

Without a way to measure their success, Japanese projects are very hard to stop

Tokyo. The lack of an independent system to monitor and assess research has made it extremely difficult for Japan to end large national research projects once they are under way. The decision by the Ministry of International Trade and Industry (MITI) to keep alive the fifth-generation computer project (see accompanying story) after a half-hearted review is just one example of a government project that continues to consume public funds despite serious shortcomings.

"In Japan, national projects are very hard to start, but once they get going they are almost impossible to stop", says Robert Geller, a geophysicist at Tokyo University and a vocal critic of Japan's national earthquake prediction programme, which has been running with little change for nearly 30 years. Assessments of big government projects tend to be carried out by insiders who, Geller says, "are very positive".

The fifth-generation computer project is no exception. A committee of 27 academics and industrialists, headed by Hidehiko Tanaka of Tokyo University, were asked by MITI to review the project after its initial ten-year life ended in March. Nearly all the committee members have close associations with the project, including executive director, Hiroichi Hiroshige, and the head of the project's research institute, Kazuhiro Fuchi.

Predictably, the report released last week concludes that the "original goals of the project have been achieved". It points out that 70 per cent of overseas researchers rate the project as "superb or excellent".

In reality, the fifth-generation project has fallen far short of its repeatedly stated goal of making a "user-friendly" parallel computer with 1,000 processors. The largest machines on display at a project conference earlier this month contained only 256 processors, and US researchers with access to them say the machines are very hard to operate because the programs they run on can be written and understood by only a very limited group of experts. MITI's proposal to extend the project and make the computer compatible with standard computers (see below) is a clear indication of its present limited use.

One of the MITI committee members admits that the assessment is "just decoration intended to praise the project". He says that the committee meetings were very short and the agenda set by MITI and leaders of the project. Some eminent committee members did not attend a single meeting. The general opinion of computer scientists in Japan is more negative, he says; although the project has stimulated the research com-

munity, it clearly fell short of its "overambitious technical goals".

A similar criticism can be made of Japan's earthquake prediction programme. The programme's leaders have argued that earthquake prediction is a worthwhile goal; some even claim that the goal has been reached. Yet most of the rest of the world believes that earthquake prediction is beyond the present capabilities of science, and has switched its attention to hazard mitigation.

In the United States and other Western countries there are independent organizations that review and monitor major government projects. For example, the US Office of Technology Assessment (OTA) was created in 1972 to advise Congress, and such organizations as the US National Academy of Sciences (NAS) also play this role. But Japan has no equivalent organization.

The Science Council of Japan, an advisory body to the government composed of several hundred prominent academics, is the nearest counterpart to the NAS. But the council fell out of favour with the government in the 1970s because of its constant criticism of government policy and the belief of the ruling Liberal Democratic

Party (LDP) that the organization was run by communists.

In 1985, the system of election of council members was restructured to allow the prime minister to screen all candidates, and relations with the LDP have since improved. But the council's budget is so small that it cannot even afford to pay travel expenses for its members.

Jiro Kondo, president of the council, made a proposal backed by the Japan Society of Technology that the council should take on a role equivalent to the OTA (see *Nature* 348, 572; 1990). Kondo pointed to the nuclear-powered ship *Mutsu*, which has spent only a few days at sea despite costing ¥120,000 million (nearly US\$1,000 million), as an example of a government project that should be terminated.

In the meantime, *Mutsu* continues to receive thousands of millions of yen a year while sitting in port. The Science and Technology Agency is planning to rip out the ship's nuclear engine, replace it with a diesel one, and convert the ship into an oceanographic research vessel. But oceanographers point out that the ship was never designed for oceanographic purposes.

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Fifth generation project lives on

Tokyo. After spending more than ten years and ¥50,000 million (US\$400 million) to develop a fifth-generation computer, a machine supposed to revolutionize the world of computing, Japan's Ministry of International Trade and Industry (MITI) plans to spend another ¥4,000 million and two years to make the computer compatible with commercially available machines. MITI's decision, announced last week, represents the final ironic twist in a project that, when announced in the early 1980s, sparked fears in the West that Japan would capture the world's computer markets with a new generation of machines that would make conventional computers obsolete.

MITI and project officials justify their decision to extend the project, which has already lasted one year longer than planned (see *Nature* 356, 273; 1992), by pointing to a glowing assessment by academics and industrialists closely associated with the project (see accompanying story). But the new effort, devoted to linking the Japanese computers to those that use the US-developed UNIX operating system, serves instead to highlight the shortcomings of the original project.

In the past two years, the project's Institute of New Generation Computer Technology (ICOT) has donated terminals to the US Argonne National Laboratory, the US National Institutes of Health and the Lawrence Berkeley National Laboratory. ICOT publicized the donations as a joint US-Japanese effort to develop fifth-generation software. But US researchers now see ICOT's move as largely a publicity stunt, and complain that the fifth-generation computers are slow, cryptic, prone to errors and incompatible with any other computer.

Shunichi Uchida of ICOT acknowledges the complaints. But he and MITI officials say that the aim of the extension is to overcome such problems and make the fifth-generation computer available to everybody. Uchida, however, notes that the speed of the fifth-generation computer will be reduced to "half" in linking up to UNIX computers.

The extension plan requires the approval of the Ministry of Finance. But the finance ministry seldom rejects such proposals, and there is no system for external technical review.

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