

Research Article

## **Motivation-Behavior Of High Tech Entrepreneurship In The Aerospace Industry In India**

**Krishna Murari**

Research Scholar,

Jain Deemed-To-Be University, Bangalore, India

Additional General Manager And Senior Faculty,

Hal Management Academy, Hal Bangalore, India

**Dr.Suman Pathak**

Professor And Controller Of Examination

Mats Institute Of Management And Entrepreneurship

Jain Group Of Institution, Bangalore, India

### **Abstract**

The Aerospace Sector Is Very Different From Other Sectors As It Needs High Capital Investment, Continuous Technology Advancement Along With The Drawbacks Of Low-Profit Margin And High Gestation Period. Indian Aerospace Industry Is Growing Fast Due To High Demand In Civil And Military Aviation. The Structure Of The Industry Is Changing Fast, And Opening Up For The Start-Ups At Tier 3 And Tier 2 Levels. It Provides Scope For Innovation And Creativity. Engineers And Scientists Can Use Their Expertise And Become Entrepreneurs. This Paper Emphasizes That There Are Huge Opportunities For Startups In The Aerospace Industry In India Due To The Higher Rate Of Growth Supported By The Government, Availability Of Human Resources, And Investment By Big Original Equipment Manufacturers. This Paper Has Analyzed The Growth Of The Aerospace Industry And Its Changing Shape Resulting In Scope For Entrepreneurship, High-Tech Entrepreneurship, And The Motivation-Behavior Factors For The Entrepreneurship Identified By The Researchers, The Entrepreneurs And The Industry Experts. The Motivating Factors Identified By Them Include Role Models, Education In The Field, Work Experience In An Aerospace Company, Patriotism, Childhood Dream, Opportunities In The Sector, Freedom To Become An Entrepreneur, To Be Own Boss, Push Beyond Status Quo, Research Orientation, Ability To Work On Cutting Edge Technologies, Support From Original Equipment Manufacturers And The Government, And Availability Of Required Human Resources At A Low-Cost. A Conceptual Framework Has Been Developed In The Paper Which Can Be Used For Further Research In The Field. As No Specific Research Is Found In This Field, This Paper Opens Up A New Avenue For Research In This Field.

**Keywords:** High Tech Entrepreneurship, Aerospace, Motivation, Cutting Edge Technologies, Opportunity, Role Model, Patriotism, Freedom, Own Boss

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\* Correspondence Author

## 1.0 Introduction

The Aerospace Industry Shows The Power Of A Country In The World Scenario In A Better Way In Comparison To Other Industries And Represents Its Growth In Cutting-Edge High-End Technologies. Its Growth Is Faster Than In Many Other High-Tech Industries. This Is The Industry That Made The World A Global Village Along With The It Industry And Developed The Global Economy. This Uses The Most Advanced Technologies Available In The World, But It Is Also The Most Complex Industry In The Areas Of Manufacturing, And Supply Chain. Moser Et Al. (2010) Express That “There Is Probably A No Better Example Of The Dense Interweaving Of Business, Economic, Political And Military Networks And Interdependencies Than The Aerospace Industry”.

The Growth Of An Industry Does Not Only Depend On The Government Organizations, Government Policies, Large Private Organizations, And Globalization But Also On The High Growth Of The Start-Ups In That Industry. Being An Industry Of High Gestation Period And Low Returns, The Aerospace Industry Attracts Less Number Of The Entrepreneurs. Radomska (2011) Informs That The Aerospace Industry In Europe Has Taken The Challenge Of Transforming And Bringing Changes In The External Environment. He Further Elaborates That The Aerospace Industry In Poland Has Seen Emerging Of Small And Medium Enterprises (Smes) Around Big Aerospace Companies. These Smes Are Engaged In The Production Of Precision Machined Components For Aerostructures And Aeroengines For Aircraft Manufacturers Like Airbus, Boeing, Dassault Aviation, Safran, Agusta Westland, Sikorsky, Etc. “Aviation Valley Cluster” Is Developed Due To The Need Of Small Entrepreneurs And The Need Of Poland The Aerospace Industry With The Support Of Policymakers. “Entrepreneurship Support System Under The Integrated Regional Operational Program” Was Another Boosting Reason For The Development Of This Cluster.

A Significant Role Is Played By The Entrepreneurship In The Economic Development And The Country’s Development In Developed Countries, And It Has Encouraged The People In Underdeveloped And Developing Countries To Focus On It (Chakraborty Et Al., 2018). Ulmann (1995) Expresses That A Lot Of Importance Has Been Given To Entrepreneurship In Modern Economic Theories. He Defines An Entrepreneur As An Individual Who Takes A Risk In An Uncertain Environment And Takes In His Stride The Fruits Of Profits And Losses.

An Entrepreneur In The Aerospace Industry Needs To Be Highly Innovative And Creative To Bring Out New Features In The Products To Survive In The Market Competing With Global Players Specifically In Avionics And Manufacturing Technologies, And Also Able To Work With Global Players As Tier-2 And Tier-3 Company. It Is A Very High Technology Sector With Challenging Factors Such As Technological Complexity, Long Break-Even Periods, High Customer Bargaining Power, Rigorous Assessment By Original Equipment Manufacturers (Oems), Low Volume, Zero Tolerance To Quality, Failure Of Supplied Parts Leading To A High Penalty, Cash Crunch, Etc.

