Mapping and Modeling in the Australian Taxation Office: A Case Study.

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Abstract

This paper is a case study of a major System Dynamics (SD) intervention in the Australian Tax Office (ATO). The intervention lasted two years and involved an extensive roll out of SD tools and the methodology. The context for the paper is the Action Research work based at Monash University and is a reflection on the organisational and political structures that are necessary to sustain a large-scale SD intervention in a large bureaucracy.

Introduction

This paper reports the most recent stage of the development of Systems Thinking within the Australian Tax Office (ATO). The early work was reported in the Fifth Discipline Fieldbook (Senge 1994). This paper represents a reflection on the practice and experiences of a coalition of people working in various parts of the organization over a decade.

The authors are members of an Action Research group at Monash University. In this group, reflection and double loop learning are seen as central to the organizational change process. While it is understood that each change intervention is different, the group aims to use reflection and double loop learning to establish a body of work that is capable of generalization across organizations. It is the intention that the documented reflections of significant practice will provide a base for the learning of other practitioners.

The issues addressed in this paper relate to organisational and political structures necessary to support a SD intervention in a large bureaucracy rather than modelling per se... Whereas Richardson et al (1995) established the model for participation in the model building process, this paper addresses the formal organisational, structural and process requirements for a successful project. The framework for the paper is the reflective cycles of Action Research and double loop learning for the authors who are involved in working the area of systems modelling.

The aim of the project was to establish SD mapping and modelling as a policy development tool within the Superannuation Business Line of the ATO, and the establishment of a the credibility of model building as a policy tool. This paper discusses the history of project and draws conclusions around issues such as:

- the necessary conditions for the establishment of the project
- the desirable organisational structures for the continuation of the project
- the establishment of redundancy and requisite variety within the organization
- the staging and scheduling of "deliverables".

The structure of the ATO

The (ATO) is the Australian Commonwealth Government's main revenue collector, responsible for the collection of over $165 billion in the 2000-2001 financial year.
As well as 'traditional' taxation, the ATO role has evolved to include management of, and responsibility for elements of Australia's Superannuation system and the Excise regime. It also has a role in the administration of the Higher Education Contribution Scheme (HECS) and the 30 per cent Private Health Insurance Rebate.

Superannuation in Australia

Australians are supported in retirement by two systems: personally funded superannuation schemes and a government funded pension scheme. The Federal Government is keen to decrease dependence on the public purse for retirement income. To achieve this, the Superannuation Guarantee (SG) Scheme was introduced in 1992 requiring employers to pay a percentage of a worker’s salary (at 9% from 1 July 2002) into a compulsory superannuation savings fund. There is on-going debate in Australia over the issue of superannuation and the reform of the system needed to reach the goal of individually-funded retirement for all Australians.

Developments in SD and strategic thinking in the ATO

There are two important background conditions in the ATO. The first is a history of work in Systems Thinking begun by then ATO Second Commissioner Bill Godfrey in the early 1990s. During this period, there was a series of external Systems Thinking consultants and academics involved in the ATO. There have also been two graduates from the Monash Master of Organisational Systems program working within the ATO as well as a number of graduates from the University of Western Sydney Systems program. These factors contributed to a level of awareness of, and capability in, systems thinking and SD within the ATO.

The second important background condition was a two-year development of a Strategic Management System (SMS) within the ATO (Hames and Oka 1998). The focus of this work was on developing long-term strategic capability based on systems thinking principles within the organization. As a result of this work, there was a growing recognition of the need for the ATO to develop the capabilities and tools for strategic planning and scenario building. The development of a formalized system of strategic management legitimized an explicit role for the ATO in the 'shaping and influencing' of economic and social policy. Systems mapping and modelling (as the SD technology became known) was a logical extension of the work of this strategic intervention.

The immediate need

By late 1999, it was clear that the newly re-elected Federal Government was considering reform of the superannuation system.

The Superannuation Business Line (SBL) recognized that they faced a number of issues

- the need to develop a unified view of operations and dynamics of the current superannuation system
- to the opportunity to be involved in discussions concerning the possibility of

superannuation reform;

- strategy for the reform agenda needed further development
- SBL did not have "a seat at the table" for policy reform.

While SBL had responsibility for taxation aspects of superannuation, the ATO wished to increase its formal role and relationship within the Government's Treasury portfolio in relation to policy development. The basis of policy development and assessment within Treasury was the Retirement Income Model (RIM), a micro-economic regression model that had been built up since the early 1990's and was part of the "received wisdom" of policy development.

The importance of these issues within the ATO was increased in mid-December of 1999, when it was announced that the retirement income system would be on the Federal government's reform agenda in the year 2000.

The initial establishment of SD methodologies within SBL was seen as a logical extension of the work currently being done in the development of strategic capability within the SMS project. Developing "maps of the system" was seen as a necessary step towards scenario building for policy development capability.

