



INDUSTRY-ACADEMIA COLLABORATION: A SOLUTION TO UNEMPLOYMENT AMONG ENGINEERING GRADUATES IN INDIA

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ABSTRACT

Unemployment among engineering graduates in India is escalating in a distressing rate. India, being a country with highest youth population, if not perceptive, would be more drastically affected by this issue in the coming years. Even though initiatives are taken by different governmental and non-governmental entities, the results are inadequate. According to some recent studies, skill gap is considered as the unresolved conundrum causing unemployment. Hence, this paper discusses about the potential reasons of unemployment, existing solutions and elaborately reviews a social enterprise named Confidite Innovations Pvt. Ltd., a student-owned company initiated in Kerala for assuaging unemployment. The company tries to fill the chasm between academia and industry. The data was collected directly from the executives of the company and a meticulous study of their unique features and services was conducted.

KEYWORDS: *Unemployment, engineering graduates, India, entrepreneurship, final year projects, industry exposure, social enterprise, Confidite Innovations Pvt. Ltd.*

1. INTRODUCTION

1.1 Unemployment of Indian engineering graduates and reasons

According to Aspiring Minds' National Employability Report-Engineers (2019) about 80% of the engineering graduates in India are unemployable and the major factor is skill gap. Furthermore, the unemployment trends of engineering graduates have not shown any change in the past 9 years. Engineering is a field which can be mastered only by involving substantial amount of practical work along with theories. However, only 40% of engineering students in India perform internships and only 36% undertake projects outside their required curriculum.

There is lack of opportunities, exposures and skills among engineering graduates from ordinary colleges, when compared with those from colleges like IITs and NITs.

According to this report, the major factors influencing employability are:

- a. Student Initiative
 - b. Faculty Support
 - c. Employability Challenges
- a. Student Initiative**

Under this session, Aspiring Minds carried out a survey among students to find out the proportion of students who took initiatives in making themselves employable by undertaking internships, technical projects and attending industrial talks. As shown in Fig. 1, about 40% students did a two month internship and only a 7% of the students performed multiple internships. Consequently, remaining 60% of the students were not involved in such internships. Hence, it is evident that most of the students surveyed were not serious about taking an internship.

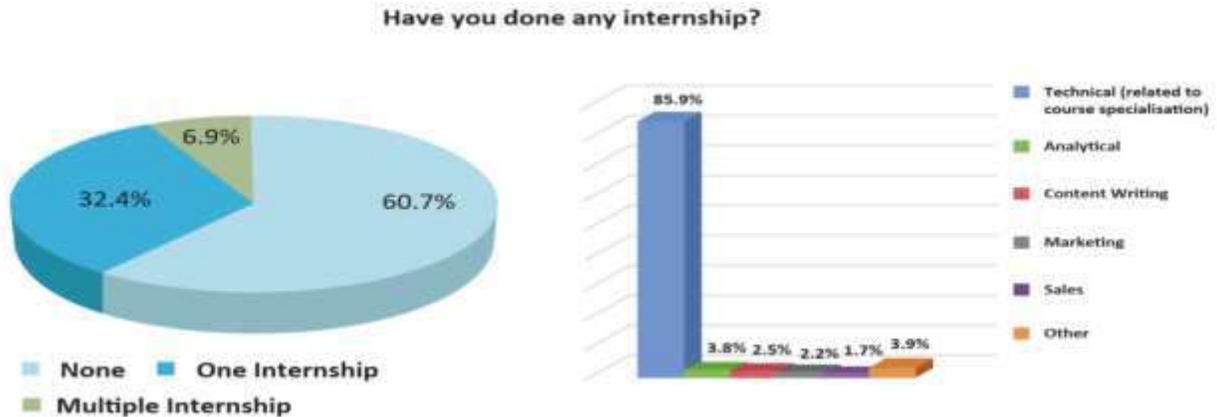


Figure 1: Internships done and the kind of work done at internships (Aspiring Minds, 2019)

Moreover, the report also provided the percentage of students who did technical projects and attended industrial talks. The data shows (Fig. 2) that only 17.4% of the students undertook technical projects and

only 31.1% of the students reported that they got help from faculty to execute a project outside their curriculum(Aspiring Minds, 2019:50).

