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DISRUPTIVE INNOVATION IN AEROSPACE: THE ROLE OF STARTUPS IN HIGH
BARRIER TO ENTRY MARKETS

ELIE ANAHORY

Work project carried out under the supervision of:

Aman Asija

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ABSTRACT

This thesis explores the escalating trend of startups disrupting the aerospace industry, traditionally characterized by high entry barriers. Despite substantial challenges, these startups have managed to introduce game-changing innovations, unsettling the industry and challenging established players. This study scrutinizes two distinct markets - aerospace and space - to comprehend the drivers of this trend. The research aims to pinpoint the factors that empower startups to innovate and surmount the hurdles associated with entering high-barrier markets. The findings will offer insights for both startups and established businesses seeking to thrive in these industries.

Keywords : Aerospace, Innovation, Barriers-to-Entry, Startups, Disruptive Innovation and eVTOL

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1) INTRODUCTION

Aerospace, often regarded as a compound term combining "aeronautics" and "space," is actually a concatenation of "atmosphere" and "outer space". The former denotes the region extending up to 100 kilometers above the Earth's surface, while the latter encompasses the vast expanse between celestial bodies. The aerospace industry encompasses both the aeronautics and space sectors, a historical unity stemming from noteworthy developments. Although the beginning of motorized aviation dates back to the Wright brothers' Flyer in 1903, it was during the post-war boom of the 1950s that aviation truly took flight. This era witnessed a significant milestone with the introduction of the pioneering jet airliner by De Havilland, revolutionizing air transport. Moreover, colossal investments in research, particularly in military and supersonic domains, characterized this period. Against the backdrop of the Cold War, where technological supremacy was of paramount importance for both blocs (Bekes, 2021), the term "aerospace" gained widespread recognition. It became increasingly evident that advancements in one realm were contingent upon advanced knowledge from the other.

In the 1950s and 1960s, aerospace emerged as a critical and strategic industry. Big names like Boeing, Lockheed Martin, McDonnell, Sputnik, and NASA stepped onto the stage. These entities, fuelled by public investment, led the way in technological and disruptive innovation. For example, under the Apollo program, funding reached a peak of \$25.4 billion for NASA, equivalent to \$257 billion today (NASA, 1974)

From then until the early 2000s, the aerospace industry evolved through several stages. The 1970s marked a time of diversification in state investment, supporting innovative projects like the Concorde, mainly funded by the French and British governments. Then, starting in 1978, the era of privatization and regulation began. The Airline Deregulation Act paved the way for private players to enter the scene, opening the skies and space to a new generation of innovators.

Over many decades, due to various factors, the aerospace industry has been considered as one of the sectors with the highest barriers to entry. Therefore, in an era where startups are increasingly occupying a pivotal role in the innovation ecosystem and the economy at large, this study will delve into the part these small entities play within the aerospace industry, focusing specifically on its disruptive innovation. To do this, we will start from the hypothesis that startups inherently possess competitive advantages over large corporations when it comes to disruptive innovation. Hence, we will strive to answer the question: What are the factors that facilitate disruptive innovation that startups possess but large corporations lack or have less of? To attempt to answer this, we will base our research on quantitative and qualitative data obtained from numerous professionals in the sector.

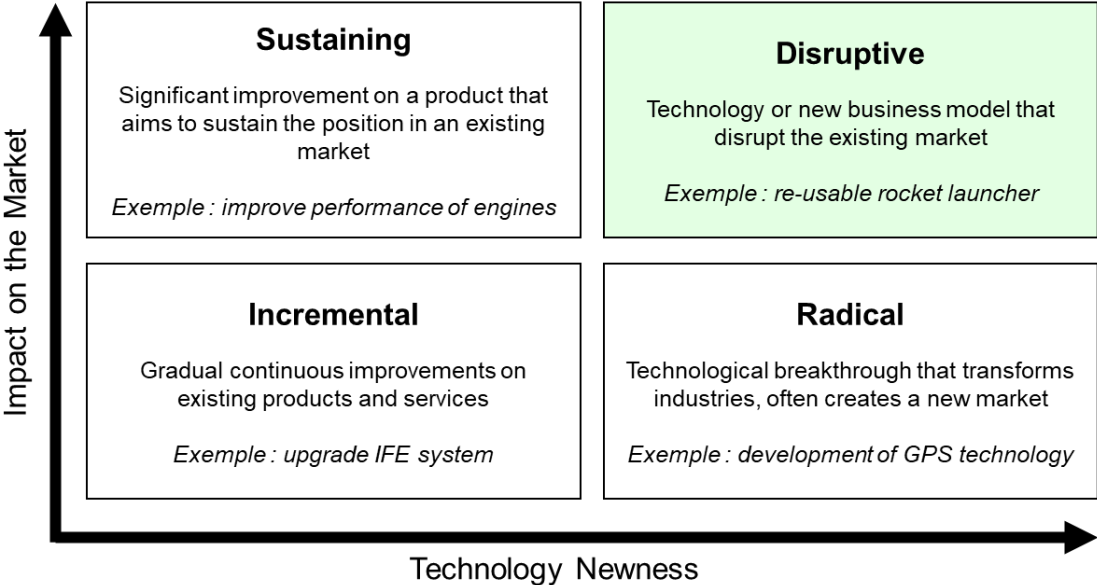
2) CONTEXT

A. The concept of Disruptive Innovation

This thesis focuses on the notion of "disruptive innovation", a term first introduced to the academic landscape in 1995 by Harvard Business School professor, Clayton M. Christensen, in his article, "Disruptive Technologies: Catching the Wave" and two years later in its book named "Innovator's Dilemma". As time passed, Christensen noted that his concept was often

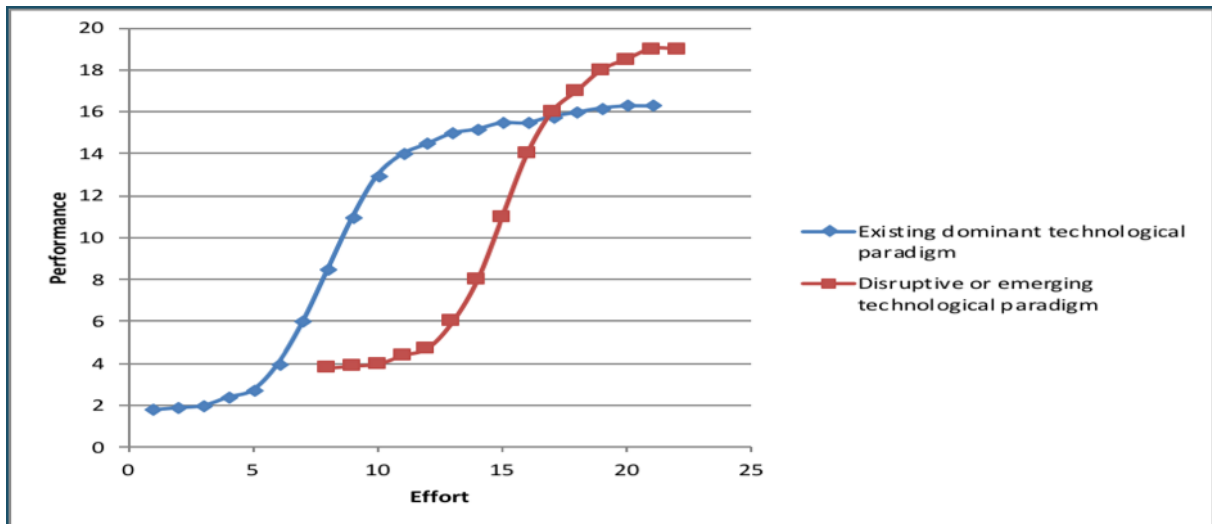
overapplied and misconstrued. Thus, he refined and elaborated his theory and we will pay special attention to his latter work in defining disruptive innovation.