In summary the reasons for using SD were

- mapping the current system was seen as a good (and maybe quick) way to improve the understanding of how it worked
- no-one had previously mapped the superannuation system as a whole
- no-one had mapped even parts of the system using causal loops
- SD was a tool to understand the implications of new policy and administration improvement proposals on system
- it was seen as developing better policies that would be easier to administer

Campbell (2001) discusses a similar situation within Hewlett-Packard where an SD project had a similar genesis.

From the outset of the project, there were two equally important aims, developing an understanding of the system, and building internal capability in Systems methodologies. Vennix (1996) stressed the importance of client involvement. Client involvement was defined as the ability of SBL to be entirely independent of the external consultant in the mapping and modelling process. This meant that the consultant had a responsibility to ensure that every technique that was used would become part of a training program within SBL. In addition, it was decided that SBL should also develop the capability to deliver the training themselves. From the outset, the project was seen as a long-term developmental process.

Getting Started

Causal loop diagrams provided for the rapid prototyping of a capability that would demonstrate that SBL had the capacity to make a contribution in the policy debate on superannuation reform. It was understood that the ability to demonstrate feedback with the system would provide a perspective that was not present in the Retirement Income Model (RIM). It was also understood that SD computer simulation had a potential to provide a model that could be used to present alternative policy options to those developed using RIM. Causal loop diagrams were seen as a means for providing transparency for the more complex computer simulations, a transparency that was currently lacking in RIM.

From the outset, the project had specific endorsement from the most senior levels of the ATO and some of the work was presented to the Assistant Treasurer. This ensured that the objective of demonstrating SBL's policy development capability was being reached

There was a growing conviction that simulation and modelling were tools that were likely to provide senior decision-makers within the ATO with the highly desirable "seat at the table" in the forthcoming policy discussions.

Kotter's 'eight stage process' of change (Kotter 1996) outlines the importance of generating short-term wins. SBL was very cognizant of the importance of producing demonstrable results. This meant that people needed to see quick wins or the project risked being cancelled even though it was creating long-term benefit.

These experiences led to the formulation of the "42 Day Rule", which suggests that a "deliverable" needed to be presented every 42 days. This is a reflection of the "urgency addiction" present in every organization. Keeping the "42 Day Rule" in mind helped the SD modelers to avoid loosing contact with key sponsors by setting a timetable for the presentation of deliverables.

A critical incident in convincing the SBL technical experts that SD was a useful tool was "creating concepts. (Nonaka and Takeuki 1995) by developing a simple stock flow diagram which became known as the CAB (**C**ontributions, **A**ccumulations, **B**enefits) model (see Fig 1). This became the basis of what was later known as the "core map". It was the simplicity of this representation that initially impressed them. It was at this point, where it became clear that mapping, using SD diagrams, could capture complicated ideas in clear simple iconography, that the legitimacy of the methodology was first established within SBL.

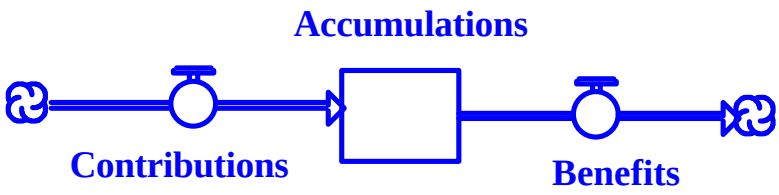

Figure 1: Contributions, Accumulations and Benefits - The CAB model.

The idea that the complex dynamics of the superannuation system in Australia could be explored by developing this simple diagram was an extremely appealing one. The decision to commit to SD was made on what Espejo et al (1996) termed the Regulatory Models Dilemma, which is that the more complex the models, the less likely

organizational learning (1996: 187). The process now had political, organizational and operational support. The importance and interdependence of these elements in the design of the intervention system is developed in the next section using Stafford Beer's Viable Systems Model (VSM). Beer's framework is important, not only because it provides an excellent model for change interventions but because it was a model and methodology which had been used extensively inside the ATO. The need for the SMS to develop mapping and modelling was seen within the ATO as the development of a "System 4 Intelligence Capability" within the organization. In Beer's VSM, System 4 has responsibility for providing information to System 5, which is the part of the system responsible for policy development.

Organisational structures and Beer

This organizational model was based loosely on Beer's Viable Systems Model (VSM) shown below.