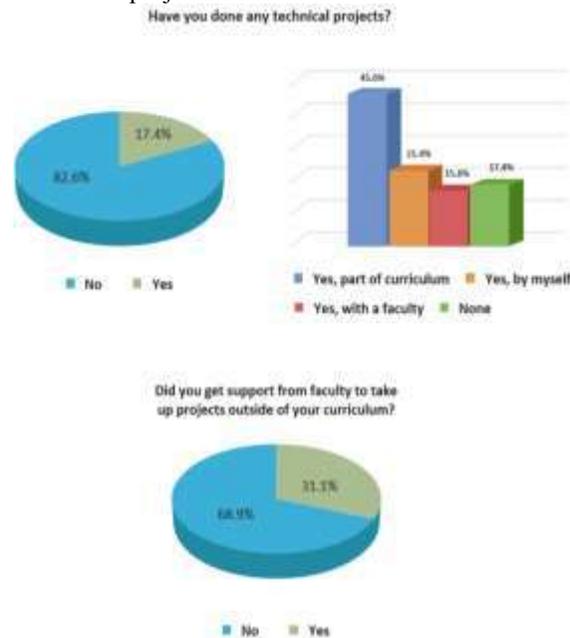


Figure 2: Technical projects undertaken and support from the faculty (Aspiring Minds, 2019)

Furthermore, Fig. 3 indicates that about half of the students surveyed did not attend industrial talks and out of those who attended, only 22.7% were reported to have attended multiple talks. Therefore, lack of

student initiative in areas like internships, technical projects and industrial talks should be considered as a fundamental factor of skill gap among engineering students in India (Aspiring Minds, 2019:51).

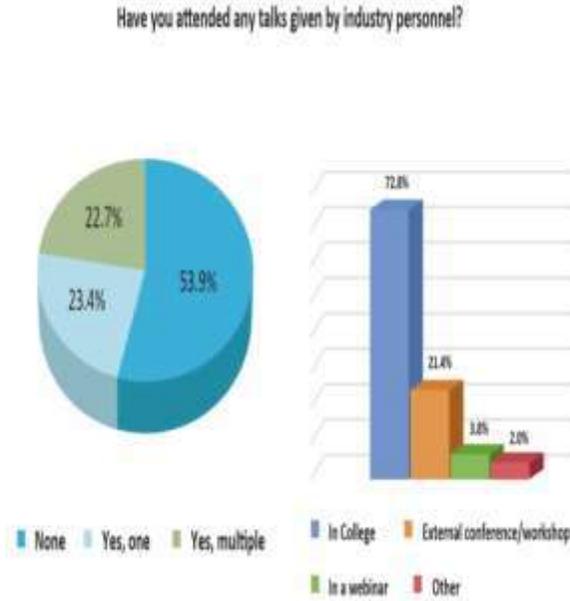


Figure 3: Talks attended (Aspiring Minds, 2019)

b. Faculty Support

Under this session, Aspiring Minds investigated about the faculty support given to students in gaining industrial exposure. It was reported that about 60% of the faculties were not explaining industrial applications of the theories taught in classrooms (Fig. 4). Moreover, around 26.6% of the students outlined

that their campus is lacking workshops, seminars, lectures and 23.4% reported lack of good faculty. Therefore, the excruciating fact about lack of industrial relationship in colleges/universities should be studied meticulously and rectified rapidly to alleviate the present unemployment crisis (Aspiring Minds, 2019:53).

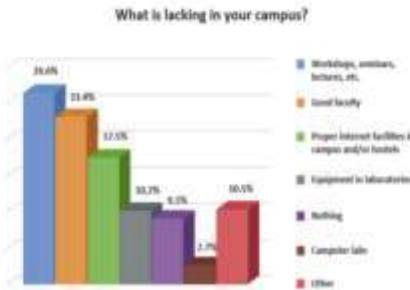
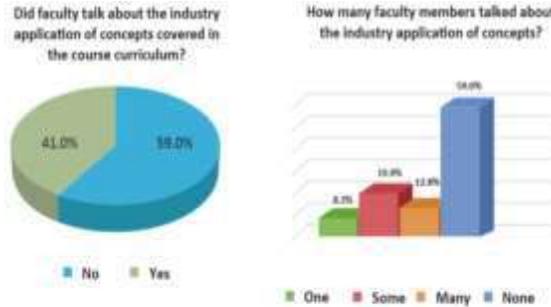


Figure 4: Support from college and faculty (Aspiring Minds, 2019)

c. Employability Challenges

This session under student initiatives depicts the major challenges faced by candidates in finding a job. Around 40% of the students described finding the right company/ profile to apply as the major challenge. About 95% of the students have attended some kind of trainings to enhance their

employability. However, most of the trainings undertaken were conducted in their colleges itself. Therefore, it shows the paucity of effort put by students to attend events outside their own college (Aspiring Minds, 2019:54).

