




No. 3 | Vol. 3

chief editor's take



BIRAC has been very active in the last four years-deploying its programmes to build the biotech innovation ecosystem in the country. Several of these programmes such as BIG, BioNEST, SBIRI and BIPP have been pioneering and have resulted in the setting up of numerous new enterprises that are bringing new products to the market. We have also now launched many new programmes (SPARSH, IIPME and BIRAC-SRISTI GYTI to name a few) which have helped us create a momentum in the industry.

 We now need to take advantage of the dynamism in the Indian biotech industry and the new momentum that it has gained to transition it to the next level. We are committed to work alongside other Government agencies, our national and international partners such as Bill & Melinda Gates Foundation and other agencies to help strategize the exponential growth of the industry which is needed for the sector to create even a greater visible impact. We welcome inputs from all our stakeholders regarding the strategies we should aim for the Indian biotech industry to take the next leap and be a global centre for biotechnology R&D and manufacturing. ■

Renu Swarup

Senior Adviser/Scientist 'H', DBT, GoI. &
Managing Director, BIRAC

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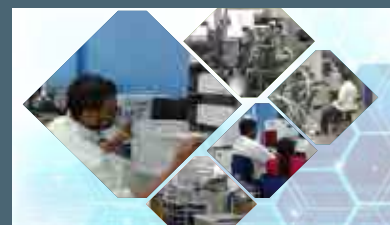
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Prof. K. VijayRaghavan
Secretary, DBT, GoI & Chairman,
BIRAC

Over the last three decades, through a focused approach by DBT combined with efforts from BIRAC, during the last five years, the strength of Indian biotech industry has grown immensely. There is a new vibrancy in the biotech ecosystem with many startups and SMEs bringing new innovative ideas for productization. BIRAC has been a catalyst in facilitating the growth of the industry and the foundation has been laid to transition to the next stage.

This new foundation has several elements that are dynamic - such as growing number of bio-enterprises : startups and SMEs, increasing inclination of research institutes to focus on translation and have collaboration with industry. Further, in view of the Government's initiatives, the barriers for doing business are continuously coming down. This is a powerful mix for the next leap for the Indian biotech sector. The Government of India also has been responsive to the needs of high technology industry and the focused national programme such as 'Make in India' and 'Startup India' will be key to the growth of Indian biotech industry.

BIRAC is working closely with these two mission programmes and aims to play a facilitative role. BIRAC in partnership with National and Global partners has created a very conducive ecosystem for Innovation to be nurtured and taken forward to product development. We are confident that our partners will join hands with us to help us in this endeavour of facilitating the startups and entrepreneurs to strategize the next leap. ■

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September 2016

Biotech Sector in India

Investing in the Future



Nitin Deshmukh
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Nitin Deshmukh is the founding member of the private equity practice at Kotak and has played a pivotal role in building the Alternate Assets business at Kotak Investment Advisors Ltd. With over 25 years of experience in VC/PE investing, he has led investments in over 60 companies. Earlier, he has served as Director of Dresdner Kleinwort and has also had a long stint of over 12.5 years with ICICI Venture. Having served as the Director General of the Association of Biotechnology Led Enterprises (ABLE), an Industry Body, Nitin Deshmukh has a strong association with the Pharmaceutical and Biotech Industry in the country. He spoke to Birac3 about his take on emergence of the Biotech sector in India.

You have not only seen the growth of the Indian biotech industry but have also played a leading role in this growth. What are your reflections on the evolution of the Indian biotech industry from 1990s until now?

Nitin Deshmukh (ND): The Indian biotech industry, like its global counterpart, has been dominated by the Healthcare and Life Sciences. The early 1990's saw the emergence of vaccine, enzyme and diagnostic businesses, many of which were led by "import substitution" and "indigenous development" efforts of products critical for the Indian masses. We saw successful introduction of vaccines, diagnostic kits and industrial & pharmaceutical enzymes at a fraction of the cost of similar imported products. It was a big jolt to the MNC competition those days and it brought into focus India's strengths in Biochemical Engineering.

Late 90's we saw the buzz of Bioinformatics on the back of India's strengths in IT, but it was the innovation in fermentation technologies which saw the emergence of biopharmaceutical companies which eventually brought scale to the Biotech industry in India.

Early 2000 we saw some great work in agri-biotech. With India allowing introduction of GM cotton in 2002, it revolutionized large scale cotton production in India. On the back of this

opportunity, we also saw some good indigenous efforts on GM technologies by a few startups. The successful IPO of Biocon in 2004 was a turning point for the industry in terms of wider recognition for the sector in general. With the passing of the Patents Amendment Act 2005, India saw a spurt in startups in areas hitherto not seen like Drug Discovery, Biologics, Botanical Drugs, Nutraceuticals, Contract & Clinical Research, Genomics and Diagnostics. Many of these received venture capital / private equity support including from us at Kotak.

With the industry getting organized under ABLE in 2002, it sowed the seeds for concerted efforts by the industry to channel funds through Dept of Biotechnology to fund R&D efforts and entrepreneurship, which also led to the formation of BIRAC. Formation of BIRAC has been a big boost to entrepreneurship in this sector. It has done an amazing job of funding over 250 plus initiatives since its inception.

There is a new buzz about startups in India especially in the domain lifescience/biotech/medtech. What are your thoughts about the new lifesciences startups that you are interfacing with? Are they globally competitive?

ND: Absolutely the last 4 years or so have been like a completely different era of Biotech entrepreneurship in

India. In general we are passing through one of the best periods ever regarding the quality of life science startups. It has been amazing to see the new breed of entrepreneurship in this space. The passion displayed, innovation quotient, the risk taking ability and the struggle to move ahead despite challenges is something I have never seen before in my entire career of 28 odd years in Venture Capital/Private Equity. There are some outstanding companies that I have come across which are doing cutting edge work. If they are able to cross the funding hurdles they will be ready to address global markets.

You have been one of the early shapers of private funding of biotech/pharma in India? How do you feel about the changing funding scenario in India especially for startups as they transition to angel & VC funding?

ND: The situation is improving but still nowhere comparable to what is happening in other sectors like technology, consumer, banking and financial services, or hospitals for that matter. While pharmaceutical and companies with local distribution strengths have been able to attract significant VC/PE funding, the same has not been the case in the case of biotech and medical device companies. VC/PE Investors have

been very cautious on account of a challenging regulatory environment in this country, especially so for clinical trial approvals. Uncertainty and significant delay in clinical trial approvals over the past few years has done damage in terms of investor sentiment. It will require some effort on corrective steps to bring back their confidence in this sector.

What advice would you give entrepreneurs regarding their pitch for venture funding?

ND: When an entrepreneur makes a pitch to a VC s/he needs to remember that s/he is selling a vision and an opportunity for the VC to join in a business partnership. To accomplish this one needs to demonstrate not only how great the product is, but also how great is the team, and how well it is suited to the opportunity. In short, the job is to offer a convincing story about one's strengths, what has been accomplished in his/her career, and what s/he plans to do.

For the entrepreneur, the objective of the first meeting should be to get a second meeting, and to drive the initiation of serious due diligence. It is essential that the team be concise, focused and well organized. A well organized, persuasive presentation will convey your sense of purpose and leave the VC with the desire to get to know your team and your company better.