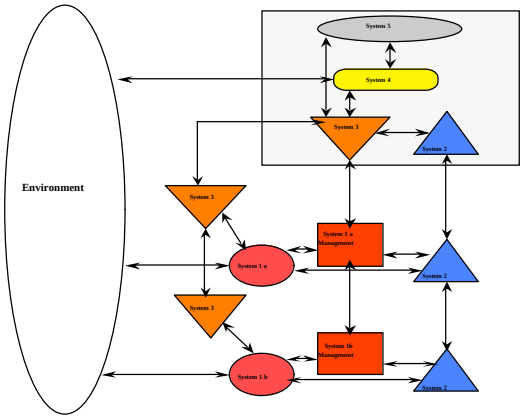

Figure 2; Beer's Viable Systems Model

The strength of the VSM is it provides a model for the communication relations necessary for a system to interact effectively with its environment. The model is recursive at all levels of an organization and hence useful for designing the organization support structures for a micro-level intervention such as is described here.

A High Level Design (HLD) team supported by a Mapping Team fulfilled this "Intelligence" function. The major responsibility of the HLD was to brief the SBL Executive on a series of national workshops around strategic issues in superannuation reform. The Mapping team was to provide maps of the system for HLD. The membership of HLD was drawn around Australia. The Mapping team consisted of a group Canberra-based ATO experts in superannuation and the external consultant

The executive of SBL was the System 5, the policy development function**,** in VSM. The "High Level Design" Team, with its responsibility for defining strategic issues, was System 4 and the Mapping team, with operational responsibility for drawing maps, was System 1. An important aspect of this design was the fact that the membership overlapped. One member of System 5 was also a member of System 4 and another member of System 4 was also a member of System 1. This structure and membership had the advantage of maintaining good communication between important stakeholders with different interests in the project and later for mounting arguments for the ongoing importance of the project.

The operation of the VSM structure.

However, with the membership of HLD drawn from four different states, a one-day meeting of HLD involved the majority of its members in 6-8 hrs of interstate travel. To share the burden of travel, these meetings were rotated between the major centers. The logistics and stresses of this became an increasing problem as attendance at meetings became erratic and the membership of the group began to change.

In contrast, the Mapping team was based in Canberra, had a membership with a formal time commitment to the project. Membership remained relatively stable throughout the project. When membership did change, there was a formal and structured process for the orientation and induction, as well as training, of the new members. This enabled a development of a coherence and consistency in the development of the maps. In addition, the Mapping team was able to establish a dedicated physical "operations" room where all

map work was conducted and all maps were on display. This had the advantage of providing the team with a visible presence within SBL.

On reflection, it would have been helpful to have done some skills development work with the HLD particularly in the start-up phase of the project. This may have had the effect of aligning the expectations of the HLD team with what the Mapping team was able to deliver. In addition, it is important to establish certain principles with all stakeholders. These are that:

- The work of SD mapping and modelling is intense, time and resource-consuming and long-term, particularly when dealing with the system as complex as a national superannuation system.
- It requires dedicated, concentrated and ongoing resources, both human and financial.
- It is important that senior executives understand the importance of the commitment of political, financial and human resources from the outset.

The dynamics of the VSM communication system

There was an unintended consequence of this particular organisational structure. The Mapping team rapidly developed a series of complex maps of the dynamics of the superannuation system and a deep understanding of the superannuation system This meant that the infrequent meetings of HLD were often became briefing sessions which had to revisit issues that the Mapping team had resolved weeks earlier. As the Mapping team moved further and further ahead of HLD, the gap between the two threatened to jeopardize the project. The situation arose where HLD, System 4 in the VSM, struggled to represent the work of the Mapping team to the Executive, with any degree of confidence. This was a classic case of structure determining behavior.

While the Mapping team was developing its capability and methodological competence, a series of strategic workshops were held to deal with specific issues around superannuation reform. This corresponded to Nonaka and Takeuki's third stage of justifying concepts, as it was in these workshops, and in the maps that emerged from

them, that the power of causal mapping was further demonstrated and justified.

The central element of the consultant brief involved the transfer of mapping and training skills to the Mapping team. The central metaphor in the “roll-out” of mapping skills in SBL was of a ladder: everyone had their feet positioned at their current skill level, one hand was reaching up the ladder to the next skill level and the other hand was reaching down to bring a colleague up the ladder. The philosophy of combining personal development with a commitment to the education of colleagues proved to be very powerful. Systems Mapping enjoyed a rapid spread to other business lines in the ATO and to other Departments of the public service in Canberra.

Mapping and modelling activities

The Mapping team then embarked on Nonaka and Takeuki’s fourth stage, building an archetype with the first map around the issue of " public confidence". The map construction process went as follows:

- gather 3-4 knowledgeable people
- identify problem in system or the readily identifiable stock as starting point
- develop stories
- draft maps freehand on whiteboard by team
- input onto Vensim/PowerPoint using animation and button features to:
  - ™ step through the building blocks
  - ™ display assumptions
  - ™ test reality
  - ™ analyse and refine if necessary
- place on an intra-website for all SBL/ATO staff to access
- provide appropriate explanation and introductory material

The aim of the map was to show the insights possible using causal loop diagrams and secondly to demonstrate the central importance of public confidence in the superannuation system as a driver of contributions. This initial diagram is shown in Fig 3

