

Civil service computerisation - the Singapore experience

Lee, Kwok Cheong.

1988

Lee, K. C. (1988). Civil service computerisation - the Singapore experience . In Expert Group Meeting on Integrating Information Systems Technology in Local Regional Development Planning : Singapore, Oct 31-Nov 4, 1988 (Vol 1). Singapore: AMIC/UNCRD/NCB.

<https://hdl.handle.net/10356/86043>

**Civil Service Computerisation
The Singapore Experience**

By

Lee Kwok Cheong

**CIVIL SERVICE COMPUTERISATION
- THE SINGAPORE EXPERIENCE**

Lee Kwok Cheong
Director, Project Management Department
Government Systems Division
National Computer Board
Republic of Singapore

CIVIL SERVICE COMPUTERISATION - THE SINGAPORE EXPERIENCE

Lee Kwok Cheong
Director, Project Management Department
Government Systems Division
National Computer Board (NCB)
Republic of Singapore

ABSTRACT

The Singapore government launched its Civil Service Computerisation Programme (CSCP) in 1981. NCB, a statutory board, was set up for the express purpose of steering the CSCP, and large investments were made in facilities, staff and user training.

This paper traces the history of the CSCP, highlighting strategies adopted and sharing lessons learned, and ends with a status review of our land-related information systems.

BACKGROUND

The Country

Singapore was a former British colony and later, a Malaysian state. It became a republic in 1965 after gaining independence. About 2.6 million people comprising Chinese, Malays, Indians and other races live in an area of 620 sq km. The average life expectancy at birth is 74 years. The literacy rate of the population is estimated at 93% for males and 81% for females. In 1987, the GNP per capita was about US\$6,700. In terms of computer usage, Singapore has 1.1 mainframe and mini computers per thousand population (compared to 1.5 for Japan¹).

The Government and the Civil Service

Parliament is unicameral and consists of 79 elected members. Judicial power is vested in the Supreme Court and Subordinate Courts. The judiciary administers the law independently of the Executive, and this independence is safeguarded by the Constitution. The President, who is elected by Parliament for a term of four years, appoints a Member of Parliament as Prime Minister. The Cabinet is responsible collectively to Parliament and comprises the Prime Minister and 14 ministers.

The Civil Service has about 70,000 employees (about 6% of the work force) in the ministries and several organs of state. Currently a zero manpower growth policy is enforced. In 1987, total government expenditure was US\$7,000 million, nearly half of which was development expenditure.

¹ Source: Mitsubishi Research Institute

History of Government Computerisation

Computers were used in the Singapore Civil Service since 1964. A common service department was formed to service the data processing needs of the Civil Service. As the demand grew in volume, variety and complexity, the common service department, with its limited resources and expertise, could no longer cope. Users became frustrated, and a huge application backlog was built up. This experience is probably very similar to that of most other governments in their early stages of computerisation.

In 1980 the Committee on National Computerisation, chaired by a Senior Minister of State, commissioned a study to look into the long term computerisation needs of the Civil Service and to recommend an action programme. The study led to the formation of the National Computer Board (NCB) and the launch of the Civil Service Computerisation Programme (CSCP). The CSCP was to have a tremendous impact on the way the Singapore government would use information technology to improve its efficiency and effectiveness.

THE CIVIL SERVICE COMPUTERISATION PROGRAMME

So What is New?

The difference between the CSCP and earlier computerisation efforts is a fundamental one - ministries now control their own destiny as far as computerisation is concerned.

Facilities, manpower and implementation are now decentralised. All ministries, and most organs of state, have one or more in-house computer information systems departments headed by a senior administrator. Ministries submit computerisation development proposals and recurrent budgets to the Ministry of Finance just like any other proposals and budgets. They decide their priorities, and are responsible for delivering the benefits promised to Finance. Decentralisation gives ministries both the authority and the responsibility to respond to their needs at their own pace.

Decentralisation could also be a recipe for incompatibility and even anarchy, if not for the co-ordination and vigilance of the NCB.

NCB is the government's advisor on computerisation. It performs CSCP-wide planning and co-ordination. It works closely with the ministries on each ministry's computerisation programme as well as on Civil Service wide programmes.

