

RUFORUM Case Studies

In Kenya, an Innovating Vice-Chancellor
Leads his University Towards Sustainability

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When Professor Richard Mibey took over as Vice-Chancellor at Moi University in 2006, he faced the same problem that university leaders everywhere contend with: how to nurture a vibrant academic community in an era of ever-dwindling funds. It has long been a fundamental quandary for universities, whose costly core business of producing top quality research – and graduates – seems to have them forever chasing money.

“Funding from donors is never consistent, and neither is funding from governments. For us to be able to run a university and meet the needs of society, we should aim at being self-reliant and having sustainable activities which ensure that research and training is not constrained.”

Professor Richard Mibey, Vice-Chancellor at Moi University

The university has embraced innovation as a means to attaining this goal of greater self-sufficiency, producing both an award-winning natural plant-based fabric dye, as well as the region's first aviation programme, to name just two examples. The university's journey towards innovation began with the purchase of Rift Valley Textiles (Rivatex East Africa), a derelict factory on the outskirts of the town, emblematic of Kenya's moribund industrial sector.

In the past, foreign aid had propped up Kenya's primarily state-owned industries, but as the Soviet Union collapsed in 1991, the previous subsidies received from rivals on both sides of the Cold War fell away, forcing Kenya to open its tightly controlled economy, join the World Trade Organisation, and compete on the free market. One by one, the country's sugar, cotton, coffee, tea, and textile industries went bust. Once the largest textile factory in East Africa, Rivatex closed its doors in 1995, a victim of market inefficiencies and internal mismanagement, as well as the rise of cheap used clothing imports into Kenya.

More than a decade later, Prof. Mibey came across the moribund factory and saw an opportunity for the university to revive business for its own purposes of *“profit, training and research”* – to turn it simultaneously into a hands-on workshop for students of chemical, mechanical, and textile engineering; finance; human resources and other fields – and into a revenue-generation enterprise to help keep the university afloat financially, creating employment at the same time.

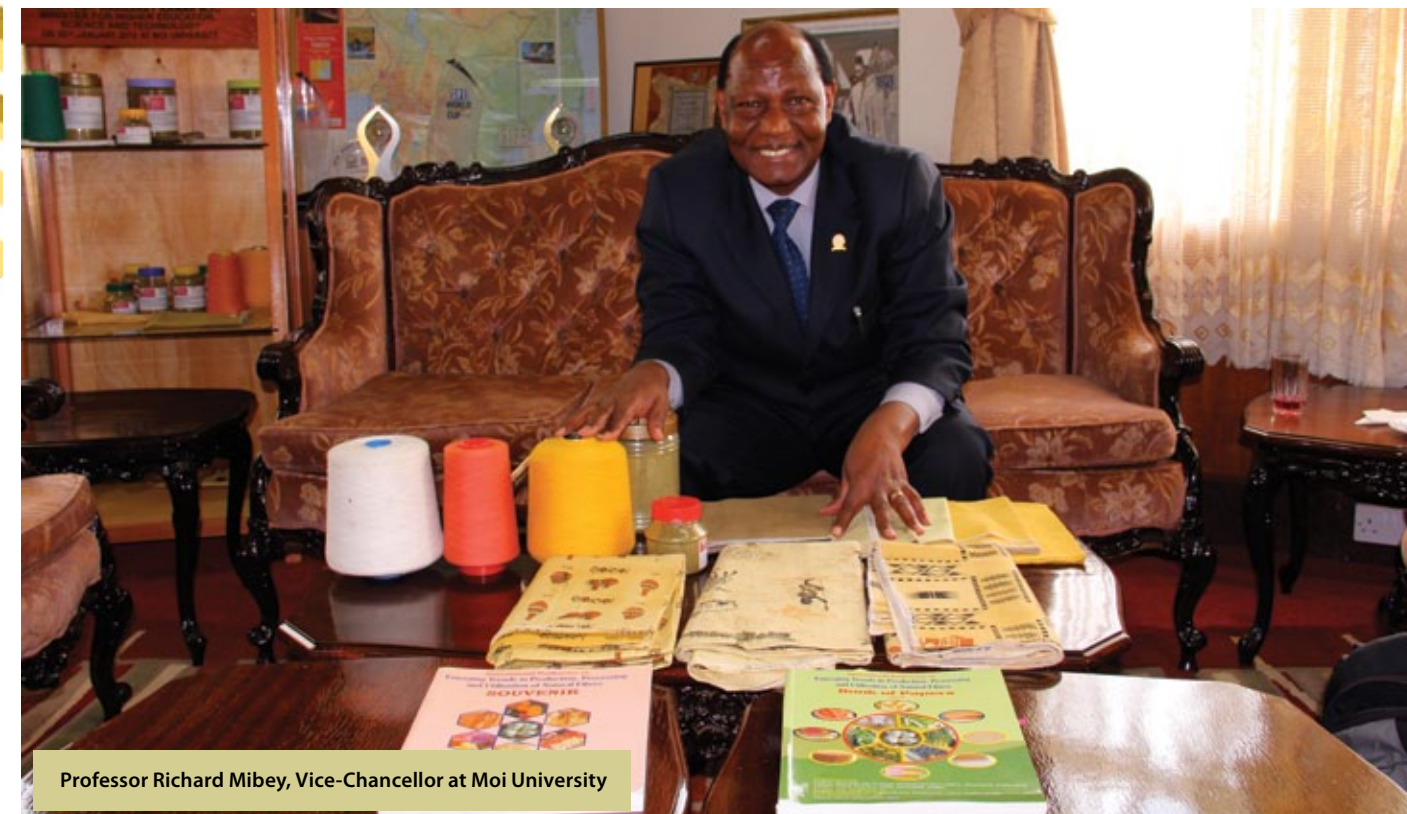
The initial idea was to offer engineering and business students a competitive edge by giving them direct commercial experience as part of their training, thus better equipping them for the workplace. *“In the same way that medical students go from the classroom to the hospital, and go around the wards and see patients, we wanted to make sure that engineering students would have the same kind of training,”* he says.

