

# MODELLING AND ANALYSIS OF NEW VENTURE PERFORMANCE – USING BUSINESS MODELS AND SUCCESS FACTORS

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**JUNE 2021**

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Submitted  
In fulfilment of the requirements of the degree of  
Doctor of Philosophy

to the



**Indian Institute of Technology Delhi**

**June 2021**

## CERTIFICATE

This is to certify that the thesis titled “**Modelling and Analysis of New Venture Performance – Using Business Models and Success Factors**”, which is being submitted by **Abhishek Kumbhat** to **Indian Institute of Technology Delhi** for the award of the degree of **Doctor of Philosophy (Ph.D.)** is a record of bona fide original research work carried out by him. He has worked under my guidance and supervision and fulfilled the requirements for the submission of the thesis, which has attained the standard requirement for a Ph.D. degree of the institute. The results presented in this thesis are not submitted for the award of any degree or diploma.



(Prof. Sushil)

Research Supervisor  
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## ACKNOWLEDGEMENTS

This study could not have been achievable without significant advice, motivation and support from many people. I want to thank all those who contributed to the accomplishment of this study.

First and foremost, I would like to convey my heartfelt gratitude to my supervisor Prof. Sushil for his generous advice and encouragement in pursuing the research in the area of my passion and helping me to develop my ideas and write about this new, dynamic and challenging subject related to Startups and Entrepreneurship. It has been my honour to be his Ph.D. student. I appreciate all his time, inputs and accommodative approach to make my Ph.D. experience meaningful and exciting. His extra-ordinary support specifically reflected during initial years as giving time out of his busy schedule of Deputy-Directorship and during later years as being flexibly available over odd hours or weekends. His style of push and pull with extreme patience has helped me sail through various difficult times during my Ph.D. I couldn't have envisioned having a better mentor for my studies.

The SRC (Student Research Committee) members Dr. Mahim Sagar, Dr. Sanjay Dhir and Dr. Shyam Sethi immensely contributed throughout my time during Ph.D. The committee was a source of friendship, advice and collaboration. Their informative observations, motivation, and challenging questions during various review sessions encouraged me to expand the horizon of my study from diverse perspectives.

I am also grateful to all other faculty members (retired and current) of the Department of Management Studies who had been a source of learning in some way or the other. I would also like to express thanks to other past and present fellow researchers with whom I have had the pleasure to work with. On a specific note, I would like to mention Dr. Monika Singla (past research scholar of the department), who has always been available to offer support and motivation during difficult times of Ph.D.

The studies discussed in this thesis would not have been possible without timely support from representatives of various startups and other experts associated with the startup ecosystem, who provided valuable data points and inputs for numerous case studies and real-life use cases

of such startups. I want to thank all such entrepreneurs and professionals for their support and time they spared from their busy schedules.

I am also grateful to the institute administration and department's staff for all the support and facilitating my studies. My special thanks to Ms. Rajni Raghu (GIFT Secretariat) for her unwavering support extended to me at various stages of my research.

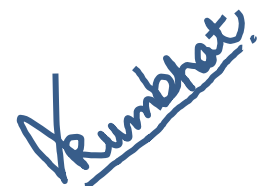
I would also like to express special gratitude to Mr. Prasan Jain (MD, S&D) and Mr. Kamlesh Vijay (Group CEO, S&D) and numerous members of Sugal & Damani Group (S&D) and Skilrock Technologies (my workplace) for not only allowing me to pursue my interests in academic research but also offering extended support during the long journey of this study.

