# In search of the smart shirt

INDIANS are proud of their rich heritage and culture. This includes a silk saree that fits into a matchbox!

A 4½m-long matchbox silk saree weighing about 50g was gifted to Michelle Obama during her visit to India. It was woven meticulously by handloom weavers using two fine filaments in warp and one fine filament in weft of the saree.

We have been donning clothes made of natural fibres like silk, cotton and wool for thousands of years. Synthetic fibres like polyester and nylon were invented about 70 years ago and is now produced in millions of tonnes.

Multinational companies like DuPont and BASF have pioneered synthetic fibre innovations. Stain-resistant and wrinkle-free fabrics are familiar to all of us.

Coeio, a start-up fashion company in the US, aims to change the funeral industry via innovative fabric solutions. The company designs burial products to provide eco-friendly, green funeral options.

In other words, a dead body is returned to the earth without harming the environment. The company also markets products for pets with a catchy tagline — the most dignified and ecological way to say goodbye to your beloved pet.

innovation

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Now imagine smart clothing that can see, smell, hear, communicate, store energy, regulate body temperature, monitor health, is resistant to bullets, and change colour to suit the occasion and our mood!

Turning such dreams into a reality is the goal of a recently announced programme called Advanced Functional Fabrics of America headquartered in Cambridge, Massachusetts.

It is a US$325 million (S$440 million) initiative by the Obama administration to encourage universities and manufacturers to develop futuristic fabrics in order to revive manufacturing in the US.

This is part of a broader vision to create a National Network for Manufacturing Innovation of 15 hubs across the US.

Each hub is designed to serve as a "teaching factory" for workers, start-ups, and entrepreneurs looking to develop new skills or prototype new products and processes.

Turning smart clothing into reality involves amalgamating innovations like quantum computing, cloud computing, nanotechnology, 3D printing, and manufacturing processes.

## Innovative fabrics

Innovative fabrics can harness energy from body movements, light, sound, vibration and store energy and release on demand, among other uses.

Recently, Prime Minister Lee Hsien Loong launched a $19 billion Research, Innovation and Enterprise Plan or RIE2020. 17 per cent of this budget is allocated to facilitate advanced manufacturing and engineering innovations.

As a part of the project, funded by the National Research Foundation, the Lee Kuan Yew Centre for Innovative Cities at the Singapore University of Technology and Design organised a workshop on "wearables" on May 4.

Those who took part in the workshop came from diverse disciplinary backgrounds to envision people-centered approaches for future wearables, especially in healthcare and work.

They imagined "empathy suits" after passionate discussions. The empathy fabrics will help wearers to get to know each other quickly upon contact and reduce the time to render help in the case of medical emergencies.

The Center for Nanofibers and Nanotechnology at the Department of Mechanical Engineering, National University of Singapore has been developing multifunctional nanofibers since 2000.

Its innovations in nanofiber processing and applications are emulated worldwide. Envisioned smart clothing future necessitates further innovations in fibers composition, properties, manufacturing and integration.

Smart clothing is a fertile ground for innovations and entrepreneurship, and interesting proofs of concepts can found on the Internet.

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