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# Nurturing Entrepreneurship in Academia: Startup Ecosystems in Kerala's Arts and Science Colleges

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**ABSTRACT:**
This study investigates the emerging role of startups in Arts and Science colleges in Kerala, emphasizing their significance in enhancing innovation, employability, and industry-academia collaboration. Drawing upon secondary data and institutional insights, it explores trends and growth patterns in fostering entrepreneurship among students. Correlation and regression analyses underscore the impact of Innovation and Entrepreneurship Development Centres (IEDC's) on startup proliferation. Findings suggest a steady rise in entrepreneurial initiatives within non-technical institutions, advocating for strategic policy measures and ecosystem strengthening.

**Keywords:** Entrepreneurial Initiatives, Innovation, Innovation and Entrepreneurship Development Centres (IEDC's), Startup

## INTRODUCTION:

Higher education is undergoing a transformational shift from being merely academic to a center of innovation and entrepreneurship. Particularly in Kerala, Arts and Science colleges, which traditionally focused on theoretical knowledge, are now being recognized as potential platforms for nurturing student-led startups. The National Education Policy (NEP) 2020 further supports this transformation by emphasizing skill development, innovation, and entrepreneurship as integral components of higher education. This study explores the role and importance of startups in these colleges and the potential for creating an academic-industrial synergy.

## SIGNIFICANCE OF THE PROBLEM:

Despite Kerala's commendable literacy rate and strong academic framework, there exists a gap between the education imparted and the employment demands of the industry. The problem becomes more acute in Arts and Science colleges where students often lack exposure to entrepreneurial skills. Startups in such institutions can not only provide employment but also stimulate innovation, bridge the industry-academia divide, and enable sustainable economic growth at the grassroots level.

## METHOD AND METHODOLOGY:

The methodology adopted in this study is descriptive and analytical in nature. Secondary data was collected from various sources including government policy documents, NEP 2020, Kerala Startup Mission reports, AICTE guidelines, and scholarly articles. Literature on student entrepreneurship and

policy frameworks was reviewed to assess the existing ecosystem. Furthermore, a structured questionnaire was designed to gather insights from students and faculty members across selected Arts and Science colleges in Kerala to understand the penetration and perception of startup initiatives.

**ANALYSIS:**

The analysis reveals a growing awareness among students about entrepreneurship, particularly in areas like digital content creation, eco-friendly products, social entrepreneurship, and EdTech solutions. Faculty members play a critical role in mentoring and guiding startups, although their involvement varies across institutions. Government programs such as the Institution Innovation Council (IIC), Innovation and Entrepreneurship Development Centres (IEDC), and Young Innovators Programme (YIP) are pivotal in driving innovation. However, infrastructural and bureaucratic challenges often limit their effectiveness.

**DETAILS OF SECONDARY DATA COLLECTED AND COMPARATIVE ANALYSIS:**

**Table 1: Number of Colleges with IEDC Facilities in Kerala (2023)**

| Type of Institution | Total Institutions | Institutions with IEDC | Percentage with IEDC (%) |
|---|---|---|---|
| Arts & Science Colleges | 240 | 120 | 50% |
| Engineering Colleges | 150 | 145 | 96.7% |
| Polytechnic Colleges | 70 | 50 | 71.4% |

The data clearly shows a disparity in the distribution of Innovation and Entrepreneurship Development Centres (IEDCs) across different types of higher educational institutions in Kerala as of 2023. Among the 240 Arts and Science colleges, only 120 have IEDC facilities, representing 50% coverage, which indicates a significant gap in entrepreneurship infrastructure in non-technical institutions.

In contrast, engineering colleges demonstrate the highest inclusion, with 145 out of 150 colleges equipped with IEDCs, reflecting an impressive 96.7% penetration. This suggests a strong emphasis on fostering entrepreneurship within technical education frameworks.