Before delving into the specifics of disruptive innovation, it is important to acknowledge that innovation comes in various forms. However, this thesis will concentrate only on disruptive product innovation. Let's survey the landscape of innovation types:



When describing his theory, Christensen defines a specific development process and some key characteristics shared by all disruptive innovations.

Indeed, the journey of disruptive innovation is a progressive one, initially targeting overlooked or underserved market segments. These innovations usually enter the market with simpler, more affordable, and often more convenient solutions compared to existing offerings (Christensen, 1997). A classic example is the disk drive industry, where each successive generation of smaller and cheaper disk drives first served emerging markets before gradually becoming the mainstream (Christensen, 1995).



The S-curve graph visually represents the performance of disruptive innovation over time. It captures the initially slow performance improvement, followed by a rapid increase as the innovation matures, and finally a tapering off as the innovation reaches its peak potential.

Over time, the quality of disruptive innovation improves, enabling it to cater to a wider, more mainstream audience. This evolution is evident in the shift from mainframe computers to personal computers. The initial inferiority of personal computers, in terms of performance, was offset by their affordability and accessibility, which gradually improved to meet and exceed user needs, leading to their widespread adoption (Christensen, 1997).

Disruptive innovations, according to Christensen, exhibit certain distinguishing traits. They often redefine the **value proposition**, shifting the focus from product characteristics to aspects like **accessibility or ease of use** (Christensen, 2003). Despite initially lower performance metrics and margins, disruptive innovations possess the potential to become profitable as they scale and meet the needs of larger markets (Christensen, 1997).

Incorporating new technologies or innovative business models, these disruptions represent a significant departure from the status quo, inherently carrying a high degree of risk due to their uncertain returns. Interestingly, the adoption of disruptive innovations typically begins slowly,

and once they establish a foothold and begin to improve, their acceptance grows rapidly, often at an exponential rate (Christensen, 1997).

This being said, let's go back to our Aerospace industry and understand why the theory of DI is particularly interesting in this sector.

Indeed, the concept is very much applicable to the aerospace industry due to its potential for transforming a traditionally rigid market historically dominated by a few large, established companies, who primarily cater to high-end(*) market segments with offerings focused on advanced capabilities, enhanced performance, and high reliability (AIA, 2021). This conjuncture is optimal for both **Low-end Disruption** and **New-market Disruption** (Cote, 2022).

Indeed, low-end disruption in the aerospace industry has a huge potential. In a sector where high performance and advanced features are often out of reach for a segment of customers who may not require such high specifications or cannot afford them, disruptive innovation can thrive. By offering simpler and reliable solutions at a more affordable price point, disruptive innovators can tap into this underserved market. They can gradually build their capabilities, starting with this overlooked segment, and over time, compete more directly with established firms by climbing up the market tiers. This movement can introduce a significant shift in the market dynamics and the competitive landscape.

On the other hand, the opportunity for new-market disruption is equally appealing in the aerospace industry. Given the high-tech nature of this industry, there are numerous possibilities for creating entirely new markets segments through innovative technologies or business models. By targeting areas of non-consumption, where existing solutions are either too complex or too costly for potential customers, disruptive innovators can break new ground. They can

*In the context of aerospace, the high-end market refers to the segment that caters to premium customers, offering advanced, often bespoke aerospace solutions characterized by superior performance, cutting-edge technology, and exceptional quality.

introduce products that are more accessible, serve a different purpose, or even create entirely new use-cases.

This showcases the tremendous potential of disruptive innovations in the aerospace sector. Both **technology-push** and **market-pull** opportunities for startups to disrupt the industry (Chopard, 2022). However, pursuing innovation in the aerospace field also poses substantial challenges and difficulties.

B. Barriers-to-Entry in Aerospace

"Barriers to entry" is an economic concept denoting the obstacles that new companies might encounter when attempting to break into a specific market or industry. These barriers can generally manifest in numerous forms, such as high costs, intricate regulations, entrenched brand loyalty, or restricted access to distribution channels. Particularly in the aerospace industry, where these barriers are often elevated (Porter, 2008).

To assess the specific barriers within the aerospace industry that pose challenges for startups, I conducted a questionnaire, the methodology of which will be elaborated upon in the following section. This survey, targeting industry professionals, aims to identify the barriers in the aerospace sector and rank them in terms of significance.

Regulatory Compliance (8.46) : The aerospace industry is heavily regulated to ensure safety and reliability. Startups must navigate a labyrinth of international, national, and industry regulations, which can be both time-consuming and costly. The complexity and stringent nature of these regulations can deter potential entrants (Church, 2000).

Capital Intensity (7.8) : The aerospace industry is extremely capital-intensive. This means that substantial financial resources are required to develop, test, and manufacture aerospace

products. High costs associated with research and development, labor, materials, and facilities can pose a significant barrier to startups without sufficient funding (Bain, 1956).

Safety and Reliability Concerns (6.92) : Aerospace products must meet extremely high safety and reliability standards. Mistakes can have catastrophic consequences, leading to a demand for proven, reliable technologies and companies. Startups, with untested technologies and processes, may struggle to meet these expectations (Rothaermel, Frank T. "Strategic management." McGraw-Hill Education, 2012).

Established Market Players (6.26) : The aerospace industry is dominated by well-established firms with strong brand reputations, loyal customer bases, and extensive resources. These firms can use their position to create obstacles for new entrants in the market, making it difficult for startups to gain a foothold (Porter, Michael E. "The five competitive forces that shape strategy." Harvard business review 86.1 (2008): 78-93).

Technological Complexity (6.03): The aerospace industry involves advanced and complex technologies. Developing or integrating into these technologies often requires a high level of expertise and substantial research and development efforts. This high technological complexity may be a daunting challenge for startups (Cohen, Wesley M., and Daniel A. Levinthal. "Innovation and learning: the two faces of R&D." The economic journal 99.397 (1989): 569-596).

Additionally, some respondents suggested including **Workforce Availability** as a barrier-to-entry. Indeed, aerospace engineering certainly demands specialized expertise, and certain regions may lack the necessary talent pool, which explains why the industry often clusters in specific hubs like Toulouse in France or Seattle in the US.

In summary, driving innovation in the aerospace sector traditionally requires substantial resources, explaining why only a handful of established companies dominated the field for

decades. However, the past 20 years have seen these towering barriers gradually lower as knowledge disperses, encouraging entrepreneurs to view aerospace as a promising territory for innovation.

3) METHODOLOGY

In order to answer the question - "What are the factors that facilitate disruptive innovation that startups have, but large corporations do not have or have less of?" - I conducted a survey with X participants to gather their insights and obtain quantitative data. Additionally, I engaged in conversations with three industry professionals, using both recorded and non-recorded interviews, to probe deeper into the topic, gain a more nuanced understanding and get qualitative data.

The survey I conducted was divided into two sections, the first focusing on barriers-to-entry and the second on the competitive advantages of startups over established market players in terms of innovation.

I received responses from X industry professionals. Of these, 49.2% have over five years of industry experience, 25.4% have less than five years, and the remaining 25.4% are students (Figure 11).

When it comes to their current roles, 47.5% work for an established company, 27.1% are employed by a startup or a unicorn, and 11.9% are students (The discrepancy between this figure and the number of students can be attributed to some students working while studying). A further 3.4% work in a consulting firm, and 10.2% fell into the "Other" category (Figure 10).

