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RECREATING THE SILICON VALLEY IN INDIA

India at the moment
is at this cusp.





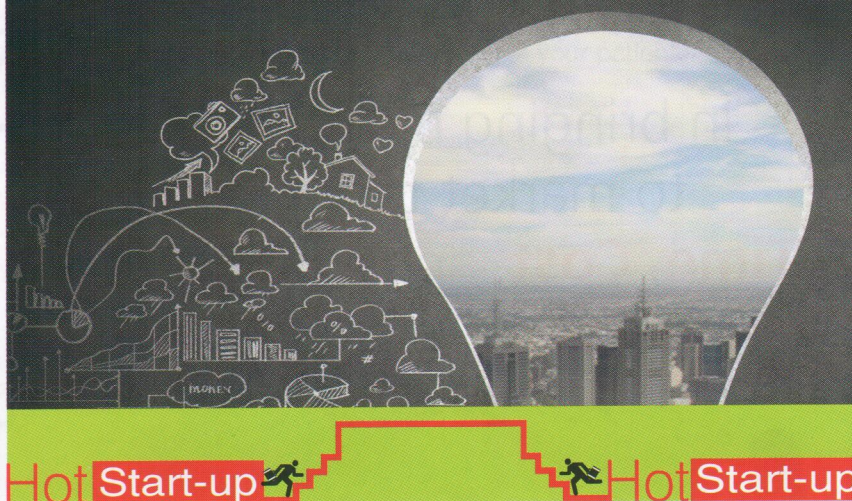
COVER
DESIGN BY:
SHIHAB K A

COVERSTORY

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RECREATING THE SILICON VALLEY IN INDIA

INDIA AT THE MOMENT IS AT THIS CUSP. THERE IS SOMETHING
HAPPENING IN THE INDIAN START-UP ECOSYSTEM IN THE LAST
10 YEARS



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BAREFEET ANALYTICS

Disruptive next-gen solutions for food analysis industry

In 2008, shortly after Dr Venkat Panchagnula (40) joined NCL (National Chemical Laboratory, Pune), there was a scare of melamine contamination in Chinese milk products.

Melamine is a white, crystalline, organic base chemical rich in nitrogen, widely used in the manufacture of adhesives, plastics and whiteboards.

This chemical has the capacity to increase the milk's nitrogen content, leading to an increased protein levels in the milk, which has been excessively adulterated with water.

During this time, Dr Venkat's group were developing bioanalysis methods for processing large number of samples within a short duration.

These methods were immediately put to use, and an analysis method to rapidly and reliably detect melamine in milk was published.

Over the next few years, the team developed an entire analytical tool kit for pesticide and food contaminant analysis was developed. The primary aim was to cater to the unique analysis needs of Indian farmers and exporters, which means handling high-volume perishables.

Ultimately, in 2014, NCL alumni from Dr Venkat's group and a couple of other scientists from NCL set-up Barefeet Analytics to commercialize these methods.



Dr Venkat Panchagnula
Director, Barefeet Analytics

The start-up intends to leverage the teams' diverse and sound understanding of both scientific and business aspects to provide potentially disruptive solutions for food analysis.

The team and the business ideas were nurtured at NCL Venture Center in Pune.

Barefeet's current team members include Dr Ajeet Singh (32), Mr Vishal Mahale (25), and Dr Magesh Nan-dagopal (37).

Dr Venkat Panchagnula currently serves as the director of the venture.

"We decided to apply for BIRAC's Biotechnology Ignition Grant (BIG)

to further develop our proof-of-concept for field trials. Approvals for the start-up through the CSIR's Scientist Entrepreneurship Program were obtained. We put a dedicated team together and rented out lab space at NCL Venture Center to begin operations," says Dr Venkat.

The food analysis market in India presents a huge opportunity for the company. Currently, the export markets, for example, in the US or EU, are highly regulated, while the Indian markets are catching up to meet the food safety standards.

"At every stage of the supply chain, a reliable partner is needed to ensure that products are meeting the required standards, and regulatory specifications among others. This need is being felt more and more now. And we are looking to serve this need," Dr Venkat remarks.