NCB hires computer professionals on behalf of the government and posts them to ministries. Training, promotion and salary administration are managed centrally by NCB. Economy of scale in recruitment and professional development is achieved (there are about 450 professionals in the CSCP), and the professionals dispersed in the ministries are trained to follow common professional practices.

NCB establishes professional methodologies and standard practices to be used throughout the CSCP. These standards range from cost-benefit analysis guidelines to application development methodology to security standards.

NCB also identifies, promotes and manages inter-ministerial programmes such as common application systems (e.g. finance & personnel), Civil Service wide networking and data administration. NCB reviews specifications and evaluation of computer-related tenders. The Board can therefore guard against proliferation of incompatible computer products.

All in all, a fine, and so far effective, balance between centralisation and decentralisation is maintained in the CSCP.

Objectives

The CSCP was conceived to be more than just the computerisation of the Civil Service. It was to spearhead the national computerisation effort and demonstrate the government's strong commitment to computerisation in the the eighties.

The specific objectives set for the CSCP are:

- (a) To increase the productivity and effectiveness of government operations.
- (b) To improve the level and range of government service to the public.
- (c) To create interest and promote computer usage in other economic sectors through the operation of new and very visible computerised systems in the Civil Service.

IMPLEMENTATION OF THE CSCP

Challenges

The odds were against a developing country with a small pool of experienced computer professionals and with Civil Servants unused to dealing with computer technology absorption. The challenges facing the start-up of the CSCP were many.

- **Sheer Scale of the Programme** Owing to the huge application backlog and the fact that no ministry was prepared to wait, we decided to implement the computerisation projects in 10 ministries concurrently. Starting up in-house information systems departments in 10 ministries simultaneously and managing them was a mammoth task compared to the limited computerisation activities of the centralised approach in the pre-CSCP era. And the number of projects and of information systems department keeps on increasing, even today. This quantum jump in management magnitude severely tested our planning and co-ordination capability.

- **Limited Manpower and Expertise** The then existing professional staff in the government were insufficient to service the central dp department, let alone the 10 information systems department to be created. The industry also lacked qualified manpower, especially those with experience to manage and implement complex systems using the latest technology. In fact, the whole of Singapore had only about 800 computer professionals in 1980! (As a result of major gearing up in IT education programmes, the number had grown to about 7,000 in 1987.)

- **Sophisticated Systems** Many of the systems identified were large and complex requiring on-line data base and data communications technologies to implement. Examples of such systems were a real-time command and control system for police, fire and ambulance services, a health care network linking up the major government hospitals, and an integrated land use and mapping system for the country. These systems contrast sharply with the mainly batch systems that the Civil Service was used to prior to the CSCP.

- **New Users** The CSCP thrust executive and implementation responsibilities on computerisation to many Civil Servants, who had little or no experience in performing these new roles. For example, many were reluctant to sign off each phase of the systems development because they could not visualise the working system. Some were uncertain about the impact of the new technology on their workplace. Others were overly enthusiastic and set unrealistic expectations.

- **Organisation and Work Methods Change** Computerisation would have tremendous impact on the way government departments operate. There would be substantial changes in work methods, office procedures and delivery of public service. There would be staff redeployment and redefinition of work roles. There was uncertainty on how to carry out all these expeditiously and on how the organisational inertia of the Civil Service would hinder progress.

- **Absence of a Model** There were no overseas models for us to study or emulate. We just had to plunge into the deep end and hoped we could swim to the other shore!

Positive Factors

On the more positive side, there were factors working in favour of the CSCP.

+ **Government Commitment** There was highly visible and total commitment from the government to computerise its operations as demonstrated by the formation of the NCB and the approval of a substantial computerisation budget.

+ **Pressure to Improve** There was strong pressure on government departments to improve productivity, particularly to reduce staff through automation and computerisation, and to upgrade the level of public service.

+ **Culture** Singapore was (and still is!) used to major restructuring. It is a matter of survival for a small city-state. It is also easier for a small country like Singapore to co-ordinate amongst various agencies to achieve common objectives. In addition, there is practically full employment and automation and computerisation are generally seen as productivity aids rather than as threats to job opportunities.

Implementation Strategies

We formulated 7 key CSCP implementation strategies which took cognizance of the challenges and environmental constraints described above.