In its four-plus years of operations, the Rivatex factory has fulfilled that aim, and more. It has also become a driver of innovation at the university, as the challenges of running a commercial enterprise have forced Prof. Mibey and his colleagues to devise creative solutions to their obstacles.

“Instead of complaining, we like to see an opportunity within a problem,” says Prof. Mibey, a prominent mycologist, who is also a Professor at the University of Nairobi, credited with the discovery of some 120 different species of mushrooms, many of them found only in East Africa.

The university's aviation programme is another example of this thinking put into practice. Several years ago, a series of high-profile plane crashes brought issues of air safety to the fore. For Prof. Mibey, who had done his PhD at the University of Oklahoma where a strong aviation programme exists, the problem posed an opportunity to harness the expertise of his alma mater, and work together with the Kenya Civil Aviation Authorities to develop a new programme to fill an unmet need in the region. The university even secured three small aircraft for students to log flying time and gain experience.





For the re-opening of the Rivatex factory, however, the timing could hardly have been less auspicious. The purchase of the factory coincided with Kenya's electoral crisis of 2008, and Eldoret saw some of the worst violence in the country, as the crisis brought out old festering conflicts over land tenure between members of different tribal groups. At the time, roads were blocked by groups of angry youth, and business ground to a halt.

But it was not only the problems of Kenya that posed difficulties. Soon the factory received its first order, for 15,000 square meters of fabric. Because of the conflict, it was difficult to source raw materials, the yarn and thread to be spun and woven. A particular problem was that no fabric dye was available within Kenya.

The necessary dye could only be sourced either from South Africa or India. The managing director of Rivatex, Dr David Rotich Tuigong, made a plan to travel to Johannesburg, but his visit coincided with a sudden explosion of violence against foreigners in South African townships, an episode which made it impossible to obtain the dye. Incredibly, when Prof. Mibey travelled to India a couple of months later for a conference, he also came back empty-handed. His visit coincided with the November 2008 bombing of the Taj Hotel in Mumbai, once again with the result that he could not get hold of the dyes.

The uncanny timing of these two disasters was a stark reminder of how fragile globally dispersed supply chains can be. And it got Prof. Mibey thinking that perhaps the university should rather focus on creating its own dyes, reducing the factory's reliance on costly imports.

Billy Makumba, a researcher in Prof. Mibey's office at the time, was tasked with looking into manufacturing plant-based dyes to replace imported synthetic dyes. As a mycologist, Prof. Mibey felt that mushrooms would be a promising start. Dr Tuigong, also a senior lecturer in textile engineering, also joined the research team.

"We thought we would come up with a dye that's organic, environmentally friendly, and that has very minimal adverse effects,"

Professor Billy Makumba, lecturer in microbiology at the School of Biological and Physical Sciences.