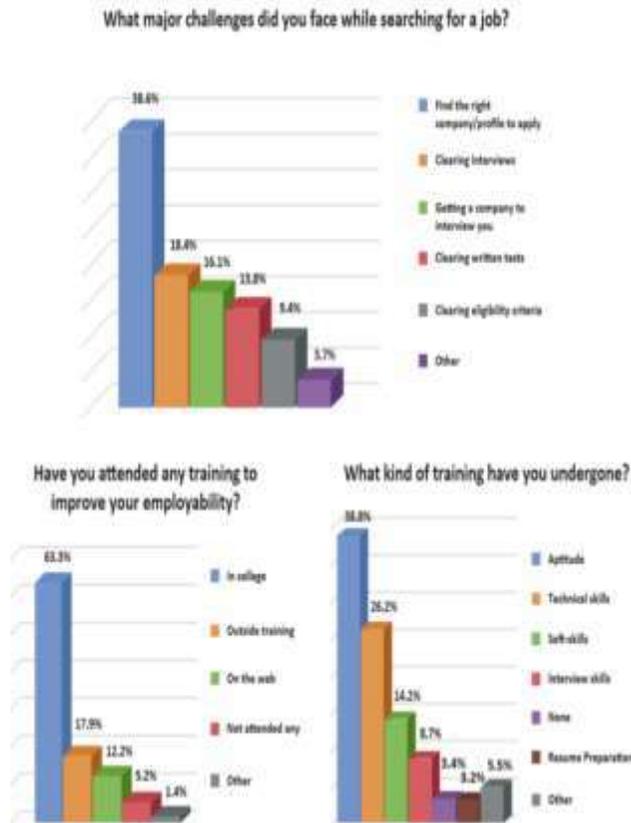


Figure 5: Employability challenges (Aspiring Minds, 2019)

Having analyzed all the factors, it is quite conclusive that absence of student initiatives and faculty support, along with difficulties in finding the right employer are the significant elements causing unemployment among engineering graduates in India.

1.2 Indian youth and impact of unemployment on India

India is considered as one of the fastest growing economies in the world. It is also one of the youngest countries with about 63% of the population in the working age group - 15 to 59 years - and it is anticipated to increase to 68.4% by 2026 (Singh and Raj, 2016:644). Even though, the country produces 400,000 engineers annually, corporations reported finding a skilled labor in India as arduous. As a result,

the impact of unemployment on the economy will be humongous.

1.2 Existing Solutions

Some of the existing solutions implemented in India to resist unemployment are:

a. University Credits

Universities provide credit points to students for participating in internships, competitions, conferences, workshops and for developing prototypes. This method is anticipated to motivate the students to involve in such activities. For instance, the Kerala Technical University (KTU) makes it compulsory for students to gain specific amount of credits in each semester. Some of the activities and their credits are shown below in Fig. 6.

Activity Head	Sl. No	Activity	Achievement Levels and Assigned Activity Points					** Approval Document	Max. Points	Min. Duration of activity
			I	II	III	IV	V			
		*Level								
Professional Self Initiatives	8	Tech Fest, Tech Quiz	10	20	30	40	50	a	50	
	9	MOOC with final assessment certificate	50					a	50	

10	Competitions conducted by Professional Societies - (IEEE, IET, ASME, SAE, NASA etc.)	10	15	20	30	40	a	40	
11	Attending Full time Conference/ Seminars / Exhibitions/ Workshop/ STTP conducted at IITs /NITs	20					a	40	
12	Paper presentation/ publication at IITs /NITs	30					a	40	
Additional 10 points for certificate of recognition.									
13	Poster Presentation at IITs /NITs	20					a	30	
Additional 10 points for certificate of recognition.									

