Executive Summary

General Observations

The team made a number of observations about the development of the industrial sustainability field in Japan including -

- emphasis at the policy level on both societal and competitive aspects of sustainability
- strength of the engineering research base supporting industrial sustainability
- growing emphasis on systems approaches
- growing emphasis on system resilience as well as efficiency

Workshop Findings

The symposium/workshop identified strong enthusiasm for future collaboration based on a shared understanding of the subject area and a broad agreement on the key technical issues.

There was also some consensus on priority areas for the future including -

- conducting research that is specifically designed to inform and influence policy development (where appropriate)
- building international communities of expertise

Mechanisms for Interaction

There are a number of mechanisms through which UK and Japanese universities may engage -

- Research placements (Sabbatical, doctoral/post-doc visits)
- Research visits & study tours
- University links with sharing of resources and contacts
- Visiting professorships
- International forums
- Joint projects (with research activity in both countries or with separate but complementary activity in both countries)

Joint Activities

High level, bilateral discussions to help –

- Co-ordinate activities
- Marshall large scale join activities
- Inform and influence policy development

Comparison between UK and Japanese approaches to further understanding of best practice –

- Policy
- Practice
- Other instruments e.g. Voluntary agreements

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General Comments

Terminology

- To the Japanese, industrial sustainability refers more readily to the sustainability and longevity of companies and industries in an economic context.
- The UK definition focused on the role of the industrial system in moving towards a sustainable society.
- The Japanese highlighted analogous concepts in their research structures, notably eco-efficiency and eco-manufacturing or green monozukuri.
- The agendas of the two countries had considerable overlap, giving both sides confidence that the actions pursued were sensible.

Industrial Interaction

- The UK university strength in the area of industrial interaction and engagement in practice led/ problem led research topics was noted by the Japanese hosts.
- Japanese universities act as knowledge centres, which industry uses to address their medium to long-term challenges.
- The tour party identified a strength in Japanese universities tackling eco-efficiency & eco-factory challenges, where they have been developing sophisticated tools and techniques.

Multi-disciplinary

- The Japanese saw the multi-disciplinary nature of some UK research as a strength, they cited both –
  - The way that the funding body (in this case EPSRC) handled multi-disciplinary calls and bids.
  - Projects highlighted by the UK delegates.
- There was a clear recognition by all participants (both funding bodies and academics) of the need to undertake more multi-disciplinary work, and an eagerness to learn from UK experiences in this area.

Systems Thinking

- There was a desire amongst funders and universities alike to significantly increase effort given to joined-up research activities that could be presented in a systems thinking context.
- The findings and implications of research into the industrial system needed to be communicated to, and understood by, industry and government.
- Common language and techniques were useful but “solutions” would always be dependent on the local context.
- A research focus on developing tools solely for the company was important but did not address not the complete picture.

Technical Prowess

- There is a high standard of research being conducted in the technical areas of sustainability (such as Design for the Environment tools, models and sustainable materials). Collaboration might offer the opportunity to improve skills, knowledge and methods required in these disciplines,
- Learning could be derived from the novel research structures (e.g. flat structure and family system) which gives rise to effective working groups and environments.

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Workshop Summary

Vision & Language

- Dialogue between countries at many levels (Academia, industry, government) is required to form a coherent vision for a sustainable industrial system.
- There was interest in developing a common language for assessment and evaluation of these visions, even if solutions for countries and regions are different.

Systems

- Systems perspectives were seen as essential for informing policy.
- We cannot limit ourselves to tools applied solely at the level of the firm, you need to address sustainability through the social and economic system. This includes influence in regulation and policy as well as effective communication with customers.

Education

- Education in sustainability needs to be developed as part of the core component of engineering education.
- How do we develop engineers with the right skills, how do we make sure they remain current and how do we help the existing stock of engineers learn what they need?
- This is urgent and the system is typically slow to respond.

Industry

- Across Japan and the UK we observed a range of models for academia-industry interaction, many of them excellent. It would be particularly useful to study which models work best under which conditions.
- There are leading examples of industrial sustainability in industry, we need to learn from these and spread the best practice.
- Helping industries to learn from another industry might be one way of accelerating progress.

