



BioNova: Bridging Life Science Education and Bio-enterprise Development

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Abstract

The initiative called 'BioNova' was the brainchild of the Department of Life Sciences of Kristu Jayanti (Deemed to be University) and was designed to bring the industry and academia together, by inculcating the biopreneurship spirit among the students. The development of innovative product, formulation of suitable business strategies and establishment of entrepreneurship to transform scientific breakthroughs into business ventures were the areas where the students sought training and were provided training by a special Biopreneurs Cell. As a result, the program helped organize seven one-of-a-kind startups like Agrifoods, Thrive UP, Paramparika, Appachiee, Bioline, Hydragen, Servam, which were concerned with areas ranging from development of biofertilizers, nutrients, diagnostic systems or natural skin care ranges. Additionally, the program has contributed to employment opportunities in technology and sustainable biotech innovations, thereby serving as an incubator for biotech startups.

Keywords: Biopreneurship, Biotechnology Startups, BioNova, Entrepreneurship Education

1. Introduction

Bio-entrepreneurship is a combination of Biology and Entrepreneurship that involves the application of the biological sciences to develop innovative business concepts that not only are useful in the real world, but create important employment opportunities. Businesses that cluster around the biosciences strive to make bio-products more popular and research that can help humanity such as preventing diseases, fighting hunger, or producing biofuels. Bio-entrepreneurship in India is largely concentrated in the biotechnology sector, encompasses healthcare, agriculture, industry and environmental solutions. The biotechnology sector has rapidly expanded in recent years, largely due to Government's efforts to promote innovation and entrepreneurship in the field. It is a fact that this potential is recognized and academic institutions are increasing the importance of entrepreneurship, especially bio-entrepreneurship, as a means of empowerment and self-reliance in the future.

1.1 Need of Bioentrepreneurship in Indian higher education:

The development of biopreneur is an essential part of the current educational system as it integrates scientific knowledge and its use in the real market (Jardim *et al.*, 2021; Valerio, A, 2014; Würmseher, M., 2017; Davey, T *et al.*, 2016). With advances in biotechnology, Life Science graduates can leverage their scientific research to create business models to address issues related to health care, food production, and sustainable development in society. Biopreneurship is an educational model which nurtures the mindset needed by students in applying science to create bioproducts and set up businesses in the industry (López-Delgado, P, 2018).

Bioentrepreneurship is an integral part of higher education in India, which brings together the innovation in biological sciences and entrepreneurship. This integration helps generate new biotech startups, develop the commercialization of research, and solve real-world problems in health, agriculture and the environment. Bioentrepreneurship is the link between research and

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market. Indian universities and institutions like IITs, IISc, central universities produces huge volumes of research work in biotechnology and very little research work is published in academic journals. Bioentrepreneurship education equips students with the expertise needed to develop business concepts for innovations from the lab including products like drugs, diagnostics, agri-biotech solutions with practical applications. BioE3 Policy India's bioeconomy to grow from \$150 billion in 2022 to \$300 billion by 2030. The bioentrepreneurship pipeline is getting inventors, founders, and technically educated business executives who know the market and biology from institutions of higher learning that include bioentrepreneurship programs. Institutions of higher education are directly providing this pipeline with inventors, founders and technically savvy business executives who understand markets and biology. India faces unique challenges in the areas of food security, antibiotic resistance, neglected tropical diseases and access to health care. Indian college bioentrepreneurs are more likely to provide solutions that are tailored to local requirements and price points than to just import solutions from elsewhere (Hine, D & Kapeleris, J. 2006).

