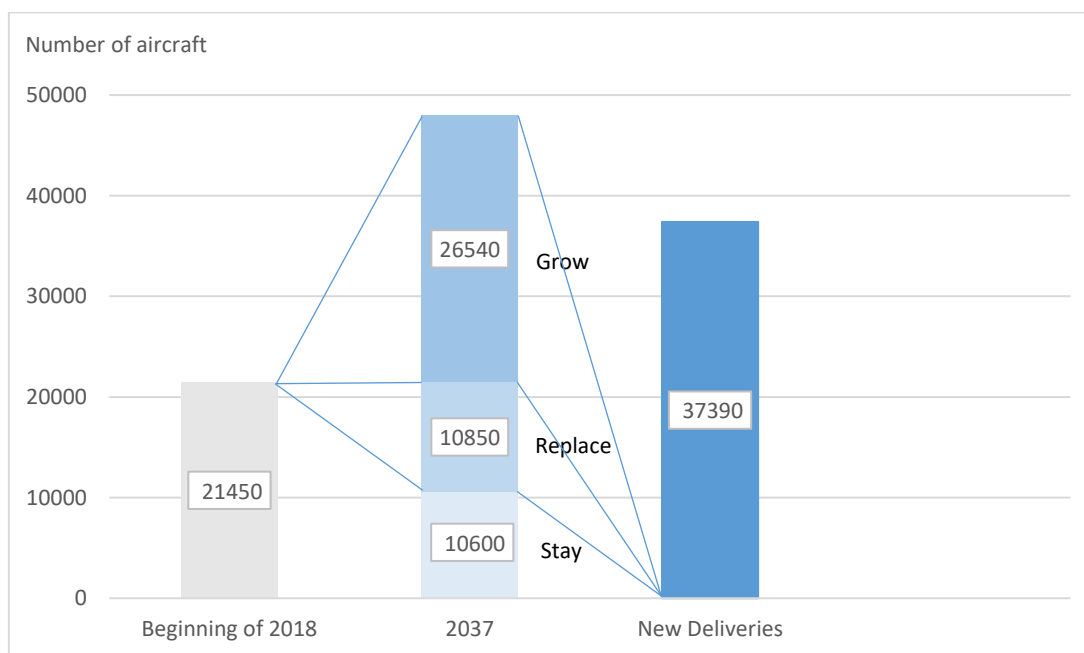


Figure 2 Projected fleet revitalization (based on Airbus 2018, 6)

The thesis was commissioned by a Finland-based executive maritime business platform, SeaFocus Oy, that addresses the actual and emerging issues facing the shipping industry. It brings to the table in-depth knowledge of the dynamic maritime supply chain, equips offshore and marine sectors with the readiness for change and many uncertainties. 2017 became the year of launching a pilot series of the Intelligence Hunt project, an international business case competition created by SeaFocus. The main purpose of the Intelligence Hunt is to connect businesses with talented students by bringing them to work together on real-life cases. This initiative tackles the challenges of fueling an interest in the maritime industry and enables individuals pursuing maritime career-oriented education to differentiate themselves in the job market.

Due to the nature of the Intelligence Hunt and its direct relevance to the problems raised in the aviation sector, the company's management and the author have brought together the research topic idea of expanding the talent pool in the aviation and aerospace industry

through adopting and scaling up a maritime industry project competition. Research endeavors commence with topics and areas of interest based on an author's insights and experience (Newman & Benz 1998, 22; Gummesson 2000, 57). The author of this thesis is a trainee at SeaFocus and a previous finalist of the second and fourth Intelligence Hunts. Knowing a system view of the project inside out gives the advantage to deliver superior value to the commissioning company and stimulate further discussions.

1.2 Thesis Objectives, Research Questions and Limitations

Research objectives constitute the purpose of a research study and closely correspond to research questions. Besides, research objectives provide evidence of a researcher's clear sense of purpose and direction (Saunders, Lewis & Thornhill 2009, 34). In other words, objectives serve as an accurate description of specific steps that need to be taken to achieve intended outcomes. Research objectives are a critical part of a research paper, and they must be exceptionally well-written – succinctly and to the point (Bloomberg & Volpe 2018, 128-129). It ensures that research questions will be unambiguously stated, which is why research objectives precede research questions in this thesis.

The main objective of this study is to ascertain whether scaling up the adoption of a maritime industry project competition will captivate and escalate students' and young professionals' curiosity for the aviation and aerospace sector, and by doing so, alleviate skills shortages.

The statement implies the following key elements for building robust research:

1. Give a definition of a skill shortage.
2. Determine factors hindering students and young professionals from making a career choice in favor of aviation and aerospace.
3. Investigate various actions that have been carried out by different organizations to integrate students and young professionals to refer to the anticipated shortage of aviation specialists.
4. Identify necessary alterations to bring a maritime industry project competition to life in aviation and aerospace.

Objective formulations have led to developing the main research question as follows:

Will scaling up the adoption of a maritime industry project competition attract more students and young professionals to the aviation and aerospace industry?

There are two forms of research questions: a central question and associated sub-questions. The central question is a broad question posed to observe the phenomenon under

study. (Creswell & Creswell 2017, 129.) The precision in a primary research question is one of the essential determinants for research success (Saunders, Lewis & Thornhill 2009, 32).

Constructing one general focus research question is a good starting point in the writing process. However, it lacks the focal points of research that sub-questions provide. (Saunders, Lewis & Thornhill 2009, 33-34.)

As mentioned at the beginning of this chapter, research objectives are strongly correlated with research questions. Therefore, research sub-questions and commensurate research objectives are organized in the following manner:

1. SubQ1: What is a skill shortage?

Objective: Give a definition of a skill shortage.

2. SubQ2: What are the factors obstructing intentions among students and young professionals from making a career choice in favor of the aviation and aerospace sector?

Objective: Determine factors hindering students and young professionals from making a career choice in favor of aviation and aerospace.

3. SubQ3: What efforts have been made by different organizations to integrate students and young professionals to refer to the anticipated shortage of aviation specialists?

Objective: Investigate various actions that have been carried out by different organizations to integrate students and young professionals to refer to the anticipated shortage of aviation specialists.

4. SubQ4: What kind of modifications should be made to bring the maritime industry project competition in question to life in aviation and aerospace?

Objective: Identify necessary alterations to bring a maritime industry project competition to life in aviation and aerospace.

Naturally, every research paper has its limitations. The limitations segment does not undermine research strivings. On the contrary, it demonstrates to what extent the study findings and conclusions can be said to be true. (Saunders, Lewis & Thornhill 2009, 538.)

The limitation in this research concerns aviation industry-specific application: it does not generalize knowledge nor appear as a source of relevant information for all industries. Consequently, the results from the empirical research, recommendations, and suggestions may not be pertinent to other industries. These are exclusively offered to the case company and

may not contain a correct solution for other businesses. However, the study provides valid and reliable information for the case company. It guides its management to understanding how aviation and aerospace can awaken an interest in students and young professionals by scaling up the adoption of the case company's project competition.

1.3 Theoretical Framework

The importance of a theoretical framework lies in an initial analytical exploration of subject-area knowledge and deepening the essence of a study (Saunders, Lewis & Thornhill 2009, 490; Maxwell 2012, 48-66). Theory informs research objectives and research questions by yielding concepts to delve into and a set of variables to test. The relevance level of theory molds to what degree an author of a research paper sensitizes to the momentousness of a research topic. (Saunders et al. 2016, 47-52.) A literature review is an integral part and a premise of an entire research process (Saunders et al. 2016, 70-74). As a result, this thesis embodies two theory-based chapters.

The first theory chapter concentrates on the conceptualization of "skill" and "skill shortage" in a broad spectrum of areas and the respective field. It is designed as a step-by-step manual to seeking an answer to the first and second research sub-questions. The logic is irrefutable. The detection of factors that predispose the decline in numbers of Generation Y and Generation Z members in aviation and aerospace and causes of skills shortages in aviation and aerospace are inextricably tied together. Before exposing the causes of the skilled labor shortage in aviation and aerospace, joint causes need to be discovered. And what the words "skill" and "shortage" embrace is dissected prior to root causes analysis.

The second theory chapter is a framework for alternatives on the market that consists of inspecting the established practices of aviation outreach, based on which a unique selling proposition, a sequence of moves, the feasibility of a business idea in the marketplace can be pinpointed. Along with that, it is backing for answering the third research sub-question and, yet again, the main research question.

1.4 Theory Development and Research Design

All research has a theory that is either implicit or explicit in research design.

There are two antithetical approaches to theory development: deductive and inductive. Deductive reasoning is top-down logic. It starts with theory derivation from the academic literature that is then either verified or falsified through a sequence of propositions. The conclusion is drawn reductively, by ratiocination, that it is unerring whenever the postulates making up the proposition are apodictic. (Saunders, Lewis & Thornhill 2016, 144-147.)

Inductive reasoning runs counter to deductive reasoning and is bottom-up logic. It opens with data gathering and data coding for rigorous theory-building. The authenticity of the generated conclusion may be probable, predicated on known premises. (Saunders, Lewis & Thornhill 2016, 147.)

The third, ancillary research approach is abductive inference. It begins with the perusal of an extraordinary fact that can be used to produce a new theory of plausible reasoning or amend an existent one, which prone to tests after adding unproven data and claims. Abduction bounces back and forth between data and theory, instead of moving from theory to data (as in deduction) or data to theory (as in induction). In effect, abduction combines facets of deduction and induction. (Saunders, Lewis & Thornhill 2016, 148-149.)

Table 1 shows the emphases of each approach to research.

There are two preeminent types of research methods: quantitative and qualitative.

Quantitative research is primarily colligated with positivism research philosophy. It goes along with the belief that science is the sole paradigm of veracity and rationality retrieved from quantifiable observations, and common sense can bias and distort the research findings. Quantitative research examines relationships between variables that are measured on a numeric scale for statistical analyses. It has kindred with experimental and survey research. Methods of quantitative data collection are face-to-face interviews or computer-assisted personal interviewing, telephone interviews, surveys, questionnaires, polls, and systematic observations. It is mandatory that each respondent understands questions in the same way since data are gathered in a standardized manner. (Saunders, Lewis & Thornhill 2016, 166-168.)

Qualitative research is preponderantly exploratory and usually cognate to interpretivism. It is interpretive because researchers disentangle strands of the occurrence being studied through social constructs, and therefore hinged on the naturalistic approach of data collection such as semi-structured and in-depth interviews, group discussions, and observations. This countenances sharpened understanding of stances, tenets, demeanors, and motives. (Saunders, Lewis & Thornhill 2016, 168-169.) Qualitative data are presumably more manifold, resilient, voluminous, and intricate than quantitative data, inasmuch as qualitative research is contingent on human communication and non-numerical data (Saunders, Lewis & Thornhill 2016, 568).

Table 1 Approaches to research (Saunders, Lewis & Thornhill 2016, 144-149)

<i>Deductive Emphases</i>	<i>Inductive Emphases</i>	<i>Abductive Emphases</i>
Scientific principles of research	Developing an understanding of how humans interpret events	Obtaining data that are sufficiently detailed and rich to explore the phenomenon
The search to explain causal relationships between concepts and variables	Concerned with the context in which events take place	Using evidence provided by existing data and new data and revise as necessary
Moving from theory to data	Theory follows data	Moves back and forth between theory and data
Quantitative data collection method prevails	Qualitative data collection method prevails	
A highly structured methodology	A less structured methodology to reveal alternative explanations	
The operationalization of concepts in a way that enables facts to be measured	The study of a small sample of subjects	
The reductionism of problems for better understanding		
Careful selection of samples to be able to generalize		

Mixed methods research is a blend of quantitative and qualitative data collection techniques to ensure a fuller and richer understanding of a phenomenon from all angles (Saunders, Lewis & Thornhill 2016, 169-170).

There are two types of data sources: primary and secondary. Primary data are unparagoned data originated by a researcher, while secondary data are already existing data collected by another person for another purpose. (Malhotra & Birks 2007, 85.)

As Figure 3 shows, this thesis applies deductive reasoning and leans on mixed methods research. The deduction paradigm is a requisite for drawing a testable axiom from theory. In this thesis, the research questions place emphasis on causality, the result of which was a choice of deduction-oriented approach. To arrive at sensible and candid answers to the research questions, the author had merged quantitative and qualitative methods, which is mixed methods research. The thesis author used both primary and secondary sources of data collection. Primary data is collected from a survey questionnaire that enacts a scenario, where respondents have to answer closed-ended and open-ended questions about demographics, perceptions of professions in aviation and aerospace, and the Intelligence Hunt project competition, the original and prospective versions alike. The research is discussed in the fifth chapter. Secondary data is collected from print and electronic sources (e.g., books, research articles, and research reports).

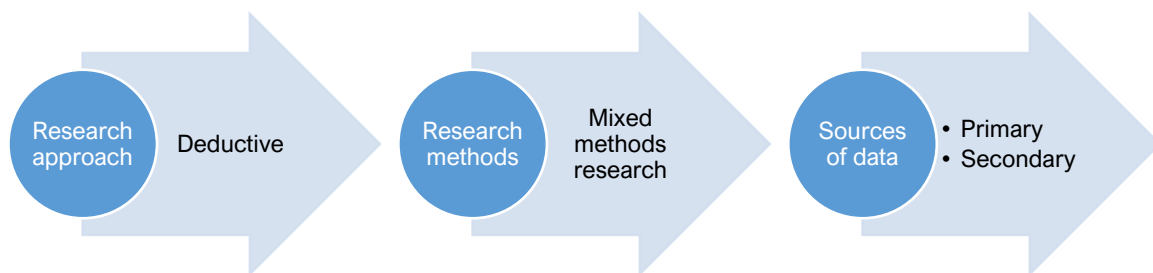


Figure 3 Research methodology and data collection

1.5 Thesis Structure

The internal structure of a thesis, dissertation, or research paper revolves around the type of research question, support scheme for a hypothesis statement or research question to write an arguable work, type of a research approach, and stylistic writing conventions used by a higher education provider.