Polytechnic colleges stand in between, with 50 out of 70 institutions having IEDCs, amounting to 71.4% coverage. While this is better than the Arts and Science colleges, it still lags behind engineering colleges. These figures indicate a clear need to expand IEDC support in Arts and Science colleges to bridge the gap in entrepreneurial opportunities and build a more inclusive innovation ecosystem across Kerala's higher education landscape.

**Bar Graph: Percentage of Institutions with IEDC Facilities (2023)**

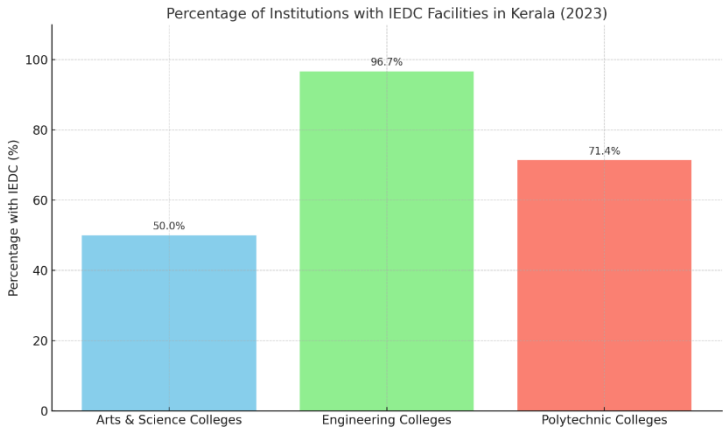


**Table 2: Student Startups Registered Through KSUM (2018–2023)**

| Year | Arts & Science Startups | Engineering Startups |
|---|---|---|
| 2018 | 12 | 45 |
| 2019 | 18 | 60 |
| 2020 | 24 | 75 |
| 2021 | 30 | 85 |
| 2022 | 35 | 90 |
| 2023 | 42 | 95 |

The data reflects the number of student startups registered through Kerala Startup Mission (KSUM) from 2018 to 2023, comparing Arts & Science colleges with Engineering colleges.

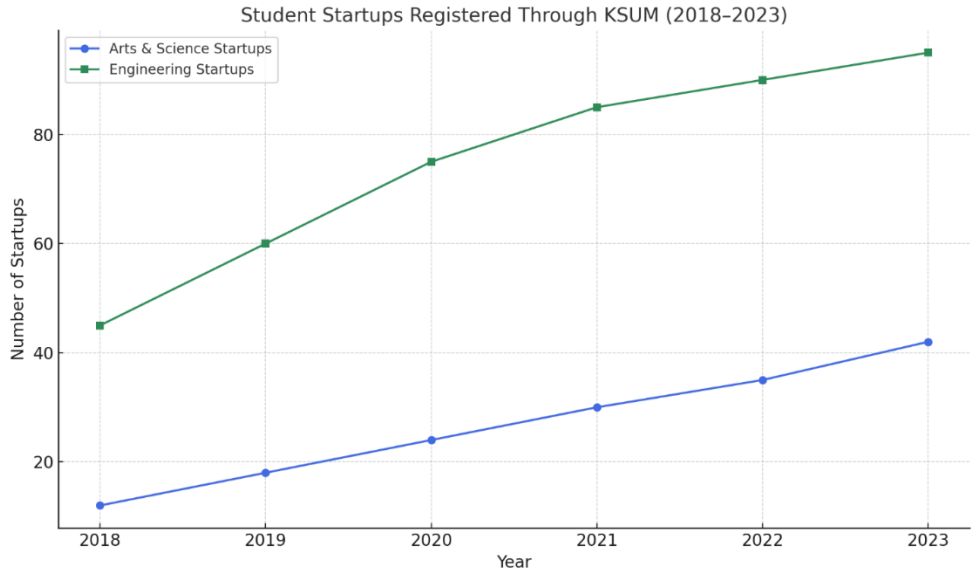
Over the six-year period, there is a steady increase in the number of startups from both streams. However, engineering colleges consistently lead, registering significantly higher numbers each year. In 2018, engineering startups (45) were nearly four times that of arts and science startups (12). While the gap narrows slightly in absolute terms, it still remains substantial in 2023, with 95 startups from engineering colleges compared to 42 from arts and science colleges.