HEIs can be incubators for the promotion of entrepreneurship via the Startup India, Atal Innovation Mission and the BioNEST (Bioincubators Nurturing Entrepreneurship for Scaling Technologies) initiative. The Indian government has given a significant push to bioentrepreneurship via key initiatives like the Biotechnology Industry Partnership Programme (BIPP) and the Biotechnology Ignition Grant (BIG). It offers start-ups and innovators from the biotechnology industry financial support, as well as incubation support, mentorship, and commercialization opportunities (Sen S, 2024). Bioentrepreneurship is important in India as a demographic strength as it is going to produce job producers rather than job seekers (Table 1). Cooperation between universities and pharmaceutical companies, agri-biotech companies and medical device manufacturers is natural as part of bioentrepreneurship programs. The partnership results in internship programs, co-development and licensing agreements. Bioentrepreneurship education means educating aspirant entrepreneurs about compliance failures, such as ignorance of IP management, biosafety laws, clinical trial frameworks and ethical issues which can be costly.

In India, the enrolment of women in life sciences is comparatively high as compared to engineering. Incorporating entrepreneurship into curricula in biology and biotech is a unique opportunity to promote a new generation of women-led biotech companies that are working to achieve gender equity and innovation objectives. NEP 2020, clearly emphasizes a lot on entrepreneurship, innovation and multidisciplinary education. NEP's flexible credit-based curriculum designs are well suited for a "Bioentrepreneurship" approach that integrates biology, business, policy and technology. In life science teaching, countries like USA (MIT, Stanford), Israel and Singapore have embraced entrepreneurship and developed competitive ecosystems in biotech that are on a par with the world. Indian institutions will need to match this to attract international finance and to retain people and compete against them in aspects like synthetic biology, genomics, biosimilars, etc.

The epidemic highlighted significant weaknesses in the Indian diagnostic system, vaccine production and biomedical manufacturing system. Bioentrepreneurship education is a national resilience plan to make India more ready to deal with health crises in the future by harnessing innovation locally. Bioentrepreneurship is rapidly moving from a niche from a core capability, which the Indian HEIs should foster to produce the next generation of life science innovators (Fig.1).

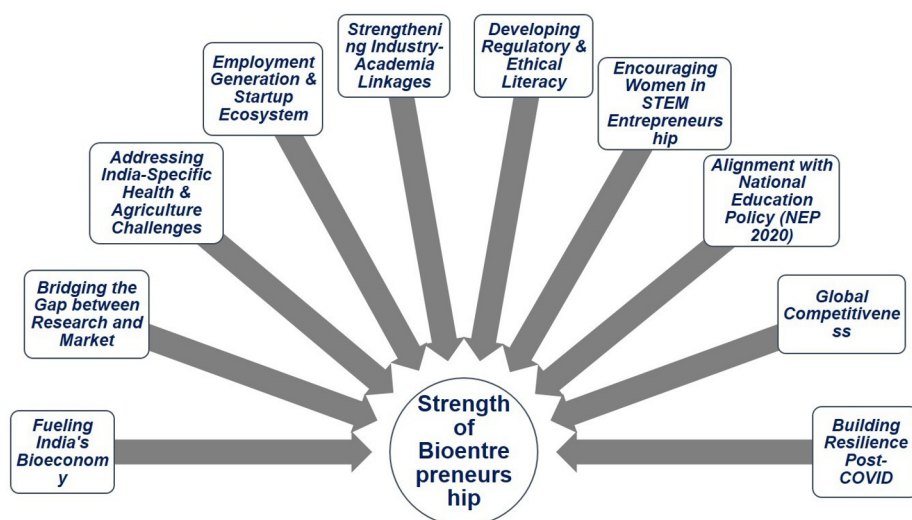


Fig.1 Key Factors Contributing to the Strengths of Bioentrepreneurship

Table 1 List of Organizations that promote Bioentrepreneurship at Higher Education Institutions in the areas of Finance, Incubation, Commercialization and Awards.