There are numerous challenges in the economics and logistics of food analysis with significant rejection rates and losses in the export market.

The company has received its seed funding through BIRAC's BIG grant worth Rs 47 lakh. The start-up now caters to quality control & food testing laboratories. **BS**

EUMENTIS INFORMATICS

Forging ahead with perseverance

Hailing from a Marwari family, Mr Pawan Samdani was always around business-driven people, and was immersed right into the business culture starting from his early childhood.

While in school, he always dreamt of being an entrepreneur someday. During his first year in college, he sensed that internet-based businesses would be the future. He started learning web development and created websites.

In the third-year of his college, he started developing SaaS products as 'Cloud' seemed to be the buzz at that time.

But it was an internship at the world's largest vaccine maker, Serum Institute, where it dawned on him that his enterprise would be biotechnology-oriented as he was greatly motivated by Serum's work.

"I decided not to sit for placements and started my company right away," recalls Mr Pawan, the 25-year-old founder of Eumentis Informatics, a biotech analytics and consulting start-up incorporated in 2014.

Eumentis is a data analytics start-up providing analytics service and develop data-driven products in the field of Biotechnology, Life Sciences and Agriculture.

Mr Pawan is from IIT-Delhi, holding both his Bachelor's and Master's degree in Biochemical Engineering and Biotechnology.

So far he has self-funded the company with an investment of Rs 3 lakh,



Mr Pawan Samdani
Director, Eumentis Informatics

and has received support from Venture Center, Pune.

After his degree, he was carrying out his research work at IIT-Delhi, and at International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi.

Both he and his batchmate, Mr Krishna Choudhary, discussed about starting their own data analytics company in Life Sciences.

Simultaneously, the duo were also applying for their respective PhD programs.

Mr Pawan targeted Swiss Federal Institute of Technology (Eidgenössische Technische Hochschule Zürich, ETHZ), European Molecular Biology Laboratory (EMBL), and Sanger Institute. But was rejected in

all the three places.

However, Mr Krishna was offered a place for his PhD at the University of California, Davis, USA. He went to pursue the program. Mr Pawan decided to stick to his decision in starting a bioinformatics company.

Currently, the company provides all types of bioinformatics services in genomics, proteomics, transcriptomics and systems biology.

It also specializes in Next-Generation Sequencing (NGS) and its analytics, and consult researchers and companies on utilizing NGS in their research.

Eumentis is developing a diagnostic test for Tuberculosis (TB) which can determine drug resistance to most of the antibiotics using NGS. Later on, it intends to develop tools surrounding clinical applications of NGS.

It is looking out for partnerships with biomedical device manufacturing companies to develop the device for its TB diagnostic tool.

The company is also working on big data technologies like Apache Spark to carry out large-scale and real-time analytics in healthcare (healthcare IoT data, EMR data, and hospital data). According to him Next Generation Sequencing is the future. **BS**

ABIRUCHI PROBIOTICS

Battling cholesterol with novel probiotics

Here is how a Pune-based young start-up is innovating to prevent heart diseases in the country.

Cholesterol is one of the leading factors behind all the heart diseases across the globe. According to a report by World Health Organization (WHO), cardiovascular diseases (CVDs) are the number one cause of death globally, and more people die annually from CVDs than from any other cause. Over three quarters of CVD deaths take place in low- and middle-income countries.

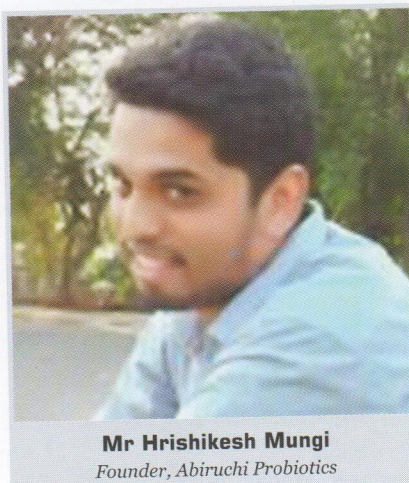
Globally, India seems to be leading in two of the major ailments – diabetes and heart diseases.

