CHAPTER 6

6. FIELD TEST

1. INTRODUCTION

The principal purpose of the field test was to test the validity of conclusions drawn from the earlier research stages - the laboratory experiment (see 4.5) and the Gigante case study (discussed in Chapter 5). The South-Western University (SWU) field test constituted a literal replication (Yin, 1984) of the Gigante case study, in that the domain constraints specified in 4.3 were satisfied. Specifically, The target IS environment was data-centred, the organisation was heavily dependent on its information systems, information systems were heavily disseminated throughout the organisation and many parties had IS roles and responsibilities. Data collected during the field test was evaluated along the *assumption applicability* and *prediction accuracy* dimensions, identified by Markus (1983). Briefly, evaluation along the assumption applicability dimension involved determining the extent to which the SWU SISP implementation domain could be represented in MP/L1 and prediction accuracy was assessed by comparing the results of field test conflict prediction sessions against laboratory experiment results.

SWU was formed in January 1989 by amalgamating three existing tertiary education institutions (called Western, Central and Southern in this thesis). The university was established as a federated network organisation, whereby each network member was to retain its autonomy and operate within common policies and procedures set by a small Headquarters Secretariat (headed by a Vice Chancellor).

The Computer Centre Manager at Western proposed that part of a $0.5M amalgamation expenses grant should be spent on a SISP study. His proposal was accepted by the Corporate Management Team, he was made Project Manager and, with the help of external consultants, he produced a study report that included two controversial recommendations. These were:

- first, common systems, conforming to a common corporate data model, should be used by all network members; and

- second, overall responsibility for information systems and SISP implementation should rest with an IT Director, located at Headquarters.

While the original report was not well-received by the Corporate Management Team, the Project Manager was able to use his position as a staff elected member of the Board of Governors to steer through a compromise proposal. This still involved common systems and a data-centred approach, but it vested responsibility for strategy implementation in a committee, consisting of the three computer centre managers and a centrally-located IT Manager. SISP implementation was divided into six projects, one of which was the key data management project. Central were given lead-house responsibility for this project.

Some time after the data management project commenced, the researcher was invited to assist the strategy team in its implementation. MP/L1 was employed to model the SISP implementation domain and was effective in describing most aspects (see 6.7.1). Conflict prediction sessions were held with the strategy team and results obtained indicate the effectiveness of MP/L1 in the field and lend support to laboratory experiment results. Results of the prediction sessions are presented in 6.7.2 and discussed in more detail in Chapter 7.

While the study was successful in meeting its research objectives, progress with the SISP implementation itself to date has not been good and it was concluded that stronger leadership is required if the data management objectives are to be realised. A number of tactics aimed at overcoming specific areas of resistance are identified (see 6.9), with particular attention being given to the system of influence encapsulated in the rule stating that "network members must have maximum autonomy".

The field test research design was presented earlier in Chapter 4 as part of the overall discussion of research design. Findings included in this chapter are supported by material in the field test data base listing presented in Appendix 4. As in the case of the Gigante study, citations enclosed here in square brackets refer to supporting documentation in the appendix. Field test research findings are discussed further in the following chapter, in conjunction with case study and laboratory experiment results. A glossary of acronyms used in this chapter is presented in Table 2.

AISMG	Administrative Information Systems Management Group
CEO	Chief Executive Officer
CMT	Corporate Management Team
ITAC	Information Technology Advisory Committee
ITM	Information Technology Manager
LCC	Local Computer Centre
RCC	Responsible Computer Centre
SWU	South-Western University

Table 2: Glossary of Field Test Acronyms.

2. SWU: THE ORGANISATION

In the mid-1980s, the Australian Government initiated a number of major tertiary education reforms, including the abolition of the "binary system" (which distinguished universities from colleges of advanced education) and a process of amalgamations which is still in progress.

One result of this was the establishment of SWU in January 1989, initially incorporating the Western and Central Colleges of Advanced Education, with the Southern College of Advanced Education joining later that same year. The university was structured as a federated network institution and currently services the higher education needs of some 10,000 equivalent full-time students, mostly drawn from the outer-western suburbs of a major Australian city. It is expected that the university will grow to 15,000 equivalent full-time students by the mid-1990s. The SWU organisation structure is presented in Figure 10.

The act of incorporation specified that each network member would retain a high degree of local autonomy, while reporting to a single Vice Chancellor. The need for network members to retain their autonomy is also emphasised in the organisation's Mission and Goal Statement [Dt1], but this is balanced by the objective of *"developing common policies, systems or procedures where these can provide greater effectiveness and efficiency."*

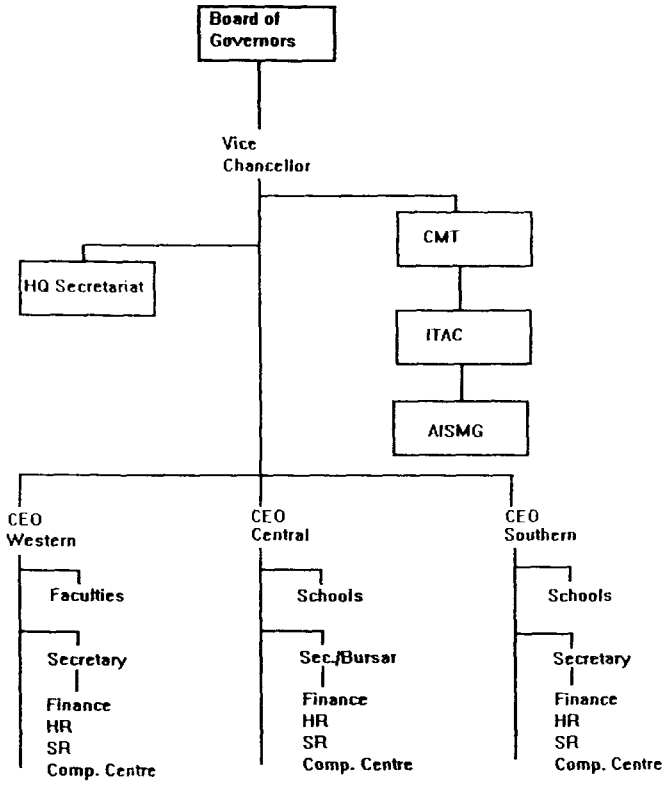

Figure 10: SWU Organisation Structure.

Currently, each member has its own administrative organisation and all structures are similar, with responsibilities being divided along functional lines (the major functions being Human Resources, Finance, Student Records and Information Systems) and with functional managers reporting to a University Secretary or Secretary/Bursar (who, in turn, reports to a CEO). A small Headquarters Secretariat supports the planning, policy development, evaluation and review functions of the Office of the Vice Chancellor. Functional managers meet regularly to discuss issues of commonality, but CEOs have warned their managers to be on guard against excessive centralisation [Nt23].

6.3 SWU's IS ENVIRONMENT: PRE-SISP

6.3.1 Processing Architecture

Each network member had its own computer centre. Common hardware was used in each of the three centres but systems were built on a variety of software platforms. In addition, many smaller systems had been developed, outside the computer centres, using IBM compatible or Macintosh PCs.

Most systems did not use DBMS technology and terminals were tightly coupled to individual systems. There was little effective interaction between terminals, PCs and computer centre hardware. However, all members were planning the development of

campus-wide communications networks. There were no significant data communications links between computing facilities in the three computer centres.

6.3.2 Systems

Most systems were old, required considerable maintenance and, as was generally recognised, were in need of replacement [Dt3]. Systems were a mix of packages and in-house developments, many were poorly documented, there was little commonality in data definitions and, in general, users had no great involvement in systems development or installation activities.

Despite the high maintenance load and a limited pool of skilled systems development resources (between 5 and 10 analyst/programmers in each computer centre), there was little sharing of solutions and expertise between network members.

At the commencement of the SISP study, two major systems initiatives were underway: first, the Human Resources Manager at Western was planning to implement a personnel package (against the advice of the Computer Centre Manager); and, second, Southern had commenced development and implementation of an integrated finance/personnel/payroll/physical records suite of systems. The Southern development was championed and directed by the University Secretary and was part of a five year strategic plan, aimed at replacing all existing systems with a new set.

6.3.3 Approvals and Funding

No information systems chargeback or transfer pricing arrangements were in place, but computer centre managers were expected to operate within budgets.

New work and maintenance programmes at Western and Central were established through negotiations between computer centre managers and functional area managers. Disputes were settled at the next level (University Secretary). At Southern, work plans were expected to conform to the five year Administrative Computer Systems Strategic Plan. The level of funds available for new developments at Southern was significantly greater than at either Western or Central.

6.4 SWU SISP STUDY

In early 1989, a university-wide working party was given the task of recommending how a $0.5M amalgamation expenses grant should be allocated. The Computer Centre

Manager Western was a member of this working party and he prepared a paper [Dt4] in which he recommended that a SISP study should be undertaken. With strong support from the Vice Chancellor, this proposal was approved by the Corporate Management Team.

The Computer Centre Manager Western was appointed study Project Manager and the remainder of the study team consisted of two external consultants. The study was brief (two months) but was intensive, with over 60 key personnel being interviewed. The team reported in May 1989 [Dt3] and their major recommendations were:

- Existing systems were inadequate and needed to be replaced as soon as was practicable.

- The new systems should be common to all network members, should conform to a common applications architecture and corporate data model and should be processed on a common processing platform.

- Overall responsibility for information systems operations should rest with an IT Director, located in Headquarters and reporting direct to the Vice Chancellor. The IT Director would be responsible for strategy implementation and its ongoing development, but the computer centres would remain intact and would undertake detailed development and processing work in accordance with agreed standards and programmes. The computer centres would contribute substantially to the development of standards.

- All data was to be owned by the university but data access policies and procedures would need to be established to restrict access to some classes of sensitive data.

- Establishment of a university-wide communications network should be undertaken urgently and the processing architecture should move progressively towards an open systems environment.

- The many existing systems developed by academics overlapped substantially with the administrative systems and should be redeveloped as part of the common systems core. At the same time, the benefits of academic experimentation with new technology were recognised.

The SISP report was presented to the Corporate Management Team but their initial reaction was unfavourable, with the recommendations concerning common systems and the establishment of an IT Director being of most concern (because of the threat to network member autonomy). A decision on acceptance of the report was deferred and the newly-appointed University Secretary was asked to develop a response for later consideration by the Corporate Management Team.

The University Secretary formed a working party, consisting of himself and one senior management nominee from each network member. The SISP team were excluded from any further input to the working party's deliberations. The working party prepared a paper [Dt7] which effectively supported most of the SISP team's recommendations, but suggested two major amendments:

- first, implementation of specific recommendations would not involve all network members, but would be the responsibility of individual members (for example, one member would be allocated the task of implementing common systems and another would be asked to implement the university network); and
- second, the IT Director position would not be established and responsibility for strategy implementation would rest with the working party - in future to be called the Information Technology Advisory Committee (ITAC).

The ITAC report was accepted by the Corporate Management Team and was forwarded to the Board of Governors. Coincidentally, the SISP Project Manager was a staff-elected member of the Board of Governors and he and another member objected to the ITAC amendments. The Chancellor directed that the two Board members meet with ITAC and resolve their differences.

The SISP Project Manager then proposed a compromise model [Dt5] that was accepted by ITAC and the other Board member. This involved establishment of an IT Manager as the sole centrally-located position and network members being given lead-house responsibility for implementation of individual recommendations. Lead-houses were to involve other network members as appropriate and the IT Manager would arbitrate on any disputes. Responsibility for strategy implementation would rest with the IT Manager and the three computer centre managers. This group was to be called the Administrative Information Systems Management Group (AISMG) and would report to ITAC.

After lengthy debate, the compromise was accepted by the Corporate Management Team. The Board of Governors then endorsed the revised SISP.

6.5 SISP IMPLEMENTATION: PROJECTS

Six strategy implementation projects were identified and lead-house roles were assigned as follows:

- Central were given responsibility for *common systems development* and *data management;*
- Western were given responsibility for *networking* and *minicomputer operations;* and
- Southern were given responsibility for *microcomputer operations* and *information centre* (data extraction etc.) operations.

For any one project, the lead house was to be called the Responsible Computer Centre (RCC) and the other two computer centres were to be called Local Computer Centres (LCCs).

High priority projects identified were networking, data management and development of a new Student Records system. Central had lead-house responsibility for the latter two projects and their approach was to undertake the two projects in parallel. That is, initial data management activities were to be an integral part of the Student Records project. The researcher's role was to assist the strategy implementation team in preparing tactics for data management implementation.

One of the first data management activities undertaken was the preparation of a roles and responsibilities document [Dt6]. The essence of this document is presented in Table 3. The table was used as the basis of the interviews from which much of the material presented in the following section was obtained.

Function	Responsible	Involved
Standards		
Develop data modelling standards including: -basic approach -modelling conventions -naming standards	ITM RCC	LCCs
Recommend standard data dictionary and information repository hardware/software platform	ITM RCC	LCCs
Approve standards	AISMG	
Ensure consistency with emerging industry standards	ITM RCC	

Ensure consistency with DEET and CASMAC requirements	ITM RCC	
Data Model Development		
Coordinate and consult on data model development	RCC	
Develop models and recommend changes	RCC	All
Promulgate changes and obtain consensus	RCC	
Settle disputes	RCC AISMG	ITAC
Ensure dictionary and repository security and integrity	RCC	LCCs
Develop an Information Encyclopaedia	RCC	All
Systems Development		
Develop data validation standards and procedures	ITM RCC	LCCs
Approve data validation standards and procedures	AISMG	ITAC
Consult on data validation module development techniques	RCC	
Specify data validation modules	LCCs Users	RCC
Code and test data validation modules	LCCs Users	RCC
Ensure data validation module compliance with standards	RCC	LCCs Users
Data Base Access		
Recommend upon data base access rights	ITM RCC	All
Develop and oversee data base access procedures	ITM RCC	LCCs
Approve data base access policies and procedures	AISMG	ITAC CMT CEOs
Approve requests to access data bases	LCCs	AISMG ITAC CMT CEOs

Perform data base extracts	All	LCCs
Manage, control and monitor data base access	LCCs	ITM RCC

Table 3: SWU Data Management Roles and Responsibilities.

