The First Higher Education, Science and Technology (HEST) Forum

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ABSTRACTS

Exploring New Areas of Cooperation between North West Universities and Japan

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A Vision in Engineering at Japanese Universities for the 21st Century

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This year the world has fallen into the global recession of its economy. Even though Japan accounts for higher than 15% of all the world's spending on R&D, we are now suffering from a structural depression of its economy.

In 1996, the Basic Plan of Science and Technology was adopted by the Japanese Government for the next century. Japan has made a firm determination to progress as a creative Science & Technology Oriented country. This is also emphasizing the responsibility of fundamental research at national universities and institutes. As the duty of national universities, the first responsibility is to produce many creative scientists and engineers as well as policy making generalists and the second is to do a fundamental research leading to the new development of "leading-edge" technology intensive industries.

According to this basic plan, Japan should expand priority funds for promoting diverse R&D with an emphasis on selectively strengthening basic science activities. The research at universities should be upgraded. We are urged to promote international joint R&D for this purpose. The basic plan is also wanting to increase public understanding of science, with a particular emphasis on young generation.

The engineering education should be reconsidered. Japanese national universities are now urged to consider a basic strategy for new development of the heart-core of engineering education programs in order to meet the needs of the fast changing world.

Owing to cultural and linguistic reasons, Japan used to be one of the uninternationalized countries. Japanese universities are now making an effort to become an internationally-minded institute. We should consider what is the most important in order to give the young generation a dream and ardent aspiration for their own 21st century.

The Liverpool Telescope Project and Telescopes Technologies Limited -- a model for University-Industry collaboration

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The Liverpool Telescope will be the world's largest robotic telescope and will be equipped with state-of-the-art instrumentation. Local astronomers, the UK astronomical community and International partners will use it primarily for research. The telescope will be sited on the Spanish Island of La Palma in the Canary Islands but will be controlled from, and image data relayed to, Liverpool via the Internet. It is being manufactured by a subsidiary company of Liverpool John Moores University, Telescope Technologies Ltd, and will be the first New Generation Astronomical Telescope. Two other New Generation Astronomical Telescope projects, one to be sited in Hawaii, the other in India, are also underway as are negotiations for the design and manufacture of other telescopes.

The New Generation Astronomical Telescope is designed to follow a sequence of pre-programmed nightly observations, without the need for astronomers to be 'on-site'. Such telescopes are ideal for quick response observations to targets of opportunity, long and short term monitoring of the sky, simultaneous and co-ordinated observations with space observations, satellite survey follow up work and programmes of Public Understanding of Science and Technology. Modern astronomical telescopes rely on CCD technology for image capture. In this way the faintest light is detected and an electronic image is produced. This image data can then be passed back to the telescope control centre via the Internet.

The success of Telescope Technologies Limited hinges on its ability to produce high quality inexpensive telescopes with specifications which appropriately match the those of the customer. The range of contacts and experience within the University mean this is possible. Conversely the long-term success and growth of the University's research and training and its ability to service wider research interests and public interest depends on Telescope Technologies Limited. This symbiotic relationship has already led to significant benefits on both sides.

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A Future Looking Perspective from the Universities Of Greater Manchester – e-learning ⇒ e-business UK Models for University-Industry Collaboration

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Abstract

Over a century ago Greater Manchester (the cities of Manchester and Salford, Trafford and Tameside) were the focus of the first industrial revolution; many ideas of which were later shared with Japanese industrial colleagues. Almost fifty years later its universities have kept themselves at the industrial leading edge through the design, development and implementation of computer technologies for the good of British industry and beyond. This collaboration has continued to flourish so that today, the Greater Manchester universities (of Manchester Victoria, UMIST, Manchester Victoria and Salford) all have high quality working relationships with local, national and even international industrial/business/commercial partners. They have also pioneered several important models for improved university-industry collaboration which have now been adopted widely throughout the UK. In particular, at the start of the next "Information Revolution", our universities are using their vast experience of the information superhighway to develop a unique network for local industry to improve its creativity, enterprise, inventiveness, innovation and business skills. Known as the North West Enterprise Network, eight universities of the North West of the UK have combined their capabilities, knowledge, skills and efforts to help local industry, and especially Small & Medium Enterprises. In effect they have already formed a Virtual University for Industry for the North West of the UK.