Last but certainly not the least, I would like to thank my parents, especially my mother Mrs. Kanti Kumbhat who has always been the source of positive energy and motivation, with extra-ordinary listening skills to absorb all negative energy or thoughts I could have in difficult times. Without her presence, I could have neither started nor finished this research work. Another special mention for my sister – Ms. Ritu Kumbhat, who has not only been the biggest support system for the whole family and me but also pushed me beyond my limits for completion of any work, including this study. Without fail, I would like to mention and express my thanks for my wife – Mrs. Namrata Kumbhat and my two lovely daughters – Ms. Anika & Ms. Aanya; as they always offered their unquestioned and unconditional support during my studies, whereby a large share of my time for them was diverted to my studies. Also, support and encouragement from all other family members, especially in my hometown - Jodhpur, Rajasthan, India, can't be overlooked.

Above all, I thank the Almighty God for all the blessings and support system, without which no work can be achieved. I wish that my study is of value to both practitioners and researchers at large.

Thank you all !!

New Delhi



(Abhishek Kumbhat)

## ABSTRACT

Rise of creativity and entrepreneurial attitude in today's conceptual era introduced the Startup ecosystem as a new major contributor to the global economy. The continuous exponential surge of Startups and associated ecosystems have not only driven the socio-economic prosperity across the globe but also offered an alternative career path for the young generation. Such an economic influx is powered by factors like low setup cost of a startup, faster adoption of new technologies by a large pool of consumers, and highly accessible investors and their risk appetite. In contrast to these positive vibes, the fact about a very high failure rate of the startups and highly competitive global market place cannot be overlooked. While the concerns on survival and sustained success of startups are continuously increasing; such failure has directly influenced investor appetite for risk, which directly reflects in changing startup investment patterns of the last few years. Such a shift in investment approach, from Fear-Of-Missing-Out (FOMO) to Capitalisation-of-Funds reflects in continuously increased deal sizes and reduced number of deals. This phenomenon is expected to severely impact the survival of early-stage startups and associated ecosystem negatively. Therefore, the current study aims to study factors that contribute to startup success and to analyse and predict venture performance to strengthen the startup ecosystems across the globe, ultimately.

The study has been carried out in five phases. The first phase that laid down the foundation of current research started with an extensive literature review, firstly sensing the current status of the startup ecosystem and changing economic patterns. With deep-dive literature review in the associated areas of business models, startup development lifecycle, and startup success factors, apparent research gaps in the current knowledge base were highlighted. Identified issues in the literature and opportunities at hand motivated a well-crafted research methodology to conceptualize the framework for modelling and analysing startup success.

In the second phase of current research, the critical role of business models in startup success has been reinstated, and a better understanding of business models and associated components has been offered. A comprehensive yet straightforward three-step process for business model discovery has been defined, which at first starts with clearly defined components, dimensions

and associated alternatives. The process includes preparing a static morphological box in the current context, followed by contextual selection and specific additions of dimensions and alternatives in the context of the selected industry. The proposed methodology helps startups discover new business model opportunities, even in the most complex and competitive business environments.

In the third phase of the research, considering the unique challenges and opportunities that a startup experience at each stage of its lifecycle, eight dimensions of startup growth and well-articulated attributes of each dimension in each stage have been proposed. After that, a four-point scale of each dimension has been proposed as the Multi-Dimensional Development Stage model. Such a model can identify the development stage of a startup, and find whether the startup is heading towards unbalanced scaling across any dimension or not. This process helps ensure that the expectations from a startup and respective contributing success factors in each stage are uniquely expressed. The use case analysis over 176 startups and observations thereon also reflect behavioural patterns of Most-Successful and Least-Successful startups over different development stages.

After the ground-work related to business model and startup development stage, the fourth phase of the current research focused on the compilation of well-articulated 58 success factors and six result areas of a Startup. Such success factors were grouped as factors related to the value proposition, founders, team and resources, and market and operations; for a better-structured understanding of such factors. The initial level of interpretive modelling using TISM among success factors within each set illustrated the inter-relationships and interactions among such factors. It was accepted that these factors do not function in isolation and mutually correlated influence of these factors is more critical than that of individual factors. However, on a practical basis, it becomes difficult to quickly evaluate a startup and craft inter-relationships among themselves, over such a large number of diversified factors. Therefore, a need to summarize such factors into a smaller number was identified.