14	Industrial Training/ Internship (atleast for 5 full days)	20	a/b	20	
15	Industrial/ Exhibition visits	5	a/b/d	10	
16	Foreign Language Skill (TOFEL/ IELTS/BEC exams etc.)	50	a	50	
Entrepreneurship and Innovation	17	Start-up Company – Registered legally	60	d	60
	18	Patent-Filed	30	d	60
	19	Patent - Published	35	d	60
	20	Patent- Approved	50	d	60
	21	Patent- Licensed	80	d	80
22	Prototype developed and tested	60	d	60	
23	Awards for Products developed	60	d	60	
24	Innovative technologies developed and used by industries/users	60	d	60	
25	Got venture capital funding for innovative ideas/products.	80	d	80	
26	Startup Employment (Offering jobs to two persons not less than Bs. 15000/- per month)	80	d	80	
27	Societal innovations	50	d	50	

		Core coordinator	Sub coordinator	Volunteer			
Leadership & Management	28	Student Professional Societies (IEEE, IET, ASME, SAE, NASA etc.)	15	10	5	d	40
	29	College Association Chapters (Mechanical, Civil, Electrical etc.)	15	10	5	d	40
	30	Festival & Technical Events (College approved)	15	10	5	d	40
	31	Hobby Clubs	15	10	5	d	40
	32	Special Initiatives (Approval from College and University is mandatory)	15	10	5	d	40
	33	Elected student representatives	30 (Chairman)	25 (Secretary)	15 (Other Council Members)	d	

*Level I College Events
 *Level II Zonal Events
 *Level III State/ University Events
 *Level IV National Events
 *Level V International Events

**Approval Documents: (a) Certificate (b) Letter from Authorities (c) Appreciation recognition letter (d) Documentary evidence (e) Legal Proof (f) Others (specify)

Figure 6: KTU Credits (APJ Abdul Kalam Technological University, 2016:25-28)

b. Entrepreneurship Development Programs in India

Entrepreneurship development is another solution proposed to address the current conundrums of unemployment in India. The cardinal aspect of entrepreneurship is job creation. When students are trained to be job seekers, they would be struggling only to make living for themselves. However, when they are nurtured to be job providers, entrepreneurs, they would be capable of creating employment for others as well as themselves.

Several entrepreneurship development programs and schemes were introduced by the government of India in the recent years. The purpose of these programs is to nurture innovations among different sectors by engaging with academia, industry,

non-governmental organizations, investors, small and big entrepreneurs and so on. According to Kumar and Babu (2018), some of the initiatives put forward by Indian government in fostering entrepreneurship are as follows:

- i. Entrepreneurship Development Scheme
- ii. Make in India
- iii. Support to Training and Employment Programme for Women (STEP)
- iv. Biotechnology Industry Research Assistance Council (BIRAC)
- v. Stand-Up India
- vi. Trade related Entrepreneurship Assistance and Development (TREAD)
- vii. Pradhan Mantri Kaushal Vikas Yojana (PMKVY)

- viii. National Skill Development Mission
- ix. Science for Equity Empowerment and Development (SEED)
- x. Self Employment and Talent Utilization (SETU)
- xi. India Aspiration Fund
- xii. Micro Units Development Refinance Agency (MUDRA)

However, according to a recent study, only 26% of the trainees who participated in entrepreneur development programs started an enterprise. Meanwhile, about 10% of the trainees were found to be obstructed by several reasons in between the process of setting up a company. Also, about 17% of the trainees were reported to be involved in work activities other than setting up an enterprise (Kumar, 2017:25).

2. RESEARCH METHODOLOGY

Apparently, the unemployment among engineering graduates is primarily due to skill shortage. The major elements influencing employability are said to be student initiatives, faculty support and industrial exposure, according to Aspiring Minds' NER 2019. The research methodology involves the profound examination of Confidite Innovations and rigorous study of its distinct services, provided to alleviate the ongoing issues of unemployment by acting as a bridge between the candidates and their potential future employers. All the data, from July 2019 to September 2019, were collected directly from the executives of the company. The potential beneficiaries of their unique services are anticipated to be engineering students, researchers, enterprises, upcoming entrepreneurs and so on.

2.1 Objectives of this paper

- To study the services provided by Confidite Innovations Pvt. Lt.
- To understand the model of operating student owned companies
- To analyze the potential outcomes of these services on unemployment of youth in India.

