Impact of Technical Education on Entrepreneurial Perception among Engineering Students for developing Small Scale Entrepreneurship

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Abstract

Small and medium enterprises worldwide and small-scale sector in India is the foundation of economy. It is a fact that SSE Sector has not been developed to its fullest potential yet. The sickness in this sector is far reaching, and is developing at a quick rate, bringing about immense misfortune at various levels. Engineering and engineering education have experienced huge changes in the recent past. In today's instructive and industrial situation, where un-employment level is rising and career path is winding up plainly less very much characterized, more practical approach in teaching is expected to encourage more grounded business intuition in the potential business visionaries. For this, it is the responsibility of the engineering institutions to build up their students not only as engineers but also as technocrats and business people. The wide goal of the present work is the examination of the contribution through engineering education to build up the entrepreneurial vision among engineers for feasible development of the SSE sector. To build up the entrepreneurial abilities among the engineering students and to offer entrepreneurship as a reasonable profession alternative, an enterprise improvement model is proposed for the engineering educational program. The said model can be valuable for engineering students to create information and redesign the aptitudes and their comprehension.

Keywords: Small Scale Enterprises, Entrepreneurship, Entrepreneurial Education, Entrepreneurial Perception, Entrepreneurship Development Model.

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1. Introduction

In India, small and medium enterprise (SME) generally termed as small-scale unit (including small sector) is characterized by the criteria of size of capital venture. The SSE in India has risen as the most powerful

and dynamic part lately. The Government as far back as Independence has reliably energized this segment as is obvious from the strategies confined every once in a while. The SSE part in India covers a wide range of industry ordered under small, medium and large sector extending from small sector/skill units to present day generation units with noteworthy ventures.

The advancement of the small-scale sector in India has been an imperative pushed of modern strategy since autonomy; however the concentration of concern changed with the needs of every five-year plan. The extension and globalization of the world economy prompted two distinct advancements. In some area, globalization has restored the industrial development, tending to a novel time of high development and fare intensity.

1.1 Essentials of Entrepreneurship

There is significantly more to enterprise than orderly development, the very establishment of business as a practice and discipline is the act of precise advancement. Deliberate precise development starts with the investigation of the wellsprings of the new opportunities and trend-setters must break down all opportunities. Finding those opportunities, and exploiting them with centered pragmatic arrangements, requires restrained work.

1.2 Significance of Entrepreneurship Development

For effective entrepreneurship teaching and development, entrepreneurship career path has been decomposed into five stages:

1. **Foundation:** The creation and reinforcement of entrepreneurial values bound for individual and society as whole;
2. **Awakening:** Confrontation of an individual with entrepreneurship as a viable career option;
3. **Specialization:** Acquiring initial skills necessary for business creation helping individual to identify as an entrepreneur.
4. **Creation:** The individual moves from knowledge and learning to action.
5. **Maturing:** Individual builds upon his experience and advances his career through knowledge-based development and networking.

With appropriate instruction and preparing furnished to the individual with entrepreneurial enthusiasm, reasonable business enterprise could be produced. Education and preparing of potential business

visionaries has a noteworthy bearing on the fruitful quest for enterprise, yet the question emerges what training inputs are required for the potential business visionaries.

1.3 Engineering Education Domain

Engineering and engineering education has undergone significant changes in the recent past, while engineering as a profession demands traditional attributes such as problem solving ability, analytical skill, interpersonal skill, decision making skill etc.

Today engineering educators face an increasing need for clarity in what they are doing and why they are doing it and how. There are two reasons for this engineering practice and industry has fundamentally changing needs and society is demanding greater accountability and attention to quality. Early engineers believed in and worked in a society that believed in, technology for its own sake. The paradigm was that the engineer was an agent of technological change. Today, engineers are facing significantly different paradigm. They are expected to bring combination of technology, economics, social consciousness, and environmental awareness to engineering works to ensure that most possible good is derived for both present and future communities.

Due to the application of new technologies, different customer requirements of technical products and services, increasing dependency of economics, engineers are confronted with new qualification demands. Therefore the classical technical–scientific qualification has to be extended by interdisciplinary knowledge and skills, which enables creative problem solutions, leadership abilities and communication competencies as well as holistic approach for technical problems.