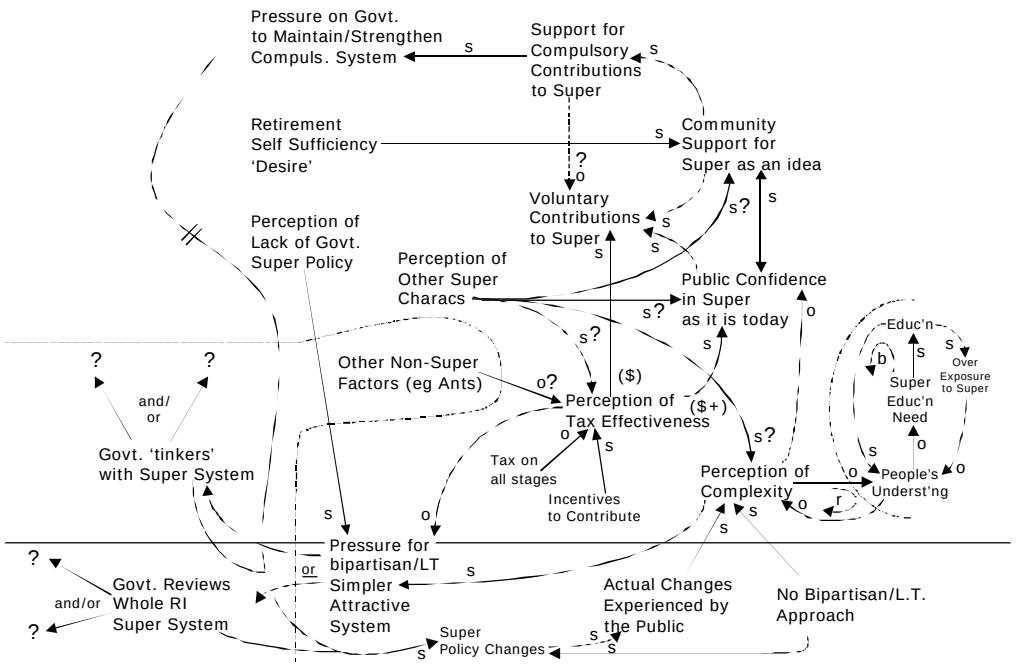

Figure 3: The Public Confidence map.

The presentation of this map to HLD was extremely successful in demonstrating the power of causal diagrams for the exploration of policy design.

This map and the subsequent 'core map' (see Figure 6) were the basis of three more presentations at senior levels both inside and outside the ATO. These three presentations demonstrated that the ATO, and in particular SBL, had unique knowledge of the superannuation system that could be used in discussions on superannuation reform. It was at this point, where the ATO gained the "seat at the table", that the credibility and validity of SD methodology was established in a wider context outside SBL.

The next activity of the Mapping team was to develop the core map of the superannuation system. This was essentially an extension of the earlier "public confidence map". The basis for this was the original stock-flow diagram shown in Figure 5. Developing this

model produced some interesting questions for the Mapping team. The accepted view in industry and government, shown in Figure 4, was that the principal driver of contributions was the tax concessions, which made superannuation a highly effective means of saving, *and* tax reduction.

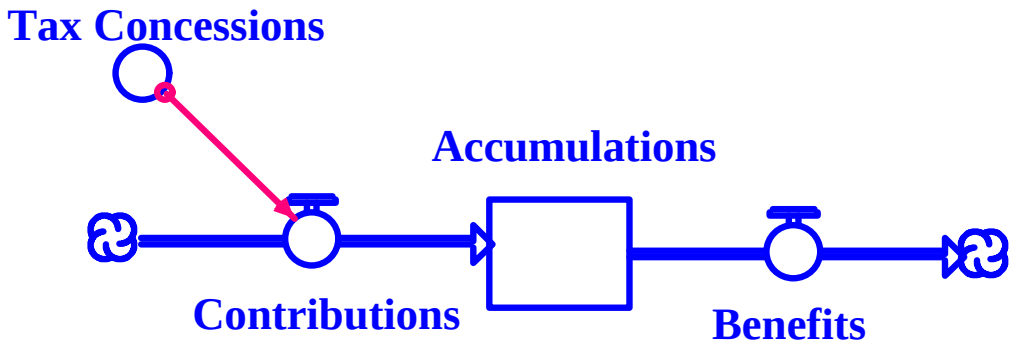

Figure 4: The linear mental model of contributions drivers.

It is also indicative of the "feedback-free" mental models that dominated early thinking in the mapping process. The Mapping team began to develop a hypothesis that, as individual taxpayers got closer to retirement, the size (or more accurately the lack of size) of the accumulated savings would create a feedback loop to drive contributions. In essence the view developed that "proximity to retirement" and the perception of the size of the benefits available were significant drivers of superannuation contributions and that contribution rates would increase for older workers. The model shown in Figure 5 represented the first serious consideration of feedback in the policy debate on superannuation reform.