6.6 SISP IMPLEMENTATION: RESISTANCE

6.6.1 Computer Centre Managers

As members of the group responsible for strategy implementation (the AISMG), the computer centre managers gave varied support to the data management project and all were concerned about, at least some, aspects of the strategy.

Central had been given lead-house responsibility for the data management project, but the Computer Centre Manager was skeptical that the desired results could be realised through shared responsibility and cooperation [Nt13]. As noted in 6.5, his approach was to undertake the initial data management activities in parallel with development of the Student Records system.

The researcher's view, however, was that data management activities would be neglected as project pressures and activity increased [Nt18]. A particular concern was that little detailed data management planning had been undertaken at Central and they had still to address a number of complex technical issues associated with their parallel approach. If these problems (such as how the corporate data model can be extended without invalidating existing project data models) are not addressed, they may not be amenable to later resolution. (For a treatment of the complexities inherent in corporate data model - project data model alignment, see Dampney, 1990.)

A further problem faced by the Computer Centre Manager Central was the issue of settling on a standard information repository hardware/software platform. Because this decision strongly influences the direction that both the applications and processing architectures will take, it is probable that the computer centre managers at Western and Southern will resist any decision not consistent with their own strongly-held views [Nt6, Nt35]. Even before the SISP, these two managers were in conflict over the worth of a 4GL product in use at Southern.

This resistance was symptomatic of a belief held by many parties; namely, that "we are the technical experts". This belief was identified as an important system of influence

[In3]. Consequently, unless the Central Computer Centre Manager closely involves the managers of the other two computer centres in the establishment of development standards, he may expect resistance in this area as well [In4, In25].

As data management activity proceeds, the Central Computer Centre Manager may also find himself in increasing conflict with his counterpart at Southern because of threats to applications development and ownership autonomy and consequential threats to power derived from information provision and decision making [In25]. In this case, the Southern Computer Centre Manager will be reflecting the views of the Southern Secretary, who exercises stronger control over the computer centre than was evident at the other two institutions (see 6.6.4).

6.6.2 Analyst/Programmers

Development staff at all three member sites had a significant stake in existing systems. Their expert knowledge and the poorly documented state of many important systems, meant that they were indispensable to essential maintenance activities. Their services were also required for data base extracts to satisfy ad-hoc management information requests. Thus the data management project threatened power derived from their involvement in applications development and ownership, and their consequent involvement in information provision and decision making [In6, In14, In27].

The future level of analyst/programmer resistance will depend largely on the extent to which they are involved in the establishment of the new development standards. Of concern here were that progress on standards development appeared to have stalled and that the strategic vision and implementation details had not been conveyed adequately to all development staff (with the result that much disinformation had been spread through informal communication channels) [Nt36]. A particular problem existed at Central where one senior analyst/programmer favoured a small systems approach and objected to the imposition of university-wide standards [In16, In17].

Resistance to the implementation of standard development and processing platforms seemed unlikely. Some staff had specific product preferences, but most were of the view that any new platform would be an improvement on the existing, antiquated, technical environment [Nt43].

6.6.3 CEOs

The CEOs at Central and Southern were determined to protect the individual identities and autonomy of their institutions [In18, In30]. They wanted to keep inter-member committee activity to a minimum and, as such, were wary of the high level of inter-member collaboration demanded by the data management project [Nt7, Nt22]. As with the Gigante study, the organisational value of maximum autonomy was a major system of influence. The data management project was viewed by the CEOs as a significant threat to this value.

The CEOs also objected to the common systems a data-centred approach demands. They wished to have custody of their own systems, to have the right to approve (or veto) access to their data bases and to have control over the flow of information to Headquarters [In17, In29]. Their belief was that Headquarters should only require a relatively small amount of aggregated information. The Central CEO, in particular, seemed to be well-aware that control over access to information is an important source of power in organisations [Nt11, Nt15, Nt26, Nt28].

6.6.4 Senior Management

The Southern Secretary had his own IT vision for the university and, in many respects, this was consistent with the SISP outputs. As noted previously, Southern were some way advanced in implementing their own integrated data-centred systems environment prior to the SISP and the Secretary was the architect and controller of this operation. He was very much a "hands-on" executive and was viewed by those outside Southern as the information systems power at that institution [Nt5].

After some initial misgivings, the Southern Secretary was supportive of the SISP and believed that the necessary level of cooperation could be realised. He considered, however, that the personnel/payroll and financial systems, recently implemented at Southern, should not be thrown away but used to implement the second stage of the data-centred environment (after the Student Records project) [Nt30, Nt37]. He was of the view that the Southern processing platform was superior to those at the other two institutions and should form the basis of the university-wide processing architecture standards [Nt32, Nt35]. The evidence also suggests that the Southern Secretary might be expected to resist consequential threats to power derived from his involvement in information provision and decision making, resulting from a diminished role in applications development and ownership [In31].

Another significant information systems player was the Central Secretary/Bursar. He was chairman of the Student Records project and, like the Southern Secretary, had his

own IT vision. He believed that many of the organisation's current information systems problems had resulted from the technical bias of computer centre staff and wanted analyst/programmers involved with current systems excluded from Student Records development [Nt42]. This posed a major threat to data management objectives, as the Student Records project was supposed to be the vehicle for the establishment of both the applications architecture and the initial version of the corporate data model. He had his own strongly-held views on systems development and was prepared to resist any threat to his preferred approach or to power derived from his ownership of that application [In19]. The Central Secretary/Bursar was another strong supporter of the organisational value of maximum network member autonomy [Nt8, Nt19, Nt44].

6.6.5 Functional Areas

Some functional areas, particularly at Southern, were prepared to resist the replacement of recently introduced, computer centre developed, systems [In33]. In addition, the Human Resources Manager at Western had recently introduced his own vendor-purchased personnel package. He believed that the package was an excellent product, that his function differed markedly from the human resources function at the other two network members and he was not prepared to consider its replacement [In8, In9].

The Western Human Resources Manager also believed that there was little overlap between his data and that of other functional areas. He would, therefore, resist any attempt to make any of his data more accessible to other organisation parties [In8]. This concern with protecting functional data was shared by other functional managers [In10, In23, In33].

Nevertheless, most functional managers were prepared to participate in corporate data model data analysis sessions. Most believed that this would lead to the identification of a small subset of aggregated data that would satisfy the information needs of Headquarters [Nt2, Nt47].

6.6.6 Academics

Many small administrative systems, designed to support the work of the teaching faculties, had been developed over the years. Mostly, these had been developed (and were maintained) by individual academics, on PCs, using a variety of hardware/software platforms. The academic systems provided vital support for the university's teaching

operations, but their functionality overlapped substantially with the mainstream administrative systems.

The SISP study recommended that the academic systems should be redeveloped and integrated with the mainstream administrative systems. Senior academics objected to this recommendation and refused to involve themselves in strategy implementation [Nt12, Nt18]. They maintained that their systems' activities provided a means to experiment with new technology and that this was important to their research mission. To do this effectively they needed to be free to select their own development platforms and approaches [In35]. The SISP report recognised that there was value in this experimentation, but no serious attempt was made to explore means (for example, prototyping) by which experimentation could be integrated with core systems redevelopment activity. The notion of academic independence was an important system of influence [In2].

Another phenomenon encountered was "posturing". That is, administrative staff felt that academics were inclined to resist any proposal on principle and that there was an element of "grandstanding" in their approach [Nt12, Nt45]. The academics' view, however, was that they were merely applying their knowledge and skills to rational analysis of (often) inadequate proposals. Pfeffer (1992, Ch.8) devotes considerable attention to power derived from "being in the right sub-unit". By increasing sub-unit power generally, individual members of the sub-unit gain power that can be applied in specific power struggles. The posturing phenomenon encountered at SWU would appear to be a symptom of an ongoing struggle for power between academic and administrative sub-units - a phenomenon not unknown in other academic institutions nor, indeed, in other organisations where there is a division of administrative and professional personnel (Kim and Michelman, 1990).

6.7 SISP IMPLEMENTATION: APPLICATION OF MP/L1

6.7.1 Domain Modelling

As noted previously, field test data was evaluated along Markus's (1983) dimensions of assumption applicability and prediction accuracy. Assumption applicability is concerned with the extent to which the field test SISP implementation domain can be represented in MP/L1.

Most relevant (power source distribution) aspects of the SWU strategy implementation could readily be implemented in MP/L1. As descibed in 6.6, many organisation parties

derived considerable power from their involvement in, or authority over, processing architecture development, applications development and applications ownership. From their roles in these base-level processes, some parties derived consequential power from control over information provision and involvement in decision making processes. The data management project required changes in authorities and responsibilities that seriously threatened many of these existing power sources. However, the field test did reveal a number of additional factors that need to be allowed for in the model. These are:

- The probability that effective resistance will be mounted against standardisation initiatives is diminished if resistors do not have access to discretionary funds or slack resources [Nt38].

- Resistance to processing architecture standardisation is less likely where the current architecture is technically outdated [Nt3, Nt43].

- Posturing; i.e. the tendency for some parties to resist any proposal on principle [Nt12, Nt45].

- Parties that stand to gain from an initiative may resist if an ally is threatened [Nt9]. Related to this, one experiment subject raised the possibility that some alliances and coalitions may result from extra-organisational factors (such as membership of the same clubs or religious organisations).

- The model assumes that the party responsible for strategy implementation is committed to its success. The field test revealed that this is not necessarily the case [Nt9, Nt13].

As noted in 3.4.6, the strategy implementor, when presented with an instance of potential conflict by the MP/L1 expert system, has the option to reject the instance as unlikely. Specifically, the expert system asks the user whether one or more *discount factors* might apply. These are: involvement in issue trade-offs; a lack of concern over the loss of a power source; placement of corporate goals above local goals; and "other".

In the field test, the discount factor "other" was used to account for the fact that systems development areas would not resist processing architecture standardisation (because of a lack of funds and/or the current architectures were technically outdated). Thus, the field test revealed that this part of MP/L1 could usefully be strengthened. In particular, there does appear to be a need to include activity specific discount factors within the model.

The phenomenon of posturing, or particular groups (in this case academics) resisting change on principle, can be restated as the heuristic "all academics will resist most change sponsored by administrators". However, it is important to be wary given that Kotter and Schlesinger (1979) and Markus (1983) have both been critical of managers for too often applying simple heuristics when predicting resistance to change. The rationale for the development of MP/L1 was that a more finely-grained analysis of potential resistance (than the application of heuristics) is required if resistance is to be predicted effectively. Nevertheless, many heuristics are often appropriate and the MP/L1 expert system could easily be enhanced to allow the representation of heuristics as first-order logic rules. This would be consistent with the view (expressed in 2.3.1) that resistance should be examined from different perspectives.

The field test (specifically resistance from the Computer Centre Manager Southern) also revealed that MP/L1 needs to be extended to allow for resistance arising out of membership of alliances or coalitions; such memberships having been identified by Pfeffer (1981) as important power sources. Currently, MP/L1 analyses potential resistance only on an individual party basis but, technically, amending the MP/L1 (and expert system) logic to accommodate power derived from group membership would not be a difficult task. The amendment would simply involve extending the *may-resist* specification (presented in 3.4.6) with a rule such as;

may-resist(x, y, involvement-in(alliance, z)):-
may-resist(u, y, v),
member(x, z),
member(u, z)

which means;

party x may resist activity y because x's involvement in the alliance z is threatened if
party u may resist y because power derived from source v is threatened and
x is a member of alliance z and
u is a member of alliance z.

Extension of the MP/L1 entity-relationship and network bases to accommodate this amendment, however, requires more thought - principally to ensure both clear representation of the additional concept and conformance with existing MP/L1 specification conventions.

Finally, one of the more interesting field test results was that one member of the strategy implementation team was not fully committed to a successful implementation. Specifically, the Computer Centre Manager Central was not convinced that a consensus-based change approach would work and felt that a strong central authority would stand a much better chance of success (c.f. Lindner, 1989 and her change anchors). It is reasonable to assume that this situation might be fairly common given, as noted by Pfeffer (1981), that organisation actors frequently seek membership of committees for the purpose of *preventing* change.

MP/L1 already allows multiple representation of individual parties, so that (as in the case of the SWU study) members of an implementation team can also be represented as potential resistors (under different party names). The model does need to be extended, however, to make the semantics of multiple group representation clearer. Also, organisation parties, performing dual roles as both implementors and resistors, raises questions concerning the practicalities of how the MP/L1 model might best be applied and by whom.

At SWU, it was interesting to observe that identification of instances of potential resistance from the resistors themselves, led to what appeared to be reasonable and honest discussion of the reasons for the resistance and the implications. To some extent, this was probably the result of the personal characteristics of the implementation team members. However, use of the model itself might also have been a contributing factor, in that it may have played the role of a group decision support system (where IT is used to reduce the level of politics in group decision making processes) (Watson and Bostrom, 1991). This suggests that MP/L1 might well be employed as a group decision support system tool and this has been identified as an area worthy of further research.

