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Entrepreneurial Inquisitiveness of Under Graduate Mechanical Engineering Students

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Abstract State-of-the-art technologies have changed engineering education and the manufacturing industry over the past few years. Now, the markets in electronics and information science arena have variety of products and are easily accessible for the customers through e-commerce. Mostly the start-up companies are wont these online platforms for their business. The start-ups have a potential to flourish their products in the market. The number of student's start-ups in the mechanical engineering stream is relatively less when compared to the ones spawned by other engineering streams. Products from pure mechanical engineering stream is less in the market but has a huge potential that is waiting to be explored. Promotion of mechanical based start-ups can be made only by paving the seed of entrepreneurial culture, which has to be sprout among engineering students through the campus start-up activities.

This study analyses the entrepreneurial inquisitiveness of under graduate mechanical engineering students in the state of Kerala, India, in terms of their attitude, involvement in entrepreneurial programs in the campus, policies of universities, influence of Government organizations, barriers faced by the students and the different components behind campus start-ups. A sample of 380 mechanical engineering students from various engineering colleges across Kerala participated in survey through both direct and online methods. The questionnaire for the data collection was prepared based on literature, feedback and market research. A seven-point Likert scale was used to record their responses. The data was analysed using a multiple regression approach, with the Statistical Package for Social Sciences (SPSS).

Results from this research are aimed at providing insights to State Governments in their start-up policy, to the Universities in their curriculum revision and to the Higher education department in the states to sire an entrepreneurial ecosystem in the engineering campus. Educated youth have to fortify as an industrialist for the economic growth of their nation.

Keywords: Global market, Entrepreneurship, Campus Start-ups, Inquisitiveness, Engineering students.

1. Introduction

The development in entrepreneurship culture among women, youth and minorities can be improved by the establishment of entrepreneurship excellence centres(United Nations, 2014). A training centre or a skill development centre will enhance the

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entrepreneurial skill, which incites the people to think out of the box(Grecu & Denes, 2017). A sustainable livelihood for the world's poor can be achieved only through entrepreneurship(UN Department of Political Affairs, 2017) . Fostering entrepreneurial awareness and building entrepreneurial capabilities at scale strengthen the support system for start- ups (NASSCOM, 2017) . Imparting innovativeness and creativity for the new venture creation are the entrepreneurial research criteria in most of the developed countries (Tripathi & Brahma, 2018). Best technology innovations are not always happening in large industries. Large industries are excellent at scaling up of products developed by the start-ups (Jhunjhunwala & Madras, 2014) .

India is a developing country with a population of 135 million, in which economic turbulence, growing inflation, illiteracy and unemployment are causing an imbalance among educated youth (Bhat, 2003) . These precariousness can be resolved by entrepreneurship (Khanduja & Kaushik, 2009) . India has developed its entrepreneurial culture through several pathways, including government policy, shaping of curriculum, and through interaction with entrepreneurs and multinationals (Jain, 2018). Many government and non-government agencies are making efforts to enhance entrepreneurial activities, particularly the Entrepreneurship Development Institute of India (EDII), Department of Science and Technology (DST), National Science and Entrepreneurship Development Board (NSTEDB) etc. have played a key role for the Government of India.

In the state of Kerala, all the entrepreneurial activities and supports given to the students and public by the Government is through Kerala Start-up Mission (KSUM) (Kerala Startup Mission, 2019). Which drives the campus and supports the educated youth especially engineering students across Kerala through the Innovation and Entrepreneurship Development Centre (IEDC)(Startup Policy, 2016.) Furthermore, IEDC acts as a knowledge hub for the whole students in each campus irrespective of their discipline. IEDC playing as a catalyst in creating and developing a campus start-up eco system by providing technical workshops, seminars, hackathons, Idea summit etc. across the state. IEDC creates a network between the students by organizing these programs for all the interested students under APJ Abdul Kalam Technological University's (KTU). Networking between inter college and intra college students will enhance the knowledge sharing and the entrepreneurial spirit of students. KSUM gives financial and technological support for conducting IEDC activities. KSUM corroborate and have a detailed dissection on all the funded activities of IEDC frequently.