To determine the competitive advantages of startups in terms of innovation, I asked the respondents to rate four factors on a scale of 1 to 10, where 1 indicates a non-existent

advantage and 10 represents a very strong advantage. They also had the option to add any other advantages they perceived in an open-ended question.

In addition to the survey, I conducted interviews following an interview guide (Appendix).

One of these was recorded and transcribed. My aim was to engage with successful aerospace industry entrepreneurs from my LinkedIn network who have experience in both startups and large companies. This breadth of experience was essential to make a comparative analysis of how innovation is executed in different types of organizations.

4) RESULTS

A. Survey

Before getting to the results of the researches, it is important to consider the limits of the survey which are : low number of respondent and concentration of the respondents in EMEA and North America. Thus, the results should be interpreted as giving an overall idea of the market perceptions which might not be the most precise one.

For the question “On a scale from 1 to 10, do you think Factor X is a competitive advantages for startups in aerospace ?”, the responders had 4 propositions and here are the results :

Agility and Flexibility (7.91): With the highest average, the agility that startups enjoy over big companies seems to be the strongest competitive advantage to create disruptive innovation. Indeed, without the constraints of multiple management layers, rigid procedures, and legacy systems, startups can rapidly pivot, embrace market changes, and seize emerging opportunities which is a huge advantage in an industry where innovation processes can sometimes take decades. For example, Boom Supersonic is a startup aiming to commercialize “Overture”, their 55 passengers supersonic aircraft (Mach 1.7) in 2027 while they only announced their super-factory. This rapidity in the processes can only be done by smaller

structures which processes are more efficient. Today, we even see large corporations creating their own subsidiaries like Embraer with Eve Air Mobility in operate faster and enjoy agility and flexibility.

Low Cost Structure (7.37): In aerospace, the capital-intensive nature of the industry makes the lean cost structures of startups a distinctive advantage. With their innovative use of technology, efficient resource allocation, and focus on core capabilities, startups can operate on significantly lower budgets than established corporations. Take SpaceX, for example. By adopting innovative manufacturing techniques and a lean operational model, it has reduced the cost of development of its Falcon 9 rocket to only \$300M comparing to \$1B for the development of the equivalent launch system of Lockheed Martin, the Atlas V (Nasa, 2017). Furthermore, it is important to note that low cost structure had the smallest standard deviation in the survey, indicating a shared consensus on the crucial role it plays in fostering aerospace innovation.

Entrepreneurship Mindset (7.44): The entrepreneurial mindset, characterized by a willingness to take risks, resilience in the face of failure, and a relentless focus on innovation, is a key asset for startups in the aerospace industry. This mindset fosters a culture of creativity and experimentation, which is critical for driving disruptive innovation. There are tons of examples of that, especially in the last 20 years with aerospace innovations opening its door to entrepreneurship individuals. The high rating of 7.44 underscores the value that survey respondents place on an entrepreneurial mindset in the aerospace industry.

Having the Right to Fail (6.49): The right to fail is a characteristic advantage of startups in many sectors, as it allows for risk-taking and learning from mistakes. However, the aerospace industry's high-stakes nature, where failure can have severe financial and safety implications, increase the power of this advantage. Consider the case of Ariane Group, a longstanding

player in the space launcher industry. Observing the emergence of new-space startups, their CEO recently admitted that the group had the technology for reusable launchers years ahead of their competitors. However, they chose not to pursue this market, fearing that unsuccessful tests could tarnish the company's reputation and negatively affect its value (Aberkane, 2022). This illustrates the caution that established companies might exercise, potentially limiting their willingness to take on disruptive innovation.

B. Expert Opinions

Drawing from extensive discussions with industry professionals, the importance of the unique attributes that startups bring to the table in the aerospace sector becomes even more clear. Their agility, cost-efficiency, entrepreneurial mindset, and resilience in the face of failure are not just abstract concepts, but tangible drivers of disruptive innovation. These discussions helped to contextualize these factors within the real-world workings of the aerospace industry. During my research, I had engaging discussions with three industry professionals, one of whom agreed to be recorded. These conversations, grounded in their experiences and perspectives, reinforced the validity of the key competitive advantages I had previously identified and incorporated into the survey.

It became apparent that these advantages are not just inherent to startups but are also reflective of the challenges larger, established companies face when considering disruptive innovation. Companies such as Airbus, Boeing, or Raytheon continue to lead the way in innovation, but their focus tends to be more on incremental advancements. Their substantial financial and technical resources allow them to consistently invest in product enhancements to stay competitive and meet customer demands. However, the lower risk associated with incremental innovation aligns more closely with their risk tolerance levels, which can be a disadvantage when it comes to disruptive innovation.

The structure of these larger organizations often includes a complex network of stakeholders, which can hinder the cultivation of a truly innovative, 'out-of-the-box' mindset. The political landscape within these companies is also a consideration, with longstanding relationships and agreements potentially discouraging the pursuit of disruptive innovation. For instance, the balance between aircraft and engine manufacturers can often be fraught with personal interests and agreements, which might inhibit the development of disruptive technologies

This raises the question of what role these established companies will play within the aerospace innovation ecosystem moving forward. Will they seek to integrate smaller, more innovative actors ? Or will they concede certain market segments to these new entrants? At this stage, it's challenging to provide a definitive answer. However, the shifting dynamics within the 'new-space' sector suggest that the influence of established players is waning. Could this trend extend to the aviation industry ? I will explore this question further in the Case Study section.

5) CASE STUDY

During my internship I had the privilege to be at the forefront what is expected to be a revolution for air mobility, the eVTOL market which stand for electrical vertical take off and landing. Indeed, I worked for AIR, an Israeli startup which differentiate from competitors by the fact they aim to make it a personal vehicle while most of the actors are targeting commercial segment, also known as “flying taxi”.

The global eVTOL market size is projected to reach USD 30.8 billion by 2030. Today, some of its actors like Archer, Joby or Lilium are already listed on the stock exchange and rose billions of dollars. This being said, the market is currently at “Through of Desillusion” stage of the Gartner hype cycle. Some small eVTOL already enter service like the Ehang 216, a

Chinese 1-seater aircraft. However most of the startups like Air expect an entry in service around 2025 in accordance to the regulatory institutions.

This market is particularly interesting for a simple reason, it is the first one of the “startups era” that aims to create and attract new segments of the air mobility by introducing a hardware product which present many challenges.

The technological intricacy stands as a crucial challenge that eVTOL startups encounter. The crafting, cultivation, and production of eVTOL aircraft necessitate sophisticated technical proficiencies and expertise. These pioneering aircraft must not only ensure safety, reliability, and efficiency but also possess the capability for vertical take-off and landing. All these must be achieved while satisfying rigorous regulatory standards that are at par with those complied with by industry behemoths like Airbus or Boeing. To surmount this hurdle, a considerable number of professionals in the eVTOL sector actually have their roots in these established firms. Consequently, it's this fusion of experienced and skilled individuals with unconventional thought processes that empowers startups to triumph and address the challenge of technological complexity. They are equipped to rapidly acclimatize to technological advancements, incorporate state-of-the-art technologies, and refine their designs in iterative steps.

The second major challenge for eVTOL startups is regulatory compliance. The nascent nature of the eVTOL market means that regulatory frameworks are still evolving. Navigating this fluid regulatory landscape requires a high degree of adaptability and a proactive approach to engaging with regulatory bodies. Startups' agility allows them to quickly respond to regulatory changes, and their entrepreneurial mindset often drives them to actively shape the regulatory discourse.

