

## Report on the Success of Japan's Fifth Generation Project

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I would like to take this opportunity to give my views on the success of the Japanese Fifth Generation Project. Rather than restrict my comments solely to the technologies developed, I would like to discuss the important contributions that the FGCS Project has made to Japanese industry and to the organization of research in Europe.

To give you some background, I have been an Adviser to Government Ministers in a number of countries on the organization of industrial research programs such as the FGCS Project. I am currently an Adviser on industrial policy to the European Commission. And in addition, I am the Chairman for the British Conservative Party for the Thames Valley region; Britain's silicon valley. I also had the great fortune to be at the launch of ICOT, to see the foundation of the FGCS Project and to work at ICOT for a short period.

The FGCS project has three major achievements:

1. It has given a major boost to the state of the art of software technologies in Japanese industry.
2. It has changed the way that Information Technology research is conducted in Europe and other countries.
3. The FGCS Project plan provided a "Road Map" for future computer research, one that remains still relevant today.

I will discuss these three achievements further.

My observation of the Japanese software industry in the early 1980s, when I attended the conference that launched the FGCS Project, was that it was a long way behind the excellent Japanese hardware industry and was way behind the American and European software industries. With the launch of the FGCS Project, Japanese companies immediately acknowledged the growing importance of software and especially of artificial intelligence techniques for robotics, image processing and knowledge-based systems. The launch therefore spurred Japanese companies to switch major resources to software. The result is that during the 1980s the Japanese software industry overtook the Europeans and made very significant progress in catching up with the Americans. In addition, throughout the pasted 10 years of its operation the FGCS Project through

its committee structure and conferences has provided a major vehicle for information to be gathered from around the world and to be quickly disseminated to Japanese companies.

Outside of Japan, the major impact of the FGCS Project was to change the way that Government sponsored research in Information Technology, and also other areas, was organized. In Europe prior to the FGCS conference:

1. Industry and universities had very little contact even in a single country.
2. Industry often had little idea of new concepts and universities undertook very pure, often only theoretical, research.
3. There was almost no contact between companies and universities from different countries in Europe.
4. Most researchers looked to the United State for technical leadership.

The FGCS Conference had a major impact on the government delegations attending. The two main conclusions were firstly that the Japanese Government had a fundamentally better way to organize industrial research and secondly that the FGCS Project could lead to Japan becoming the world leader in computer products. In response the European Commission established the ESPRIT Programme and individual governments set up national programs to coordinate and fund IT research. For example Britain established the ALVEY Programme. The FGCS Project had the following impact in Europe:

1. Pre-competitive, collaborative research programs became the standard method of organizing government funded research.
2. Companies and universities started to undertake applied research. In fact, the research is becoming increasingly applied, moving towards development of products, and working with large user companies.
3. Strong links were built between companies and universities.
4. In the European Community these research programmes have built a single research community. UCL now works close with PHILIPS(N), SIEMENS (G) and THOMSON (F) than with any British company.

Notably a large number of similar collaborative research programs have been established especially by the European Commission. Therefore the effect of the FGCS Project on the way that research is organized in Europe cannot be over emphasized.

The third achievement of the FGCS Project is the actual Project Plan. I well remember reading an early draft of the Plan and feeling I had a "Road Map" setting out

future computer research. When I have asked to identify what are the most important aspects of the FGCS Project and the way Japanese research is organized, I always refer to the putting together of the Plan as the most valuable part. I describe it as; bringing together the leading experts in Japan, then gathering all the information available from the best people world-wide, collating this information, building a consensus on the future, and then distributing the resulting plan, especially to Japanese industry. The FGCS Plan is as relevant today as it was in 1982. During the past year I have been reading the NIP'T or Real-World Computing documents and I have been struck by how similar they were to the FGCS Plan. In fact, if one took the FGCS Plan and changed all the references from Logic to Neural Networks the two plans would be almost the identical.

It is easy today to dismiss the impact of the FGCS Project saying that it was a mistake to base it solely on Logic and that some of the estimates for breakthroughs in Speech Processing were over ambitious, but, this is to ignore the wider impact that the FGCS Project has had particularly on software research in Japan and on the way governments' organize collaborative research world-wide. We must remember that at the time the decision was made to base the project on Logic, there were no other alternative choice. For example, Neural Networks were a good seven years away.

Therefore I remain convinced that the FGCS Project has been major success, and is a credit to the Japanese Government.

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