Many youths nowadays, especially engineering students possess business ideas, but only a few have the capacity and ability to turn it into viable businesses (Gaikwad, 2016). Despite the many efforts that have been made through IEDC by Government or other agencies, the lack of participation of engineering students in entrepreneurial activities is still a call for concern. IEDC promotes the campus startup activities but the most of the startups generated in the campus is with the background of electronics and information science arena. The student's start-ups in the mechanical engineering stream are relatively less when compared to the ones spawned by other engineering streams (Kerala Startup Mission, 2019) . Mechanical engineering (ME) students have been selected for the study as they are not very involved in entrepreneurial activities on campus. Nurturing the entrepreneurial skills of mechanical engineering students through campus startup activities is essential to increase the rate of production arising out of mechanical engineering domains across the world. The product life cycles are getting progressively shorter due to technological exploitation(Mandal & Nigam, 2018). In this shorter span, the process of technology commercialization encompasses all the activities from idea creation, its development, designing and testing with prototype, and manufacturing to marketing. (Mitchell and Singh 1996). The students' education system, both in the classroom and in the campus have changed according to the revised syllabus of APJ Abdul Kalam Technological University. KTU holds 189 engineering colleges and have an intake of around 65000 students for different courses. This educational change in the campus has to be converted into an entrepreneurial culture. Proper entrepreneurial skills and trainings are essential for the youth to impart start-up culture(Upadhyay, 2017) .

The purpose of this study is to find out the factors addressing the inquisitiveness of mechanical engineering students towards campus startup activities and also find the effectiveness of government agencies like KSUM and IEDC.

Literature review

The increasing rate of unemployment among the graduated youngsters is a threat to the nation; the educational institution produces graduates yearly without commensurate job opportunities (Ekpo,2010). The educated young talents have a moto to get into self-employment or to initiate stat-ups, which leads to the economy equilibrium of the nation (Hitt& Reed, 2000). Start-up initiatives should develop in students with innovative minds, as this innovative mind is the specific tool for entrepreneurs (Welsh et al., 2016) . Lots of business opportunities are identified by the youth, but most of the educated youth are not ready to take the mantle of entrepreneurship as their career around the world (Obembe et al., 2014).

The various factors considered among engineering students for their entrepreneurship or stat-ups are, they didn't have the necessary entrepreneurial skills to start their own business, and their entrepreneurial perspectives are narrow (Karim, 2016) . The results of various programs like workshops and hackathons from the IEDC shows the skill and innovative culture has to be nurture at the grass root level of engineering education. School culture, campus life and job satisfaction are obviously factors that influence entrepreneurial inclination (Abdulwahed et al., 2013) . The need for independence or self-employment, financial motivation and need for achievements are the things required for entrepreneurship (Barba-Sánchez & Atienza-Sahuquillo, 2018) . The conversion of technology and services into meaningful products leads to employment and encourages entrepreneurship (Jwara & Hoque, 2018). The outcome of entrepreneurship learning and awareness programs by the agencies shows constant challenges for the faculty to stay innovative and forward looking (Leffel & Darling, 2009). The entrepreneurial opportunity according to technological changes and fitness of youth for new venture has elevated (Davidsson, 2015).

Innovative ideas based on the technology changes effectuated by the engineering students in their curriculum projects should enhance their entrepreneurial mindset (Doboli et al., 2010) . A good business plan, self-efficacy and focus control are significantly related to the effectiveness of an entrepreneurship program (Din et al., 2016) . There is an inverse U shaped relationship between age and the decision to start a business, and this is one of the most influencing factors among students (Bönte et al., 2009). Findings suggest that the age specific likelihood of becoming an entrepreneur is related to countries' entrepreneurial features, labour market etc. but it is globally accepted that middle aged individuals are more prone to new start-ups ventures (Casserly, 2013). It is experienced that adult professionals become active entrepreneurs by leaving paid employment to become self-employed (Harmset al., 2014; Blanchflower, 2004). An individual's entrepreneurial intention is mainly influenced by personality traits such as personal background (Hong et al., 2012,) self-efficacy, risk taking need for achievement, attitude and behaviour control (Remeikiene et al., 2013), (Mäkimurto-Koivumaa & Belt, 2016) . Influence of student perceptions and intention towards entrepreneurship is dependent on factors such as accessibility of capital, risk tolerance, university intervention, familiarity and social network (Obembe et al., 2014),(Shaikh, 2012) .