As a first step, a deep-dive empirical analysis of 58 success factors for almost 200 startups, spread over industry, region and development stages, was conducted. After that, using the collected

data and factor analysis techniques like Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), the originally-proposed success factors are summarized into a smaller set of Key Success Factors. While performing EFA, a set of ten factors are statistically proposed and thereafter qualitatively combined as Key Success Factors. The proposed summarization as Key Success Factors was statistically validated by CFA over the collected data and minimization of information loss is assured by various Fit Measures. Re-aligning with the core objective of the research, a conceptual framework of inter-relationships among proposed Key Success Factors using TISM has been proposed. The proposed interpretive model clearly defined driving power and dependence of such Key Success Factors. More so, the proposed inter-relationship among Key Success Factors has been validated through structural analysis using Structural Equation Modelling (SEM). While, the Measurement model of SEM describes the relationship between the observed variables (Success Factors) and the latent constructs (the Key Success Factors), the Structural model of SEM describes the inter-relationships between the latent constructs (the KSFs), as conceptualized as a framework using TISM or structural modelling. While the overall model is validated using various Fit Measures, Significance and Strength of each path of the TISM is also verified.

With the ultimate objective of this complete research, to predict venture performance, result areas are also included in the proposed structural model, thereby proposing the framework relating Success Factors to Result Areas, using Structural and Path Analysis performed using SEM. Finally, this conceptual framework to analyse venture success, with contributing success factors as input variables is further cross-validated over 177 Startups and illustrated through the implementation of the proposed model on specifically selected six startups.

Finally, it has emerged from the critical findings that Entrepreneurial Personality traits and relevant prior experience of founding members, along with the proper composition of the founding team through complementary skill set are of paramount importance for venture success. Therefore not only the selection of entrepreneurial journey as career path must assure the presence of relevant founders personality, experience and skills, but also the investors should essentially focus on such factors to select a startup for prospective investment. In addition,

quality value proposition and embracement of innovation culture, along with optimally-managed and balance-scaled operations to serve the target market are of critical essence to the startup success. While these factors can be strengthened by appropriate deployment of sufficient resources, the above said personality factors, experience and skills of the founding team lay the foundation of these factors. The founders and investors must ensure sufficient focus on such execution-oriented factors, without which startup success cannot be achieved.

Therefore, the proposed framework for venture performance analysis can calculate predicted values of Key Result Areas as independent variable based on Success Factors as Dependent Variables. This must offer an immense tool to help not only the founders to find key improvement areas for the startup but also the investors to identify a better prospect for their investment. Despite such a proposed framework, it must not be forgotten that Entrepreneurship is nothing but taking advantage of opportunities that others have not seen, and it derives its power from the underlying uncertainty. Nevertheless, in a real sense, uncertainty always remains ahead of planning; the odds of such uncertainty can be reduced with focused effort. Thus, any tool, methodology, or list of do's & don'ts can neither make a startup extra-ordinarily successful as a unicorn nor guarantee venture success. However, the probability of success can be improved by deploying the right resources, techniques and practices.