The thesis is subject to the guidelines for bachelor theses of the author's university of applied sciences. It is divided into two parts, that is, theoretical and empirical parts that further unwrap into eight chapters, as it is shown in Figure 4 below.

Chapter one sets the scene and puts research in context by broaching the crux of the research problem and delineating the road map that will usher the author from the outset towards the culminating bit of the thesis.

Chapter two discloses what the expressions “skill” and “skill shortage” denote, offers the typology of skills shortages, reflects contention surrounding it, and examines the causes contributing to skills shortages in the ubiquitous and sectoral spreads.

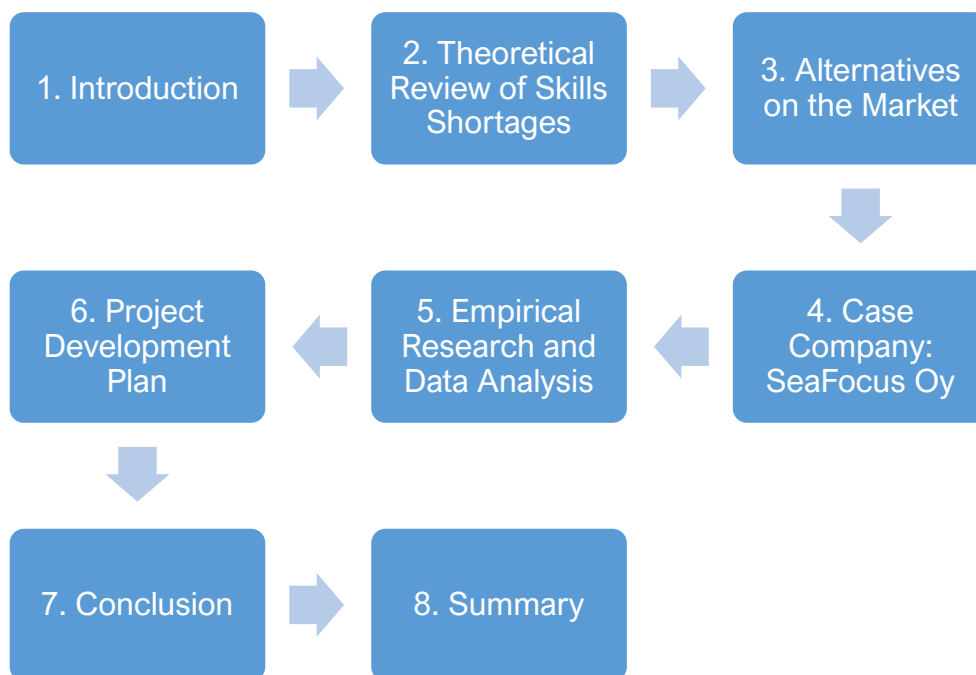


Figure 4 Thesis structure

Chapter three goes through initiatives introduced by aviation and aerospace organizations to actuate students and young professionals to join the industry.

Chapter four acquaints the reader with the case company, its core and secondary business activities, as well as with the Intelligence Hunt project competition.

Chapter five deals with obtaining empirical evidence for the study publication; it encloses the formulation and design of empirical research, as well as a description of data acquisition, and data analysis. The theoretical and empirical parts lead to the development of a project management plan in chapter six.

Chapter seven answers the research question and sub-questions, evaluates the validity and reliability of the quality of research, instructs on how to contrive future research, and chapter eight recapitulates the study.

2 THEORETICAL REVIEW OF SKILLS SHORTAGES

Employers, employees, and policy analysts have contrasting viewpoints on what is the meaning of a skill shortage. The absence of a common understanding instigates vagueness in problem analysis and recommendations for remedying the situation. (Shah & Burke 2003, 5.) Therefore, the first theory chapter sheds light on the term “skill” and the affiliated notion of skill shortage, followed by reviewing causes of skills shortages in both broad and industry-specific contexts. Withal, it is written as a means of answering the first and second research sub-questions.

2.1 Definition of Skill

The reason behind an in-depth examination of the nature of a skill is that some concepts of a skill shortage are a repercussion of incomprehension of skills needs and skills deficiency rather than a lack of available labor force, as it will become evident in the subchapters below.

According to the International Standard Classification of Occupations (ISCO-08), skill is an ability to competently perform the assigned set of professional tasks and duties (ILO 2007, 1). Usually, skills and their validation are interpreted through formal learning. Regardless of this perception, an individual constantly hones and develops his or her skills through informal learning and real-workplace experience. (Shah & Burke 2003, 5.)

Employers have a different way of understanding the term "skill". Some perceive it as a learning ability rather than an obtained skill. Others consider behavioral skills displayed throughout the interview process to be more significant than certified skills. The latter can seldom occur when candidates have the same skill set, or its quality is ambivalent. Situationally, a recruiter might be interested in a particular type of person, who he or she sees fit for a position, rather than in skills requirements. (Bosworth, Dutton & Lewis 1992, as cited in Shah & Burke 2003, 6.)

The skills pillar is applied to provide a comprehensive list of relevant knowledge, skills, competencies for the labor market, and is organized in a hierarchical structure. An accustomed approach to skills classification has two dimensions – what the specific tasks are to be completed and the extent of skills and expertise possessed by a person, with recognizing one’s training needs (Holt, Sawicki & Sloan 2010, 3).

In addition, skills can be classified into foundational, personal attributes, vocational, and core skills for employability. Foundation or basic skills are transferable across various disciplines and occupational sectors. These skills comprise the literacy and numeracy skills.

They are essential for getting a job placement to enable a person to meet his or her daily needs, and also considered as a prerequisite for continuing education that will lead to vocational skills acquisition. Personal attributes are often deemed to be generic by its very nature. These include personality traits that have an impact on employee performance. Integrity, the sense of independence, patience, punctuality, diplomacy, and reliability can be given as examples. Vocational or technical skills are knowledge-based skills acquired through education, training programs, and work-based learning experiences. Core employability skills or core work skills evolve from and enhance those skills learned through general education, vocational or technical skills, and personal virtues. Core work skills are critical for lifelong learning and long-term success. Technological innovation and organizational change are the key drivers for skill obsolescence; as a consequence new skills must be developed. For instance, adaptability, critical thinking, creativity, problem-solving, leadership, teamwork can compose the fourth and final type of skills. (Brewer 2013, 6.)

2.2 Meanings of Skill Shortage

This section serves a purpose in scrutinizing contradicting definitions of each term connected to the concept of a skill shortage and makes a distinction from one another.

Skills Shortages

David M. Blank and George J. Stigler conducted one of the foremost research studies on occupational labor shortages. They define a shortage as follows:

A shortage exists when the number of workers available (the supply) increases less rapidly than the number demanded at the salaries paid in the recent past (Blank & Stigler 1957, 24).

The Blank-Stigler model (Figure 5) is used to demonstrate a market equilibrium (E) between demand (D) for and supply (S) of workers (Q_E) with wage rate W_E . If demand rises, the whole demand curve will shift to the right to D_1 . Under the circumstances when employers will be willing to hire Q_1 workers with the wage remaining at W_E , but only Q_E workers will be available to work at this particular wage, a shortage will transpire. The workers' wage rate will be increased from W_E to W_2 until a new equilibrium is reached at the position where the new demand curve and supply curve intersect with Q_2 workers. Great stress should be laid upon flaws in the Blank-Stigler model. To start with, growing demand is discerned as the solitary possible origin of a shortage, thus disregarding other feasible root causes. For another thing, the model suggests that a shortage can be eliminated by a rise in wages,

excluding the observation of labor market imperfections such as wage controls and imperfect information. (Barnow, Trutko & Piatak 2013, 6.)

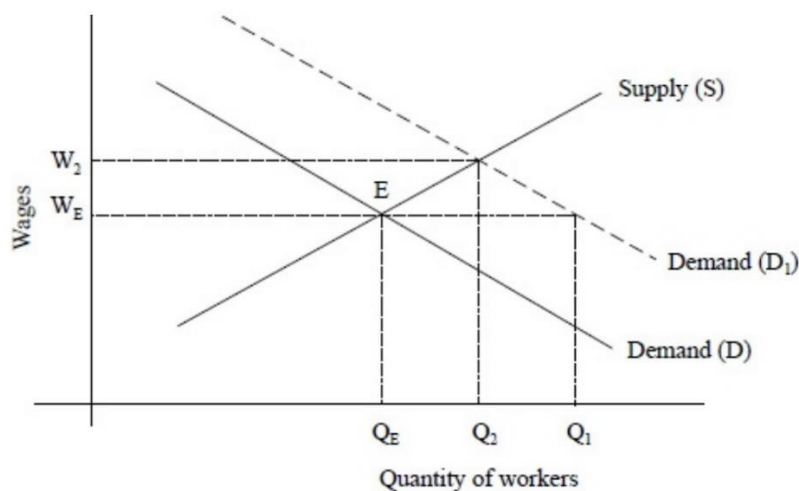


Figure 5 Illustration of the Blank-Stigler and Arrow-Capron models (Barnow, Trutko & Piatak 2013, 7)

Kenneth Arrow and William M. Capron conveyed a discrepant viewpoint and developed a dynamic labor shortage model. They refer to a shortage as follows:

A situation in which there are unfilled vacancies in positions where salaries are the same as those currently being paid in others of the same type and quality (Arrow & Capron 1959, 301).

Akin to the Blank-Stigler model, the Arrow-Capron model is characterized by accelerating demand. A prominent feature of the Arrow-Capron model is the reaction speed, which is the rate of wage growth that relates to the excess of demand over supply. The bigger the reaction speed, the higher the elasticity of demand and, the quicker a shortage will disappear. The pivotal determinants of the reaction speed are institutional arrangements, such as long-term contracts, the rapidity of information dissemination about wages, vacancies, and available workers throughout the market. (Sloane, Latreille & O'Leary 2013, 154.) Figure 5 depicts the number of vacancies ($Q_1 - Q_E$) after growing demand. If demand continues to increase, market disequilibrium might occur (Barnow, Trutko & Piatak 2013, 8).

The supplementary explanations about the complexity of skills shortages are presented below.

In their exploratory study of skills shortages, Chandra Shah and Gerald Burke (2003, 7) unravel the notion of a shortage as instances where

...the demand for workers for a particular occupation is greater than the supply of workers who are qualified, available and willing to work under existing market conditions...

The authors accentuate that the shortage phenomenon is the aggregate of hard-to-fill vacancies in an occupational specialization. These are vacant positions that can long endure in spite of strenuous efforts made by employers. (Shah & Burke 2003, 7.)

The concepts of shortage comprise characteristics that require undivided attention. The first one is viewing them not only in terms of occupational areas but also in terms of geographical locations and time frames. The second hallmark stems from the fact that market demand is always for a combination of skills accompanied by personality traits and inherent social cues. The level of significance is the third feature. On the one hand, it can be understood in terms of counterproductive outputs and output values that are lost because of the skill shortage. On the other hand, it is associated with the substitution method of skills by which skills that are in short supply may be replaced by other skills. (Holt, Sawicki & Sloan 2010, 10-11.)

Skills Gaps

The terms “skill shortage” and “skill gap” appear to be often used interchangeably, whereas, in fact, they are utterly disparate. An actual skill shortage is the implication of an inadequate number of people who are available and eager to perform work. The lack of required skills in employees and job applicants is a skills deficiency, or simply a skills gap. (Green, Machin & Wilkinson 1998, 165.)

Academic and vocational qualifications attainment is not the only principal source of the existence of a skills gap aggravation. An employee may hold a professional degree and pertinent qualifications with respect to his or her occupational field and meet the eligibility criteria, yet one may lack generic skills, such as computer and customer service skills. (Shah & Burke 2003, 9.)

A latent skills gap emerges when employers are largely unaware of the skills needed for enhancing business processes and accomplishing business objectives (Shah & Burke 2003, 9).

Recruitment Difficulties

Analogously to skills shortages, recruitment difficulties imply hard-to-fill vacancies. However, they do not constitute a meager supply of labor, nor they negatively affect an effective workplace practice. Ergo, recruitment difficulties do not contribute to a market-wide shortage. Low remunerations, unsatisfactory working conditions, incomprehensive employee benefits packages, lengthy commutes, and atrocious recruitment practices are exemplifications of the underlying reasons for recruitment difficulties. (Shah & Burke 2003, 9.)

2.3 General Causes of Skills Shortages

Changes in skills demand and supply are common characteristics of market economies. Certain constituents that induce fluctuations are consistently haphazard, whereas others are unvarying and may incorporate seasonality and trend-cycles. (Shah & Burke 2003, 11.) The trend component is the slow variation over a long period of time (Stigum 1991, 947).

The demand-side elements encompass a change in the price of a commodity, changes in the composition of the population, a change in consumer tastes and preferences (Sloman & Wride 2009, 34-35). The supply-side entails technological change; organizational change; education and training reforms; career changes; government policy; the number of suppliers; demographic changes in the labor force, such as aging, emigration, and immigration; unpredictable events, such as the breakdown of machinery and industrial disputes (Sloman & Wride 2009, 40-41).