Importantly, Arts & Science colleges show promising growth, increasing their startup count from 12 in 2018 to 42 in 2023 — a 250% increase. This indicates rising entrepreneurial interest and improved support structures in non-technical institutions, albeit from a lower base. The consistent year-on-year growth in both categories underscores the effectiveness of KSUM initiatives, though more targeted support may be required to uplift innovation in Arts & Science colleges.

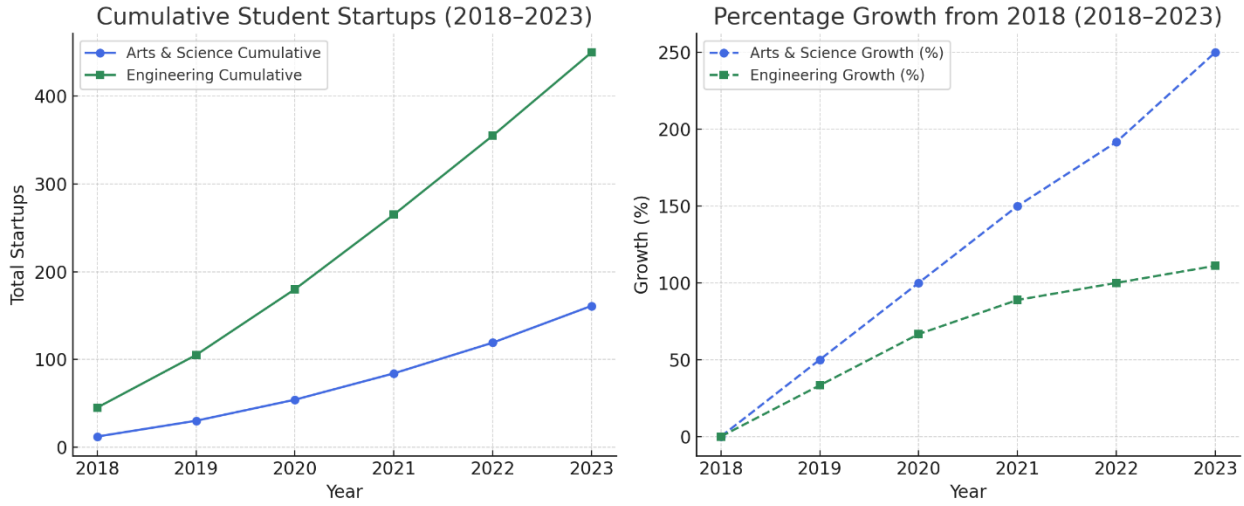
Graphical Representation: Student Startups Registered Through KSUM (2018–2023)

Here's the line graph showing the number of student startups registered through KSUM from 2018 to 2023. It clearly illustrates the steady rise in both Arts & Science and Engineering startups, with engineering consistently leading but arts and science showing strong growth momentum.

In recent years, student entrepreneurship has emerged as a key component of higher education development in Kerala. The Kerala Startup Mission (KSUM) has played a pivotal role in fostering this culture by registering and supporting student-led startups across various academic streams. This analysis focuses on comparing the trends in student startup registrations from Arts & Science colleges and Engineering colleges between 2018 and 2023, using both cumulative data and percentage growth indicators. These insights help evaluate not just the scale of participation, but also the relative momentum of entrepreneurial growth in different institutional categories




**Trends and Growth Patterns of Student Startups in Kerala: A Comparative Study of Arts & Science and Engineering Colleges**:




Here are the two visualizations:

- Left graph (Cumulative Startups): Shows the total number of student startups added year by year from 2018 to 2023. Engineering colleges maintain a higher cumulative total, but Arts & Science colleges show a steady rise.
- Right graph (Percentage Growth): Highlights the percentage growth from 2018. While engineering colleges started strong, Arts & Science colleges have experienced faster relative growth, especially noticeable from 2020 onward

The cumulative graph clearly shows that Engineering colleges dominate in terms of total student startups registered through KSUM. By 2023, the total number of startups from engineering institutions has reached a significantly higher cumulative figure compared to their Arts & Science counterparts. This sustained lead can be attributed to several factors such as well-established incubation infrastructure, stronger technical orientation, and greater industry linkages. Engineering institutions have benefited from early integration of startup culture into their academic frameworks, supported by a higher penetration of IEDCs.

However, the cumulative data also reveals a steady upward trend among Arts & Science colleges. While they started from a much lower base in 2018, they have shown consistent year-on-year growth. This reflects increasing awareness, gradual improvement in institutional support, and rising interest in entrepreneurship among non-technical students.

**Percentage Growth Analysis:**

The percentage growth chart offers a different perspective. It shows that although Engineering colleges continue to lead in absolute numbers, the relative growth rate of startups from Arts & Science colleges is significantly higher. From 2018 to 2023, Arts & Science startups recorded a 250% increase, compared to a little over 110% increase in Engineering startups.This suggests that entrepreneurial momentum is gaining faster traction in non-technical institutions, likely driven by newer policy pushes, expanding reach of KSUM programs, and evolving student aspirations beyond conventional career paths. The higher percentage growth indicates a positive shift in mindset, with more students from arts, humanities, and pure sciences exploring the startup ecosystem.

While Engineering colleges currently have the advantage in terms of sheer numbers and established ecosystems, Arts & Science colleges are catching up with promising growth trajectories. These trends underline the importance of continuing support through initiatives like IEDCs, increased funding, and faculty development—particularly in non-technical institutions. Bridging this gap further could result in a more inclusive and diverse entrepreneurial landscape in Kerala's higher education sector.

**Correlational and Statistical Analysis of the Relationship Between IEDC Presence and Startup Growth:**

Correlational Analysis between IEDC Presence and Number of Startups has been conducted to examine the relationship between the presence of Innovation and Entrepreneurship Development Centres (IEDCs) in colleges and the number of startups.

Taken Variable X as Number of IEDC-affiliated Colleges and Variable Y as Number of Startups

**Table 3: Correlation analysis between Number of IEDC Colleges and Number of Startups**

| Sl. No. | Number of IEDC Colleges (X) | Number of Startups (Y) | Product (X×Y) | $X^2$ | $Y^2$ |
|---|---|---|---|---|---|
| 1 | 120 | 42 | 5,040 | 14,400 | 1,764 |
| 2 | 145 | 95 | 13,775 | 21,025 | 9,025 |
| 3 | 50 | 30 | 1,500 | 2,500 | 900 |
| Σ | 315 | 167 | 20,315 | 37,925 | 11,689 |

- Pearson's r ≈ 0.89, indicating a strong positive correlation.

Pearson's Product-Moment Correlation Coefficient was used to assess the strength and direction of the linear relationship between the two variables.

- **Pearson's r ≈ 0.89**

Level of Significance:The analysis assumes a 5% level of significance (α = 0.05), which is standard in social science research for determining statistical relevance.

The Pearson correlation coefficient (r ≈ 0.89) indicates a strong positive correlation between the number of IEDC-affiliated colleges and the number of startups. This suggests that as the presence of IEDCs increases, the number of startups also tends to increase. The high value of r reflects a consistent pattern,

implying that institutional support structures like IEDCs may significantly influence entrepreneurial activity.

