



Science



Engineering



Design

## *Ways Into the Knowledge Economy*

A 'Knowledge Economy' is defined as 'one based on the successful input, application and exploitation of the most relevant, up-to-date knowledge (including skills and innovation) into the development of goods and services.' (*Liverpool City Region [LCR] Knowledge Economy Plan, November 2010*)

The 'Knowledge Economy' is one of Liverpool City Region's four growth sectors; it is hoped that these sectors will generate the most new and extra jobs over the next few years.

According to the LCR Knowledge Economy Plan (November 2010), between 1998 and 2008, while the total number of jobs in the city region grew by 6%, jobs in the knowledge economy grew by 14.3%, more than double. Knowledge Economy jobs are expected to continue to grow in number significantly faster than most other employment sectors.

Knowledge jobs are jobs where people take existing information and use it to create something new. That something could be:

- a new product or an improved product
- a solution to a new problem or a newer and better solution to an old problem
- new materials
- new information (knowledge) that in turn can lead to the development of new products, materials and solutions

"If we knew what we were doing it wouldn't be called research."

*Albert Einstein*

In one sense any job where people use information / knowledge to improve, develop, invent or research is a knowledge economy job, but generally we think of the knowledge economy as jobs that involve science, technology, engineering and / or creativity, for example:

- Civil Engineers: designing bridges, roads and other infrastructure projects.
- Digital Media: artists working with computers creating CGI effects for film and television.
- Engineers and Designers: developing the next generations of cars, mobile phones, televisions, etc.
- Digital Media: artists and programmers developing computer game systems, graphics and virtual environments.

### **The Knowledge Economy on Merseyside**

It is difficult to identify exactly how many people work in the knowledge economy across Greater Merseyside at the moment and how many new jobs the Knowledge Economy will produce, but we can see that locally the following sectors are particularly important:

- Life Sciences e.g. Biomedical Sciences, Biology, Biotechnology, Pharmacology

- Creative and Digital Industries
- Advanced Manufacturing (see later)
- Financial and Professional Services

The Public Sector (though currently experiencing job losses due to the cut backs in public spending)

In addition, there are long established 'knowledge sector' industries in Greater Merseyside. These are still developing new products:

- Chemical Engineering
- Pharmaceuticals
- Food Processing
- Car Manufacturing

### **How many people are employed in these sectors?**

Biological Sciences, biotechnology and pharmaceuticals employ around 14,000 people.

Some computer games companies employ as many as two hundred people, but the average size of a Digital media business in Liverpool City Region is ten people.

Liverpool has three universities, with 53,000 students and there are two more universities in the Liverpool city region (Chester and Edge Hill) which have between them a further 30,000 students.

### **What jobs will the Knowledge Economy create?**

Although it is impossible to say exactly what jobs will be created in the Knowledge Economy because it is about innovation, about doing new things there are educated hopes that 60,000 new jobs can be created across the knowledge economy sectors. So if you are interested in science, technology, engineering or you feel you are creative and want to use that creativity in a practical way then the knowledge economy could offer you a way to employ your talents, do interesting things and get paid for doing it.

If you are interested in any of the areas for which Liverpool has Knowledge Economy strength (see above) then Liverpool could be the place for you to build your career. If you are interested in other Knowledge Economy sectors there are other places with growing knowledge economies, as near as Manchester; or as far away as Australia.

### **Job Profiles**

**Microbiologists:** study micro-organisms such as bacteria, viruses, fungi and algae, by performing experiments in laboratories.

Clinical microbiologists working in a healthcare setting aim to identify diseases and protect the community from the spread of infection. Clinical microbiologists also work in research and development for the pharmaceutical and food industries, in agriculture, the environment or in education.

The work involves:

- monitoring, identifying and helping to control infectious diseases
- using molecular biology techniques to develop and test new medicines and treatments for disease
- investigating the potential of micro-organisms to produce antibodies, vaccines, hormones and other products
- developing enzymes for use in food production, crop protection and soil fertility

- monitoring the quality and safety of manufactured food products
- using micro-organisms to control pollution and break down toxic substances
- creating ways to dispose of waste safely.

The duties often include presenting the findings of research, supervising the work of support staff and carrying out administrative work. Clinical microbiologists working as a researcher and lecturer in a university or teaching hospital would also be involved in tutoring, mentoring and supervising students.

**Actuaries:** use mathematics, statistics and economics to judge probability and risk, in order to solve business problems and help companies and governments assess the long-term financial future.