The rate of technological advances will have a significant influence on the direction of engineering education. This as an opportunity and challenge and stressed upon focusing energy and resources on fostering an environment for creativity and innovation in engineering education program.

1.4 Necessity of Engineer as Entrepreneur

The necessary set of skills in developing science based entrepreneurial engineer as follows:

1. Ability to analyze and diagnose the problems of production and service of an enterprise and device remedial measures at the right time;
2. Ability to grasp opportunities which offers economic advantage;

3. Ability to workout economics of production and service outputs and evolve competitive and cost effective strategies;
4. Ability to give fillip to ancillarisation, thus help in better linkage between large and small industries;
5. Technical and analytical capability helpful in preventing accidental breakdown problems, thus reducing expenditure on trouble shooting;
6. Ability to forecast the changes in technology and adopt to the changing environment more easily;
7. Ability to contribute to self-propelled performance rather than push propelled developments;
8. Ability to effectively transfer technology from laboratories to industries.

1.5 Role of Engineering Education in Entrepreneurship Development

The technology transfer has to take place through an educational process. The objective of effective technology transfer should be an effective operationalization and enhancement of national productivity. With the existing educational system, technology transfer can take place through universities and high technological institutes. In today's educational scenario, with unemployment levels rising and career path becoming less well defined, a more practical approach to teaching could foster a stronger business acumen in the potential entrepreneur. Engineering education in has never been given due significance by educationists and organizers. In India, no exertion has been made to construct specialized human drive to address the future difficulties. The returns from the investment in R&D in engineering institutions are highest. In this context, efforts should be taken to setup technology diffusion centers, innovation centers, technology parks, incubators to build between researchers and industrialists for economic growth. The effective partnership between academics and industry, and technology transfer is found to revitalize both the industry and institute.

2. Literature Review

FarnazMojab et al. (2011) examined the importance of entrepreneurial competencies to identify entrepreneurship education features using a competency based approach for IT students.

CodrinChiru et al (2012) undertakes an integrated analysis of the students' acquired business skills and various psychological/behavioral factors (risk acceptance, success models & patterns, personal motivation, self-confidence) in the middle and higher education institutions by using a mix of quantitative and qualitative evidence.

Thomas Lans et al (2014) explored the boundaries between two disciplines i.e. education for sustainability & entrepreneurship education. Findings of the study suggest a set of clear, distinct competencies providing stepping stones for monitoring students' sustainable entrepreneurship development in school-based environments.

Shaghayegh Khayri et al. (2011) investigated barriers to enhance entrepreneurship in the Agricultural higher education. A descriptive–correlation survey approach was used in this study. The results showed that lack of adequate government support, limited financial ability to provide graduates employment arrangements in the agricultural sector and lack of efficiency in universities to educate entrepreneur graduate are the main barriers to employment of agricultural graduates.

Nihan et al. (2012) determined the entrepreneurial intentions of public universities in Turkey by exploring their strategic postures, cultural and organizational units that supplement and support entrepreneurial activities and collaborations.

Bruce C. Martin et al (2013) explored a quantitative review of literature in the context of human capital theory for developing effective human capital formation through the medium of entrepreneurship education and training (EET).

Niklas Elert et al (2015) described the study of long-term impact of entrepreneurship education and training in high school on entrepreneurial entry, performance, and survival. Findings suggest that while institutional participation increases the long-term probability of starting a firm as well as entrepreneurial incomes, there is no effect on firm survival.

Sorina Moica et al (2012) designed a model innovative system to build communication networks between the various factors involved in the innovation process using entrepreneurship education initiated by entrepreneurial university.

Zhou Hong et al (2012) investigated the entrepreneurs' personal backgrounds, psychological and behavioral characteristics of college students, and analyzed the external impacts on entrepreneurship. The results indicated that those backgrounds and characteristics could influence the undergraduates' entrepreneur motivation and decision-making.