The first meeting with a venture firm almost invariably lasts 1-1/2 hours. Your presentation should take 30 -40 minutes maximum to deliver without questions. The rest of the meeting should consist of introductions, questions and discussion. Begin the presentation by asking the participants what they would like emphasized. Bring key members of your team, but in no case more than three or four people. And everyone should get some time to speak. Do not hesitate to ask questions to the VC about their experience in your industry and how the VC operates and the value that the VC can provide to your business. A good VC is a partner and an advocate for the entrepreneur. A VC investment in your company is the beginning of a relationship that can help your company grow and succeed in a very competitive marketplace – but it only works if the fit is good. Like any successful relationship, it has to be built on a good understanding and reasonable expectations. The presentation portion of the meeting should cover the Big Four: Management, Market, Product, and Finance. Begin by giving the backgrounds of key management members. Discuss the market size opportunity, but more importantly describe the customer need with compelling anecdotal information. The product presentation should not dominate the discussion. A demo can be helpful in explaining the concept. Conclude with a brief presentation on your financial performance, projections and capital needs.

Finish the meeting on time. Ask about next steps and follow-on information and never be shy about calling the venture partner for follow-up feedback.

It is often said that in the current scenario it is easy to raise money for startups in the e-commerce space vis-a-vis biotech/medtech arena. Can this skewness be lessened and how?

ND: Entrepreneurship in India is definitely on the rise, and goes far beyond traditional business ideas. It is now no longer looked at as a risky activity. Over the last 3 years we have seen flood of investments into startups majority of them though have been internet based or technology platform dependent. Most e-commerce ventures have been a copy-cat model, inspired by success stories in the US or China. Many of these ventures don't show profit. What they have is an idea, which gains investor validation and customer acceptance.

One of the reasons for significant investor interest to these new-age internet and tech businesses has been because

they allow you to create new revenue lines and disruption, often without large sums of initial capital. Contrast this to most biotech ventures, except for those with a services model, which require significant capital and have high gestation period for product to get to market. So while such companies have also attracted investments, they have been few and far between.

While one has seen some slowdown in e-commerce ventures this year, all indications are that entrepreneurship in India will continue to be technology-led for the next several years.

What kind of alternative routes are present for raising capital besides VC/PE? Is there path for a startup/SME to raise from public exchange?

ND: Yes, both the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) and have created separate exchange platforms to list small and medium companies. Both have their own criteria for listing. For example, BSE SME Exchange stipulates that the company should have net tangible assets of at least INR 1 crore as per the latest audited financial results. Net-worth (excluding revaluation reserves) of at least INR 1 crore as per the latest audited financial results and track record of distributable profits (excluding extra-ordinary income) in terms of section 205 of Companies Act, 1956 for at least two years out of immediately preceding three financial years, with each financial year being a period of at least 12 months. Otherwise, the net-worth shall be at least INR 3 Crore.

Similarly, NSE Emerge stipulates that the post issue paid up capital of the company (face value) shall not be more than INR 25 crore and the company should have track record of at least 3 years. Besides the company should have positive cash accruals (earnings before depreciation and tax) from operations for at least 2 financial years preceding the application and its net-worth should be positive.

BIRAC has funded close to 250 startups and entrepreneurial individuals? What would be your advice to them as they strive for business excellence?

ND: Entrepreneurship is about producing a good product or a service, solving problems in the society and being profitable. Be driven by these and everybody will like you. ■

Bio-pharma in India Transforming Biopharma

Arun Chandavarkar
CEO and Joint Managing
Director, Biocon



Arun Chandavarkar is the Chief Executive Officer (CEO) & Joint Managing Director at Biocon Limited, one of Asia's leading bio-pharmaceuticals companies.

He has played a critical role in the growth of Biocon during the past 25 years. He has a degree in Chemical Engineering from the Indian Institute of Technology-Bombay, Mumbai and holds a Ph.D. in Biochemical Engineering from MIT, Cambridge, USA. He joined Biocon as General Manager - Operations in 1990, took on the role of President - Operations & Technology and subsequently became the Chief Operating Officer in 2006. He is currently Chairperson of the National CII Committee on Biotechnology for the year 2016-17.

You have helped shape the growth of the largest Indian biotechnology company. What are your reflections on the way the ecosystem has evolved over the years?

The Indian biotechnology sector has grown from a handful of fledgling start-ups to a vibrant industry encompassing diverse skills and capabilities in discovery research, development and large scale bio-manufacturing. India is now well-placed to emerge as a high-value, low-cost innovator in bio-therapeutics, vaccines, enzyme technologies, GM crops and Bioinformatics. In the realm of biopharmaceuticals, India has emerged as the world's largest vaccine producer and is aiming to replicate this success with biosimilars. In agri-biotechnology, the use of genetically modified Bt-Cotton has made India a leading producer of high quality cotton. The country has also started to exploit the opportunities in genomic sequencing, big data health analytics and scientific data mining. All of these initiatives are targeted towards addressing national as well as global needs in health, nutrition, energy and environment.

What are the emerging areas in biopharma that the Indian biopharma industry can take advantage of- are there specific areas within the biosimilar space that is exciting for Indian majors to explore? What are your thoughts on the current biosimilar regulatory landscape? Can the co-diagnostics space be leveraged too? Is India ready for integration of personalised medicine as standard care?

Having already established a leading global position in vaccines, the next biggest commercial opportunity for the Indian biopharma industry lies in biosimilars. These have the potential to provide affordable access to complex and expensive biologic therapies for a variety of chronic diseases. Besides addressing the rapid increase in the incidence of non-communicable diseases like diabetes and cancer in India, a few Indian companies are also positioning themselves to address the unfolding global opportunity, which is estimated to reach USD 25-35 billion by 2020.

In terms of biosimilar regulations, India has been among the front-runners, having unveiled guidelines back in 2012. Indian regulators have kept pace with the fast evolving nature of global biosimilars regulations by recently announcing updated draft



guidelines for biosimilars based on high science and a strong clinical rationale that will enable such drugs to be developed and brought to the market in an affordable and expeditious manner, whilst ensuring quality, safety and efficacy.

Advances in the field of biomarkers and analysis of data on specific genetic mutations or expression could be leveraged to develop 'companion diagnostics' that gauge the response of patients to a particular treatment. Better selection of potential responders through invasive and non-invasive bioanalytical techniques and continuous monitoring would also reduce the burden on healthcare costs besides improving patient outcomes. Similarly, targeted genome editing technology such as CRISPR provides opportunities for developing platforms for early diagnosis and treatment of inherited disorders most of which have no cure.

The steep drop in costs of sequencing the human genome has allowed Indian scientists to make rapid strides in the adoption of new techniques in genomic and proteomic sciences, which could lead to medical therapies that are personalized to an individual's genetic makeup. Indian biopharma companies can also explore the prospects offered by advances in cell therapy, which is providing new hope in curing a number of debilitating diseases.

Manufacturing especially biopharma manufacturing is a prime policy target in India. What are your suggestions for a conducive manufacturing environment in India? Please elaborate.

India is already viewed as the pharmacy to the world through its success in small molecule generics and vaccines. We must not lose this competitive advantage and, in fact, do all it takes to replicate this success in the biopharma sector. The biopharma space is both research and capital intensive with long gestation periods for product development including clinical trials. Hence policy initiatives should be geared to encourage and de-risk such investments.

The government has a major role in this fast changing, globalized competitive environment through quick implementation of policies supporting infrastructure, relevant skill development, smart regulations which are globally aligned yet appropriate to the needs of the country and other healthcare initiatives. The technology intensive nature of bio-manufacturing leads to a strong dependence on expensive R&D; so policies that encourage R&D would have synergies with those that encourage bio-manufacturing. Creating a bio-manufacturing ecosystem would benefit from streamlining the regulations around technology transfer, use of contract manufacturing and services and delinking of manufacturing regulations from product approvals especially for exports. Many countries have preferential government procurement policies to encourage local manufacturing subject, of course, to appropriate cGMP and product quality.