A third challenge for eVTOL startups is market creation and acceptance. The concept of urban air mobility is still novel for most people, and establishing trust and acceptance is crucial. Startups have been tackling this challenge by actively engaging with various stakeholders, including potential customers, city planners, regulatory bodies, and the general public. They are investing in pilot projects, demonstrations, and public awareness campaigns to familiarize people with eVTOL technology and its potential benefits. For example, Uber Elevate hosted an annual summit from 2017 to 2020 to foster public discussion on urban air mobility.

Regarding the competitive advantages of startups, it's worth noting that startups are not completely alone in the eVTOL market. Several established aerospace companies, such as Airbus or Embraer, are also exploring eVTOL technology. However, startups have certain advantages that can aid them in driving disruptive innovation. Their agility, lean cost structure, entrepreneurial mindset, and right to fail enable them to rapidly innovate, seize emerging opportunities, and navigate the various challenges of the eVTOL market.

What does the future hold for the eVTOL market ? Are we witnessing a rare moment where established companies might yield their sovereignty of the skies ? In a conversation with a founder of a hybrid/electric VTOL project, who previously contributed to Airbus's E-Fan 2.0 project, he envisioned two plausible paths. The first envisages the major players leveraging their substantial resources and expertise to eventually dominate the market, a strategy characterized by allowing smaller entities to pioneer the technology, and then capitalizing on their competitive advantage in the manufacturing stage. The alternative scenario anticipates that some of the current smaller players may emulate the trajectories of companies such as SpaceX or BlueOrigin, successfully advancing their developments. Furthermore, the recent partnership between Archer and Stellantis suggests the possibility of players from diverse industries entering the fray, utilizing their expertise in specialized areas. For instance,

Stellantis, with its manufacturing management prowess, is set to produce Archer's Midnight eVTOL, indicating the intersection of varied industrial competencies in this emerging field.

In conclusion, while the path to creating and attracting new market segments in air mobility is fraught with challenges, eVTOL startups are well-positioned to drive disruptive innovation in the aerospace industry. Their unique competitive advantages equip them to navigate these hurdles and potentially transform the future of urban air mobility.

6) CONCLUSION

Following our study it is more easier to answer the research question which was : What is the role of startups in aerospace disruptive innovation's ?

Indeed, startups play a critical role in shaping disruptive innovation within the aerospace industry. Their contribution can be seen in their ability to drive technological advancements. Unencumbered by bureaucratic processes that often slow down established corporations, startups are typically at the forefront of adopting new technologies and methodologies. Their inherent willingness to embrace risk allows them to venture into unexplored territories, propelling the development and application of breakthrough technologies that can revolutionize the industry.

Moreover, startups act as catalysts for market evolution. Through their innovative products and solutions, they can create new market segments or drastically alter existing ones. These disruptive innovations have the potential to redefine customer expectations, compelling the entire industry to adapt and shift in response.

Another crucial contribution of startups lies in their capacity to accelerate the pace of innovation. The agility and lean structure of startups often result in shorter development cycles, which can hasten the rate of innovation within the industry. This acceleration can push

established companies to innovate more rapidly to keep up, further fostering a competitive environment.

In fact, startups not only introduce competition but also promote collaborations. The threat of disruption can galvanize established companies to innovate, while collaborations can lead to shared learning, resource pooling, and the fusion of diverse ideas, benefiting the industry as a whole.

Startups also foster an innovation-driven culture within the industry. Their entrepreneurial spirit, characterized by risk-taking, experimentation, and out-of-the-box thinking, can permeate the industry and influence larger corporations. This culture can lead to an industry that is more receptive to and driven by innovation.

Finally, disruptive innovation often poses challenges to existing regulatory frameworks. In this context, startups, through their ground-breaking innovations, can indirectly influence policy changes. These changes can create an environment that is more conducive to further innovation, enabling the industry to evolve and grow.

In conclusion, startups serve as vital engines of disruptive innovation in the aerospace industry. Their role extends from driving technological advancements to influencing policy and regulation, highlighting their integral contribution to the industry's evolution.

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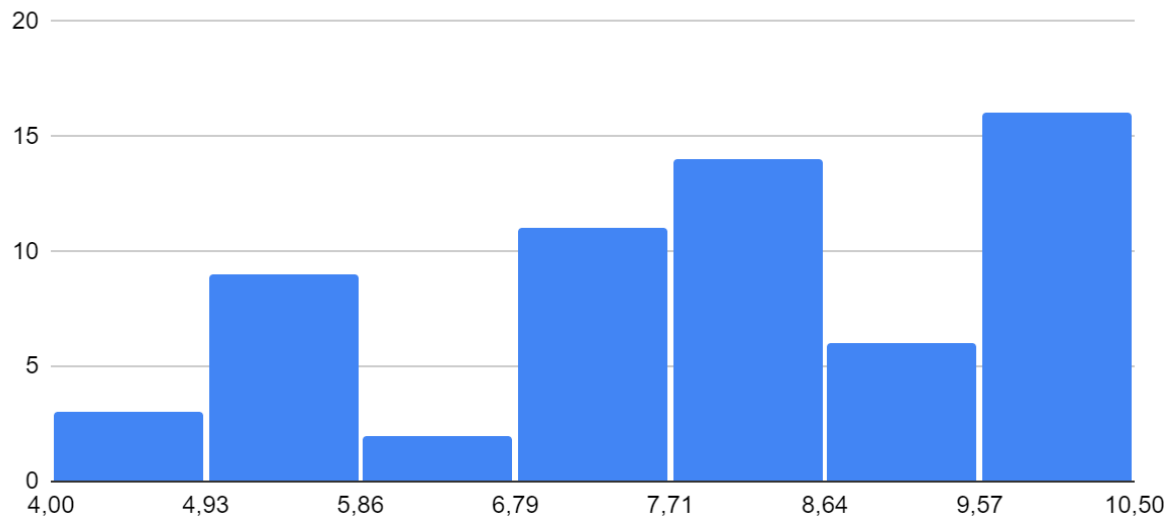
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8) APPENDICE

Data from the survey :

1. Barriers-to-Entry

On a scale from 1 to 10, do you think Capital Intensity is a barrier to entry ? (10 means strong barrier, 1 means no barrier)

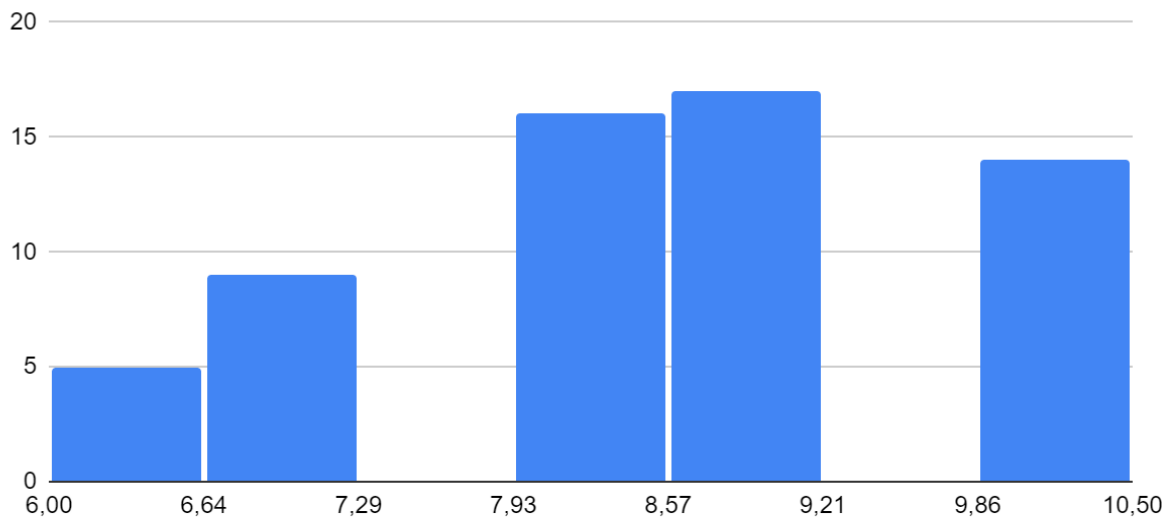


On a scale from 1 to 10, do you think Capital Intensity is a barrier to entry ? (10 means strong barri...