Extensions to MP/L1 and areas for additional research are discussed further in Chapter 8.

6.7.2 Conflict Prediction

With Method A (any preferred method), the SISP implementation team correctly predicted 22.5% of actual conflicts. With Methods B (manual application of MP/L1) and C (the expert system), correct prediction scores obtained were 73.9% and 77.5% respectively. These results compare well with laboratory experiment results and this aspect is discussed in detail in the following chapter.

6.8 A RATIONAL CHOICE PERSPECTIVE

As with the Gigante case study, much resistance encountered can readily be interpreted from a rational choice perspective. It was reasonable that the Southern Secretary should be protective of his recently installed systems on a number of grounds (investment protection, impact on users and, perhaps, superior quality). The CEOs were correct that the data-centred environment would lessen the autonomy they had been guaranteed and the academics could reasonably claim that their experimentation was important to the future evolution of the organisation's IT environment.

An earlier anlysis of some of this resistance might have led to a different implementation approach. For example, Southern might have been given lead-house responsibility for data management and given a brief to investigate the practicality of using their recently installed applications as "seed systems" for the data-centred environment. A side benefit would have been that, through the Southern Secretary, the data management project would have had a powerful champion, committed to both the vision and to inter-member collaboration. Also, as noted in 6.6.6, means by which academic experimentation could be integrated with mainstream systems development activity might have been explored.

However, consistent with the Gigante study, the evidence suggests that most resistance occurred as a result of parties protecting their own interests. The benefits of common systems and data were substantial and should have outweighed any loss of autonomy [Dt3]. Also, the academics' arguments were inconsistent with their refusal to cooperate with administrative systems parties [In2, In35]; and objections by some functional areas to common systems and data were inconsistent with their criticisms of current central reporting operations [Nt47, In8].

In 6.9, tactics aimed at improving the prospects for a successful implementation of the data management project are detailed. These were developed, by the strategy implementation team, following analysis of resistance encountered to date (from both political and rational choice perspectives).

6.9 MANAGEMENT OF THE SISP CHANGE PROCESS

A number of significant change mangement problems were identified.

The most critical problem identified was leadership. The data management project leader's skepticism regarding the collaborative approach could well have been a self-fulfilling prophecy and the strategy implementation team should have involved itself

more in the project. In particular, the team should have ensured that a number of important management and technical issues were addressed more urgently. These included:

- establishment of information analysis standards;
- establishment of information repository hardware/software standards;
- establishment of corporate data model compliance methods and standards;
- identification of a corporate data model evolution approach that maximises data independence; and
- integration of data management and systems development standards.

The team should have ensured that staff from all three network members were heavily involved in addressing the activities identified above. This would have resulted in two significant benefits: first, it would have addressed the major fear of many parties (viz. that they would have no significant role in strategy implementation) and, second, it would have provided an effective means of spreading the vision and of countering disinformation.

The implementation team might also have attempted to coopt the services of key resistors from functional areas (such as the Western Human Resources Manager). Pfeffer (1981) details a number of motives for employing cooptation as a tactic. Some of these are highly devious (for example, to secure cooperation by providing potential resistors with rewards that result from committee membership). In this case, however, the objective would have been to expose resistors to new information (for example, to have made the extent of overlaps between functional data clusters apparent).

The concerns of the CEOs and others with the autonomy issue should also have been addressed. Frost (1987) has argued that directly challenging a system of influence is dangerous but, as noted in 2.3.1, he has also argued that change agents can use systems of influence to their advantage. At SWU, an opportunity existed for the implementation team to establish data and applications architectures that would have allowed network members to customise common core systems to their own requirements. Flexibility and autonomy could then have been the dominant theme in all presentations and discussions on the new systems development environment.

In pursuing the above approach, the implementation team would have been setting the agenda (Pfeffer, 1981). In 5.7.7, it was noted that the Gigante SISP team failed to do this in the area of implementation costs. Similarly, the SWU implementation team should have aimed to produce costings on strategy implementation as soon as was practicable.

If, in doing so, the focus was on what the existing systems environment was costing the organisation, the implementation team would have been setting the agenda for debate on the strategy.

Related to the issue of costs, data management projects can be lengthy, expensive and resource-intensive. The implementation team could have investigated utilising work already done in other organisations. For example, rather than develop an applications architecture from scratch, they could perhaps have tailored Gigante's GIME architecture to their own needs. SWU would have been well placed to negotiate with Gigante, since the latter organisation was keen to be seen supporting tertiary education institutions. A collaborative effort might also have reassured senior SWU management that they were pursuing an IT strategy consistent with industry directions.

Finally, the SWU strategy implementation had much going for it: the organisation was relatively small; their current systems were generally recognised as inadequate; there was a willingness at the working level to collaborate; and the strategy had some powerful support. However, the lack of strong leadership and tardiness in initiating the critical activities identified above have largely negated these advantages and, at this stage, the prospects for success (particularly in the data management area) do not look good.

CHAPTER 7

7. DATA ANALYSIS

7.1 OVERVIEW

In this chapter, laboratory experiment and field test results are presented and analysed. The discussion builds on the research strategy, research hypotheses and experiment and field test designs, which were presented in Chapter 4, and the case study reports presented in Chapters 5 and 6.

In 7.2, (quantitative) experiment and field test results are presented. Then, in 7.3, these results are analysed in relation to the three research hypotheses. The chapter concludes with a summary of the major findings. Supporting tables are presented in Appendix 5.

7.2 RESULTS

7.2.1 Experiment Results

To reiterate, the basic purpose of the experiment was to assess the conflict prediction effectiveness of: first, MP/L1 against any preferred method; and, second, the expert system implementation of MP/L1 against MP/L1 applied manually.

Definitions of each prediction method used in the experiment are given in 4.3, but to recapitulate briefly:

- Method A is any preferred method;
- with Method A′, subjects use any preferred method but employ the MP/L1 recording instrument;
- with Method B, subjects use MP/L1; and
- with Method C, subjects use the expert system.

Subjects were given background on the Gigante SISP and asked to predict conflicts arising out of the project "APPS Development". The set of actual conflicts arising out of this project is presented as a matrix in Section 5 of Appendix 3. A prediction was judged to be correct if it matched one of the cells labelled c1 - c67 in this matrix. Otherwise, the prediction was judged to be incorrect. Correct and incorrect prediction scores were calculated by adding the correct and incorrect predictions made by a subject in a test and expressing each of these sums as a percentage of the total actual predictions.

Twenty subjects were tested in individual sessions. They were randomly assigned to experimental and control groups (each with 10 subjects). Each subject was given three shots at the test:

- in the first test, each subject employed Method A;
- in the second test, experimental group subjects used Method B and control group subjects used Method A′; and
- in the third test, experimental group subjects used Method C and control group subjects used Method B.

The null hypotheses were:

H0a: Experimental group subjects are no more effective at conflict prediction than control group subjects when measured by correct prediction scores (when both groups use Method A).

H0b: Experimental group subjects are no more effective at conflict prediction than control group subjects when measured by incorrect prediction scores (when both groups use Method A).

H2a: Method B is no more effective than Method A′ in predicting conflict when measured by correct prediction scores.

H2b: Method B is no more effective than Method A′ in predicting conflict when measured by incorrect prediction scores.

H3a: Method C is no more effective than Method B in predicting conflict when measured by correct prediction scores.

H3b: Method C is no more effective than Method B in predicting conflict when measured by incorrect prediction scores.

Note that H0a and H0b are concerned with establishing group equivalence, H2a and H2b are concerned with assessing MP/L1 against any preferred method and H3a and H3b are concerned with assessing the expert system against the manual application of MP/L1. Result sets produced by the experimental group with Methods A, B and C were E1, E2 and E3 respectively. Result sets produced by the control group with Methods A, A′ and B were C1, C2 and C3 respectively. All null sub-hypotheses were tested using

one-way ANOVA. t-values were calculated for correct and incorrect prediction scores for:

- E1 and C1 (to confirm group equivalence);
- E2 and C2 (to test H2a and H2b); and
- E2′ and C2′ (to test H3a and H3b).

Significance was set at the .05 level.

Mean correct and incorrect prediction scores (together with standard deviations) obtained by subject groups are displayed in Tables 4 and 5 repectively. These tables were derived from data presented in Tables 1 and 2 of Appendix 5 and are illustrated graphically in Figure 11. One-Way ANOVA tables, derived from the same data, are presented in Tables 6 and 7.

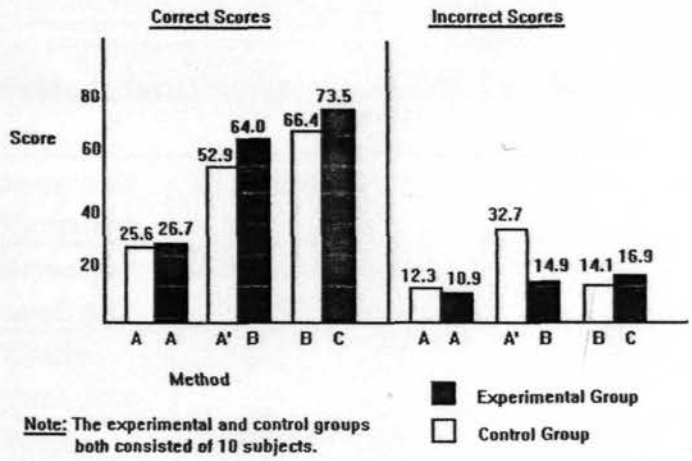

Figure 11: Experiment Conflict Prediction Scores.

Result Set	Group	Method	Mean	SD
E1	Exp.	A	26.7	4.64
E2	Exp.	B	64.0	5.57
E2′	Exp.	C	73.5	9.67
C1	Control	A	25.6	3.07
C2	Control	A′	52.9	4.21
C2′	Control	B	66.4	6.68

Table 4: Correct prediction Scores - Means and SDs.

Result Set	Group	Method	Mean	SD
E1	Exp.	A	10.9	5.07
E2	Exp.	B	14.9	5.01
E2′	Exp.	C	16.9	4.11
C1	Control	A	12.3	5.05
C2	Control	A′	32.7	5.72
C2′	Control	B	14.1	5.03

Table 5: Incorrect Prediction Scores - Means and SDs.

Source of Variation	Variation	d.f.	Variance	F-ratio	p-value
Between result sets	21,501	5	4,300.2	107	p << .001
Within result sets	2,170	54	40.18		
Total	23,671	59			

Table 6: Correct Prediction Scores - ANOVA Table.

Source of Variation	Variation	d.f.	Variance	F-ratio	p-value
Between result sets	3186.2	5	637.2	22.8	p << .001
Within result sets	1507.8	54	27.92		
Total	4694.0	59			

Table 7: Incorrect Prediction Scores - ANOVA Table.

The ANOVA results indicate that the probability that both result sets have come from the same parent populations is much less than .001. To determine which means differ

significantly, three comparisons were made for both correct and incorrect prediction scores. Identifying the means in Tables 4 and 5 as m_i (where i = row number), the null hypotheses can be restated as:

- H0a and H0b: $m_1 - m_4 = 0$;
- H2a and H2b: $m_2 - m_5 = 0$; and
- H3a and H3b: $m_3 - m_6 = 0$.

t-values for the two sets of three comparisons are presented in Table 8.

Null Hypothesis	First Mean	Second Mean	t-value	Critical Value	p-value
H0a	26.7	25.6	0.388	2.45	$p > .10$
H2a	64.0	52.9	3.915	2.45	$p < .01$
H3a	73.5	66.4	2.504	2.45	$.01 < p < .05$
H0b	10.9	12.3	-0.593	2.45	$p > .10$
H2b	14.9	32.7	-7.542	2.45	$p < .01$
H3b	16.9	14.1	1.186	2.45	$p > .10$

Table 8: t-values.

By the Bonferroni method, testing three hypotheses at the .05 level means that each individual hypothesis must be tested at the .05/3 (= .0167) level. With 57 degrees of freedom (60 observations and 3 comparisons), the Bonferroni t-distribution yields a critical value of 2.45. Thus, H0a is not rejected, H2a is rejected and H3a is rejected. Similarly, for incorrect prediction scores, H0b and H3b are not rejected, but H2b is rejected.

Implications of these findings are discussed in the following section (7.3).

Finally, Table 9 below displays the percentage of consequential conflicts predicted by experimental and control groups with Methods A′, B and C. The table was derived from data presented in Tables 6 and 7 of Appendix 5 and implications of these results are discussed in 7.3.2.

Group	Method		
	A′	B	C
Experimental	-	72.7	94.4
Control	55.1	75.1	-

Table 9: Consequential Conflicts Predicted (%).

7.2.2 Field Test Results

The field test was undertaken to assess the external validity of laboratory experiment findings. The 4-member strategy implementation team at SWU completed three conflict prediction sessions; initially with any preferred method (Method A), then with MP/L1 (Method B) and, finally, with the expert system (Method C). Thus, their prediction results could be directly compared with those of experimental group subjects (specifically, their average scores). Correct and incorrect prediction scores were calculated as in the laboratory experiment (see 7.2.1). The set of actual conflicts, against which field test predictions were measured, is presented in Section 5 of Appendix 4.

Results of prediction sessions carried out during the SWU case study are presented in Table 10. Base data for these results is presented in Table 11 of Appendix 5. A comparison of field test results with mean correct prediction scores obtained by experimental subjects is illustrated in Figure 12. Field test results are discussed, in conjunction with laboratory experiment results, in the following section.