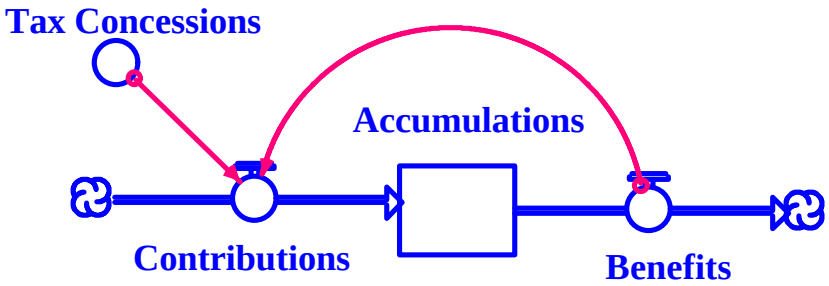

Figure 5: The CAB model with feedback.

However, there was no empirical data or research on what drove superannuation contributions. So a large market survey of the population who would retire without the full benefit of the compulsory super guarantee system was commissioned. The findings were that, not only was the accepted mental model wrong, the proposed hypothesis was also wrong. It was found that for a significant proportion of workers, the contributions needed were so great that they opted not to save at all and intended to rely on the Government funded pension. As it will be another 30-40 years before most workers have the full benefit of the Super Guarantee, the retirement funding of this group represents a profound and long term problem for Australian society. This finding was generated by the thinking that arose out of the simple diagram shown in Fig 5. This is an example of the power of causal diagrams to expose deeply held mental models. It is also an example of the simplicity of a deeply held mental model.

The development of the core map provided a starting point for understanding the system and provided the basis for the subsequent development of a series of some 40 sub-maps.

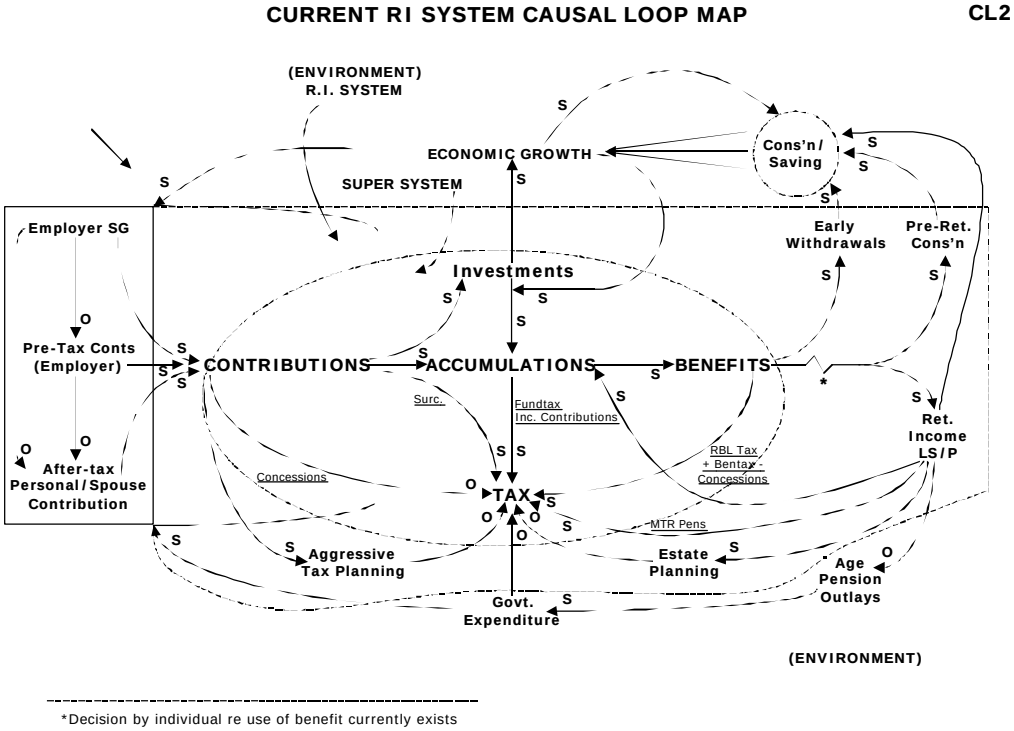

Figure 6: The high level Core Map of the superannuation system.

This map was designed to provide a high-level understanding of the superannuation system from which sub-maps could be developed in detail. Campbell (2001) comments on the difficulty of separating high level understanding from detailed complexity. This issue was handled during the development of the core map by asking the question of each variable – “Core map or sub-map?” This map proved particularly useful in a number of ways. It served as the basis for the development of further strategic workshops, provided a powerful tool for later external presentations and also provided the basis for the development of the first computer simulation, called the "macro model" and shown in Figure 7.