The Core Of Entrepreneurship Is The Identification Of Opportunity For A Start-Up (Shane & Venkataraman, 2000). Srivastava (2010) Emphasizes That Alertness, Prior Knowledge, Networking, And Diversity Of Information Are Necessary For The Identification Of Entrepreneurial Opportunities. Many Scholars Have Tried To Define Entrepreneurship For The Last More Than Two Centuries By Identifying Many Attributes. Says (1803) Defines Entrepreneurship As “Bringing Together Of The Factors Of Production”; Kirzner (1973) Defines It As “Exploration Of Opportunities”; Gartner (1988) Defines It As “Creation Of Organizations.” Frank Knight (1921) Expresses That “The Entrepreneurs Attempt To Predict And Act Upon Change Within Markets, Bear The Uncertainty Of Market Dynamics, And Perform The Fundamental Managerial Functions Of Directing And Controlling”. Schumpeter In 1934 Presented The More Acceptable Definition Of An Entrepreneur As “An Entrepreneur Is The Innovator Who Brings The Changes By Presenting The New Combinations Of Introducing New Goods, A New Method Of Production, Opening, And A New Source Of Supply To Bring A New Organization Of An Industry”. Kirzner (1979) Has Defined Entrepreneurs As “A Person

Who Identifies The New Market Opportunity And Exploits It As An Arbitrageur”. Chakraborty Et Al. (2018) Summarize Entrepreneurship As “A Function Which Involves Creating An Organization, And The Exploitation Of Opportunities By A Combination Of Productive Inputs Bearing Risks Associated With The Opportunities By Taking Creative And Innovative Actions And Fleeting”.

On Literature Review, No Result Was Found With Specific Search With Phrases, “ Motivation Of Startups In The Aerospace Industry”, “High-Tech Startups In The Aerospace Industry”, “Startups In The Aerospace Industry“, Entrepreneurship In The Aerospace Industry”, And “Smes In The Aerospace Industry” On Research Gate, Google Scholar And Web Of Science. On Search With Phrase On Research Gate “Startups In The Aerospace Industry “Without Any Specific Search, Articles Found Are More Technical In Nature Linking Technology, Composite, Laser, Nanotechnology, Plasma Additive Technology It, Corrosion, Fatigue, Cad/Cam, Surface Finish Technology, Ndt, Etc. Some Articles Are Found In Networking, Knowledge Management, Internal Entrepreneurship, Environmental Challenges, Offset Challenges, Agility, Future Prospect, Smes In The European Aerospace Industry, Industrialization To Globalization, Higher Education, And Mexican The Aerospace Industry,

Search On Google Scholar With The Phrase “Entrepreneurs In The Aerospace Industry” Gave Four Research Articles. The Research Paper “The Assessment Of The Competitiveness Of The Aerospace Industry (Manufacture For Civil Aviation)”(Radomska, 2012) Covers Only Competitiveness. The Research Paper “Clusters — A Strategy Of Building Competitiveness Of Companies Of The Region In The Knowledge-Based Economy” (Piasny, 2009) Emphasizes On The Significant Role Of The Regional Environment In Competitiveness. The Research Paper “Knowledge Spill Over; The General Level Of The Entrepreneurship In The Region Is Increasing” (Radomska, 2011) Analyses The Entrepreneurship Due To Spill Over. He Highlights That A Cluster Results In A Higher Level Of Cooperation And Competition Together With The Knowledge Transfer, Innovation, Ability To Absorb The New Technologies, Attracting New Resources, And Diffusion Of Know-How.

A Study Of Yusof And Jain (2010) Highlights The Crucial And Initiating Role Of The Entrepreneurial Intention In Starting Of Start-Ups. Some Studies Are Found In The Field Of Entrepreneurship In The Aerospace Industry Such As “Its Role In Aircraft Maintenance Education” (Chakraborty Et Al., 2018), “Entrepreneurship In General Aviation” (Ulmann, 1995) But No Study Is Found In The Motivation Or Entrepreneurial Motivation For High-Tech Entrepreneurship In The Aerospace Industry In General And In India In Particular. Hence, It Is Worthwhile To Study The Motivation Of Startups In This Industry.

This Paper Covers The Overview Of The Aerospace Industry, Opportunities For Startups In The Aerospace Industry In India, Motivation, And Construct Of Behavior Of Entrepreneurship; The Motivating Factors Identified By Renowned Researches Based On The Theory Of Planned Behavior And Other Behavior Theories, Vrooms’ Expectancy Theory And The Factors Identified By High-Tech Entrepreneurs And Industry Experts, And Develops A Theoretical Framework Based On These Factors.

### **2. Need For The Study**

Indian Aerospace Industry Is Growing Fast Due To High Demand In Civil And Military Aviation. Also, The Structure Of The Industry Is Changing Fast, And Opening Up For The Start-Ups At Tier 2 And Tier 3 Levels. It Provides Scope For Innovation And Creativity, And The Usage Of Expertise By Engineers And Scientists. But, The Returns Are Slow With High Investment And The Risks Are High Even To The Extent That A Few Failures May Result In Winding Up The Business. No Specific Study Was Found In The Area Of Research On Search In Google Scholar, Web Of Science And Research Gate. Hence, A Need Is Felt To Study The Motivation-Behavior Of Startups In The Aerospace Industry In India. This Study Attempts To Understand High-Tech Entrepreneurship And Identify The Motivating Factors Specifically In The Indian Aerospace Industry.

### **3. Objectives Of The Study**

The Objectives Of The Study Are:

- To Study The Growth Of The Aerospace Industry In The World And India, And Its Changing Shape Resulting In Scope For Entrepreneurship In India.
- To Understand High Tech Entrepreneurship And Identify The Motivation-Behavior Factors For High-Tech Entrepreneurship.
- To Develop A Theoretical Framework For High-Tech Entrepreneurship In The Aerospace Industry

#### **4. Methodology**

Qualitative Research Methodology With An “Integrative Review Of The Literature” And Interviews/Discussions With Entrepreneur/Experts Has Been Followed While Finding Out The Motivation-Behavior Of Entrepreneurship In High-Tech Areas Of The Aerospace Industry With Very High Risks And Long Gestation Period By Studying The Birth And Growth Of The Industry, High-Tech Entrepreneurship, And The Motivating Factors For Entrepreneurship, Opportunities For Entrepreneurship In The Aerospace Industry In India, And Critically Analyzing The Motivational Factors Identified By Some Successful Entrepreneurs With Respected To Various Theories Of Motivation And Planned Behavior.

#### **4.1 The Aerospace Industry-An Overview**

The Aerospace Industry Is One Of The World’s Largest Manufacturing Industries With Very High Employment And Revenue Generation. It Is One Of The “Defining Industries Of The Twentieth Century” (Bugos, 2001).