Institution / Program	Major Startup & Innovation Support
Department of Biotechnology (DBT)	Promotes biotechnology entrepreneurship through BioNEST incubators, Bio-incubation facilities, BioE3 initiatives, BioCARE, and commercialization of research outcomes.
Biotechnology Industry Research Assistance Council (BIRAC)	Offers financial assistance through BIG, SBIRI, LEAP Fund, SEED Fund, PACE, SPARSH, BioNEST, and BioE3 programs for biotechnology startups and innovators.
Department of Science and Technology (DST)	Supports innovation via NIDHI, PRISM, technology development schemes, and startup incubation initiatives.
Technology Development Board (TDB)	Assists in transforming research innovations into commercially viable products and technologies.
Ministry of Micro, Small and Medium Enterprises (MSME)	Offers incubation support, entrepreneurship promotion, startup incentives, and innovation grants for MSMEs.
Startup India Initiative	Facilitates startup recognition, access to funding opportunities, mentoring, networking, and policy support.
Atal Innovation Mission (AIM)	Operates Atal Incubation Centres, ARISE, and ANIC programs to strengthen the national innovation ecosystem.
NITI Aayog	Develops policies and strategic initiatives to encourage entrepreneurship and innovation across sectors.
Council of Scientific and Industrial Research (CSIR)	Encourages technology transfer, industrial collaboration, and commercialization of scientific research.

Indian Council of Medical Research (ICMR)	Funds translational medical research and supports healthcare and biomedical innovations.
University Grants Commission (UGC)	Promotes innovation, entrepreneurship, and incubation activities in higher education institutions through various schemes.
All India Council for Technical Education (AICTE)	Encourages innovation through IDEA Labs, Innovation Cells, and entrepreneurship development programs in technical institutions.
National Research Foundation (NRF)	Supports research excellence, innovation, and commercialization of scientific discoveries.
Indian Council of Agricultural Research (ICAR)	Promotes agri-biotechnology innovation, agritech startups, and commercialization of agricultural technologies.
Department of Pharmaceuticals	Encourages pharmaceutical and medical biotechnology innovation through research support programs.
National Startup Awards	Recognizes outstanding startups contributing to innovation and economic development under the Startup India initiative.
BIRAC Innovator Awards	Honors researchers and entrepreneurs making significant contributions to biotechnology innovation.
National Entrepreneurship Awards	Rewards exceptional entrepreneurs and entrepreneurship ecosystem builders across India.
TiE Global Awards	Recognizes high-potential entrepreneurs and innovative startups with global impact.
NASSCOM Emerge 50 Awards	Celebrates promising technology startups demonstrating innovation and business growth.
World Summit Awards	International recognition for digital innovations that contribute to sustainable development goals.
BioNEST Incubation Programme	Establishes biotechnology incubation centres within universities and research institutions to nurture startups.
IIT/NIT Technology Business Incubators (TBI) & IKS Networks	Offer incubation, mentoring, infrastructure, and technology commercialization support for emerging ventures.
National Education Policy (NEP) 2020	Promotes entrepreneurial education through multidisciplinary learning, innovation, and curriculum flexibility.
STEM Entrepreneurship Cells	Encourage innovation, startup culture, and grassroots entrepreneurship among students in educational institutions.

2. BioNova Program: Vision and Implementation

Innovations in the Department of Life Sciences at Kristu Jayanti University in Bengaluru have benefited from research, entrepreneurship, and industry-based learning procedures (Perkmann, M *et al.*, 2013). The department's ongoing BioNova project and the creation of the Biopreneurs Cell give students practical experience learning how to create bioproducts and launch businesses. Scientists can flourish and conduct scientific research in contemporary labs with the support of mentors and connections with incubators (Fini, R *et al.*, 2011). Consequently, the Life Sciences Department contributes to the development of a culture in which multidisciplinary research initiatives are carried out and put into action to offer creative answers to urgent issues.

BioNova is a strategic development initiative that was created as a platform for student-run biotechnology companies in the Department of Life Sciences at Kristu Jayanti University. The Biopreneurs Cell was created to develop and carry out the program in response to the need for an academic and commercial integration program (Greco, F., 2023). By fusing scientific expertise with commercial savvy to generate revenue-generating concepts, the BioNova platform was able to provide an integrated solution for creative bioproduct development. Innovations in biotechnology and sustainability served as the foundation for BioNova. Seven biotech startups have emerged thanks to the many learning courses offered by the BioNova platform (Huggett, B, 2017; Kumar, G, 2026).