## सार

आज के वैचारिक युग में रचनात्मकता और उद्यमशीलता के रवैये में वृद्धि ने उद्यमी पारिस्थितिकी तंत्र को वैश्विक अर्थव्यवस्था में एक नए प्रमुख योगदानकर्ता के रूप में पेश किया है। स्टार्टअप्स और संबंधित पारिस्थितिकी प्रणालियों के निरंतर घातीय वृद्धि ने न केवल दुनिया भर में सामाजिक-आर्थिक समृद्धि को प्रेरित किया है, बल्कि युवा पीढ़ी के लिए एक वैकल्पिक कैरियर मार्ग भी पेश किया है। इस तरह की आर्थिक आमदनी, एक स्टार्टअप की कम स्थापना लागत, अधिकतर उपभोक्ताओं द्वारा नई तकनीकों को तेजी से अपनाने और अत्यधिक सुलभ निवेशकों और उनके जोखिम लेने की क्षमता जैसे कारकों से संचालित होती है। इन सकारात्मक भावनाओं के विपरीत, स्टार्टअप्स की अत्यधिक उच्च विफलता दर और अत्यधिक प्रतिस्पर्धी वैश्विक बाजार के तथ्यों को नजरअंदाज नहीं किया जा सकता है। जबकि स्टार्टअप्स के अस्तित्व और निरंतर सफलता पर चिंता लगातार बढ़ रही है; इस तरह की विफलता ने जोखिम के लिए निवेशक की क्षमता को सीधे प्रभावित किया है, जो सीधे पिछले कुछ वर्षों के स्टार्टअप निवेश दृष्टिकोण को दर्शाता है। Fear-of-Missing-Out (FOMO) से कैपिटलाइजेशन-ऑफ-फंड्स में निवेश के दृष्टिकोण में इस तरह की बदलाव लगातार बढ़े सौदे के आकार और सौदों की कम संख्या में दर्शित होता है। इस बदलाव से शुरुआती स्तर के स्टार्टअप और संबद्ध पारिस्थितिकी तंत्र के अस्तित्व को नकारात्मक रूप से प्रभावित करने की उम्मीद है। इसलिए, वर्तमान अध्ययन का उद्देश्य उन कारकों का अध्ययन करना है जो अंततः स्टार्टअप सफलता में योगदान करते हैं और अंततः वैश्विक स्टार्टअप पारिस्थितिकी तंत्र को मजबूत करने के लिए उद्यम के प्रदर्शन का विश्लेषण और भविष्यवाणी करते हैं।

अध्ययन पांच चरणों में किया गया है। पहला चरण जिसने वर्तमान शोध की नींव रखी, एक व्यापक साहित्य समीक्षा के साथ शुरू हुआ, सबसे पहले स्टार्टअप पारिस्थितिकी तंत्र की वर्तमान स्थिति और बदलते आर्थिक परिवेश को महसूस किया। व्यावसायिक तंत्र, स्टार्टअप विकास जीवनचक्र, और स्टार्टअप सफलता के कारकों से संबंधित क्षेत्रों में गहरी-गोता साहित्य की समीक्षा के साथ, वर्तमान ज्ञान आधार में स्पष्ट अनुसंधान अंतराल पर प्रकाश डाला गया। साहित्य में पहचान के मुद्दों और हाथ में अवसरों ने स्टार्टअप सफलता की भविष्यवाणी के लिए रूपरेखा तैयार करने के लिए एक अच्छी तरह से तैयार की गई अनुसंधान पद्धति को प्रेरित किया।

वर्तमान शोध के दूसरे चरण में, स्टार्टअप की सफलता में व्यावसायिक तंत्र की महत्वपूर्ण भूमिका को बहाल किया गया है, और व्यावसायिक तंत्र और संबंधित घटकों की बेहतर समझ की पेशकश की गई है। व्यावसायिक तंत्र खोज के लिए एक व्यापक एवं सरल तीन-चरणीय प्रक्रिया को परिभाषित किया गया है, जो पहले स्पष्ट रूप से परिभाषित घटकों, आयामों और संबंधित विकल्पों के साथ शुरू होता है। प्रक्रिया

में वर्तमान संदर्भ में एक स्थिर रूपात्मक बॉक्स (morphological box) तैयार करना शामिल है, इसके बाद प्रासंगिक चयन और चयनित उद्योग के संदर्भ में आयाम और विकल्पों के विशिष्ट परिवर्धन शामिल हैं। प्रस्तावित कार्यप्रणाली स्टार्टअप को नए व्यावसायिक तंत्र (business model) के अवसरों की खोज करने में मदद करती है, यहां तक कि सबसे जटिल और प्रतिस्पर्धी व्यावसायिक वातावरण में भी।