Wright Brothers With Their First Powered Flight On 7 December 1903 Brought A Revolution In The Field Of Aerospace. Once This Industry Took Flight, It Has Not Looked Back And Grown Exponentially At The Speed Of Changing Speed Of Aircraft With The Time From Subsonic To Hypersonic Speed. Manufacturing Of Aircraft Started By Glenn Curtiss And Also By Astra Company, France. Curtiss Brought His Aircraft For Sales In 1909 In New York And Astra Started The Production By Taking License From Wright Brothers In 1908 After Wright Brothers Got An Order From The Us Army. Some More Entrepreneurs Joined Them In The Usa. By The Start Of World War I, France Had Manufactured More Than 2000 Fighter Aircraft And Inducted In Its Air Force. By That Time German Had More Than 1000 Fighter Aircraft While England Had About 1000 Fighter Aircraft And The Usa Had Around 100 Aircraft (Bugos, 2001).

Aircraft Took Its New Shape In The 1920s With The Development Of Cantilever Wings, Biplanes, Propeller Engines, Aerodynamic Closed-Shaped Fuselages, Etc. Metals Replaced The Wood By The Mid-1930s. Civilian Airlines Started In The 1920s And Military Aircraft Took The Major Leap To Advanced Fighters. The Airmail Business Started With Kelly Air Mail Act Of 1925 And Hundreds Of Pilots Joined With Their Small Aircraft. Boeing Came Up With The Manufacturing Of Large Civil Aircraft And Introduced Boeing 247 Airliner Developed Based On B-9 Bombers. Douglas Dc-3 Made Airlines Viable In The Usa With The Profitable Business Of Air Travel. England And Germany Produced Large Bombers By The Start Of World War Ii. Europe Developed A Jet Engine, Sophisticated Radar, And All-Weather Navigation Systems During The 1930s And 1940s. With The Start Of The Cold War Between The Usa And The Soviet Union In 1947, Boeing Started Developing Manufacturing Series On New High-Tech Aircraft Including Bombers And Civilian Aircraft. Technology-Specific Start-Ups Firms Started In Sikorsky, Hiller And Bell Started The Development And Manufacturing Of Helicopters And General Electric Brought Jet Engines Into The Market. Also, New Firms Joined The Industry With Innovative Products, Spacecraft, Rockets To Send The Spacecraft In Earth Orbits (Bugos, 2001).

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The 1960s saw a high growth of the European aerospace industry with advanced technological growth, and the start of British aerospace, Dassault, MBDA (Messerschmitt-Bölkow-Blohm), CASA, Snecma, etc. Airbus came into existence in the year 1970 and newly industrializing countries started establishing aerospace industries in their countries (Bugos, 2001). Hindustan Aircraft Limited started in 1940 in India and grew to a fully-fledged aircraft R&D and manufacturing company. It was taken over by the government of India and converted into Hindustan Aeronautics Limited (HAL) on 1st October, 1964.<sup>1</sup>

The post-cold war era saw a downturn in the aerospace industry and a lot of disinvestment, merger, closure, and takeover took place in the 1990s in the USA and globalization started. During its growth and ups and downs, advanced technologies like advanced composites, single-crystal blades, unstable structures, stealth technology, and electronic warfare have been developed and the industry became highly technology-driven with a greater scope for high-tech entrepreneurs to play major roles in the advancement of the industry worldwide.

During its development, the industry has moved forward from the manufacturing of everything from nut, bolt and washer to structural assembly, equipping, and flight testing to only assembly and flight testing. Tier 1, Tier 2 and Tier 3 suppliers of various components and subassemblies to Tier-1 suppliers of major assemblies have been developed. Start-ups and entrepreneurs in SMEs have come up specifically in the last 3 decades with a supportive environment and support of policies in various governments and agencies.

Moser et al. (2010) highlight, "The aerospace world is changing at a high velocity" and there is a huge transformation from the era of complete manufacturing by the OEMs to a phase of sharing the workload with suppliers with an associated cost, and risk, and rewards. Moser et al. (2010) also bring out, "The aerospace industry transformation has led to the evolution of the aerospace supply chain" with the emergence of new players in other countries from the USA, Europe, and Canada such as India, Brazil, China, etc. which highlights the shifting of global power. Due to its low labor cost, R & D capabilities, and a high number of intellectuals, India is emerging as a global power center for the aerospace industry.

### **4.2 High Tech Entrepreneurship And Motivation-Behaviour Factors For Entrepreneurship**

Radomska (2011) claims that aerospace is only another high tech sector apart from "pharmaceutical sector". Cluster formation in the aerospace industry in many countries and European Union cooperates and interacts with clusters in other countries for cutting edge technologies and formulates joint ventures. "Podkarpackie Science and Technology Park" supports the creation and development of innovative enterprises by means of incubation processes and spin-companies" (Radomska, 2011).

#### **4.2.1 High Tech Entrepreneurship**

Entrepreneurship is a complex, heterogeneous and multi-level phenomenon of economic, social, self-reflective, internally oriented, openness to methodological approach, contextualization and diversification (Landström et al. 2011). Entrepreneurship focussed on high technological areas and from large companies to small companies in the 1970s because of turbulence in the world economy, development in its sector, technological progress, development in biotechnology, innovation, and industrial dynamics (Acs, 1992).

Van Roy and Nepelski (2017) define high-tech entrepreneurship as "means to exploit new knowledge and technologies to gain economic and social benefits". Ohyama (2011) explains "entrepreneurs with higher job-specific human capital prefer to use the advanced technologies

While Entrepreneurs With Low Human Capital Try To Manage With The Conventional And Proven Technologies”. The High Technologies Such As High-End Avionics, 3d Printing, Robotics, Composites, Precision Manufacturing Are Needs Of The Hour In The Aerospace Industry To Gain A Competitive Edge And Higher Dominance.