Figure 1

Mean	Standard Deviation	Variance	Median	Minimum	Maximum
7,74	1,89	3,56	8	4	10

On a scale from 1 to 10, do you think Regulatory Compliance is a barrier to entry ? (10 means strong barrier, 1 means no bar...

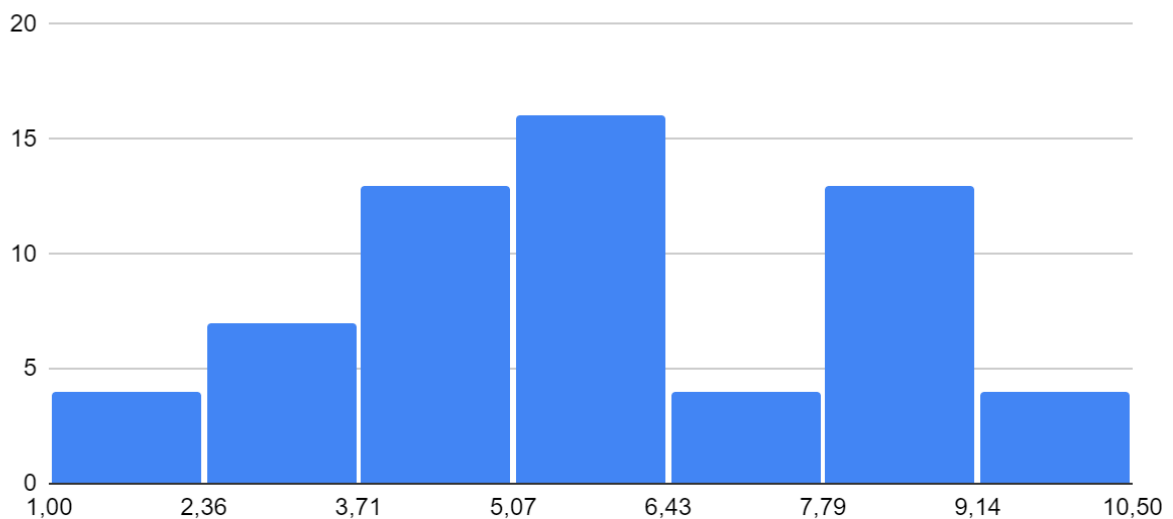


On a scale from 1 to 10, do you think Regulatory Compliance is a barrier to entry ? (10 means stro...

Figure 2

Mean	Standard Deviation	Variance	Median	Minimum	Maximum
8,43	1,23	1,52	9	6	10

On a scale from 1 to 10, do you think Technological Complexity is a barrier to entry ? (10 means strong barrier, 1 means no b...

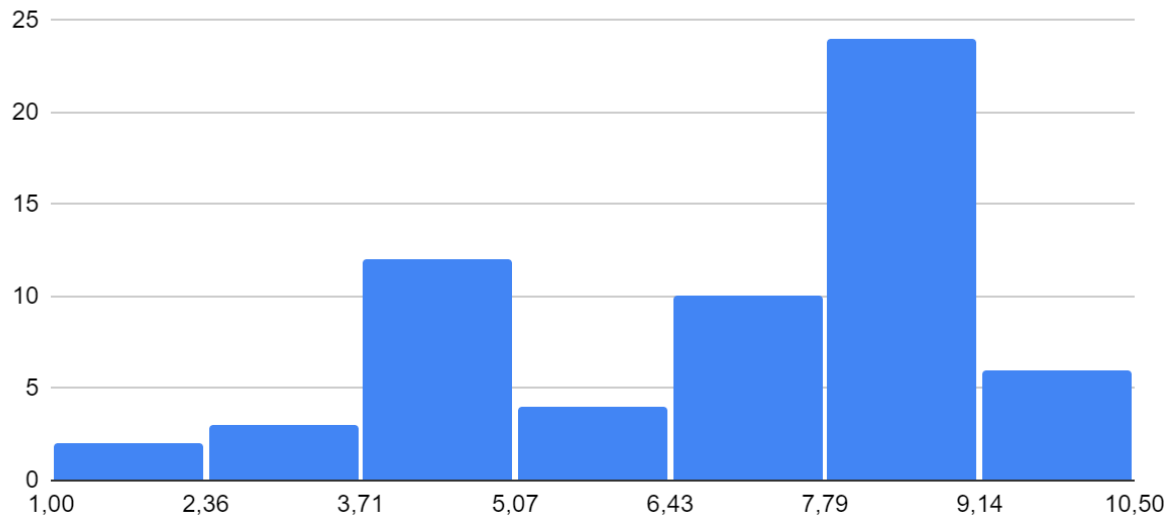


On a scale from 1 to 10, do you think Technological Complexity is a barrier to entry ? (10 means st...

Figure 3

Mean	Standard Deviation	Variance	Median	Minimum	Maximum
5,98	2,36	5,58	6	1	10

On a scale from 1 to 10, do you think Safety and Reliability Concerns are a barrier to entry ? (10 means strong barrier, 1...

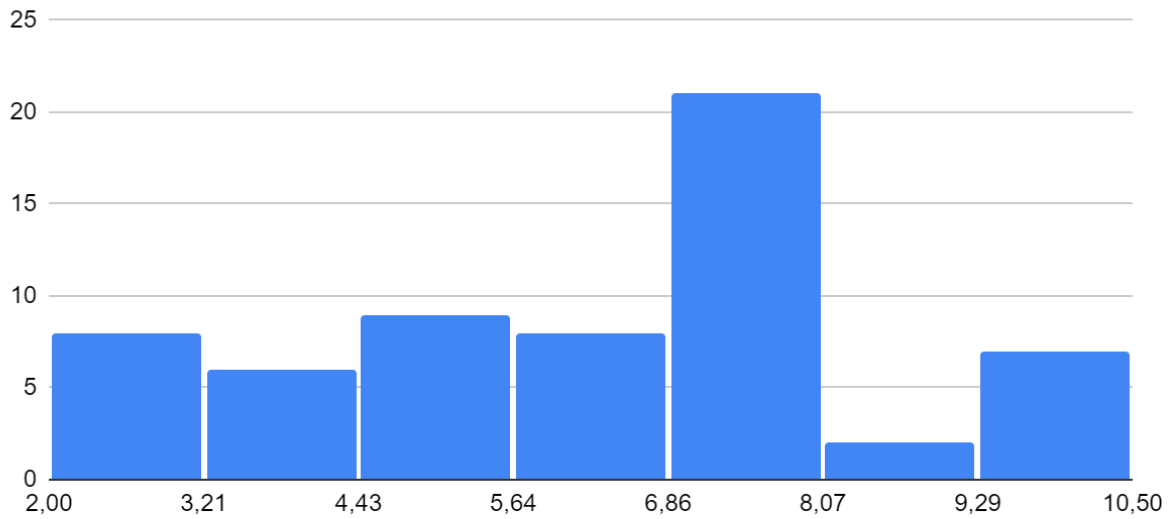


On a scale from 1 to 10, do you think Safety and Reliability Concerns are a barrier to entry ? (10 m...