An engineer is assumed to be endowed with a certain stock of knowledge. This knowledge spills over and is commercialized by developing new technologies for the market (Refaat, 2009) . Attitude towards start-up is the degree to which the individual holds a positive or negative personal valuation about being an entrepreneur (Vamvaka et al., 2020) . The entrepreneurial quality can be measured by need for achievement, locus of control, risk taking propensity, perseverance, independent, creative and knowledgeable (Rani, 2016) . Literature says about entrepreneurial skill set of engineering students with their products and start-ups. The research on mechanical engineering students and their start-up activities are still minimal. Based on the literature, feedback and market research the entrepreneurial inquisitiveness of under graduate mechanical engineering students in the state of Kerala, India, in terms of their attitude, involvement in entrepreneurial programs in the campus, policies of universities, influence of Government organizations, barriers faced by the students and the different components behind campus start-ups were examined. The research objectives below emerged from a need to assess the effectiveness of the IEDC in promoting entrepreneurial inquisitiveness of engineering students.

Research Objectives

1. To conceptually propose a model linking various factors determining Entrepreneurial

Inquisitiveness among Students.

2. To empirically test the model and analyse the role of the following factors on Entrepreneurial Inquisitiveness.

   a. Attitude of ME students towards Entrepreneurship.

   b. Involvement of ME students in Entrepreneurial Campus Activities.

   c. Policy of University and College.

   d. Influence of KSUM and other Government Organisations.

   d. Barrier Factors on Entrepreneurship.

3. To examine the role of IEDC as Catalyst to condition the effect of the above-said factors and to develop Entrepreneurial Inquisitiveness among students.

4. To provide theoretical and practical guidelines based on the results, focusing on the promotion of Entrepreneurial Inquisitiveness orientation among students.

Direct Hypothesis

H1: Attitude of ME students towards Entrepreneurship has a positive impact on Entrepreneurial Inquisitiveness.

H2: Involvement of ME students in Entrepreneurial Campus Activities has a positive impact on Entrepreneurial Inquisitiveness.

H3: Policy of University and College has a positive impact on Entrepreneurial Inquisitiveness.

H4: Influence of KSUM and other Government Organizations has a positive impact on Entrepreneurial Inquisitiveness.

H5: Barrier factors of Entrepreneurship have a negative impact on Entrepreneurial Inquisitiveness.

Moderating hypothesis

H6: Attitude of ME students towards Entrepreneurship on Entrepreneurial Inquisitiveness is positively moderated by IEDC as Catalyst.

H7: Involvement of ME students in Entrepreneurial Campus Activities on Entrepreneurial Inquisitiveness is positively moderated by IEDC as Catalyst.

H8: Policy of University and College on Entrepreneurial Inquisitiveness is positively moderated by IEDC as Catalyst

H9: Influence of KSUM and other Government Organizations on Entrepreneurial Inquisitiveness is positively moderated by IEDC as Catalyst.

H10: Barrier of Entrepreneurship on Entrepreneurial Inquisitiveness is negatively moderated by IEDC as Catalyst.

Research methodology

The research objectives are accomplished by testing the hypothesis with the help of a suitable methodology. Structural equation modelling (SEM) was used for the analysis. A statistical tool SPSS-AMOS- IBM was used to evaluate the available data. The methodology is used to analyse the entrepreneurial inquisitiveness of under graduate mechanical engineering students across the state of Kerala. Factors like attitude, involvement in entrepreneurial programs in the campus, policies of universities, influence of government organizations, barriers to campus start-ups were taken as the Independent variables towards entrepreneurial inquisitiveness of engineering students. The dependent variable is entrepreneurial inquisitiveness and the catalyst is IEDC which is to enhance the students innovative and creative mind. Fig.1 shows conceptual frame work for entrepreneurial inquisitiveness.

In the study, the researcher tested the study hypotheses in three sequential phases. In the first phase, an Exploratory Factor Analysis (EFA) with all the seven factors ie. five Independent variables, one Dependent variable and one Catalyst with maximum likelihood estimation was performed to examine the dimensional structure of the scale measures. Exploratory factor analysis was performed to identify or understand dimensional structure underlying in the measurement items, and also to test whether the a priori dimensional structure for the selected scales or sub-scales is consistent with the structure obtained with the particular set of measures.