#### ***4.2 Motivation And Construct Of Behaviour For Entrepreneurship***

“Motivation” Word Is A Derivative Of The Latin Word “Movere” Which Means “To Move”. Motivation Is A Construct Of Physiological Build Up And This Encourages A Person To Initiate Action For Achieving The Set Goal Set. The Goal May Be Financial, Sociological Or Psychological In Nature, Or A Combination Of These Goals. It Explains Why A Person Acts In A Certain Way. “Vroom’s Expectancy Theory, Locke’s Goal-Setting Theory And Bandura’s Self-Efficacy Theory Try To Explain The Motivation Leading To A Peculiar Behaviour Depending On His Needs Or Goals” (Murari, 2020). “The Construct Of Behaviour Being A Vibrant Process, Varies In Response To The Situation And The Goals Of A Man” (Shaver And Scott, 1991). “Physiological Approach Gives Clarity To The Motivation” Shaver And Scott (1991).

“Expectancy, Instrumentality And Valance Are The Important Variables For Motivation” (Vroom, 1964). The Expectancy Talks About The Expected Performance Based On Efforts. The Instrumentality Is To Achieve A Result By Expected Performance And Valance Shows The Attractiveness Of The Result. Sánchez And Sahuquillo (2017) Found That Entrepreneurial Motivation Can Be Explained By This Theory. They Also Concluded That “Motivation Plays Important Role In Business Are Creation” Sánchez And .Sahuquillo (2017).

“Entrepreneurship Is The Prime Character In Economic Theory” Schumpeter (1934). There Are Entrepreneurs At The Start Of The Civilization, However, They Need A Supporting Environment (Baumol, 1993).

Mcclelland (1961) Emphasizes On Behaviour Aspects Of Entrepreneurship And Found Following Factors Influence The Behaviour Of An Entrepreneur.

- Need For Achievement
- Need For Control
- Individual Motives
- Self-Confidence
- Risk-Taking
- Problem-Solving Skills,
- Follow Up And Feedback
- Taking Individual Responsibility

Ketz De Vries (1977) Adds The Following Two Factors To Mcclelland (1961)’S Factors Which Are Based On Individual’s Childhood Experiences Of Unhappy Family And The Dislike For Working With Others.

- Entrepreneurial Personality
- Desire For Autonomy

Many Scholars Discussed The Different Kinds Of Leadership Qualities In An Entrepreneur. Delmar And Davidsson (2000) Bring Out Two New Factors Resulting In Entrepreneurship Namely Over-Optimism And Desire For Autonomy.

Motivation Initiates Behaviour And Entrepreneurship Has A Direct Bearing On The Motivation Of The Entrepreneurs. Motivational Theories Have Two Aspects Viz. Inner Part Of The Individual Which

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Initiates, Guides And Control The Behaviour, And The Processes Of Initiation, Direction And Sustenance (Campbell Et Al., 1970).

Gilad And Levine (1986) Propose “Push Theory And The Pull Theory For Entrepreneurial Motivation”. Where Push Is Due To The Negative External Forces Such As Job Dissatisfaction, Unemployment, Low Salary, Strict Work Schedule, And Pull Is Due To Attraction Towards Independence, Wealth, Self-Fulfilment And Some Other Individual Requirements. “Individuals Become Entrepreneurs Primarily Due To The ‘Pull’ Factors, Ant Not The ‘Push’ Factors (Keeble Et Al., 1992 And Orhan And Scott, 2001).

“Entrepreneurial Behaviour Is A Planned Behaviour. The Entrepreneurial Event, Entrepreneurial Attitude Orientation, Theory Of Planned Behaviour, And Entrepreneurial Potential Model Explain The Behaviour Of An Entrepreneur” Chakraborty Et Al. (2018).

Shapero’s Model Explains That Entrepreneurial Intention Is Generated By Perceived Desirability, Perceived Feasibility, And Propensity To Act Where Perceived Desirability Is A Result Of Personal Attitude, Values, Feelings, And Perceived Feasibility Is Perceived Ability For Certain Behaviour (Shapero, 1982).

Entrepreneurial Attitude Orientation Model Uses Four Attitudinal Factors: A) Need For Achievement, B) Innovation, C) Perceived Control And D) Perceived Self-Esteem. “The Attitude Is The Susceptibility To Respond In A Favorable Or Unfavorable Manner” Robinson Et Al. (1991). Achievement Covers The Results And Growth Of The Start-Up; Innovation Considers The Carrying Out Activities In A Unique Way; Perceived Control Considers Control Over Outcomes Through The Perception Of Control And Influence Over The Business; And Perceived Self-Esteem Links The Self-Confidence And Competencies (Robinson Et Al., 1991),.

Ajzen (1991)’S Theory Of Planned Behaviour Specifies That Intention Results In And Depends On Attitude, Subjective Norms And Perceived Behavior Control. Where The Attitude Depends On The Allure Of The Behavior Which Results In The Desired Outcome. The Subjective Norms Depend On Social Support To A Behavior Where Society Includes Family, Friends, Mentors And Role Models. The Perceived Behavioral Control Is Defined By The Self-Evaluation Of Competence For A Task Or Behavior By The Individual (Ajzen, 1991, 2001). Perceived Behavioral Control Is Similar To The Self-Efficacy Construct Of Bandura (1986).

Lee Et.Al.(2011) While Exploring The Influence Of Organizational And Individual Factors On Entrepreneurial Intentions, Find That Higher Job Satisfaction, High Income, Organizational Technical Excellence Incentives And Innovation Orientation Reduce The Entrepreneurial Intentions While Self-Efficacy, Misfit Between Individual Orientation And Organisational Conditions, Higher Qualification With High Expectations To Rewards And Benefits, And Low Organizational Support For Innovation Lead To Poor Job Satisfaction, And Increase The Entrepreneurial Intentions.

The Entrepreneurial Intention May Or May Not Lead To Entrepreneurial Action For The Startups. The Entrepreneurial Motivation Significantly Effects Intention-Behaviour Link In The Theory Of Planned Behaviour (Alam Et Al.2019). The Entrepreneurial Motivation Is The Origination Point Of Entrepreneurial Activity And It Sets The Development Of Entrepreneurial Behavior And It Leads To Startups (Haynie Et Al., 2010). Carsrud And Brännback (2011) Support This Construct And Argue That “Intention-Action Is Created As A Consequence Of Motivation” (Carsrud And Brännback, 2011).