A vibrant industry would need to tap into an excellent skilled workforce? What are the existing skills gaps you notice and how can these be bridged?

Biotechnology, like any other knowledge-based industry, requires an industry-ready workforce to fuel it. However, biotechnology is a catch-all phrase that spans research and drug development, diagnostics, agri-biotech, enzymes, biomanufacturing, analytical and bioanalytical services, clinical operations, delivery devices, e-health, etc. Hence, skill development can only build upon a strong fundamental core curriculum in the basic disciplines of biochemistry, microbiology, cell biology, fermentation and bioprocess engineering, etc. Specialization or targeted skills can be subsequently cultivated as part of post graduate programs or sector-specific finishing schools. The needs of the industry straddle the high end skills needed for discovery research and product development to the vocational skills required to operate biomanufacturing facilities or routine laboratory analysis. A one-size-fits-all approach would probably not be the best to support the diverse needs of industry and research institutes.

Biocon has many partnerships including those with academia. What are your thoughts on strategic nature of industry-academia collaborations? What are the key ingredients of successful partnerships? How can Indian industry and academia work together? On a related note can BIG companies & startup work together?

Industry-academia linkages are critical to enhancing the value of the biotech sector. Globally, most thriving biotech ecosystems are anchored around centres of academic excellence which not only include the scientific and engineering research universities but also premier teaching hospitals where much of the translational research takes place. Whilst much attention has been focussed on trying to improve the collaboration between academia and large industries, the most fruitful outcomes typically come from interactions with start-ups and spin-outs from universities.

Presently, collaboration between industry and academia is restricted to relationships with one or two faculty through consulting assignments or one-off problem solving projects. A much deeper and broader relationship can be had when academic institutes create an internal cluster of labs and researchers working on diverse yet related aspects in a chosen area. This allows for the creation of centres of excellence in universities or teaching hospitals which facilitates the creation of intellectual property portfolios.

Academic institutions can also be encouraged to set up incubators and accelerators preferably in partnership with business schools and hospitals. The cutting-edge research being done by small start-ups will attract established companies to collaborate with them.

There is a new vibrant life science startup ecosystem developing in India? BIRAC has supported more than 250 startups and entrepreneurs? What is your advice to the young entrepreneurs as they pursue growth of their enterprise.

By definition, entrepreneurs are those who are willing to take risks and challenge the status quo. They need to quickly attract a small but strong core team who not only share their vision and values but bring in complementary skills and execution excellence. A key skill is the ability to articulate the essence of the business value and the underlying unmet need. Whilst entrepreneurs remain focused on their vision they should not lose sight of the differentiation required to stand out in a crowd, or gain first mover advantage in a rapidly changing and competitive environment.



Yigal Erlich
Founder, Chairman &
Managing Partner
The Yozma Group, Israel



Yigal Erlich is the founder of Israeli venture capital industry and one of the most prominent figures in the Israeli high-tech arena in the past 15 years. Founder of the Israel Venture Association and its former Chairman. Mr. Erlich served as the Chief Scientist of Israel's Ministry of Industry and Trade between 1984 and 1992.

Instrumental in the establishment of several bi-national industrial and technology R&D cooperation agreements with Canada, France, the Netherlands, Singapore and Spain, Mr. Erlich also started the Technology Incubator Program that led to the creation of 24 Incubation Centers throughout Israel.

He has also served as the Deputy Chairman of the National Research & Development Council of Israel (until 2010) and as the Chairman of MATIMOP, a nonprofit government entity focused on promotion of industrial R&D. He has worked as a consultant to several national governments including New Zealand, Korea, Canada, Latvia, Slovakia and Estonia.

Israel Emergence of a Start-up Nation

Welcome Mr Erlich, you have been instrumental in shaping the technology and innovation driven industry in Israel especially through a focused approach of establishing Yozma in 1993. Can you reflect on the early days of Yozma- the reason for it being established and the then landscape of technology led industry in Israel.

Yozma was planned by the CSO, chief scientist office (heading by me at that time) in the ministry of industry and trade (today the ministry of economy). The CSO was then as now the main organization that funds technology innovations, mainly in companies. It works in a very simple manner, based on matching funds principle, meaning that the maximum a company can get is 50% of the cost of a project. The government part is a kind of conditional loan, i.e. if the project fails, the government loses too and if it succeeds the company pays royalties to return this loan + interest. Any company, big or small, can apply and receive this kind of grant as far as they can convince that they have an innovative idea which they be able to commercialize and that they hold enough financial resources to match. The budget was split in ratio 1:1 for big companies and small ones. We noticed that in the long term we don't receive good results from our support in the small companies sector. The problem was that from one side they succeed in performing their development plan but fail to create a real company. The consequence was that they lack abilities in marketing and management, exactly what VC is there for. We didn't have VCs at that time, so it was just natural to start seeking for it.

The CSO policy was not to define for the companies what to develop, but to let them initiate any innovative idea that can be commercialized. In fact what happened was that technologies were developed according to the people skills, so you could find many in semiconductors, fabless, communication, medical devices, enterprise software etc.

Yozma focused on development of three industries in Israel initially- Communications, IT and Life Sciences. What was the strategy behind picking these three domains?

Again, Yozma as well as the CSO did not define these industrial areas. It happened that most of the talents of Israeli engineers and scientists are in these areas. Of course, each and every project and company was evaluated according to its abilities and the market potential, this dictated the future rise of these industries. Having said that, one can't forget the fact that the beginning of the Israeli technology came from defense and agriculture needs which put the basis of human resources and knowledge for future focus in the outcome industries.

Israel is globally known for being the 'Start up Nation'. What are the underlying factors and flux that created this dynamism? Was there a subterranean 'entrepreneurial energy' that needed an outlet? Has this been reflected in change of societal perception on entrepreneurship and entrepreneurial culture?

A startup nation is not created in one day, not even in ten years. It is an evolutionary process and the establishment of an ecosystem enables it. Of course there is a need for several conditions that will help it happen. One of them, the entrepreneurial energy is deep in us. I don't know what makes someone entrepreneur, may be it is genetic inheritance, or a learning process, or maybe it comes when you have no choice but to do it yourself. But no doubt that Israel after its inception had no choice but to do almost everything by itself, a fact that forced many people to think out of the box and to create many means, especially in defense and agriculture in order to survive. I am sure that during the years there has been a change in social perception of the people so that today probably entrepreneurs are at the top of the list of people's admiration. But I would guess that it is more because of the rate of success of many of them than just being entrepreneurs.

How did you convince the Government in Israel to participate in the endeavour to establish Yozma especially bringing together the Government and Orbimed?

The case of Orbimed, which came long after Yozma was privatized, was different. I was asked by the ministry of finance to help find the right way for similar ecosystem that Israel has in ICT. The problem was that there were small number of VC funds in Israel for the bio industry as well as presence of too few big-pharma companies. The ministry thought to use Yozma model which was successful more than ten years ago. They made a bid and offered good incentives but not too many applied. I used my good relations with one of Orbimed partners, whom I knew, from a previous investment that we did together and convinced him that this program is a win-win for Israel and Orbimed. They were chosen because they are one of the best bio-funds in the world who had some former experience in Israel. They raised more than two hundred million dollars and are very successful.

When you reflect back on almost a quarter century (23 years!) of Yozma- what have been the high points of this journey?

We changed the climate of investments in technology companies in Israel- from a story of too many failures to many high successes. Yozma created in short time 10 VC funds that could provide \$250 Mn to small companies. It was the best catalyst in

the best time for investments (the beginning of the 90's). We brought foreign experienced partners to Israel that could support and provide a lot of help to small companies on top of financing. The success of bringing these groups to Israel as interested partners also created a very important outcome – the creation of networks between Israeli companies and the networks that our partners had. Not least, of course, is the fact of creating many success stories by new companies as well as the success of our funds that 80% of them made a nice return to their investors including the government.