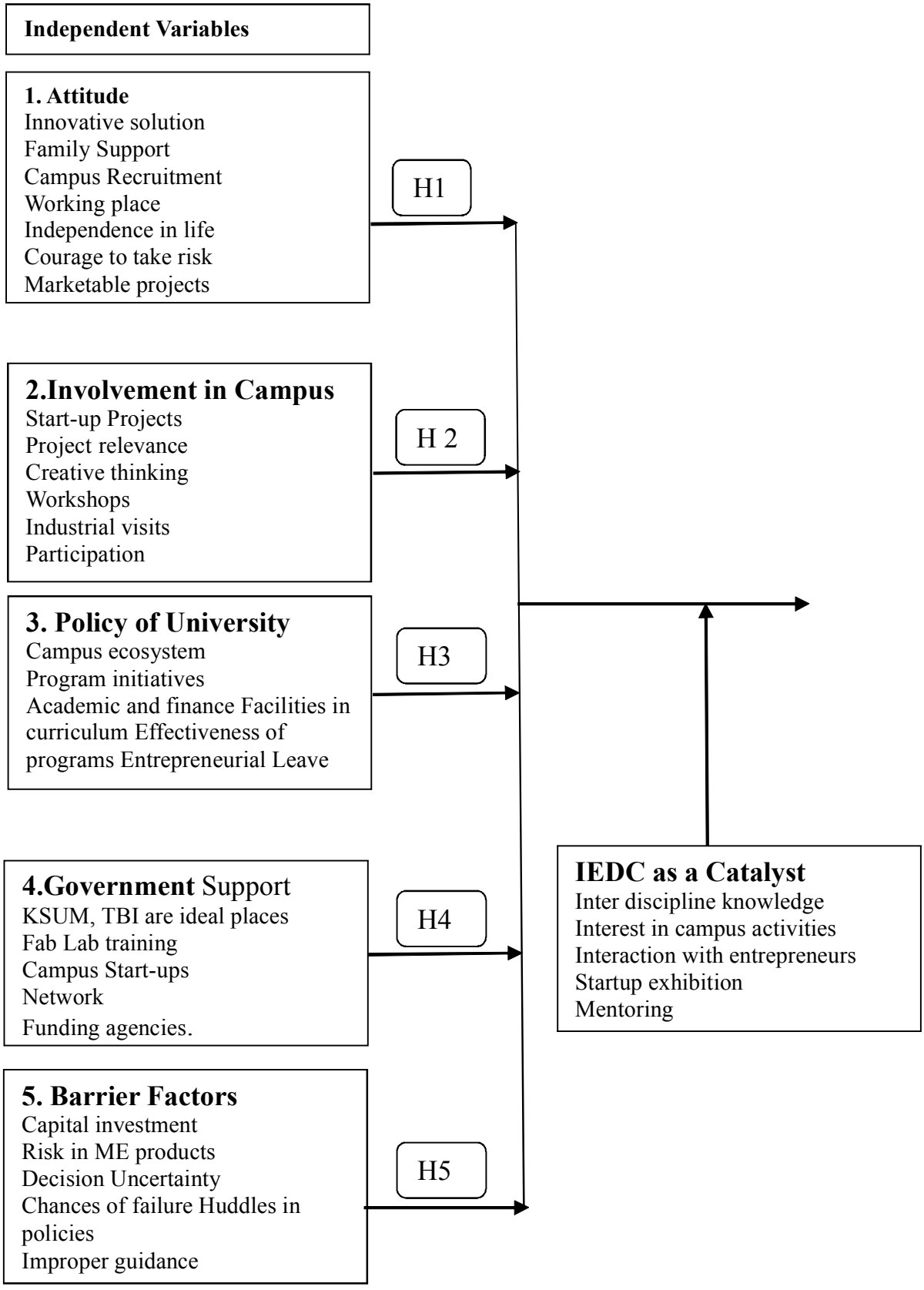

Fig.1 : Conceptual frame work of entrepreneurial inquisitiveness

Entrepreneurial inquisitiveness of engineering students was measured from the undergraduate final year mechanical engineering students in various engineering colleges across the state of Kerala under the APJ Abdul Kalam Technological University (KTU). Final year students were selected for the data collection because they are more aware about the campus activities, they are seeking professional career immediately after their studies and they have the ability to take an entrepreneurial decision compared to their juniors. Over the past 25 years the number of female in mechanical discipline is about one or two in sixty students. So that, gender parity is considered and the sample is taken as a single cluster.