Sanchez And Ruiz (2009 Find That The Main Reasons For Start-Ups` Are Need For Achievement, Economic Motivation, Need For Independence For Entrepreneurship, And Their Growth Depends On The Performance And Satisfaction Of These Needs. Thus Motivation Of Entrepreneurship Found In Their Study Is In Alignment With Vroom’s Expectancy Theory Of Motivation. The Same Is Found In

The Research Of Manolova Et Al. (2012), Hsu Et Al. (2014) And Sánchez And .Sahuquillo (2017), Ohyama (2011) Brings Out The Ingredients Of High-Tech Entrepreneurship As Follows.

- Learning Ability Of The Entrepreneur
- Decision Making Ability Of The Entrepreneur
- Human Capital
- Job Experience,
- Work Related Knowledge
- Access To New Technology
- Skill Mix
- Capability To Understand The Uncertainty Of Technology
- Entrepreneurial Education

As Found By Ohyama (2011), The Results Are The Success Of The Presence Of Above Factors Are Motivation To Continue As An Entrepreneur, Generating Value And High Return While The Absence Of Or Lacking Of The Above Factors Result In Leaving Entrepreneurship. (Ohyama, 2011). Braguinsky Et Al. (2012) Also Support Ohyama (2011) With Additional Factors Identified For High-Tech Entrepreneurship That Include Talent, Education Level In Science And Engineering, And Risk Tolerance. However, These Factors Can Be Categorized Under The Attitude, Social Norms, And Perceived Behavioral Control Leading To Entrepreneurial Intentions As Postulated By The Theory Of Planned Behavior Except For Access To New Technology, Human Capital, And High Earnings Which May Be Considered As Factors For Entrepreneurial Motivation.

#### 4.3 Factors Identified By Researchers For Motivation And Behavior For Entrepreneurship

Based On The Discussion Above The Factors, Identified By Some Researchers For Motivation And Behavior To Be An Entrepreneur Are Summarized In Table-1.

**Table-1:** Factors Identified By The Researchers For Motivation And Behavior For Entrepreneurship

| Sl.No. | Factors   | Scholar(S) And Year With Type Of Factors Identified |   |             |                       |                            |                        |                               |                             |
|--------|---|---|---|-------------|-----------------------|----------------------------|------------------------|-------------------------------|-----------------------------|
|        |   | Shapero And Shokol, 1982                            | Robinson, Stimpson, Huefner, And Hunt, 1991 | Ajzen, 1991 | Fazio And Olson, 2014 | Riquelme And Lanqawi, 2016 | Israr And Hashim, 2017 | Alam, Kousar And Rehman, 2019 | Ng, Hung Kee And Khan, 2019 |
| 1      | Attitude Towards Entrepreneur-Ship/Desirability/ Need For Achievement | Ind   | Ind   | Ind         | Ind                   | Ind                        |                        | Ind                           | Med                         |
| 2      | Entrepreneurial Desire  |   |   |             |                       | Med                        |                        |                               |                             |
| 3      | Vision  |   |   |             |                       |                            | Ind                    |                               |                             |
| 4      | Subjective Norms/ Role Models/  |   |   | Ind         |                       | Ind                        |                        | Ind                           | Ind                         |



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|  |   |     |     |     |  |     |     |     |     |
|--|---|-----|-----|-----|--|-----|-----|-----|-----|
|  | Mentors/Social Support  |     |     |     |  |     |     |     |     |
| 5  | Proactive Personality   | Ind |     |     |  |     |     |     | Ind |
| 6  | Creativity/ Innovation/ Propensity To Act                                 |     | Ind |     |  |     | Ind |     |     |
| 7  | Anticipated Emotion   |     |     |     |  | Ind |     |     |     |
| 8  | Entrepreneurship Education  |     |     |     |  |     |     |     | Ind |
| 9  | Entrepreneurial Opportunities   |     |     |     |  |     | Ind |     | Ind |
| 10   | Perceived Behavioral Control /Self-Esteem/Self-Confidence And Competences |     | Ind | Ind |  | Ind |     | Ind | Med |
| 11   | Perceived Feasibility/ Ability For Entrepreneurship                       | Ind |     |     |  |     |     |     |     |
|  | Entrepreneurial Motivation  |     |     |     |  |     |     | Mod |     |
|  | Entrepreneurial Intentions/ Growth/ Independence                          | Dep |     | Dep |  | Dep | Dep | Dep | Dep |
| Note : Ind – Independent , Dep- Dependent, Med- Mediator , And Mod-Moderator |   |     |     |     |  |     |     |     |     |

### 5.0 Opportunities For Startup In Indian The Aerospace Industry

Confederation Of Indian Industry (Cii) Report In 2009, Mentions The Huge Opportunities In The Indian Aerospace Industry. It Highlights That “India Is Poised To Become A Large Commercial And Defence Aircraft Market. With Rising Passenger Traffic And Increasing Military And Defence Expenditures, The Demand For Aircraft Is Expected To Increase. Boeing Expects A Demand Of 900 To 1,000 Commercial Aircraft Worth Us\$100 Billion Approximately In The Next 20 Years. This Also Suggests That A Significant Portion Of The Business Opportunities Could Accrue To India, Due To The

Associated Offsets” ( Oems Like Boeing, Airbus, Dassault Aviation, Safran, Etc. Are Going For Reorganization And Restructuring Of The Supply Chains With Offloading The Manufacturing Work To Low-Cost Manufacturers In Emerging Markets To The Countries Like India China & Brazil. India’s Major Aircraft Manufacturing Company Hindustan Aeronautics Limited (Hal) Is Also Outsourcing Not Only The Components Manufacturing Including Composite Parts But Also The Major Sub-Assemblies Like Front Fuselage, Centre Fuselage, Rear Fuselage, Wings, Etc. To Tier 2 And Tier 3 Companies. Hal Is Also Encouraging Smes In The Manufacturing Sector And Entrepreneurs To Develop An Aerospace Ecosystem In India. Maintenance, Repair And Overhaul (Mro) Sector In The Aerospace Industry Is Going To Boom In The Next 5 Years With The Reduction In Taxes Matching With Other Competing Countries In South Asia.

