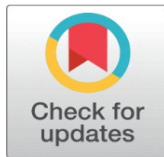


A STUDY ON AWARENESS ABOUT HACKATHON AND ITS IMPACT ON INNOVATIVE STARTUPS IN TAMIL NADU

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ABSTRACT

Hackathons have become essential platforms for fostering innovation, entrepreneurship, and problem-solving among youth. This study explores the awareness of hackathons and their impact on innovative startup development in Tamil Nadu. Using a descriptive research design with 150 respondents comprising students, entrepreneurs, and professionals, the study applies ANOVA, Chi-square, and multiple regression analyses. Results show that hackathon participation significantly influences startup initiation and innovation levels. Mentorship, funding, and institutional support are the strongest predictors of post-hackathon startup success. Demographic factors such as age, gender, and education affect awareness levels and participation patterns. The findings emphasize that hackathons, when supported by structured mentorship and funding mechanisms, can transform creative ideas into viable businesses. Policy interventions from educational institutions and government agencies are suggested to strengthen the hackathon-driven entrepreneurial ecosystem.

Keywords: Hackathon, Innovation, Entrepreneurship, Mentorship, Startup Ecosystem, Incubation

1. INTRODUCTION

1.1. GLOBAL AND NATIONAL IMPORTANCE OF HACKATHONS

In the contemporary era of rapid technological advancement and digital transformation, hackathons have become vital platforms for fostering innovation, collaboration, and entrepreneurship. Globally, these time-bound innovation marathons encourage participants to design creative solutions for real-world challenges through teamwork and applied problem-solving. Hackathons have evolved from being purely coding competitions to multi-disciplinary innovation events encompassing sectors such as education, health, agriculture, and sustainability. In India, hackathons have gained national significance through initiatives like the Smart India Hackathon and Atal Innovation Mission, which aim to

stimulate entrepreneurial thinking among students and professionals by connecting them with industry experts, mentors, and investors.

1.2. STATE-SPECIFIC INITIATIVES IN TAMIL NADU

Tamil Nadu has emerged as a leading state in promoting hackathon-based innovation through a variety of government-backed programs. The Entrepreneurship Development and Innovation Institute (EDII) of Tamil Nadu organizes several innovation challenges, startup boot camps, and ideation contests under initiatives such as the Tamil Nadu Student Innovators (TNSI) and the EDII Innovation Hackathon for college students. Similarly, the School Innovation Development Programme (SIDP) nurtures innovation among school students. The Naan Mudhalvan Niral Thiruvizha, conducted by the Tamil Nadu Skill Development Corporation, further enhances youth participation by linking students with industry mentors and incubators. At the national level, the MSME Idea Hackathon encourages aspiring entrepreneurs to present implementable business solutions, providing financial assistance and incubation opportunities. Collectively, these initiatives demonstrate Tamil Nadu's strong commitment to building an inclusive and sustainable innovation ecosystem.

1.3. RESEARCH GAP

Despite the growing frequency of hackathons and the active involvement of institutions and government agencies, there remains limited empirical understanding of how these events translate into tangible startup creation and long-term innovation outcomes. Most existing studies focus on the educational benefits or immediate outputs of hackathons but overlook their sustained entrepreneurial impact.

Furthermore, there is insufficient data on the level of awareness, post-event support mechanisms, and the role of mentorship and funding in converting ideas into viable startups within the Tamil Nadu context. This gap highlights the need for a comprehensive analysis of the hackathon ecosystem's influence on entrepreneurial development in the region.

1.4. RESEARCH QUESTIONS

To address this gap, the present study explores the following key questions:

- 1) Do hackathons effectively help participants convert their innovative ideas into viable business ventures?
- 2) Do participants receive adequate mentorship and institutional support after the events?
- 3) How does the availability of funding influence the success of startups emerging from hackathons?

2. REVIEW OF LITERATURE

Hackathons have increasingly emerged as important mechanisms in innovation ecosystems, offering participants time-bounded, high-intensity collaborative settings for tackling real-world problems. They bridge formal education, entrepreneurial experimentation, and ecosystem networking (e.g., Innovation Studies). Research on hackathons now spans educational outcomes, design processes, virtual/online modality, and post-event continuity. The following review is organised thematically to map out current findings, and concludes with the identified gap motivating this study.

2.1. HACKATHONS AS EXPERIENTIAL LEARNING AND SKILL-BUILDING

Hackathons are widely recognised as experiential learning laboratories that foster both technical and non-technical competencies. Milicevic et al. (2024) found that participants in a blockchain hackathon demonstrated measurable gains in technical expertise, innovation skills, and teamwork, although continuation of projects post-event remained limited.