Phase	Prediction Method	Correct Prediction Score	Incorrect Prediction Score
2	Method A	22.5	3.6
3	Method B	73.9	5.8
4	Method C	77.5	7.2

Table 10: Correct Prediction Scores from the SWU Field Test.

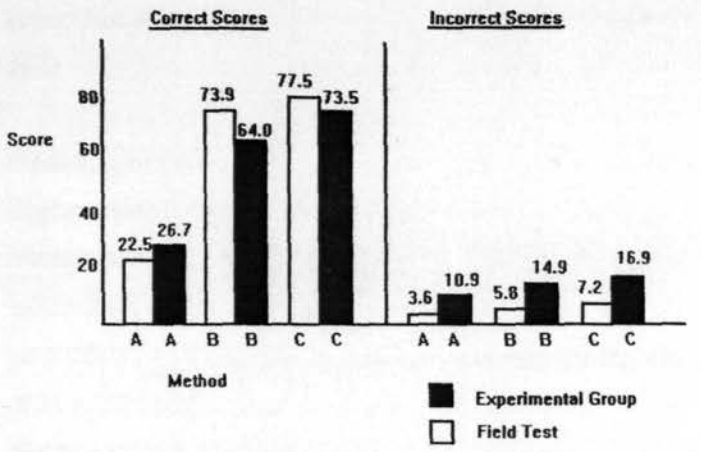

Figure 12: Experimental Group and Field Test Conflict Prediction Scores.

7.3 HYPOTHESES EVALUATION

7.3.1 Hypothesis H1 Evaluation

H1: Strategy implementors do not predict resistance well.

The mean correct prediction score for experimental group subjects using Method A was 26.7 (compared with a mean of 64.0 for the same group when using Method B). Method A was meant to approximate conditions found in the field with implementors using any preferred prediction method. Even allowing for the threats to internal and external validity, identified in 4.5.5, this score is low and the result would appear to provide some support for H1.

The SWU implementation team's correct prediction score at their initial attempt (without exposure to MP/L1) was 22.5, which is lower than the mean of 26.1 obtained by all experiment subjects using Method A. Thus, the field test strengthens support for H1.

7.3.2 Hypothesis H2 Evaluation

H2: Exposing strategy implementors to the power source distribution model MP/L1 will improve their ability to predict resistance.

Mean correct prediction scores obtained with Methods A′ and B were 52.9 and 64.0 respectively and mean incorrect prediction scores obtained with the two methods were 32.7 and 14.9 respectively. The differences in scores were sufficiently great to cause

rejection of null hypotheses H2a and H2b. Thus, experiment results provide support for H2.

Although the experiment was not designed to compare Methods A and A′, the much higher mean correct prediction score obtained by control group subjects with Method A′ compared with Method A (52.9 versus 25.6) suggests: 1) that the MP/L1 tabular recording instrument may, in itself, be a useful conflict prediction mechanism (probably as a result of possible sources of conflict being built into the recording instrument); 2) that a learning effect occurred; or 3) that the difference was due to a combination of these factors. Note, however, that the experiment design eliminated the learning effect in evaluation of the formal hypotheses (because pre-test results were compared with pre-test results, post-test results with post-test results etc., as indicated in Figure 6 in 4.5.2).

Analysis of incorrect prediction scores reveals that a significantly lower mean was obtained with Method B than with Method A′ (14.9 versus 32.7 and rejection of H2b). This suggests that use of the MP/L1 recording instrument, without exposure to MP/L1 concepts, encourages a "scatter gun" approach. That is, actual conflicts will be predicted well but much prediction will be inaccurate. This may not matter much, as the implementor's primary aim must be to ensure that as much potential resistance as possible is identified. However, it may mean that implementors will prepare tactics based on, at least some, wrong reasons for resistance.

In addition, the importance of identifying consequential reasons for resistance has previously been discussed (see 3.4.6). That is, an implementor should be aware, not only of threats to a party's involvement in or authority over a process, but also to consequences of that threat (for example, a threat to applications development may threaten funds generated from that activity). Table 9 indicates that Method B was considerably more effective than Method A′ in predicting consequential conflicts (72.7% versus 55.1%) and this suggests that experimental group subjects using MP/L1 might have been better equipped to prepare tactics than their control group counterparts (because tactics could be based not only on threats to parties' involvement in operational processes but also consequential threats to other sources of power). Note also that Method C was even more effective than Method B (94.4 versus 75.1). Thus, when applying MP/L1 manually, consequential conflicts might be overlooked through human error. The exhaustive search carried out by the automated expert system, however, ensures that all potential conflicts are brought to the attention of strategy implementors.

At SWU, correct prediction scores obtained with and without MP/L1 were 73.9 and 22.5 respectively. The much improved performance with MP/L1 is consistent with laboratory

experiment results but pre-testing and instrumentation differences undoubtedly contributed to the improvement. Also, the researcher's unavoidable involvement in the MP/L1 conflict prediction exercise may have been an additional factor responsible for the higher score (discussed in detail in 4.6.2).

Nevertheless, the SWU implementation team responded well to MP/L1 and were enthused that application of the model alerted them to sources of potential resistance that they believed should have been identified in their initial attempt. This one field test result, by itself, significantly strengthens support for H2.

Finally, as noted in 6.7, most relevant aspects of the SWU strategy implementation domain could readily be represented in MP/L1 and implemented in the expert system. While the field test did reveal some five additional factors that need to be allowed for in the model, the impact of these on field test conflict prediction results was insignificant. Consequently, it is concluded that MP/L1 provided an effective means of both describing the power source distribution associated with the SWU strategy implementation and of predicting potential conflicts. Thus, the field test strengthens support for hypothesis H2. Specifically, field test results suggest that MP/L1 might well be usefully applied in other organisations, subject to the domain constraints specified in 4.3.1. At the same time, the discovery of the additional factors at SWU clearly indicates the need for further case studies.

7.3.3 Hypothesis H3 Evaluation

H3: Resistance prediction ability will improve further where implementors use the computerised (expert system) implementation of the power source distribution model MP/L1.

Laboratory experiment results indicate that correct prediction scores obtained using the expert system were significantly better than those obtained with the manual application of MP/L1 (73.5 versus 66.4 and rejection of H3a) and that there was no significant difference in incorrect prediction scores (16.9 versus 14.1 and non-rejection of H3b). Since the extraneous variables, pre-testing and instrumentation, were controlled in testing Method C against Method B, rejection of H3a implies support for H3.

In the SWU field test, the correct prediction score of 77.5 obtained with the expert system was only slightly higher than the correct prediction score of 73.9 obtained with MP/L1.

One reason for this might be that the researcher led the SWU implementation team in applying MP/L1, whereas the experiment subjects were not given the same degree of guidance. That is, the researcher's knowledge of his own model led to a more comprehensive search in the case of the field test. This suggests that the expert system might be of most use where practitioners are aware of MP/L1 principles but have little experience in the application of the model.

A further possibility is that the SWU team were more familiar with the background to their strategy implementation than experiment subjects were with the case study background. If this variable is to be used to explain variations in experiment and field test MP/L1 correct prediction scores, however, a similar (if not greater) variation might be expected in scores obtained at the initial attempt. This did not occur (see 7.3.1).

A third possibility is that experiment subjects had to make their predictions in one test, restricted to one hour, whereas no time limit was placed on the field test implementation team and they were given the opportunity to refine their results in a second session. Only two amendments were made in the second session, but the initial session did take two hours and the extra time given the field test team almost certainly contributed to the improved performance. Similarly, the fact that field test predictions were made by a team (rather than by isolated individuals) may also be partly responsible for the better results.

7.4 SUMMARY

Low correct prediction scores obtained without exposure to MP/L1 in both the experiment and field test provide support for the hypothesis (H1) that SISP implementors do not predict conflict well. This suggests that poor conflict prediction may well be a determinant of the poor SISP implementation success rate (Lederer and Sethi, 1988). However, this can only be verified through further research. This applies particularly to data-centred target environments, where the 100% implementation failure rate reported in the Doll Martin Associates (1990) survey suggests that there may be basic technical and managerial problems, associated with this type of information systems environment, that are currently intractable (for example, ensuring data base integrity, security and performance where different groups are developing systems around the same set of data bases).

The much improved prediction score obtained by experiment subjects using MP/L1 (compared with any preferred method) provides significant support for hypothesis H2.

The even greater improvement experienced in the field test strengthens this support, but the possible effects of pre-testing and experimenter involvement must be acknowledged. A conservative conclusion is that where:

- a SISP implementation team uses MP/L1;
- in a session (or sessions) with a facilitator experienced in using the model; and
- with the MP/L1 prediction session following an earlier session with any preferred method

the team will predict conflict well.

In the experiment, the mean correct prediction score obtained with the expert system was significantly higher than that obtained with the manual application of MP/L1 (73.5 versus 66.4). This result was not mirrored in the field, where correct prediction scores obtained with the expert system and MP/L1 were 77.5 and 73.9 respectively. The most that can be concluded, therefore, is that conflict prediction will not suffer where the expert system is used and may well improve where no MP/L1 expert is available to guide the prediction sessions (see 7.3.3). Intuitively this makes sense, as a major function of an expert system is to act as a surrogate for a human expert (Hayes-Roth, 1985). Nevertheless, the effectiveness of the expert system without expert guidance is another area for further research.

CHAPTER 8

8. CONCLUSION

8.1 OVERVIEW

In this chapter, the thesis is reviewed and directions for further research are indicated. In 8.2, the study is summarised and the major conclusions reached are presented as grounded hypotheses. Further testing of these hypotheses is the principal direction for further research indicated in 8.3. Other promising future research themes centre on extensions to MP/L1 to accommodate a tactics component and organisational change triggers other than IS strategy implementation (such as organisation restructuring).

8.2 RECAPITULATION AND DISCUSSION

Many organisations are unable to realise their business objectives because of inadequate information systems (Nolan et al., 1989; Doll Martin Associates, 1990). A SISP study is often undertaken as a first step in order to correct this problem. The major outputs of a SISP study are: first, the specification of a target information systems environment that aligns an organisation's business objectives with its information systems; and, second, the detailed specification of the projects that will create the target information systems environment.

The available evidence suggests that the SISP implementation success rate has been poor (Lederer and Sethi, 1988; Sager, 1988b; and Doll Martin Associates, 1990). Thus, this research was motivated by a desire to determine reasons for this lack of success and to identify practical actions that could be taken to remedy the situation.

An exploratory case study of a SISP development and implementation at Gigante Corporation revealed that: first, resistance from organisational parties was a major contributing cause to the failure of key SISP projects; second, that much resistance was the result of perceived or actual threats to existing power sources; and, third, that the strategy team did not predict resistance well. Furthermore, much of the resistance encountered could have been predicted and explained using a power source distribution model framework (Markus, 1983) and this framework, together with the SISP implementation domain, could be modelled using formal information analysis and artificial intelligence techniques. This led to the development of the power source distribution model, MP/L1, which was implemented as an advisory expert system designed to assist SISP implementors in predicting potential resistance.

The case study was also used to generate detailed research hypotheses. These were:

```
In implementing information systems strategy:

H1: Strategy implementors do not predict
    potential resistance well.

H2: Exposing strategy implementors to the power
    source distribution model MP/L1 will improve
    their ability to predict resistance.

H3: Resistance prediction ability will improve
    further where implementors use the
    computerised (expert system) implementation
    of the power source distribution model MP/L1.
```

Hypotheses testing was undertaken using a combination of a laboratory experiment and a field test. In the laboratory setting, independent variables could be controlled and the experimental design enabled comparisons to be made between the conflict prediction effectiveness of: first, MP/L1 and any preferred method; and, second, MP/L1 and the expert system implementation of MP/L1. The field test was undertaken in order to assess the external validity of experimental findings and involved MP/L1 being used to assist in a SISP implementation at South-Western University (SWU).

The laboratory experiment revealed that conflict prediction results achieved with MP/L1 were significantly better than those achieved with any other preferred method and that a further significant improvement occurred when the expert system was employed. In addition, conflict prediction results achieved with any other preferred method were poor. Thus, experimental results provide significant support for the three research hypotheses.

In the field, the correct prediction score achieved with any preferred method was of much the same order as that achieved in the experimental setting and an even greater improvement (over the experimental result) was experienced with MP/L1. Consequently, field test results strengthen support for hypotheses H1 and H2. However, while a further slight improvement was experienced in the field when the expert system was used, this improvement was not significant. Nevertheless, conflict prediction scores obtained with the expert system in the laboratory and the field were of the same order.

The lack of a significant improvement with the expert system in the field was attributed to unavoidable researcher involvement in conflict prediction when using MP/L1 and no time limit being placed on the prediction session when using this method.

A further important field test result was that most aspects of the SWU IS strategy implementation domain could be conveniently represented using MP/L1. Hence, the assumptions that underpin MP/L1 appear to be well grounded.

Thus, in summary, this research:

- *Provides significant support for the hypothesis (H1) that SISP implementors do not predict resistance well.*

- *Provides significant support for the hypothesis (H2) that exposing SISP implementors to the power source distribution model MP/L1 will improve their ability to predict resistance. However, it may be that best results will be obtained if prediction sessions are: first; led by a facilitator experienced in using MP/L1; and, second, if an MP/L1 prediction session is preceded by a session using any preferred method.*

- *Provides some support for the hypothesis (H3) that use of the MP/L1 expert system will produce a further significant improvement in resistance prediction results (over those achieved with the manual application of MP/L1); particularly, where no experienced MP/L1 expert is available to guide prediction sessions.*

8.3 LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH

Additional testing of the grounded hypotheses presented above requires further application of MP/L1 in the field. Because of the nature of SISP work, such a study would necessarily be lengthy. The study might be expected to reveal additional power model concepts that could usefully be included in MP/L1 and modifications to the set of SISP activity specific processes identified during this initial research stage. The levelled MP/L1 design (see 3.3) and the logic-based expert systems technology employed for the automated implementation ensures that the model can be readily extended and modified.