India is going through a massive transformation in the last two decades and especially in the last decade new entrepreneurs are pushing the boundaries of what is possible. The Government of India has also initiated two key programmes- Startup India and Make in India. What would be your advice for policy changes in driving technology led entrepreneurship in India? How can Government play a catalytic role and find a balanced approach to engagement?

Government should encourage two things. First, taking more risk by companies and entrepreneurs while developing new long term technologies. The best way is to share these risks financially but also backing it in public, because failures are part of it. The public will understand it. In case of success the companies will share it with the government. Second, having more cooperation with world VC fund by attracting them to work in India with local teams.

I would say that the best way to encourage entrepreneurs is not to define for them the preferences of investment policies of the government, but to say that any idea will be judged according to its innovative and commercializable merits and then anyone can get support. Of course, the government can decide on the level of support according to its policy.

BIRAC has funded around 250 biotech/medtech/life sciences startups in India. The milieu of venture funding in India is nascent but growing. We have a vibrant e-commerce and IT startup space. However biotech/medtech/healthcare startup needs are different especially since the gestation periods are longer. What would be your advice to life sciences and medtech startups in India in terms of seeking growth funds?

Well, this is the situation of the sector not only in India. Private investors don't like to put down money for too long and institutional investors don't like to show losses on their balance sheets for too long. For them some technical solutions can be found, but the basic fact that medical and bio companies need much time to show returns is a real obstacle. First, I hope and believe that some new technologies will be developed in order to cut the time of preclinical tests and then the clinical trials itself, with the cooperation of the regulatory agencies. I don't know how but it must happen. The government should think of ways that will make it easier for the investors to jump in. Maybe a buyback plan after some years or such. Also support and encourage corporate funds to participate and Government funding can facilitate the situation.

Where do you see Israel's tech industry in the next decade? How do you see Yozma Group evolving? What are the new areas that Yozma is strategizing on? How can we connect Indian and Israel startups especially life science/medtech startups?

Israel will continue to lead in several areas of technologies because of its strength in human resources and good number of experienced serial entrepreneurs. So the legacy of this sector which fits the trends in the world will make Israel continue to lead and keep the top position as startup nation in the world. It is also possible that more startups will decide to take the chance to create big companies and to lead Israel to be less "startup nation".

I believe that cooperation between countries help both sides. India and Israel have a lot of common characteristics. They should use the fact that one is small and fast and the other is big with endless potential to create successful companies, leading in the world.

MEDTECH : The Next Leap



Siraj Dhanani
Founder and CEO
InnAccel Pvt.Ltd.

Siraj Dhanani is the Founder and Chief Executive Officer of InnAccel Pvt. Ltd., a medtech Incubator. He co-founded PharmARC Analytic Solutions Pvt Ltd. in 2004 and served as its Chief Executive Officer. His 12 years of experience spans market research, health economics, pharmaceutical marketing, pricing and reimbursement and licensing activities with Bristol-Myers Squibb, as well as healthcare investment banking, capital raising and deal structuring activities for healthcare companies. He is a successful entrepreneur, investor, and healthcare professional and an active angel investor in MedTech and information technology startups.

India and most other developing nations face a key constraint in providing affordable and quality healthcare to its citizens. This constraint is medical technology—the devices, diagnostics, and equipment used in delivering healthcare. In India, like elsewhere, Western imports make up over 65% of the medical technology market and effectively serve only the high-income, tier 1, “global Indian” consumer. These technologies are unaffordable for the rest of the market and have very little alignment with our healthcare ecosystem (with its skill, resource and infrastructure constraints).

The medical technology market in India, and global emerging markets (GEMs) is exploding. By 2025, MedTech spend is expected to cross \$40 billion in India, and \$250 billion in GEMs. These markets require a whole new wave of innovation to address their needs - **Affordable Innovation**. This is innovation aligned with extreme price-sensitivity and severe constraints endemic in these low-income, self-pay markets. This is NOT *jugaad*, but innovation accompanied by rigorous, standards-driven, yet frugal engineering. Affordable MedTech Innovation has a global market, and India can be the global leader if the right ecosystem is created. Such innovation can also form the basis of a flourishing MedTech manufacturing industry in India, serving both Indian and global healthcare needs.

The Government of India (GoI) can enable the creation of such an enabling ecosystem in partnership with industry and academia, and catalyze a whole wave of innovation, entrepreneurship and manufacturing. This effort can be guided by a hugely successful program instituted by Israel in 1990s to gain technology leadership in key areas, notably MedTech. In 7 years, the program created 24 world-class technology incubators, a complete ecosystem with private management and venture capital, and a growing pool of MedTech companies that have made Israel the “outsourced MedTech innovator” for the developed world. Singapore is implementing a very similar program explicitly directed at taking leadership in MedTech—but is again likely to focus on developed world markets.

India can take learnings from the Israel model, and create a program that aims for global leadership in MedTech for GEMs in 7 years. How is this possible? Well, today there is no national ecosystem or platform that is innovating for GEMs— a \$250 billion opportunity. India, with its large and growing domestic market, strong clinical and engineering talent, and a

Newsletter of BIRAC

flourishing entrepreneurial culture, is well poised to take global leadership in Affordable MedTech Innovation. In 7 years, India can create world's first platform innovating for Indian and global emerging markets - with world-class technologies, processes, and systems. The result can be a whole new paradigm in medical technology - one that can disrupt even developed markets, while transforming healthcare in India and GEMs.

There are already several steps being taken by different departments in the Govt. to create such an ecosystem, notably by Dept. of Biotechnology and BIRAC. These steps can be consolidated into a holistic program that leverages public resources, private capital and expertise, and academic excellence, to create a world-class, innovation-led, MedTech industry. Such a program, as outlined below, has benefits of scale, limited public investment, measurable outcomes, and a reasonable time frame of 7 years to achieve global leadership.

1. Create a national database of critical unmet needs

This can be developed using the Stanford Biodesign methodology, and supplemented by input from panels of top clinicians in each field. This can provide innovators with a list of validated problems to address, and direct their innovation in relevant areas. Target 50 critical needs identified by 2018.

2. Create a dedicated grant funding mechanism for MedTech research

Similar to, or as part of, the BIG program run by BIRAC, a dedicated mechanism to fund idea-stage research (pre-proof of concept) in priority areas of medical technology. This fund should be for individuals, research teams, and companies, and should be adequate to support 6-12 months of early stage research. Target awarding 200 such grants in 7 years, with a focus on projects working on needs identified in 1).

3. Set up world-class medical technology incubators

Create 6-8 world class MedTech incubators, with state of the art R&D infrastructure, prototyping facilities, etc, in partnership with leading academic and clinical institutes. Invite private parties to operate these incubators, with government providing operating support for 5-7 years, after which the incubator should be self-financing. Give preference to grant-funded teams from 2) for incubation.

4. Provide seed funds for incubated projects

After the proof of concept stage is achieved, a team requires substantial seed capital (INR 2-5 crores) to engineer a world-

class product with the right market fit. Such capital is not easily available for MedTech startups from India's angel investor and venture capitalist community. The Government can set up seed-funds at each incubator (in partnership with the private operator, to share the financial risk) to invest in incubated projects. Such seed funding should be designed to get a team to a regulatory-certified, world-class product ready for launch in 2-3 years-when the team should be able to access venture capital. Target seed-funding for 100 projects in 7 years.