Kienzler and Fontanesi (2017) highlighted that hackathons enhance creativity, adaptability, and entrepreneurial readiness by exposing students to problem-based learning.

Similarly, Eimler and Strassmann (2023) described hackathons as "occasions to experience entrepreneurial thinking," providing experiential contexts that strengthen participants' entrepreneurial self-efficacy. Collectively, these

studies confirm that hackathons serve as effective educational interventions, yet they underscore the persistent need for post-event structures that reinforce sustained innovation.

2.2. HACKATHONS AND ENTREPRENEURSHIP OR STARTUP PATHWAYS

Mentorship and post-event support emerge consistently as decisive factors in determining whether hackathon ideas mature into sustainable startups. Angarita and Nolte (2021) demonstrated that consistent, high-quality mentorship significantly increases teams' likelihood of continuing their projects beyond the hackathon. Zukin and Papadantonakis (2018) cautioned that inclusivity issues, limited funding, and poor follow-up processes constrain hackathons' long-term entrepreneurial impact. Empirical evidence from Sivakumar and Anandan (2021) reveals that participation significantly enhanced engineering graduates' employability skills and boosted their entrepreneurial aspirations. Rajasekar and Pushpalatha (2020) in Tamil Nadu confirmed that hackathon participation enhances entrepreneurial intent but that mentoring gaps and weak incubation networks limit conversion to startups. Adding to this discourse, Kitsios and Kamariotou (2023) found that open-data hackathons act as digital innovation platforms that strengthen entrepreneurial ecosystems when adequately supported by institutional collaboration and data infrastructure.

2.3. DIGITAL AND HYBRID HACKATHONS IN THE POST-PANDEMIC ERA

The pandemic era accelerated experimentation with virtual and hybrid hackathons, prompting research into their design and social dynamics. Kuk and Davis (2021) reported that digital hackathons can match traditional formats when supported by effective communication and mentor interaction. Kamariotou et al. (2022) similarly showed that hybrid models foster inclusivity but require clear coordination frameworks to maintain engagement.

Mendes et al. (2022) explored socio-technical affordances in online collaboration and identified constraints such as time-zone differences and limited informal communication, recommending structured virtual mentoring. Emerging technologies are also reshaping hackathon formats. Together, these recent studies broaden understanding of how digitalisation, hybrid participation, and AI integration redefine collaboration and innovation in hackathons.

2.4. POST-EVENT CONTINUITY AND ECOSYSTEM SUPPORT

Long-term success of hackathon projects depends heavily on structured post-event pathways. Sundaram and Narayanan (2021) showed that MSME-sponsored hackathons in Tamil Nadu with seed funding and incubation achieved higher startup conversion rates, particularly among youth and women innovators. Karthikeyan (2019), evaluated the effectiveness of the Smart India Hackathon among participants from Tamil Nadu and found that while awareness and participation at the state level are steadily increasing, there is still limited support available for scaling hackathon ideas into viable startups

2.5. AWARENESS AND PARTICIPATION DYNAMICS

While awareness is a precondition for participation, empirical studies on hackathon awareness remain scarce. Menaka and Gopal (2019) demonstrated that integrating hackathons into academic curricula increased awareness and engagement, especially among women students. Government initiatives in Tamil Nadu, such as EDII (2023) and TNSDC (2023) reports, show improved awareness through targeted campaigns, yet participation remains uneven across gender and regional lines. These disparities highlight the need for awareness-building and inclusivity strategies, particularly for non-technical and rural participants. Awareness not only influences participation but may also mediate the translation of hackathon exposure into entrepreneurial activity.

Despite this progress, few empirical studies quantitatively link awareness, participation, and startup creation within specific regional ecosystems. Tamil Nadu, despite its extensive hackathon programmes, lacks systematic data on how mentorship, funding, and institutional backing influence entrepreneurial outcomes. Addressing this research gap forms the core rationale for the present study and directly motivates its objectives.

3. RESEARCH PROBLEM

The research problem focuses on the limited understanding of how hackathons truly impact startup development in Tamil Nadu. Despite their growing popularity, there is insufficient insight into participants' awareness levels and how effectively hackathons translate into real-world innovation, startup creation, and enhanced entrepreneurial confidence among youth. This gap calls for a detailed assessment to measure the actual influence of hackathon involvement on fostering sustainable entrepreneurial outcomes.