Further research is required to determine:

- whether pre-testing (with any preferred method) has a beneficial effect on later conflict prediction sessions with MP/L1;

- whether teams are better at conflict prediction than individuals;

- the extent to which an iterative approach might contribute to better conflict prediction;

- whether MP/L1 might impact on any relationships discovered between conflict prediction and predicting party (team or individual) and the number of prediction attempts; and

- the effectiveness of the MP/L1 expert system as a surrogate for an MP/L1 expert.

The extent to which the findings of this research can be generalised is limited by the research domain constraints presented in 4.3. Essentially, the domain constraints limit the applicability of the research findings to organisations that:

- have invested heavily in information systems and are very dependent on their information systems;
- have many organisation parties involved in information systems activities; and
- have the implementation of a (logical) data-centred information management environment (Sager, 1988b) as a core strategic information systems objective.

Thus, the research findings may have little relevance for organisations that, for example, maintain strong central control over their information systems operations or whose operations are loosely coupled (and can, therefore, quite reasonably, develop and implement their information systems on a functional area basis). Nevertheless, it is this researcher's view that the research findings are applicable to many medium to large organisations. This view is based, in part, on a 1990 survey of 22 large Australian organisations (Doll Martin Associates, 1990) which found that all of these organisations were undertaking major transformations of their information systems environments and most believed that it was not a matter of *whether* to implement a data-centred environment but *when*.

As discussed in 2.3.4 and 3.4.7, MP/L1 does not, at this stage, have a tactics component that can be used to advise on appropriate tactics that might be used to combat predicted resistance. Nevertheless, the current design does include a high-level specification of a tactics component (see 3.4.7) and detailed specification of this section of the model is a high priority area for further research. The change management literature (surveyed briefly in 2.3.4) is rich in recommendations for dealing with resistance to change and many recommendations are amenable to representation as rules. Thus, expert system technology might also be used to very good effect in this area.

As noted in 6.7.1, the field test revealed that the MP/L1 model needs to be extended to accommodate additional discount factors, commonly used heuristics, coalitions, memberships of multiple groups and the fluid nature of group composition (which can be highly issue dependent). Ideally, these extensions should be made prior to further field testing of the model.

As discussed in 3.3, MP/L1 has been designed in a way that should permit convenient extension to activity specific domains other than IS strategy implementation. Organisation restructuring, resource allocation and the introduction of new technologies and work practices are only some of the domains that would appear to be worthy of investigation.

Technically, the current expert system implementation of MP/L1 suffers from two deficiencies which, if not corrected, could inhibit its acceptance outside a research setting. These are: first, that a number of research subjects commented that they found the MP/L1 user interface inferior to the graphical user interfaces they were using in their everyday work; and, second, while MP/L1 can be applied in stand-alone mode, it should ideally be integrated into a CASE tool as a front-end planning workbench component. Of interest here is that Hayes-Roth (1991) has recently argued that a major reason why expert systems have not proliferated to the degree envisaged in the early 1980s is because of difficulties experienced in integrating expert systems applications into mainstream information systems environments.

Finally, no attempt is made in this thesis to judge resistance from moral or ethical perspectives. The power source distribution model MP/L1 has been developed as a means of contributing to a better understanding of the whole conduct of SISP as an organisational process. This has application to managing such a technological change operation, in terms of the possibility of better dealing with the critical aspect of resistance to change, as part of the general perceived and real conflict emanating from the whole process. In common with Pfeffer (1981) and Markus (1983), the view is taken

that resistance is essentially neither good nor bad but is endemic in organisations and much resistance encountered during IS strategy implementation will be the result of reasonable technical and economic concerns.

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MP/L1 LINKS

1. PROCESS - PROCESS LINKS

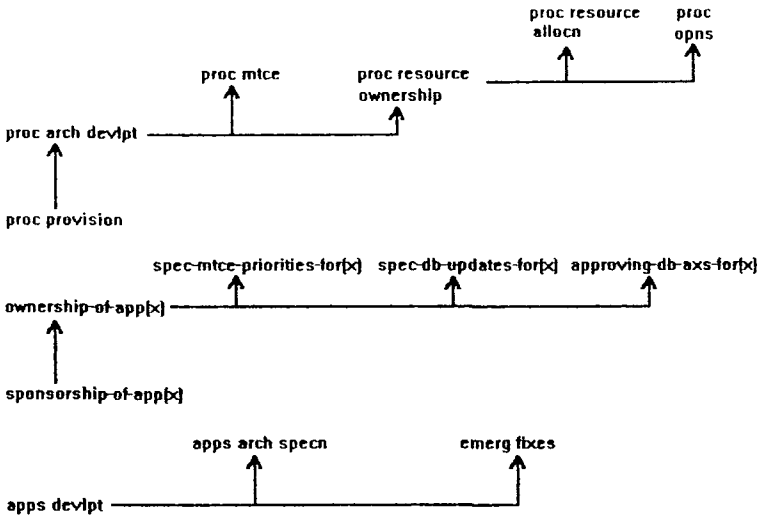

Figure 1: Process - Process Links.

linked-to(control-over("critical fn", x), control-over("critical fn", y)):-
process-link(x, y)

process-link("proc arch devlpt", "proc provision")
process-link("proc mtce", "proc arch devlpt")
process-link("proc resource ownership", "proc arch devlpt")
process-link("proc resource allocn", "proc resource ownership")
process-link("proc opns", "proc resource ownership")
process-link(ownership-of-app(x), sponsorship-of-app(x))
process-link(spec-mtce-priorities-for(x), ownership-of-app(x))
process-link(spec-db-updates-for(x), ownership-of-app(x))
process-link(approving-db-axs-for(x), ownership-of-app(x))
process-link("apps arch specn", "apps devlpt")
process-link("emerg fixes", "apps devlpt")

2. FUNCTION - FUNCTION LINKS

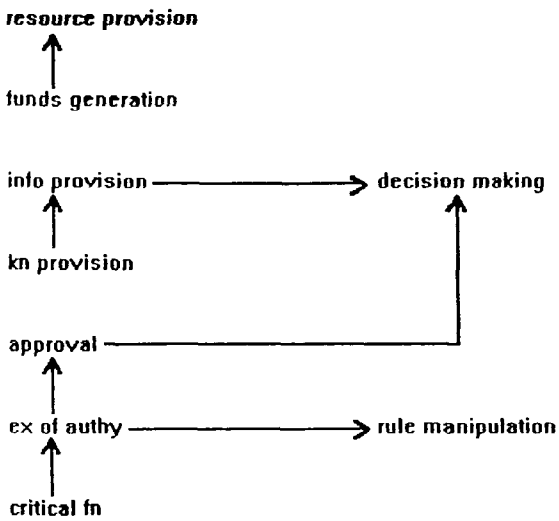

Figure 2: Function - Function Links.

linked-to(control-over("resource provision", x), control-over("funds generation", x))
linked-to(impact-on("decision making", x), involvement-in(approval, x))
linked-to(impact-on("decision making", x), control-over("info provision", x))
linked-to(involvement-in(approval, x), control-over("ex of authy", x))
linked-to(control-over("info provision", x), control-over("kn provision", x))
linked-to(control-over("rule manipulation", x), control-over("ex of authy", x))
linked-to(control-over("ex of authy", x), control-over("critical fn", x))

3. PROCESS - FUNCTION LINKS

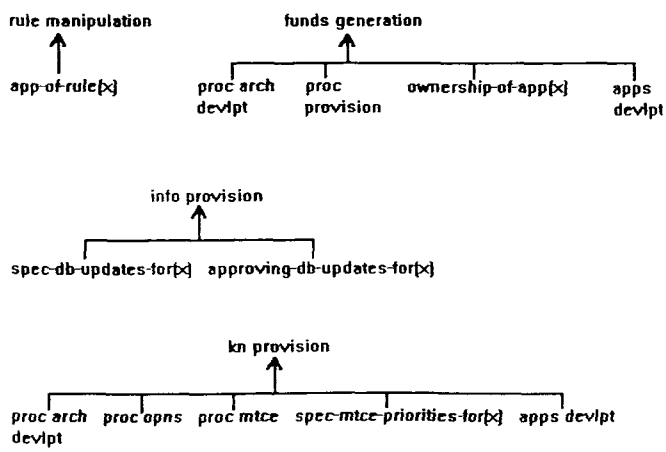

Figure 3: Process - Function Links.

linked-to(control-over("rule manipulation", app-of-rule(x)),
control-over("critical fn", app-of-rule(x)))
linked-to(control-over("funds generation", "proc provision"),
control-over("critical fn", "proc provision"))

linked-to(control-over("funds generation", "proc arch devlpt"),
control-over("critical fn", "proc arch devlpt"))
linked-to(control-over("funds generation", ownership-of-app(x)),
control-over("critical fn", ownership-of-app(x)))
linked-to(control-over("funds generation", "apps devlpt"),
control-over("critical fn", "apps devlpt"))
linked-to(control-over("info provision", spec-db-updates-for(x)),
control-over("critical fn", spec-db-updates-for(x)))
linked-to(control-over("info provision", approving-db-axs-for(x)),
control-over("critical fn", approving-db-axs-for(x)))
linked-to(control-over("kn provision", "proc arch devlpt"),
control-over("critical fn", "proc arch devlpt"))
linked-to(control-over("kn provision", "proc opns"),
control-over("critical fn", "proc opns"))
linked-to(control-over("kn provision", "proc mtce"),
control-over("critical fn", "proc mtce"))
linked-to(control-over("kn provision", spec-mtce-priorities(x)),
control-over("critical fn", spec-mtce-priorities-for(x)))
linked-to(control-over("kn provision", "apps devlpt"),
control-over("critical fn", "apps devlpt"))

APPENDIX 2

EXPERIMENT DOCUMENTATION

1. OVERVIEW

Background material given to all subjects is presented in Section 2. Instructions given to subjects for the pre-test, post-test and repeat of the post-test are presented in Sections 3, 4, and 5 respectively. Briefings given on MP/L1, the MP/L1 recording form and the expert system are presented in Sections 6, 7 and 8 respectively. Sessions schedules are contained in Section 9.

2. CASE STUDY BACKGROUND

Case study background material given to experiment subjects was extracted from the Gigante case study report presented in Chapter 5. Table 1 relates experimental pseudonyms (shown on the left) to the set of pseudonyms used in Chapter 5 (shown on the right).

Gigante	Gigante
Information Systems Department (ISD)	GAIS
Systems Development Branch (SDB)	National Applications Development
Corporate Systems Group (CSG)	CNSS
Decision Support Systems (DSS)	Business Management Systems
Cliente Speciale Division (CSD)	Corporate Customer Division
Metropoli	Gigante Residential Division
Rurale	Country Division
Commerciale	Gigante Business Services
Corporate Information Technology (CIT)	CIS
Moribondo	Bull
Montagna	Fujitsu
GNET	GACONET
Gigante's System's Environment (GSE)	GIME
IPOS system	APPS
OPOS system	DCRIS
SPOS system	RASS

Table 1: Experiment Pseudonyms.

Material presented to all subjects was as follows:

Section 1: Introduction

This report is organised as follows: An introduction to Gigante, together with a discussion of the evolution of the company through the 1980s is presented in the following section. Details of the company's information systems environment prior to its

Strategic Information Systems Planning (SISP) study are given in Section 3, followed by presentation of the SISP study recommendations in Section 4. In Section 5, information on key parties involved in strategy implementation is provided. The report concludes with a glossary of acronyms used.

Section 2: The Company

The Gigante company is a public utility servicing all sections of the Australian community. Up to the early 1980's, the company had a monopoly over the provision of its specific services. Since then, its monopoly has been eroded to a point where it now faces competition in all sectors of its operations.

In 1986, Gigante's management, recognising that competition was inevitable and increasingly concerned about the company's ability to succeed in a competitive environment, commissioned a consulting firm to review its operations and organisation structure.

The major outcome of the review was that the previous regional and product-based structure was to be replaced by a "customer-focused" structure, comprised of four divisions (each responsible for a customer sector) and a number of shared resource units (SRUs) (each responsible for a particular area of functional support). The four customer divisions were Cliente Speciale Division (CSD), Metropoli, Commerciale and Rurale and the SRUs included Material Services, Accounting, Engineering and the Information Systems Department (ISD).

CSD, along with ISD, were established in July 1987 and the remainder of the organisation structure was put in place in May 1988. The Gigante organisation structure is presented in Figure 1.

Other outcomes of the review, relevant from an information systems viewpoint, were:

- -Gigante's information systems were inadequate to meet the needs of the changing environment;
- -divisions and SRUs were to be given maximum autonomy;
- -managers, to the lowest level possible, were to be accountable and were to be subject to performance-based pay; and
- -SRUs (including ISD) were to be given a two year "period of grace", during which they would be sole provider of services; after that, they would be open to competition (in fact, ISD, in particular, was already facing significant competition from alternative providers of information systems services).

[*Note:* Figure 1 is Figure 8 from Chapter 5 using experimental pseudonyms.]

Section 3: The IS Environment - Pre-SISP

A direct copy of 5.3, from Chapter 5, using experimental pseudonyms.