By transforming students into biotechnology entrepreneurs with expertise in both science and administration, BioNova is a program that connects education and business (Organization for Economic Co-operation and Development, 2017). Students at BioNova can understand how they might employ biotechnology in novel ways to solve issues by combining scientific research with economic concerns. BioNova is producing future scientists whose industrial research will not only propel the company's expansion but also have a wide range of societal implications. With the assistance of many industry stakeholders, including experts, incubators, and investors, students receive the necessary training, mentoring, and incubation to realize their ideas.

In this regard, BioNova offers a thorough educational program with training modules focused on helping students develop broad entrepreneurial abilities. These include, among other things, market strategy, product development, business planning, and regulatory compliance (Rasmussen, E *et al.*, 2024). In relation to the first topic, students are introduced to a range of methods for converting creative concepts into practical business models, including financial forecasts and competitive analysis. Regarding the second subject, the emphasis is on the confirmation of scientific findings and their wider application. Students are introduced to the significance of biosafety and intellectual property protection in commercialization through the informative regulatory compliance module.

The mentorship culture and collaborations with other businesses and organizations, which have provided students with all the knowledge and experience required to transform their ideas into profitable enterprises, are among the most significant factors contributing to BioNova's success (Fig. 2) (Perkmann, M *et al.*, 2013). Through BioNova, aspiring biopreneurs may communicate directly with seasoned industry executives, investors, and academic mentors. Through these collaborations, the students gain a thorough grasp of how to create novel goods and create a profitable business strategy centered around them. Through partnerships with several incubators, biotechnology firms, and the government, students gain experience adhering to industry best practices (Huggett, B, 2017; Kumar, G, 2026). Moreover, these partnerships can result in a number of funding opportunities, pilot production, and market introduction of these startups.

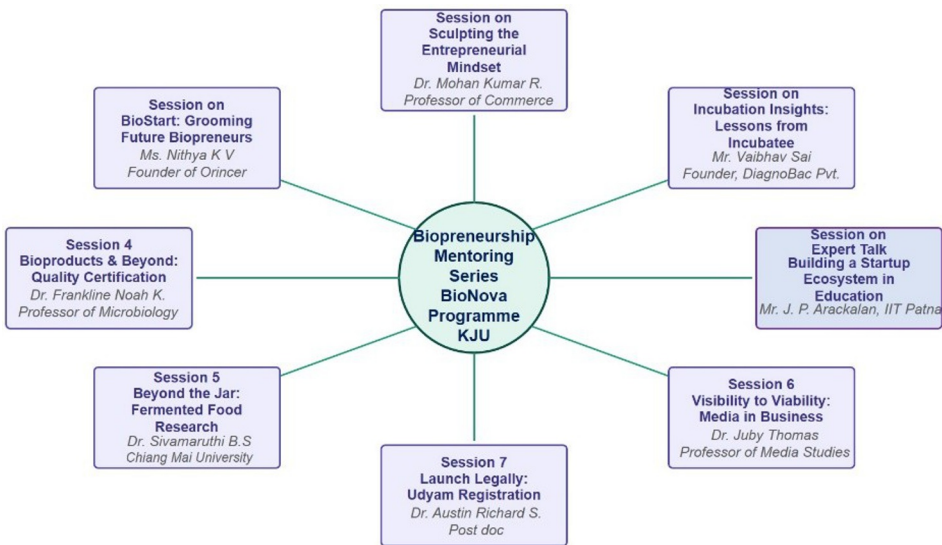


Fig. 2: Biopreneurship Mentoring Series: Radiating sessions under leading enterprises of BioNova Programme

3. The Seven Startups: A Success Story

The BioNova program has been successful in nurturing and launching 7 student-led biotech start-ups, demonstrating an important success in biopreneurship development. There are a number of startups that have made a mark in the fields of sustainable agriculture, health, diagnostics, and personal care that does not harm the environment (Table 2), such as AgriFoods, Thrive UPs, Paramparika, Appachiinii, BioLine, HydraGen, and Cervam Pvt.Ltd.