Pandey (2020) Highlights The Scope Of Entrepreneurship In The Space Industry In India Is Linked With The Indian Space Research Organization (Isro) And The Government Of India Has Provided Approval To “The Indian National Space Promotion And Authorization Center (In-Space)” To Encourage Private Sector Companies In Manufacturing Of Satellites And Rockets, Or Participate In Satellite Launch Services, But The Participation Of Start-Ups Is Negligible So Far. Mukherjee (2017) Discusses The Significant Work Being Carried Out By Five Start-Ups And Highlights Projects Of Development Of Jet Engines, Flight Computer, Uav, Drone, Audit, And Training.

Big Oems Like Boeing And Airbus Are Supporting The Start-Ups Specifically Technology-Based Start-Ups As Reported By Many Aviation Magazines. These Oems Have Set Up Engineering And Technology Centers, Incubators, And Partnerships For These Activities. The Government Of India Has Also Stepped Up A Support System For Start-Ups In The Space Sector Of The Aerospace Industry. There Were About 160 Start-Ups By The End 2019 Including 33 Funded Start-Ups With Total Funding Of About Us \$6.2 Million Located At Various Parts Of The Country Specifically In Delhi Ncr (24.68% And Bangalore (20.89%) (Das, 2019). Spinoff Is Found To Be Working In The Space Sector As Many Scientists Of Vikram Saraabhai Space Centre And Indian Space Research Organization Have Started The Enterprises Related To Space Projects (Dasgupta, 2018).

## **6.0 Motivational Factors Highlighted By High Tech Entrepreneurs And Experts**

Ulmann (1995) Emphasizes That The Entrepreneur Is A Medium To Introduce Technical Innovation But Corporations Play A Major Role And Sources To Raise The Capital Which Is A Crucial Factor For The Success Of A Start-Up Company. The Sources Of Capital Include Savings Of The Founder, Support From Family And Friends, Borrowings, Investment Groups Like Venture Capital, Grants, Government Loans, Partnership, Banking Institutions, Oems And Customers. He Also Explains That Aerospace Products Are Expected To Have Reliability And High Level Of Performance Along With Technical Complexity. Some Entrepreneurs Go In A Traditional Way Of Working In Known Territories Of Technologies While Other Venture In Innovation And New Technologies And Materials. Ulmann (1995) Highlights The Characteristics Of Entrepreneurs In This Industry As Agility, Ability To Attract The Attention Of The Market, Media, Political Circles And Partners.

Interviews With Aerospace Entrepreneurs By Dasgupta In 2018 Reveal That “Role Models And Their Visions” Like Dr. Vikram Sarabhai (The Founder Of Indian Space Research Organization(Isro)) & His Vision Of Self-Reliance Of The Country In Space, Dr. Abdul Kalam (Ex. President Of India And Pioneer Of Space And Missile Programs), Education In Indian Institute Of Space Science & Technology (IIST) & Other Institutes, Experience In Indian Space Organisations, “Patriotism”, “Opportunities In The Space Sector”, “Freedom To Become An Entrepreneur”, “ To Be Their Own Bosses”, “Push Beyond Status Quo”, Research Orientation, “Ability To Work On Cutting-Edge Technologies”, Low Labor Cost, Support From The Space Agencies, Their “Childhood Dreams”, Low Competition In The High-Tech Area With Better Chances To Be Successful Are The Main Sources

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Of Motivation To Launch Start-Ups In The Space Sector Of The Aerospace Industry In India (Dasgupta, 2018).

Hindustan Aeronautics Limited, The Largest Aeronautical Company In India, Aeronautical Development Authority (Ada), National Aeronautical Laboratories (Nal), Drdo, Isro, Vikram Sarabhai Space Centre (Vssc), Etc. Encourage The Smes And Start-Ups By Outsourcing Design, Development And Production Of High-Tech Products For Indigenous Current Projects Lca, Htt 40, Alh, Lch, Luh, Satellites, Space Shuttles, Bramhos Missiles, And Upcoming Projects Like Amca, Nuh, Uavs, Civil Aircraft, Etc.

Interview With The Owner And Managing Director Of A Successful Sme In Avionics Which Designs, Develops And Manufactures Fight Control Equipment For Aircraft And Helicopters Reveals That Passion, Technical Knowledge, Accepting Challenges, Being Creative, Freedom To Experiment, Less Job Opportunity, Previous Work Experience, Identification Of Opportunities And Can Do Anything Approach Made Him An Entrepreneur But Continuous Knowledge Up-Gradation, Passion, Risk-Taking, Value Creation More Than Mere Satisfaction, Adoption Of New Technology, Selection Of Right Employees, Hard Work And Focus Made Him Successful.

Discussions With Some Industry Experts And The President Of The Association Of Smes In Aerospace And Defence Sector In India Highlight That Passion, Role Models. Patriotism, Education (Engineering And Science), Childhood Dream, Freedom To Do What One Wants And To Be Won Boss Are Important Factors For Entrepreneurship In This Industry.