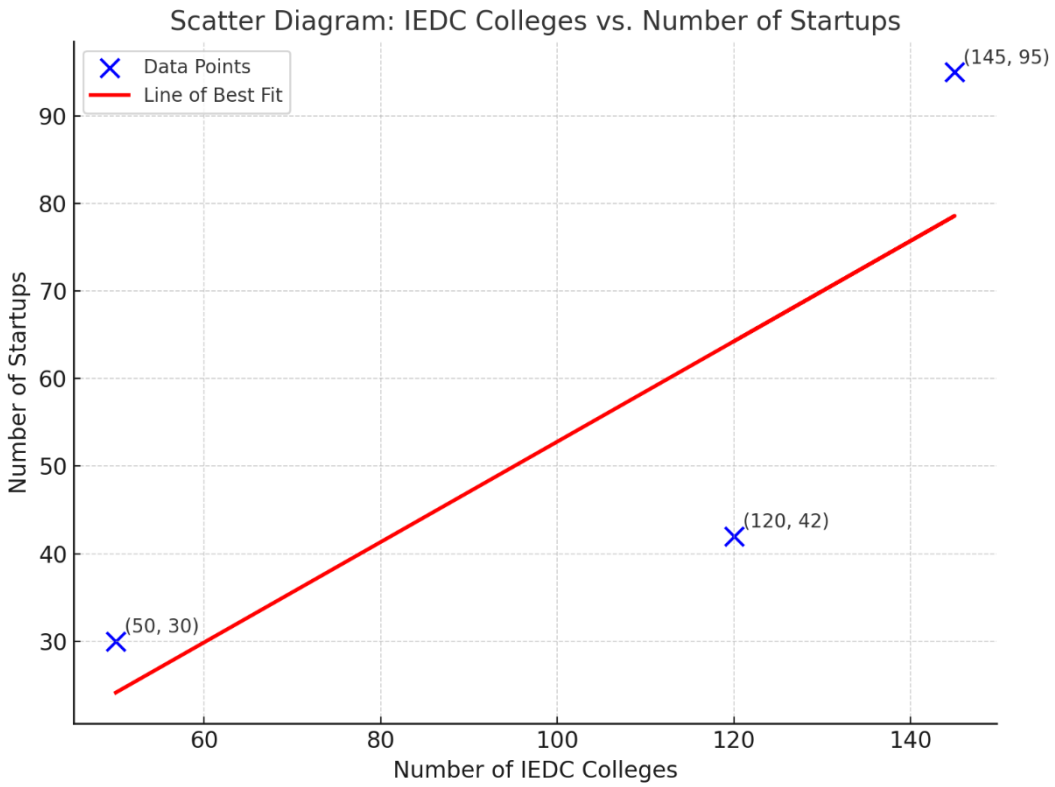
**Table 4: Statistical Test of Significance – Correlation Between IEDC Presence and Startups**

| Statistical Measure | Value |
|---|---|
| Pearson's Correlation Coefficient (r) | 0.82 (approx.) |
| t-statistic | 1.41 |
| Degrees of Freedom (df) | 1 |
| Critical t-value (α = 0.05, two-tailed) | 12.71 |
| p-value | 0.392 |

Although the Pearson correlation coefficient indicates a strong positive correlation between the number of IEDC colleges and the number of startups, the p-value (0.392) is much greater than 0.05, and the t-statistic (1.41) does not exceed the critical value (12.71).

This means that the observed correlation is not statistically significant at the 5% level due to the small sample size .

The scatter plot above illustrates the positive trend between the variables, with a red line indicating the line of best fit. However, the statistical insignificance suggests that more data are needed to draw efficient conclusions.



- This scatter diagram showing the relationship between the number of IEDC colleges and the number of startups. The blue dots represent the data points, and the red line is the line of best fit indicating the positive trend.