The process of adjustment to confront changes requires considerable time and comes at exorbitant expenses for both the demand and supply sides. Hence, changes bring disequilibrium in the market at the current wage rate. Market clearing occurs in flexible labor markets. (Shah & Burke 2003, 11.)

Wage Stickiness

The inertia of wage adjustments to be more susceptible to labor market conditions is another underpinning of skills shortages. Economists refer to the slow adjustment of nominal wages as sticky wages. To put it in a nutshell, sticky wage theory describes downward wage rigidity in matters of a period of disruption at the company level or the broader economic landscape due to the workers' reluctance to accept a nominal wage cut. (Haltom 2013, 10.)

Slow adjustment is generated by a range of factors. First, acknowledging the existence of a shortage takes time. Second, the wage level and hiring decisions are gradual and time-consuming procedures. Third, a time lag between potential entrants and information flows.

Delayed opportunity exploitation contributes to the supply-side lags. Besides, equivocal wage agreement on a rate of pay acts as a deterrent to wages adjustments. Wage inflation to attract new employees is not bound to follow since employers anticipate discontent among existing staff. In-house training programs for lesser-skilled workers in a company or new hires without the required skills is a generally favorable response in such a situation. Furthermore, some sectors appertain to a market, where the government has extensive authority over the forces of supply of and demand for skills. Education, the healthcare and public health sectors are applicable to this type of system. Lastly, skills shortages will prevail if the equilibrium wage rate is below a reasonable minimum level. (Shah & Burke 2003, 11-14.)

The Slowness of Adjustment Mechanisms in Supply

Non-wage adjustments are an initial technique to offset shortages. It is attributable to the limited use of alternative margins in highly competitive markets. The internal labor market is a short-term palliative. A business may endeavor to revise working hours and capacity utilization. It may also reorganize a work process in a work unit in a way that a job function can be accessed through transitioning the right-fit employee to a new role. (Shah & Burke 2003, 14.)

The external labor market is a long-term solution, although a variety of reasons make it difficult to align the supply of skills with demand. First, awareness of more enticing job offers in a specialization. To prevent prospective contenders for an opening from leaving for a different employer, it may come to entering an employment bond with students in training. A student is obliged to remain committed to a company on a given time basis. Second, an employer's discriminatory preferences. Third, employers resist hiring without prior experience. Moreover, stabilizing the enrolment rate of students in educational institutions, ensuring course availability, designing and implementing programs with an appropriate skill-mix, budget setting, appointing new academic personnel may take years to resolve. Ultimately, employees leaving their current workplace, or the labor force diminishes the supply of skills. (Shah & Burke 2003, 15-16.)

Lack of Labor Market Data

A scarcity of verifiable data inhibits the speed of labor market adaptation, thus affecting the duration and magnitude of shortages or surpluses. The provision of credible information and its transmission across all markets is an indispensable resource for firms, households, government officials, and education providers. It should display current national minimum wage and national living wage rates, the unemployment rate, rates of return, open positions,

and labor supply. Extracting impartial data and data analysis is a high-cost prowess. It raises the subject of information-gathering, its quality, and granularity. (Shah & Burke 2003, 17.)

2.4 Causes of Skills Shortages in the Aviation and Aerospace Industry

A series of central issues are precursors to the anticipated worldwide shortages of skills in the aviation and aerospace industry.

First, many practitioners have almost reached their retirement eligibility age (ICAO 2009, 4; Johnson 2018). Continuous and relentless technological advancements exacerbate the challenge in fleet growth. In its 2018 edition, Airbus' Global Market Forecast (2018, 6-7) emphasizes that the passenger and freight aircraft fleet will more than double over the next 20 years.

Second, careers in aviation and aerospace do not lure millennials and the post-millennial generation (ICAO 2009, 4; Johnson 2018). Younger workers say that long work hours and the prevalence of irregular work schedules, relocations, time away from home and family, disgruntled customers, physically demanding work, chronic stress are not worth the cost of the personal sacrifices. Moreover, apprenticeship programs for pilots, aircraft mechanics, and service technicians can take a minimum period of 24 months to complete. The time constraint with regular attendance thwarts holding down a job, while non-funded tuition fees necessitate personal investments. (Johnson 2018.)

Third, the next generation does not have full consciousness of career opportunities. This is an indicator of information asymmetry that can be overcome during the school-age years by fostering a heightened awareness of the aviation and aerospace industry. (ICAO 2010; RAeS 2017, 7-12.)

Likewise, a fierce competition for skilled professionals with other industries expedites shortages (ICAO 2010; Johnson 2018). And on top of that, due to its profoundly cyclical nature, air transport economics with layoffs and furloughs intensifies employee attrition and makes attraction and retention strategies futile (ICAO 2009, 4).

Additionally, obsolete learning resources and teaching methods are not responsive to accommodate modern learning styles (ICAO 2010; Johnson 2018). In closing, non-harmonized regulatory standards and programming arrangements can be a matter of concern to recruitment in the wider industry (ICAO 2009, 4).

3 ALTERNATIVES ON THE MARKET

This chapter explores alternatives on the market that are aviation and aerospace organizations, to wit: a number of key players in the sector, their market share, presence, and the established practices of aviation outreach.

3.1 The International Civil Aviation Organization (ICAO)

The International Civil Organization is a specialized agency of the United Nations established in 1944 during the Convention on International Civil Aviation, also known as the Chicago Conference, held between the 1st of November and the 7th of December. It was inaugurated to secure uniformity in policies, standards and recommended practices, and procedures on civil aviation through the medium of international cooperation. (ICAO 2019.)

ICAO, with headquarters in Montreal, Canada, works with its 193 Member States and industry stakeholders to cultivate the augmentation of a safe and secure, efficient, economically, and environmentally sustainable civil aviation sector in all world regions by consensus-driven decision making on international SARPs and policies. Among the priority areas of action, ICAO undertakes and oversees safety and security compliance audits; devises and strives to refine global multilateral planning systems for the safety of air navigation; routinely monitors performance metrics and compiles reports; succors in capacity building for its Member States and industry stakeholders in support of aviation development goals and objectives; provides global aviation training courses; advocates for aviation education and student-centered activities. (ICAO 2019.)

As part of its membership in the United Nations family, ICAO cooperates actively with the International Maritime Organization (IMO), the World Tourism Organization (UNWTO), the World Meteorological Organization (WMO) and others (ICAO 2019; UN 2019).

ICAO engages non-governmental organizations in its ventures and future scenarios, including the International Air Transport Association (IATA), the International Business Aviation Council (IBAC), the Airports Council International (ACI), International Coordinating Council of Aerospace Industries Associations (ICCAIA), the International Council of Aircraft Owner and Pilot Associations (IAOPA), the International Federation of Air Line Pilots' Associations (IFALPA), the International Federation of Air Traffic Controllers' Associations (IFATCA) and the Civil Air Navigation Services Organization (CANSO) (ICAO 2019).

3.1.1 NGAP Program

The Next Generation of Aviation Professionals initiative was set in motion in May 2009 as an incipient stage to cope with the forecasted acute shortage of adepts that are aptly proficient for maintaining and conserving the future of the universal aviation community and air transportation (ICAO 2009, 4; ICAO 2019). It was built on the IATA Training and Qualification Initiative and complimented its compelling attempts to weaken the severity of contemporary and impending shortages. ICAO formalized the NGAP Task Force consisting of voluntary contributors from national aviation authorities, air navigation service providers, academia, training centers, regulatory bodies and international organizations to deliberate on a course of action for the imminent shortage and how to be of assistance to youth in deriving the inspiration for aviation education and professions in the same year. (ICAO 2009, 3-9.) Since then, ICAO has been collaborating with its associates (Figure 4) to map out tactics, distribute best practices, set out standards and guidelines, simplify information exchange within and across the sector to appeal to, educate and retain the succeeding cohorts of aviation experts (ICAO 2019).

As NGAP issues are of paramount solicitude to all affected parties, the initiative has been elevated to the status of an ICAO Programme, henceforth being consolidated into the global and business plans of the Organization (ICAO 2015, 2; ICAO 2019).

Amid tremendous and remarkable achievements to date, NGAP has

- found assorted working groups e.g., Accreditation, Pilot and Air Traffic Management competency units;
- utilized mass media and communication in the form of regular NGAP Outreach Newsletters and ICAO Training Reports;
- prepared global and regional 20-year forecasts for pilots, maintenance personnel, and air traffic controllers – Doc. 9956 – to reinforce States in quantifying their human resource departments;
- run a YouTube video contest to thrill society, and in particular, adolescents about becoming an aviation professional in February 2012;
- convened two Global Symposia, in March 2010 and in December 2014, and eight Regional Symposia from 2011 to 2013 sequentially;
- pioneered the Aviation Training and Education Directory;
- published the Aviation Internship Toolkit for the Next Generation of Aviation Professionals;

- rolled out training handbooks for air traffic controllers and air traffic safety electronics personnel;
- organized regional ATCOs and ATSEPs workshops;
- allied itself with the International Pilot Training Association to create a video content to amplify pilot careers awareness, accumulate data on enablers and barriers for the career pathways to become a pilot;
- introduced Fundamentals of the Air Transport System eLearning course, to which anyone anywhere around the globe can sign up for free of charge;
- hosted two Global Summits, the first one in Montreal, Canada on 27-28 November 2017 and the second one in Shenzhen, China on 12-14 December 2018;
- had career fairs;
- endorsed Dreams Soar and its mission to empower females and excite them about taking up STEM study and embarking on STEM careers;
- partnered with UNESCO to put together a Think Pink – Hard Hat Workshop simultaneously with the original NGAP Global Summit to spur a passion for STEM careers in lives of more than sixty elementary and high school girls and combat any prejudice for STEM fields;
- developed the NGAP 2018 application, i.e., ICAO Events present-day, the official events guide;
- evaluated what can aviation training avail through the use of MR Technologies by immersing the College of Aviation at Western Michigan University in the experiment, with inventing a prototype of JetXplore application as the pedagogical material later on;
- installed the ICAO Training Needs Analysis tool (ICAO 2017, 3-25; ICAO 2018, 1-3; Vreedenburgh 2018).

Similarly, Sri Lanka and Singapore have incepted their versions of the NGAP program, meanwhile, Cameroon has started the Young African Aviation Professionals Association (ICAO 2017, 4; ICAO 2018, 5-8).

The Model ICAO Forum is a case study competition for college and university students with enthusiasm for aviation that was set up twice as a side affair of the NGAP Global Summit. The ambition of the event is to highlight obstacles plaguing the aviation sector and uplift participants who aspire to a career in aviation and aerospace. A total of 53 students from 19 universities partook in the inaugural Forum, and 180 students from 27 universities located in 28 different countries entered the second competition. Both times entrants have been divided into teams, each putting forward solution to an expert panel at the close on

unmanned aircraft systems, dangerous air cargo, the socio-economic benefits of air transport, and aviation security systems. (ICAO 2018, 3; ICAO 2019.)

Speed Mentoring is another student-focused learning imperative that took place concurrently to the NGAP Global Summit on 27-28 November 2017 in Montreal, Canada for the first time. The gathering caters to the need for acquainting the new era of aviation professionals and ambassadors with the copious career prospects in aviation and aerospace by individual consultation with aviation experts for time intervals of 20 to 45 minutes. Attendees receive a brief background of their mentor in advance to be sharp for a meeting. (ICAO 2018, 2; ICAO 2019.)

The Aviation University Forum is a one-of-a-kind occasion to mingle and network that provided a venue for universities on behalf of the establishment of the International Association of Aviation and Aerospace Education during NGAP/2 in 2018. Nowadays, ALICANTO symbolizes the interests of universities with aeronautics and aviation programs at the national, regional and global levels. (ALICANTO 2018; ICAO 2018.)

Future Aircraft Designs and Competition is an innovation competition for three discrete age groups launched in honor of the 75th anniversary of ICAO in 2019. In the first category, the Ideas Competition, the Organization is requesting school-age children 6-12 years to propose ideas for fresh new types of aircraft, and how they can revive and expand the aviation register for humanity. The Concepts Competition is the second tier for 13-17-year-olds to submit their proposals for brand-new types of aircraft or avionics systems, with explanations of how they can be conducive to aviation operations and everyone's convenience. The Prototypes Competition is for adults for 18 years old and over to do 3D renders of new state-of-the-art aircraft types or types of operations, with an accompanying explanatory 500-word maximum summary of why they can intrigue investors, and how to produce them efficiently and execute a plan for social welfare. The three peer groups have no limit to their imaginations and can prepare blueprints for flying in the skies or into outer space. (Uniting Aviation 2019.)

3.1.2 Young Aviation Professionals Program (YAPP)

In December 2013, the International Civil Aviation Organization coalesced with the International Air Transport Association and the Airports Council International to globally bolster the elaboration of the intellects of tomorrow by inducting them into positions at the mentioned organizations under the Young Aviation Professionals Program (ICAO 2019).

The 12-month program is targeted at bright minds with advanced degrees and a minimum of two years' experience either in aviation-related regulatory activities or in the aviation

industry. Know-how in both is welcomed but not obligatory. Selected aspirants are expected to pitch in on the strategic direction of every organization with adhering to the rules, as stipulated by, and counsel of a subject-matter expert from ICAO, IATA, and ACI. (ACI 2015; ICAO 2019.)

