

Not just theory: BT invents with academic partners



How do you predict performance before a network is built, and some of the required components don't even exist? That was the question facing BT and its industry partners as they planned to develop a fibre-optic network to offer customers high-speed internet, cable television, telephone, and other digital communications services over a single line.

Enter BT's University Partnerships, a collaborative programme that gives us, and you, access to the brightest minds in academia. We brought this fibre-optic challenge to our partners at Massachusetts Institute of Technology (MIT), where just 18 months ago a joint BT-MIT team began to create a cost-modelling method for the development of such a network.

BT knew it needed to estimate not only the cost to build it, but also the costs to maintain it, year after year. "There was very good modelling of capital costs, but not operational costs," recalls Steve Whittaker, BT's Head of Strategic US University Research Partnerships and MIT Visiting Scientist. "If you get it wrong, you're living with big surplus costs for several years."

However, there was still something missing: some optical network components had yet to be developed, and no manufacturer could project a timeline or estimate the cost to create them. This meant that there could be no accurate modelling. Again, the MIT researchers stepped up with a solution: they worked with BT to demonstrate to industry partners how to create prototypes of the necessary transceivers.

Innovation on demand

Under BT's leadership and open innovation framework, a team was built, including optical network component manufacturers, module assemblers, carriers, and other key players across the telecommunications supply chain such as JDS Uniphase, Motorola, Telecom Italia, Nokia, and Comcast. Led by principal investigator and MIT Associate Professor Rajeev Ram, the team created prototypes of the components necessary to complete the network.

With the prototypes in place, the modelling could commence. The project has resulted in estimates that give BT the knowledge it needs to move forward. It also proved BT's projection that architecture would affect operational costs, and saved roughly 30% by modelling the network first.

"Right now we've validated a capital expense model and initially validated an operational expense (OPEX) model on small networks (under 10,000 users)," said Ram. "The next step is to validate the OPEX model for much larger networks (e.g., 100,000 users), and to perform further engineering analyses for the OPEX model."

The project is an example of how, through open innovation, a market challenge pushed industry to find a new solution, and how academic researchers can play a role in helping industry drive new technology - all to the benefit of customers.

"This project has not only hit our key objective of producing a new model of operational costs, but has also demonstrated the clear links to good network architecture and design," said Jeff Patmore, Head of Strategic University Research at the BT Group Chief Technology Office. "In this case we have been able to bring a 'real-world' problem to the attention of people with the right skills and interests to work on it, and this has been enhanced by the 'working group' approach, which has brought to the table a number of interested parties to collaborate together."

Putting insight into action

"It's a win-win-win situation for our university partners, BT, and our customers," said Patmore. "The researchers get to see the impact of their work in the real world sooner by working with us; we're able to develop better products on a faster timeline with reduced costs; and in the end, better products plus reduced costs equals happy customers."

Partnerships with leading academic research institutions have long been a strategic component of BT's open innovation programme. This two-way exchange of knowledge enables us to develop better products and services, reduce operational costs to become more competitive, and improve customer relations.

"The relationships we have with universities like MIT and UC Berkeley aren't based on traditional 'blue sky' models of research," says Whittaker. "We work closely with our peers in academia on the most pressing issues and the most transformative opportunities. In doing this, we aim to harness the research process to produce *actionable insight* - a process that draws on academia's business experts as much as it does its engineers."

Global exploration leads to global solutions

BT's University Partnerships extend relationships and research around the world through ongoing programmes at no less than 36 universities. For example, a BT-sponsored PhD student at University of Cambridge is working in both China and the UK to help BT understand the Chinese market and develop better solutions for it.

Thousands of miles away at Braunschweig University of Technology and Magdeburg University in Germany, a team of researchers is working with BT to develop an intelligent tool that helps predict customer service interactions and prevent 'churn' - customer turnover. This will both maintain the customer relationship and save the costs associated with new customer acquisition, important considerations in outsourcing.

All of these success stories are results of BT's University Partnerships. We're able to discover solutions to the known - and the unknown - challenges facing business today by working with these renowned universities. Collaborating with our academic partners through open innovation enables BT to chart the unknown and keep moving ahead.

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