

Nourishing Entrepreneurship through Interdisciplinarity in Engineering Education

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Abstract

Purpose

This paper aims to highlight the effect of interdisciplinarity in Engineering Education on Entrepreneurial Orientation of the engineering students in India.

Design/methodology/approach

A survey questionnaire was circulated among the students of the select engineering colleges of India and the data was analyzed through smartpls2 to test the hypothesis.

Findings

The research study brings out the relation between the interdisciplinarity in engineering education and entrepreneurial orientation.

Research limitations/implications

It suggests the policy makers, government and the educational institutes, start-up ecosystems and incubators to include the soft skills and other essential interdisciplinary skills in the engineering curricula. This research study makes the engineering students understand the importance of interdisciplinarity in employability and entrepreneurship.

Originality/value

The unique contribution from the study is to highlight the importance of interdisciplinarity in engineering education in nourishing the entrepreneurial orientation as this important relation was not studied in the previous research.

Keywords: *Entrepreneurship, Entrepreneurial Orientation, Interdisciplinarity, Engineering Education Competitive Advantage*

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I. Introduction

Policy makers and the government pay attention to enhance the entrepreneurship [1] as it offers employment to many people and thereby improves

the socioeconomic conditions through the technological innovation [2]. Technological innovations start budding in the incubation centres of the engineering colleges. Innovation takes place with the multi-dimensional

perspectives on a particular thing. Thus, it requires process centred cross-functional curriculum [3], which focuses on the interdisciplinary areas of engineering[4].

Moreover, an entrepreneur should have good managerial skills apart from the technical skills and innovation. There is a growing need of developing inter-personal skills, adaptability to cross-functional and cross-cultural teams[5], which empower them to enjoy the work with enlightenment [6] to effectively handle the work pressures, uncertainties and emergencies [7] and real life problems [8]. These multi-talented individuals become crucial in New Product Development teams [9]. Thus, the entrepreneurial orientation for the engineers, equipped with the diverse skillsets, is the key for employability. The research of Levenburg and Schwarz (2008) focuses on entrepreneurial orientation of the youth in business schools of India. Whereas, Barba-Sánchez and Atienza-Sahuquillo (2018) highlights the moderating effect of entrepreneurial training on entrepreneurial motivation causing the entrepreneurial intention in engineering students of Spain. Cardon *et al.*(2013) measures the entrepreneurial passion. Lee, Lim and Pathak (2011) opines that there should be unique and customised approaches of education based on the cultural context for achieving the entrepreneurial orientation. Their research introduces a measurement scale for entrepreneurial orientation.

The need of understanding the cross-functional aspects of the business by the undergraduate students is highlighted by Bishop *et al.*(1998). Whereas, Brackin (2002) proposes to develop, test and implement a quality model in the business setting and only after ensuring its success, that programme can be included in the engineering curriculum. To do so, industry-academia coordination and cooperation is required[16]. Industry may extend a helping hand to share the technical and managerial expertise with the students and the faculty to enable them

understand the business scenarios with the proper practical exposure [17]. As per Sharma and Yarlagadda (2018), industry-academia linkages help in introducing interdisciplinarity in the curriculum, taking cues from the best practices, to match the current requirements of the industry. The research of Lattuca and Knight (2012) focuses on measuring interdisciplinary competence of engineering students.

As India has large number of engineers produced in the world, our study is specifically on engineering education in India. Though the number of engineers coming out of the college is high, maintaining the quality of engineering education is a challenge for India[1]. Thus, the universities should be proactive to update the engineering curriculum matching the present needs of the customers and the society as the engineers are the key for innovation and economic competitiveness[20].

As less attention has been given by the researchers on enhancing the entrepreneurial orientation through proper changes in the curriculum, this research paper fills the gap by testing whether the interdisciplinarity in engineering has an impact on entrepreneurial orientation among the engineering students.