K. Sudharson et al (2013) developed a theory model in order to study how entrepreneurial traits affect entrepreneurial orientation among the student community. In this model entrepreneurship education has been integrated in engineering curricula and geared towards students with entrepreneurial intentions.

Teresa Tiago et al (2015) proposed a model that identifies enabling factors of entrepreneurship and their contribution to the development of a marketing innovation centered culture. The findings indicate that entrepreneurship education is a main contributor to entrepreneurial intention.

Syed Zamberi Ahmad et al (2014) empirically examined the effectiveness of the entrepreneurship curriculum used in Malaysian polytechnics in respect of students' entrepreneurial tendencies. The study identifies that the entrepreneurship syllabus in polytechnics is not effective and that students are not imbued with entrepreneurial knowledge, skills or attributes during their studies.

KareMoberg (2014) analyzed the influence of two different approaches to entrepreneurship education at the lower secondary level of education. The influence of education for entrepreneurship and education through entrepreneurship on pupils' level of school engagement and entrepreneurial intentions is analyzed and assessed by including theories about cognitive and non-cognitive skill formation.

Sarah Robinson et al (2014) suggested that the flexibility and rigorous nature of ethnography provides an appropriate tool for evaluating entrepreneurship teaching in educational institutions. Findings proposed that the nature of this discipline lends itself to ethnography as a method for discussions about how enterprising behavior is nurtured, supported and evolves into entrepreneurial practices through socially constructed communities.

Badariah et al (2016) evaluated effectiveness of entrepreneurship education programs on Malaysian university students using survey technique. The findings suggest a strong relationship between the business plan, risk thinking and also self-efficacy and effectiveness of the program, while a moderate relationship is observed in need for achievement and locus control.

MohdSufian Abdul Karim (2016) presented the review and revision of the engineering degree programs to further improve its entrepreneurship education within current requirements from the relevant authorities and constraints from prospective students.

Jodyanne Kirkwood et al (2014) addressed the gap between mechanism of entrepreneurial education and perceived value they received from it, by assessing the value of a Master of Entrepreneurship program via the use of student reflections.

Daniela Maresch et al (2016) investigated context-specific entrepreneurship education that leads to Entrepreneurial Intention among engineering students. The results indicate that entrepreneurship education modified to suit a particular target group could address the issue of subjective norms separately

for business students and science and engineering students. Findings suggest that there is a contextual difference between business students and science and engineering students.

3. Problem Statement

To identify as to how the entrepreneurial capability of the engineering student is dependent on the qualitative and quantitative input of faculty in engineering institution.

4. Research Goals

The principle goals of this examination are the investigation of:

1. The growth of SSE sector;
2. Magnitude and causes of sickness in SSE sector;
3. Factors influencing development of SSE division in the changing situation of liberalization, privatization and globalization;
4. The role of engineering institutions in instilling entrepreneurial aptitudes;
5. The essential contributions to designing training for creating ingenuity and inventiveness among specialists for creating entrepreneurial/entrepreneurial vision.

5. Hypothesis Development

Hypothesis 1: The performance of an industrial unit in small-scale industrial sector is dependent on the factor viz. managerial, technical, financial, and personal capability of an entrepreneur.

Hypothesis 2: Engineering students do possess the entrepreneurial characteristics and capabilities.

Hypothesis 3: Teacher does have the knowledge, skill, and understanding of the entrepreneurial education to engineering students.

6. Research Design

Entrepreneurship researchers are often faced with challenges of how to collect relevant information to answer their research questions. Researchers are interested in obtaining data on a wide variety of aspects of entrepreneurship, including data on traits, business operations, business practices and business performance and so on. Online survey is one of the most frequently used methods of data collection. Compared with other methods, the online survey is relatively inexpensive and less time consuming. Additionally a certain degree of respondent anonymity can be assured.

6.1 Operationalization of Hypothesis

6.1.1 For SSE Entrepreneurs

- Facilitating factors leading to entrepreneurship i.e. starting the unit;
- Factors responsible for success of the unit;
- Factors causing difficulties while running the unit;
- Factors responsible for sickness of the unit.