Table 2 below shows the number of products which BioNova has achieved in the following sectors, founded by the company and their MSME registration status.

No.	Startup Name	Sector	Founder Name, Year & Course Studying	No. of Products produced	MSME registration ID
1	Agri Foods Pvt. Ltd.	Food & Agri culture	Mr. Mithun, II-year BSc Biotechnology & Genetics	22	UDYAM-KR-03-0377675
2	Appachiinii Pvt. Ltd.	Health & Wellness	Ms. Gopika, II-year MSc Biotechnology	4	UDYAM -TN-09-0075101
3	Cervam Pvt. Ltd.	Personal Care & Cosmetics	Mr. Udayaprakash, II-year MSc Biotechnology	13	UDYAM-TN-29-0064776
4	Paramparika Pvt. Ltd.	Food & Beverage	Ms. Anu Raphael, II-year BSc Biotechnology & Genetics	1	UDYAM-KR-03-0466841
5	HydraGen Pvt. Ltd.	Biotechnology	Mr. Tharun Balaji, II-year BSc Microbiology	1	UDYAM-TN-20-

6	BioLine Pvt. Ltd.	Green Technology	&	Ms. Nandana Menon, II-year BSc Biotechnology & Genetics	1	0159567
						UDYAM-KL-10-0060024
7	ThriveUps Pvt. Ltd.	Agri & Horticulture	&	Ms. Gayatri, II-year BSc Biotechnology & Biochemistry	1	UDYAM-KR-03-0466283

3.1 Agri Foods Pvt. Ltd.– Sustainable Biofertilizers and Spice Products

By creating biofertilizers that improve soil health while reducing their negative effects on the environment, AgriFoods is committed to transforming sustainable agriculture. Microbial formulations are a more environmentally-friendly option to chemical fertilizers that are used to increase the output of crops naturally, offering a solution to this issue, AgriFoods does. The company also had a focus on organic spice products, ensuring that all spices they sold were high in quality and free from harmful chemicals, while retaining their medicinal and nutritional properties. In this regard, AgriFoods works towards a better and greener future by connecting farmer and consumer health through its strong commitment to organic production of foods and sustainable agriculture.

3.2 ThriveUps Pvt. Ltd.– Plant-Based Nutritional Supplements

Thrive UPs are formulated with the latest in plant-based supplements that are derived from superfoods and therapeutic plants to help minimize nutrition deficiencies. These supplements are designed to meet the needs of anyone seeking sustainable, vegan and natural options for food that promotes overall health. The products from Thrive UPs are rich in essential vitamins, minerals, and antioxidants, thanks to the clinically proven plant extracts. The company specializes in clean label nutrition with natural supplements that are free of GMOs, chemicals, and enhance energy, digestion, and immunity, ensuring natural wellness for all.

3.3 Paramparika Pvt. Ltd.: Organic Remedies and Ancient Traditional Medicine in revival

Paramparika is set to rejuvenate and modernise traditional medicine with their organic treatments, grounded in Ayurvedic and Siddha principles. By combining scientific findings with ethnobotanical knowledge, Paramparika formulates herbal blends for both prevention and treatment, thereby aiming to foster a healthier lifestyle. The company's commitment to using locally sourced organic foods ensures authenticity and effectiveness. Paramparika aims to bridge the gap between traditional knowledge and modern healthcare by offering long-lasting, safe, and proven solutions, which align with the rising demand from consumers for natural therapeutic alternatives.