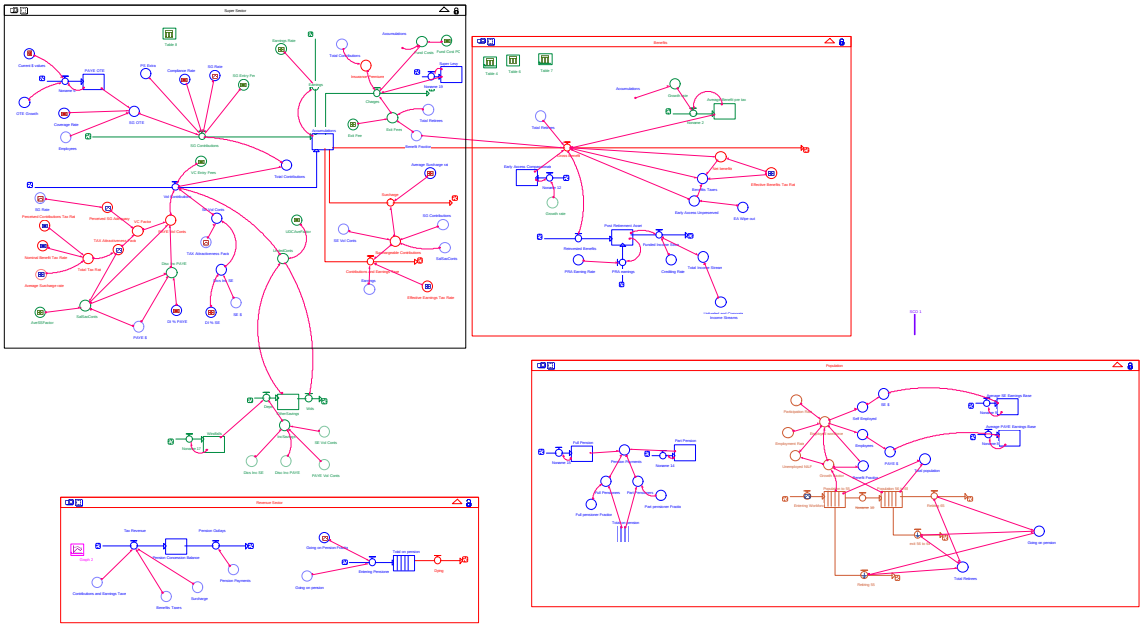

Figure 7: Early iteration of the CAB simulation.

Organizational dynamics around the mapping process

It was during this period that the "rich and famous" rule was developed. Complimenting the 42 Day Rule, this rule proposed that SD consulting interventions make people rich and famous, however no one person could be both. As most consultants opt for “rich, this

concept brings the focus on the need for internal sponsors who to become famous. Clearly, senior executives will want to be able to use their sponsorship of the SD intervention as a means of gaining organisational and political credibility. This means that the modelling process involves two closely related activities: gaining and managing the support of the senior executives and ensuring that the focus of the intervention is on issues of strategic and political importance to those senior executives.

It was this level of support that proved to be extremely useful towards the middle of 2000 when the gap between the Mapping team and HLD became an issue. While there was some questioning of the ongoing viability of the project, the interest of the most senior bureaucrats and political parties made it extremely important for SBL to continue the work. This small crisis highlighted an important aspect of this and possibly other projects: it was under constant review and the internal sponsors had an ongoing role to "ride shotgun on the SD stagecoach."

By the middle of 2000, the Mapping team submitted a business case for funding for the next twelve months which was approved and which firmly embedded SD mapping in the policy development process of SBL. In addition, work was begun with each of the strategic workshops to develop causal diagrams around their specific strategic issues. This proved to be a masterstroke in establishing the methodology as an ongoing process and it exposed a large number of people in SBL to causal diagrams. This activity developed over 40 maps, all of which were displayed on the wall in the operations room. Over time, these maps developed an almost iconic status for the importance and thoroughness of the work of the Mapping team.

At this stage, it was considered important for further development of the Mapping team's own internal modelling and simulation capability. One member of the team was initially given extensive time to work with the modelling package" ithink". He took over responsibility for the continued development of the macro model, which had been begun by the consultant. In addition, he continued the development of the micro-models of the superannuation savings of individuals from specified demographic groups. The first of

these, called “Susie” and shown in Figure 8, modeled the superannuation savings of a single mother with intermittent employment.