5. Align public procurement with indigenous innovation

Public procurement, both at central and state levels, needs to be aligned with innovation that is directly addressing Indian needs. While the steps above will spur such relevant innovation, it will be restricted to sectors dominated by the private sector, as long as public healthcare is seen as an unviable market by innovative startups. This can be addressed in a variety of ways, only some of which are listed below:

- Make GoI the first buyer of products developed for unmet needs identified in 1). This can be through a guaranteed minimum purchase commitment (of say INR 5 crores) for products that can demonstrably show safety and efficacy in addressing the problem.
- For public procurement, introduce "Human Factors Analysis" requirements to ensure that the product works effectively in the actual public health setting in India. This would automatically favor products that have been developed for, and with, Indian care givers, and will also nudge global manufacturers to focus heavily on usability in the Indian context.
- Most public procurement today is done through a multi-bid tendering process, which is designed for commodity products with several suppliers. For innovative products that are created, and sold, by just one company, the procurement process becomes extremely complex. Create a simple direct contracting path for products that can demonstrate that there is no equivalent product in the market.

India today has the opportunity to be the global leader in Affordable MedTech Innovation- while transforming healthcare for its billions. Capturing this opportunity requires a holistic approach addressing all elements that make a vibrant innovation ecosystem, and if done right, can make India a leader in an emerging \$250 billion global industry. ■



Social Innovation programme for Products: Affordable & Relevant to Societal Health

on AGEING and HEALTH

With focus on

GERIATRICS and ASSISTIVE MEDICAL TECHNOLOGIES

In an endeavour for adding life to years, the challenge is open for:

- Assistive Products and Technologies
- Innovative Devices for helping mobility, hearing, incontinence, Orthoses, etc. Spectacles & Therapeutic foot-ware for elderly
- Technologies for managing emergency conditions
- Home-based personalised Products
- Management of age related diseases
- Fortified food for senior citizens
- Techniques for Life Style alternatives like Pill organisers, Travel aids, Communication card, Software for better medication adherence
- Affordable and Innovative Diagnostic Tests

The call is also open for **Social Innovation Immersion Program (SIIP)** to support young Innovators / Entrepreneurs through SIIP partners.

We seek only online Expression of Interest from stakeholders on or before 30th September, 2016

For further information please refer BIRAC website or contact

Sonia Gandhi, Sr. manager, BIRAC at sparsh.birac@nic.in



Department of Electronics & Information Technology
Ministry of Communications & IT,
Government of India



ELECTRONICS INDIA
Support. Incentive. Enable. Create.



Biotechnology Industry Research Assistance Council
(A Govt. of India Enterprise)

Watch your innovation makes a difference in the field of Medical Electronics

BIRAC in partnership with DeitY invites Proposals for **Industry Innovation Programme on Medical Electronics (IIPME)**

With an aim to support cutting edge technologies in multi-disciplinary areas of Medical Electronics.

Proposals are invited for medical technologies ranging from handheld point of care devices to large equipments, wearable gadgets to outreach devices, and from health tracking devices to RADAR technology based ultrasound machines.

Focus Areas

- Imaging and navigation
- Technologies for chronic diseases
- Convergence of medical device and bioinformatics
- Increasing the outreach through medical electronics

What's in for Applicants?

- Funding support for testing the bold ideas
- Mentorship from various subject matter experts and KOLs
- Networking Platform
- Opportunity to scale up the validated technology/product

The proposals are invited till midnight of 10th March 2017 & will be short listed three times during the period. The last dates for considering proposals for evaluation are 10th July 2016, 10th Nov 2016 and 10th March 2017

We seek online 'Letter of Intent' from Innovators, Start-ups, SMEs and large Indian companies individually or in partnership / consortia mode.

For further information please visit www.birac.nic.in or contact **Sonia Gandhi, Senior Manager, BIRAC at sgandhi.birac@nic.in**

Biotech Entrepreneurship

Fertilizing Indian Agriculture



Abhay Shendye
Executive Director,
Swasti Agro and
Bioproducts Pvt. Ltd.

Abhay Shendye is trained in the field of microbiology and molecular biology and has a passion for sustainable agriculture. He has 20 year experience of working in this space. He has done technology development for a few companies, and developed market for innovative products. He has one international patent for developing innovative bio-active molecule. His work experience relates to soil bio-fertility, plant growth promotion, and building disease resistance in crops. His key focus is to provide a holistic solution for farmer's problems.

How did you decide to go into entrepreneurship? What were the trigger points for founding Swasti Agro? What gap in the market is the company trying to bridge?

Abhay Shendye (AS): Immediately after my PhD ((1995), I started a commercial R&D firm – Agro BioTech, played roles of consultant, advisor, contract manufacturer, advisor for implementation of 'organic farming'. Finally the core activity was defined in 2011 – manufacture of research based products. In these 18 years, we developed technologies, filed patents, exported products. USAID, World Resource Institute (Washington), Santa Clara University (California) recognized our work. Main focus was on 'soil fertility'. But farmers were happily using chemical fertilizers, and our solution had no value. We shifted focus to "crop diseases" in 2005. The team worked hard to get convinced about the new approach. This led to incorporation of Swasti Agro & Bioproducts Pvt Ltd in 2011. The objective was to "Build disease resistance in plants".

Farmers all over the globe lose up to 90% of their crop because of diseases irrespective of using the curative products (specifically when climate is bad). Swasti developed "disease prevention technology". Swasti approach will prove to be a game changer, solving issues of sustainability, toxic residue, and food security.

How were the initial days of Swasti Agro? What hurdles did you face and how did you overcome it?

AS: The initial years starting from 1995 till 2014 were tough on all fronts. We had no capital. The end beneficiaries – farmers – neither understood our language, nor the offerings and their importance. The short term goals of generating

revenue for the monthly expenses pushed us away from the long term organizational goals. But we did not lose our focus and commitment. At times we had to compromise on salary of founders to nurture the activity. Borrowings and commitments were kept absolutely manageable. We assigned one provisional patent to Camlin Fine Sciences and generated revenues.

Who were part of your initial team? How important is team for a successful venture?

AS: The initial team comprised of technocrats. End users and product marketing agencies were our channel partners. We were learning from stakeholders involved in the process of product commercialization. We looked for mentors and advisors, but did not get much help. In this respect, we started feeling the change in business ecosystem by 2005. But organizationally we were not geared up! We started seeking support from the business ecosystem in 2014. By then Swasti had business traction, had raised a small capital on its own, team was trained in manufacturing and marketing; and more importantly was connected to professional mentors.

How did Swasti seek early stage funding? How did you strategize to access funding? What should startups keep in mind when they are seeking growth funds? Swasti has been recognised through several awards- can you comment on some. Do you think the landscape of venture funds has changed in the country especially for agri-startups?

AS: Raising funds for innovative Agri-input project is very

difficult. Third party validation of the technology often takes 3 – 5 years and is costly. To get returns on investment, the investor must wait for longer durations. So we decided to generate revenues from contract manufacturing till the β version of the product (MVP) could be launched. First 6 months of launching of the MVP, gave us good revenue. At this juncture (2014 December) we got BIRAC BIG award for POC, and we simultaneously infused Rs 27 lakh (borrowed from relatives). This provided us much needed data, validation, and initial customers. Swasti recorded a revenue of 1.28 Cr within a year (2015-16).

Same year we tested ourselves by participating in competitions. We got an award from Villgro for Unconventional implementation. We won ET Power of Ideas, Gold medal at IIGP, and Millennium Alliance award. The training obtained at CIIE, and Goa from Stanford Business School has radically changed our lookout. Mobile for Good award of Vodafone and Digital India Award from Times Network gave us confidence that Swasti's work in digital and tech fields is also on the right path.