The sample survey was done in the KTU campuses under Government, aided and unaided engineering colleges, having IEDC in their campus. The questionnaire for the data collection was prepared based on literature, feedback and market research. See annexture1. A set of 38 questions including Independent and dependent variables were distributed to 396 students and out of these, 380 responses were taken for data analysis after error checking. Data was collected directly from the class room and through online methods by using Google forms during the period of February 2019 to May 2019. The 7-point Likert scale was used in the questionnaire to get an accurate response from the students. The data was analysed using a multiple regression approach, with the Statistical Package for Social Sciences (SPSS).

Analysis and Result

As expected, the EFA results supported a seven-dimensional factor structure with a total variance explained of 61.92%, which indicated a satisfactory factor extraction (Hair et al. 2010). Further, as reported in Table 1, the results supported a satisfactory factor loading structure, with attitude (ATT) towards entrepreneurship is defined by seven factors loaded between .746 and .867, involvement in entrepreneurial campus activities (INVCA) is defined by five factors loaded between .671 and .776, policy of university and college. (PUC) defined by seven factors loaded between .637 and .835, influence of KSUM and other government organizations (KGOV) defined by seven factors loaded between .703 and .791, barrier factors of entrepreneurship (BF) defined by six factors loaded between .742 and .842, IEDC as a catalyst defined by five factors loaded between .754 and .817 and entrepreneurial inquisitiveness (EIN) defined by four factors loaded between .635 and .729.

Table 1: EFA factor loading results

	Factor						
	1	2	3	4	5	6	7
ATT1	.746						
ATT2	.798						
ATT3	.797						
ATT4	.816						
ATT5	.862						
ATT6	.806						
ATT7	.867						
INVCA1					.776		
INVCA2					.671		
INVCA3					.751		
INVCA4					.756		
INVCA5					.713		
PUC1		.637					
PUC2		.748					
PUC3		.777					
PUC4		.772					
PUC5		.835					
PUC6		.771					
PUC7		.802					
KGOV1						.791	
KGOV2						.721	
KGOV3						.729	
KGOV4						.703	
BF1			.757				
BF2			.742				
BF3			.75				
BF4			.78				
BF5			.821				
BF6			.842				
IEDC1				.772			
IEDC2				.754			
IEDC3				.793			
IEDC4				.795			
IEDC5				.817			
EIN1							.729
EIN2							.68
EIN3							.704
EIN4							.635

In general practice, a factor loading of 0.40 or greater is often recommended as the suggested criterion for retaining an item in a component and factor loadings lower than the cut-off point of 0.40 were eliminated from the factor structure. The factor analysis results

supported a KMO value of 0.889, and Bartlett's test of Sphericity = 8556, $p < 0.01$. This supported that factor analysis was suitable for these seven factors.

Test of validity and reliability

In the second phase, the measurement model testing results performed to confirm the validity and reliability of the scale used in the study, the researcher applied a confirmatory factor analysis (CFA) with the maximum likelihood estimation technique. The study decided to perform two types of validity. First type validity called as convergent validity. This type of validity explains the extent of convergence among the items covering the respective dimension. Similarly, the discriminant validity explains the extent of divergence between the items covering the different dimensions. In this stage, the study analysed the reliability of the study measurements using a coefficient, called as Composite Reliability (CR).

In this study, a measurement model is necessary to test the hypotheses. This measurement model testing was conducted through Confirmatory Factor Analysis (CFA). The study assessed the goodness-of fit indices available as part of model estimation. These goodness-of-fit indices examines the goodness of fit of the data with the model. As reported in Table 2, the results of the seven factor CFA show a satisfactory fit of the data with the correlated CFA model (Chi-square) = 676.119, CMIN/DF =1.050, Comparative Fit Index (CFI) =0.996, Root Mean Square Error of Approximation (RMSEA) =0.011, PClose = 1.000).

Table 2: CFA Goodness of fit indices

Measure	Estimate	Threshold	Interpretation
CMIN	676.119	--	--
DF	644	--	--
CMIN/DF	1.05	Between 1 and 3	Excellent
CFI	0.996	>0.95	Excellent
RMSEA	0.011	<0.06	Excellent

Followed by the satisfactory model fit confirmation, the study estimated the validity and reliability estimates from the CFA factor loadings and the related estimates. The CFA factor loadings indicates that all the items carry a significant factor loading to its respective factor, and the standardized factor loadings were above the suggested cut-off of 0.50 (Hair et al., 2010). As reported in Table 3, the estimated composite reliability (CR) and Average Variance Extracted (AVE) were above the suggested threshold of 0.50, which indicated the convergent validity of the scale. In addition, it also indicates the reliability of the scale.