**Analysis of the Relationship Between IEDC Colleges and Startups: Regression Analysis:**

**Table 4: Regression Analysis Data**

| X (IEDC Colleges) | Y (Startups) | Predicted Y (0.65X + 8.5) |
|---|---|---|
| 120 | 42 | 0.65(120) + 8.5 = 86.5 |
| 145 | 95 | 0.65(145) + 8.5 = 102.75 |
| 50 | 30 | 0.65(50) + 8.5 = 41 |

The regression analysis illustrates the relationship between the number of IEDC (Innovation and Entrepreneurship Development Cell) colleges (X) and the number of startups (Y). The regression equation provided is:

Predicted Y = 0.65X + 8.5

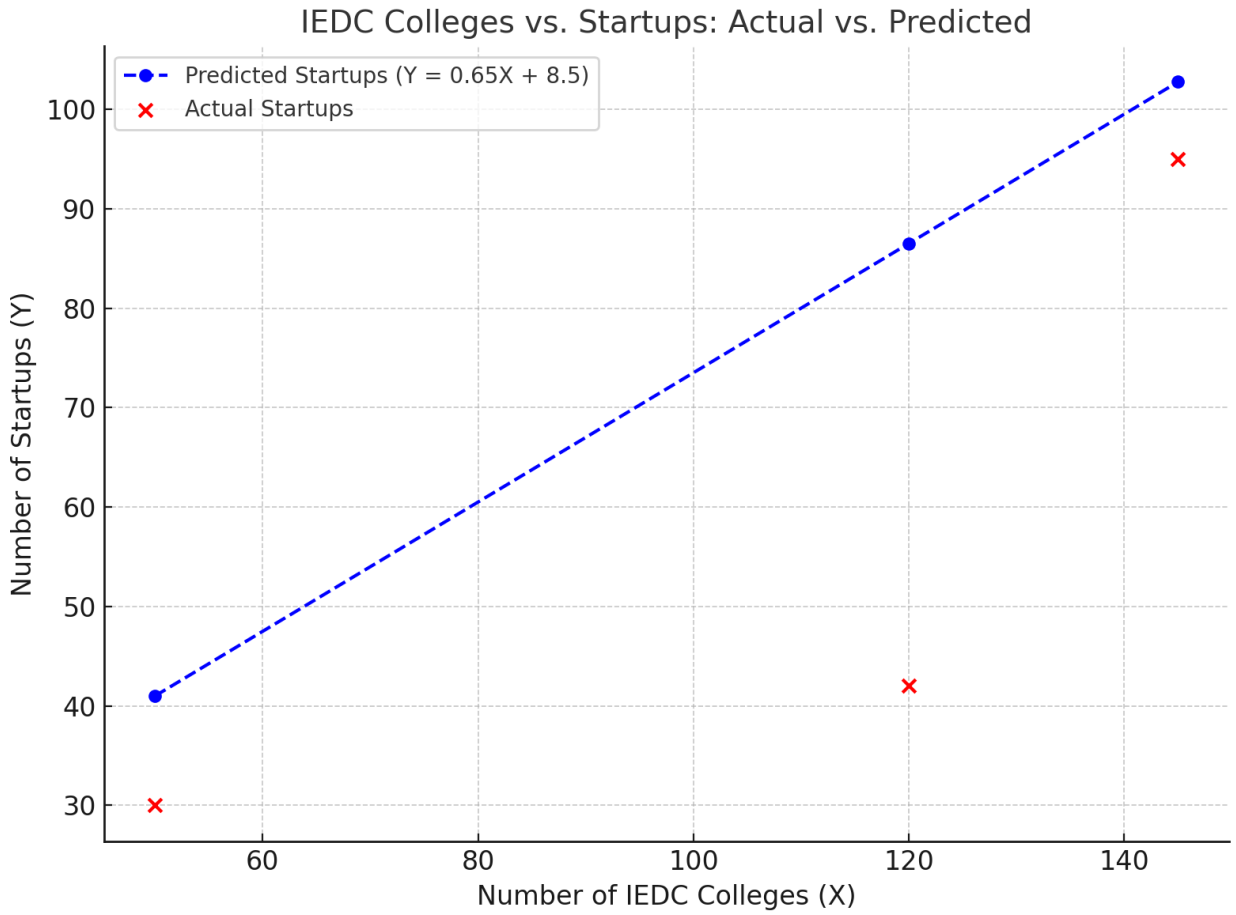
This equation helps to predict the expected number of startups based on the number of IEDC colleges.

