START-UP PERFORMANCE AND SUSTAINABILITY IN KERALA: THE ANALYSIS OF ECO SYSTEM ENABLERS, CHALLENGES AND POLICY SUPPORT WITHIN THE CONTEXT OF START-UP MISSION

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Abstract*—Start-ups are critical in economic development, innovationand creation of jobs. Start-ups need a favourable start-up ecosystem to improve their performance and sustainability in the long term. This paper will consider the presence or role of the start-up ecosystem in determining the performance and saliency of start-ups within the state of Kerala through the nature of ecosystem enablers, issues and policy support as part of the Kerala Start-up Mission. The research design is quantitative research design, which is founded on primary data gathering of 120 start-up founders and managers who are running their businesses in Kerala through a structured questionnaire. To determine the most important dimensions of start-up ecosystem support, EFA was adopted, and Multiple Regression Analysis was adopted to analyse the effects of the dimensions on start-up performance. The factor analysis has revealed five broad dimensions of ecosystem support, which are the Financial and Funding Support, Incubation and Infrastructure Support, Mentorship and Networking Support, Policy and Institutional Support, and Skill Development and Training Support. Good internal consistency was achieved by reliability analysis with all factors. The regression results however showed that the entire model was not significant meaning that there was no significant direct effect of ecosystem support factors to start-up performance in the current study. The results indicate that although Kerala has an established start-up ecosystem with the help of the Kerala Start-up Mission, the sole support through the ecosystem might not have a significant impact on the start-up performance and survivability. The analysis of the study demonstrates that additional outcome-oriented, more targeted, need-based support mechanisms should be considered, and that more attention should be paid to the capabilities of firms and factors that are related to the market. The research helps to have a better grasp of the dynamics of start-up ecosystem in Kerala and provides ideas to policy-makers, support organizations and subsequent researchers.

***Index Terms*—Start-up Ecosystem, Start-up Performance, Sustainability, Kerala Start-up Mission, Ecosystem Support, Policy Support**

I. INTRODUCTION

Start-ups have become one of the major drivers of economic growth, innovations and job creation in both developed and developing economies. Start-ups are able to enhance competitiveness and development in the region through the introduction of new products, services and new business models (Audretsch, 2007). A start up ecosystem is a related system of institutions, policies, financial systems, human capital and support systems that interact in a way that affects entrepreneur activity (Isenberg, 2010). Established

ecosystem offers an access to financing and infrastructure, mentorship and markets, as well as regulatory subsidies that are critical in enhancing start-ups performance and survival (Stam, 2015). In the past, it has been highlighted that ecosystem enablers are important in minimizing uncertainty and growth opportunities of start-ups (Malecki, 2018).

Some of the challenges encountered by start-ups despite the ecosystem support are that the finance is limited, there is a skill shortage, regulation becomes complicated, and the market is constrained (OECD, 2017). These issues may be detrimental to the start-up performance and sustainability in case no policy interventions and institutional support to address them can be developed. Start-up missions and initiatives developed by governments have thus become more significant in fostering the development of entrepreneurial ecosystems, particularly in an emerging economy (Acs, Autio, and Szerb, 2014). The national and state-level policies have favored the start-up ecosystem in India, which has seen a rapid growth there. Kerala is one of the states in India that has made great efforts to encourage entrepreneurship by the Kerala Start-up Mission (KSUM). Kerala Start-up Mission is focused on facilitating the environment to start-ups by offering financial support, incubation centre, mentoring, skill development programmes, and policy support (KSUM, 2021). Although a number of studies discuss the role of ecosystem support, a smaller number of studies empirically determine whether ecosystem support yields quantifiable performance results (Roundy, Bradshaw, and Brockman, 2018). It is this divide that is particularly observed in the Kerala start-up ecosystem.

This work investigates the start-up performance and sustainability in Kerala through studying the ecosystem enablers, challenges of start-ups, and policy support in the context of Kerala Start-up Mission. Also, by defining the most important dimensions of ecosystem assistance and determining the impact that they have on the performance of start-ups, the study will have an impact on the existing literature and offer practical recommendations to the policymakers, support institutions, and entrepreneurs.