1 Balance between Centralisation and Decentralisation We strike a fine balance between centralisation and decentralisation to obtain the best of both worlds. Details of this balance were described earlier in the "So What is New?" section. This strategy has enabled our decentralised information systems departments to be responsive to the needs of the ministries and, at the same time, allows us to reap economy of scale, reduce duplication of effort, implement Civil Service wide systems, integrate and interconnect systems, adopt common standards, and share experiences and scarce technical resources among the ministries.

2 Partnership Philosophy "Partnership" is part of NCB's "3P" corporate philosophy (the other two being "People orientation" & "Professionalism"). In CSCP we strive to play complementary roles with the ministries and the industry. We work on the principles that the ministry's success is NCB's success and that a strong industry is essential to support the CSCP. This strategy channels the relative strengthes of line management, users, I/S and vendors fully to the CSCP. It also prevents the traditional "we-they" negative relationship from developing between the users and I/S.

3 Top Management Commitment Two measures are used to secure top management commitment which is essential to the success of computerisation. First, we stipulate that each ministry sets up a high level Information Systems Steering Committee to provide policy directions to the ministry's computerisation programme and that the Permanent Secretary should personally chair the Committee. Second, each ministry must justify its needs for computerisation to obtain funds from the Finance Ministry. The ministry is therefore committed before a computerisation programme starts, and the ministry has to see the programme through to realise benefits promised to Finance.

4 Strategic Information Systems Planning We have developed a strategic information systems planning (ISP) methodology to help a ministry translates its mission, goals and strategies into information systems strategies and a long term information systems development plan. Under the CSCP, a ministry has to conduct a comprehensive ISP study before embarking on major computerisation projects. This study is carried out jointly by key ministry officials and NCB professionals. The planning exercise will ensure that the information systems support

the business of the ministry, that the long term integration of systems and data is planned and that the maximum potential for information systems implementation is identified.

5 Extensive User Training Recognising the crucial role of end users in determining the success of information systems implementation, we have formulated user education programmes for all levels of users, from Cabinet Ministers to clerical staff. Thousands of Civil Servants have now gone through our user education programme. And we are in the process of updating the programme to reflect new issues and new opportunities.

6 Framework for Data Sharing When all ministries are computerised, there will be tremendous benefits to be gained from inter-organisational data sharing through electronic means. Such data sharing can only be widely implemented when the ministries' information systems are fully operational and the communication networking infrastructure is in place. However, if advance planning is not done, incompatibility of systems and data may preclude data sharing. A framework for data sharing was therefore strategised early and being nurtured through our Data Administration (more details later) and Civil Service Network programmes.

7 Moving Up the Experience Curve Early efforts were directed at building up a solid technological capability to drive the CSCP. We recruited bright fresh graduates and invested heavily in their training. We judiciously engaged overseas consultants and experienced local contract staff to fill some key technical positions and transfer their skills to our inexperienced staff. We jointly developed complex systems with vendors who brought in experience and expertise from overseas. And we recruited from other countries seasoned professionals who were interested in settling in Singapore (often Asians who had gained experience in developed countries).

So What is the Score?

There is nothing extraordinary about the above seven strategies. Any textbook on I/S management would prescribe something similar. The extraordinary thing is that they are not just talked about but actually executed, and in a civil service environment! The results speak for themselves.

A recent CSCP wide cost-benefit review shows that the return on investment over the first 5 years of the CSCP is 171% and there are significant intangible benefits as well.

From a modest start in 1981, we now have 31 information systems departments in the Civil Service managing some 70 computers and thousands of personal computers and terminals. About 130 applications have been implemented, another 90 under development and 90 approved but awaiting development. The total investment in the CSCP over the last 5 years amounts to about US\$100 million. This has led to significant improvements in public service - faster processing, greater convenience and new services on a broad front.

CONCLUSION

It is essential to do thorough situational appraisal and to formulate realistic implementation strategies at the Civil Service level. It is important to paint a corporate vision for all parties to work towards. A fine balance between centralisation and decentralisation must be crafted. A co-ordinating mechanism must be emplaced. Partnership between users and I/S at all levels must be cultivated. Integration must be planned. Manpower must be developed. And there must be an abundance of perseverance!

We believe that in the CSCP, because we have done all of the above, we have reaped good returns on investments - 171% after 5 years of hard work.

Acknowledgement

Much of the material in this paper are distilled from various NCB internal documents and do not come from original research. Other papers by NCB staff derived from similar sources have been published.