Developing a Revenue Model for Bioinformatics R&D in India using Management Approach

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Abstract

Research in biological sciences has witnessed a major transition in the methods used to address the impending issues, starting from *in vivo* and *in vitro* experimentation to adopting *in silico* methodologies, which fall under the bioinformatics domain. Bioinformatics is an interdisciplinary area that works on ways to understand biological data, especially when the data sets are large and complex. This prominent inclusion depends mainly on the development and efficacies of various computational tools and software to deal with scientific problems related to the functioning of various organisms. The rapid growth in bioinformatics research resulted in the advancement of scientific methods and development of relevant technologies, culminating in products and services beneficial to society. Considering the significance and relevance of various efforts in the life science area, the bioinformatics and computational biology approaches attract researchers and professionals belonging to different fields, such as computer science and information technology, chemistry, biological sciences, mathematics, and other related areas, to join hands and work together through a common platform to eventually create an innovation ecosystem of greater value to address biological research problems linked with prevailing and upcoming healthcare issues, *inter alia*.

This study tries to investigate and understand the scenarios and factors that enable the academia, where most basic research and development activities take place, to think further and embed commercialization aspects with the research & development activities and make the endeavors self-sustainable in the long run. This scenario opens many untapped opportunities for academia in India and enables them to think beyond the conventional approach of generating and disseminating new knowledge to the stakeholders. Most academics and decision-makers concur that entrepreneurship is the new way to go and is essential to the advancement and welfare of society at large. This thesis attempts to explore the management aspect of research in bioinformatics and attempts to develop a feasible model in the direction of incorporating revenue generation prospects in basic research activities.

Publications:

i) **Shekhar, S.**, Dhir, S., Gomes, J., & Jayaram, B. (2023). Academic bioinformatics activities joining hands with entrepreneurial ventures: a way to go in life science research (case studies from Indian academia, start-ups and the life science sector). *International Journal of Research, Innovation and Commercialisation*, *5*(1), 70–105. https://doi.org/10.1504/ijric.2023.132943

ii) Singh, A., **Shekhar, S**., & Jayaram, B. (2020), "CADD: Some success stories from *Sanjeevini* and the way forward", in Innovations and Implementations of Computer-aided Drug Discovery Strategies in Rational Drug Design", Springer Nature, Singapore Pte Ltd., 2020. https://doi.org/10.1007/978-981-15-8936-2_1

iii) **Shekhar, S**., Dhir, S., Gomes, J., & Jayaram, B. (2023), Analyzing the role and significance of High-Performance Computing (HPC) technology in the area of bioinformatics R&D in an academic environment using modified total interpretive structural modeling (M-TISM) approach to eventually develop an HPC-oriented revenue model (under peer review).

iv) **Shekhar, S**., Dhir, S., Gomes, J., & Jayaram, B. (2023), Developing a knowledge-based ecosystem for bioinformatics R&D by strengthening human resource development programs: a case study and analysis in Indian context using SAP-LAP based approach (submitted).