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Collaboration

- Sustainabile development is a global issue and requires international collaboration and cooperation.
- Standardisation of key tools (e.g. eco-design, LCA) was seen as essential, and the role of information systems was also highlighted.
- The UK and Japan share some key characteristics, (e.g. island nations) and there maybe the potential for enhancing mutual lessons learned in different research arenas as a result of those similarities.
- However, there are also significant differences in culture which may negate some of these opportunities.
- Case studies were suggested as an effective mutual learning tool, allowing analysis of real time data and legislative endeavours.

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Conclusions

Data Sets

- Strong interest in accessing data from UK companies.
- Links could be made between universities to –
  - support the exchange of data
  - provide access to companies
  - share research activities

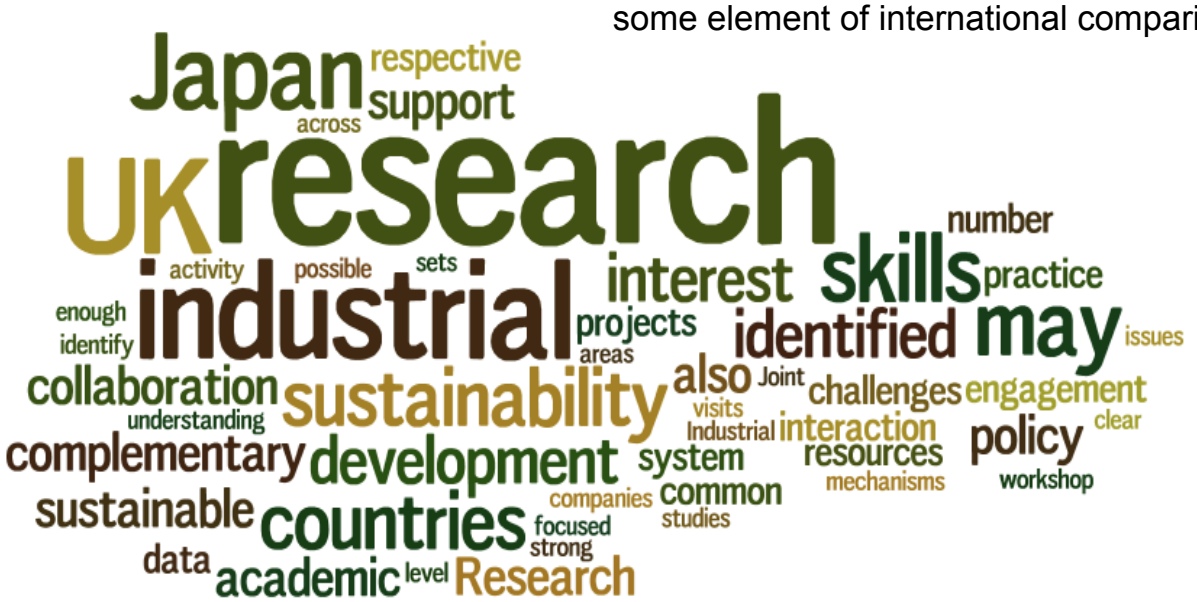
Case Studies

Case studies illustrating examples of leading practice in either country could inform policy and practice in both.

Complementary Skills

In the short term it is possible to build research collaborations which would not otherwise be possible using the existing skill sets of groups.

These collaborations would be enhanced by some element of international comparison.



Sharing of Research Trajectories

High-level bilateral discussions could be used to

- increase understanding of each other's research directions progress, identify opportunities,
- share respective visions of sustainability and how they fit with national policy.

A more technical strand, in parallel, may also be worthwhile to support **the development of international standards and a common language**, involving a **wide range of countries**

Education

- Education is a key enabler of change in the industrial system, helping to train the next generation of researchers and practitioners with the critical skills required to tackle sustainability challenges.
- Few courses have sustainability addressed as a mandatory component of their courses.
- International cooperation on the development of teaching techniques and resources may be valuable in rapidly establishing these course components.

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