Even after all this success Swasti has not raised funds. Funds are required, and we are ready for appropriate dilution. The match making between fund seeker's and funder's needs requires that people with right mindset meet at the right time. The right time for Swasti is still to come!

The funds raised must lead to creation of value for the company and the investor. It may be in terms of impact, company valuation, revenue generation; or a combination of these. The goals may be different for the investor and the investee. Thoughtful match making therefore, is very important. Often an inexperienced start-up burns the raised equity and wholeheartedly chases the founder's innovative idea. We must remember that the capital is for careful implementation – may be a β version of idea – with the objective of value creation.

Who were your early mentors and advisors? How important is for a startups to have mentors? Hows does one choose a mentor?

AS: BIRAC's BIG grant paved way for 'structured development' within Swasti. TiE Pune mentored us under their "Nurture Program". Swasti always looked upon experienced and educated farmers as informal mentors. We sought advice, and discussed with professionals and our role models. But, the onus of the final decision was always on the Swasti team. This is particularly very important when the mentors are honorary. Very recently we have started building a board of professional advisors, where the responsibilities and remunerations are defined.

How is Swasti Agro thinking to scale? Which other markets are you looking to enter and how are you strategizing to enter new markets? You recently went to Africa, what kind of opportunities does the continent present to companies like Swasti? What are the barriers for scale?

AS: Swasti has a huge potential to scale provided we cross a few more hurdles. The biggest one is the 'last mile delivery'. When the farmers understand how to use the products, and see the benefits; we have tens of thousands of crore rupees worth market just within India. Kenya as an exporter to Europe, needs our technology for growing residue free produce. There are unmet needs in USA for crops such as oranges, soya bean and wheat. There are specific problems of 'organic state' Sikkim. There are problems associated with mountain terrain in whole of North-East and Bhutan. Swasti technology can add value in each of these cases. Proving the worthiness of technology in such strategic markets, and providing high touch base to end users for proper dissemination of the technology is key to success.

There is an immense potential in the agri sector including secondary agriculture? What kind of policy changes need to happen to tap into this opportunity?

AS: Agriculture industry is yet not organized. Statutory requirements must become simpler for implementation and at the same time more transparent for all stakeholders. The policies related to agriculture produce such as import-export, minimum assured prices offered to farmers, and inflation control, many a times counteract against each other. Often market forces take undue advantage of this situation, and neither farmers nor consumers are benefited under any of the circumstances. A firm baseline defining macro and micro economic priorities must be drawn for the benefit of the citizens of this country. Fair strategies will automatically evolve through implementation of this baseline.

Any advice to would be entrepreneurs.

AS: My belief is that when I am innovative, I am trying to do things differently. Then how can I expect that people around me understand it thoroughly well and provide me right advice? Each innovator is unique. He or she must find his/her own way to success. Waiting for right advice is never going to help. But I use a rationale, and it is worth sharing.

When everyone questions my decision, then I think-Is it not perfectly aligned with my innovation thought process? And if it is, that it is probably the correct decision! ■

Grand Challenges



The mandate of Grand Challenges India (GCI) programme is to address some of the critical challenges confronting health and development issues in India. The initiative is further strengthened with the Wellcome Trust, UK, joining the collaboration. The Programme fosters Indian innovation and research to develop affordable and sustainable solutions to improve health and ensure well-being of humankind globally.

Addressing Global Challenges

The GCI fosters innovation and research to develop affordable and sustainable solutions to address some of the critical challenges confronting health and development issues, ensuring well-being of humankind. The initiative is collaboratively supported by Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India (GoI), Bill and Melinda Gates Foundation (BMGF) and United States Agency for International Development (USAID) to improve public health and beyond. Under GCI framework, projects of both young and established investigators are piloted. The research efforts mainly caters national and societal needs focussed to accelerate progress and ensures that advanced

technologies reaches to developing countries masses. Funders, investigators and other stakeholders actively collaborate and follow global access commitments to ensure the fruits of their research are available to those most in need.

Since its inception three successful calls have been launched under GCI initiative:

- The goal of **first initiative “Achieving Healthy Growth through Agriculture and Nutrition”**, launched under GCI framework was to fund a portfolio of Indian-led pilot projects that seek to target the relationship between agriculture, nutrition, and health and to reduce the high

incidence of low birth weight and early stunting and wasting among Indian infants through interventions.

During BIRAC **Innovator Meet** scheduled for September 22, 2016, Innovation Marketplace was an unique opportunity to showcase these product/prototype/technologies developed by GCI Innovators and facilitate investor-grantee interface. Three “Achieving Healthy Growth through Agriculture and Nutrition” grantees have been selected to showcase their innovation during the event. The grantees will demonstrate their prototype/POC/ model and give presentation highlighting key components of their studies.

- The **second initiative, “Reinvent the Toilet Challenge”** mainly encouraged grantees to drive research and development of low cost, eco-friendly and efficient ‘next generation toilets’.

Over 40 million urban households (excluding slums) are not connected to drainage, leaving waste from toilets in open drainage channels and causing sanitation problems as a result of exposure to water contamination, and pathogens including bacteria, helminths, etc. This number of affected households correlates to more than 4 million existing community toilets that would benefit from a disinfection system. The Indian government considers that another 120 million toilets need to be built to end open defecation by 2019, at a current program cost of US \$30 billion (India Government Swachh Bharat program). A system thus dealing with septic tank effluent at community level via disinfection to internationally accepted safety standards at a cost below US \$2000 per installed toilet would imply an investment of US \$8 billion over time, which is a fraction of the annual cost caused by inadequate sanitation.

In this regard, project titled “**Empowered septic tank as decentralized wastewater treatment system**” has been funded to BITS Pilani. The proposal is aimed at developing an electrochemical technology for effectively sanitizing septic tank effluent by destroying both bacteria and helminth eggs fulfilling discharge requirements. An electrochemical technology sits after discharge point of a septic tank and disinfects the effluent. The technology aims at maximal simplicity through minimal mechanical processes. Septic tank effluent passes through the electrochemical cell and sequentially goes through high and neutralizing pH regimes. The system does not rely on hazardous chemicals and does not generate additional unpleasant odors. The electrical element operates at a relatively mild voltage and current, and is housed in a container that the user does not interact with, and thus poses no risk under normal operation. The system can be effectively incorporated into existing community toilet structures.

The core group involved has developed an electrochemical

cell unit able to disinfect septage. The unit is highly compact (for community toilet the reactor volume is about 50L) and can be deployed on new sites as well as via retrofitting in existing sites. The system comprises of two electrodes separated by a membrane or separator, housed in a polymeric vessel and is connected to a small pump. The system is controlled by a dynamic power supply, which will be able to deal with flow variations. The system can be mounted directly after a septic tank, or can be implemented as a combined roughening wetland – electrochemical cell. In the latter case, higher levels of organics removal can be obtained at lower energy investment. The system is now deployed at its most basic level, for disinfection, but can be adapted later on to achieve nutrient recovery. The system has been successfully demonstrated for a single household. Construction for 100 people equivalent is completed and scientific investigations are in progress.



Electrochemical vector connected to a septic tank for a single toilet

- Although, birth defects, adverse pregnancy outcomes and developmental disabilities in children are interrelated functions of several known determinants. Incidentally, much remains unknown about the root cause. The “**All Children Thriving (ACT)**” launched as a **third call** under GCI framework intends to investigate novel cost-effective measurement tools and mechanisms to combat unhealthy birth, growth and development. The program by putting best strategies in place try to adequately alleviate the burden of birth defects, adverse pregnancy, outcomes and developmental disabilities in children.