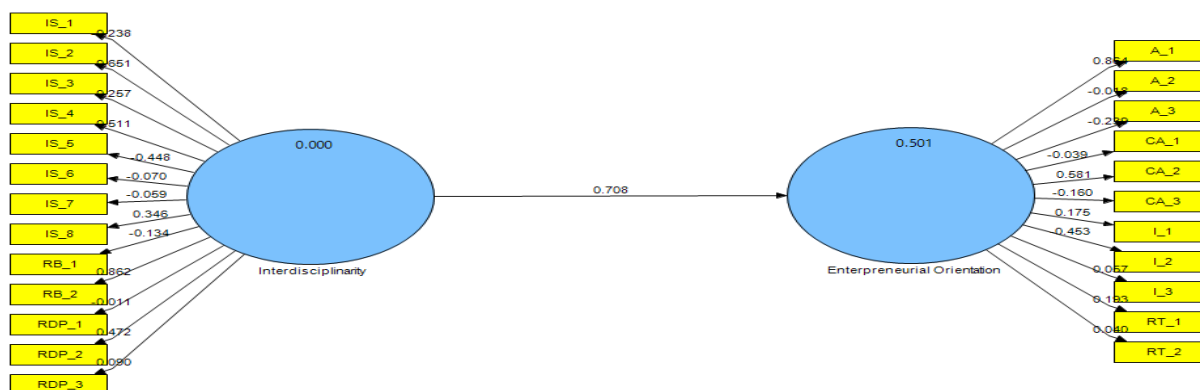
II. Methodology

A survey questionnaire was made by adopting the scales for measuring the constructs Interdisciplinarity adopted from Lattuca and Knight (2012) and Entrepreneurial Orientation adopted from Lee *et al.* (2011). Using convenient sampling method, the questionnaire was circulated to 100 final year students of 8 reputed engineering colleges in India. 61 responses were received. The data was analyzed through Structural Equation Modelling (SEM) through smartpls2 software.

Interdisciplinarity is the Independent Variable (IV) and Entrepreneurial Orientation is the Dependent Variable (DV).

Results and Discussion

The Smartpls2 output is as below



The positive value of the path coefficient i.e., 0.708, clearly reflects that the Entrepreneurial Orientation is positively correlated to Interdisciplinarity of Engineering Education. It means that the amount of interdisciplinarity incorporated in the curriculum introduces the engineering students to the various aspects of real-world situations and the ways to solve the problems. This enables them to see in a broader spectrum. The understanding of the overall picture of the industry and their roles as the engineers motivate them for innovation and entrepreneurship. Thus, the extent of interdisciplinarity in the curriculum has a direct impact on the entrepreneurial orientation among the engineering students. The results are in line with the research done by Attri and Kushwaha (2018) for suggesting the integrated curriculum to ensure academic performance, communication skills, industry projects and cocurricular activities for meeting the industry's needs. Moreover, Entrepreneurial Orientation explains 50.1% of variance in Interdisciplinarity. The statistical significance of the model was checked after bootstrapping. The t-static is found to be 2.1844, which is more than the acceptable value of 1.96. Thus, the model is statistically significant.

As the measurement scales are directly adopted, though there might not be a requirement to prove the reliability and validity of the scales, still an

attempt is made to prove them in the Indian context. After dropping the items with less item loadings (A2,3; CA1,3; I1; RT1,2; IS1,3,5,6,7; RDP1,2,3), the composite reliability is established as the values 0.7346, 0.7616 for the DV and IV respectively are greater than the acceptable value 0.7. More droppings of the items clearly show the need of modification of the scales as per the Indian context. The AVE values were found to be 0.5972 for DV, 0.5329 for IV which is acceptable for proving the validity.

III. Conclusion

The paper highlights the importance of the interdisciplinarity in engineering education and its effect on entrepreneurial orientation in the engineering students of India. It suggests the policy makers, government and the educational institutes, start-up ecosystems and incubators to include the soft skills and other essential interdisciplinary skills in the engineering curricula. It can be possible with the interaction, guidance and support from the industry and the experienced entrepreneurs. This research study makes the engineering students understand the importance of interdisciplinarity in employability and entrepreneurship. It also motivates the researchers to conduct future research by considering larger samples to generalize the results. Moreover, other aspects like role of

incubators, start-up ecosystems, industry-academia collaboration etc., can be studied as the moderators between the interdisciplinarity and the entrepreneurial orientation.

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