3.4 Innovative Herbal Health & Wellness Products from Appachiivi Pvt. Ltd.

Appachiivi specializes in developing herbal health and wellness products that combine the essence of traditional herbal medicine with modern living standards. From stress-relieving formulas to immune-boosting remedies, Appachiivi's products are meticulously developed using scientifically-backed herbs. The firm is dedicated to wellbeing that is free of chemicals and preservatives, making sure that each product encourages overall health and vitality. By bringing herbal wellness within reach, Appachiivi plays a pivotal role in advancing the cause of long-term and sustainable healthcare solutions.

3.4.1. The Success Story of the Startup Appachiiii Pvt. Ltd. is clearly evident.

Through a 12-week hands-on biopreneurship training program, the Biopreneurship Cell, an initiative of Kristu Jayanti University's Department of Life Sciences, links biosciences with business by enabling undergraduate, graduate, and alumni students to create start-ups and bio-products. The Department of Electronics, IT & Biotechnology, Government of Karnataka, organized the Bengaluru Tech Summit 2024 with the theme of Smart Bio Awards under the umbrella of Smart City. One of the interesting findings was that Ms. Gopika (III Semester, M.Sc. Biotechnology) and her team Appachiiii Pvt. Ltd. won the category of Best Campus Company Award 2024. Particularly during the dengue outbreak, the award also emphasized the health advantages of the company's hallmark product, Chukka Brew, an instant health drink made from bioactive herbs like tulsi, black pepper, coriander, and dried ginger. Dr. Prasanna Kumar C (Award Winner), Mr. Udayaprakash (Team Member), and Ms. Gopika (CEO & Founder) commemorated the BioNova Program's achievements in the students' overall entrepreneurship development, the creation of new technologies, and the expansion of startups (Fig. 3).



Fig. 3 Recognition of *Appachiiii Pvt. Ltd.*-Best Campus Company Award 2024 at the prestigious 27th Bengaluru Tech Summit 2024

3.5 BioLine Pvt. Ltd. Health Solutions and Diagnostic Kits Based on Biotechnology

BioLine specialises in innovative diagnostic solutions, based on kits developed with biotechnology, designed for rapid, precise and reasonably priced disease diagnosis. The company develops point-of-care testing kits for early detection of genetic disorders, metabolic diseases and infectious infections. BioLine's solutions, which prioritize accuracy and dependability, are used by medical professionals, research facilities, and diagnostic labs. BioLine's biotechnology innovations help extend healthcare access around the globe and ensure timely intervention and improved patient outcomes.

3.6 HydraGen Pvt. Ltd: Bioremediation Solutions and Hydra Based Toxicity Assays

Hydra vulgaris is a model organism for bioremediation and toxicity testing for a cutting edge biotech business, HydraGen. Through the development of cutting-edge bioassay techniques, HydraGen provides reliable and cost-effective toxicity screening platforms for businesses and academic institutions, for chemicals, medicines and pollutants. The startup also studies bioremediation methods with hydra models to assess and lower the level of environmental pollution. With their creative approach, HydraGen can contribute to safer medicines, environmentally friendly industrial processes and environmental sustainability.

3.7 Cervam Pvt. Ltd: Eco-Friendly Personal Care Products & Organic Cosmetics

Cervam is committed to sustainable cosmetics, which means that all their cosmetics and personal care products are organic and contain no artificial perfumes, parabens or synthetic chemicals. The company collects naturally occurring and plant-based ingredients to create environmentally friendly and skin-safe solutions, meeting the growing demand for such options. By focusing on ethical sourcing, cruelty-free ingredients, and sustainable packaging, Cervam promotes a holistic approach to skin care and well-being while reducing the carbon footprint of the beauty industry.

The seven companies that have been born from the BioNova initiative (Fig. 4) are just a glimpse of the great potential for biopreneurship to convert cutting-edge research into viable and important commercial innovations that solve environmental sustainability and health problems.



Fig. 4: Launch of various startups by distinguished dignitaries.