Table 3: Validity Analysis

	CR	AVE	MSV	MaxR(H)	ATT	PU	BF	IEDC	INV	KG	EIN
ATT	0.933	0.668	0.041	0.937	**0.817**						
PU	0.911	0.596	0.102	0.916	-0.02	**0.772**					
BF	0.917	0.65	0.201	0.924	0.01	0.008	**0.806**				
IEDC	0.907	0.661	0.201	0.907	-0.083	-0.049	-0.449***	**0.813**			
INV	0.858	0.548	0.095	0.862	-0.042	0.088	-0.026	0.054	**0.74**		
KG	0.834	0.557	0.052	0.837	0.073	-0.130*	0.098†	-0.082	0.055	**0.746**	
EIN	0.842	0.571	0.102	0.846	0.203***	0.320***	-0.291***	0.189**	0.307***	0.228***	**0.76**

The study also conducted heterotrait-monotrait ratio of correlations (HTMT) analysis to check the discriminant validity of the scale measures. As reported in Table 4, the test of discriminant validity was analysed following the criterion suggested by Henseler et al. (2015). According to this discriminant validity test, HTMT values less than 0.850 indicates a strict and between 0.850 and 0.90 shows liberal discriminant validity. As shown in the table the results supported that all the HTMT values were below the strict threshold of 0.85, which indicates that the scales used in the study carry sufficient discriminant validity.

Table 4: HTMT Analysis

ATT	PU	BF	IEDC	INV	KG	EIN
ATT						
PU	0.025					
BF	0.01	0.013				
IEDC	0.081	0.046	0.442			
INV	0.04	0.042	0.027	0.052		
KG	0.086	0.128	0.091	0.031	0.055	
EIN	0.196	0.319	0.289	0.198	0.313	0.232

All these directed the study that the scale used to measure different dimensions are valid and reliable, therefore, proceed for hypotheses testing.

Test of Hypothesis

In the third phase, as part of testing the hypotheses, the study performed a multiple regression analysis. In this, to test the hypotheses (H1-H5) the study considered the attitude of ME towards entrepreneurship (ATT), involvement of ME in

entrepreneurial campus activities (INVC), policy of university and college (PUC), influence of KSUM and other Government organizations (KGOV), barrier factors on entrepreneurship (BF), as the independent variables, and entrepreneurial inquisitiveness (EIN) as the dependent variable. In addition to this, the study also included the product terms of all the independent variables with IEDC as a catalyst to analyse the moderating hypotheses (H6-H10). Table 5 and 6 reported the regression results.

Table 5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	151.46	10	15.15	24.87	.000[b]
	Residual	224.76	369	0.609		
	Total	376.22	379			
a. Dependent Variable: EIN						
b. Predictors: (Constant), INT5, KG, INV, INT3, ATT, BF, INT2, PU, INT1, INT4						

As reported in Table 5, the model testing results supported a significant model (F = 24.865, p = .000) with an R2 of .403. More importantly, it supported the significance of all these considered variables in the model to predict the dependent variable. Further, the regression estimates were examined to test the study hypotheses. As reported in Table 6, the attitude of ME students towards entrepreneurship (ATT EIN = .216, p = .000), involvement of ME in entrepreneurial campus activities (INV EIN = .295, p = .000), policy of university and college (PU EIN = .343, p= .000), influence of KSUM and other government organizations (KG EIN = .272, p = .000), barrier factors of entrepreneurship (BF EIN = -.334, p = .000) supported a significant impact on the dependent variable. Thus, the study findings supported H1-H5.