4. RESEARCH OBJECTIVES

- 1) To assess the level of awareness about hackathons among youth and entrepreneurs in Tamil Nadu.
- 2) To evaluate the influence of hackathon participation on the development of innovative startups.
- 3) To analyze the role of mentorship, funding availability, and institutional support in post-hackathon startup success.
- 4) To identify the challenges faced by hackathon participants in converting ideas into startups.
- 5) To suggest measures to improve the efficacy of hackathons in fostering innovation and entrepreneurship.

5. HYPOTHESIS

H1: There is a significant relationship between hackathon participation and startup creation.

H2: Awareness level of hackathons significantly differs across demographic groups.

H3: Mentorship, funding, and institutional support significantly influence startup success post-hackathon.

H4: There is a positive correlation between hackathon participation frequency and innovation level in startups.

H5: Gender and educational background significantly influence the likelihood of startup formation post-hackathon.

6. RESEARCH METHODOLOGY

6.1. RESEARCH DESIGN

The present study adopts a descriptive and exploratory research design to analyze the level of awareness about hackathons and their influence on innovative startup formation in Tamil Nadu. This design is appropriate because it enables the researcher to describe current awareness levels, test relationships between variables, and explore factors influencing post-hackathon entrepreneurial outcomes.

6.2. SAMPLING DESIGN

Population and Sample Size: The study targeted students, early-stage entrepreneurs, and working professionals across Tamil Nadu who have either participated in hackathons or are aware of such events. A total of 150 respondents were selected for the study. The sample size was determined based on Krejcie and Morgan's (1970) sample size determination table, which suggests that for a population exceeding 10,000, a sample of around 150–200 respondents ensures a 95% confidence level with a 5% margin of error. Hence, the sample size of 150 is both statistically adequate and representative.

Sampling Method: A stratified random sampling method was used to ensure proportional representation of different respondent categories. The sample was divided into four strata: 1) Students (engineering, management, and technology streams); 2) Early-stage entrepreneurs (startups or incubation members); 3) Working professionals (IT, business, or related sectors) and 4) Others (freelancers or innovators). Random selection within each stratum ensured that the data reflected diverse perspectives on hackathon participation and startup creation.

6.3. DATA COLLECTION

Primary data were collected using a structured questionnaire, distributed both digitally (Google Forms) and physically during entrepreneurship development programs and hackathon events conducted by EDII-TN and TNSI. The questionnaire consisted of three parts: Section A: Demographic profile; Section B: Awareness and participation in hackathons; Section C: Impact on startup development and post-hackathon outcomes.

Secondary data were obtained from academic journals, government portals (EDII-TN, MSME, Naan Mudhalvan), and published reports on innovation and entrepreneurship.

6.4. RELIABILITY AND VALIDITY

A pilot study was conducted with 30 respondents to test the clarity and consistency of the questionnaire. The internal consistency of the items was measured using Cronbach's Alpha, which yielded a coefficient of 0.87, indicating high reliability (as values above 0.70 are considered acceptable).

Content validity was ensured through expert review by two academicians and one industry mentor specializing in innovation and entrepreneurship studies.

6.5. TOOLS FOR ANALYSIS

Collected data were analyzed using SPSS software. The following statistical tools were employed: Frequency Analysis – to describe demographic and awareness patterns; ANOVA (Analysis of Variance) – to test the difference in startup initiation across hackathon participation levels; Chi-square Test – to assess the relationship between demographic variables and awareness; Multiple Regression Analysis – to identify the key predictors of post-hackathon startup success.

6.6. VARIABLES USED

- 1) **Independent Variables:** Age, Gender, Education, Profession, Hackathon Awareness, Mentorship Support, Funding Availability, Institutional Backing
- 2) **Dependent Variables:** Startup Initiation, Innovation Level, Post-hackathon Success, Entrepreneurial Intent
- 3) **Tools for Analysis:**
 - Frequency Analysis, ANOVA, Chi-Square Test & Multiple Regression Analysis

Variables:

- 1) **Independent Variables:** Age, gender, education, profession, hackathon awareness, mentorship availability, funding support, institutional backing.
- 2) **Dependent Variables:** Startup initiation, innovation level, post-hackathon success, entrepreneurial intent.

7. DATA ANALYSIS AND INTERPRETATION:

Table 1

Table 1 Demographic Profile of Respondents			
Demographic Variable	Category	Frequency	Percentage
Gender	Male	88	58.70%
	Female	62	41.30%
	Total	150	100.0%
Age Group	Below 20	25	16.70%
	21-30	85	56.70%
	31-40	28	18.70%
	Total	150	100.0%

Education	UG	68	45.3%
	PG	54	36.0%
	Others	28	18.70%
Total		150	100.0%
Profession	Student	77	51.30%
	Entrepreneur	39	26.0%
	Professional/Other	34	22.70%
Total		150	100.0%

Interpretation: The demographic composition shows that 58.7% of respondents were male and 41.3% female. The largest age group (56.7%) was between 21–30 years, representing the youth demographic most engaged in innovation activities. Academically, 45.3% were undergraduates, followed by 36% postgraduates. Professionally, over half (51.3%) were students, while 26% were entrepreneurs and 22.7% professionals.