II. REVIEW OF LITERATURE

The start-up ecosystem has been an important concept in entrepreneurship research because it provides a platform through which innovation, economic growth, and job creation are stimulated. Researchers focus on the fact that the matter of start-up performance and sustainability cannot be decided only by individual entrepreneurs but is highly affected by the ecosystem of support institutions, policies, and resources that are in place. Stam (2015) argues that an effective entrepreneurial ecosystem increases the growth of start-ups by availing key resources that include funding, infrastructure, and networks. The studies have emphasized that ecosystems are important to decrease the barriers to entry and enhance the survival rate of start-ups.One of the most significant factors that can influence the success of start-ups has been found to be financial support. Seed funding, venture capital, and government financial schemes provide a way to support start-ups to break the early-stage barriers and expand their operations (Acs et al., 2014). Nonetheless, OECD (2017) observed that even with the existing financial schemes, most start-ups still struggle to secure funds because of delays in the processes and ignorance. Infrastructure and incubation are also important in the development of start-ups. According to Malecki (2018), incubators and accelerators offer start-ups physical infrastructure, technology support, and business services to make them more efficient in their operations. Roundy et al. (2018) consider that mentorship is useful to entrepreneurs to achieve the management skills and strategic goals, whereas networking will enable them to connect with markets and industry knowledge. Associated with that, however, weak professional networks have been reported to be a key challenge to start-ups in emerging ecosystems (Spigel, 2017).

Another important dimension that affects performance of start-ups is policy and institutional support. Taxation, regulations and how easy it is to conduct business are government policies that have a great influence on entrepreneurial activity (Audretsch, 2007). Acs et al. (2014) opined that a good policy framework will enable innovation-based entrepreneurship to thrive, and a complicated regulatory process will inhibit the growth of start-ups. Skills training and entrepreneurship is required to improve the sustainability of the start-ups. The entrepreneurial education enhances the opportunity recognition capabilities, decision-making, and risk management skills (Fayolle and Gailly, 2015). It was revealed that the performance of a start-up is usually constrained by skill gaps among founders, especially in the field of technology and market orientation (Bosma et al., 2018). A few studies have explored the development of the start-up ecosystems with the support of government programs like Start-up India and state-specific start-up missions in the Indian context. As noted by researchers, although the institution's support systems are on the increase, they have varied effects on the performance of start-ups (NASSCOM, 2020). The literature review indicates that support in the start-up ecosystem is a multidimensional concept with theoretical significance to the emergence of entrepreneurs. Nevertheless, there is scant empirical research, especially at the regional stage, on whether there is a direct conversion of ecosystem enablers to better start-up performance.

III. STATEMENT OF THE PROBLEM

Start-ups have become a highly appreciated source of economic growth, innovation, and creation of jobs. Governments and institutions have set up start-up ecosystems to support their growth and sustainability in the long run, by offering financial support, incubation, mentorship, skills training and policy guidance. Kerala Start-up Mission (KSUM) is an initiative that has been applied to Kerala with the aim of providing a friendly atmosphere to start-ups and increasing their performance and survival. Although Kerala has a well-organized start-up ecosystem, most of the start-ups still have a problem in terms of finance, infrastructure, penetration of the market, regulatory processes, and skill development. Although there are numerous mechanisms of ecosystem support, it still remains uncertain as to whether such support mechanisms can be effectively converted into better start-up performance and long term sustainability. Also, no systematic studies that determine the defining dimensions of ecosystem support, assess the difficulties of start-ups, and analyse the success of the policy support offered under the Kerala Start-up Mission. This disconnect leaves a question as to whether the existing support systems are efficient or not and whether they are relevant to the actual needs of start-ups. Thus, the issue that this research seeks to address is to analyse the contribution of start-up ecosystem facilitators, obstacles, and policy assistance within the Kerala Start-up Mission to start-up performance and sustainability in Kerala. This relationship is imperative to comprehend in a bid to have a better policy design, a stronger ecosystem intervention and a better overall effectiveness in the start-up support systems.

IV. SCOPE OF THE STUDY

The current research targets the investigation of the issues of the start-up ecosystem in affecting the performance and sustainability of the start-ups in Kerala. The study will be confined to the start-ups that are in the state of Kerala and those that lie within the scope of the Kerala Start-up Mission. The research predominantly discusses enablers of an ecosystem that include support in terms of finance and funds, incubation and infrastructure support, mentoring support and networking support, policy and institutional support, and skills development and training support. The dimensions are examined in order to determine their role in the performance of start-ups. The research relies on a primary data gathered with the help of start-up founders and managers in the form of a structured questionnaire. The research results can be applied to the chosen sample and time frame and cannot be extrapolated to all other start-ups not based in Kerala or

to other locations. Nevertheless, the research can be valuable to policymakers, support organizations, and researchers who are interested in the development of start-up ecosystems and their performance.