Depending on the success of the YAPP completion, officers may be contemplated for posts at ICAO, IATA, and ACI in the future (ICAO 2015, 1).

3.1.3 ICAO Global Aviation Training (GAT) Office

In January 2014, ICAO established the GAT Office to guarantee that the ICAO Training Policy domain will be operated in a courteous, efficient, and coordinated fashion by dint of maneuvering the management process of all assortments of ICAO aviation training activities.

The Office supervises training systems in an orderly, sequential mode starting from the calibration protocol for assessing the regulatory and institutional quality dimensions of training organizations and inferring whether they thoroughly conform to the international standards and ending with the development of the GAT course catalog for ICAO training centers.

The GAT Office covers proceedings of the three entities that are the cornerstone of all ICAO training activities: Training Design and Development, Training Assessments and Consultancy, and TRAINAIR PLUS Programme. (ICAO 2018, 19-28.)

3.2 The International Air Transport Association (IATA)

The International Air Transport Association is a cosmopolitan airline trade alliance headquartered in Montreal, Canada. The neoteric IATA is a descendant of the International Air Traffic Association founded in the Hague, the Netherlands, on August 28, 1919 – the year marked by the genesis of the world's first non-stop scheduled transatlantic flights. IATA was assembled in Havana, Cuba, on April 19, 1945, as the prime catalyst for inter-airlines liaison in sustaining trustworthy, prudent, and economical air services from the perspective of end-users intercontinentally. (IATA 2019.)

At its dawn, IATA was an amalgam of 57 members, with a substantial fraction of 31 nations from Europe and North America, whereas now it federates 290 members from 120 nations all across the planet. IATA operates in 53 countries. Its members are the world's leading passenger and cargo airlines that represent 82% of total scheduled traffic. According to IATA's website, its mission is to represent, lead, and serve the airline industry. (IATA 2019.)

IATA Training & Qualification Initiative (ITQI)

In 2007, the ITQI program commenced under the supervision and support of the IATA Board of Governors and Operations Committee, intending to meet the aviation's industry pressing need for the next generation of authorized personnel for mid and long-term, heighten career awareness, and achieve strong industry attractiveness. The ITQI team has been working with partners like the International Civil Aviation Organization, the Flight Safety Foundation, and the International Business Aviation Council. To reach objectives, IATA runs awareness programs, implements competency-based training, and simulators for flight crew and maintenance engineers. (IATA 2009, 3-7.)

4 CASE COMPANY: SEAFOCUS OY

In this chapter, the author recounts the case company's history, the journey of growth, and its core and context activities in a nutshell. Ensuingly, the concluding subchapter unfolds the Intelligence Hunt project competition specifics and its points-of-difference.

4.1 Company Profile

SeaFocus Oy is a fully independent, privately-owned company, administered from Helsinki, the capital of Finland, that seeks to work earnestly and ardently for the benefit of the maritime sector, in keeping with holistic, integrated, and participatory approaches. It belongs to UK ART OY Ltd, designated for international project management, event management for high caliber senior teams, partnerships strategy, and investor relations. Ulla Keino, a Partner and Managing Director at UK ART OY Ltd, is the proprietor of SeaFocus. Her perennial experience in supply chain management and logistics and passion for the sea and the shipping industry had triggered the formation of SeaFocus in 2006 with like-minded companions. (Brewer 2017; SeaFocus 2019.)

The value of education synchronized with the business drivers of SeaFocus. The company's founding principle is to perpetually do its utmost to resume maritime its erstwhile reputation as one of the magnetic industries in which young undergraduates, postgraduates, and alumni will start looking for employment, and where institutions of higher education will vie to provide high-grade maritime training programs. (Brewer 2017.)

The fact that SeaFocus has thirteen trainees in the latter-day structure, whose myriad tasks and roles diverge within the frame of the Intelligence Hunt, puts extra emphasis on the importance of education. The rest of the team subsumes Heli Koukkula-Teixeira, Chief Operating Officer; Saana Rantanen, Business Development Manager, as of July 4th, 2019, in the wake of restructuration; and an advisory board.

An advisory board buttresses and quality-assure all the work, with board members covering ten spheres of mastery: environment and sustainability, finance and investments, maritime security, commercial shipping, legal and risk management, digital transformation, technology and shipbuilding, offshore and arctic, cargo and passengers, education (SeaFocus2019).

4.2 Business Activities

Partnership Concept

SeaFocus is a new business opportunity goldmine that comports itself like a matchmaker for its partners; it shortens lead times right up to contracting by screening in the right person to contact to sort things out. Interacting with high-profile maritime decision-makers warrants the likelihood of SeaFocus' partners getting in touch with appropriate bodies in the hopes of developing a reciprocally propitious relationship. SeaFocus' partners, in turn, have a crucial role in developing SeaFocus farther. (Brewer 2017; SeaFocus 2019.)

Partnerships fall into the following categories:

- strategic partners
- corporate partners
- the Intelligence Hunt partners
 - event partners and project sponsors
 - case companies
- associate partners
- institutional partners
- developing partners
- academic partners.

SeaFocus has not grouped its partners by using the size of the sponsorship as a baseline, as substance given to a greater cause and for the good of maritime cannot always be measured in currency. (SeaFocus 2019.)

The partnership concept is tailored to each patron's culture and individual needs (SeaFocus 2019).

Meetings and Events

With a list of formidable partners comes immense responsibility, and so, SeaFocus yearly throws open events to global executive partakers; current affairs workshops, smaller events or meetings that take place behind closed doors, to ruminate on partners' assignments; get-

together and teasers chiefly in aquatic habitats – aboard spacious and elegant vessels, with a modern twist, moored in a port (Brewer 2017; SeaFocus 2019).

The SeaFocus Annual Executive Meeting (SFAEM) is a narrow-format, invitation-only meeting for maritime executives held in the third or fourth week of May. The summoned executives are called on to share their pervasive and protracted professional expertise in the theme of the year. SeaFocus' partners have an agreed quota seat for their management and emporers. (Brewer 2017; SeaFocus 2019.)

Digital Marketing

In this day and age, in the sea of content, frequently producing high-quality one for the website and social media channels, as well as grasping what is going on in the maritime world and circulating the top news, stories, and updates are transcendent in the SeaFocus' digital marketing strategy.

The website encapsulates facts about the entity and everything it stands for. On the vendor home page, a visitor can encounter a quondam and forthcoming project narrative and event commentary paired with cardinal input, such as agendas, bulletins, speakers and presenters, company overviews, photo galleries, videos and live streams, and other paraphernalia; news and blogs where SeaFocus in conjunction with its partners release germane and tangential data for proponents and interested parties; "virtual lounge" which accommodates polished, stellar articles and space to share hands-on experiences and erudition apropos of maritime; a logbook; testimonials; a bookstore; social media buttons that provide links to Facebook, Twitter, LinkedIn, Instagram, and YouTube to boot.

A powerful and synergistic social media presence permits SeaFocus to put the word out, humanize the brand, garner attention, maximize customer engagement, provide customer service and support round-the-clock in real-time, increase website traffic, and generate leads.

The grand peculiarity of SeaFocus' social media activities is the refusal of dispatching negative news as the team believes in the power of good news.

Vacancy Promotion

In the middle of 2017, SeaFocus began offering headhunting service, and, in doing so, it has been aiding companies in descrying ideal candidate personas to join the maritime sector. The bourn is to advertise vacancies beyond the job announcement, in practice and on social media on a steady basis. (Brewer 2017.)

4.3 The Intelligence Hunt Project Competition

Project Overview

The Intelligence Hunt is a case study project competition in maritime supply chains between companies who indite a business situation or dilemma and multinational contingents of students and recent graduates in undergraduate, graduate, doctorate programs who are allocated to a concrete case.

The purpose of the Intelligence Hunt is to withstand and intercept the two most salient challenge areas of maritime actors antecedently to them deteriorating. Shipping suffers from the scarcity of skills and the stereotyped perception of the industry as being deprived of the exhilaration that comes with a vocation, thereby dehorting young talent as job seekers. It works in tandem with students not having unmediated connections at companies to contrast themselves with other appliers.

The Intelligence Hunt puts these two riddles to rest by dint of exhibiting maritime as a forward-looking and auspicious employer in university-business collaboration on bona fide cases to introduce the novel, technically feasible, and commercially viable out-of-the-box concepts.

At the beginning of 2017, SeaFocus rolled out a trial version of the project to assay the potential of the initiative for real-world applications. The rudimentary Finals were organized on May 18, 2017, at the Finnish Science Centre Heureka in the city of Vantaa. They brought together 13 case companies and 38 local and overseas students. At the moment of writing the thesis, five project competition editions have been completed successfully. (SeaFocus 2019.)

How Does the Concept Work in Practice?

SeaFocus, being an all-in-one maritime business platform, is invariably in touch with the flagship representatives of the cluster, which makes it doable to approach any conceivable case company and vice versa, invite seasoned mentors and preceptors of complete professionalism. The sourcing of deft candidates supervenes from email marketing, social media marketing, and word-of-mouth marketing, and is mostly targeted at the European continent.

Registrants do not have to be enrolled in maritime cutting-edge programs or study at a maritime academy, for that matter. Participation is free of charge. SeaFocus' fervent conviction is that only culturally diverse teams of scholars from cross-faculties can be the bedrock of the project deliverables. The selection of finalists is based on entry forms, curricula

vitae, preliminary test questions, and interviews. The directorate split admitted finalists into geographically dispersed teams of strangers and allot assignments to them. The cases embrace a medley of maritime business operations or current development interests, up to the marrow logistics challenges that shippers defy today. The project lasts two to three months and culminates with the finals twice a year, in November and in May-June, where student teams set forth made-to-order proposals solution to their case company. Apart from this, the finals are an outlet for influential, inspirational speakers of the industry to show good judgment on trending matters. And, what is more, they can debate on them off the stage, in a less formal atmosphere, during networking coffee breaks or after the closing ceremony of a project with those present. (SeaFocus 2019.)

Throughout the entire lifespan of a project, students receive mentoring from an elite management advisor with a background in global supply chain management and international trade, and relay findings and divulge their plans to a case company's delegate. In such wise, the Intelligence Hunt yearns to replicate future workplace realities students must be prepared for in global companies. (SeaFocus 2019.)

Gains from the Project

Students harness the skills and knowledge in project management, namely, in all five phases of the project life cycle: conception and initiation, definition and planning, execution, performance and control, closure. They learn to lead and manage the plethora of cultures, personality types, skill sets, aptitudes, work styles, and communication styles in a team. Mentees learn how to deliver effective and galvanizing presentations that will leave an indelible impression on a vast audience. Upon project completion, students properly understand value chains and how to apply business case thinking into the bargain. The bottom line is that contestants do not only liaise with those who are behind the wheel of the industry, but also can get an internship position; a permanent, temporary, or seasonal job offer; a master's thesis topic from their case company or another company, after showcasing themselves on stage at the finals. (SeaFocus 2019.)

Companies, for their part, have an opportunity to get a vision of the new generation with fresh and avant-garde ideas that will be the panacea for all corporate ills; fulfill their corporate social responsibility obligations by supporting academic cooperation; be palpable as progressive, with custom-built action plans for the future; access the Future Talents Pool with roughly 200 students' CVs, executive summaries, and handouts of presentation during the finals; use the project as an anchor for marketing purposes (SeaFocus 2019).

5 EMPIRICAL RESEARCH AND DATA ANALYSIS

This chapter details the empirical research and data analysis. The avowed aim of the research is to settle if scaling up the adoption of a maritime industry project competition will attract more students and young professionals and avert the skills crisis in aviation and aerospace, which, therefore, answers the main research question. Not only that, it vindicates claims about factors impeding students and young professionals from making a career choice in favor of aviation and aerospace in the literature review, which, therefore, answers SubQ2. The design of an empirical research setting, data collection, and the analysis thereof are discussed.

5.1 Design of Empirical Research Setting

Empirical research is implemented to answer or clarify research questions (Ghauri & Grønhaug 2010, 54).

As mentioned in the opening chapter, the research design for the thesis synthesizes quantitative and qualitative elements, which is mixed methods research. The usage of quantitative and qualitative methods detachedly, within a single-phase data collection, distillation, and analysis enables both sets of results to be deciphered synchronically to provide a definitive and extensive answer to a research question. This is concurrent mixed methods research. (Saunders, Lewis & Thornhill 2016, 169-170.) The thesis also uses primary and secondary data.

The primary data was amassed from a Google Forms survey. The full survey is in the appendices (Appendix 1). Survey is a superordinate term for questionnaires, interviews, and observations. To obtain intensive data, the most economical, wide-reaching and swiftest way of conducting a survey, was the questionnaire. It consists of both closed-ended and open-ended questions to acquire objective and subjective data, which makes it mixed methods research.

When drawing up and sending out the questionnaire, a necessary and sufficient condition for data acquisition was for respondents to belong to the group of minors under 18, the 18-24, or the 25-34 age groups that are incorporated into the students and young professionals group and be at least faintly apprised of the Intelligence Hunt project to be able to return the completed questionnaire.

The survey questionnaire has 18 questions altogether, and it is divided into three sections: demographic questions, perceptions of aviation and aerospace occupations, and cognitive of and satisfaction with the Intelligence Hunt project competition.

5.2 Data Collection

The questionnaire was prepared at the end of July, going into the beginning of August. The tentative draft called for a series of pretests, evaluations, and the rectification of errors that have led to the development of the final survey ready for fielding.