Section 4: The SISP Study

A direct copy of 5.4, from Chapter 5, using pseudonyms and with direct references to Arthur Andersen deleted.

Section 5: Involved Parties

A direct copy of 5.6, from Chapter 5, using pseudonyms and with the final para. of most subsections either deleted or amended to remove direct references to resistance or power sources.

3. PRE-TEST INSTRUCTIONS

Section 1: The Task

In Section 2, background on a Gigante Corporation IS strategy implementation project is provided.

The project involved the development of a new product orders system called Integrated Products Orders Systems (IPOS). The development was sponsored by the Cliente Speciale Division (CSD), who approached Corporate Information Technology (CIT) with a proposal for IPOS to be the initial major system development within Gigante's Systems Environment (GSE).

> **You are asked to place yourself in the position of the strategy implementor (CIT) and, after having considered the proposal (within the context of the agreements identified in the following section), you need to predict which parties in the organisation may resist the development.**

For each potential resistor, please identify the reasons why you believe they may resist. Answers are to be entered directly into the PC with reasons for resistance entered under the party headings shown.

You have 1 hour to complete the exercise.

Section 2: IPOS - Background

In late 1989, CSD commenced planning the development of IPOS. The new system was intended as a replacement for Gigante's two product orders systems, Ordinary Products Orders System (OPOS) and Special Products Orders System (SPOS) and would be used by all other divisions.

Both OPOS and SPOS were originally developed and owned by CSG but, in early 1988, CSD successfully wrested control over SPOS from them. Technical maintenance of OPOS and SPOS was performed by the Information Systems Department's Systems

Development Branch (SDB) and both systems were processed on Moribondo mainframes within GNET.

In February 1990, CSD approached CIT with a proposal to proceed with IPOS development. After negotiation, CSD agreed to the following conditions:

-IPOS was to be developed as a GSE-compliant system.
-DB2 was to be used as the DBMS platform and development and processing were to take place on GNET Montagna mainframes.
-IPOS was to be developed within the GSE Applications Architecture (established by SDB).
-CSD were to heavily involve all other divisions in the development.
-GSE data base control and ownership provisions would apply.

CSD had used SDB resources in their IPOS planning work and would continue to employ them for the remaining development stages. In addition, they hoped to be able to involve CSG in some way.

4. POST-TEST INSTRUCTIONS

4.1 Instructions to Experimental Group Subjects

Section 1: The Task

In this exercise, you are required to repeat the previous exercise. That is, using the background material and the information on IPOS contained in the Exercise 1 handouts, you are asked to predict which parties will resist IPOS and for what reasons. On this occasion, however, you are to make your predictions within an MP/L1 framework. Specifically, you should declare that a party will resist if you consider that a power source is threatened (i.e. if IPOS poses a threat to a party's involvement in, or authority over, a process or if IPOS poses a threat to an organisational rule).

Before commencing, you should give some consideration to what you believe the MP/L1 process/function network is for the Gigante SISP implemetation domain.

Please enter your answers directly into the PC using the MP/L1 conflict prediction form. A hard copy of this form is displayed in Section 2. Placement of an "x" uniquely identifies a resisting party and the reason for resistance. For example, placement of an "x" in the Montanga column and the proc. arch. devlpt row, indicates that Montagna will resist IPOS because their involvement in processing architecture development is threatened.

You have 1 hour to complete the exercise.

Section 2: Recording Form

	GM ISD	Mgr SDB	SDB PMs	Cost	CSG	DSS	CSD	Met	Rur.	Com.	Mor.	Mon.
Proc provn												
Proc arch devlpt												
Proc ownership												
Funds source												
Apps devlpt												
Funds source												
Apps ownership												
Funds source												
Spec db updates												
Approving db axs												
Info provn												
Decn making												
Authority over: Proc provn												
Proc arch devlpt												
Apps devlpt												
Apps ownership												
Decn making												
App of Rule-1												
App of Rule-2												
App of Rule-3												
App of Rule-4												

4.2 Instructions to Control Group Subjects

Section 1: The Task

In this exercise, you are required to repeat the previous exercise. That is, using the background material and the information on IPOS contained in the Exercise 1 handouts, you are asked to predict which parties will resist IPOS and for what reasons.

Please enter your answers directly into the PC using the form on which you have just been briefed. A hard copy of this form is displayed in Section 2.

You have 1 hour to complete the exercise.

Section 2: Recording Form

As for experimental group subjects.

5. POST-TEST REPEAT INSTRUCTIONS

5.1 Instructions to Experimental Group Subjects

Section 1: The Task

In this exercise, you are required to again repeat the previous exercise. That is, using the background material and the information on IPOS contained in the Exercise 1 handouts, you are asked to predict which parties will resist IPOS and for what reasons. On this occasion, however, you will use the MP/L1 expert system, on which you have just been briefed. Instructions for manipulating the expert system menus are presented in Section 2.

You have 1 hour to complete the exercise.

Section 2: Menu Manipulation

Horizontal menus:
Spacebar - move right.
Backspace - move left.

Vertical menus:
Spacebar - move down.
Backspace - move up.

Return key:
Use to enter menu choice(s) once selected.

Multiple choice menus:
M is toggle key: Use it to select and deselect choices.

5.2 Instructions to Control Group Subjects

As presented in 4.1 of this appendix.

6. INTRODUCTION TO MP/L1

Subjects were presented with the following information:

MP/L1 is based on the power, or political, model of organisation decision making. In the power model, organisation parties have different goals and different views on how those goals can be realised. Where there is a clash between corporate and local goals, local goals take precedence. Action is the result of bargaining and compromise, with the result that outcomes seldom reflect the views of any one organisation actor. It is the power held by individuals that is the major determinant of outcomes - power being a resource that can be used to overcome resistance and make ones way in the organisation.

Many organisation decisions are made using rational choice processes or bureaucratic rules but there is general consensus that the power model is appropriate where there is a scarcity of resources, where uncertainty exists, where there is disagreement about goals, objectives and technology and where the issues are important. All these are characteristic of IS planning.

Organisation parties have power sources. Examples are control over important functions, resource provision (including funds), information provision and there are many others.

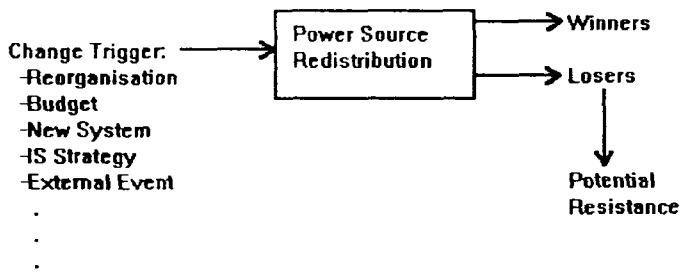

Figure 1: Core of MP/L1.

Many organisation activities have the potential to produce resistance. Examples of change triggers are reorganisations, budget resource allocations, the implementation of new information systems or IS strategies and external events (such as deregulation or some major technological advance). The change trigger may cause a redistribution of power, in which case there will be winners and losers and the losers may resist.

This concept is at the core of MP/L1. One party (the change agent) is responsible for implementing change and a conflict occurs where a party resists the change agent for a particular reason. The reason is the loss of a power source. Thus a conflict is a <party, reason> pair.

There is another form of power - called deep structure power. Deep structure power is derived from common beliefs, values and interpretations of reality. It can be expressed as rules. For example:

"Universities must be free to pursue pure research."
"Divisions must have maximum autonomy."
"The Information Systems Department is hopeless."

Authority is a particular form of deep structure power. It is power that has been institutionalised and, again, can be expressed as rules. For example: "The Information Systems Department has the right to develop the total Corporate processing architecture."

MP/L1 power sources are represented in a network.

[Figure 3, from 3.4.3 of Chapter 3, shown to subjects here.]

An organisational activity can threaten a party's invilvement in, or authority over, a base-level process and this, in turn, can threaten power sources at higher levels in the MP/L1 network. e.g. IPOS might be a threat to party X's involvement in applications development. Also, if X is dependent on funds generated from his applications development activities, then IPOS will pose a consequential threat to his ability to generate funds. Consequently, by following this route through the network, we have identified two potential conflicts. Each other route through the network, from base-level processes to higher-level functions, must be traced in order to identify all conflicts.

However, just because a party is threatened with a loss of a power source, it does not necessarily mean that resistance is automatic. Consequently, each time you identify a conflict, you need to assess if one or more mitigating factors might apply. These are:

-the party might not be concerned with the loss of the power source;
-the party might take a wider corporate view;
-the party might be involved in issue trade-offs; and
-perhaps, some other reason.

Finally, you also need to consider if the change trigger poses a threat to deep structure power. Specifically, does the activity pose a threat to an organisational rule and is the party inclined to apply the rule. For IPOS, there are four relevant rules. These are:

-Rule1: CSG are Gigante's systems development experts.
-Rule2: ISD have done a poor job.
-Rule3: Divisions and managers must have maximum autonomy.
-Rule4: UNIX/ORACLE is the only route to open systems.

7. INTRODUCTION TO THE MP/L1 RECORDING INSTRUMENT

Subjects were given the following information:

In the next exercise, you will be required to enter your answers using this form.

[*Note:* Form presented in 4.1 displayed to subjects.]

Placement of an "x" in a cell uniquely identifies the resisting party and the reason for resistance - with the column identifying the party and the row the reason.

The reason for resistance is expressed as an organisational function or process. IPOS means that the way in which a number of important IS functions are carried out will have to change. Consequently, if you believe that a party will object to changes in a process or, if the party might not like changes in who is involved in (or has authority over) a process, nominate that party and that process as a source of potential resistance. e.g. if you believe that Montagna might object to IPOS, on the grounds that their involvement in

processing architecture development might change, then place an "x" in the Montagna/proc. arch. devlpt cell.

Funds generation, information provision and decision making are generic functions, in the sense that they are actually carried out through some IS-specific processes. The links are identified implicitly in the form. i.e. funds can be generated through processor provision, processor ownership, applications development and applications ownership. Information provision can be effected through specifying data base updates and approving data base access and a party's involvement in information provision might, in turn, mean that the party has a role in the wider decision making process. You must consider, however, that even if a process changes in a way that might not be beneficial to a party, whether the party will really be concerned about the changes.

8. INTRODUCTION TO THE EXPERT SYSTEM

Subjects were given the following tutorial session:

The goal:

(_P _R):will-probably-resist(_P "DBMS stand'n" _R)

is set up on the screen. Press the return key and a search will be intiated for all parties that may resist the DBMS standardisation project, together with the reasons for resistance.

This screen (see Figure 2) asks you to select which processes might be threatened by the project. if you think that parties involved in processor provision might be threatened, press the "M" key to select that choice. Repeat for the remaining processes. Use the spacebar to move down the menu and backspace to move up the menu. "M" is the toggle key - pressing it once will select a choice and pressing it again will deselect the choice. When you are happy with your choices, press the return key to enter them into the system.

In this next screen (see Figure 3), MP/L1 now asks you to nominate which parties currently perform your first selected process - in this case, processor provision. Move down and up the menu and highlight your choices as before - i.e. using the spacebar, backspace and "M" keys. Again, when you are happy with your selections, enter them by pressing return.

MP/L1 now consults its rule base to look for potential conflicts. The first answer it returns (see Figure 4) is that Moribondo may resist because their involvement in processor provision is threatened. The system now asks you to consider if Moribondo may not resist because one or more mitigating factors might apply. If you believe this to be the case, select your choices and press return. Otherwise, just press return and the potential conflict will be recorded.

You are now asked (see Figure 5) to consider if DBMS standardisation threatens parties with authority over some processes. Select your choices and enter and you are now asked

(see Figure 6) to nominate which parties have authority over your first selected process - processor provision. Again, make your choices and enter.

MP/L1 now goes back to its rule base and looks for further potential conflicts. The next answer it returns (see Figure 7) is that Moribondo may resist because their authority over processor provision is threatened. As before, you are asked to nominate any mitigating factors that might apply. Select them, if appropriate, and press return.

By repeatedly selecting "more", MP/L1 will conduct an exhaustive search for all remaining potential conflicts. Effectively, it is tracing its way up the MP/L1 network. You are free to accept or reject the conflicts found using the same menu manipulation procedures you employed for the first two conflicts found.

When the search is exhausted, you will be presented with a screen (see Figure 8) which shows all potential conflicts found. This completes the session.

9. SESSION SCHEDULES

	Experimental Group	Control Group
Background familiarisation	40min	40min
Pre-test	1hr	1hr
Break	15min	15min
Post-test briefing	30min	10min
Post-test	1hr	1hr
Break	15min	15min
Post-test repeat Briefing	10min	30min
Post-test repeat	1hr	1hr
Total:	4hr 50min	4hr 50min

:Query being investigated:
will-probably-resist (_P DBMS standn _R)

Answer this question
DBMS standn threatens parties involved in performing which processes ?

Processes
»processor provision
apps devlpt
apps ownership
proc arch devlpt

Figure 2:
Expert System - Screen 1

:Query being investigated:
will-probably-resist (_P DBMS standn _R)

Answer this question
Which parties currently perform processor provision ?