Based On The Above Discussion, The Factors Affecting The Motivation Of Start-Ups In The Aerospace Industry, Specific To India Can Be Summarised As Follows:

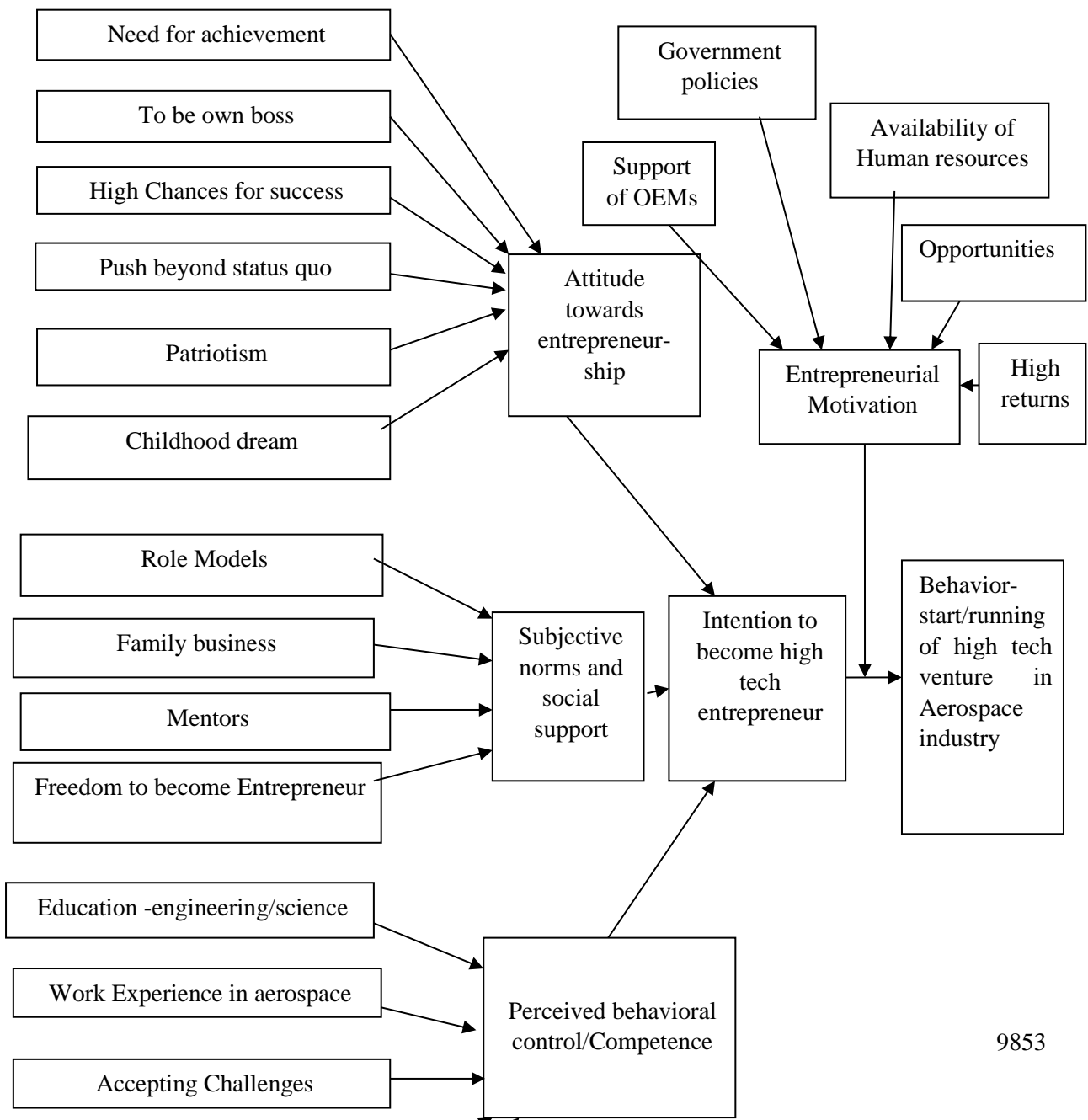
- Role Models
- Education In The Field
- Work Experience In Aerospace Company
- Patriotism
- Childhood Dream
- Opportunities In The Sector
- Freedom To Become An Entrepreneur
- To Be Own Boss
- Push Beyond Status Quo
- Accepting Challenges
- Research Orientation
- Ability To Work On Cutting Edge Technologies
- Passion
- Support From Oems
- Availability Of Required Human Resources At Low Cost
- Fewer Job Opportunities

Ajzen's Theory Of Planned Behavior (Tpb) Emphasizes Deliberate Processes Linking Attitude To

Behavior While Fazio’s Mode Model Explains Spontaneous Processes Linking Attitude To Behavior. Ariely (2017) Finds That “Varied Dimensions Of Patriotism Are Allied With Attitudes And Behaviors”. Hence, Patriotism May Be Considered As An Attitude With A Strong Effect Component (Tonga And Aksoy, 2014). Environmental And Economic Factors Can Be Mostly Accounted For Within The Perceived Behavioral Control Specified By Ajzen (1991). These Are Quite Visible Factors Identified By The Entrepreneurs In The Aerospace Industry In India. It Is Also Visible That Pull Factors Like “To Be Own Boss”, “Freedom To Become Entrepreneurs”, Etc. Are Important Motivators In Line With The Factors Identified By Keeble Et Al. (1992) And Orhan And Scott (2001).

### 6.1 Conceptual Framework For Motivation-Behavior Of High High Tech Entrepreneurship In Indian Aerospace Industry

Based On Researches Vis-Vis Views Of Entrepreneurs And Experts As A Conceptual Framework For Motivation-Behavior Of High Tech Entrepreneurship In Indian Aerospace Industry Is Developed And The Same Is Shown In Figure -1.



**Figure 1:** Conceptual Framework For Motivation-Behavior Of High-Tech Entrepreneurship In Indian The Aerospace Industry

Attitude Towards Entrepreneurship May Be Due To Need For Achievement, A Desire To Be Own Boss, Beliefs That There Are High Chances Of Success, Internal Push Beyond Status Quo, Patriotism, And Childhood Dream To Be A Part Of The Aerospace Area. Social Norms And Social Support May Include Role Models, Mentors, Family Business And Freedom To Become Entrepreneurship While Education Like Engineering And Science, Work Experience In An Aerospace Company, Accepting Challenges, Creativity/Research Orientation And Ability To Work On Cutting Edge Technology May Be Included In Perceived Behavioral Control And Competence. The Entrepreneurial Motivation Which Works As Moderator Comes From Opportunities, Government Support For Finance And Entrepreneurship And Availability Of Human Resources At Low Cost.

The Conceptual Framework Of Theory Of Planned Behavior With Moderator Between Intention And Behavior Is Quite Appropriate For Such Research (Alam Et Al., 2019).