This diverse mix reflects the growing engagement of young, educated individuals in hackathons—consistent with Sivakumar and Anandan (2021), who reported that student participation in hackathons significantly enhances entrepreneurial intent and practical skill development.

Table 2

Table 2 Awareness Level of Hackathons		
Awareness Level	Frequency	Percentage
High	45	30%
Moderate	70	46.7%
Low	35	23.3%
Total	150	100.0%

Interpretation: The results indicate that 30% of respondents possess high awareness, 46.7% have moderate awareness, and 23.3% have low awareness of hackathons.

This suggests that while a majority are familiar with the concept, a notable awareness gap persists, especially in non-technical domains and rural regions.

The findings align with Karthikeyan and Krishnamurthy (2019), who found that hackathon awareness in Tamil Nadu is improving but remains uneven across educational streams. Increasing institutional and government-led outreach could bridge this divide.

Table 3

Table 3 Hackathon Participation Vs Startup Initiation Using Anova					
Source	SS	df	MS	F	Sig.
Between Gr.	112.4	2	56.2	5.76	0.004**
Within Gr.	1394.6	147	9.49		

Interpretation: ANOVA results show a statistically significant relationship between hackathon participation and startup initiation ($F = 5.76, p = 0.004$). Participants who had attended multiple hackathons were more likely to initiate startups compared to those with limited or no participation.

This finding supports Angarita and Nolte (2021), who emphasized that repeated hackathon exposure enhances entrepreneurial confidence and the likelihood of business creation. Hence, hackathons are not merely short-term learning platforms—they serve as entry points into the startup ecosystem when supported by mentorship and incubation mechanisms.

Table 4

Table 4 Awareness vs Demographics Relationship Using Chi-square			
Variable	Chi-square	df	Sig.
Age vs Awareness	14.67	4	0.005**
Education vs Awareness	18.23	3	0.002**
Gender vs Awareness	10.21	1	0.001**
Profession vs Awareness	12.78	2	0.008**

Interpretation: Chi-square analysis revealed significant associations between awareness levels and demographics: 1) Age vs Awareness ($p = 0.005$), 2) Education vs Awareness ($p = 0.002$), 3) Gender vs Awareness ($p = 0.001$) and 4) Profession vs Awareness ($p = 0.008$)

These findings suggest that awareness varies significantly across demographic groups, with younger, educated participants showing greater familiarity. This pattern aligns with Menaka and Gopal (2019), who found that integrating hackathons into academic credit systems enhances youth engagement. Interestingly, gender-based differences persist, with male participants showing higher awareness levels—mirroring global concerns about women's underrepresentation in innovation spaces. Targeted awareness programs and gender-inclusive initiatives can help balance participation.

Table 5

Table 5 Factors Influencing Startup Success Using Regression Analysis					
Variable	B	Std. Error	Beta	t	Sig.
Mentorship	0.331	0.072	0.398	4.59	0.000**
Funding Support	0.267	0.063	0.357	4.23	0.000**
Institutional Backing	0.198	0.061	0.294	3.25	0.001**
Gender (Male = 1)	0.123	0.058	0.134	2.12	0.035*
Education Level	0.156	0.064	0.162	2.43	0.016*
Constant	1.478	0.429		3.45	0.001

$R^2 = 0.684$ | Adjusted $R^2 = 0.671$ | $F = 19.62$ | $p < 0.001$

Interpretation: Regression results indicate that mentorship ($\beta = 0.398$, $p < 0.001$), funding support ($\beta = 0.357$, $p < 0.001$), and institutional backing ($\beta = 0.294$, $p = 0.001$) significantly predict post-hackathon startup success. Additionally, education ($\beta = 0.162$) and gender ($\beta = 0.134$) show moderate influence. The model explains 68.4% of the variance in startup success (Adjusted $R^2 = 0.671$), confirming strong predictive power.

These results are in line with Sundaram and Narayanan (2021), who reported that structured mentorship and government support enhance innovation adoption and startup formation in Tamil Nadu. Also, Rajasekar and Pushpalatha (2020) pointed out that lack of long-term mentoring remains a critical gap. The present findings reaffirm that hackathon-driven startups succeed primarily when embedded within a continuous support ecosystem involving mentors, funding agencies, and incubators.