शोध के तीसरे चरण में, जीवनचक्र के प्रत्येक चरण में एक स्टार्टअप द्वारा अनुभव किए गए अद्वितीय चुनौतियों और अवसरों पर विचार करते हुए, स्टार्टअप विकास के आठ आयाम और प्रत्येक चरण में प्रत्येक आयाम की अच्छी तरह से व्यक्त विशेषताओं का प्रस्ताव किया गया है। उसके बाद, प्रत्येक आयाम के चार-बिंदु पैमाने को बहु-आयामी विकास चरण तंत्र के रूप में प्रस्तावित किया गया है। ऐसा तंत्र किसी स्टार्टअप के विकास के चरण को पहचान सकता है, और यह पता लगा सकता है कि स्टार्टअप किसी भी आयाम पर असंतुलित विकास/ वृद्धि की ओर बढ़ रहा है या नहीं। इस प्रक्रिया से यह सुनिश्चित करने में मदद मिलती है कि स्टार्टअप से उम्मीदें और प्रत्येक चरण में संबंधित योगदान कारक विशिष्ट रूप से व्यक्त किए जाते हैं। 176 स्टार्टअप्स और उसके बाद के अवलोकन पर केस स्टडी (case study) विश्लेषण भी विभिन्न विकास चरणों में सबसे सफल और कम से कम सफल स्टार्टअप के व्यवहार स्वरूप को दर्शाता है।

व्यवसाय तंत्र और स्टार्टअप विकास चरण से संबंधित जमीनी कार्य के बाद, वर्तमान अनुसंधान का चौथा चरण अच्छी तरह से व्यक्त 58 सफलता कारकों (success factors) और एक स्टार्टअप के छह परिणाम क्षेत्रों (result areas) के संकलन पर केंद्रित है। इस तरह के सफलता कारकों को मूल्य प्रस्ताव (value proposition), संस्थापकों, टीम और संसाधनों, और बाजार और संचालन से संबंधित कारकों के रूप में समूहित किया गया; ऐसे कारकों की बेहतर संरचित समझ के लिए। प्रत्येक समूह के भीतर सफलता कारकों के बीच सम्पूर्ण विवेचित संरचना मॉडलिंग (TISM) का उपयोग करके व्याख्यात्मक संरचनात्मक मॉडलिंग (interpretive structural modelling) का प्रारंभिक स्तर ऐसे कारकों के बीच अंतर-संबंधों और परस्पर-प्रभाव को चित्रित करता है। यह स्वीकार किया गया था कि ये कारक अलगाव में कार्य नहीं करते हैं और इन कारकों का परस्पर संबंधित प्रभाव व्यक्तिगत कारकों की तुलना में अधिक महत्वपूर्ण है। हालांकि, व्यावहारिक आधार पर, इतनी बड़ी संख्या में विविध सफलता कारकों के बीच एक स्टार्टअप और उनके अंतर-संबंधों का त्वरित मूल्यांकन करना कठिन हो जाता है। इसलिए, ऐसे कारकों को एक छोटी संख्या में संक्षेपित करने की आवश्यकता की पहचान की गई।

पहले कदम के रूप में, उद्योग, क्षेत्र और विकास के चरणों में फैले लगभग 200 स्टार्टअप के लिए 58 सफलता कारकों का गहन-गोता अनुभवजन्य विश्लेषण किया गया। उसके बाद, एकत्र किए गए तथ्यों (data) और कारक विश्लेषण तकनीकों जैसे अन्वेषी कारक विश्लेषण (EFA) और पुश्तिपरक कारक विश्लेषण (CFA) का उपयोग करते हुए, मूल रूप से प्रस्तावित सफलता कारकों को मुख्य सफलता कारकों (Key Success Factors) के एक छोटे समूह में संक्षेपित किया जाता है। EFA का प्रदर्शन करते समय, दस कारकों का एक