Aware of this trend, 25-year-old Mr Hrishikesh Mungi is working hard in his lab at NCL (National Chemical Laboratory), Pune, on solving one of India's major health threats.

In 2012, after graduating with an Engineering degree in Biotechnology from KLE Engineering College, Belgaum, Mr Mungi was selected to work on a project on the extraction of bile salts hydrolase enzyme at NCL. "We soon realized the commercial potential of our research," says Mr Mungi.

His guide, Dr Archana V Pundle, a chief scientist at NCL was the first to point out the research's commercial viability.

Mr Mungi continues, "We then ap-



Mr Hrishikesh Mungi
Founder, Abiruchi Probiotics

plied for a patent with the help of NCL. We put together a business plan including market survey and future goals for building a commercial enterprise."

The research work was selected by BIRAC (Biotechnology Industry Research Assistance Council) for funding the project further through its BIG (Biotechnology Ignition Grant) scheme.

In June 2014, Abhiruchi Probiotics was incorporated by Mr Mungi, with Dr Pundle serving as a scientific advisor and non-executive director of the start-up.

Abhiruchi is a technologically-driven start-up, involved in developing novel probiotic products having health

benefits.

It is currently focusing on developing, manufacturing and commercializing of a cholesterol-lowering probiotic formulation without any side effects on the body.

Investments worth Rs 50 lakh has been invested in the company so far.

The company has now acquired provisional patent for lowering cholesterol by the application of probiotics.

"At the moment we are validating the technology, and it'd take another 5 years for the products to reach the market," adds Mr Mungi, who enjoys playing cricket.

Mr Mungi's father and grandfather were also entrepreneurs who inspired him to actively pursue entrepreneurship since his early childhood.

He bagged the 'Young Entrepreneur Award' at Eureka 2014, a business model competition conducted by IIT-Bombay.

While developing the technology at NCL, Mr Mungi worked hard for a monthly pay as little as Rs 8,000. At times he had to wait patiently for months together to receive his salary.

BS

NEWNDRA INNOVATIONS

Newndra's revolutionizing 'JaipurBelt'

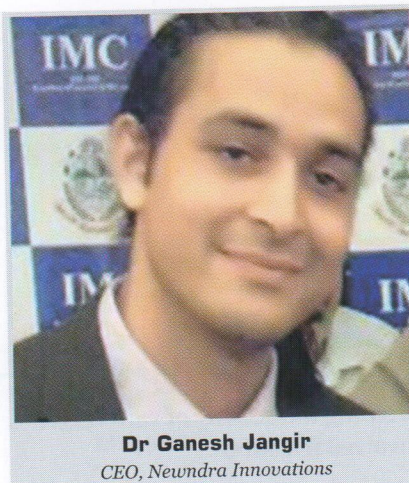
Hailing from Jaipur, Rajasthan, Mr Ganesh R Jangir (26) was the first engineer from his rural village, who had an unquenchable passion to help farmers and people from his own village.

During his school vacations, he had to work at his village farm. He felt excruciating back pain shooting through his body just after a few minutes of working. He realized that this was the tale of every farmer in the country.

He says that doctors' advice of getting good rest after a hard labor was next to impossible for farmers and workers. That kick-started within him to think in different ways and try hundreds of attempts to innovate a device that could solve the issue. The end result? The birth of the 'JaipurBelt' (Belt System for Body Support).

"I sent my idea to National Innovations Foundation and got the needed support for prototype development and patent filing. Later I sent the details of the functional prototype to Indian Institute of Science in Bangalore for Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship. I got through them. That gave me enough confidence of commercializing the device. I knew what had to be done but didn't know how and where," recalls Mr Ganesh, co-founder, Newndra Innovations, which was started in 2014.

With headquarters in Jaipur, Newndra is a disruptive and frugal innovation-based company involved in commercializing products that has



Dr Ganesh Jangir
CEO, Newndra Innovations

the potential for the betterment of health and lives of people, who are involved in manual labor work.