Prior to distributing the survey to an entire sample group, the author asked a small number of respondents to give their feedback on and evaluate the criterion of relevance, the order of questions, survey question flow, existence of double-barreled questions, survey length, the difficulty of survey. Respondents were urged to refrain from carelessly invalid responses to ensure accurate data collection. All pretest responses were cleared before the release of the survey questionnaire.

Only after that, it was opened and shared on 7 August and closed on 23 September. The questionnaire was available only in English and sent individually in an email message or direct message on a messaging platform to recipients that fit the target audience. An email or direct message included an introduction text for the survey describing its purpose and content. In the end, there were 92 valid responses. The data were analyzed at the beginning of October.

Responses of inferior quality have dire consequences for research, which is why the author examined every returned questionnaire, severally, and checked it against the following indicators:

- straight-lining
- a pattern of answers (e.g., a zigzag pattern)
- repetitive patterns in answers
- gibberish answers to open-ended questions (e.g., a random jumble of letters)
- all or single-checkbox answers, where it is impossible
- one-word answers to open-ended questions.

Dubious responses were erased to avoid confusion and the undermining of data processing.

5.3 Analysis of the Questionnaire

This subchapter probes into demographics, percipience and knowledge of the aviation and aerospace industry, a degree of market penetration the Intelligence Hunt project has

attained, and the expression of keenness in a new project. The outcomes of each answer are unveiled.

5.3.1 Demographics

In the first part of the survey, respondents answered four questions concerning the characteristics of a population, i.e., gender, age, educational level, and employment situation. All questions had a 'require' setting.

Being mindful of gender as a parameter is of service to the researcher to comprehend how gender might shape survey responses and afflict final survey results. It also paints a realistic picture of gender-based differences, gender disparities, and imbalances. About three-quarters of participants in the survey questionnaire were male, one-fourth of participants were female, and only a tiny fraction of the total number of participants chose "Prefer not to answer" (Figure 6).

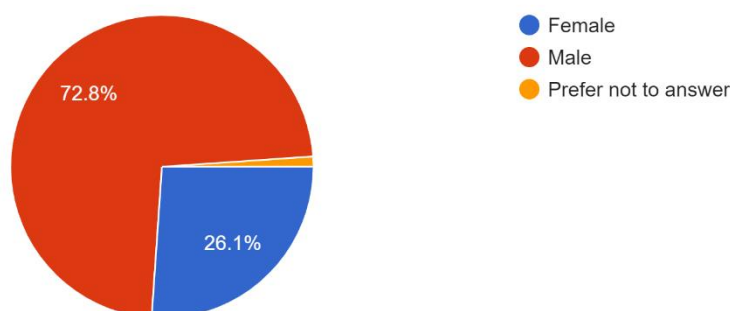


Figure 6 Gender distribution of participants; 92 respondents

The age distribution (Figure 7) reckons with targeting the right audience; it allows the author to attest to the type and extent of information needed. The vast majority of participants, 66.3 %, were aged between 18-24 years. Over one-third of participants, 31.5 %, were aged between 25-34 years, followed by the group aged 17 or younger (2.2 %).

Different educational levels manifest omnifarious opinion and behavior trends. Measuring educational attainment can be of use for a cross-analysis, to see how people of different education levels answer to a certain question. All respondents in the questionnaire have graduated from high school, and approximately a third of them hold bachelor's degrees, twenty-five percent have master's degrees, and a professional degree was conferred on one of the participants (Figure 8).

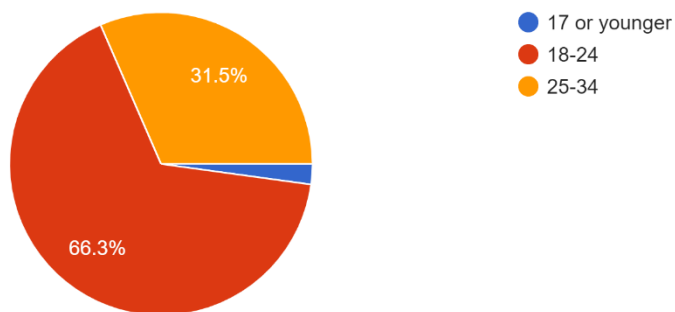


Figure 7 Age distribution of participants; 92 respondents

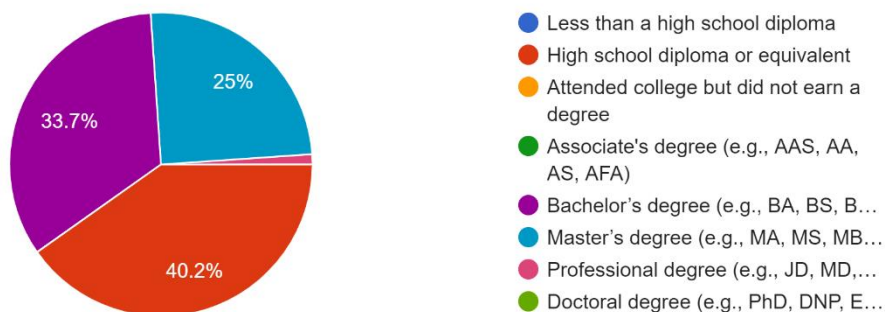


Figure 8 Participants' educational level; 92 respondents

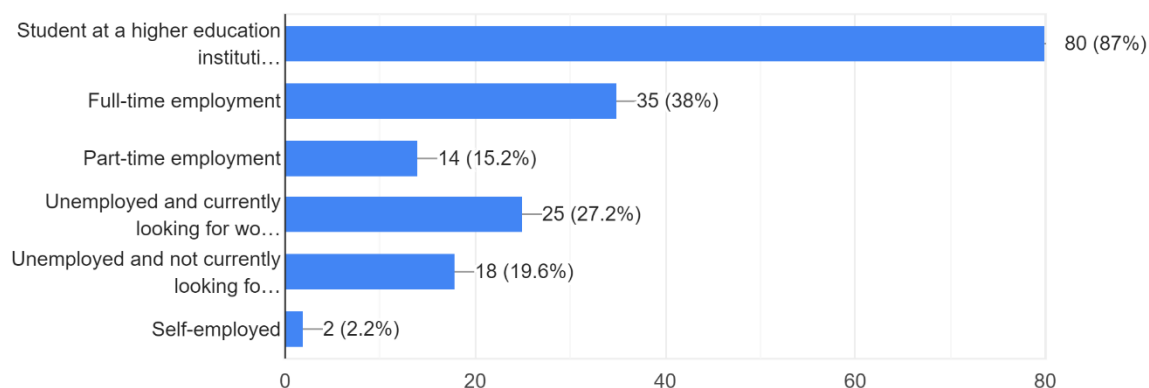


Figure 9 Participants' employment status; 92 respondents

The employment status question confirmed that the preponderance of all participants were students (Figure 9). Letting respondents select multiple answers, gave an evaluation of the students' employment situation. Precisely, 23 of 80 students are in full-time employment, 14 are in part-time employment, 25 are unemployed and currently looking for work, and 18

are unemployed and not currently looking for work. Twelve of the participants are in full-time employment, of which two are self-employed.

5.3.2 Perceptions of Aviation and Aerospace Occupations

In the second part of the survey questionnaire, recipients were asked six questions related to what they deem to be aviation and aerospace. Survey findings are vital to understanding whether they mirror the theoretical framework and discovering something overlooked.

The first question spotted that 44.6 % of the participants know very little about aviation and aerospace occupations, 31.5 % know a fair amount, 19.6 % have heard of but know nothing about careers in the aviation and aerospace industry, and 4.3 % said that they know a lot about careers in this sector (Figure 10). Only one respondent works in the industry.

Which of the following statements best describes how familiar you are, if at all, with aviation and aerospace careers?

92 responses

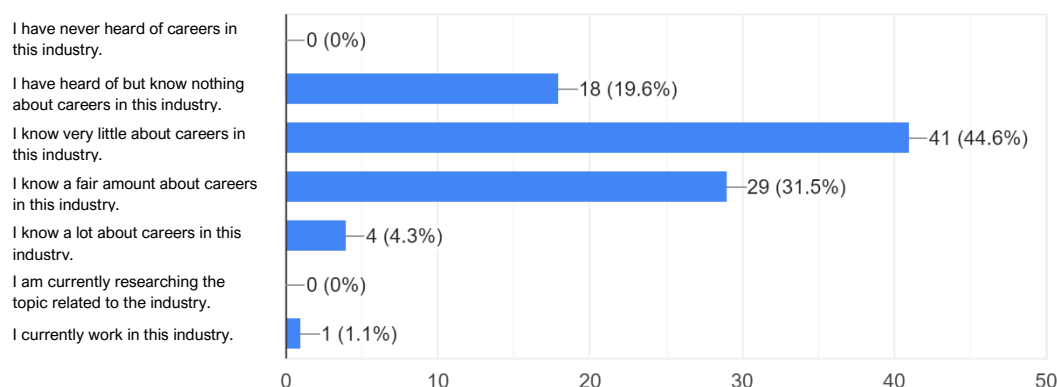


Figure 10 How familiar respondents are with aviation and aerospace careers; 92 respondents

The second question used an agree, disagree scale to collate respondents' views with the most popular beliefs and common stereotype examples (Figures 11.1 and 11.2) that strung the following statements together:

1. Stakeholders in the aviation and aerospace industry continuously seek to acknowledge, empower, and harness socio-cultural diversity.
2. The aviation and aerospace industry has a reputation for surmounting unconscious bias in HR decisions.
3. You need to obtain a degree specific to aviation to have career prospects in aviation and aerospace.

4. Unless you want to become a pilot, there are hardly any other professions in the world of aviation and aerospace.
5. A career in aviation and aerospace is one of the most stable career paths.
6. I would not consider a career in aviation and aerospace as there are only extremely stressful occupations.

Forty-one of the participants picked that they strongly agree with the first statement, twenty-eight agree, and twenty-three neither agree nor disagree. Fifty-two of the participants said that they neither agree nor disagree with the second statement, nineteen strongly agree, fourteen agree, and seven disagree. Thirty-eight of the participants answered that they neither agree nor disagree with the third statement, seventeen agree, sixteen strongly disagree, eleven disagree, ten strongly agree. Sixty-one of the participants stated that they strongly disagree with the fourth statement, twenty neither agree nor disagree, five disagree, and only six either strongly agree or agree. Sixty-four of the participants neither agree nor disagree with the fifth statement, twelve agree, ten strongly disagree, four disagree, and two strongly agree. Twenty-eight of the participants neither agree nor disagree with the sixth statement, twenty-six strongly disagree, twenty-one strongly agree, thirteen disagree, and four agree.

To what extent do you agree or disagree with each of the following:

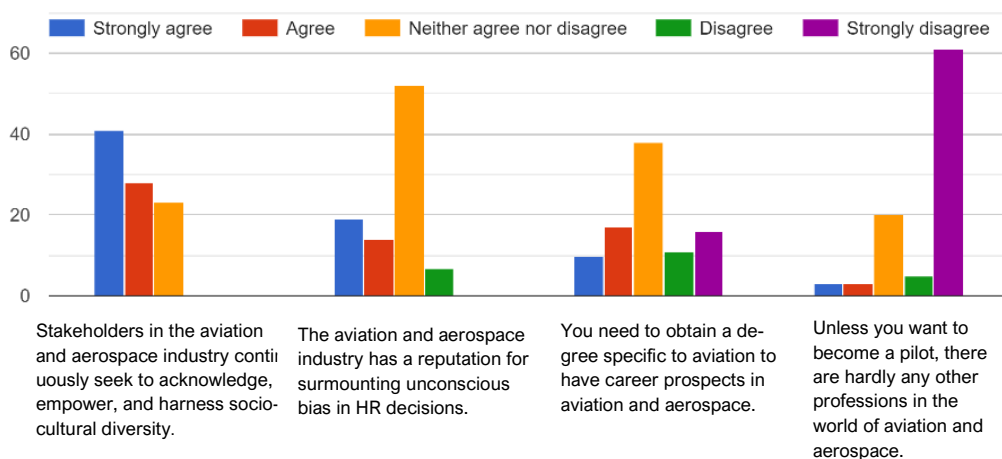


Figure 11.1 How respondents' views juxtapose with the most popular beliefs and common stereotype examples; 92 respondents

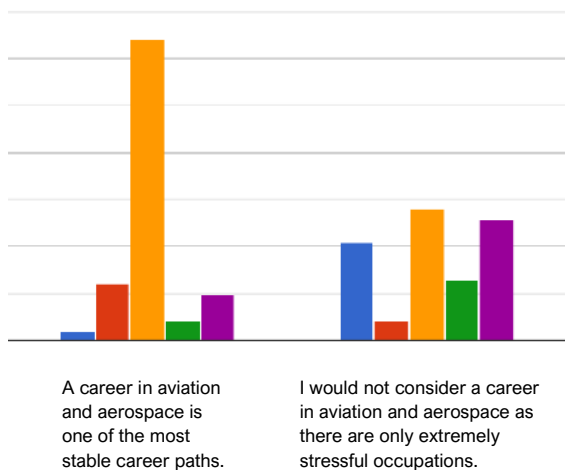


Figure 11.2 How respondents' views juxtapose with the most popular beliefs and common stereotype examples

The third question fathomed participants' knowledge of career compendium in the aviation and aerospace industry (Figure 12). All participants answered that they have heard of in-flight careers. Nearly all participants, 91, said that they are aware of airline careers. Eighty-eight of the participants know of airport careers; eighty-five know of physical scientists' careers. Nearly 80 % recognize aircraft manufacturing careers. Over half of the participants acknowledge aerospace careers. More than a third of the participants are informed of academic careers. Just 17.4 % of the participants tuned in state government careers. No one answered, "None of the above".