8. MAJOR FINDINGS

- 1) 76.7% of respondents have moderate to high awareness of hackathons.
- 2) Participation in hackathons significantly influences startup creation and innovation level.
- 3) Demographics such as age, gender, education, and profession affect awareness levels.
- 4) Mentorship, funding support, and institutional backing play a crucial role in startup success post-hackathon.
- 5) Educational background and gender are statistically significant in predicting startup success.
- 6) Challenges include limited access to post-hackathon support, lack of market exposure, and scalability issues.
- 7) Most successful hackathon startups benefited from continued mentorship and incubation.

- 8) Awareness is higher among tech and business students compared to those in arts and humanities.
- 9) Professionals show willingness but lack time and institutional encouragement to participate.
- 10) Female participants showed higher retention in startup efforts when supported by mentorship programs.

9. DISCUSSION AND PRACTICAL IMPLICATIONS:

This study clearly demonstrates that hackathons act as innovation accelerators—bridging creative ideation and entrepreneurial action. However, the impact is not automatic; it depends heavily on follow-up mentorship and institutional linkage.

9.1. KEY IMPLICATIONS INCLUDES

- 1) **Integration with Academia:** Universities and colleges should embed hackathons into curricula and link them with campus incubators to facilitate sustained development of prototypes.
- 2) **Post-event Support:** Government programs such as EDII-TN Hackathon and Naan Mudhalvan must incorporate structured post-hackathon mentorship and seed-funding pipelines.
- 3) **Inclusivity Measures:** Special initiatives for women participants and professionals outside the IT sector can broaden innovation diversity.
- 4) **Public-Private Collaboration:** Corporates can co-host domain-specific hackathons to channel youth creativity into industry solutions.

By addressing these areas, Tamil Nadu can transform its vibrant hackathon culture into a sustainable innovation ecosystem, fostering both economic and social entrepreneurship.

10. CONCLUSION

This study provides empirical evidence that hackathons play a significant role in fostering innovation and entrepreneurial intent among youth in Tamil Nadu. The analysis confirms a strong positive relationship between hackathon participation and startup initiation, with mentorship, funding, and institutional support emerging as the most influential factors for post-hackathon success. Demographic differences in awareness—particularly across gender, education, and professional categories—highlight the need for targeted engagement strategies.

Rather than serving as isolated events, hackathons function as launchpads for innovation ecosystems, bridging creative ideation, technical collaboration, and entrepreneurial action. When supported by structured mentorship and incubation, hackathon ideas can evolve into sustainable business ventures that contribute to regional economic development. These findings reinforce global evidence that hackathons are not merely competitions but transformative learning environments that integrate education, industry, and entrepreneurship.

11. POLICY AND PRACTICAL IMPLICATIONS

- 1) **Educational Integration:** Institutions should formally recognize hackathon participation through academic credits and embed them into entrepreneurship curricula.
- 2) **Post-hackathon Mentorship:** State agencies such as EDII-TN and MSME-TN must institutionalize post-event mentorship frameworks to ensure project continuity and commercialization.
- 3) **Funding Mechanisms:** Establishing a Hackathon Seed Fund jointly managed by government and industry partners can provide early-stage financial support.
- 4) **Inclusive Participation:** Focused outreach and gender-sensitivity training can enhance participation from women innovators and non-technical disciplines.
- 5) **Monitoring Frameworks:** Regular impact assessments of government-funded hackathons can help evaluate outcomes and refine policies for startup development.

These steps will not only strengthen Tamil Nadu's innovation pipeline but also position the state as a national model for hackathon-led entrepreneurship.

12. LIMITATIONS OF THE STUDY

Despite its useful insights, the study has certain limitations:

- 1) The sample size of 150 respondents, though statistically valid, limits broader generalization across all districts.
- 2) The cross-sectional design captures awareness and impact at a single point in time, without assessing long-term outcomes.
- 3) The study focuses exclusively on Tamil Nadu; hence, contextual differences in other states are not represented.
- 4) Self-reported data may involve respondent bias, particularly regarding perceived startup success.

13. FUTURE RESEARCH DIRECTIONS

Future studies may adopt a longitudinal design to examine the long-term sustainability of hackathon-generated startups. Comparative studies across different Indian states or international ecosystems could provide deeper insights into how regional policies influence outcomes. Additionally, qualitative research exploring the experiences of hackathon mentors, organizers, and investors could enrich understanding of post-event challenges.

Exploring digital and hybrid hackathon models—especially in the post-pandemic context—would also contribute to literature on virtual innovation ecosystems.

CONFLICT OF INTERESTS

None.

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