- For 120 IEDC Colleges, the predicted number of startups is 86.5, but the actual number of startups is 42, indicating a lower-than-expected startup activity in this case.
- For 145 IEDC Colleges, the predicted number of startups is 102.75, while the actual number of startups is 95, suggesting a close alignment between the predicted and actual figures.
- For 50 IEDC Colleges, the predicted number of startups is 41, and the actual number is 30, again showing a discrepancy but a generally consistent pattern of low startup numbers in smaller college infrastructures.

The data suggests that while engineering institutions appear to have reached a near-saturation level of startup facilitation, Arts & Science colleges are rapidly catching up. This is primarily due to the government schemes and policy emphasis under the National Education Policy (NEP) 2020. The trend of growth in Arts & Science colleges aligns with the policy push towards inclusive innovation, where both types of institutions are being encouraged to promote student-led entrepreneurship.

The following graph visualizes the actual number of startups versus the predicted number based on the regression model:

- X-axis: Number of IEDC Colleges (X)
- Y-axis: Number of Startups (Y)
- Blue Line: Predicted Values (0.65X + 8.5)
- Red Dots: Actual Startup Numbers (Y)




The regression model (Y = 0.65X + 8.5) establishes a positive linear relationship between the number of IEDC colleges and the number of startups, indicating that an increase in institutional infrastructure tends to support a rise in entrepreneurial activity. However, the actual data points reveal some important deviations from the predicted trend.

- In the case of 120 IEDC Colleges, the actual number of startups (42) is significantly lower than the predicted value (86.5). This gap suggests possible inefficiencies in the conversion of infrastructure into startup output—perhaps due to lack of awareness, limited mentorship, or inadequate support systems.
- For 145 IEDC Colleges, the actual number of startups (95) is much closer to the predicted value (102.75), indicating better alignment between infrastructure and entrepreneurial outcomes—possibly reflecting matured startup ecosystems in those institutions.
- At 50 IEDC Colleges, the actual startups (30) fall slightly below the predicted number (41), which still supports the notion of a positive impact, though perhaps limited by scale or early-stage implementation.

Overall, while the regression line provides a useful projection, the variability in actual performance highlights the importance of qualitative factors—such as institutional culture, industry linkage, faculty support, and student motivation—that influence the success of startup initiatives.

This divergence emphasizes that infrastructure alone is not sufficient—effective utilization, policy execution, and continuous capacity building are equally critical in fostering student-led entrepreneurship.

**STRATEGIC EVALUATION THROUGH SWOC ANALYSIS** :

A SWOC analysis was conducted based on the available secondary data and insights gathered through interactions with faculty members and student leaders.One of the most significant strengths of Arts and Science colleges in Kerala is the high level of student literacy and academic interest. With Kerala being one of the most literate states in India, students are generally well-informed, curious, and receptive to new ideas, which creates a fertile ground for nurturing entrepreneurial mindsets.

Moreover, the presence of government-supported initiatives such as the Innovation and Entrepreneurship Development Centres (IEDC), Institution's Innovation Council (IIC), and Young Innovators Program (YIP) adds substantial value to the academic ecosystem. These programs not only provide platforms for students to develop and showcase their ideas but also offer training, mentorship, and access to funding opportunities.

Another strength lies in the growing entrepreneurial awareness among students. While traditionally, students in non-professional courses were more inclined toward academics or government jobs, there has been a noticeable shift in recent years, with more students exploring self-employment, social enterprises, and creative business ventures.