The company has developed its unique and award-winning flagship 'JaipurBelt' for spinal and waist-related issues. It received a grant support worth ₹10 lakh from the Department of Scientific and Industrial Research (DSIR), Government of India.

Mr Ganesh, the inventor of the belt, says that the company's product will impact billions across the globe, especially for people engaged in agricultural and manual labor.

He explains, "Back and waist pain is highly debilitating and affects all individuals regardless of age, ethnicity

or economic status. It is a very common problem for a wide range of professions including laborers, farmers, housewives, and the elderly."

It is estimated that more than 90% of the farmers, laborers, and MSME workers' activities involve frequently bending up and down, and commonly suffer from back and spinal disorders. The problem is equally severe in developing and as well as developed countries.

Mr Ganesh points that laborers and farmers drink alcohol to relieve their physical pain, which has a consequential effect on their health, social and economic status.

In other cases, they are forced to ingest painkillers or have to wear constrictive elastic belts wrapped around their waists. These belts usually restrict the body movements than providing the actual support.

He says that painkillers suppress the pain but cannot be a solution. Surgeries of the spine are complex with severe side effects and prolonged recovery periods. The JaipurBelt, as supporting means, is useful for many applications including manual lifting, frequent bending up and down, or other situations where high levels of stress are applied to the spine and waist. **BS**

EXOCAN

Unleashing the power of Exosomes

Started in early 2015, ExoCan is an Indian start-up aimed at building interconnected technology platforms for analyzing and using Exosomes in cancer diagnosis.

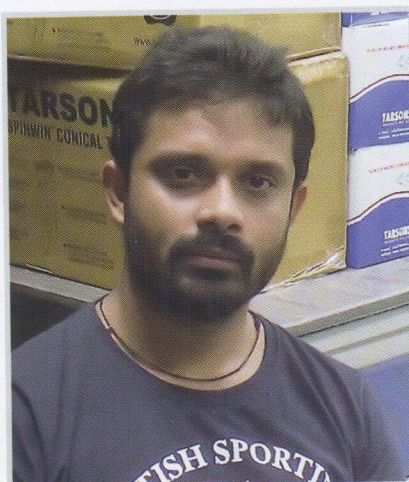
While pursuing his PhD at National Centre for Cell Sciences (NCCS), Dr Aman Sharma (32) worked on brain tumors and his attention drew towards cancer patients who were in great physical, emotional and economical agony.

He then visited a cancer hospital in Western Rajasthan and found that the lab was not researching enough on patients with cancer.

That visit sparked a fiery flame within Dr Sharma, who then decided to pursue translational research, and ended up receiving the Biotechnology Ignition Grant (BIG) worth Rs 49 lakh from BIRAC (Biotechnology Industry Research Assistance Council) in 2015 to set up his own start-up venture – ExoCan.

ExoCan is involved in developing unique Oncotechnology platforms for applications in cancer diagnosis, imaging and chemotherapy. It aims to develop technologies at lower costs with greater accessibility and clinically manage cancers for better survival outcomes.

As a plan of action, Dr Sharma secured seed funding and developed the proof-of-concept with active association with R&D institutions in India and abroad, and has so far signed MoUs with two national level research institutions.



Dr Aman Sharma
Founder & CSO, ExoCan Healthcare

Contradictorily, ExoCan faced minimal initial challenges while setting up. “BIRAC’s seed funding helped us to face the initial stages, and we were incubated at Pune’s Venture Centre. However, the investors we interacted with showed minimal understanding of the healthcare R&D, and it looked like they were never going to take significant risks for disruptive technologies which we are trying to develop,” voices Dr Sharma.

The company has also applied for 3-4 other government grants which is in the pipeline. It has also been short-listed for two other grants for the next set of rounds.

ExoCan, in the next 18 months, aims to come up with its R&D product which will enter clinics after the nec-

essary regulatory approvals.

In the next 4-5 years, Dr Sharma tells that, the company would be a pioneer in developing disruptive Oncotechnologies.

Once it has developed 3-4 products, it intends to expand to Europe and the US.