4. Challenges and Overcoming Obstacles

4.1 Financial and Operational Hurdles Faced by Student Entrepreneurs

Due in large part to their lack of pre-monetary statistics and security, student entrepreneurs encounter a number of challenging conditions for which they lack funds. In addition to decreasing productivity, students' struggles with reading and conducting might result in fatigue. Scale-up capabilities might be hampered by costly tactics and a lack of resources as it is unable to get important equipment or expertise. Another challenge that may affect businesses in sectors like biotechnology is managing criminal activity and regulatory issues (World Intellectual Property Organization, 2020). In comparison to more established agencies, it is primarily challenging to reach the market and develop strong manufacturers. It is also challenging to scale up operations; financial and operational inefficiencies also prevent your organizations from expanding and surviving. According to Perkmann, M et al. 2013, student entrepreneurs lack responsibility over what to do or how to behave. Nevertheless, student marketers may overcome these obstacles with perseverance and care.

4.2 Strategies adopted to ensure product viability and market competitiveness

To make certain product viable and marketplace competitive, student marketers followed a multi-pronged technique combining rigorous research, strategic pricing, and targeted advertising. They leveraged customer feedback and iterative prototyping to refine their wares, ensuring alignment with marketplace demands. Using shared laboratory facilities and obtaining raw materials locally were two cost-effective production techniques that reduced costs without sacrificing quality. Startups used influencer partnerships, social media outreach, and digital marketing to increase brand awareness (Greco, F., 2023). Important insights into market trends, regulatory compliance, and distribution strategies were obtained through industry alliances and mentorship programs. A competitive advantage in the biotech and organic product industries was also made possible by obtaining intellectual property rights through patents and certificates, which enhanced product credibility (Huggett, B, 2017; Kumar, G, 2026). Student-led firms effectively positioned themselves in the market by using these tactics, guaranteeing long-term impact and sustainable growth.

5. Impact Assessment and Future Prospects

Through practical insights on innovation, business strategy, and implementation within the biotechnology domain, the BioNova program has significantly improved the skill set and increased employment chances for student entrepreneurs (Rasmussen, E *et al.*, 2024). Through a variety of training modules on product creation, legislation, financial management, and branding, the participants gained the necessary industrial skills. By promoting a creative approach to problem-solving, the curriculum enabled the participants to put theory into practice. Through their interactions with incubation centers, industrial professionals, and mentors, they developed professional networks that improved their career prospects. Graduates of this school will succeed if they establish profitable biotech companies or land prestigious positions in research, biotechnology, and business development sectors. Table 3 below provides an overview of the performance rating of firms founded under BioNova.

Table 3: BioNova Program Startups' Performance Summary (as of February 4, 2025)

S. No.	Name of the Startup	Launch Date	Overall turnover as of 4 th Feb, 2025 (in INR)	No. of customers	No. of GST filed
1	AgriFoods	20-09-2024	210,000	1002	3

2	Appachi	08-10-2024	85,000	703	-
3	Cervam	18-10-2024	87,000	707	-
4	Paramparika	08-11-2024	27,000	402	-
5	Thrive UPs	13-11-2024	7,000	307	-
6	BioLine	13-11-2024	-	-	-
7	HydraGen	13-11-2024	4000	1	-

With 1,002 customers and the highest turnover of INR 2,10,000 among the startups, AgriFoods has demonstrated strong financial compliance by filing three GST reports. With more than 700 clients, Appachi and Cervam have made INR 85,000 and INR 87,000, respectively. With a revenue of INR 27,000, Paramparika, which specializes in traditional medicine, has drawn 402 clients. Due to their early-stage growth, Thrive UPs and HydraGen, which were both introduced on November 13, 2024, have lesser turnovers of INR 7,000 and INR 4,000, respectively. BioLine has not yet disclosed any turnover, which suggests that product development or regulatory approvals are still ongoing. Together, the firms have reached 3,122 clients and made INR 4,20,000 in revenue, demonstrating the influence and entrepreneurial success established by the BioNova project as well as the possibility for more scaling and market development.