समूह सांख्यिकीय रूप से प्रस्तावित हुआ और उसके बाद गुणात्मक रूप से मुख्य सफलता कारक के रूप में संयुक्त किया गया। मुख्य सफलता कारक के रूप में प्रस्तावित संक्षेप को CFA द्वारा एकत्रित आंकड़ों पर सांख्यिकीय रूप से मान्य किया गया और विभिन्न योग्य मापों (fit measures) द्वारा सूचना के नुकसान को कम करने का आश्वासन दिया गया है। अनुसंधान के मुख्य उद्देश्य के साथ पुनः संरेखित करते हुए, TISM का उपयोग करते हुए प्रस्तावित मुख्य सफलता कारकों के बीच अंतर-संबंधों का एक वैचारिक ढांचा प्रस्तावित किया गया। प्रस्तावित व्याख्यात्मक तंत्र (interpretive model) स्पष्ट रूप से ऐसे मुख्य सफलता कारकों की चालन (driving) और निर्भरता (dependence) शक्ति को परिभाषित करता है। इसके अतिरिक्त, मुख्य सफलता कारकों के बीच प्रस्तावित अंतर-संबंध संरचनात्मक समीकरण मॉडलिंग (SEM) का उपयोग करके संरचनात्मक विश्लेषण के माध्यम से मान्य किया गया। SEM का मापन मॉडल अवलोकन किए गए चर (construct) (सफलता कारक) और अव्यक्त निर्माणों (मुख्य सफलता कारक) के बीच के संबंध का वर्णन करता है, जबकि, SEM का संरचनात्मक मॉडल अव्यक्त निर्माणों (KSF) के बीच के अंतर-संबंधों को अवधारणा के रूप में वर्णित करता है। TISM या संरचनात्मक मॉडलिंग का उपयोग करते हुए एक रूपरेखा के रूप में। जबकि समग्र मॉडल विभिन्न योग्य माप, TISM के प्रत्येक पथ के महत्व और शक्ति का उपयोग करके सत्यापित किया गया है।

इस पूर्ण अनुसंधान के अंतिम उद्देश्य के साथ, उद्यम की सफलता की भविष्यवाणी करने के लिए, परिणाम क्षेत्रों को प्रस्तावित संरचनात्मक मॉडल में भी शामिल किया गया है, जिससे परिणामी क्षेत्रों में सफलता कारकों से संबंधित रूपरेखा का प्रस्ताव करते हुए, संरचनात्मक और पथ विश्लेषण का उपयोग करके SEM का उपयोग किया गया। अंत में, उद्यम की सफलता का अनुमान लगाने वाली इस वैचारिक ढांचे की वेधयता सत्यापित के लिए 177 स्टार्टअप्स में सफलता कारकों के योगदान पर विश्लेषण किया गया और विशेष रूप से चयनित छह स्टार्टअप पर प्रस्तावित मॉडल के कार्यान्वयन के माध्यम से सचित्र हैं।

अंत में, यह महत्वपूर्ण निष्कर्षों से उभरा है कि उद्यमिता व्यक्तित्व लक्षण और संस्थापक सदस्यों के प्रासंगिक पूर्व अनुभव के साथ-साथ, पूरक कौशल के माध्यम से संस्थापक टीम की उचित संरचना उद्यम की सफलता के लिए सबसे महत्वपूर्ण हैं। इसलिए न केवल उद्यमशीलता की यात्रा के कैरियर मार्ग के रूप में प्रासंगिक संस्थापकों के व्यक्तित्व, अनुभव और कौशल की उपस्थिति का आश्वासन देना चाहिए, बल्कि निवेशकों को संभावित रूप से निवेश के लिए एक स्टार्टअप का चयन करने के लिए ऐसे कारकों पर ध्यान देना चाहिए। इसके अलावा, लक्ष्य बाजार की सेवा करने के लिए आशावादी रूप से प्रबंधित और संतुलित सीमा (बैलेंस-स्केल) संचालन के साथ-साथ नवाचार संस्कृति (innovation culture) और गुणवत्ता मूल्य प्रस्ताव, स्टार्टअप सफलता के लिए गंभीर सार हैं। हालांकि इन कारकों को पर्याप्त संसाधनों की उपयुक्त तैनाती से मजबूत किया जा सकता है, उपर्युक्त व्यक्तित्व कारक, संस्थापक टीम के अनुभव और कौशल इन

