

LI KA SHING CENTRE HEALTH INFORMATION AND DISCOVERY



The **BIG** Data Era

According to research by McKinsey Global Institute and McKinsey's Business Technology Office, the amount of data in the modern world has been exploding, and analysis on large data sets – so-called big data – will become a key basis of competition, underpinning new waves of productivity growth, innovation, and consumer surplus. Leaders in every sector will have to grapple with the implications of big data, not just a few data-oriented managers. The increasing volume and detail of information captured by enterprises, the rise of multimedia, social media, and the Internet will fuel exponential growth in data for the foreseeable future.



“What will happen here is more than the promise of harnessing the power of a **data-intensive revolution** to improve **healthcare**. It will free up resources for much needed investments in **educational opportunities** and will lead to **new and deeper competencies** that are pragmatic, precise solutions to sustain hope and stability today and lead to even **greater discoveries tomorrow.**”

- Li Ka-shing

UK Prime Minister, David Cameron, speaks at the launch stressing that breakthroughs are needed in medicine, explaining “it is vital for the UK to compete and thrive in global science”.

CAPTURING THE FULL POTENTIAL OF BIG DATA in the complex field of medical sciences sets the background for the Li Ka Shing Foundation’s GBP20 million (about USD30.5 million) donation to create the Li Ka Shing Centre for Health Information and Discovery at Oxford University in the UK, with its first phase officially launched in early May 2013, as part of a GBP90 million initiative. The Centre will create a focus for the emerging field of analysing big data to medical science research in the UK, helping to transform understanding about disease, treatment of patients, monitoring disease prevalence and management of healthcare systems. It will also provide commercial and academic opportunities to drive research in the UK and globally.

In modern society, very large sets of medical data are often collected anonymously through patient records, DNA sequencing, clinical trials and other national registries. The Centre will pioneer new analytical techniques – also called

supercomputing – that will provide powerful new insights into who develops illnesses and why, opening all sorts of possibilities for medical treatment.

“Big data will transform the way we treat patients and understand disease in the coming decades,” said Andrew Hamilton, Vice-Chancellor at Oxford, at the launch ceremony for the Centre. “We have collected much of this data already. We owe it to ourselves to make full use of it and deliver more effective treatments for all of us as patients. The Li Ka Shing Centre, and this enormously generous gift which underpins it, along with continued public investment, will be instrumental in driving this research forward.”

Building a World-Class Research Facility

The Centre is being developed in two phases and will house up to 600 scientists when complete. The UK’s National Health Service will provide a rich pool of data for the scientists to analyse.



(Above) UK Prime Minister, David Cameron, sharing his passion and vision for the Foundation's development.
(Bottom Right) All smiles as discussions continue with this GBP 20 million project.

The first phase of the Centre is the Target Discovery Institute, which will house research-generating comprehensive data about disease using genomic and chemical screens, which is important for the early stages of drug discovery. It aims to make use of genomic and genetic medicine to more accurately identify good drug targets for industry to pursue. Poor target selection is one of the most important reasons for setbacks in the pharmaceutical industry. The Institute will use novel technology for target identification within the university environment and hence provide the necessary academic backing to the industry.

According to the Head of the Structural Genomics Consortium at Oxford, Professor Chas Bountra, who is a drug discovery expert himself, the time and money spent developing drugs for impractical targets currently is “a tragic waste of resources and a tragedy for patients who need medicines that work.”

He also stressed the importance of the contribution of several international pharmaceutical companies to the Target Discovery Institute and their collaboration on the project.

“By collaborating with Oxford University on the project, the drug makers are seeking to eliminate development of drugs targeting the wrong biological pathways, thereby cutting out billions of dollars of research spending,” said Professor Bountra. “Once a target has been successfully identified and validated, and pharmaceutical companies can compete to develop medicines that manipulate those targets.” Another hope for this partnership is to drastically reduce the 90 per cent failure rate of drugs in mid-stage clinical trials in humans.

The second phase of the Centre will be the Big Data Institute, which will focus on analysing large data sets, bringing together leading researchers from across genetics, epidemiology and public health, clinical medicine, computer science, IT, statistics, and bioinformatics, who will analyse the data in order to improve disease detection, treatment and prevention.




Better, safer and more personalised treatments

The Centre was launched by Mr Li Ka-shing and British Prime Minister, Mr David Cameron. At the launch ceremony, Mr Li said, "What will happen here is more than the promise of harnessing the power of a data-intensive revolution to improve health care. The work of this Centre will identify innovative ways to increase access to health care while lessening the burden of cost. It will free up resources for much needed investments in educational opportunities and will lead to new and deeper competencies that are pragmatic, precise solutions to sustain hope and stability today and lead to even greater discoveries tomorrow."

Mr David Cameron shares his vision, and spoke about how he felt when he discovered his late son had a rare form of epilepsy. As he visited the laboratory of the Centre, he met a researcher who was running genetic data – DNA tests – against a very unknown disease, a syndrome called Ohtahara Syndrome, which his son Ivan suffered from and eventually died of in 2009.

"I will never forget when we were first told of the diagnosis of a desperately ill and disabled child. Then when you want to know more about it, there's very little that we know. It's one of the many parts of medical science where we have huge breakthroughs still to make," said Mr Cameron. "It will be good to say there is, right here in Oxford, a vital piece of scientific work going on to try and link DNA information with this under-researched syndrome."

Mr Cameron added, "I think what happens today (at the ceremony) really matters. It is an enormous investment that Mr Li is making to this Centre, which has the potential to revolutionise medical research and healthcare in this country and beyond. This will help to further develop a strong and competitive science and research base in this country which is vital for the UK to compete and thrive in the global race." 



Big Data

Some facts

Target Discovery Institute and Big Data Institute together form the Li Ka Shing Centre for Health Information and Discovery, which has been boosted by the GBP20m gift from the Li Ka Shing Foundation, in particular through funding new research positions. The GBP10m announced from Higher Education Funding Council for England through the second round of its Research Partnership Investment Fund (RPIF) is for the new Big Data Institute building. The Target Discovery Institute received GBP10m in the first RPIF round.

These two related areas of activity harness novel 21st-century opportunities in healthcare and represent the first examples of these types of research endeavours in academia anywhere in the world.

Research in the Li Ka Shing Centre for Health Information and Discovery will cover a number of strands. These will include:

- Mining data from electronic patient records as they become increasingly available;
- Research in genomic medicine, now that the cost and speed of sequencing patients' entire DNA have come down so far to make this realistic in the clinic;
- The use of genomics and other approaches in disease surveillance, such as mapping the emergence of drug resistance in malaria parasites or tracking the spread of infections in hospitals; and
- High-throughput and automated approaches that can speed the early stages of drug discovery, by identifying and verifying better targets for drug development in important diseases such as cancer, diabetes, psychiatric conditions and inflammatory diseases where society needs new and better treatments.

Upon completion, the Centre will house 600 scientists.