3. RESULTS

3.1 Problem statement

According to Dr. Binoy Baby, former Head of Mechanical Department at St. Joseph's College of Engineering and Technology, Palai, Kerala, every year a typical engineering student team spends about Rs. 20,000 for their final year project. He also mentioned that an average class consists of at least 10 such teams. An ordinary engineering college consists of around 10 such classes, which means the annual expenditure in a college for final year projects is about Rs. 2 million. Kerala has more than 100 engineering colleges. Therefore, approximately Rs. 200 million is disbursed every year by the engineering students of Kerala for final year projects.

However, only a small amount of this is utilized for the development of competent projects that benefit the society, student's career and the industries. Meanwhile, the remaining amount is either wasted on futile projects or on projects that couldn't be completed due to ineffective time and resource management.

Additionally, it was also observed that most of the projects were dropped without further developments after the course. As mentioned earlier from the report of Aspiring Minds, out of the students who did a technical project, about half did it as a part of the curriculum. This supports the argument that students undertake technical projects only when it is mandatory in the coursework.

Many a times, students face unemployment even after developing relevant projects. The main reason seems to be lack of access to guidance and opportunities for exhibiting their work. Hence, it is evident that the dilemma of unemployment and inadequacy of its resilience programs in India demands an immediate remedy.

3.2 Proposed Solution

One method to address the above mentioned problem could be connecting students and industries through projects. Since projects/products are strong common factors between the two groups, a solution could be obtained by placing more emphasis on it. Therefore, this paper provides a case study of a social enterprise that concentrates on the above aspect. Confidite Innovations acts as a troubleshooter by finding and rectifying the problem at the source itself. Their purpose is to help the students and innovators make their ideas and projects more commercially successful for the benefit of society, the economy and the academia. The students are supported through a platform, where they can exhibit their projects in front of potential users/industries, thereby, establishing connection between students and industry.

Moreover, relevant project ideas collected from enterprises are exposed to students, so that those who do not have project ideas can be benefited. Consequently, students are given an opportunity to work on projects that already has buyers, if completed successfully.

Besides, Confidite Innovations provides opportunities and trainings to diligent and passionate individuals for turning any products developed there into another business. This enhances entrepreneurship development by providing required resources to upcoming entrepreneurs.

Furthermore, the company is currently concentrating in green projects like renewable energy, clean tech, climate change solutions and so on. Therefore, attracting all the green panthers around the world to associate with this initiative to try and resolve

the problems linked with employment, project fund utilization, entrepreneurship and environment.

3.3 Services

The services provided can be broadly classified into four categories such as:

- a. Services for students, researchers and innovators
- b. Services for companies, NGOs
- c. Consultancy services
- d. Open Networks

a. Services for students, researchers and innovators

i. Prototype Commercialization

This service provides a platform for students to commercialize their projects by exhibiting it in front of other companies. The details involving working of the prototype, cost, technology readiness level and so on will be made accessible to everyone. Therefore, any enterprise or individual entrepreneur can help the students in commercializing their prototype. Furthermore, unlike before, this service can reduce the number of projects dropped behind at college because the project is made available for commercialization/licensing.

ii. Industrial Projects

Through this service, the company provides a list of relevant project ideas submitted from industries for the development of prototype. Student teams can select the project idea they wish to pursue and submit an abstract which should contain details including design, estimated cost, time schedule and so on. Then, the abstracts are shortlisted and those selected teams are given permission to develop a prototype. Finally, the company/enterprise that proposed the idea would fund the project if the prototype developed is competent enough. Accordingly, students are given opportunities to work on industrial projects, acquire employability skills and develop an alliance with the industry at an early stage of their career.

iii. Internships

This service provides students opportunities to associate with ongoing industrial projects as interns. It is anticipated that students other than final year students, who usually have not initiated their final year projects, would find this service appropriate. Internships at Confidite Innovations allow the students to gain knowledge and skill in specific areas by choosing any ongoing project of their interest.

b. Services for companies, NGOs

i. Technology Licensing

The prototypes/projects collected from students for commercialization is made available to public. The major beneficiaries are companies, NGOs and similar entities as they are given an opportunity to license any of these technologies and commercialize it through their company. The agreement will be between Confidite Innovations Pvt. Ltd. and the licensing enterprise.