5.1 The future roadmap for expanding the BioNova initiative

The goal of the BioNova initiative's future expansion plan is to help student-led enterprises grow by assisting with patent applications, obtaining funding, and cultivating business partnerships. BioNova seeks to assist inventors in patenting their distinctive bioproducts and innovations in order to bolster the intellectual property (IP) portfolio, guaranteeing commercialization prospects and a competitive edge. Through research grants and business incubation programs, the initiative will actively seek for public and private funds to support additional R&D, infrastructure growth, and market entry. In order to close the gap between academia and business, BioNova will also form strategic partnerships with biotech companies, academic institutions, and venture capitalists. The project aims to turn potential startups into long-lasting, high-impact businesses that support the biotech and life sciences ecosystem by expanding access to advanced manufacturing facilities, regulatory knowledge, and global markets.

AgriFoods, which had INR 2,10,002 in turnover and the most customers, at 1,002, has shown excellent financial compliance by filing 3 GST reports amongst the start-ups. Appachi has created INR 85,000 with more than 700 clients while Cervam has created INR 87,000 with more than 700 clients. Paramparika, a traditional medicine maker, has attracted 402 clients with its revenue of INR 27,000. The two Thrive UPs, both launched on November 13, 2024, have turnovers of INR 7,000 and INR 4,000 respectively, as they are still in the early stages of growth. The company has not revealed its turnovers so far, indicating that the product development or regulatory proceedings are ongoing. The BioNova project, along with the influence and entrepreneurial success it has built, is now reaching a reach of 3,122 clients with INR 4,20,000 in revenue, which shows the potential for further scaling and market development.

5.2 Next steps for the BioNova project and its expansion plan

The future expansion plan of the BioNova initiative will aim to support student-led enterprises in their development by providing support for patent applications, and funding as well as business partnerships. BioNova aims to help inventors patent their unique bioproducts and innovations, thereby strengthening the intellectual property (IP) portfolio and ensuring a competitive advantage and commercialization opportunities. Research grants and business incubation programs will be actively pursued to look for public and private funding for additional R&D, growth of infrastructure, and market entry. To bridge the academic/industry divide, BioNova will also establish strategic alliances with biotechnology firms, universities and venture capitalists. The project's focus is to develop potential start-ups into sustainable and impactful enterprises which will contribute to the biotech and life sciences ecosystem through providing access to advanced manufacturing facilities, regulatory information and global markets.

6. Conclusion

The BioNova project is one of the most impactful incubators to support entrepreneurs in creating seven biotech businesses. These companies tackle issues that are significant in the areas of wellness, sustainability, health and agriculture. The training and mentoring process, combined with the business and technical skills imparted, have helped the initiative to close the gap between academia and industry, equipping its participants with the necessary business, technical and leadership skills. Despite a few obstacles, such as finance, regulatory and logistical issues, BioNova businesses have proven their potential in the market by creating their own inventions and, in some cases, registering their invention as patents and acquiring grants, and collaborating with the industry. This project has contributed to not only the creation of jobs and self-employment, but also has brought Kristu Jayanti University at the forefront of the biopreneurship and biotechnology research.

Academic biopreneurship programs need to be sustained to foster creativity, independence and entrepreneurship in the life sciences. Students can integrate scientific concepts and their use in the business sector into business projects such as BioNova, which allow them to make their scientific skills and knowledge profitable. These types of activities have tremendous potential to create a generation of biotechnology entrepreneurs that can contribute to economic development by the academic community. Academic programs such as Biopreneurship not only promote economic growth and biotechnological development, but also foster interdisciplinarity, sustainability and other biotechnology inventions as well. To keep up-to-date with the details of BioNova projects and other activities on the subject of biopreneurship see our official website at <https://www.kristujayanti.edu.in/academics/school-biological-forensic-science/life-science/biopreneurship-cell.php>

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