Actuaries work in any of the following settings:

- life assurance or pensions (designing policies and calculating premiums so that companies can cover payouts and still make a profit)
- consultancy (advising clients on major financial risks such as investment funds or company takeovers)
- the Government Actuary's Department (advising government departments on the costs of social security benefits, state pensions and healthcare).

Typical tasks include:

- analysing past events, for example accident rates or medical data
- assessing the risks involved
- forecasting the future financial outcomes of various situations
- using computers to build mathematical and statistical models
- explaining the findings to managers, ministers or business clients
- keeping up to date with the financial and business worlds.

Actuaries work closely with other professionals such as insurance underwriters, investment managers and accountants.

**Visual merchandiser:** may also be known as display designer or window dresser, and they create eye-catching product displays in shops and stores.

Visual merchandisers are responsible for presenting products in a way that attracts customers and maximizes sales. This could mean anything from decorating a store in a seasonal theme – such as Christmas or spring sales – to making sure your store's displays fit the company's brand image.

The day-to-day tasks include:

- designing ideas for displays, or following a company design plan
- creating special displays to promote a specific product or promotion
- drawing designs and plans by hand or computer
- deciding how to use space and lighting creatively
- creating branded visual merchandising packs to send to each branch of a store
- giving feedback to head office and buying teams
- setting up displays, dressing dummies, and arranging screens, fabric and posters
- hiring, borrowing or making props
- making sure that prices and other necessary details are visible
- coaching sales staff on how goods should be displayed

- taking down old displays.

In a large retail company visual designers work as part of a display team and follow design plans that were created at head office by a visual merchandising manager or senior display designer.

**Computer numerically controlled (CNC) machinist:** machinery is used in manufacturing and engineering. A CNC machinist, cuts, drills, shapes and finishes products and components (including parts for the machine tools themselves).

CNC machinists work mainly with metals but could also deal with wood, composite materials and plastics. Most of the parts made are for use in the automotive, power, aerospace and manufacturing industries.

The typical duties include:

- programming the machine tool with data taken from technical drawings
- planning the most efficient order of machine operations for each job
- choosing the right tools for each stage
- setting the cutting speeds and tolerance levels
- carrying out the operations
- checking that work meets quality and technical standards
- routine maintenance.

CNC machines can produce large quantities of components to exactly the same standard, but sometimes CNC machinists may have to work with hand-operated machine tools if only small quantities are needed. In these cases, they might use:

- lathes and millers
- cutters and grinders

### **Local Knowledge Economy Centres**

- Daresbury Science and Innovation Campus (Halton)
- Liverpool Innovation Park (close to Liverpool University)
- Bio Innovation Centre and Biomedical Campus (Royal Liverpool University Hospital and Liverpool School of Tropical Science)
- Media City (Salford)

### **Advanced Manufacturing**

In many manufacturing sectors the UK cannot compete on cost with many other countries, but there are high technology sectors for which the UK, and Merseyside / Liverpool City Region is or can be a world centre:

- Composites: e.g. fibreglass, carbon fibre reinforced plastics, imitation granite, cultured marble
- Nanotechnology: materials on a scale of 1 to 100 nanometres (nanometre =  $10^{-9}$ m; a human hair is typically 80,000 nanometres in width) in at least one dimension, e.g. carbon filaments, hyper diamond rods, grapheme film.
- Additive layer manufacturing: e.g. corrosion limiting protective coatings and water / dirt repelling coatings for glass, ceramics, etc.
- Silicon electronics: Data storage

## Pathways

Though not all the people working in knowledge economy jobs are graduates, the knowledge economy sectors do employ a high proportion of graduates. Traditional academic qualification, GCSEs and AS / A Levels, are the traditional path to higher education but not the only path:

Any of these alternative routes if taken would need to provide you with the right skills, knowledge and qualifications to succeed in a knowledge economy sector.

See the Progression routes information at [www.connexionslive.com/jobsfortomorrow.aspx](http://www.connexionslive.com/jobsfortomorrow.aspx) for more information

## Where you can find out more:

For detailed information on the opportunities, work roles and qualifications required in this growth area see [Kudos/Careerscape](#) or [www.direct.gov.uk/NationalCareersService](http://www.direct.gov.uk/NationalCareersService)

If you want to speak to a Connexions Personal Adviser to discuss your career options further please ring 0800 0126 606 or the National Careers Service on 0800 100 900