ii. Prototype Development

This service bequeaths a virtual Research and Development Centre to all the companies, where they can develop a prototype and test it without spending much of their valuable resources like money, manpower and, most importantly, time. Enterprises that desire to develop a prototype can submit their requirements, which include proposed idea, capacity parameters, cost and deadlines, to the website. This information will be exposed to the students as industrial projects. Consequently, interested student teams along with their faculty guides can submit abstract and their expected activity time schedule. Then, the shortlisted teams will be monitored and updates will be sent to respective companies who submitted the idea. Finally, the companies can select the most competent prototype and provide fund for its further development or buy that prototype from the team. In other words, the companies are given an opportunity to develop and test a prototype of their idea without spending much of their time and money on it. Since, the expenditure of the prototype (usually about Rs. 20,000/-) is bore by the students, it is convenient for the enterprises to test new prototypes. Meanwhile, engineering students utilize the project fund effectively on applicable industrial projects rather than spending it on obsolete projects, which would not provide any remarkable boost in their early career.

iii. Lab Renting Facilities

This service promotes the use of unutilized labs in universities and colleges. A database with details of labs, such as equipment availability, testing and analysis facilities, expertise guidance, college/university information and lab location, would be provided in the website. As a result, the bond between academia and industry would be improved through exchange of knowledge and resources. This service is open and accessible to all for testing and validating their ideas. Hence, this helps establishing a virtual network of labs in India.

c. Consultancy services

i. Be a Consultant

Through this consultancy service researchers, college faculty and M.Tech graduates are given an opportunity to bestow their knowledge and skills for training the students who need mentoring in completing their projects. Candidates who prefer to be a consultant through Confidite Innovations are asked to submit their CV along with the list of consultancy services they can provide. Therefore, a database of interested consultants and their services will be generated. The expected consultancies are project mentoring, grant application writing, patent facilitation form filling, business plan writing, cost estimation, product development planning and so on. The consultant fee will be charged from the team availing this service, which includes the consultant fee for the consultant as

well as the consultancy management fee for the company. Hence, the company provides a platform for the consultants to generate income.

ii. Find a Consultant

This service collects consultancy requirements from the users and informs it to the above mentioned database of consultants, thereby, making the process of finding a consultant effortless.

iii. Founder CEO

The numbers of unemployed citizens are hiking rapidly these days, ranging from young engineering graduates to middle aged expatriates returning to India due difficult working environments overseas. This large community and their hardships could be addressed to a certain limit by educating them about self-employment. Under the Founder CEO program, passionate and hard working candidates who are experienced entrepreneurs or who have an aspiration of becoming an entrepreneur are selected and trained to take up any of the projects developed at Confidite Innovations. Furthermore, the candidates are educated about the product's technical aspects as well as its market opportunities. Even after the training period, they are given guidance to run their business successfully.

d. Open Network

Open Networks provided by Confidite Innovations is an online open database of individuals/ organizations with similar interests. Few initial open networks proposed include:

- Network of Clean Tech companies/organizations in India
- Network of colleges/universities with lab facilities

- Network of companies/organizations associated with water security

These networks would be used for disseminating updates about new projects, to exchange information, to circulate calls for new activities.

3.4 Business Model of Confidite Innovations

Confidite Innovations Pvt. Ltd. is a company which is owned and run by students to acquire employability skills and generate income while doing their college. This enables them to commence their professional endeavor alongside their college life. Hence, they would no longer be a fresher when they graduate from college.

Confidite Innovations has a unique business model to generate revenue by serving its potential customers. It plays an important role in bridging gap between industry and students. The company generates revenue through commissions or managing fees when a student project is commercialized or licensed. Furthermore, Confidite Innovations also receives commission when a company develops and purchases a prototype through them. Similarly, revenue is generated through consultancy services and paid internships as well.

Member students who are shareholders of the company are provided assistance in licensing their technologies to industry. Opportunities are also provided to undertake industrial projects leading to employment with the company in new product development and technology commercialization. The shares of the company are transferable and its value increases as more projects are added into company's portfolio for licensing.