V. OBJECTIVES OF THE STUDY

- To examine support of start-up ecosystem helps in enhancing the performance and sustainability of start-ups in Kerala.
- To determine the key issues that start-ups are going through and the assistance that the Kerala Start-up Mission is offering to start-ups to overcome these issues.

VI. RESEARCH METHODOLOGY

Research Design: The research design assumed in the study was quantitative and descriptive to measure the dimensions of start-up ecosystem support and their effect on the performance of start-ups.

Population and Sample: The target population of the study was start-ups within the chosen area of the study. The respondents were selected through a convenience sampling technique. One hundred and twenty valid responses were gathered and were utilized to conduct the analysis.

Data Collection: Structured questionnaire was used to collect primary data. The questionnaire contained the questions concerning start-up ecosystem support and start-up performance. A five-point Likert scale was used to measure the responses, which are 1 (Strongly Disagree) to 5 (Strongly Agree).

Variables of the Study

Independent Variables:

Financial and Funding Support, Incubation and Infrastructure Support, Mentorship and Networking Support, Policy and Institutional Support, Skill Development and Training Support.

Dependent Variable: Start-up Performance.

Tools for Analysis

Data received were examined with the assistance of the SPSS and the tools as follows:

1. The underlining dimensions of start-up ecosystem support were determined through Exploratory Factor Analysis (EFA).
2. The impact of ecosystem support factors on the start-up performance was analysed by means of Multiple Regression Analysis.

Statistical Analysis and Discussion

(a) To investigate the effect of support of start-up ecosystem to the performance and sustainability of start-ups in Kerala.

Table 1: KMO and Bartlett's Test

Measure	Value
Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy	0.781
Bartlett's Test of Sphericity – Approx. Chi-Square	1126.384

Degrees of Freedom	78
Significance (p-value)	0.000

The value of KMO 0.781 shows that the adequacy of sampling to factor analysis is good. The Test of Sphericity of Bartlett is important ($p < 0.05$) and proves the correlation matrix to be not an identity one and factor analysis is suitable.

Table 2: Total Variance Explained

Component	Eigenvalue	% of Variance	Cumulative %
1	3.842	27.44	27.44
2	2.067	14.76	42.20
3	1.534	10.96	53.16
4	1.196	8.54	61.70
5	1.012	7.23	68.93

Five eigenvalues that are more than one were obtained and they together can explain 68.93% of the total variance which is deemed to be satisfactory in terms of research in the social science.

Factor Rotation

Varimax rotation was done on the factors extracted to get a better interpretability.

Table 3: Rotated Component Matrix

Variables	F1	F2	F3	F4	F5
Availability of seed funding	0.812				
Access to venture capital	0.786				
Government financial schemes	0.754				
Incubation facilities		0.801			
Infrastructure support		0.773			
Technology support		0.741			
Mentorship support			0.824		
Industry networking			0.798		
Market access support			0.762		
Policy facilitation				0.809	
Regulatory support				0.774	

Institutional backing				0.742	
Skill development programmes					0.817
Training and workshops					0.789
Entrepreneurial education					0.755

Factor loadings below 0.50 are suppressed.

Table 4: Extracted Factors and Labels

Factor	**Factor Name**
Factor 1	Financial and Funding Support
Factor 2	Incubation and Infrastructure Support
Factor 3	Mentorship and Networking Support
Factor 4	Policy and Institutional Support
Factor 5	Skill Development and Training Support

Table 5: Cronbach's Alpha Values

Factor	**Cronbach's Alpha**
Financial and Funding Support	0.842
Incubation and Infrastructure Support	0.816
Mentorship and Networking Support	0.834
Policy and Institutional Support	0.807
Skill Development and Training Support	0.792

The findings of the factor analysis give a good empirical justification to the multidimensional nature of the start-up ecosystem support mechanisms. The Kaiser-Meyer-Olkin (KMO) value of 0.781 confirms that the sample is sufficient to extract factors and the value of Bartlett, Test of Sphericity (kh2 = 1126.384, $p < 0.001$) is significant enough to determine that the variables used are correlated enough to warrant the extraction of the factors. All these diagnostics make the data suitable and sturdier in the face of exploratory factor analysis. It produced five factors having eigenvalues more than one and explains a total of 68.93% of the total variance, which is above the generally acceptable level of social science studies and demonstrates a powerful capacity of model. Varimax rotation maximized interpretability as it generated a well-defined and clear factor structure where all of the retained items were heavily loaded ([?] 0.50) onto the various factors they belong to and cross-loadings were low.