Figure 4

Mean	Standard Deviation	Variance	Median	Minimum	Maximum
6,93	2,24	5,00	7	1	10

On a scale from 1 to 10, do you think Established Market Players is a barrier to entry ? (10 means strong barrier, 1 me...



On a scale from 1 to 10, do you think Established Market Players is a barrier to entry ? (10 means...

Figure 5

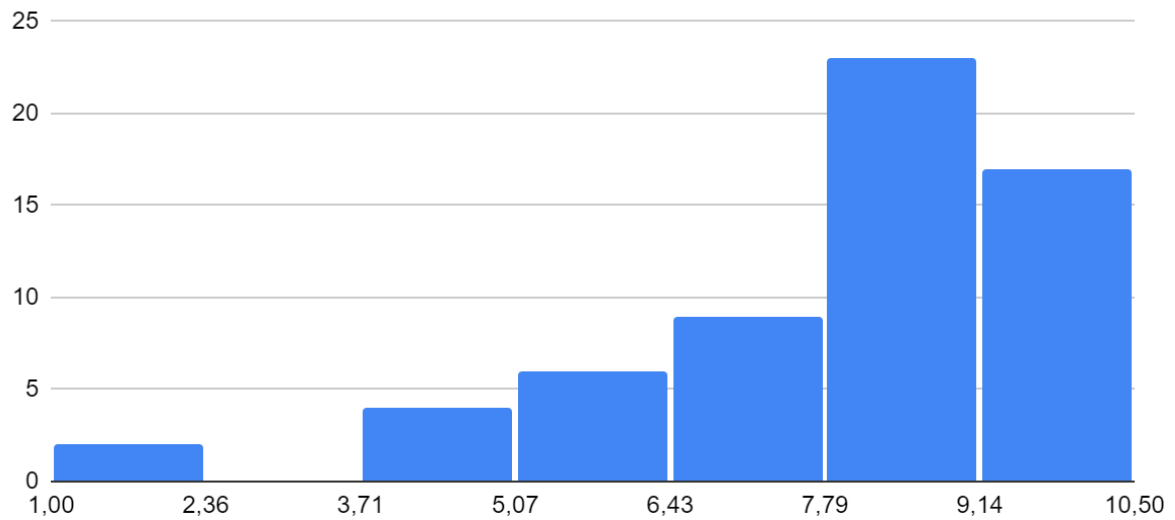
Mean	Standard Deviation	Variance	Median	Minimum	Maximum
6,23	2,25	5,08	6	2	10

Open question answers :

Availability of skilled staff due to shortage of engineers. Also, ability for companies in certain locations to attract talent.
High operating costs
Availability of relevant talent
Societal barrier: for instance autonomus Aircraft (no pilot)
Find people expert in aerospace
Skill matters a most in aerospace industry
Actual skilled people rather than on paper Engineers
Skills
Getting good suppliers to support a new start-up. There are credibility issues, since most aerospace start-ups fail, and that can make suppliers reluctant to support some projects with adequate resources. There is also a risk that the supplier could damage their relationships with their other, major customers who see the start-up as a potential competitor.
Time to Market
There are three barriers that are hidden in your form: (a) Fit to the need/market; (b) Implementation complexity; (c) the need for qualified personnel

2. Competitive Advantages

On a scale from 1 to 10, do you think Agility and Flexibility are competitive advantages for startups in aerospace ? (10 mean...

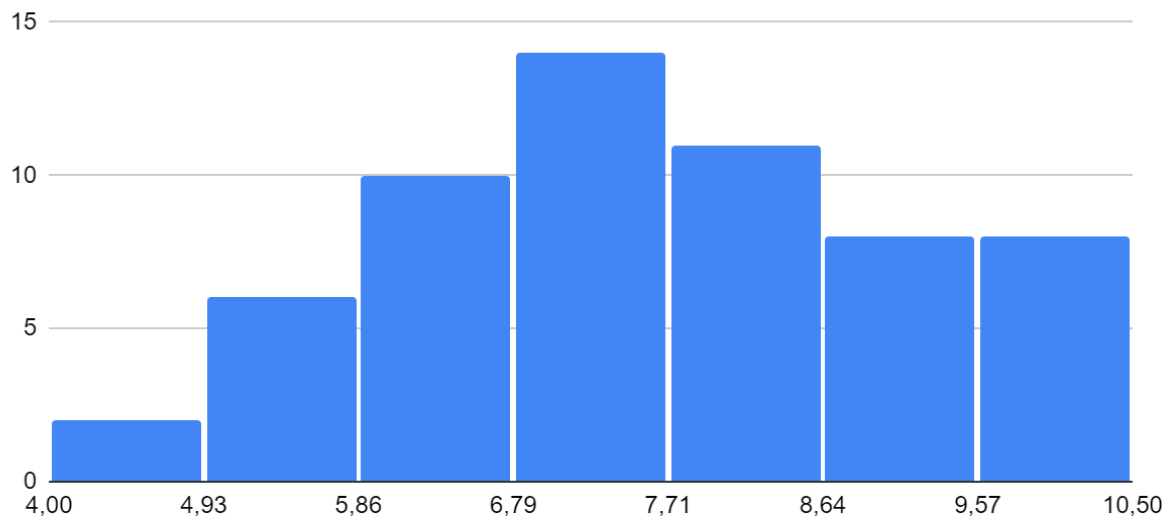


On a scale from 1 to 10, do you think Agility and Flexibility are competitive advantages for startups...

Figure 6

Mean	Standard Deviation	Variance	Median	Minimum	Maximum
7,93	2,08	4,33	8	1	10

On a scale from 1 to 10, do you think Low Cost Structure is a competitive advantages for startups is aerospace ? (10 mean...

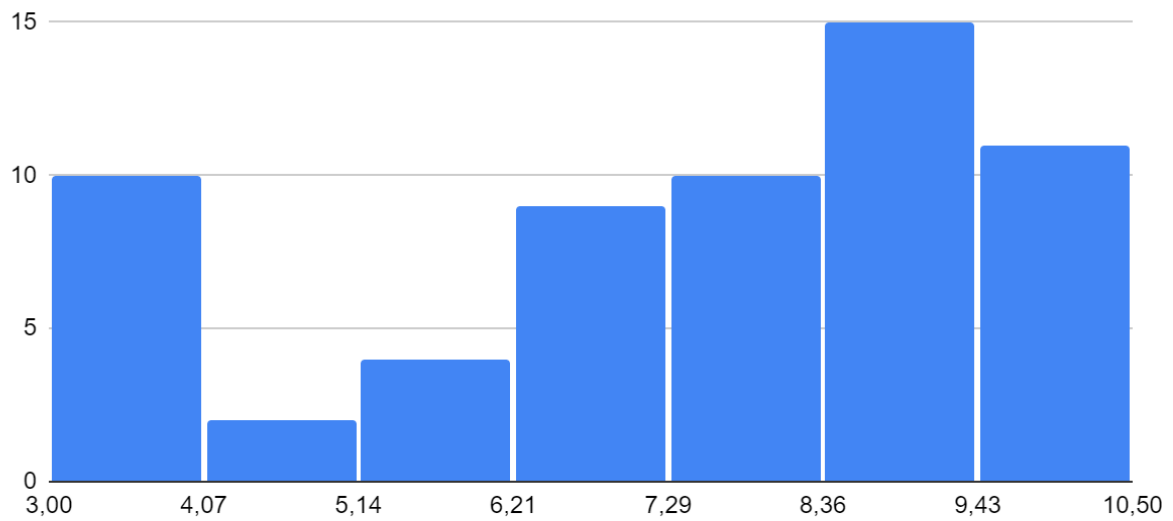


On a scale from 1 to 10, do you think Low Cost Structure is a competitive advantages for startups i...