Parties
»CSD
Metropoli
Commerciale
Rurale
GM ISD
Mgr SDB
SDB project mgrs
Contractors
CSG
DSS
Moribondo
Montagna

Figure 3:
Expert System - Screen 2

```
:Query being investigated:
  will-probably-resist (_P DBMS standn _R)

Answer this question
If you believe Moribondo may resist because
 (involvt-in processor provision threatened) press return .
 Otherwise nominate mitigating factors .

Mitigating Factors
»Can ignore threat
 Takes a corporate view
 Involved in a trade-off
 Will gain more than is lost
 Other
```

Figure 4:
Expert System - Screen 3

```
:Query being investigated:
  will-probably-resist (_P DBMS standn _R)

Answer this question
DBMS standn threatens parties with authority over which processes ?

Processes
»processor provision
 apps devlpt
 apps ownership
 proc arch devlpt
```

Figure 5:
Expert System - Screen 4

:Query being investigated:
will-probably-resist (_P DBMS standn _R)

Answer this question
Which _A have authority over processor provision ?

Parties
»CSD
Metropoli
Commerciale
Rurale
GM ISD
Mgr SDB
SDB project mgrs
Contractors
CSG
DSS
Moribondo
Montagna

Figure 6:
Expert System - Screen 5

:Query being investigated:
will-probably-resist (_P DBMS standn _R)

Answer this question
If you believe Moribondo may resist because
(auth-over processor provision threatened) press return .
Otherwise nominate mitigating factors .

Mitigating Factors
»Can ignore threat
Takes a corporate view
Involved in a trade-off
Will gain more than is lost
Other

Figure 7:
Expert System - Screen 6

```
:Query being investigated:
  will-probably-resist (_P DBMS standn _R)

:(_P _R):

 : (Moribondo (involvt-in "processor provision" threatened))
 : (Moribondo (auth-over "processor provision" threatened))
 : (Moribondo (funds-generated-from "processor provision" threatened))
 : (Moribondo (involvt-in-approval-process-thru "processor provision" threaten
ed))
 : (Moribondo (decision-making-impact-thru "processor provision" threatened))

 NO MORE SOLUTIONS


  Hit any key to continue
```

Figure 8:
Expert System - Screen 7

Gigante Case Study Data Base Listing

1. INFORMANTS

Informant-id	Org./Org-unit
I1	CIS
I2	CIS
I10	GAIS
I11	GAIS
I12	GAIS
I13	GAIS
I14	GAIS
I15	GAIS
I16	GAIS
I17	GAIS
I18	GAIS
I19	GAIS
I20	GAIS
I21	GAIS
I22	GAIS
I40	MISU
I50	GBS
I60	CNSS
I61	CNSS
I62	CNSS
I63	CNSS
I70	BMS
I71	BMS
I80	Country
I81	Country
I82	Country
I90	CCD
I91	CCD
I92	CCD
I101	MD
I102	DMD
I103	DMD
I104	Corp.
I105	EDCS
I106	CIO
I110	SMS
I111	SMS
I120	MS
I130	Bull
I140	TNE

2. DOCUMENTS

Document-id	Document
Dt1	GACONET Facility Plan (Mar.87)
Dt2	CCD APPS Draft Business Case (May90)
Dt3	CCD SISP Report (Aug.89)
Dt4	CCD APPS System Outline (Apr.90)
Dt5	MISU IT Strategy - Broad Framework (Mar.88)
Dt6	MISU Systems Environment and Migration Approach (Jul.88)
Dt7	MISU Tech. Issues Arising from App. Migration (Jul.88)
Dt8	CIS paper reviewing the Material Management Project (Jul.89)
Dt9	CIS working paper, headed "Tactics for IMIS Implementation", (Nov.89)
Dt10	CIS memo. commenting on draft Data Management and Procedures documentation (Nov.89)
Dt11	CIS memo. to Mgr GIC, headed "DBMS Working Party" (oct.89)
Dt12	CIS report, "DBMS Issues Relating to GIME" (Sep.89)
Dt13	CIS memo., headed "GIME Compliant DBMSs" (Dec.89)
Dt14	CIS - "GIME Arch. Manual" and subsiduary manuals (Apr.90)
Dt15	ITG - "OSA Overview" (Sep.91)
Dt16	Paper, received from I22, criticising Dt17 (no date)
Dt17	CIS paper, "Developing App's in GIME" (Aug.89)
Dt18	Memo. from GM NAD, headed "Developing App's in GIME" (Dec.89)
Dt19	Interim research report, "Report on PhD Field Work" (Oct.88)
Dt20	Interim research report, "B'ground to PhD Research" (May90)
Dt21	Memo. from EGM GAIS to CIS, ref. TIS 89/175 (Oct.89)
Dt22	CIS Quarterly Report (May89).
Dt23	Memo. from CNSS to CIS, headed "GIME SDBs" (Apr.89)
Dt24	Memo. from EGM GAIS to CIS. ref. IOB/11/20 (Mar.89)
Dt25	Memo. from EGM GAIS to EDCS (Apr.89)
Dt26	Memo. from EGM GAIS to CIS, headed "GIME Technology Strategy Study" (Jun.89)
Dt27	Memo. from EDCS to GAIS, ref. COR 1215 (Jul.89)
Dt28	Memo. from EGM GAIS to MISU (Aug.88)
Dt29	Financial review article, headed HP sells Gigante $15M worth of UNIX computers" (Jun.90)
Dt30	Country paper, headed "The Development of Management Info. Delivery Facilities for Country Division" (Nov.88)
Dt31	Memo. from Country to CIS, headed "Country Division Requirements - Management Info. Delivery" (Mar.89)
Dt32	Memo. from GIC to CIS re. IMIS (Nov.89)
Dt33	Memo. from Project Manager IMIS to CIS (Nov.89)

Dt34 Memo. from GIC to CIS, headed "IMIS" (Nov.89)
Dt35 CIS working paper, Headed "IMIS: The Next Steps" (Nov.89)

3. NOTES

Nt1

From I15, in discussion, on 17/11/87.
Most Bull load to be shifted to IBMC. Future DPS purchases for DCRIS only.

Nt2

From Dt1 (Mar.87).
Anticipated IBMC growth rate of 49% well into the 1990s.
Bull - 43% in 87/88, 32% in 88/89 and 20% in 89/90 and on (all for DCRIS).

Nt3

From I40, in MISU team briefing, on 23/11/87.
Will probably not recommend a standard proc. arch. - but, will have to identify the issues.

Nt4

From I10, in discussion, on 23/11/87.
GAIS is no longer the policeman. Will give the divisions what they want. Divisions have very different systems needs and must have the autonomy to pursue their own needs. Divisions will select GAIS on a cost/performance basis.
Proc. arch. development implies proc. resource ownership and owners must have the right to use their resources as they like.
More than ever, it is imperative that GAIS is profitable. Proc. operations is the major revenue generator. Divisions can do what they like with the secondary network but GAIS must control the primary network.
Divisions will play a major role in systems development. GAIS's role in developing large systems for the whole of Gigante is over.

Nt5

From I17, in discussion, on 8/12/87.
CNSS want to control development in Gigante. They will use their own DISNET proc. arch. to enhance the major systems themselves, locking GAIS out. They believe they are better at development and are attempting to denigrate GAIS at every opportunity.
Their ownership of the major systems is the key to their strategy.
Because they have never charged for their services, they desperately need to generate funds. They can do this through, DISNET, their development activities and their ownership of the major systems.
We need to standardise on IBMC.

Nt6

From I16, in discussion, on 15/12/87.
We should standardise on IBMC but project managers will resist any attempt to impose standards on them. They are jealous of their autonomy and will not allow users to be involved in the technical aspects of development (their legitimate domain).
His branch is under threat. The EGM is not interested in development (only proc.). I16 sees the strategy as a means of securing his future.

Nt7

From I40, in a meeting, on 21/12/87.
CCD want to take over RASS from CNSS. CNSS are resisting the proposal. He would prefer that all major systems remained under the control of CNSS but may be forced to meet CCD's request (to meet their urgent needs).

Nt7a

From I40, in discussion, on 22/12/87.
LAN development is out of control with DISNET, ESSNET, Plaza LAN, GAIS initiatives and many more. How can we control it and how much important data is locked up in these LANs?

Nt8

From Dt2 (May90).
CCD proposal for them to develop (and own APPS) as a replacement for RASS and DCRIS. Major reason given for the development is the need for better information. Enhancing RASS dismissed as a feasible alternative.

Nt9

From Dt3 (Aug.89)
CCD SISP states that RASS problems mean it is unsuitable for meeting CCD needs. Develop APPS instead.
Better organisational decision making is very much dependent on better information from CCD systems.

Nt10

From Dt4 (Apr.90).
As for Nt9 (i.e. same points made).

Nt11

From I40, in meeting, on 8/2/88.
MISU will not explicitly recommend the replacement of any existing systems - it would upset too many people.

Nt12

From I50, in MISU presentation to CMT, on 8/4/88.
MISU strategy (Dt5) is inconsistent with Gigante's wider strategy. Divisions must be free to choose, develop and process their own systems. The strategy merely perpetuates GAIS's control over IS. Results in the past have been poor.

Nt13

From I10, in discussion, on 25/5/91.
I10 reluctant to take on development of IMIS and establishment of the GIC. Will only do so if granted indemnity from costs incurred.

Nt14

From I18, in discussion, on 28/7/88.
Agrees with I10 that strategy (Dt6 and Dt7) is idealistic and impractical. COI is OK but won't work if based on DISNET.

Nt15

From I60, in discussion, on 29/7/88.
100% behind strategy (Dt6 and Dt7) but too much emphasis on GAIS.
Systems' roles not clearly outlined. Imperative that CNSS retains its central role in the major systems. What is not generally recognised is that senior management want to be able to go to one point for advice on systems operations and directions.
The strategy does not address distributed processing, OSI and UNIX. DISNET will be rebuilt using UNIX/ORACLE and this is the way to open systems.

Nt16

From I70, in response to MISU presentation, on 8/8/88.
What right does MISU have to tell BMS how it will develop its systems and what products it will use (Dt6 and Dt7)?
If the GIC is to be established anywhere it should be in BMS, who are doing a much better MIS job than GAIS could ever do.
As it is, the GIC proposal threatens the very future of BMS.

Nt17

From I40, in team meeting, on 9/8/88.
I60 in defensive mood. Concerned that the strategy gives too much to GAIS.

Nt18

From I61, in discussion, on 9/8/88.
Plans to replace all major systems' terminals with DISNET terminals. Enhancements will be done using DRIFT.
DISNET/DRIFT is being redeveloped using UNIX/ORACLE to GOSIP standards and should be used as the COI base.
GAIS is merely a "MIP shop" and "body shop".
Forget CDM but CNSS is well-placed to take on the corporate DBA role - it has the db design and specification skills and security and access procedures in place. BMS MIS work fits neatly under this DBA umbrella.

Nt19

From I12, in discussion, on 15/8/88.
NAD currently trying to establish development standards. Almost impossible to get consensus from PMs.

Nt20

From I40, in team meeting, on 5/9/88.
Re. MIS Directions conf. presentation - have rough costs ready but don't present unless asked and don't get down into detail.

Nt21

From I10, in MIS Directions conf., on 12/9/88.
At what point is the economic justification done? Who is responsible for producing the investment analysis? Who provides the funding?
Is Gigante not trying to move away from issues of global efficiency?

Nt22

From I2, in MIS Directions conf., on 12/9/88.
Strategy endorsed but proceed with caution. Get early results.
Stressed that CIS a catalyst and has no direct control over the divisions.

Nt23

Observation, at Info. Management Forum, on 24/10/88.
Country and GBS both reluctant to commit resources to CDM (V1) project. Country (I81) stressed it would take resources away from their own urgent development activities.

Nt24

From I81, at Info. Management Forum, on 24/10/88.
Urgent need to standardise. No need for a long study - UNIX/ORACLE the answer (partly because of OSI).

Nt25

From I71, in discussion, on 25/10/88.
No need for IMIS. CMS can do the same job.

Nt26

From I82, in discussion, on 14/11/88.
Divisions must be free to deal with their customers in their own way.
GAIS costs estimated at 5-10% of a district's total revenue. Way too high and Country can provide some services cheaper themselves. Distributed processing is the key (hence UNIX/ORACLE network).

Nt27

From I81, in discussion, on 14/11/88.
IMIS unnecessary and processing platform is wrong. Would prefer to take feeds direct from OSS into their UNIX/ORACLE network.

Nt28

From I19, in IMIS meeting, on 18/11/88.
BMS building VAMIS for GBS (and perhaps Country) as a substitute for IMIS.

Nt28a

From Dt28 (dated 23/8/88).
I10 criticising Dt6 and Dt7 - particularly costs, authorities, accountabilities and threat to divisional autonomy.

Nt29

From I81, in discussion, on 22/11/88.
ORACLE will be the DBMS standard for Country. 25 copies purchased so far and are pushing Fujitsu to get it up under MVS.
"Our business is end-user computing."

Nt30

Observation at SPF meeting on 1/12/88.
Conflict between I90 and I60.
I90: "Divisions can build own systems - CNSS are brokers."
I60: "CNSS are not brokers - we are in the business of building total solutions (systems and proc. facilities) for the divisions."

Nt31

From I20, in SPF meeting, on 1/12/88.
GBS are claiming that government-imposed regulatory requirements mean that all their systems have to be physically separate.

Nt31a

From Dt30 (dated 25/11/88).
Paper by I81 detailing Country's MIS approach. Will do their own development using their own UNIX/ORACLE network.

Nt32

From I71, in CMS meeting, on 14/12/88.
BMS, with Bull, are trialling the TERADATA back-end db machine on extracts from DCRIS. He said they have not committed themselves beyond the trial but was very enthusiastic about the machine.
"BMS are in the MIS business and want to be the principal providers of management information to Gigante's decision makers. Our knowledge of DCRIS and our control over (and knowledge of) the TERADATA machine will position us well for the future."