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He travelled to the Kakamega Forest, the last remnant of equatorial forest in Kenya, and gathered various species of mushrooms, particularly those with bright colours. While it was relatively easy to extract dyes from species such as the *Boltus piperatus* and the *Macrolepiota rachoides*, the colour did not always hold fast. Mibey and his co-researchers were able to publish a paper on the results of their experimental efforts, but still they found nothing that could produce a consistently high quality dye. “A number of them were good, but they were not good enough,” recalls Makumba. “We wanted something we could commercialise.”

The focus then moved on from mushrooms to flowers, as Makumba tested a bold pink native flower, the *Iresine herbstti*, which produced a dye bath that was “a promising rich purple” – as well as the *Lithonia diversifolia*, a relative of the sunflower. But still the colours would not hold consistently in fabric.

Finally, he found a plant that worked, the *Targetes minuta*, a bushy, invasive species of marigold originating from South America, whose fine, tiny yellow flowers give off an unmistakably pungent smell.

When he prepared dye baths from the inflorescences, he got solid, intense, and attractive colours. By varying the temperature of the dye baths, the researchers were ultimately able to produce seven different shades of colour from the *targetes minuta*, ranging from lemon yellow to olive green, mustard, rich gold, and tobacco brown. “I said Eureka, this is it,” Makumba recalls. “This is what we were looking for!”

The researchers have named the product Tamidye, an abbreviation of the plant’s Latin name. For uniform colour, the dyeing process involves spreading the fabric between rollers and a hot flue that is connected to a vacuum pump. Now, with a small grant from the government, the university is beginning to commercialise the Tamidye, which is already being used by Rivatex to produce popular yellow shades of printed fabric used for shirts and table cloths.



Already, the potential of the product was recognised at the First African Forum on Science, Technology and Innovation, a continent-wide higher education meeting organised by the African Development Bank and held in Nairobi in April 2011, where Prof. Mibey was voted the “best African innovator” and received an award for the Tamidye invention.

Currently, the dye is also being ground into powder and bottled and sold, at a small production facility on the campus, with plans underway to upscale operations to a commercial scale.

The discovery of the *Targetes minuta* as a source of fabric dye was particularly auspicious, because until now the plant has been a nuisance in Kenya, spreading uncontrollably across farmers’ fields – devilishly hard to uproot once it takes hold. So far, Makumba says, he has been able to source enough of it from asking friends and family members to gather it for him, but soon, he says, they will need to begin growing it on a commercial scale.

“It’s already been a success. It’s safe for the environment, as opposed to the petrochemical-derived synthetic dyes, and at the same time we save costs at the factory, and can sell it and earn extra revenue. And for farmers, instead of complaining about this plant, they can harvest it and get two incomes from the same field. Demand for the dyed cloth is so high now. We are in a position to mass-produce it and earn good revenue.”

Professor Richard Mibey

While Makumba is now continuing his work, searching for other plants to yield natural dyes in other colours – so far, he says he has found a potential source of green – the Rivatex Factory is also gaining ground, says Dr David Rotich Tuigong, the factory’s managing director, and also a senior lecturer in textile engineering.

The factory now employs around 200 weavers, dyers, seamstresses, and tailors, as well as around 150 students, taking part in industrial attachments, from various faculties at any given time. It supplies several shops in Nairobi, Kisumu, and Eldoret, specialising in school uniforms and African prints, and has also received interest from overseas. After three years in operation, the factory began to break even, and is expected to become profitable in 2014.

For now, earnings are invested in on-site research that will add further value to the business, in areas such as treating effluent and generating power from solar and wind energy, as well as biomass from sugar industry waste. The university is also now working to spur a revival of the country’s cotton-growing sector, which currently supplies only a third of the factory’s raw material needs, by supplying free seeds to farmers.

“It’s good to do research, but let it be research that leads to products for commercial purposes,” says Mibey. *“We do not have money to do research for publications that stay on the shelves, that will not take us beyond dependency.”*

As Moi University is a member of the Regional Universities Forum for Capacity Building in Agriculture, a training and research network of 29 member universities spread across the Common Market for Eastern and Southern Africa (COMESA) region, Prof. Mibey sees the university’s experience of commercialising its innovations as a model that could be shared across the network.

In another venture, the university has now developed a maize-meal processing plant to produce maize flour and animal feeds at lower-than-market prices, in response to dramatic recent food price increases. The university has a competitive advantage, says Prof. Mibey, because it can grow maize directly on its farm, eliminating storage and transport costs. Now, they are developing facilities on campus to mill and package the maize meal.

Ultimately, Prof. Mibey hopes that a flourishing entrepreneurial environment at the university will encourage more students to develop their own products.

“Universities are supposed to make life better, and lessen miseries,”

Professor Richard Mibey



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