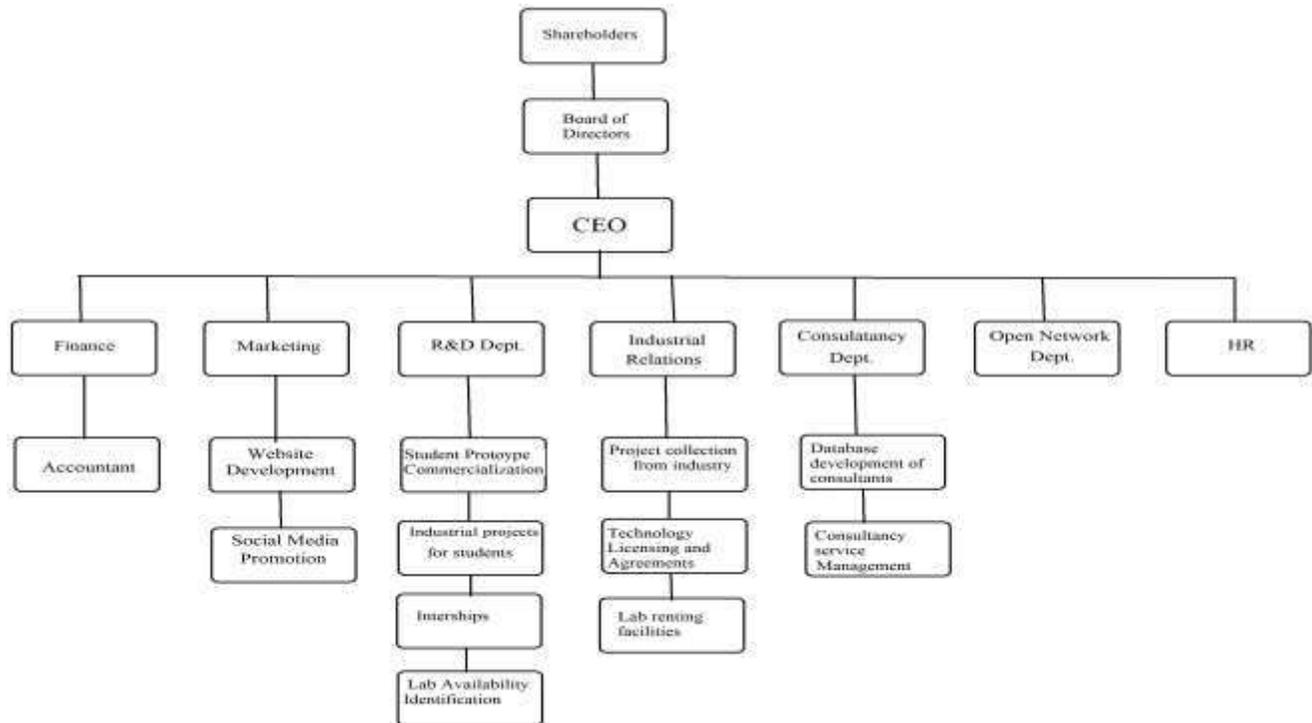


Fig 7: Organizational chart of Confidite Innovations

4. CONCLUSION AND RECOMMENDATIONS

From the case study conducted above, we can understand that Confidite Innovations Pvt. Ltd. tries to address most of the factors causing unemployment in India. As explained at the beginning of this paper, major elements of unemployment appear to be lack of student initiative, lack of faculty support and employability challenges.

Firstly, this company augments student activities like performing internships, undertaking technical projects and attending industrial talks. Moreover, students would be more excited to engage in various activities of the company as they are also one of the shareholders. Secondly, faculty's involvement with the student projects and the company would encourage them to educate the next batch of students about industrial applications. Furthermore, the consultancy services allow them to generate an extra income, in turn, motivating them to associate more in such activities. Thirdly, the challenges faced by the students in finding the right company/job could be mitigated, since students are given an exposure to the industry to which their project belongs. Finally, entrepreneurship success rates could be improved through this company as well. Some of the recommendations for enhancements in future are:

- a. To provide special training and development programs for faculty as well.

- b. Universities, for instance, KTU could collaborate with companies like Confidite Innovations in nurturing the future game changing engineers of India.
- c. Awareness about internships and project based learning must be disseminated among the faculty and students from their first year itself.
- d. Industrial talks must be conducted in colleges by industrial persons periodically to keep the academia well-informed about the market needs.
- e. A newsletter containing current market needs and initiatives could also be circulated among students to make them aware about present scenarios in the industry.
- f. Government funds utilized by M.Tech and PhD students could be analyzed in a similar way to promote projects that benefit the society.
- g. Government could promote initiatives like Confidite Innovations by providing incentives to such companies.
- h. Incubators and funding agencies could associate with social enterprises like Confidite Innovations to support upcoming entrepreneurs. Therefore, encouraging the formation of more similar initiatives throughout India.
- i. Knowledge Triangle or interaction between research, education and innovation must be

given priority in future developmental programs.

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