Figure 7

Mean	Standard Deviation	Variance	Median	Minimum	Maximum
7,39	1,65	2,72	7	4	10

On a scale from 1 to 10, do you think Entrepreneurial Mindset is a competitive advantages for startups in aerospace ? (10...

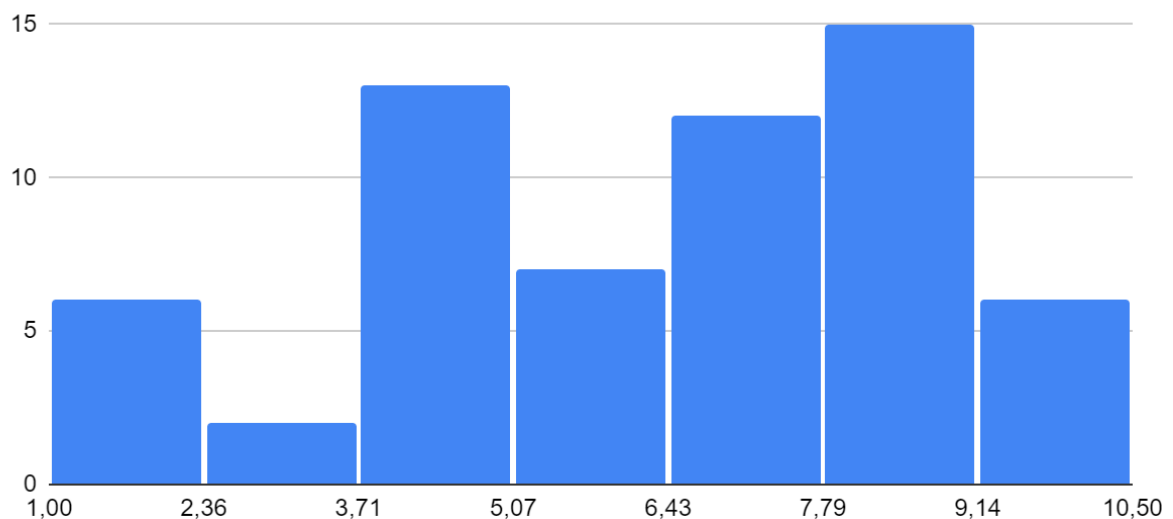


On a scale from 1 to 10, do you think Entrepreneurial Mindset is a competitive advantages for start...

Figure 8

Mean	Standard Deviation	Variance	Median	Minimum	Maximum
7,48	2,23	4,99	8	3	10

On a scale from 1 to 10, do you think Having Right to Fail is a competitive advantages for startups in aerospace ? (10 mean...



On a scale from 1 to 10, do you think Having Right to Fail is a competitive advantages for startups...

Figure 9

Mean	Standard Deviation	Variance	Median	Minimum	Maximum
6,49	2,39	5,72	7	1	10

Open question answers :

Flexibility outside of large OEMs to test and test again to get something right.
Single mission focus
Ability to test cutting edge technologies
Experience and approach to customers
Low cost structure is only successful for short flights / local flights, in longer flights low cost structure is not successful. Other competitive advantage is to focus on reliability . With effective reliability companies can save lots of money and thus helps in their growth
No
Move fast
Regarding Low Cost Structure: That may not always be true for a start-up. While there is generally a much leaner management structure and lower overhead in a typical start-up, the start-ups often have to pay relatively high costs for outside services such as test labs, component fabrication, consultants and subject-matter-experts, etc, that the established companies already have as capabilities.
Fast development & prototyping
The willingness to pay higher salaries than traditional aerospace industry

Employers

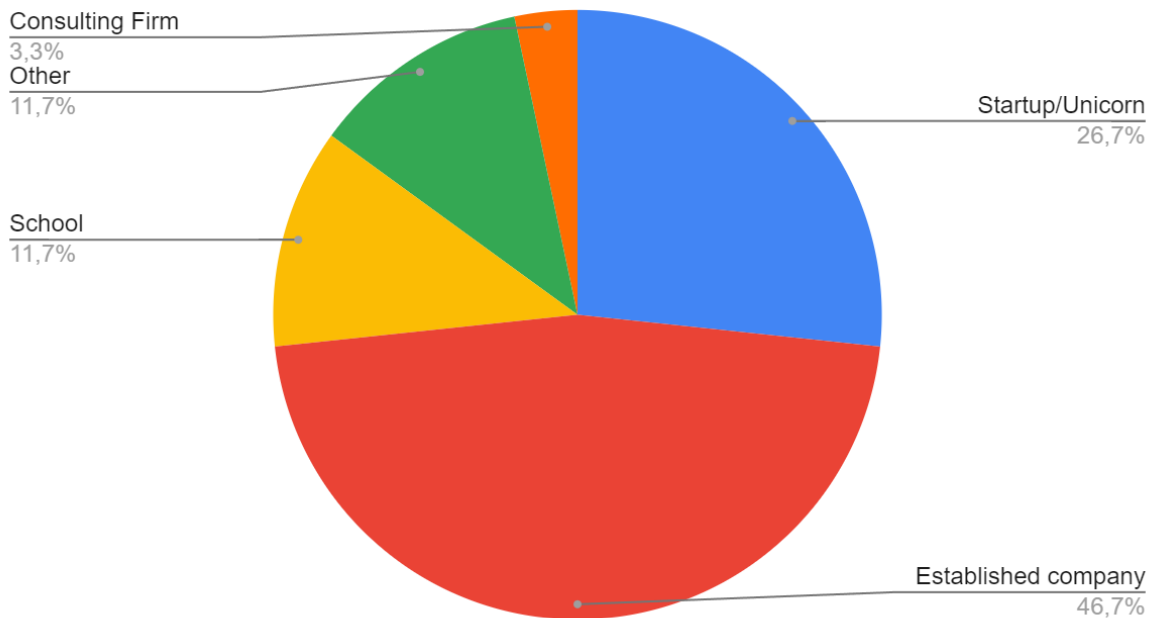


Figure 10

Are you ?

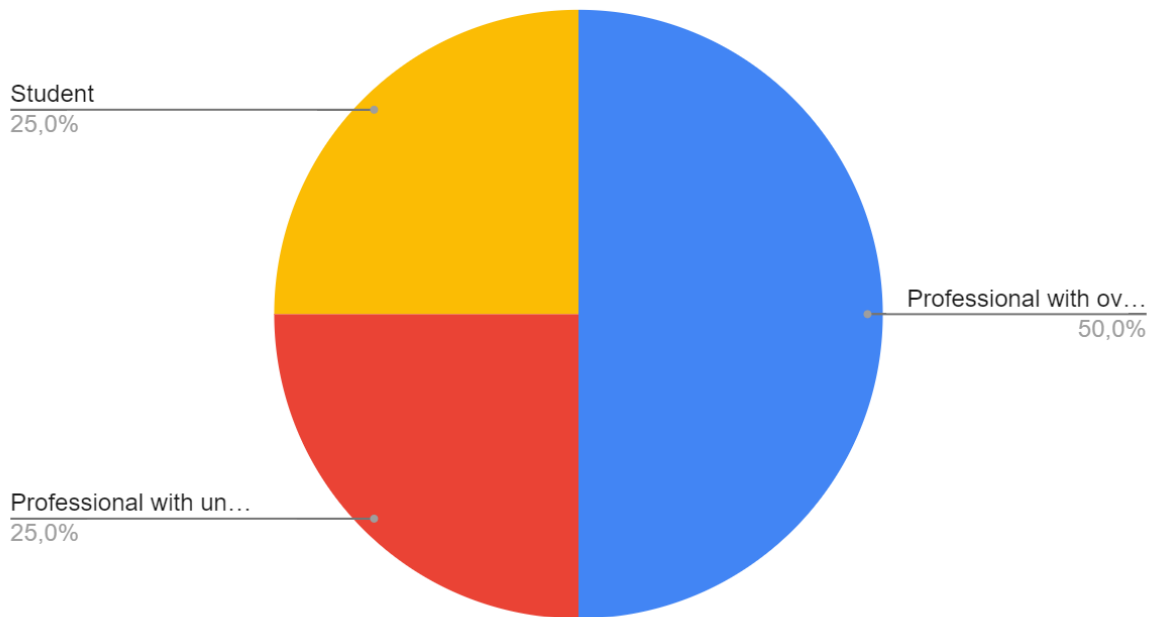


Figure 11

Interview Guide

“Disruptive Innovation in Aerospace: The Role of Startups in High Barriers-to-Entry Market”