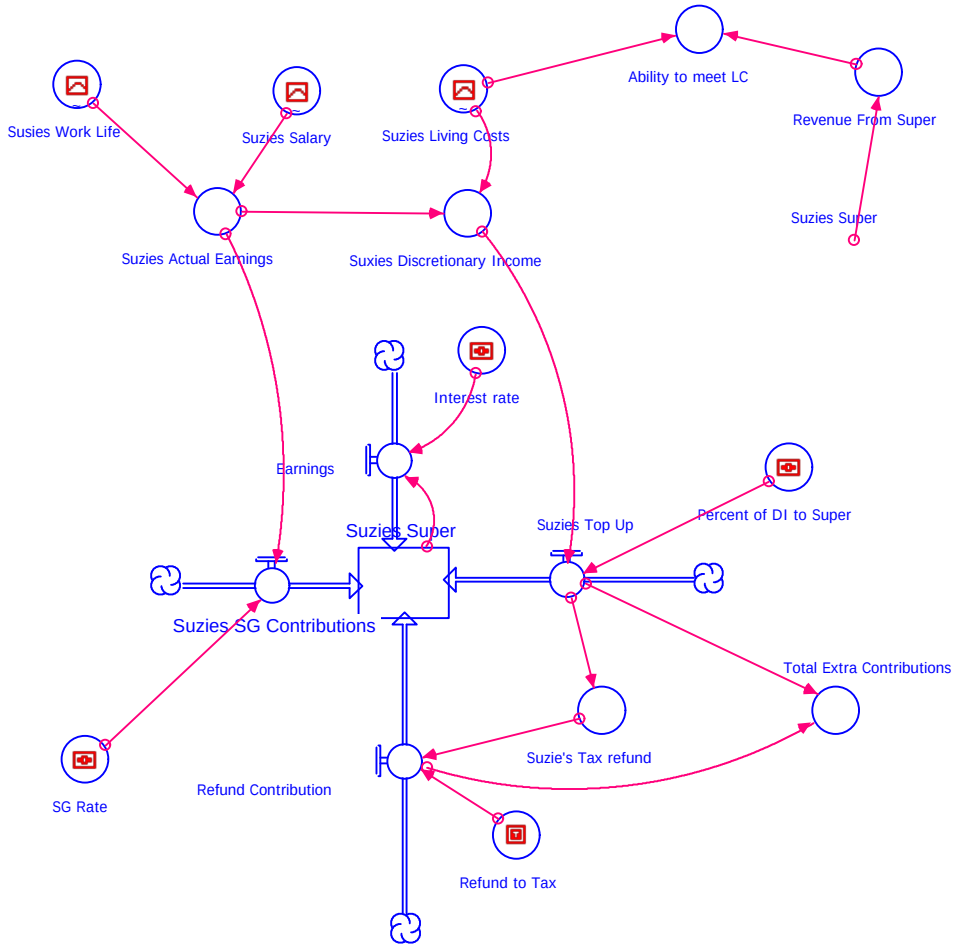

Figure 8: “Suzie” – the first micro-model.

It is the development of these micro-models which constitutes the ongoing activities of the Mapping team at present. In these models, the modeler can vary the employment patterns, marital status, number of children, and simulate the long-term impact of these events on their superannuation savings.

External points of reference (Nonaka and Takeuki’s cross-leveling knowledge)

In Australia, superannuation reform has wide ranging implications for a number of federal bureaucracies. Treasury has responsibility for overall economic and fiscal policy,

the Department of Family and Community Services has responsibility for the aged pension, one of the sources of retirement income, and the ATO has responsibility for superannuation taxation policy. Once it was known that SBL was using SD models for policy analysis, the other departments began showing interest in the methodology. As SBL began the roll-out of mapping techniques in a series of training sessions, other sections of the ATO, and more importantly, management from Treasury and FaCS wanted their people to become skilled in the use of these techniques**.** The view outside the ATO was that if this tool were to be used for policy development, then it was important that other departments involved in policy development should be able to "speak the same language". This is the classic case of “success to the successful” archetype.

As a result of this roll out process, mapping work began in both FaCS and to a lesser extent in Treasury. Within the ATO itself work using mapping techniques began in four other business lines: It appeared that SD mapping modelling was gaining a critical mass that would make it one of the standard policy development tools in the federal bureaucracy.

The Context of Government Policy Reform: GST and Workforce Adjustment

While superannuation reform was "on the agenda", the most important concern for the Federal Government was the implementation of the Goods and Services Tax (GST) from 1 July 2000. The GST had been the central policy platform of the Government’s 1998 electoral victory and the ATO was charged with implementing it. This was the most significant reform of the tax system in living memory and its implementation was not without its critics nor was it without a series of administrative challenges.

In the context of the SD project there were two major implications of the introduction of the GST:

- the implementation of GST was a short term, resource intensive and extremely politically sensitive.

- the development of a reform agenda for Superannuation was longer term, smaller and less resource intensive.

The GST implementation and in particular, the staffing and resource implications, set up a dynamic that was to have a profound effect on the SD projects.

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Policy development, and the methodologies that go with it, will always have endorsement of senior executives. SD was being positioned as one of these methodologies. However, SD work is carried out by a small, dedicated and highly skilled group whose focus is long-term. The work of such a group is always vulnerable when short-term crises arise.