It is now targeting a revenue of Rs 5-10 crore in the next 2-3 years.

He also predicts that there is going to be a dire need for innovations in the oncology sector in next 10 years.

“It might be possible that cancers would no longer be killing lives as they currently do. Moreover, the oncology industry would be driven, not by big pharmas, but by small or medium level and value-based entities,” opines Dr Sharma, who is a fan of geek Nikola Tesla.

He also says that sectors like Agri-biotech and Nanomedicine as promising areas where new start-ups can venture into. He sees Pune as the next biggest hub for the country’s biotech start-ups, and advises that joining an incubator is far better while erecting a start-up.

Being in Life Sciences, Dr Sharma points there is a total lack of understanding by capitalists about R&D happenings in start-ups. **BS**

ORTHOCRAFTS INNOVATION

Crafting bioabsorbable implants for India

In 2006, Dr Ashish Lele, a chief scientist at National Chemical Laboratory (NCL), was first introduced to screws made of a polymer called Polylactic Acid or PLA, used for repairing of torn Anterior Cruciate Ligament.

PLA is a biodegradable biomaterial made from corn, sugarcane or sugar beets, widely manufactured in the United States. The biomaterial instantly attracted Dr Lele's attention due to its unique properties including being able to be absorbable inside the body and retaining the mechanical properties to a certain time period.

He then introduced this product to Dr V Premnath, another chief scientist at NCL, who has his PhD from Massachusetts Institute of Technology. Dr Lele holds his PhD from the University of Delaware, USA.

The product was promising and was sufficiently challenging to stir the enthusiasm between the two, and before long, they teamed up together to develop biocompatible maxillofacial volume filling implants.

Four years later, in 2010, Mr Piyush Joshi, a polymer engineer from the University of Pune, joined them. His expertise helped them to identify the benchmark properties of the product to-be developed, and its economics.

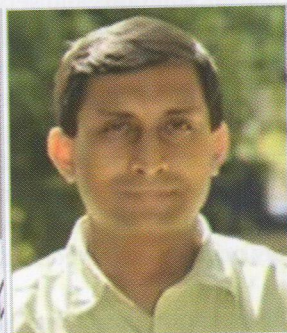
They soon realized the importance to make bioabsorbable polymers with varied properties. All the efforts by the team were directed towards synthesis of appropriate molecular



Mr Piyush Joshi
COO & Executive Director,
Orthocrafts Innovations



Dr Ashish Lele
Director,
Orthocrafts Innovations



Dr V Premnath
Advisor,
Orthocrafts Innovations

weight PLA material. The three of them participated in Venture Center's (Pune) 'Lab2Mkt' program which focuses on commercializing early-stage technologies.

The idea bagged its initial funding of Rs 7 lakh from proof-of-concept (PoC) initiative. Thus the team was able to raise a small amount to set up initial experiments to synthesize the bioabsorbable polymers, and carry out further market research.

With sustained market research, the trio understood that this single product will soon envisage the whole product portfolio using bioabsorbable polymers and their composites.

By 2012, they went on to study and identify other products which use

similar polymers.

"There were no Indian manufacturers who made biomedical grade PLA, and this was a real setback for the Indian medical device manufacturers. Surgeons had to rely on foreign players. We saw this as an opportunity and decided to use the expertise to develop the bioabsorbable material and products for India. This was the moment when the idea was taking firm roots to be considered as a platform to create a new venture," says Mr Piyush Joshi, COO and executive director, Orthocrafts Innovations.

Over the next two years, the whole team was building the chemistry know-hows of medical grade PLA, and was waiting for the appropriate funding opportunities. **BS**

SEAGULL BIOSOLUTIONS

Eradicating Measles from the world

A Pune-based start-up has developed the world's first VLP (virus-like particles) vaccine for Measles.

One are the days when start-ups were associated only with young-blooded fresh graduates from prestigious universities abroad and iconic Indian institutes.

Today, age is proving to be an ignorable factor for pursuing passionate entrepreneurial adventures.

Fifty-two-year-old Dr Vishwas Joshi founded Pune-based start-up Seagull BioSolutions (SBPL) along with Dr Shailendra Maheshwari in 2011.