The three factors that are extracted: Financial and Funding Support, Incubation and Infrastructure Support, Mentorship and Networking Support, Policy and Institutional Support, and Skill Development and Training

Support are unique but complementary aspects of the entrepreneurial ecosystem support. These dimensions are all inclusive of the financial, structural, relational, regulatory and human capital dimensions that are critical in the growth and sustainability of an entrepreneur. Further the reliability analysis supports the quality of measurement model also in that all the factors show a better Cronbachs Alpha value than the recommended value of 0.70 which indicates that they have a good internal consistency and reliability. Comprehensively, the results indicate that the identified factor structure is not only statistically but also conceptually sound, which gives a credible framework of comprehending and evaluating the most important elements of support systems that have an impact on entrepreneurship and start-up development.

(b)To determine the key problems encountered by the start-ups and how much the Kerala Start-up Mission has helped the start-ups to overcome the problems.

Determinants of Start-Up Performance Multiple Regression Analysis (ANOVA and Coefficients).

H0 (Null Hypothesis): There is no significant impact of Financial Funding Support, Incubation and Infrastructure Support, Mentorship and Networking Support, Policy and Institutional Support and Skill Development and Training Support on start-up performance.

H1 (Alternative Hypothesis): There is a strong impact of financial funding support, incubation and infrastructure support, mentorship and networking support, policy and institutional support and skill development and training support on start-up performance.

Table 6- ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.501	5	3.700	1.741	.131[b]
	Residual	242.290	114	2.125		
	Total	260.792	119			
a. Dependent Variable: Start Up performance						
b. Predictors: (Constant), Skill Development Training, Incubation Infrastructure Support, Mentorship Networking Support, Policy Institutional Support, Financial Funding Support						

Table 7-Coefficients

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	4.391	.672		6.538	.000		
	Financial Funding Support	-.094	.097	-.089	-.968	.000	.961	1.040
	Incubation Infrastructure Support	.094	.096	.089	.981	.001	.979	1.021
	Mentorship Networking Support	-.169	.095	-.162	-1.780	.000	.988	1.012

	Policy Institutional Support	-.141	.094	-.137	-1.493	.000	.972	1.028
	Skill Development Training	-.156	.090	-.160	-1.737	.002	.964	1.037
a. Dependent Variable: Start Up performance								

Table 8- Collinearity Diagnostics

Collinearity Diagnostics[a]									
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	Financial Funding Support	Incubation Infrastructure Support	Mentorship Networking Support	Policy Institutional Support	Skill Development Training
1	1	5.221	1.000	.00	.01	.01	.01	.01	.01
	2	.217	4.905	.00	.22	.09	.17	.03	.32
	3	.210	4.988	.00	.04	.05	.34	.15	.30
	4	.163	5.667	.00	.01	.22	.27	.50	.07
	5	.157	5.761	.00	.48	.56	.03	.05	.00
	6	.032	12.822	1.00	.25	.08	.19	.26	.31
a. Dependent Variable: Start Up performance									

The multiple regression analysis was done to investigate the effect of five dimensions of ecosystem support on the start-up performance. The results of ANOVA show that the regression model as a whole is statistically non-significant ($F = 1.741$, $p = 0.131$) which implies that on the whole, the independent variables do not significantly explain the variations in the start-up performance at the 5% level of significance. Thus, the null hypothesis cannot be rejected. The regression coefficients indicate that all the predictor variables of Financial Funding Support, Incubation and Infrastructure Support, Mentorship and Networking Support, Policy and Institutional Support, and Skill Development and Training Support do not significantly influence the start-up performance at an individual level ($p > 0.05$). Even though Mentorship and Networking Support ($b = [?]0.162$, $p = 0.078$) and Skill Development and Training Support ($b = [?]0.160$, $p = 0.085$) seem to have rather strong effects than those of other variables, the influence of these variables is not significant. Tests of collinearity show that the model does not have multicollinearity because the tolerance values are much bigger than 0.10, the VIF values are very near to 1, and the condition indices are not higher than permissible levels. This proves the consistency and validity of the regression estimates. Altogether, the results imply that the ecosystem support factors are important in theory but they do not have a significant predictive power of start-up performance in the current sample, which means that other variables involving firm-specific capabilities, market conditions, or entrepreneurial characteristics can have a stronger impact on start-up performance.

VII. FINDINGS

This paper has investigated the factor analysis dimension and multiple regression dimension of start-up ecosystem support and their influence on start-up performance.