Table 6: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	Constant	0.005	0.043		0.105	0.916
	ATT	0.216	0.042	0.209	5.121	0
	INV	0.295	0.042	0.287	7.065	0
	PU	0.343	0.039	0.364	8.863	0
	KG	0.272	0.041	0.274	6.64	0
	BF	-0.334	0.043	-0.32	-7.832	0
	INT1	0.02	0.052	0.016	0.383	0.702
	INT2	-0.084	0.047	-0.073	-1.78	0.076
	INT3	0.004	0.04	0.004	0.087	0.93
	INT4	-0.012	0.042	-0.012	-0.287	0.775
	INT5	-0.094	0.04	-0.096	-2.334	0.02
a. Dependent Variable: EIN						

Followed by this, the study analysed the significance of the interaction estimates to test the moderating effects. However, the results supported a significant moderation of IEDC as a catalyst only in case of the relationship between involvement of in entrepreneurial campus activities and EIN (INV*IEDC EIN = -.084, p = .076), barrier factors of entrepreneurship and EIN (BF *IEDC EIN = -.094, p = .020). In other cases, IEDC does not show a significant moderation. Thus, the study supported H7, H10 means IEDC supports campus activities and minimise the barriers for the entrepreneurial inquisitiveness of ME students.

It can be seen that H6, H8 and H9 means attitude, policy and influence of Government agencies are not directly influence IEDC activities. ME Students having entrepreneurial attitude has positive impact on entrepreneurial inquisitiveness H1, but IEDC couldn't show any direct catalytic property on attitude H6. Policy of University and Colleges has a positive impact on Entrepreneurial Inquisitiveness H3, but IEDC couldn't show any direct catalytic property on policy decision H8. Influence of KSUM and other Government organisation has a positive impact on entrepreneurial inquisitiveness H4, but IEDC couldn't show any direct catalytic property to influence entrepreneurial inquisitiveness of KSUM and other Government organisation H9.

2. Conclusion

The main contribution of the research is the identification of factors influencing ME student entrepreneurial inquisitiveness. Entrepreneurial inquisitiveness can be developed in students by creating technological workshops, hackathons, industrial visits and seminars etc with in the campus and between the campuses. Students having capacity to think out of the box will do their projects with some innovations during their curriculum. The selection of curriculum projects should be supported by a mentor and to make an awareness in the students about design thinking, business plan, marketing techniques and

customer destitution. By knowing the need of customers students' innovative projects can be moulded in to campus start-ups and thereby scale up these projects into entrepreneurial ventures. Constitute a team for running a start-up by the student community needs lot of support from the University, Government and their agencies. Students need supports for in every stage of its developments like, idea stage, design stage, prototype stage, development stage and scale up stage.

The interventions studied in this paper show positive impact in developing an entrepreneurial inquisitiveness in ME students. Further study is needed to better understand what effects entrepreneurial attitude, policy, and governmental influence by the IEDC programs.

Limitation

The study is limited to only one state and concentrated only on one discipline. Data collection has to spread over more states for generalising. Start-ups are germinated in the campus but has short life span. Fast failure and slow success rate of the start-ups are the concern for the parents to lead their ward to entrepreneurial activities

In this research, data has not been captured from entrepreneurs, investors, and faculties, who can also have an influence on students. Data collection should be made from start-up CEOs, University fellows and government agencies to ensure policy-based start-up culture among the students.

Future research

Future research has to be concentrated on students from mechanical allied courses to examine and gain a richer insight to improve campus start-ups ecosystems for self-employment.

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ANNEXURE: 1 Questions used for Data Collection

College:…… ……

Phone:/ Whats App No…..…..……

Email:……..…….

(1) SD = Strongly Disagree (2) D =Disagree (3)Slightly Disagree (4) N = Neutral (5)Slightly Agree (6) A = Agree (7) SA= Strongly Agree