Which of the following, if any, aviation and aerospace careers have you heard of before today?

92 responses

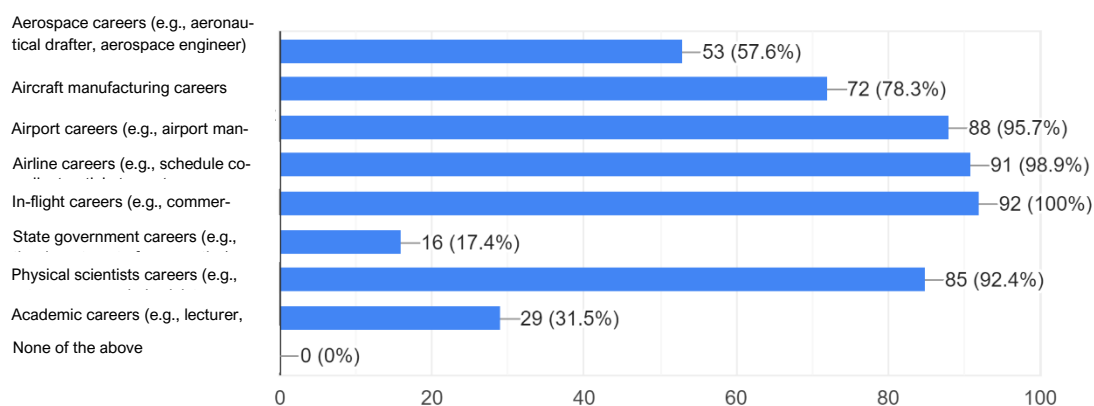


Figure 12 Which of the careers respondents have heard of; 92 respondents

The fourth, multiple-answer question, dispelled any doubts as to what are the most invigorating practices to reinforce career awareness in aviation and aerospace (Figure 13). Respondents could have opted for an answer from a choice list and an answer in open text format. All of the respondents are confident of seminars and workshops in schools that feature professionals with real-life experiences as the solution, 95.7 % of aviation recruitment fairs, and approximately 90 % of school tours to aviation and aerospace companies. No one seems to think that the options offered by the questionnaire designer were inapplicable. Respondents went over and above and provided some excellent suggestions. They are as follows:

- the course development for students studying in non-aviation programs
- a social media campaign to spread the word about the importance of aviation and aerospace careers
- career counseling and guidance for middle school and high school students
- creating brochures and pamphlets for all school-age children
- career days throughout the school year with company displays of a product or service
- job shadowing
- interactive games for elementary students
- taking into account parental influence on career choice of school students and inviting them to career events.

Which of the following, if any, do you think are the most helpful ways to foster career awareness in aviation and aerospace?

92 responses



Figure 13 How to increase career awareness in aviation and aerospace; 92 respondents

The fifth question ferreted out how many survey participants were actually brooding over their educational pursuit in aviation-related career paths (Figure 14). Surprisingly, the overwhelming majority of respondents, 66.3 %, answered positively, and 33.7 % negatively.

The last, open-ended question traced the sources that suppressed students' and young professionals' abilities to follow a career in aviation and aerospace. To keep respondents' confidential data safe, the author decided not to insert a figure with answers. By the same token, answers with personal matters were excluded from this study. Other than that, respondents recalled that the root causes were, as follows:

- tuition costs of education
- the impact of family and friends on career selection
- a distant location of a university from home country
- the burden of responsibility for someone's life
- not enough knowledge of the industry
- failing entrance examination several times.

Were you thinking about pursuing an education in aviation-related career paths at some point in your life?

92 responses

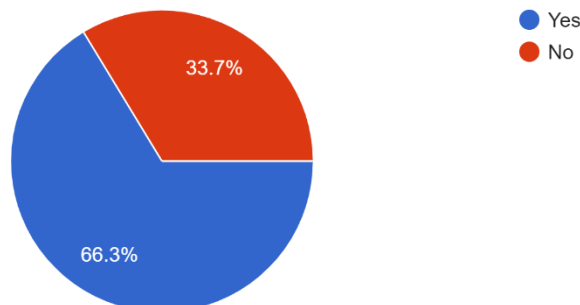


Figure 14 Respondents' past considerations of whether to pursue an education in aviation-related career paths; 92 respondents

On the whole, the results of this survey section revealed that the mass of the participants wanted to receive aviation education, even though it was not one of the preconditions for taking part in the survey, nor the author of the study did hint that it will be one of the questions. Even so, the scantiness of information on career opportunities and trajectories, superficial knowledge of the industry, hefty tuition fees, the fear of onerous responsibility, worrying about being away from family and friends, and parental and peer pressure in career choice are often observed causes that held back students and young professionals from entering education and beginning a career in aviation and aerospace. Some of these

causes have already surfaced at the end of the first theory chapter. Withal, the submitted responses indicate that preschools, elementary schools, middle schools, and high schools largely decide a student's career choice, and apparently, they play a key role in embedding information barriers, as previously discussed in the theoretical framework. It is beyond the bounds of possibility to answer, on average, how many students contemplate receiving aviation-aerospace education but do not act on it.

5.3.3 The Intelligence Hunt Project Competition

The third part of the questionnaire concentrates on finding out to what extent respondents are familiar with the project, assessing the project and project finals through sets of touchstone, and framing hypothetical questions that are appurtenant at the initiative stage for idea realization of the Intelligence Hunt in aviation and aerospace.

When asked how familiar respondents are with the project (Figure 15), 58 answered that they are former project participants, of which 7 have a profound knowledge of the project, and 51 have full knowledge. Twenty-eight of the respondents said that they have factual but incomplete knowledge of the project. Five of the respondents have full knowledge, but they have never joined the project. A single individual is a trainee at SeaFocus and has a profound knowledge of the project. No one answered that they have limited or uncertain knowledge of the project. There were no current participants in the project who filled out the questionnaire.

Overall, how familiar are you with the Intelligence Hunt project? Please select all that apply.

92 responses

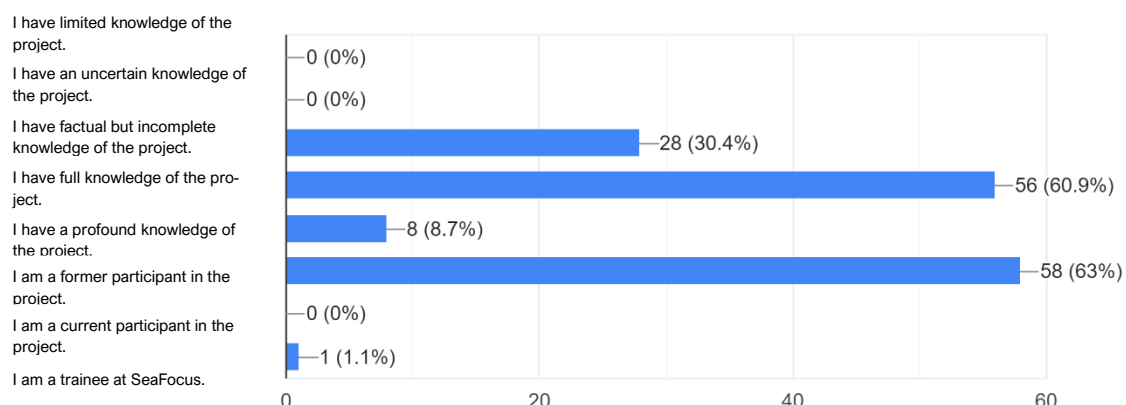


Figure 15 The extent to which respondents are familiar with the project; 92 respondents

The successive question asked former and current project participants, if any, to rate plain attributes on a Likert scale (Figures 16.1 and 16.2). Fifty-eight of the participants rated the

project's purpose as very good. Thirty-five of the participants graded teamwork as good, seventeen as fair, four as very good, and two as poor and very poor. Thirty-seven of the participants ranked case study assignments, e.g., their clarity, engagement, and actuality as good, and twenty-one as very good. Thirty-one of the participants rated case companies, e.g., responsiveness, manner of handling follow-up questions, mentoring as very good, twenty-six as good, one as fair. Thirty-eight of the participants think that resources are good, thirteen – fair, and seven – very good. All 58 responses evaluated the SeaFocus team, e.g., responsiveness, professionalism, efficiency in solving problems, knowledge in a given case as very good. In terms of realistic timelines, thirty-six of the participants rated them as good, thirteen as fair, and nine as very good. All respondents rated the value of the project upon its completion as very good.

In the last question, if one of your answers was "I am a former participant in the project." or "I am a current participant in the project.", please rate the project on the following attributes.

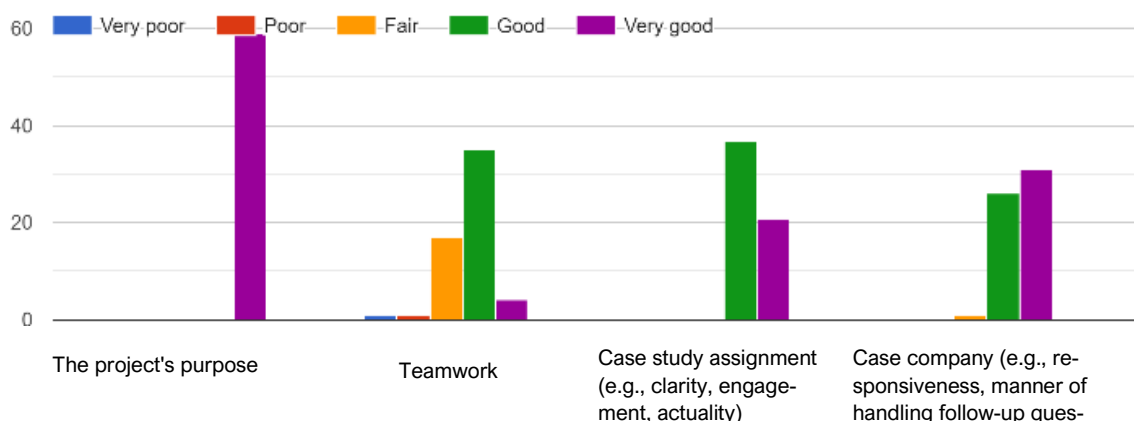


Figure 16.1 How former and current project participants rated project attributes; 58 respondents

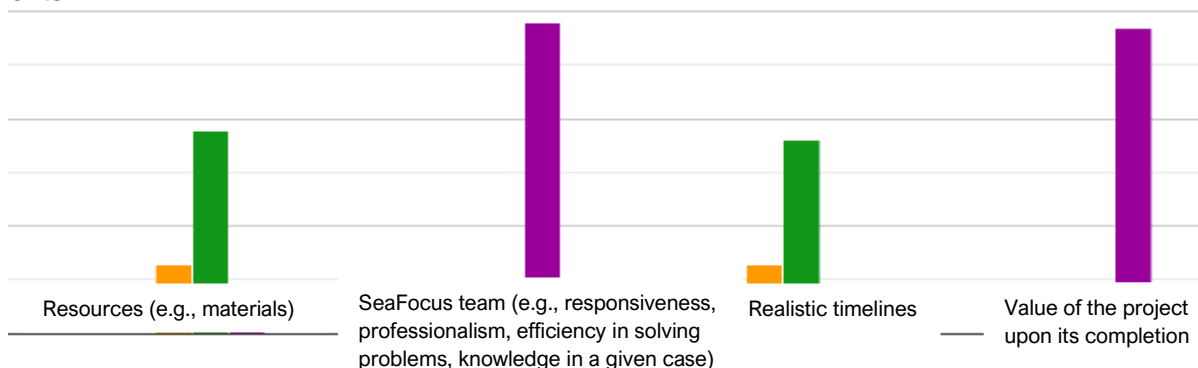


Figure 16.2 How former and current project participants rated project attributes

Fifty-six of the respondents answered that, on a scale from 1 to 5, it is very likely that they would have recommended the project to someone they know; two of the respondents replied that it is likely.

How likely is it that you would recommend participation in the project to a fellow student, friend, or colleague?

58 responses

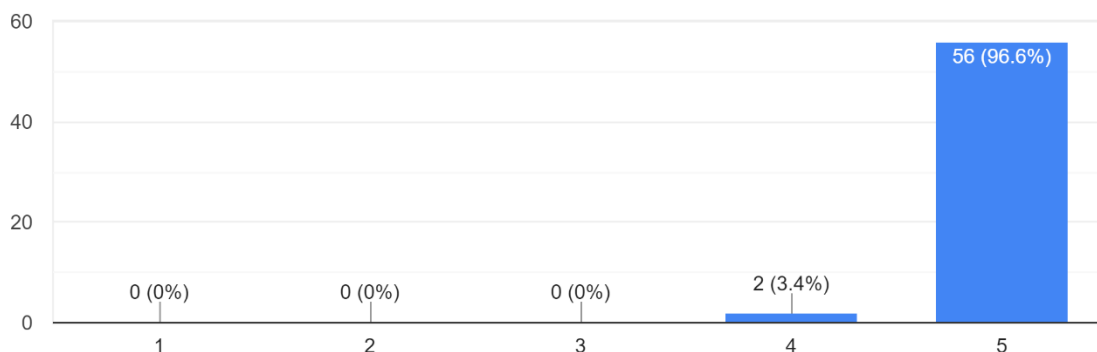


Figure 17 How likely is it that respondents would recommend participation in the project; 58 respondents

When asked to provide feedback and suggestions for the improvement of future projects, the overwhelming majority declared that they are pleased with how everything works right now. Only a few respondents mentioned that sometimes, team members lose their fire towards the end of the project, but it is not the organizers' fault.

