Executive Summary

The emergence of the Educational- Industrial Complex, both globally as well as locally in our country, has brought in its wake enormous opportunities and attendant challenges – for academia as well as industry. Never before has the Indian economy and its industrial sectors witnessed such sweeping forces of liberalization, globalization and privatization. The Small and Medium Enterprises, especially in the technology-intensive sunrise sectors such as electronics, IT, bio-technology, automotive components etc seem to have the greatest potential to gain or lose and to die or grow in this milieu. In this context, the much debated subject of interactions between the academic institutions and the industrial enterprises has acquired a renewed importance as well as urgency. Unfortunately, the focus of the debate has remained large scale industry-centric. And the discussions in this subject area, hitherto, have been dominated more by generalities and opinionated emotions, than a debate informed by a systematic and objective exploration of the embedded issues and the essential characteristics of interactions. This study has, in the authors' judgment, broken new ground by conducting an extensive survey of academic institutions in both engineering and management and small and medium enterprises in the aforementioned science & technology sectors. The study was aimed at uncovering the current patterns of interactions, the reasons for the same and the expectation and the motivations of the actors involved and the road forward. The findings are supported by rigorous tools and techniques of univariate and multivariate statistical analysis. The highlights of the findings are presented below:

- This quantitative research has attempted to understand the status of interactions between techno- management institutions and the SMEs in the S&T sectors such as electronics, automotive components, machine tools, IT and bio-technology. This was based on an extensive survey of 139 institutions and 122 SMEs spread across Tamilnadu, Karnataka and the city of Hyderabad.

- Factor analysis has revealed the existence of Five Domains of interaction namely 1) Knowledge-oriented, 2) Industry-oriented, 3) Academic-oriented, 4) Long-term Association oriented and 5) Short-term association oriented.

- Factor Mean scores of the 'Extent of the Frequency' of Interaction reveals that the current nature of interactions by the institutions is characterized by 'Industry- & Short-Term Orientation, aimed at seeking support from industry for project work, placement and guest lectures which are course and curriculum oriented.

- The key motivational driver for the institution is 'brand building'. This is supported by the factor analysis of 16 motivational variables and 18 benefit-related variables. Vision, mission and the brand image of the institutions stand out as the key elements in this.

- Industry-related factors (Industry-related type of barrier) have received the highest factor-mean weight as the main barrier in the path of interactions in the knowledge and academic. The factors covered under this are - lack of alignment of priorities, lack of continuity and response from industry.

- The full-time (regular) faculty with industry background rather than doctoral qualification seems to be active in supporting interactions with industry. This category of faculty has exhibited significant correlations with 4 out of the 5 Domains of Interaction

- A frequency profile of the patterns of use of various mechanisms reveals near uniformity across all of them. However, Use of Interaction Cell (87%) and Full Time Placement Officer (86%) stand out as the most dominant.

- The Management Departments exhibit a relatively higher level of interaction with industry, on a 1-5 scale of interaction intensity.

- It is heartening to note that Institutions are looking inward and have identified 'Initiative by the institution ' and 'Mind-set' as the two most important perceptual factors in terms of the expectations of the industry

- The Propensity to Interact, a composite index based on a multi-item scale, points to a very positive and healthy score of 2.9 on a 5 point Likert scale.

- Factor analysis of 19 variables has helped uncover three key domains of interaction engaged in by the Industry namely: Academia-driven Interaction, Industry-Driven Interaction, Short –term and Industry-Driven Interaction, Long Term.

- The relative Factor Weights indicate that the Industry does not interact with institution for seeking technological or management inputs, but prefer to serve the low-end academic needs of the institutions. Institutions set the agenda for such interactions.

- Industry views such interactions more from the 'social responsibility' perspective rather than as a long-term arrangement to exploit the knowledge-base of the academia. This was uncovered by the factor analysis of 19 benefit-related variables. The 'Social Responsiveness' factor had a preponderant weight of 1.1284 compared to 0.6136 and 0.4179 for 'outsourcing Partnership' and 'Strategic Partnership' respectively.

- The main reason for the discontinuation of interaction by the industry has been more perceptual than based on their actual experience. Factor analysis of 11 variables with respect to the reasons for discontinuation, revealed two underlying dimensions namely Conviction-based and Experience-based.

- The importance ranking of the reasons for not interacting with institution reveals lack of initiative on the part of the institutions as well as the lack of confidence in the ability of the institutions to solve the problems of industry.

- Academia -driven domain of interaction exhibits a highly significant positive correlation with size of the firm, in terms of Investment in Plant & Machinery and Annual Sales Turnover.

- IT and the Bio-tech sectors have a relatively higher correlation with Academia-driven domain of interaction than other sectors such as Electronics, Automotive and Machine Tools.

- Analysis of the frequency of interactions between the departments of industry and the various types of institutions presents an interesting picture. HR/Personnel department seem to be interacting more as compared to other departments. This could be due to their functional nature – recruitment, training and development. R&D and Operations/Production departments exhibit a high degree of interaction with technical institutions due to the technical nature of activities. Marketing and Exports/International present a similar pattern of interaction, equally with technical and management institutions.

- Similar to the institutions, the Propensity to Interact has been encouraging at 2.8 on a 5-point scale.

- Mean Scores of the ranking of preference for the Models of Interaction, MOU and Mentoring have been voted as the two most preferred.

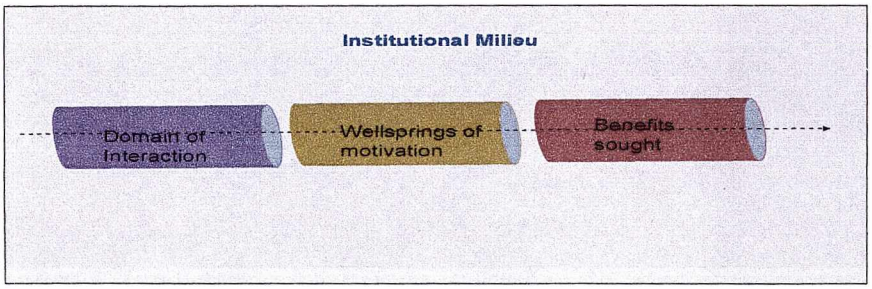
- A correlation of the Model Preference vis-à-vis Sectors of Industry present an interesting picture. Machine Tools exhibit a consistently low preference for all the models except R&D and Market Survey, where they are weak. Automotive seem to

adopt a middle-of-the-road preference for all the models, with the exception of consulting for establishing laboratory. Due to the technology – orientation of Biotech sector, they have indicated a high degree of preference for Consultancy for establishing Laboratory and R&D. It is interesting to note that the electronics sector has low preference for most of the models except Mentoring which may be due to the fact that one-to-one coaching is more beneficial. While Public Limited and Private Limited companies prefer MOU, R&D and Participating in Academic activities, Proprietary and Partnership firms seem to prefer the Mentoring model.

- The road map for enhancing the interactions between the institution and industry is to augment from the current domain short-term, operational and curriculum oriented one towards strategic, long-term and knowledge-oriented.

- This requires an alignment of the domain with motivation and benefit sought. This 'fit' appears to be critical to initiating and sustaining the interaction. This is depicted in the following schema.

Flow of Interaction



- There are three phases of interaction that the study proposes – the current phase which is operations-intensive, the second phase which is Entrepreneurial and the third phase which is knowledge-intensive. The evolutionary progress of this trajectory is presented visually as follows: