In Conversation

A Dialogue with Dr. Prashant Singh, Chief Operating Officer, Bhubaneswar City Knowledge and Innovation Cluster

— Adita Joshi

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*Dr. Prashant Singh standing outside the BCKIC building.
Image credits: Bhubaneswar City Knowledge and Innovation Cluster*

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Image credits: I-STEM website*

Feature Story

I-STEM Facilitates Free Access to the LabVIEW Platform for Indian Academics

— Neena Ratnakaran

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Science and Technology Clusters

A Jodhpur-Based Digital Museum to Showcase Bone & Horn Handicrafts

— Rachana Bhattacharjee

On 2nd and 3rd July 2022, a hall at the Indian Institute of Technology (IIT) Jodhpur brimmed with a myriad of products made of bone and horn. This was a two-day open house exhibition cum sale organised by the Jodhpur City Knowledge and Innovation Foundation (JCKIF), jointly with IIT Jodhpur.

*A variety of bone and horn handicrafts.
Image credits: Jodhpur City Knowledge and Innovation Foundation*

IN CONVERSATION

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Image credits: Bhubaneswar City Knowledge and Innovation Cluster

A Dialogue with Dr. Prashant Singh, Chief Operating Officer, Bhubaneswar City Knowledge and Innovation Cluster
— Adita Joshi

The Bhubaneswar City Knowledge and Innovation Cluster (BCKIC) has its genesis within the broader programme of the establishment of science and technology (S&T) clusters across India by the Office of the PSA. BCKIC's guiding principles aim to create inclusive S&T infrastructure in the eastern Indian state of Odisha, identifying key regional challenges and working on strategic areas of national importance. We spoke to Dr. Prashant Singh, the CEO of BCKIC, about BCKIC and his roles and responsibilities.

Ever since Dr. Singh became a Ph.D. student at the Delhi-based International Centre for Genetic Engineering and Biotechnology (ICGEB), innovations have been a centre of his attention and enthusiasm. He recollects his fascination with adopting next-generation sequencing technology during his early research days in 2005. Later, he moved to the industry in the field of molecular diagnostics and clinical sequencing at Roche diagnostics, where he honed his skills and scientific expertise in a commercial setting.

It was while working with industry that he learned the fundamentals of academia–industry interplay across diverse technological innovation domains. His experience at the Foundation for Innovative New Diagnostics (FIND) gave him a 360-degree view of the synergy between knowledge innovation and the commercial market and the deployment of these innovations across communities. With this experience, Dr. Singh chose to enter into his present role at BCKIC.

In conversation with us, he talks about activities unique to Odisha, technology innovation projects, and BCKIC's evolving relationships with knowledge partners and stakeholders.

BCKIC's verticals

BCKIC has six verticals spanning environmental innovation, societal innovation, industry, and business integration. These cover everything from food and nutrition to waste-to-wealth, wetland management, advanced materials, biosciences, and polymer sciences.

BCKIC's waste-to-wealth activities revolve exclusively around mining waste, which can be used to create value, thus giving a huge impetus to the growth of the region. To circumvent the problem of chromite overburden, the cluster plans to develop processes to recover nickel and cobalt and remove chromium via the treatment of mining effluents. Along similar lines, the process and technology for extracting rare materials from bauxite residues and using fly ash (from power plants) to create ceramic wall tiles are being worked out.

The wetland vertical focuses on understanding the microbial diversity of Chilika lake. Chilika is battling anthropological and cyclonic issues, and about 150 km^2 of the lake is covered with a reed called *Phragmites karka* which has affected its water holding capacity, resulting in its gradual shrinkage and posing livelihood challenges for the fishermen. BCKIC's efforts are targeted at managing the reed as biomass to create value-added paper products and providing employment opportunities to local fishermen.

The biosciences vertical is working to create a diagnostics innovation hub and introducing components of commercial manufacturing to deliver technologies that may impact human health. This sector is less capital intensive because Bhubaneswar is home to established medical institutions, technology incubators, start-ups, and knowledge experts. Dr. Singh believes that together these can conceptualize multiple diagnostic devices and solutions. Here, the cluster's role will mostly include helping these entities receive the right assistance for regulatory clearances and secure platforms for prototyping, validation, and clinical trials.

BCKIC operates with a multi-sectoral and multi-project approach

BCKIC takes a multi-vision, multi-project, and multi-sectoral approach, where it works with diverse stakeholders with different needs, wants, and challenges. The cluster functions based on

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Local Water Body Rejuvenation Project in partnership with IITians For Influencing India's Transformation (IIT–IIT)
Image credits: Bhubaneswar City Knowledge and Innovation Cluster

a cross-collaboration model between academia, industry, philanthropic organisations, and the state government, to look for inclusive solutions and to seek technology support for solving the problems that have been identified in the region.

Dr. Singh informs, *"To start with, we have performed a granular mapping of the resources and infrastructure, available technologies, the centres of excellence flourishing in the region, the knowledge expertise on hand, industry strengths, and start-ups with TRL3 potential. Second, we identified problems that are need-based, region-based, industrial, or societal, and prioritized them for sustainable solutions that will be helpful for everyone."*

The cluster's ideology is to start with R&D activities on solutions that are ready to be commercialized or to initiate product development for innovations with potential commercial value, and end with the deployment of the same, thus connecting the whole loop of technology development and translational think-tank aspirations.

"BCKIC is spearheading efforts to empower the industry with newer, viable, scalable, and environment-friendly solutions that align with their current needs. We also work with start-ups to promote new products and prototypes in the market. Through these efforts and in this process, BCKIC tries to emulate major thrust areas of the government," noted Dr. Singh.

> *Unless you have the people's participation, the chances of success and sustainability are lower.*
> — Dr. Singh

Generating employment, integrating marginalised populations

BCKIC is the knowledge partner of the Jajpur district administration and is providing the local artisans of Jajpur access to technology that can help increase the shelf life of bamboo. Further, a 'Bamboo Academy' to train these local artisans to better their products and on reaching out to national markets, is also being conceptualised.

Another area of future attention will be creating opportunities and imparting skills and knowledge to forest dwellers/tribal groups, and generating

value around Odisha's indigenous resources and produce. Dr. Singh explains, *"Our projects align with the local resources. At the same time, we try to integrate marginalised sections so that success is shared among research institutions, industry, and businesses, along with the people. Unless you have people's participation, the chances of success and sustainability are lower."*

Team and capacity building at BCKIC

From innovation managers to intellectual property managers, business development managers, and programme managers for outreach and other activities—BCKIC is building a very strong team to facilitate the cluster's work. In addition, experts from academia and industry are onboard for guidance and consultancy. The cluster's team is a good combination of senior expertise and young enthusiasm and dynamism.

> Dr. Singh adds, *"We are not only recruiting competent people, but also constantly working to upskill our team members through participation in policy workshops, techno-commercial workshops, and other training programs that enable them to understand the vast S&T scenario and its interface with society."*

The Bhubaneswar cluster has had capacity-building initiatives mostly for its waste-to-wealth vertical through workshops on bioplastics, promoting environmental technologies, and organizing international conferences focused on this area. Several interesting programs are underway to boost the start-up ecosystem across the state of Odisha. BCKIC works closely with Odisha's S&T Department, Odisha Bigyan Academy, and the Odisha State Higher Education Council to propagate the start-up culture, with emphasis on innovation, design thinking, etc., and attract more youth to the innovation enterprise. Recently, the cluster organized a ten-day boot camp for students across 12 cities to teach, guide, and motivate them to take up entrepreneurship and join S&T business enterprises. In the future, the cluster plans to strengthen its capacity to support the national missions in artificial intelligence and machine learning.

Practical learnings

When asked about the challenges he has come across in his short and new journey as the leader of BCKIC, Dr. Singh says, *"Think of BCKIC as a conglomerate which is working in sync with many organizations. A common challenge has been when you have to pick one out of four possible solutions coming from different stakeholders."* He shares that these decisions have to be taken while keeping everyone aligned and on the same page. He adds that such tricky situations often demand that the stakeholders have a shared vision, and so far, BCKIC has been able to build that trust with the right approach and has garnered support from all stakeholders.

A more difficult part of Dr. Singh's job is not only managing projects that have been approved but at times denying projects that don't align with the larger vision and mandate of the cluster. *"While interacting with stakeholders, we have to keep things simple, generate trust, highlight our strategic focus, and present a foolproof implementation plan,"* he adds. He emphasizes the importance of developing good networking and conversation skills, as one has to interact with domain experts and experienced leaders within the cluster.

"As a cluster, we want to be humble, simple, and grounded in the sense that we are here to strengthen and deliver the right solutions and not to complain and criticize."

— Dr. Singh, when asked about BCKIC as a brand.

Dr. Singh describes himself as a person who prefers to keep things simple, supports constructive ideas, gets along well with partners, and endorses critical thinking over criticism. He is optimistic that some of the tech solutions at BCKIC will be on the ground with the help of the right people, the right networks, and the right outreach. His goal for BCKIC is to be able to integrate technologies on a common platform using the strengths, resources, and capabilities of the state of Odisha.

ABOUT THE AUTHOR

Adita Joshi is a science education and communication consultant, and a freelance science writer

FEATURE STORY

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Image credits: I-STEM website

I-STEM Facilitates Free Access to the LabVIEW Platform for Indian Academics
— Neena Ratnakaran

Globally, for over three decades now, a certain platform has been a staple for engineers and scientists across industry, academia, and the community at large. LabVIEW, short for Laboratory Virtual Instrument Engineering Workbench, is a graphical programming platform for building automated research and test systems.

Originally developed by National Instruments (NI)—a company headquartered in Austin, Texas, USA—LabVIEW has thus far been a software for which a license needs to be procured at considerable expense, which limited its use in India. But now, a collaboration between NI and I-STEM (Indian Science Technology and Engineering facilities Map; an initiative by Indian Institute of Science Bangalore, supported by the PSA Office) has made it accessible to all Indian academics via a national license (at public expense).

LabVIEW's launch on I-STEM

I-STEM is a portal that hosts R&D facilities in institutions across India and makes them accessible to researchers pan-India. At its launch in 2020 by the Hon'ble Prime Minister of India Shri Narendra Modi, it was envisioned as a dynamic and interactive platform that can provide support and facilities to needy researchers to strengthen the research and development ecosystem in the country and make it self-reliant. To date, I-STEM has procured national licenses and provided free access for academics to two widely used software platforms for R&D and learning: COSMOL Multiphysics and MathWorks/MATLAB.

This—as Dr. Sanjeev Shrivastava, National Coordinator of I-STEM at IISc Bangalore, has noted—has benefited thousands of researchers

nationwide. Now, **to access LabVIEW, researchers need only to log in to the portal and register for the software.**
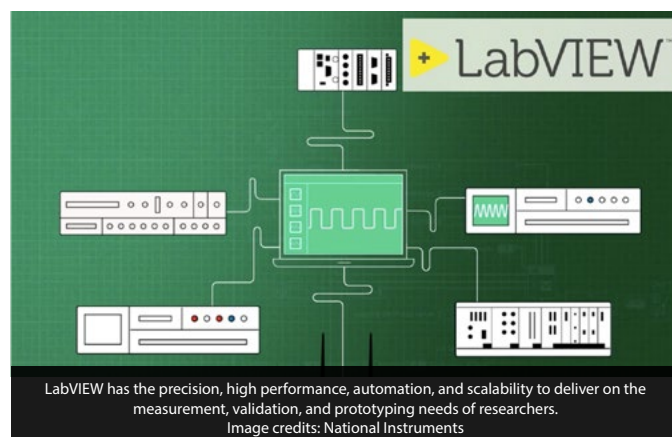
Speaking at the event to mark the launch of LabVIEW on I-STEM, Prof. A. K. Sood, Principal Scientific Adviser to the Government of India, called it *"another feather in the cap of I-STEM."* He noted the impact that the addition of this platform would have, remarking that it would be a great booster for collaborative research and innovation in the country's R&D sector. He said, *"...this is a big step. And the fact that it (LabVIEW) is also available to startup companies, especially in deep-tech innovation, can go a long way..."*

The launch was followed by two technical presentations on LabVIEW by experts from NI, who talked about the support that their company is dedicated to providing to users of the platform. This would include online videos and other instructional material, along with need-based training sessions. The launch event was attended by participants from across the country.

What can researchers achieve with the newfound free access to LabVIEW?

In a nation that is seeing rapid technological progress and moving towards smart societies, the possibilities with LabVIEW are myriad. LabVIEW can be used to drive the automation of practically every instrument and data acquisition hardware. Moreover, it facilitates connectivity with other systems and protocols/tools (even in other languages!). This can considerably reduce the costs involved in setting up separate, hardware instrumentation, which is often expensive and complex, which in turn means that small academic labs and startups that do not have the necessary funds to set up the required hardware instrumentation, can instead use virtual instrumentation via LabVIEW.

Notably, LabVIEW uses a graphic interface that allows the user to easily create the required flow by joining various elements together, and it runs on Windows, OS X (Apple), and Linux operating systems, making it suitable for most computing systems.

LabVIEW has the precision, high performance, automation, and scalability to deliver on the measurement, validation, and prototyping needs of researchers.
Image credits: National Instruments

In effect, LabVIEW can be used to build automated test systems for various kinds of analysis, measure physical systems with sensors, validate electronic and experimental designs, visualize potential outcomes, easily identify and fix errors in designs, and devise smart equipment, making it useful in fields ranging from package delivery to defense and everything in between.

What's more, it can also help in teaching concepts to engineering students!

Considering that access to LabVIEW will be given not only to academicians but also to startups, Prof. Sood said at the launch event, *"Deep-tech start-ups do need such high-end facilities, and I am sure with time, as more such startups set up in our country, this will have an [enormous] impact in the startup ecosystem."* Indeed, using LabVIEW can bring about minimal experimental errors, high throughputs in less time, more accurate and reproducible data, and even safer environments!

Ready and painless access to this platform can be a gamechanger in the Indian research ecosystem, enhancing scientific discoveries and innovations by leaps and bounds. Echoing this sentiment, Mr. Priyachandar, Country Head, Indirect Sales, at NI, India, said at the launch that the addition of LabVIEW to the I-STEM portal will *"change the dynamics of the Indian research ecosystem."*

In short, this industry–academia collaboration is all set to have a powerful impact on science, technology, and innovation in India.

ABOUT THE AUTHOR
Neena Ratnakaran is a freelance science writer and editor.

SCIENCE AND TECHNOLOGY CLUSTERS
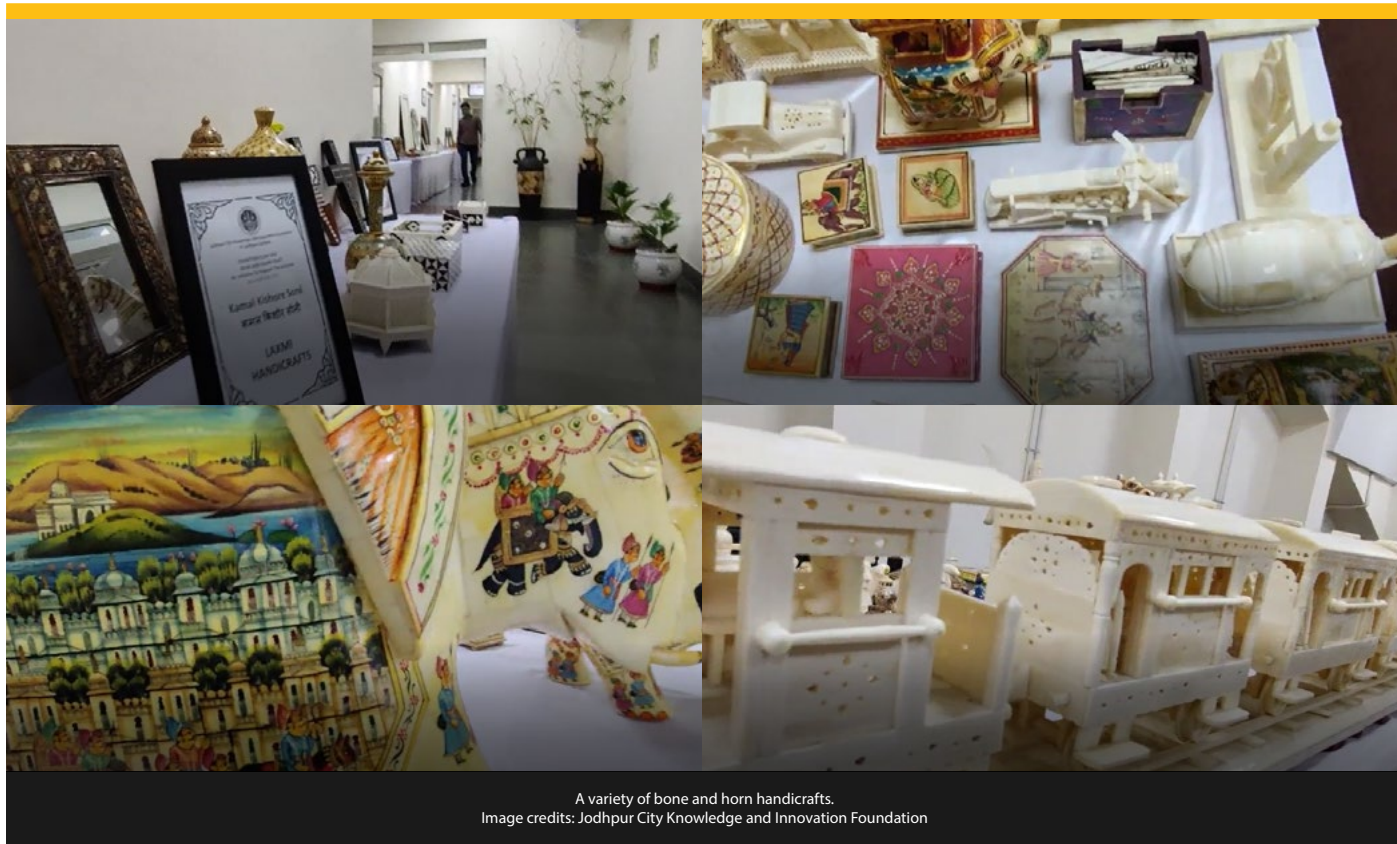
A variety of bone and horn handicrafts.
Image credits: Jodhpur City Knowledge and Innovation Foundation

A Jodhpur-Based Digital Museum to Showcase Bone & Horn Handicrafts
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On 2nd and 3rd July 2022, a hall at the Indian Institute of Technology (IIT) Jodhpur brimmed with a myriad of products made of bone and horn; one could find everything from a model of the Taj Mahal to coffee tables, models of trains and buses, handbags, jewellery, and a variety of decorative items, all intricately carved and painted, some purely from bone and some made of bone embedded in wood. This was a two-day open house exhibition cum sale organised by the Jodhpur City Knowledge and Innovation Foundation (JCKIF), jointly with IIT Jodhpur.

The event, inaugurated by Prof. Sampat Raj Vadera, Deputy Director of IIT Jodhpur, displayed products by seven local handicrafts manufacturers and had robust footfall. Other dignitaries who were present included Prof. Abhimanyu Kumar, Vice Chancellor of Rajasthan Ayurved University; Mrs. Seema Kavia, RAS Registrar at Rajasthan Ayurved University; and Mr. Abhishek Surana IAS, CEO, Zila Parishad.

Speaking of the motivation for conducting this event, Dr. G. S. Toteja, CEO, JCKIF, who was a key member of the organising committee, said, *"Our goal is to help these artists in the unorganised sector promote their work, not just here in Jodhpur but worldwide, so that their work is appreciated, they see good sales, and this industry progresses."*
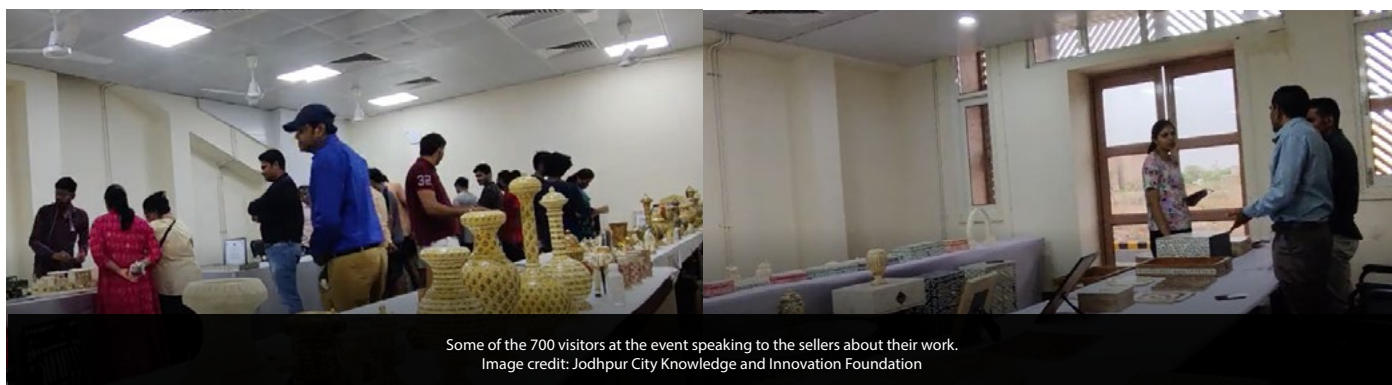
Some of the 700 visitors at the event speaking to the sellers about their work.
Image credit: Jodhpur City Knowledge and Innovation Foundation

To help these artisans with global marketing, JCKIF is creating a digital museum of their products. This is a crucial initiative, catalysed partly by lessons learned from the economic hit the handicrafts industry took during the first two years of the COVID-19 pandemic: when the manufacturers' brick and mortar establishments were forced to close down, their poor digital literacy, difficulty in understanding English, and the complex paperwork on e-commerce portals prevented them from keeping up sales online. This, in addition to the fact that the 200+ marketing events and fairs that the government helps organise for them every year did not occur, created a major revenue shortfall for the industry.

Exhibitions such as this one and initiatives for digitisation—including upskilling in digital technologies—will prove to be key steps for reviving these artisans' livelihoods. And when it comes to the latter, JCKIF becomes a major player as the Jodhpur Science and Technology Cluster, operating under the aegis of the PSA Office.

Dr. Toteja explains, *"One of JCKIF's key responsibilities as a science and technology cluster, is to facilitate collaborations among local institutes to first identify knowledge and technology gaps in the handicrafts sector, and then design and implement digital technologies for value addition in this sector. Our goal is to preserve the richness of this traditional heritage and art in Jodhpur, so that future generations see it thriving. To date, we have held several workshops to assess the needs of artisans working in block printing, tie and dye, leather mojhari, and bone and horn crafts. And now, here, at IIT Jodhpur, we are enabling these bone and horn artisans, equipping them for the future through digitisation."*

A testament to the success of the event are the words of one of the participants: *"This exhibition is doing us a lot of good. It is helping us get value for our work, especially as it takes a lot of time to create something."* The event not only boosted sales and awareness about the handicraft, but also increased respect and admiration for the artisans.

Bone and horn crafts are, indeed, a big part of Rajasthan's handicraft industry and its culture. The goal should be to not only preserve the art and revive artisans' livelihoods, but also ensure sustainability in these aspects. Moreover, this is an environmentally sustainable craft form—with only dead animals' bones being used—and would do well with a boost not just in Rajasthan but across the nation, in states such as Uttar Pradesh, Odisha, Bengal, Karnataka, and Kerala where, too, this is a traditional handicraft form. Perhaps, this exhibition and digitisation initiative at IIT Jodhpur is a step in these directions.
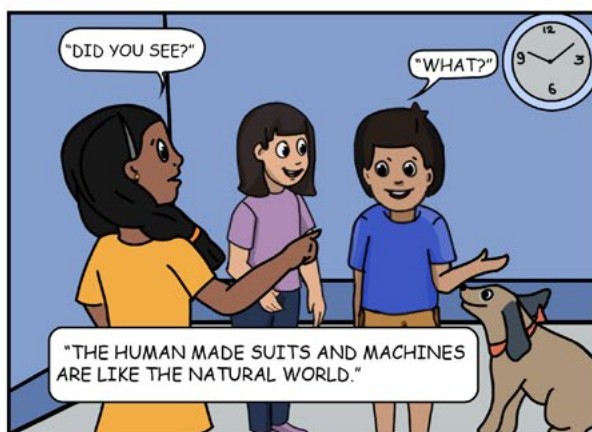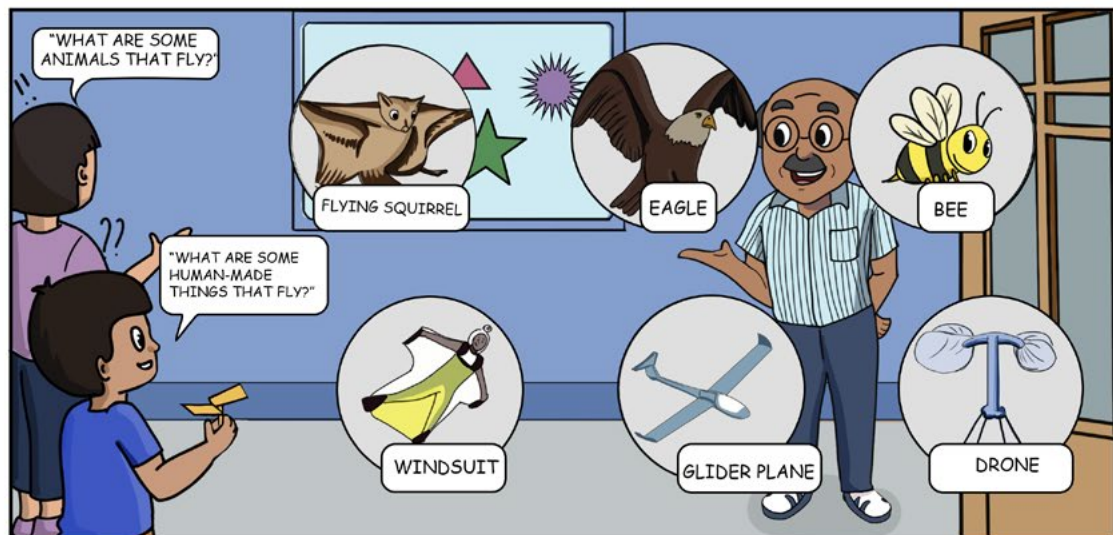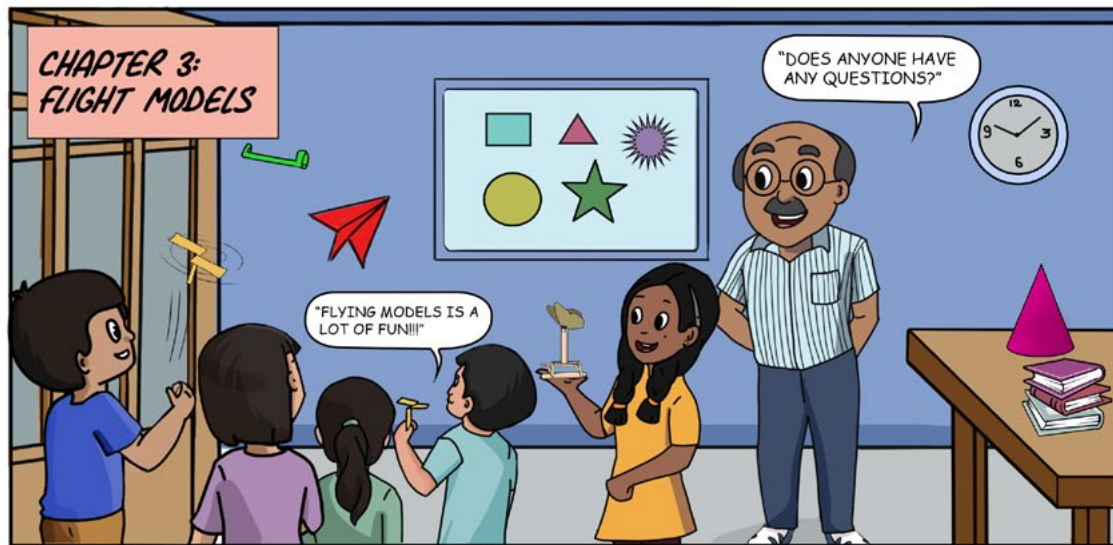

Dr. G. S. Toteja, CEO of JCKIF, with artists at the exhibition.
Image credit: Jodhpur City Knowledge and Innovation Foundation

ABOUT THE AUTHOR

Rachana Bhattacharjee is an author, creative lead, and one of countless chroniclers of the information age.

Adventures of Dadu, Mitti, and Samosa

— Concept and story: Ipsa Jain; Illustration: CrazzyPixels

Want to know more about the evolution of human flight models?
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Ipsa Jain is a scientist turned illustrator. She makes zines, books, stories, and images to share her love and joy for science.