The two ensuing questions showcased the reasons to attend the project finals (Figure 18) and respondents' satisfaction with an event (Figure 19). Fifty-eight of the respondents were members of presenting teams and used an event as a networking tool; fifty-two respondents of those fifty-eight knew the organizers or participants, and ten had an interest in case study assignments. Eleven of the respondents attended the finals just because they knew the organizers or participants, nine for networking, and ten were curious about case study assignments. No one sought the finals because of other options. All respondents approved of the project finals giving it the highest mark on a scale from 1 to 5, where 1 means "very dissatisfied" and 5 - "very satisfied".

If you have attended at least one of the project finals, what was the main reason? Please choose all that apply.

88 responses

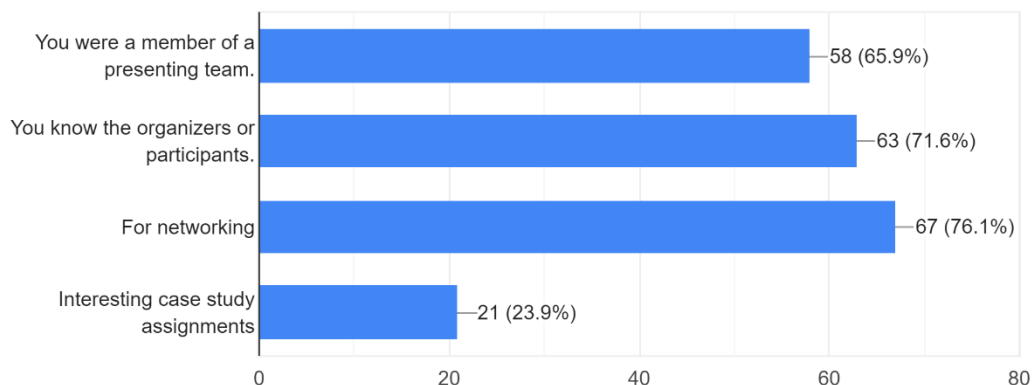


Figure 18 What were the reasons to attend the project finals; 88 respondents

How satisfied were you with the finals?

88 responses

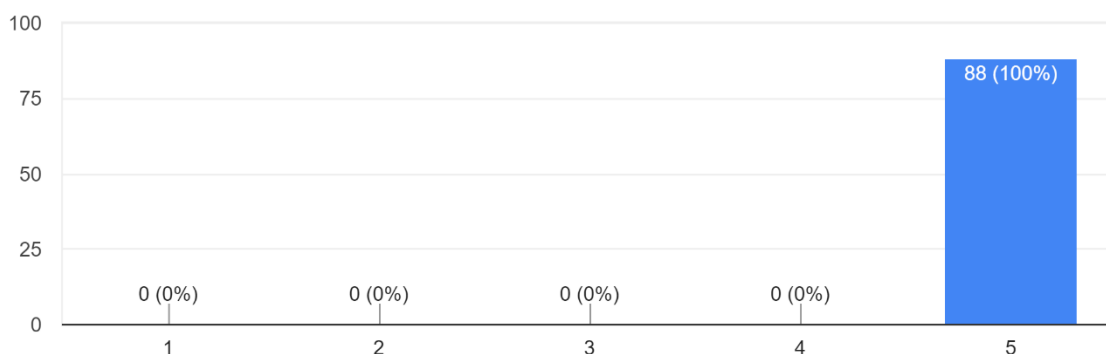


Figure 19 Respondents' satisfaction with the finals; 88 respondents

The two concluding questions decided the fate of the idea of scalability of the Intelligence Hunt in aviation and aerospace (Figures 20 and 21). Hundred percent of the respondents gave affirmative answers to the question "Do you think scaling up the adoption of the project would be as successful in aviation and aerospace as it is in the maritime industry?". Nearly 94 % said that if they had an opportunity to challenge themselves in the aviation project version, they would apply as a candidate. For the rest of the respondents, it may be the case. There is not a single negative answer. It can be safely assumed that the project is and will be in demand. If the results for the small sample size are close to 100 percent, then it is a positive probability that it will be the same for a larger sample size. Hence, scaling up the adoption of the maritime industry project competition will attract more students and

young professionals to the aviation and aerospace industry, which answers the main research question.

Do you think scaling up the adoption of the project would be as successful in aviation and aerospace as it is in the maritime industry?

92 responses

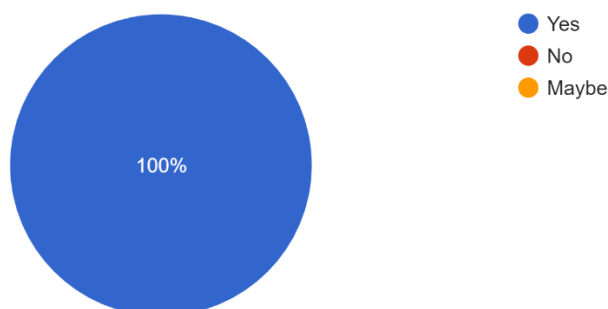


Figure 20 What respondents think about the hypothetical scalability of the Intelligence Hunt; 92 respondents

If you had an opportunity to challenge yourself in the aviation project version, would you apply as a candidate?

92 responses

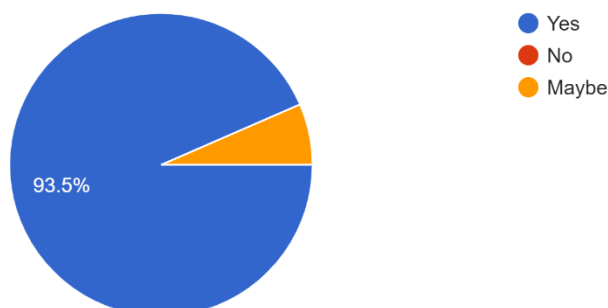


Figure 21 What respondents would do if they had an opportunity to challenge themselves in the aviation project version; 92 respondents

6 PROJECT DEVELOPMENT PLAN

The project development plan is based on the theoretical part, findings of the empirical study, and the author's intimate knowledge of the inner workings of the case company. Since the previous chapter has shown that the Intelligence Hunt in aviation and aerospace is in demand, it is time to consider some aspects of project management. The first subchapter looks at the SWOT analysis for project management, followed by the second subchapter that discusses modifications to the original design of the project. And the last subchapter outlines the project management timeline.

6.1 SWOT Analysis for Project Management

SWOT analysis is a strategic tool to evaluate a company's overall strengths, weaknesses, opportunities, and threats with meticulous attention. The objective of SWOT analysis is to leverage a company's strengths and irresistible opportunities in the external environment while abolishing or taming the weaknesses and curtailing the threats. (Kotler & Armstrong 2012, 53-54.) SWOT analysis for project management capacitates a project manager to optimize the entire project process, diagnose problem areas, and espy hidden improvements. Given the intrinsic nature of the analysis, it is crucial to carry it out during the production and deployment phase of a project. Figure 22 displays the elements of a SWOT analysis. Figure 23 illustrates the amended version of a SWOT analysis for project management.

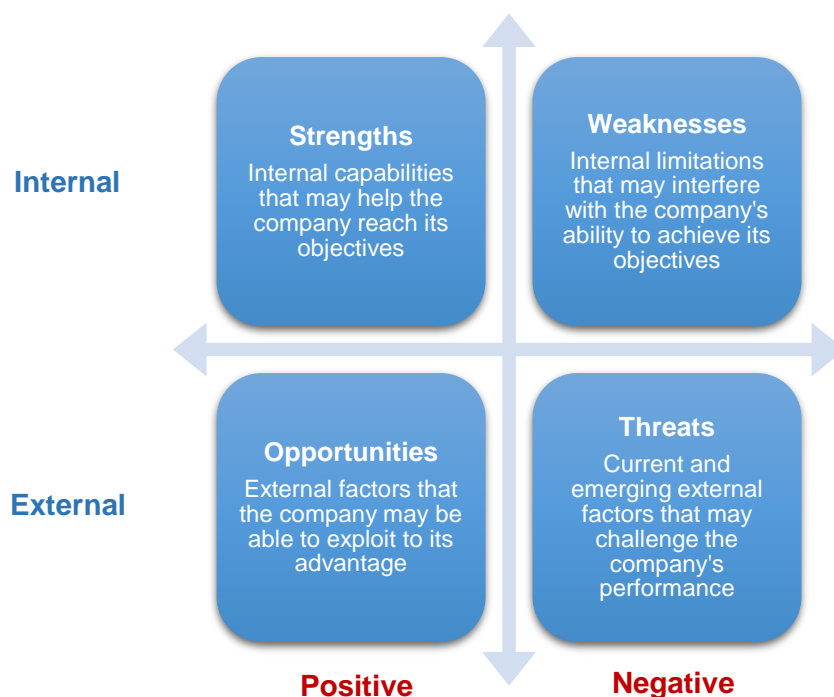


Figure 22 Elements of a SWOT analysis (Kotler & Armstrong 2012, 54)

Figure 24 contains the SWOT analysis for the Intelligence Hunt project management in aviation and aerospace. The backbones of the analysis are theoretical and empirical research of the thesis.

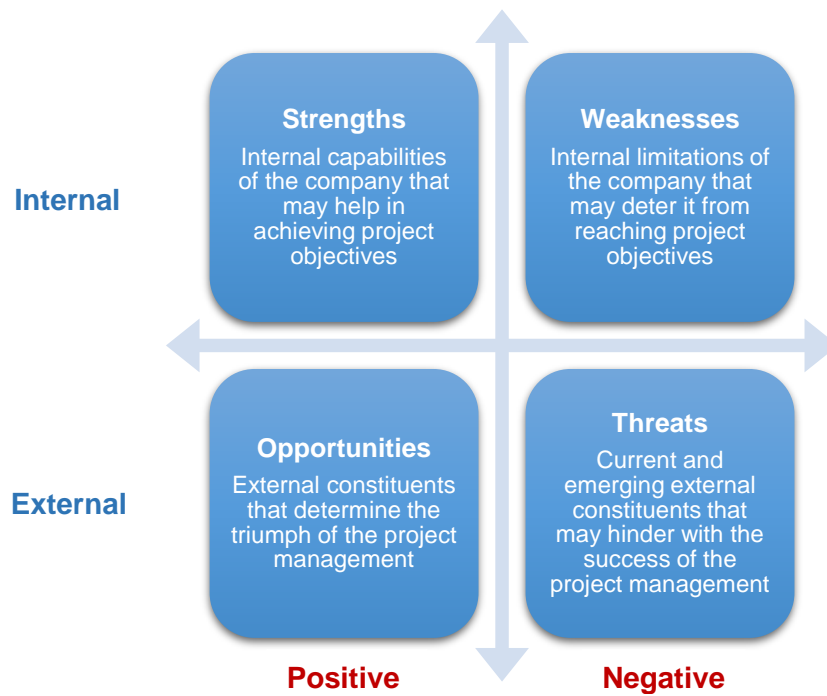


Figure 23 Elements of a SWOT analysis for project management



Figure 24 The SWOT analysis for the Intelligence Hunt project management in aviation and aerospace

6.2 Modifications to the Original Design of the Project

Now, when the survey questionnaire has detected existing demand for the project competition in aviation and aerospace, without which there would be not much point to start working on project implementation, it is possible to answer SubQ4: "What kind of modifications should be made to bring the maritime industry project competition in question to life in aviation and aerospace?"

As already noted in the SWOT analysis, Figure 24, the Intelligence Hunt is a platform-independent project, which means that a carbon copy of the project gives any industry the advantageous feature of using it without making drastic changes. However, there are alterations needed. They are as follows:

- writing project objectives
- formulation of a mission and vision statements
- defining project deliverables
- stakeholder mapping and value proposition for each group
- project management timeline
- recruiting a team of trainees involved in initial project planning and a clear definition of their roles
- project sourcing, e.g., advisory board
- project cost management
- preparing the pitch proposals for stakeholders and establishing partnerships
- getting the right sponsors
- devising a communication plan with all stakeholders
- finding the right project participants.

All alterations are readily achievable; ergo, project implementation is feasible.

To identify stakeholder groups, their degree of importance, the breadth of interest in a project, level of involvement, and whether they will adversely or positively affect a project, a company can conduct a mapping exercise. In 1981, Mendelow introduced the power/interest matrix, which ranks stakeholders contingent upon the power they possess and wield

and their operational interest in a company. Figure 25 presumes project stakeholders in aviation and aerospace and allocates the position to a stakeholder on the grid.