12/05/2023

Warm-up

"Thank you for agreeing to this interview in which we'll discuss various topics concerning the role of startups in the aerospace industry. The purpose of this conversation is to gather your insights to enhance this research. With your permission, this interview will be recorded and your responses transcribed. However, you have the right to remain anonymous and choose not to answer certain questions."

Background

- Could you tell us about your role and your company ?
- How many years of experience do you have in the aerospace industry ?
- What is your relationship with innovation and the startup ecosystem ?

Overview of the Aerospace ecosystem

- Can you describe the current state of the startup ecosystem in the aerospace industry ?

-
- What unique challenges and opportunities do startups face in the aerospace sector compared to other industries ?

Disruptive Innovation in Aerospace

- How would you define "disruptive innovation" in the context of the aerospace industry ?
- Can you share examples of startups that have introduced disruptive innovations in the aerospace industry ?
- In your opinion, what key factors make an innovation disruptive in the aerospace industry ?

Startups Vs Established Companies

- How do the approaches to innovation differ between startups and established companies in the aerospace sector ?
- Can you give examples where startups have been more successful than established companies in certain areas of the aerospace industry ? Why do you think that is ?
- How have established companies reacted to these disruptive innovations by startups ?

Overcoming Barriers to Entry

- The aerospace industry is known for its high barriers to entry. How have startups successfully navigated these challenges ?
- What strategies have proven effective for startups to overcome regulatory hurdles, high capital requirements, or technological barriers ?
- How important are partnerships with other companies or organizations in helping startups overcome these barriers ?

Impact and Reception

- What impact have startups, particularly those introducing disruptive innovations, had on the broader aerospace industry ?
- Can you share any instances of resistance or challenges startups have faced when introducing their innovative product/service ? How did they address these ?

Futur Prospects

- How do you see the role of startups in the aerospace industry evolving in the next 5-10 years ?
- What are your predictions for the future of disruptive innovation in this industry ? Which areas might see the most change ?
- In your opinion, what emerging technologies or trends might drive the next wave of disruptive innovation in this sector ?

Interview transcription:

Could you tell us about your role and your company ?

Absolutely, I'd love to. As the CEO and founder of our eVTOL company, I'm basically the captain of the ship, steering us towards our vision. We're all about revolutionizing the future of transportation, using vertical take-off and landing technology to leapfrog the congestion and bring about sustainable urban air mobility. I worked at Airbus before this, so I've been marinating in this industry for quite a while now.

How many years of experience do you have in the aerospace industry ?

Counting my time at Airbus and now with my own company, I've got well over a decade of experience in the aerospace industry. It's been a ride!

What is your relationship with innovation and the startup ecosystem ?

Well, innovation and startups are like my bread and butter. I'm all about pushing boundaries, exploring new frontiers, and making a significant impact. The startup ecosystem is like a playground for me; it's where I get to play, experiment, and create.

Overview of the Aerospace ecosystem

Can you describe the current state of the startup ecosystem in the aerospace industry ?

The aerospace startup scene right now is buzzing, like bees around a hive. It's full of brilliant minds and crazy ideas, all trying to leave their mark on the industry.

What unique challenges and opportunities do startups face in the aerospace sector compared to other industries ?

Startups in aerospace have some unique mountains to climb, for sure. The industry is highly regulated, capital-intensive, and safety-critical. But on the flip side, the opportunities are massive. We're talking about literally opening up new horizons, from air taxis to space tourism.

Disruptive Innovation in Aerospace

How would you define "disruptive innovation" in the context of the aerospace industry ?

Disruptive innovation? In aerospace, it's all about game-changing technologies or business models that shake up the status quo. It's not just about making things better; it's about doing things differently.

Can you share examples of startups that have introduced disruptive innovations in the aerospace industry ?

SpaceX is the poster child here, for sure. They've brought reusable rockets into the mix, slashing the cost of getting to space. Boom Supersonic is another one, working to bring back supersonic passenger travel.

In your opinion, what key factors make an innovation disruptive in the aerospace industry ?

A disruptive innovation needs to offer a significantly different and better value proposition. It's not enough to just be new; it has to be better in a way that matters to customers.

Startups Vs Established Companies

How do the approaches to innovation differ between startups and established companies in the aerospace sector ?

Startups and established companies approach innovation from different angles. Startups are all about moving fast, taking risks, and breaking things. Established companies, on the other hand, tend to be more measured and incremental.

Can you give examples where startups have been more successful than established companies in certain areas of the aerospace industry ? Why do you think that is ?

SpaceX's is a famous one, its success in reusable rockets is a great example. They took a risk that established companies weren't willing to take, and it paid off big time.

How have established companies reacted to these disruptive innovations by startups ?

Established companies have reacted in different ways. Some are investing in or partnering with startups. Others are trying to catch up by developing their own innovative solutions.

Overcoming Barriers to Entry

The aerospace industry is known for its high barriers to entry. How have startups successfully navigated these challenges ?

It's true, aerospace isn't for the faint of heart. But startups are finding ways to navigate the landscape. Some are focusing on niches or using novel business models to get a foot in the door.

What strategies have proven effective for startups to overcome regulatory hurdles, high capital requirements, or technological barriers ?

Strategies that work involve a mix of innovation, collaboration, and perseverance. Partnerships are especially crucial for dealing with regulatory and technological hurdles.

How important are partnerships with other companies or organizations in helping startups overcome these barriers ?

First if you working on hardware you need for sure to build partnerships, often big companies have an interest in helping you testing and see you grow

Impact and Reception

What impact have startups, particularly those introducing disruptive innovations, had on the broader aerospace industry ?

Startups are shaking things up, no doubt. They're pushing the industry to move faster, think bigger, and embrace change.

Can you share any instances of resistance or challenges startups have faced when introducing their innovative product/service? How did they address these ?

There's always resistance when you're doing something new. But the key is to stay focused on the vision, engage with stakeholders, and demonstrate the value of the innovation.

Futur Prospects

How do you see the role of startups in the aerospace industry evolving in the next 5-10 years ?

I see startups playing an increasingly important role in aerospace. They're the ones who are going to keep pushing the envelope and driving the industry forward.

What are your predictions for the future of disruptive innovation in this industry? Which areas might see the most change ?

Disruptive innovation is going to continue to redefine the industry. I think we'll see a lot of action in urban air mobility and space tourism.

In your opinion, what emerging technologies or trends might drive the next wave of disruptive innovation in this sector ?

As for emerging trends, keep an eye on AI, autonomous systems, and green technologies. These are going to be big drivers of the next wave of disruption.