Technical Advisory Group Meeting

One of the proposal funded under ACT portfolio is “**Improving linear growth of children in low income settings through household supported integrated nutritional environmental WASH and care interventions in pregnancy and early**

childhood” by Society of Applied Studies (SAS), New Delhi, India. The study was planned with a vision to improve newborn, child and maternal health, and nutrition in India through high-quality, population-based research leading to development of effective interventions and design of novel delivery strategies.

The PMU-BIRAC along with World Health Organization co-hosted a Technical Advisory Group (TAG) meeting for reviewing the proposed design and interventions of this important and interesting full grant study on 8th and 9th of September 2016.

Several national and international TAG experts gathered to independently provide scientific and technical strategic advice on linear growth study. The experts reviewed the proposed study design and interventions (nutritional, environmental WASH and care) with the aim to ensure putting best strategies in place.

They provided best optimum ways for delivery of proposed interventions. The discussion was also taken as to what will be the outcome measures and how it will be measured. The proposal seems to be ambitious with potential to deliver significant learning about the maximum expected impact of known interventions to promote linear growth, packaged together, delivered at distinct time points, in birth mothers.

TAG emphasized that attention should be paid to how each component of intervention will be delivered with high compliance. It was also stressed that continuous monitoring the program for evaluating the program parameters it is imperative to make nodal officers working at three different consecutive levels.



TAG Meeting: Linear Growth Study

Other Proposed Initiatives

Knowledge Integration and Translational Platform:

The maternal and child health (MCH) and nutrition are pertinent public health issues in developing countries of the world. Addressing these health challenges are not only the key to foster nation's progress but are also crucial for attainment of Sustainable Development Goals (SDGs). In view of these concerns the GCI launched a unique Knowledge Integration and Translational (KnIT) Platform. The mandate is to enable a structured process for knowledge synthesis and a robust mechanism for timely transfer and integration to help impact in MCH and nutrition. The KnIT will mainly support the state and federal governments in India to help design programs to facilitate integrations of new interventions on MCH, nutrition and other related relevant areas in a manner that promotes the comprehensive integrated development of health systems in India.

The KnIT platform has been structured in a very benign manner, the two Domain Centers identified for KnIT platform are; the Society of Applied Studies (SAS), New Delhi, India (for nutrition issues) and International AIDS Vaccine Initiative (IAVI), India (for MCH issues).

Planning Committee Meeting KnIT

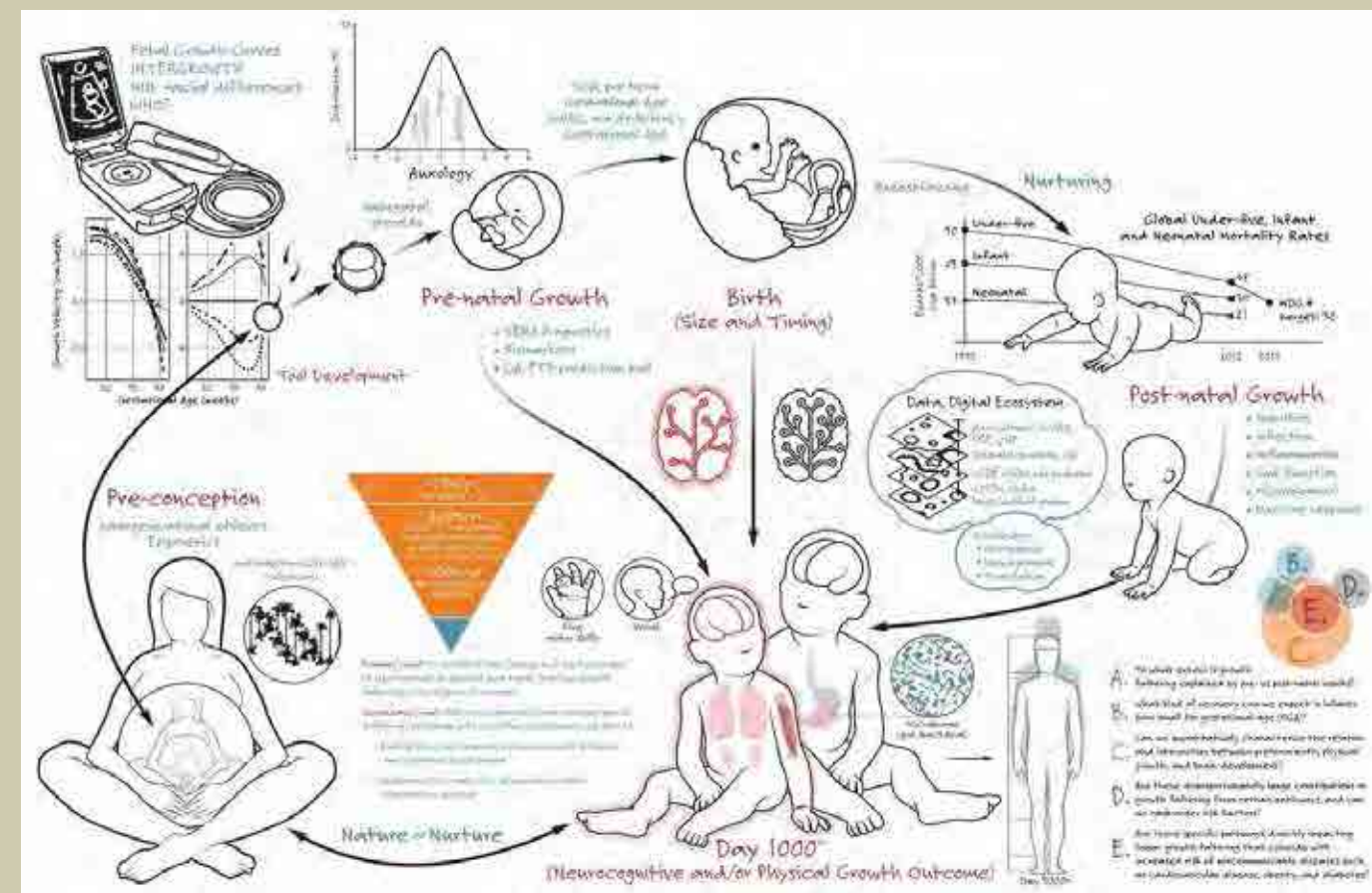
The first Planning Committee Meeting of KnIT was held at IAVI, India Office on 22nd July 2016. The meeting was held for consultation on the need to reform and strengthen the Primary Healthcare (PHC) system in India.

In this meeting emerging key issues in PHC were discussed. As poor state of PHC delivery system is reflected in slow economic development, high maternal and child mortality rates, and no improvement in nutritional status of the nation. It was emphasized that revitalization of primary level health delivery system in India is mandatory, through data capturing on existing PHC system needs, its success, its limitations and scope of future improvement. It was deliberated that knowledge integration and experience based guidance is mandated for effective and equitable health care services. Discussion regarding the Health Care System Design Center were also made, the program is focused on new innovations coupled with future health care system.

The members tried to address the lacunae in the present PHC system (in terms of infrastructure, human resources, and service provision), examine the existing knowledge gaps and strive path for establishing effective PHC in India. All members were

in view that in order to have a clearer picture/ sense of merits and demerits of PHC in India; devising ways to make health systems more equitable, inclusive, and fair in near future; it is essential to come out with evidence based documents. Such documents will be generated through systematic reviews and can be later taken up for policymaking.