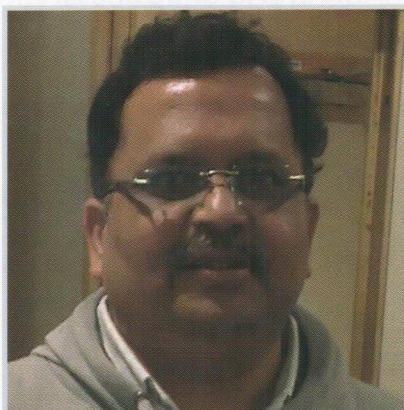
The company is incubated at Venture Center, an Entrepreneurship Development Center, hosted by National Chemical Laboratory (NCL), Pune.

Seagull is involved in developing and commercializing new technologies for advanced healthcare applications and medicines addressing unmet medical needs in the country and are affordable to the common man.

Seagull has developed 2 technology platforms for producing protein and viral therapies and vaccines: eSAME and Active Virosome Technology.

The former is useful for expressing recombinant proteins and RNA products in different animal cells. The latter helpful in producing new viral vaccines and gene therapy agents.

Both these technologies are proprietary to Seagull, and allow develop-



Dr Vishwas D Joshi

Founder, Seagull BioSolutions

ment of biosimilar versions of existing therapies and vaccines, and also produce innovative therapies and vaccines belonging to emerging therapeutic classes.

"Thus, they can be called as 'futuristic technologies'", says Dr Joshi. Seagull has already tied-up with a US-based biotech company for using the eSAME technology to deliver anti-sense RNA molecules into the cancer cells.

If successful, this will be a more preferred method, since unlike the currently used systems, the eSAME system will not involve integration of the DNA into host cell genomic DNA.

Using both these platforms, the start-up has developed 3 novel products: SBPL-0100, SBPL-0200, and SBPL-0500.

SBPL-0100 is an innovative oncolytic virotherapy which also induces anti-cancer immunity.

This therapy will be effective against breast, lung and prostate cancers and represents a fast follower of US-based drug maker Amgen's T-Vec, which has opened a new class of non-toxic anti-cancer immunotherapies.

SBPL-0200 is another innovative vaccine agent for Dengue prevention.

"This is our first product produced using the Active Virosome Platform. The efficacy of the product was shown by in-house testing, and also confirmed by testing at the Center for Vaccine Development at Mahidol University (MU) in Thailand," reveals Dr Joshi.

The third product, SBPL-0500 -- according to him -- is the world's first VLP vaccine for Measles. This vaccine is expected to be useful for immunizing infants aged between 4 to 9 months, who cannot be vaccinated with currently used vaccine, and still remain susceptible to measles infection and mortality.

"If successful, this will help us get closer to the dream of eradicating Measles from the world altogether," voices Dr Joshi optimistically. The Dengue vaccine and the cancer therapeutic agent will be developed further up to Phase II clinical studies. **BS**

SWASTI AGRO AND BIOPRODUCTS

Entrepreneurship starts with your own dream'

Though there was no entrepreneurial background in the family, the concept of entrepreneurship was already imbibed in Dr Abhay Shendye's DNA.

While in school Dr Abhay enjoyed rearing fish and photography as his prime hobbies, which enabled him to set up a small business, giving him the leverage of having enviable amounts of money in his pocket at his disposal for trying out newer ideas.

He was always influenced by his grandmother, who single-handedly managed the family-owned agriculture venture in a unique and sustainable manner.

Dr Abhay holds a PhD in Microbiology (Molecular Biology) from National Chemical Laboratory (NCL), Pune, and has been working as an entrepreneur for the last 20 years.

During that time, Dr Abhay zeroed in on jumping into entrepreneurship and seriously started reading journals on R&D policy and management. Simultaneously, he was also working on an agriculture project called 'Bharat Yatra Kendra', where he closely experienced the problems faced by common farmers.

"This was the time when ideas about 'agri-entrepreneurship' started bubbling in me and there was some scope for testing them," says Dr Abhay Shendye, founder & director, Swasti Agro & Bioproducts.



