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Transforming Systems through Partnership

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ESTABLISHING A BIOPROCESS WORKFORCE IN THAILAND TO DELIVER AFFORDABLE BIOLOGICAL MEDICINES THROUGH BIOMANUFACTURING EDUCATION AND INDUSTRIAL-RESEARCH INTEGRATION

Lead partner: Assistant Professor Dr Lalintip Hocharoen, King Mongkut's University of Technology Thonburi, Thailand

THE PEOPLE

Assistant Professor Dr Lalintip Hocharoen, King Mongkut's University of Technology Thonburi

Professor Daniel Bracewell University College London

Professor Dr Duygu Dikicioglu University College London

Dr Stephen Goldrick University College London

Dr Panit Kitsubun, KinGen Biotech Co. Ltd

Thailand Excellence Center of Life Sciences

THE CHALLENGE

Thailand is among the fastest ageing countries in the world. The proportion of the country's population aged 60 and over is projected to increase from 13% in 2010 to 33% in 2040. Due to Thailand's ageing society, the healthcare expenditure is expected to grow from 400 billion THB (£9.1m) in 2017 to 1.4 trillion THB (£32m) over the next decade.

As Thailand progresses to a fully ageing society, the country lacks the industrial expertise and workforce required to develop biopharmaceuticals to meet the healthcare demands of its ageing population. Biopharmaceuticals are a diverse range of medications produced using biotechnology and encompasses a wide range of products including therapeutic proteins, vaccinees, gene therapies etc. Thailand's future healthcare demand is for around 2,000 personnel specifically in the field of biological medicines and bioprocess engineering.

In addition, Thailand depends on expensive imports to obtain high quality biopharmaceuticals, such as vaccines, therapeutic proteins and antibodies such as Pembrolizumab used for cancer treatment. Relying on imports for essential medicine and vaccines can leave countries vulnerable to supply chain disruptions as was the case during the COVID-19 pandemic and put the health of citizens at risk.

Consequently, establishing a biopharmaceutical ecosystem comprised of a bioprocessing workforce is critical to lowering Thailand's biopharmaceutical imports, increasing access to affordable biological medicines and thereby improving health and well-being.

To solve this challenge, Dr Lalintip Hocharoen and her team embarked on a project funded by Engineering X's Transforming Systems through Partnerships (TSP) programme.

THE PROJECT

The funding from the Academy enabled the project team to design and deliver bioprocessing education through short courses, on-the-job training, and industrial research integration.

The female-led project was supported by University College London (UCL) in the UK, who brought experience in bioprocessing and designing industrial and academic training programmes. The other partners included the Department of Chemical Engineering, King Mongkut's University of Technology Thonburi (KMUTT), KinGen Biotech and Thailand Excellence Center of Life Sciences.

In consultation with UCL and Thai industry partners, the project team **collaboratively** developed the courses and training programme to meet the industrial challenges associated with bioprocess development for biopharmaceutical production in Thailand.

Dr Hocharoen and her team used feedback from questionnaires to design a relevant training programme for Thai industry. These short training courses were delivered to individuals from academia, the private sector and the public sector. The training consisted of fundamental and practical sessions focusing on downstream and upstream processes.

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IMPACT

Thanks to the project, a small biopharmaceutical academic-industry community has now been formed with **15 partnering companies and organisations**. In this way, the project has contributed to **supporting** and **strengthening the biopharmaceutical and vaccine ecosystem** in Thailand creating an ecosystem in biopharmaceuticals and vaccines in Thailand and increasing access to affordable lifesaving drugs.

The project team produced **four short courses, with 270 people from academia and industry in Thailand attending the training courses**.

The project has improved the **technical skills** of Thailand's biopharma industry workforce. In total, **50 people participated in the industrial bioprocess workforce programme** and **gained hands-on experience in techniques** including fermentation and purification of products.

The industrial bioprocess workforce programme has been expanded to include trainings for people from the biotechnology industry such as a beverage companies.

"What I want to see in the future, in terms of a small community or ecosystem, is already happening. It seems we can raise awareness among Thai people that we do have this kind of thing. I was so impressed by what we have done for two years and it shows something promising. I'm happy."

Dr Lalintip Hocharoen, lead partner

As a result of participating in the TSP-funded project, Dr Hocharoen and her team have established themselves as experts in bioprocess engineering and **increased the visibility** of KMUTT and UCL in this area. Dr Hocharoen and her team have been in contact with KMUTT and UCL for consultancy on workforce and biomanufacturing development.

"Being a TSP alumni has helped a lot. I talked to people from the EU and UK, they know the Royal Academy of Engineering. So, that has increased the trust and our credibility."

Dr Lalintip Hocharoen, lead partner

Following on from this project, Dr Hocharoen and her team have **secured a Catalyst Grant** from the British Council Thailand and the Ministry of Higher Education, Science, Research and Innovation in Thailand to form a partnership and knowledge-sharing platform between universities in Thailand and the UK. The Consortium aims to support the advancement of quality teaching, learning and research through human capacity development and knowledge exchange with the UK.

THE FUTURE

Dr Hocharoen is seeking further funding to continue the work made possible by the TSP grant to create Thailand's bioprocess ecosystem. The project team has already submitted a proposal to funding bodies to continue training and research in the vaccine field. The project has received interest from Thailand and other Asian countries, as well as support from the National Vaccine Institute in Thailand, who are interested in building an Asian training hub.

SOURCES:

This impact case study was prepared using information from interviews with the project team, documents supplied by the Academy including reports, and additional online resources.

- Project TSP2021\100124: Application
- Establishing a bioprocess workforce in Thailand to deliver affordable biological medicines through biomanufacturing education and industrial-research integration. Transforming Systems through Partnership final project report April 2023
- Interview with Dr Lalintip Hocharoen
- Economic Research institute for ASEAN and East Asia. (2021) Population ageing in Thailand

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Royal Academy of Engineering
Prince Philip House, 3 Carlton House Terrace, London SW1Y 5DG
For more information: https://engineeringx.raeng.org.uk/tsp