Once the GST had been implemented and 'bedded down', the ATO was over-staffed as a result of employing 4000 new staff to help with the implementation and in July 2001 a process of "workforce adjustment" was begun to alleviate what was developing into a significant budgetary crisis within the ATO. The impact of this across the ATO was a serious dislocation of the embryonic mapping groups. In addition, the budgetary constraints underlying the workforce adjustment meant that funding for both internal and external expertise in the SD area dried up.

In late 2001, the Federal Government announced a number of small scale changes to the superannuation system that effectively took superannuation reform "off the agenda" This effectively took away the political (and hence organization) impetus for superannuation reform and the need for policy modelling using SD.

A secondly, the embryonic work in FaCS and Treasury did not yet have key stakeholder support in those Departments. The possibility of the establishment of an inter-departmental policy analysis function faded. In April 2002, a major report on superannuation and retirement income was tabled in Federal Parliament. It was based on RIM, the traditional regression model for policy development. Clearly, SD modelling had not been accepted as a policy development tool.

Organizational Urgency

It is difficult to be certain about all the causes of the slowing of the SD initiative within the ATO. The redundancy program around "workforce readjustment" clearly had an impact on organizational capability. The urgency surrounding the workforce adjustment became a primary operational focus for the organisation. Nonetheless, it is important to remember that the project was born of a sense of urgency for policy development in the area of superannuation reform.

This is the paradox of senior support for such projects. Senior executives in large government departments are highly sensitive to changes in the political climate and can mobilise resources around what they see as political imperatives. They just as easily de-mobilise resources when the political climate changes. When the methodologies for dealing with changes in political climate are consistent, well accepted and understood, then methodologies such as long-term strategic navigation, SD modelling and scenario planning become part of the landscape. However, when such methodologies are not used consistently, or changed frequently, then techniques such as SD modelling can easily be labeled as "fads".

To avoid this it is necessary to create sufficient requisite variety in terms of capability in long term strategic thinking, so that when the crisis hits, techniques such as SD modelling are seen as the "default" methodology put dealing with it.

In a positive sense, SD modelling has now been used, albeit sporadically, for over a decade within the ATO and considerable progress was made in disseminating the methodology during the recent two-year project in SBL. It can only be hoped that this project has created sufficient requisite variety for the methodology to live to fight another day. It is likely that, had some early wins been widely disseminated and policy work involving SD in the other two Departments well-established, then SD modelling would have been well on the way to establishing itself as a major policy development tool

within the federal bureaucracy.

Conclusions.

The experience in the ATO leads to a set of reflections on the organisational and political structures for SD projects. The framework is effectively a step in the process of the development of a set of " necessary but not sufficient conditions " for SD projects.

Reflection 1

The organization had some prior exposure to SD modelling and Systems Thinking. It is possible that this prior exposure has left some requisite variety, residual expertise and enthusiasm for Systems Thinking.

Reflection 2

The SD intervention must be linked to an immediate strategic need. The strategic link places the SD intervention on the agenda of senior policy-makers and power brokers. This ensures resource allocation and support for the project particularly when operational level problems threaten the viability of the project.

Reflection 3

The project needs an organisational structure that effectively links three discrete functions: senior policy-makers, a strategy and intelligence function and the operational activities of modelling. The membership of these groups must overlap. The person who fills this overlapping role must have a sufficient organizational power base to mount an effective defense of the project during review and evaluation processes.

Reflection 4

The modelling team must consist of internal “content” technical experts with significant organisational credibility to demonstrate significant organizational commitment, and an external SD capability to build the models and ensure a skills transfer to the team.

Reflection 5

The project needs visibility through the “42 Day Rule” and the “Rich and Famous” rule. Dissemination of the project into related business areas is an advantage in this respect. Anchoring the SD project to a critical business issue and then producing highly visible short-term wins establishes credibility for the project and its sponsors and generates the conditions for a viable continuance.

Reflection 6

The project must remain close to its sponsors. Constant effort is required to ensure that the expertise of the mapping team does not outstrip the knowledge of the sponsor groups.

Reflection 7

There needs to be requisite variety and redundancy of function within the organization to take advantage of the urgency spikes. This variety and function needs to be able to lie dormant until the next appropriate spike.

Reflection 8

The goal of client independence from the consultant is important. It builds ownership as well as a skill base. This skill base provides the requisite variety upon which future work will be based.

The experience in the ATO demonstrated the potential for SD as a widespread technology for policy development. It also demonstrated that, despite the best efforts of

large numbers of people, major political and organisational change can damage or destroy long-term projects. This paper has endeavoured to identify those conditions that can contribute to the success of such projects and those that bring about their demise. Future work will involve identifying the drivers of the spikes and seeking to establish any cyclical behaviour that may enable the SD action researcher to time and schedule projects for increased success.

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