कारकों की नींव रखते हैं। संस्थापकों और निवेशकों को ऐसे निष्पादन-उन्मुख कारकों पर पर्याप्त ध्यान केंद्रित करना चाहिए, जिनके बिना स्टार्टअप की सफलता हासिल नहीं की जा सकती।

इसलिए, उद्यम सफलता की भविष्यवाणी के लिए प्रस्तावित रूपरेखा प्रमुख परिणाम क्षेत्रों के अनुमानित मूल्यों की गणना कर सकती है, जो कि आश्रित परिणाम क्षेत्र कारकों के आधार पर स्वतंत्र सफलता कारकों के रूप में हैं। यह न केवल संस्थापकों को स्टार्टअप के लिए महत्वपूर्ण सुधार क्षेत्रों को खोजने में मदद करने के लिए एक विशाल उपकरण प्रदान करता है, बल्कि निवेशकों को अपने निवेश के लिए एक बेहतर संभावना की पहचान करने के लिए भी सशक्त करता है। इस तरह के प्रस्तावित ढांचे के बावजूद, यह नहीं भूलना चाहिए कि उद्यमिता कुछ भी नहीं है बल्कि उन अवसरों का लाभ उठाती है जो दूसरों ने नहीं देखे हैं, और उद्यमिता अंतर्निहित अनिश्चितता से अपनी शक्ति प्राप्त करता है। फिर भी, एक वास्तविक अर्थ में, अनिश्चितता हमेशा नियोजन से आगे रहती है। केंद्रित प्रयास से ऐसी अनिश्चितता की बाधाओं को कम किया जा सकता है। इस प्रकार, किसी भी उपकरण, कार्यप्रणाली, या do's & don'ts की सूची न तो किसी स्टार्टअप को असाधारण रूप से सफल बना सकती है और न ही उद्यम की सफलता की गारंटी देती है। हालांकि, सही संसाधनों, तकनीकों और प्रथाओं को तैनात करके सफलता की संभावना में सुधार किया जा सकता है।

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## **NOMENCLATURE**

ANP	:	Analytic Network Process
CA	:	Context Aware
CFA	:	Confirmatory Factor Analysis
CFI	:	Comparative Fit Index
DF	:	Degree of Freedom
EFA	:	Exploratory Factor Analysis
FMA	:	First Mover Advantage
FSA	:	Feasible – Suitable - Acceptable
GFI	:	Goodness of Fit Index
IFI	:	Incremental Fit Index
ISM	:	Interpretive Structural Modelling
IT	:	Information Technology
KRA	:	Key Result Areas
KSF	:	Key Success Factors
LBS	:	Location Based Services
MICMAC	:	Matriced' Impacts Croise's Multiplication Applique'e a UN Classement
MVP	:	Minimal Viable Product
NFI	:	Normed Fit Index
PCA	:	Principal Component Analysis
PFA	:	Principal Factor Analysis
RA	:	Result Areas
RMSEA	:	Root Mean Square Approximation Error
ROI	:	Return On Investment
SEM	:	Structural Equation Modelling
SF	:	Success Factors
SRMR	:	Standardized Root Mean Square Residual
TISM	:	Total Interpretive Structural Modelling
TLI	:	Tucker-Lewis Index