Categorization of Factors

- Economic Factors
- Personal Factors
- Managerial Factor
- Technical factors

6.1.2 For Engineering Students

SN	Factors	Variables
1	Technical	Technical Knowledge
		Availability of Technical Resources
		Entrepreneurial Training Activities
		Industrial Advancement
2	Economic	Capital Investment
		Infrastructure
		Market size
		Government Policy
3	Social	Family Background
		Individual Personality
		Social Respect
		Social Network
4	Psychological	Motivation
		Need for achievement
		Self confidence
		Career goal and vision

6.1.3 For Faculty of Engineering Institution

SN	Factors	Variables
1	Technical	Industrial Gap Analysis
		Entrepreneurial Development programs
		Expert Lectures
		Industrial Tours and Trainings
2	Economic	Government Support Schemes

		Effective Plant Designing
		Market Analysis
		Cost Estimation Training
3	Managerial	Work Study Training
		Resource Planning Training
		Financial Management
		Supply Chain Management
4	Psychological	Entrepreneurial Success Story
		Significance of Self-Employment
		Entrepreneurial Case Studies
		Technological Awareness

7. Data Analysis

7.1 Analysis of Survey Response of SSE Entrepreneurs

Entrepreneurs (Technical)

Variables	Factors	Mean	SD	Variance	Weightage
Facilitating factors for starting the unit	Technical	3.304	1.025	1.052	0.661
	Managerial	2.143	0.943	0.888	0.429
	Financial	3.393	0.731	0.534	0.679
	Personal	2.821	0.936	0.877	0.564
Factors for Success of unit	Technical	3.089	0.978	0.956	0.618
	Managerial	3.464	1.078	1.162	0.693
	Financial	2.946	0.903	0.815	0.589
	Personal	2.375	1.037	1.075	0.475
Factors causing difficulties in unit	Technical	3.411	0.968	0.937	0.682
	Managerial	3	0.972	0.945	0.6
	Financial	2.214	0.967	0.935	0.443
	Personal	2.857	0.98	0.961	0.571
Factors causing sickness in unit	Technical	3.339	0.859	0.737	0.668
	Managerial	2.357	0.999	0.997	0.471
	Financial	3.429	1.042	1.086	0.686
	Personal	2.946	1.034	1.07	0.589

Entrepreneurs (Non-Technical)

Variables	Factors	Mean	SD	Variance	Weight
Facilitating for starting the unit	Technical	3.829	0.985	0.97	0.766
	Managerial	3.629	1.06	1.123	0.726
	Financial	2.629	1.114	1.24	0.526
	Personal	3.086	0.951	0.904	0.617
Factors for Success of unit	Technical	3.2	0.933	0.871	0.64
	Managerial	3.429	0.884	0.782	0.686
	Financial	3.914	1.147	1.316	0.783
	Personal	3.143	1.061	1.126	0.629
Factors causing difficulties in unit	Technical	3.571	0.884	0.782	0.714
	Managerial	3.971	1.014	1.029	0.794
	Financial	3.229	0.843	0.711	0.646
	Personal	2.771	1.19	1.417	0.554
Factors causing sickness in unit	Technical	3.057	0.968	0.938	0.611
	Managerial	3.514	0.853	0.728	0.703
	Financial	3.771	0.942	0.887	0.754
	Personal	3.4	0.736	0.541	0.68

Comparative weightage of factors for both Entrepreneurs

Variables	Factor	Technical Entrepreneurs	Non-technical Entrepreneurs
Facilitating for starting the unit	Technical	0.661	0.766
	Managerial	0.429	0.726
	Financial	0.679	0.526
	Personal	0.564	0.617
Factors for Success of unit	Technical	0.618	0.64
	Managerial	0.693	0.686
	Financial	0.589	0.783
	Personal	0.475	0.629
Factors causing difficulties in unit	Technical	0.682	0.714
	Managerial	0.6	0.794
	Financial	0.443	0.646
	Personal	0.571	0.554
Factors causing sickness in unit	Technical	0.668	0.611
	Managerial	0.471	0.703
	Financial	0.686	0.754
	Personal	0.589	0.68