Results of Factor Analysis: The data were appropriate in factor analysis. The value of KMO was 0.781 that demonstrates the adequate sampling and the Bartlett Test of Sphericity was significant (kh2 = 1126.384, $p < 0.001$), and this means that the variables had a sufficient correlation. Five factors that have an eigenvalue exceeding one were extracted. These five factors contributed to 68.93% of the total variance and this is deemed satisfactory in regards to social science research. Varimax rotation was used and it generated a clear factor structure with all the variables loading above 0.50 on their factors.

The extracted factors were financial and funding support, incubation and support of infrastructure, networking support and mentorship, support of policy and institutional support, training support and skills development.

Internal consistency was good in all the factors and the Cronbach's Alpha values were between 0.792 and 0.842.

Results of Multiple Regression Analysis: The effect of the five ecosystem support factors on the start-up performance was tested by multiple regression analysis. The results of ANOVA indicated that the regression model as a whole was not statistically significant ($F = 1.741$, $p = 0.131$). This shows that the combination of the five support factors cannot significantly account for the differences in the performance of start-ups. As such, the null hypothesis was not rejected. The regression coefficients showed that the one-factor individual support factors did not significantly influence start-up performance ($p > 0.05$). Even though Mentorship and Networking Support and Skill Development and Training Support had a relatively stronger effect than the rest of the variables, their effect was not statistically significant. Multicollinearity diagnostics ensured that multicollinearity did not occur in the model since tolerance values exceeded 0.10, VIF values were within the acceptable limits, and condition indices were in acceptable limits.

VIII. SUGGESTIONS

Resting on the results of the research, the following recommendations are presented:

1. As the factors of ecosystem support turned out to have no significant effect on start-up performance, it is recommended to pay more attention to enhancing firm-level capabilities, which, in turn, include innovation, operational efficiency, financial management, and strategic planning.
2. Even though there are diverse support programs, their insignificant effectiveness indicates the necessity to enhance the quality, relevancy, and practical usefulness of funding initiatives, incubation services, mentorship, and training programmes. The support programs ought to be more result oriented as opposed to being structural in nature.
3. The support institutions and policymakers ought to develop programmes of ecosystem that are highly concise with the real requirements and maturity of start-ups. Tailor made support can be more useful compared to generic or universal programmes.
4. Mentorship/networking support and skills development and training revealed rather supportive (but not significant) effects. This means that there is room to enhance. The quality of mentors, their industry relevance, and their training in practical skills can be improved, which could lead to a higher level of their influence on the start-up performance.

5. Market access, customer acquisition, and commercialization support should be the focus more of ecosystem initiatives since the performance of start-ups is highly dependent on market conditions and competition.
6. This should not be limited to basic entrepreneurship education but training programmes must also be devoted to building critical competencies, including leadership, risk management, opportunity recognition, and adaptability.
7. Support agencies are advised to implement performance monitoring systems that allow them to evaluate the success of ecosystem interventions on a regular basis and improve them based on evidence.

Future research needs to incorporate other variables like entrepreneurial experience, the ability to innovate, the age of the firm, the size of the firm and the market environment to explain the difference in the performance of start-ups.

IX. CONCLUSION

The current paper has investigated the dimensions of start-up ecosystem support, and their effects on start-up performance. With the help of the exploratory factor analysis, five dimensions of ecosystem support were determined: Financial and Funding Support, Incubation and Infrastructure Support, Mentorship and Networking Support, Policy and Institutional Support, and Skill Development and Training Support. The results of the factor analysis proved that these dimensions can be considered as the reliable ones and reflect the clear structure of the start-up ecosystem support. A multiple regression analysis was carried out to determine the effects of these support dimensions on a start-up performance. The findings revealed that the total regression equation was not statistically significant and none of the support factors of the ecosystem had a significant impact on start up performance. This implies that, in the context of the given research, ecosystem support does not have a significant effect on start-up performance. The results indicate that though the ecosystem support mechanisms offered by the start-ups are essential in theory, they might not have a significant impact on performance unless they are well matched to the real needs of the start-ups. It seems the ecosystem support structures alone do not have as strong an effect on start-up performance, whereas firm-specific factors and market conditions, and entrepreneurial capabilities all seem to have a strong effect on start-up performance. The overall contribution of the study to the better understanding of the multidimensional character of the start-up ecosystem support and the need of more specific, practical and performance-based support systems to increase the start-up success are obvious.

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