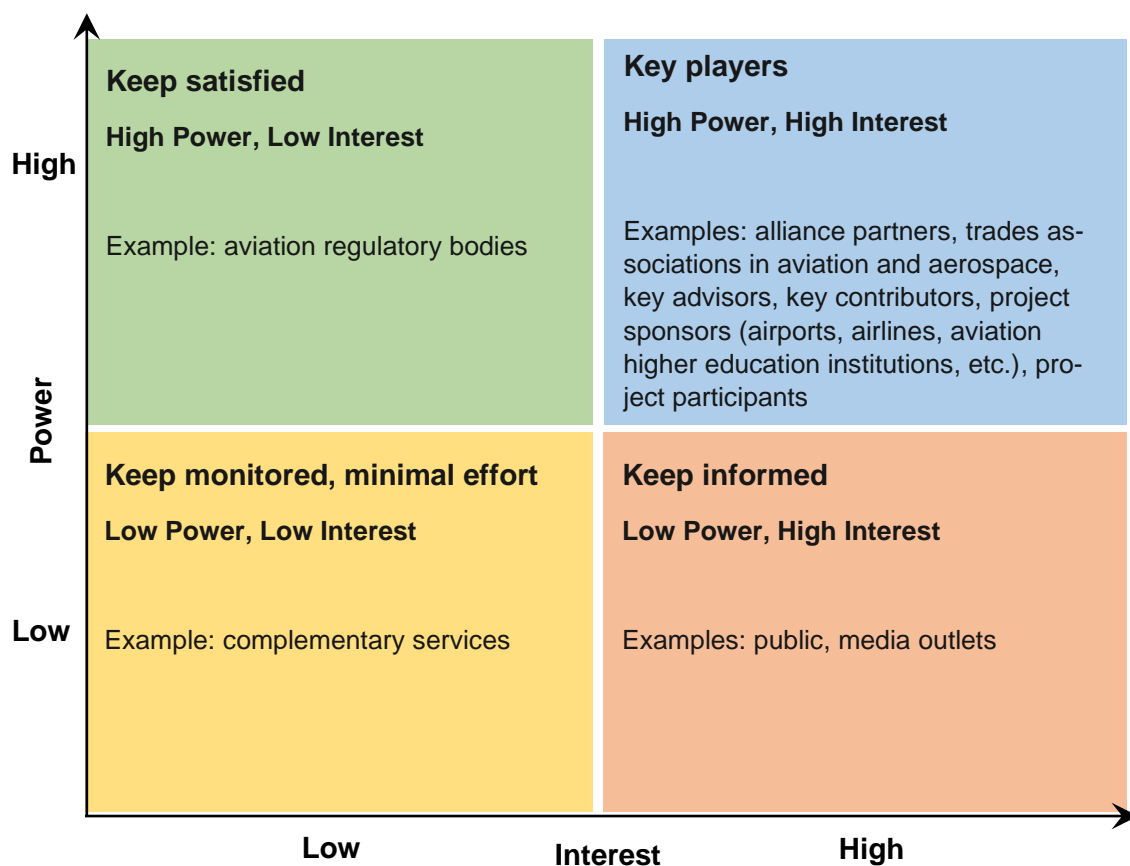


Figure 25 Stakeholder mapping (adapted from Mendelow 1981, 412)

6.3 Project Management Timeline

In an effort to better illustrate the application of the above-suggested modifications to practice and further elaborate on them, the author provides a realistic project management timeline with clear milestones that visualizes what tasks have to be done and when. The timeline is flexible, and its contents can be deleted, edited, or inserted. Complete details are given in Appendix 2.

7 CONCLUSION

The objective of the thesis is to ascertain whether scaling up the adoption of a maritime industry project competition will increase students' and young professionals' interest in the aviation and aerospace industry, in that way, minimize a skills shortage. First, this concluding chapter provides the answers to the main research question and sub-questions. Next, it measures the validity and reliability of this study. And, lastly, suggestions for further research will be made.

7.1 Answers to the Research Questions

The thesis author raised four sub-questions to facilitate the main research question answering process. The answers are in a logical sequence: first, sub-questions and then, the main question.

SubQ1: “What is a skill shortage?”

The concept of a skill shortage integrates three paradoxical definitions: a skill shortage itself, skill gap, and recruitment difficulties.

Genuine skills shortages are a consequence of an insufficient number of people who are available and prepared to work. The deficiency in required skill levels among current employees and job applicants is a skills gap. (Green, Machin & Wilkinson 1998, 165.) Recruitment difficulties also imply hard-to-fill vacancies, but they do not contribute to a market-wide shortage, unlike skills shortages and skills gaps.

SubQ2: “What are the factors obstructing intentions among students and young professionals from making a career choice in favor of the aviation and aerospace sector?”

Both theoretical and empirical research distinguished these causative factors as the major stumbling blocks, in order of importance: information asymmetry during the school-age years, the outrageous cost of tuition, lack of willingness to sacrifice health, wellbeing and personal life for professional growth, parental and peer pressure in career choice.

SubQ3: “What efforts have been made by different organizations to integrate students and young professionals to refer to the anticipated shortage of aviation specialists?”

Chapter 3 reported that the International Civil Aviation Organization and the International Air Transport Association are key players in aviation and aerospace when it comes to efforts to close skills shortages. Other parties, who have a vested interest in the industry, are highly

dependent on them, and usually either collaborate with them or use their guidelines to adopt the same models for initiatives, or both. Initiatives comprise a range of activities, including, for example, symposia, workshops, forums, development of online learning, contests, outreach newsletters. A detailed description of all activities is in the aforesaid chapter.

SubQ4: “What kind of modifications should be made to bring the maritime industry project competition in question to life in aviation and aerospace?”

In consonance with the previous chapter, the Intelligence Hunt is a platform-independent project, which means that an eidetic project works in any industry. Nonetheless, there are modifications needed in: project objectives, mission and vision statements, project deliverables, stakeholder mapping and value proposition, project management timeline, a team of trainees involved in initial project planning, project sourcing, project cost management, the pitch proposals for stakeholders to establish partnerships and get the right sponsors, communication plan with all stakeholders.

The main research question: “Will scaling up the adoption of a maritime industry project competition attract more students and young professionals to the aviation and aerospace industry?”

The survey questionnaire underscored the apparent demand for the project competition in aviation and aerospace. All respondents were absolutely satisfied with the original variant of the project and content after attending the finals event. Chapter 6 brought out that all modifications are readily achievable. In addition, there are not enough enterprises in the industry that focus on young talents who are one of the clues to solving the skills crisis. That might be a reason why the problem does not go away. Therefore, the answer to the question is affirmative.

7.2 Validity and Reliability

Validity and reliability are psychometric properties, or characteristics, of the adequacy and accuracy of behavioral measure.

Validity refers to the extent in which research is measuring what was intended to be measured (Saunders, Lewis & Thornhill 2016, 202-204). Valid research do not have systematic errors – reproducible inaccuracy introduced by faulty equipment, calibration, or technique (Bevington & Robinson 1992, 3). If study subjects misinterpret what was said, then an author misconstrues the findings. Research is valid if theoretical and empirical research are congruent. The thesis author collected secondary data from print and electronic sources; most of them are books, research articles, and research reports. To collect primary data,

the author carried out the survey questionnaire. The study transpired that theoretical and empirical parts are in consilience, which makes it valid.

Reliability refers to the replication of earlier research design by any researcher and delivering compatible findings (Saunders, Lewis & Thornhill 2016, 202). The findings of the study demonstrated that; it is reliable.

7.3 Suggestions for Further Research

The thesis author aimed to duly research prospective market needs in and demands for the case company's project competition in aviation and aerospace. It is impossible to extrapolate the number of students and young professionals who will enter the project by looking at the number of respondents who said they would. Before a dry run and a couple of projects, saying in what course the situation in the industry will change through the project, the exact areas in which it will help and what are the most useful tools to conquer skills shortages would be preposterous. Thus and so, further research could be conducted after the project is well-established. The interrelationship between acute labor shortages in other industries, e.g., transportation, information technology, healthcare, education, and the Intelligence Hunt is another transcendent research topic.

8 SUMMARY

This thesis set out to figure out whether scaling up the adoption of the Intelligence Hunt, a maritime industry project competition staged by SeaFocus Oy, will attract more students and young professionals to the aviation and aerospace industry. It might give an idea of how to keep skills shortages in the sector to a minimum.

The first chapter enveloped the research background, thesis objectives, research questions, limitations, theoretical framework, theory development and research design, and thesis structure. The concepts and causes of skills shortages were explained in chapter two. The third chapter explored existing initiatives by aviation and aerospace organizations to engage a large number of students and young professionals in the industry. In chapter four, the author presented the case company, its business activities, and the minutiae of the Intelligence Hunt project competition.

Chapter five consisted of the empirical research made in the form of a survey questionnaire on perceptions of aviation and aerospace occupations, opinions on the original release version of the Intelligence Hunt, and expressions of interest in a new project, with subsequent data analysis. Survey results aided the author in answering research questions.

In chapter six, the author put together a project development plan for aviation and aerospace with a timeline template.

The conclusion in chapter seven was composed of the answers to the research questions, validity and reliability of the research, and suggestions for further research.

The thesis met all objectives.

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APPENDICES

APPENDIX 1: Questionnaire

New Venture Project and Competition Survey

This is a questionnaire for Elza Ken's bachelor thesis, tasked by SeaFocus Oy, a Finland-based executive maritime business platform. The prime purpose of this survey questionnaire is to ascertain the possibility of scaling up the adoption of the Intelligence Hunt project competition to attract more students and young professionals to aviation and aerospace. Please note: respondents must belong to the group of minors under 18, the 18-24, or the 25-34 age groups and be somewhat familiar with the Intelligence Hunt.

Thank you once again for taking the time to complete this survey! We truly value the information you have provided. Your responses will contribute to helping shape the future of the global economy.

*Required

Please indicate your gender: *

- Female
- Male
- Prefer not to answer
- Other: _____

Which category below includes your age? *

- 17 or younger
- 18-24
- 25-34

What is the highest level of school or degree you have completed? (If you are a currently enrolled student, please select the highest degree you hold.) *

- Less than a high school diploma
- High school diploma or equivalent
- Attended college but did not earn a degree
- Associate's degree (e.g., AAS, AA, AS, AFA)
- Bachelor's degree (e.g., BA, BS, BBA, BE, BArch, BFA)
- Master's degree (e.g., MA, MS, MBA, MEd)
- Professional degree (e.g., JD, MD, DDS)
- Doctoral degree (e.g., PhD, DNP, EdD)

Which of the following best describes your current employment situation? *

- Student at a higher education institution
- Full-time employment
- Part-time employment
- Unemployed and currently looking for work
- Unemployed and not currently looking for work
- Self-employed
- Other: _____

NEXT

Perceptions of Aviation and Aerospace Occupations

Which of the following statements best describes how familiar you are, if at all, with aviation and aerospace careers? *

- I have never heard of careers in this industry.
- I have heard of but know nothing about careers in this industry.
- I know very little about careers in this industry.
- I know a fair amount about careers in this industry.
- I know a lot about careers in this industry.
- I am currently researching the topic related to the industry.
- I currently work in this industry.

To what extent do you agree or disagree with each of the following: *

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Stakeholders in the aviation and aerospace industry continuously seek to acknowledge, empower, and harness socio-cultural diversity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The aviation and aerospace industry has a reputation for surmounting unconscious bias in HR decisions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You need to obtain a degree specific to aviation to have career prospects in aviation and aerospace.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unless you want to become a pilot, there are hardly any other professions in the world of aviation and aerospace.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A career in aviation and aerospace is one of the most stable career paths.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would not consider a career in aviation and aerospace as there are only extremely stressful occupations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which of the following, if any, aviation and aerospace careers have you heard of before today? *

- Aerospace careers (e.g., aeronautical drafter, aerospace engineer)
- Aircraft manufacturing careers (e.g., aerospace manufacturing and assembly, aeronautical and astronautical systems design, airframe equipment and engine assembly)
- Airport careers (e.g., airport management, airport operations, airport engineer, airport fixed-base operator, line person or ramp service person, airport safety and security, airport maintenance, airport terminal)
- Airline careers (e.g., schedule coordinator, ticket agent, passenger service agent, flight dispatcher)
- In-flight careers (e.g., commercial pilot, corporate pilot, flight engineer or second officer, airline flight attendant, corporate flight attendant)
- State government careers (e.g., the department of aeronautics)
- Physical scientists careers (e.g., astronomers and physicists, atmospheric and space scientists)
- Academic careers (e.g., lecturer, assistant professor, associate professor or researcher at an aviation academy or university)
- None of the above

Which of the following, if any, do you think are the most helpful ways to foster career awareness in aviation and aerospace? *

- Seminars and workshops in schools that feature professionals with real-life experiences
- School tours to aviation and aerospace companies
- Aviation recruitment fairs
- None of the above
- Other: _____

Were you thinking about pursuing an education in aviation-related career paths at some point in your life? *

Yes

No

In the last question, if your answer was "Yes", but you did not start out on your career, please explain why.

Your answer

BACK

NEXT

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The Intelligence Hunt Project Competition

Overall, how familiar are you with the Intelligence Hunt project? Please select all that apply. *

- I have limited knowledge of the project.
- I have an uncertain knowledge of the project.
- I have factual but incomplete knowledge of the project.
- I have full knowledge of the project.
- I have a profound knowledge of the project.
- I am a former participant in the project.
- I am a current participant in the project.
- I am a trainee at SeaFocus.

Please give brief feedback and provide suggestions, if you have any, for improving our future projects.

Your answer

If you have attended at least one of the project finals, what was the main reason? Please choose all that apply.

You were a member of a presenting team.

You know the organizers or participants.

For networking

Interesting case study assignments

Other: _____

How satisfied were you with the finals?

Very dissatisfied 1 2 3 4 5 Very satisfied

Do you think scaling up the adoption of the project would be as successful in aviation and aerospace as it is in the maritime industry? *

Yes

No

Maybe

If you had an opportunity to challenge yourself in the aviation project version, would you apply as a candidate? *

- Yes
- No
- Maybe

BACK

SUBMIT

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APPENDIX 2: Project Management Timeline