7.2 Factors influencing Entrepreneurship Perception of Students

S. No.	Factors	Variables	Mean	SD	Var.	Wt.	Cum. Wt.
1	Technical	Technical Knowledge	4.13	0.97	0.95	0.827	0.801
		Availability of Technical Resources	3.79	0.98	0.95	0.758	
		Entrepreneurial Training Activities	4.47	0.93	0.86	0.893	
		Industrial Advancement	3.63	0.8	0.64	0.727	
2	Economic	Capital Investment	3.9	1.18	1.39	0.78	0.75
		Infrastructure	3.61	1.06	1.12	0.722	
		Market size	3.3	0.97	0.93	0.66	
		Government Policy	4.19	1.13	1.28	0.838	
3	Social	Family Background	3.19	1.24	1.55	0.638	0.601
		Individual Personality	3.57	1.22	1.48	0.713	
		Social Respect	2.42	1.15	1.33	0.484	
		Social Network	2.84	1.2	1.44	0.569	
4	Psychological	Motivation	3.9	1.24	1.53	0.78	0.676
		Need for achievement	3.28	1.13	1.28	0.656	
		Self confidence	2.8	1.1	1.22	0.56	
		Career goal and vision	3.54	1.32	1.73	0.709	

7.3 Input variables contributed by faculty towards development of Entrepreneurship

S. No.	Factors	Variables	Mean	SD	Var.	Wt.	Cum. Wt.
1	Technical	Industrial Gap Analysis	3.92	1.04	1.09	0.784	0.815
		Entrepreneurial Development programs	4.42	0.96	0.91	0.884	
		Expert Lectures	3.34	1.1	1.21	0.669	
		Industrial Tours and Trainings	4.61	0.95	0.91	0.922	
2	Economic	Government Support Schemes	4.23	1.02	1.04	0.847	0.519
		Effective Plant Designing	1.72	1.15	1.32	0.344	
		Market Analysis	2.63	1.33	1.76	0.525	
		Cost Estimation Training	1.8	1.13	1.28	0.359	
3	Managerial	Work Study Training	2.81	1.3	1.68	0.563	0.551
		Resource Planning Training	3.78	0.95	0.9	0.756	
		Financial Management	2.02	1.21	1.48	0.403	
		Supply Chain Management	2.41	1.28	1.64	0.481	
4	Psychological	Entrepreneurial Success Story	2.23	1.29	1.67	0.447	0.595
		Significance of Self-Employment	3.16	1.22	1.5	0.631	
		Entrepreneurial Case Studies	3.53	1.11	1.24	0.706	
		Technological Awareness	2.97	1.31	1.71	0.594	

7.4 Proposed Model of EDP for Engineers

8. Results

It can be concluded that for sustainable growth of the SSE sector, a technical factors are most effective. The technical person needs to be developed in entrepreneurial fold along with managerial and financial knowledge for development of SSE sector.

Technical factors are most important for influencing students towards entrepreneurship, followed by economic, personal and managerial factors. All these variables can be implemented by developing academic curriculum of technical education and teaching methodology and strategies by involving entrepreneurial concepts and studies by faculties of engineering institutions.

Technical factors are most important for developing entrepreneurial education among engineering students, followed by psychological, Managerial and Economic factors. All these variables can be implemented by developing academic curriculum of technical education and teaching methodology and strategies by involving entrepreneurial concepts and studies by faculties of engineering institutions.

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9. Conclusion

For sustainable growth of SSE engineering units, the entrepreneur with technical background needs technical and financial know-how. Whereas in case of entrepreneurs not having technical background needs technical, financial, and managerial know-how for sustainable growth of the SSE unit. Technical entrepreneur can be more appropriate for sustainable growth of SSE units in the engineering sector. The faculty of the engineering institution needs to give entrepreneurial awareness and more industrial exposure to realize the industrial problems and requirements of industry. There is definite relationship between the entrepreneurial capability of the student and input of faculty through engineering education. Improving the industrial exposure/ entrepreneurial awareness and learning attitude of the faculty can increase the entrepreneurial capability of the engineering student.

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