Sl.	**Factors**	**SD**	**D**	**SlD**	**N**	**SlA**	**A**	**SA**
	Attitude of ME towards Entrepreneurship							
1	I always think about alternate methods while working with complicated or difficult equipments or Machineries.	1	2	3	4	5	6	7
2	My parents believe that I should pursue a career by creating my own business.	1	2	3	4	5	6	7
3	Lack of campus recruitment changed me to think about self-employment.	1	2	3	4	5	6	7
4	I Prefer to work in a big organization rather than a small firm ®	1	2	3	4	5	6	7
5	I"d rather be my own boss than have a secure job.	1	2	3	4	5	6	7
6	I will start a business even though there are chances of failure.	1	2	3	4	5	6	7
7	My curriculum projects can be converted in to marketable product.	1	2	3	4	5	6	7
	Involvement of ME in Entrepreneurial Campus Activities							
8	Compared with other branches, number of ME based projects which can be converted into start-up is less in our college.	1	2	3	4	5	6	7
9	Most of the Mechanical Engineering student's projects are socially relevant and are economical.	1	2	3	4	5	6	7
10	Hands on Workshops and Seminars organized for ME within and outside our campus inspire students to think creatively.	1	2	3	4	5	6	7
11	Industrial Training and Visits lighten ME students towards entrepreneurial activities.	1	2	3	4	5	6	7
12	Compared to other branches ME students actively participates in Entrepreneurial Campus activities.	1	2	3	4	5	6	7
	Policy of University and College							
13	The Kerala Technological University (KTU) provide an entrepreneurial ecosystem in our Campus.	1	2	3	4	5	6	7
14	Project competition among professional colleges organized by university and college will create an entrepreneurial culture.	1	2	3	4	5	6	7
15	I am aware of KTU 's Academic, Activity and Financial policies to build entrepreneurship ecosystem.	1	2	3	4	5	6	7
16	Academic support (eg: attendance etc) and freedom are given to the students by the college while they are attending programs.	1	2	3	4	5	6	7
17	Most of the Engineering students are familiar with the entrepreneurial support provided by KTU in its curriculum.	1	2	3	4	5	6	7
18	The Workshops and Technical talks organized by the university and college are not enough to think about entrepreneurship. R	1	2	3	4	5	6	7
19	I am aware that KTU Students will be permitted to apply for grant of official leave of one year at a time for entrepreneurial initiatives during their study.	1	2	3	4	5	6	7
	Influence of KSUM and other Gov Organisations							

Comments- Reviewed

Sir,

Comments made by you directly in the article is made clear, updated and revised. The edited sentences are highlighted with yellow colour.

Comment from Reviewer E

Q1.Please add details on how the responses lead to the outcome as it is not defined on the approach followed to classify the responses as 'positive - Entrepreneurial Inquisitiveness' or dependent variable and the distribution of 'positive' vs total responses from the sample.

Justification

The values shown in the tables are above cut-off value so that we can say that the responses have a positive impact on Entrepreneurial Inquisitiveness. Also it depends on Cronbach Alpha and KMO values.

In general practice, a factor loading of 0.40 or greater is often recommended as the suggested criterion for retaining an item in a component and factor loadings lower than the cut-off point of 0.40 were eliminated from the factor structure. The factor analysis results supported a KMO value of 0.889, and Bartlett's test of Sphericity = 8556, $p < 0.01$. This supported that factor analysis was suitable for these seven factors. See Table 1 for values.

Reliability Tests

It is recommended that the Cronbach's alpha was a type of reliability coefficient that represents the measurement of internal consistency reliability of the scale measure. it is evident that the internal consistency measures reported for all the scale dimensions above 0.60, indicated that the scale is consistent or free from random error.

Construct	Cronbach Alpha
ATT	.932
INVCA	.856
PUC	.908
KGOV	.832
BF	.915
IEDC	.904
NE	.827

Table 5.4: KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.889
Bartlett's Test of Sphericity	Approx. Chi-Square	8556.037
	Df	703
	Sig.	.000

Q 2. The Hypothesis of the positive impact of the policies of the University and Government aided programs (KSUM-IEDC) has been rejected. It might not be the statistical data element given the small sample size, however, it's highly plausible from a business view that these programs do assist in providing opportunities and incentivising the start-up initiative. The recommendation is to add additional details from offline/online resources as it is quite important driver and the subject of the paper.

Justification

Sir, Policies of University, KSUM and IEDC has an influence on entrepreneurial Inquisitiveness (Direct Hypothesis). But while checking the Catalytic property of IEDC, is has no influence on the policy changes of the above. (Moderating Hypothesis)

Detailed in the article and highlighted.

ME Students having entrepreneurial attitude has positive impact on entrepreneurial inquisitiveness H1, but IEDC couldn't show any direct catalytic sign on attitude H6. Policy of University and Colleges has a positive impact on Entrepreneurial Inquisitiveness H3, but IEDC couldn't show any direct catalytic sign on policy decision H8. Influence of KSUM and other Government organisation has a positive impact on entrepreneurial inquisitiveness H4, but IEDC couldn't show any direct catalytic sign to influence entrepreneurial inquisitiveness of KSUM and other Government organisation H9.

Thank you.

Pradeep M