Healthy Birth, Growth and Development Knowledge integration (HBGDki): India Consortium has been launched with the aims to facilitate the integration of knowledge to quantify determinants of variability and heterogeneity of effects on growth and development. Healthy Birth, Growth and Development Knowledge Integration (HBGDki) Initiative platform will establish, a certain of the health information developed through clinical trials, observational studies, surveys and the like that would be beneficial to fostering the global health research goals. 22 data sets from 17 possible contributors from India have been short listed to sign the agreement. ■



Healthy Birth, Growth and Development Knowledge integration

2016 BIO International Convention Fostering Convergence

Organized by the Biotechnology Innovation Organization (BIO), 2106 Bio International Convention drew 15,937 industry leaders from 76 countries. Educational program included 157 sessions which addressed the latest business opportunities and breakthroughs in medicine, diagnostics, the environment, energy production, food and agriculture and more.

The Indian Pavilion was inaugurated by Dr. Kiran Majumdar Shaw. The public sector was present in force with representatives from State of Karnataka, Bangalore Bio-innovation Center, State of Telangana, T-Hub, State of Andhra Pradesh, Department of Biotechnology, Govt. of India and BIRAC. Several Start-ups and law firms represented the private sector in the event.

As a discussant in panel discussion on “India-Thriving



Opportunities for Life Science Start-ups”, Dr. Shirshendu Mukherjee, Mission Director, BMGF-Wellcome trust-DBT-BIRAC gave an extensive overview of the landscape consisting of Government Initiatives, funding, mentoring and the policies that are shaping up in India to promote entrepreneurship and startups. ■

Development and Improvement of Strains for Biomolecule Production Skiing Researchers

BIRAC organized a three-day hands on Training Workshop on “Development and Improvement of Strains for Biomolecule Production” in collaboration with DBT-ICGEB Centre for Advance BioEnergy Centre, ICGEB, New Delhi.

The total number of participants in the workshop was 14 from, drawn from different enterprises. The expert faculty associated with the workshop were Dr. K J Mukherjee (JNU), Dr. Naseem Gaur (ICGEB), Dr. Amulya Panda (NII), Dr. Shishir Srivastava (ICGEB) and Dr. Rishi Jain (Praj Industries).

The training program focused on modern tools and techniques used in experimental research in the area of strain development and improvement for the production of biomolecules. The three day training covered in-depth genetic engineering approach which included DNA



cloning, PCR, genome editing and systems biology. The purpose of the training programme was to upgrade skills and generate trained human resources in the related sector.

The program gave the participants a hands-on experience in genetic engineering paradigm for strain improvement and industrial biotechnology applications. ■

India-Africa Health Sciences Meet Shared Goals

Three day India-Africa Health Sciences Meet was jointly organized by Indian Council of Medical Research (ICMR) and Ministry of External Affairs from 1-3 September 2016, in Vigyan Bhawan, New Delhi. Four Ministries of Govt. of India namely Ministry of Health and Family Welfare, Ministry of External Affairs, Ministry of Science and Technology and Ministry of Commerce collaborated in the conduct of the event “A Smart and Caring India for a Healthy Africa”.

Inaugurating the event, Union Minister of Health and Family Welfare, Shri J. P. Nadda said, “The Indian and African health agenda are reflective of the importance that the nations are giving to the achievement of universal healthcare in the most feasible time frame”.

Dr Harsh Vardhan, Union Minister of Science and Technology and Dr. Soumya Swaminathan, Director General, ICMR outlined the similarities between India and the African countries and how partnerships in the health sector can be strengthened. Dr. Jitendra Singh, Minister of State for the Ministry of Development of North Eastern Region, addressed the Valedictory Session of the Meet”.

This meet offered a common platform to policy makers, technocrats, scientists, medical specialists, researchers and industry leaders from the two regions.

Eight BIRAC supported innovators presented their technologies at the Innovation Showcase Platform organised by ICMR as a part of the meet. ■



BIRAC PROGRAMMES

SITARE (Students Innovations for Advancement of Research Explorations)

BIRAC SRISTI GYTI AWARDS: Aimed at supporting the innovations and creativity at grassroot level among the university students, including individual innovators.

eYUVA (Encouraging Youth for Undertaking Innovative Research through Vibrant Acceleration)

- **University Innovation Clusters (UIC):** UIC initiative seeks to create an entrepreneurial culture in the Universities and help students to take their novel ideas to proof of concept.
- **SIIP (Social Innovation Immersion Programme):** A fellowship programme that builds the next generation of social entrepreneurs by helping them 'immerse' and interface with communities to identify gaps and then work on bridging the gaps through an innovative product or service offering.

Discovery, Early and Late Stage Funding

- **BIG (Biotechnology Ignition Grant):** Biotechnology ignition Grant (BIG) is available to scientists, entrepreneurs from research institutes, academia and startups, to stimulate commercialization of research discoveries by providing very early stage grants to help bridge the gap between discovery and invention.
- **SPARSH (Social Innovation Programme for Products Affordable & Relevant to Societal Health):** SPARSH combines social innovation and biotechnology for the well-being of the society by helping identify and support cutting edge innovations towards affordable product development with potentially significant social impact. SPARSH provides support in the form of impact funding and fellowships.
- **SBIRI (Small Business Innovation Research Initiative):** It is the early stage, innovation focussed PPP initiative to support incremental R&D in the area of Biotechnology to facilitate innovation and risk taking by SMEs.
- **BIPP (Biotechnology Industry Partnership Programme):** BIPP seeks to provide support for early to late stage high risk biotech R&D by industry and/or accelerate commercialization of new indigenous technologies.
- **CRS (Contract Research Scheme):** CRS scheme supports academic institutes to take forward research leads through a validation and translation cycle by the industry. Funding is in the form of grant given to both the academic as well as the industrial partner.

BIRAC BioNEST (BIRAC – Bioincubation: Nurturing Entrepreneurs for Scaling up Technology)

Birac's Flagship programme which has created 15 world-class bio-incubators to provide incubation space, mentor networks, instrumentation facilities, IP and technology management support.

Collaborative Funding

- **Indo-French Centre for the Promotion of Advanced Research (CEFIPRA):** Support high quality bilateral research, encourage and enable Indo-French collaboration between public, private research groups, industry, clinicians and end-users in the domain of red biotechnology.
- **Wellcome Trust, UK:** Support innovations in translational medicine in the domain of diagnostics for infectious diseases.
- **Grand Challenges India (GCI):** A consortium of DBT, Bill & Melinda Gates Foundation, Wellcome Trust, USAID, and BIRAC, focussing on supporting innovations in the areas of maternal and child health, agriculture and nutrition, sanitation and infectious diseases.
- **USAID and IKP Knowledge Park:** Support for new diagnostic tools for TB, with funding commitment of INR 5 crores for 3 years.
- **Horticulture Innovation Australia (HIA):** BIRAC-HIA Joint funding programme for supporting innovative technologies and solutions for sustainable and productive horticulture at a global level.
- **NESTA, UK:** BIRAC partnership with Nesta, a charity organization in UK, is aimed at supporting Discovery Awards Programme for innovators working for innovative diagnostics for anti-microbial resistance (AMR).
- **Industry Innovation programme on Medical Electronics (IIPME):** BIRAC in partnership with DeitY (Department of Electronics and Information technology) launched IIPME for supporting innovations in medical electronics and med devices sector.

Equity Funding

- **SEED (Sustaining Enterprise and Entrepreneurship Development) Fund:** Financial equity based support to start ups and enterprises through bio-incubators for scaling enterprises.
- **AcE (Accelerating Enterprises) Fund:** A Fund of Funds to scale-up R&D and innovation in biotechnology domains of sectors such as healthcare, pharma, medical devices, agriculture, sanitation and many more.

FORTHCOMING CALL FOR PROPOSALS

BIPP (Oct 15-30 Nov) | SBIRI (Oct 15-30 Nov)

For further information please contact:

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