Dr Abhay Shendye

Executive Director, Swasti Agro & Bioproducts

Swasti is a four-year-old agricultural start-up, incubated at Venture Center, Pune.

The start-up focuses on sustainable farming involving specialty biomolecules and microbes that are difficult to cultivate.

Unique combinations of these two components are used to solve key problems in agriculture such as soil fertility, crop productivity, and disease management.

In fact, Swasti is Dr Abhay's third venture in the space of technology development, and manufacturing of inputs for sustainable agriculture.

Prior to this, he established his first proprietary venture AgroBioTech, a

commercial R&D company, in 1995.

He also was involved in setting up his second dreamy manufacturing venture and a partnership firm, ABT Bioproducts.

When he started AgroBioTech, it already had its own research lab to start the initial work.

"Thanks to about a lakh of rupees earned in photography and invested to build a small research facility at home. But as a venture it was not structured with respect to business plan, financial model, or a team. There was no mission and vision statement written down. No targets and goals set. Keen interest in building sustainable agriculture techniques for farmers was the key driving force," points Dr Abhay.

Back then, it was a challenging time for Dr Abhay. But the confidence within him kept telling that something can be done for sustainable farming, and some day it is all going to convert the knowledge into huge material wealth.

During those times, Dr Abhay looked upon Dr Alejandro Zaffaroni, the most successful serial entrepreneur in the biotech space in those days. In 2011, it was another fresh start for Dr Abhay. **BS**

CLEANERGIS BIOSCIENCES

Society at large benefits from successful enterprises

For two decades, Dr Sangeeta P Naik (49) worked as a professional biotechnologist. She always cherished the desire to achieve something novel that has the power to impact entire mankind.

“I came up with the idea of starting up my company catering to the industrial needs using my expertise in the industrial biotechnology. With years of expertise, I believed I can achieve something significant in this area,” states Dr Sangeeta, founder & director, Cleanergis Biosciences.

She is a trained biotechnologist with a PhD from Indian Institute of Science (IISc). Her doctoral thesis focused on viral vaccines.

Post which, she pursued her post-doctoral research at the University of France, Paris, in Oncology.

Dr Sangeeta then worked for Cadila Pharmaceuticals and Aurigene Discovery. The turning point came when she got a break at the Danish enzyme firm – Novozymes. She managed Novozymes’ R&D activities in Bangalore. At Novozymes, her interest grew manifold in the industrial applications of enzymes.

“My interest became stronger to explore the possibilities of solving core problems faced by industries. The challenges were to develop efficient, innovative and clean methods to solve those problems,” Dr Sangeeta adds.



Dr Sangeeta Naik
Director, Cleanergis Biosciences

The year was 2012. The idea of forming a company had already conceived in her mind. By February 2013, she established Cleanergis Biosciences in Bangalore and got it registered.

With customized solutions, flexible scale, and proprietary technologies, Cleanergis Biosciences works in partnership to ensure efficient and high-quality protein production, process development and scale-up production of biologics for research and commercial purposes.

The company is currently focused on technologies that would help in producing food preservatives, and food grade enzymes. “For this, we have already established collaborations

with Indian and foreign companies,” reveals Dr Sangeeta.

No exceptions

So far, Cleanergis has been funded by the founder, along with the good support of family and friends.

She says that availability of funds is a major challenge faced by any start-up in the country.

“Cleanergis is no exception to this,” says Dr Sangeeta. “Organizing funds was a primary concern. Hence it was difficult to set-up the necessary laboratory infrastructure initially. As any other biotechnology company, we also faced challenges with availability of necessary equipment. Also, getting information in the form of patents, reports, and scientific protocols was a challenge, either due to funds or reliability. Getting the right contacts for demonstrating the technologies and establishing right partnerships were also challenges that we had to face.”

“Attempts have been made to get government grants, and partial grants have been granted for one of our projects. The company now is on an aggressive look out for additional funds through venture capital sources and business collaborators,” voices Dr Sangeeta. **BS**