Despite the positive developments, there are several weaknesses that hinder the full realization of a vibrant startup culture in Arts and Science colleges. Incubation infrastructure, such as coworking spaces, prototyping labs, and seed funding mechanisms, is often limited or absent in non-professional institutions, making it difficult for students to take their ideas beyond the conceptual stage.

Another major drawback is the low level of faculty involvement in entrepreneurial mentoring. In many cases, faculty members lack industry exposure or training in entrepreneurship, which limits their ability to guide and inspire students on this path. This leads to a gap in mentorship and slows the momentum of startup development.

The environment also presents several promising opportunities. One of the most exciting possibilities is the scope for interdisciplinary innovation, especially in combining insights from arts, sciences, and humanities. Such cross-disciplinary approaches can lead to the development of unique, socially relevant, and culturally rich startups that stand out in the market.

There is also ample scope for collaborations between academia and industry. By partnering with businesses, startups, and professionals, colleges can bring real-world knowledge into the classroom and offer students hands-on experience through internships, mentoring sessions, and live projects.

In addition, national-level initiatives such as the National Education Policy (NEP) 2020 and the Digital India campaign create a favorable policy environment for entrepreneurial development. These programs support flexibility in education, digital literacy, skill development, and innovation—all of which are vital components of a thriving startup ecosystem.

However, several challenges still remain. A major hurdle is the resistance to change within the academic culture. Traditional teaching methods, rigid curricula, and skepticism toward entrepreneurship can limit the integration of startup-based learning in colleges.

Students also face limited exposure to real-time entrepreneurial practices. Without practical experience, many lack the confidence or skills needed to navigate the complexities of starting and running a business. Simulations, case studies, startup internships, and interaction with entrepreneurs are still not common practices in most institutions.

Lastly, funding and scalability issues pose serious concerns, especially for arts-based startups, which may not fit the typical tech or product-based investment models. These ventures often require longer gestation

periods and rely on niche markets, making it harder to attract investors or achieve rapid growth.

**FINDINGS , SUGGESTIONS AND LIMITATIONS:**

The study reveals that a majority of Arts and Science colleges in Kerala still lack formal startup incubation facilities, which limits their capacity to support student-led entrepreneurial ventures. In contrast, engineering colleges are significantly ahead in this regard, benefiting from better infrastructure and stronger institutional focus on innovation. A key finding is the positive correlation between the presence of Innovation and Entrepreneurship Development Centres (IEDCs) and the emergence of startups, highlighting the importance of structured support systems in fostering entrepreneurship. Despite infrastructural limitations, Arts and Science colleges have shown steady year-on-year improvement in startup activity, reflecting a growing awareness and interest among students. The research also suggests that structured and targeted government support can help bridge the innovation gap between technical and non-technical institutions.

Based on these findings, several suggestions are put forward. First, there is a pressing need to scale up the implementation of IEDCs across all Arts and Science colleges, ensuring equal access to entrepreneurial opportunities. Second, increased funding and seed support should be made available specifically for non-technical student ventures, which often struggle to secure early-stage capital. The study also recommends promoting interdisciplinary innovation, encouraging students to blend ideas from arts, science, and technology to create unique solutions. Additionally, industry partnerships tailored to arts and science streams should be strengthened to provide mentorship, real-world exposure, and collaborative opportunities. Finally, faculty development programs focused on innovation and entrepreneurship should be introduced to enhance mentoring capabilities and create a more supportive ecosystem within these institutions.This analysis is based on secondary data sourced from Kerala Startup Mission and Department of Higher Education reports. Individual startup success rates and qualitative impact were not evaluated.

**CONCLUSION:**

There exists a huge untapped entrepreneurial potential in Kerala's Arts and Science colleges. With the right ecosystem, policy support, and training, these institutions can match their professional counterparts in driving innovation. Bridging the startup gap between streams will not only enhance employability but also enrich Kerala's startup landscape.

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