### **7.0 Discussion And Limitation**

With The Changing Business Scenario, There Is More Focus On Entrepreneurship Which Can Generate Work For Others And Bring Improvement In Society. Despite The Very High Failure Rate Of Start-Ups, There Is More Focus On Entrepreneurship And More And More People Are Dreaming To Be Entrepreneurs. There Are Huge Opportunities For Entrepreneurship In The Aerospace Industry In India As Highlighted By Many Surveys And Studies In The Near Past. Start-Ups Are Motivated In The Aerospace Industry Due To Personal Attitude, Education, Opportunities, And Support From Various Sectors Along With Supportive Government Policies Despite High Gestation Period And Low Return. The Review Of Literature Finds No Specific Study In The Field Of Study. The Motivation And Construct Of Behavior Of High Tech Entrepreneurship In The Aerospace Industry In India Has Been Studied In This Research, And It Has Explored The Motivating Factors Identified By Renowned Researchers Vis-À-Vis The Factors Identified By High Tech Entrepreneurs And Industry Experts And A Theoretical Framework Based On These Factors Has Been Developed.

Entrepreneurship Is A Complex, Heterogeneous And Multi-Level Phenomenon (Sandstorm Et Al. 2011) And High-Tech Entrepreneurship Is A Means To Translate New Technologies And Knowledge Into Products And Services (Van Roy And Nepelski, 2017). “Psychological Theories Of Motivation Support The Argument That Motivation Exists Within The Individual. There Is A Complex

Relationship Between Motivation And Behavior” (Murari 2020). McClelland’s Behavior Theory And Vroom’s Expectancy Theory Are Quite Appropriate For Entrepreneurial Motivation. However, It Is Found That Not Much Attention Has Been To Study Motivation-Behavior Of High Tech Entrepreneurship In The Area Of High-End Cutting Edge Manufacturing Technologies

The Study Has Analyzed The Growth And Prospect Of The Aerospace Industry In India. It Is Found That The Industry Is Growing Very Fast Along With The Growth Of The Economy And Changing Strategies Of Oems Like Hal Boeing, Airbus, Isro, Etc. From Manufacturers To Assemblers. Also, These Companies Are Trying To Take Advantage Of The High Growth Of The Aviation Sector, Low Man-Hour Cost, Availability Of Highly Educated Human Resources, This Has Created Huge Potential For Entrepreneurs In Cutting Edge Technological Areas Of Advanced Manufacturing, And Avionics As Tier-2 And Tier-3 Companies.

The Motivation-Behavior Factors Identified By Renowned Researchers, And The Factors Highlighted By High Tech Entrepreneurs In The Indian Aerospace Industry Show That The Factors Identified By Shapero And Shokol (1982), Robinson Et Al. (1991), Ajzen (1991), Fazio And Olson (2014), Riquelme And Lanqawi (2016), Israr And Hashim (2017), Alam Et Al. (2019) And Ng Et Al. (2019) Are Also Reported By The Entrepreneurs In The Aerospace Industry In India, But Some Additional Factors Such As Patriotism, Research Orientation, Ability To Work On Cutting Edge Technologies, Etc. Are Also Have Been Highlighted By These Entrepreneurs Which Are Not Mentioned By These Researchers. Some Factors Identified In This Study Like Role Models, Patriotism, Childhood Dream, Education In Engineering And Science, Research Orientation Are Less Explored Factors. No Study Is Found Which Addresses How Role Models Are Related To The Success Of The Firms Started Due To The Impact Of Role Models, In Various Stages Of Entrepreneurship Except At The Pre-Start Stage. Similarly, The Role Of Patriotism In Entrepreneurship Needs Exploration. The Extension Of The Theory Of Planned Behavior With Entrepreneurial Motivation As A Moderator Can Be Considered For Understanding And Explaining The Motivation Behavior Of High Tech Entrepreneurship In The Indian Aerospace Industry. This Study Has Brought A New Prospect For Research In The Field Of High-Tech Entrepreneurship.

The New Aspect Of Entrepreneurial Motivation To Convert Intention To Behavior Has Been Highlighted In This Study. It Has Brought Out That Opportunities, Government Policies, Support Of Oems, Availability Of Human Resources And The Expectation Of High Returns Result In Entrepreneurial Motivation In The High Tech Area Of The Aerospace Industry In India. This Study Provides The Factors To Be Looked Into By The Government, Original Equipment Manufacturers And Society To Encourage High-Tech Entrepreneurship In The Aerospace Industry In India.

The Present Paper Has Limitations Of Generalization As Quantitative Research Is Not Carried Out And Structured Interviews Or Delphi Are Not Conducted. The Study Is Also Conducted Within India Where The Growth Of The Aerospace Industry Is More Along With Supportive Government Policies, High Support Of Oems And It Cannot Be Generalized In For Other Countries.

### **8.0 Scope For Further Research**

Qualitative Data Through A More Structured Interview And Delphi Can Be Collected And Analyzed To Examine The Factors Based On The Theoretical Framework To Validate The Factors Affecting The Motivation-Behavior Of Start-Ups In The Aerospace Industry In General And In India In Particular, As India Has Become An Important Hub Of Activities In The Field Of Aerospace. Also, Quantitative Research Methodology Can Be Used For Validation And Consolidation.

Studies In The Field Of Entrepreneurship Are Found To Be Cross-Sectional And Not Longitudinal So The Impact Of Various Factors Varying With Time And Phases Of Entrepreneurship Are Not Considered In The Past. A Longitudinal Study Is Required To Find Out The Impact Of Motivation-

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Behavior Factors. For Example, Many Students Who Have Undergone The Entrepreneurial Training Might Not Have Started A New Firm At All And Some Might Have Dropped The Idea At Pre-Launch And Some After The Launch.

The Studies To Examine Some New Factors Mentioned By Entrepreneurs And Highlighted Above Can Be Carried To Consolidate These Factors To Exploit Them By Academia And Governments To Enhance High-Tech Entrepreneurship In The Aerospace Industry.

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