Fortunately, many of the skills, talents, wisdom capabilities and the like of the four Greater Manchester Universities complement each other. As a result they have been prepared to work together to provide a comprehensive technology transfer and knowledge transfer facilities for local industry, business, commerce and the service industries. At the presentation the author will indicate the most successful collaborations to date. These include:

1. Person Exchanges

   One of the most successful modes of technology transfer is through the use of people as the direct transfer of knowledge between university and industry. At the lowest level these occur as placement schemes on "split sandwich" courses; at a higher level, as case studentships where doctoral students spend 3 months working with industry on their problems; and through industrial fellowships (EPSRC, Royal Society, Fellowship of Engineering), where academics spend one or two years in industry.

2. Doctoral Engineers

   Over the past five years, through the EPSRC's Total Technology and Engineering Doctoral Programmes, high quality postgraduate engineers have worked with industry over a 3 to 4 year period on industrial problems which provide a doctoral challenge. This develops a

doctoral engineer of the highest intellectual level, but one of value directly to industry. It has also led to the most innovative industrial developments.

3. Consultancy Services

Academics, from each of the universities, also provide consultancy services directly to industry which engenders good technology transfer. This in itself also often leads to improved relationships between industry and academe, and to research and development partnerships on innovative industrial projects having a research challenge. The Teaching Company Scheme is a particular initiative by our Engineering & Physical Science Research Council, to support this further they work along who along with the Governments Department of Trade and Industry to pay for two year secondments of new graduates into industry. Furthermore, in such programmes as the EPSRC's Innovative Manufacturing Initiative, Industry can co-sponsor (50%) research to meet its own needs.

4. Innovation Counselling Services

The Government's Department of Trade and Industry sponsor Innovation Training Counsellors to help industry become more innovative and, further, to help companies find European funds (soft money) to help the development of innovation. The counsellors are often from academe, but with good industrial understanding. They are well versed in all the European funding initiatives such as Framework 5, ADAPT, ERDF, etc., and are seen by industry as a valuable resource.

5. Technology Foresight

Like the Japanese Technology, Forecast, has used the wisdom of the "Good and Great" to predict future Science and Technology trends for future implementation industry. This in turn drives UK funding regimes of all national R&D sponsorship towards creating innovations for industry which will lead to wealth creation and improved quality of life for all our people. g.

6. University Academic Business Enterprise and Science Parks

In recognition of the need to directly inculcate an enterprise culture surrounding universities and based upon best academic principles, most universities attempted to develop their own good working examples of high technology businesses/industries. Some universities focus their attentions on incubating academic and incubating companies, while others set up Science Parks where high tech industries often developed with the help of academic colleagues. Both are excellent, but different, ways of developing collaborations between industry and academe.

7. Action Learning Sets

Manchester has also pioneered a very different form of university/industrial collaboration where sensitive academic counsellors help SETS of industrialist learn to become better managers, designers, innovators, etc, by learning from the problems involved in carrying out their own "common sense" actions. Small SETS of industrialists explore how to develop better (or even best) practices by exploring, with colleague "partners in adversity", their failed, or failing actions and by the systemic barriers to progress. Action Learning has been shown to be an effective means of effective cultural change. The universities of Greater Manchester are currently exploring the development of a Masters in Enterprise degree for SME's based upon Action Learning principles.

8. Innovation Forum and "Hot Lines"

Based upon Action Learning Principles, and making use of advanced communication technologies, the Greater Manchester universities are also developing "drop in" centres for small and medium signed enterprises where companies can meet to benchmark themselves against new incubating companies developing within the university and against other companies with complementary capabilities. Such an Innovation Forum will act as the local physical context for the moments when "in-person" support is required by a developing company. Video-conference and more tradition (e-mail) type communications will link the companies to their host university. This will enable them to remotely link to their colleague "partners in adversity", and also to a huge data bank containing case material of good practices (approaches, use of materials, use of IT, etc). Such systems should lead to a more appropriate governance of the relationship between academe and industry, where e-learning and e-business become the norm, rather than the exception.

9. The Virtual Chamber

The most ubiquitous development to date is the Virtual Chamber of Commerce development. This project deals electronically with the traditional business of a Chamber but has become an extremely efficient and effective information and technology transfer tool, as well as making industry, business and commerce.

In conclusion, Greater Manchester and its universities have set up a strong culture of academic-industry partnerships. Both formal and informal approaches have developed over the years to become successful models of working relationships. Many of the approaches developed in the UK would be good models of potential academic-industry partnerships for Japan. Furthermore, the electronic version of partnership developments lend themselves open for direct transfer into the Japanese context, since they have themselves been on a model of socio-technical change designed on the basis of observations of good practice in Japan.