Nt33

From I2, in CIS meeting, on 20/12/88.
I90 wants to take over CMS. Has her own barrow to push and is well aware of the strategic importance of the system.

Nt34

From I104, in discussion, on 10/1/89.
By rationalising and standardising data lines and LANs, can pour $100M back into Gigante over the next 2 years.

Nt35

From I1, in discussion, on 12/1/89.
GAIS still setting the IS agenda. I10's control over the proc. arch. (and proc. operations) gives him a great deal of influence, which he will not relinquish easily.
Strongly suspects that GBS and Country (in particular) are going their own way and not telling CIS. Their defence will be ignorance (i.e. have not been told).

Nt36

From I16, in discussion, on 18/1/89.
Will gladly provide resources for app's arch. project, but CIS is mad to challenge I10 head-on over proc. arch. standardisation.

Nt37

From I62, in discussion, on 25/1/89.
20,000 DISNET/DRIFT terminals will be installed in the districts.

Nt38

From I110, in CUA review, on 14/2/89.
CCD strong on an integrated solution but want to develop and own it.
Country want their own solution and won't accept anything unless it is based on UNIX/ORACLE.
GBS are going their own way, ignoring CIS and waiting for GIME to fail.
CNSS won't cooperate unless the solution is based on DISNET/DRIFT.
Could not get to see I10.

Nt39

From I14, in discussion, on 27/2/89.
Six teams in GBS (mostly consultants) starting on Service+ functional spec's from next Monday (CIS have not been advised).

Nt40

From I1, in CIS meeting, on 6/3/89.
GBS planning to spend $5.6M on development of Service+. Two people are overseas looking for a package solution.
Common view out in the field is that they will go their own way until Corporate tells them to stop (according to I40).

Nt41

From I1, by telephone, on 15/3/89.
Has established a good working relationship with I60.
Relationship with I10 is very poor.

Nt41a

From Dt31 (dated 17/3/89)
Memo. from I81 extolling the virtues of ORACLE and alluding to Country's proc. arch. development plans.

Nt42

Observation at meeting with Country on 10/4/89.
Country agrred to use IMIS for copy management. I1 not convinced because of their ORACLE mainframe activities and their refusal to participate in IMIS system testing.

Nt42a

From Dt24 (dated 7/3/89).
I10 effectively advising that he will go ahead and install mainframe ORACLE - despite CIS objections. GAIS is in the business of making a profit and does not want a policeman role.

Nt43

From I2, in discussion, on 11/4/89.
A RASS study has revealed that $4M has not been billed for one product type alone.

Nt43a

From Dt25 (dated Apr.89).
I10 objecting to CIS sending papers to the SMC without drop copies being sent to him.

Nt44

From I60, in discussion, on 11/4/89.
Unhappy with DSA Modelling project split-up - means that in DSA-SDB translation, CCD will take over part of his patch: "--- not empire building, but what am I going to tell my DCRIS people?".

Nt45

From I2, in discussion, on 12/4/89.
I50 has rejected the consultants' output because the results look too much like GIME. Insisted that GBS implement a package solution. He is using the competitive bogey to his advantage.

Nt46

From I120, in discussion, on 17/4/89.
Material manager PM considers that GIME is "pie in the sky". CIS are too far removed from the real world.

Nt46a

From DT23 (dated 15/4/89)

Memo. claiming that GIME DSA activity threatening CNSS's control and authority over systems development and systems ownership.

Nt47

From I2, by telephone, on 26/4/89.
I50 insisting on a package, no internal development, no GACONET and no GIME for GBS systems. He sees the rest of the org. as a supplier to his business, no different to any other supplier.

Nt48

From I1, in discussion, on 15/5/89.
No EGM has any real commitment to GIME. I10 has stated that, apart from the MD and DMD, the EGMs don't want better management information.
I90 has own agenda, which involves empire building through gaining control over systems. She is also well aware that information is power.
The attitude to GAIS is almost universally negative.

Nt48a

From Dt22 (dated 30/5/90).
"--- the perception of GAIS from the Regions does not appear to be good --".

Nt49

From I13, in IMIS review, on 8/6/89.
In GAIS's monthly meeting he was "given a serve" from the EGM's 2IC on CIS's proc. arch. standardisation activities.

Nt50

From I111, in CUA meeting, on 21/6/89.
Imperative that CNSS be given a role in the CUA or they will do their best to kill it.

Nt50a

From Dt26 (dated 14/6/89).
I10 refuses to supply resources for IT study - because study is inconsistent with GAIS role mapped out by McKinsey.

Nt50b

From Dt29 (dated 18/6/90).
CNSS have purchased $15M worth of UNIX minis for DISNET. Claiming it is part of Gigante's strategic direction, GIME.

Nt51

From I61, in discussion, on 3/7/89.
CNSS is building a 3-level proc. arch. (mainframe, mini and micro) based on UNIX/ORACLE. A less expensive alternative to GACONET.

Nt52

From I16, in Material Manager meeting on 3/7/89.
NAD's future depends on GIME. By committing resources to the app's arch. project, he can "corner the market" in development expertise.

Nt53

From I2, in discussion, on 7/7/89.
I10 views the CUA report as the most unprofessional he has seen in a long time - no costs!

Nt53a

From Dt27 (dated Jul.89).
I105 expressing disappointment with GAIS's lack of support for and opposition to GIME.

Nt54

From Dt8.
NAD lack of understanding of GIME and a reluctance to conform to GIME arch. principles were major causes of the problems encountered.

Nt55

From I1, in discussion, on 15/9/89.
GAIS and CNSS will be amalgamated under a new CIO position. CIS is supportive - because current structure is making its task almost impossible. The major risk is that the new CIO will not support GIME.
Conflict between the DMD and the head of Corporate Strategy is placing CIS and GIME at risk.

Nt56

From I130, in discussion, on 19/9/89.
Bull have prepared a detailed plan for migration to GIME, based on their DPS7000 boxes and PACBASE. They have not yet presented their proposal to GAIS or to senior management. The move to IBMC means that they are finding it increasingly difficult to get a hearing from Gigante's senior management.

Nt57

From I140, in discussion, on 3/10/89.
Can't wait for CIS to produce standards - has systems that have to be developed now.

Nt58

From I61, in discussion, on 4/10/89.
Major cause of software problems in Gigante is GAIS. They don't have a vision and have "vastly de-optimised the IS environment".

Nt58a

From Dt21 (dated 5/10/89).

I10 argues against proc. arch. standardisation (because of tech. change rate). Objects to not having been briefed on papers sent to SMC.

Nt59

From Dt9 (dated 1/11/89).
Bull has formed an alliance with BMS (going through the back door). IMIS business case prepared asking that Gigante purchase $17.1M of TERADATA equipment. Business case would have to be signed by CIS.
I10 unlikely to support the business case (based on an anlysis of the way his position has shifted many times on the issue). Could use the business case to embarass CIS.
Project teams will suffer because of IMIS - they will not be able to "massage" data for MIS purposes.

Nt60

From I19, in discussion, on 17/11/89.
GIC and BMS supposed to be cooperating on IMIS development but BMS not providing him with any of the resources he needs to specify the data model and extract sources. He suspects that BMS are putting all their efforts into developing their own TERADATA solution. Their aim is to hijack IMIS.

Nt60a

From Dt16 (no date).
Paper prepared by CMS contractor higly critical of app. arch. guidelines - particularly, ISO 3-Schema approach.

Nt60a'

From Dt32 (dated 9/11/89).
Memo. from I19 complaining that BMS not cooperating on IMIS development as agreed.

Nt60b

From Dt33 (dated 14/11/89).
Memo. from I70 complaining that GAIS not supporting IMIS - because it is a Corp. initiative, inconsistent with their user-driven philosophy.

Nt60c

From Dt34 (dated 13/11/89).
Memo. from I13 complaining that Bull and Fujitsu are spreading disinformation re. the TERADATA versus DB2 decision.

Nt60d

From Dt35 (dated Nov.89).
IMIS business case has been handled badly. Result has been to allow EGM GAIS to use his formal authority to undermine IMIS, CIS and GIME with the DMD.

Nt61

From Dt10 (dated 24/11/89).
Project teams must be given a greater DBA role if their cooperation is to be secured.

Nt61a

From Dt18 (dated Dec.89).
Contains severe criticisms of GIME guidelines paper (DT17) and DB2. I16 advises that most input came from contractors (but some from PMs).

Nt62

From I91, in discussion, on 15/1/90.
Keen to make APPS GIME-compliant - but needs much more detailed standards and guidelines.

Nt63

From I90, in discussion, on 8/2/90.
Service orders application (APPS) must be built by the org. unit with most knowledge of the function and most affected by it (i.e. CCD).
Corp. data admin. should restrict their activities to CDM-compliance issues. DBA role should be with APPS team and db ownership with CCD.

Nt64

From I92, in APPS meeting, on 21/2/90.
APPS team want to comply with GIME but need more on standards. Corp. DBA don't have the necessary db design and development skills.

Nt65

From I105, in discussion, on 23/2/90.
Could present any issue to the MD in 6 different ways, depending on the result he wants.

Nt66

From I1, in discussion, on 6/3/90.
Org. parties are positioning themselves for the CIO. Has traced a number of mischevious rumours (re. CIS and GIME) to I10 and I60.

Nt67

From I63, in discussion, on 2/4/90.
APPS is shaping up as a disaster. CNSS could achieve a much better result using a DISNET/DRIFT based CUA solution.

Nt68

Observation from discussion with CIO contender I106.
Does not appear to have a good understanding of systems development. Doubt that he would support GIME's data-centred approach.

Nt69

From I1, by telephone, on 23/4/90.
Business Planning meeting on 20/4 a disaster.
DMD stated that Corporate Strategy was not providing strategic leadership.
Was backstabbed by GBS. Claimed that CIS was not providing sufficient information on GIME - but not during I1's presentation, only in the final session when the MD and DMD were present.

Nt70

From I21, in discussion, on 24/4/90.
heard (secondhand) that prospective CIO (I106) has stated that there is no support for GIME in the organisation (including the MD and DMD).

Nt71

From I2, by telephone, on 22/5/90.
Ernst and Young review into ITG structure not looking good. CIS and GIME reponsibility placed in strategy department but doing activities (e.g. DBA) not considered.

Nt72

From I2, by telephone, on 25/5/90.
100s of cases where business customers have been given official internal Gigante discounts. Possibly fraud.

Nt73

From I61, in ITG structure meeting, on 28/5/90.
There should be one "factory" for development of all core applications.

Nt74

From I12, in discussion, on 31/5/90.
CNSS are bringing in DMR to come up with a development methodology - are ignoring GIME app's arch. documentation.

Nt75

From I13, at GIC seminar, on 6/6/90.
Does not think it is possible to make the Corp. DBA Unit work in the short term. Must try to achieve aims "through the back door". Use coercion etc. in lieu of formal DBA authority. DBA role does not have project team acceptance.

Nt76

From I14, in discussion, on 7/6/90.
APPS team are claiming that GIME is a corp. overhead and that CIS should pay for their DB2 training.

Nt77

From I1, in discussion, on 7/6/90.

Corp. Business Plan coordinator is concerned that GBS have gone way beyond their original brief with Service+.

Nt78

From I1, by telephone, on 21/6/90.
CNSS are trying to sell their contracts system throughout the org'n. Having little luck.

Nt79

From I63, in discussion, on 26/6/90.
CNSS have come up with a strategy to counter APPS. They can develop a GIME-compliant version for $5M less.

Nt80

From I12, in discussion, on 2/7/90.
INCAS PM is claiming that he could develop the system in a couple of weeks without GIME overheads.

Nt81

From I2, by telephone, on 9/7/90.
CNSS maintain that they could do APPS much cheaper by using DCRIS and by not using DB2.
I90 has complained that CIS is trying to "set up" CCD by negotiating with CNSS.
CNSS proposal looks GIME-compliant (on the surface only) but maintains DCRIS as the "centre of the universe".

Nt82

From I1, in discussion, on23/7/90.
Advice from 3rd party on recent EGM GAIS's meeting (on 19/7) that I10's attitude on GIME is to "take the money and run - until the org. wakes up to its folly".

Nt83

From I2, by telephone, on 3/8/90.
CIO is out to "nail" CIS. He wants all IS strategy within the ITG.
DMD wants to decrease Corporate Strategy influence.

Nt84

From I12, in discussion, on 3/8/90.
In APPS Workshop (on 2/8), the APPS PM focused on performance degradation due to GIME overheads. he gave the impression though, that his real concern was loss of control over the db.

Nt85

From I1, in discussion, on 27/8/90.
CIO wants CIS people (but not CIS) in his org'n; "CIS have credibility but no clout - ITG has clout but no credibility".
CIO annoyed by recent CUA and Data Ownership policies put out by CIS.

Nt86

From I22, in discussion, on 10/9/90.
CIO has his own ideas on development - they don't fit well with GIME.
I16's support for GIME has waned. He will do whatever the CIO and I60 want.

Nt87

From I2, in discussion, on 21/11/90.
CIO does not like to have solutions presented to him; he likes to come up with his own and have them seen as his own.
CIO not looking out any longer than 3 years (when his contract expires) in his planning - wants quick results.

Nt88

From I12, in discussion, on 6/12/90.
ITG is currently specifying a SOE. GIME documents will be of no consequence.

Nt89

From I2, in discussion, on 12/12/90.
I61 is claiming that ORACLE is a corp. standard. When challenged - "What are you going to do about it"?

Nt90

From I2, in discussion, on 12/12/90.
Syd. Nth. (Gig. Res.) have had 50 people working on a SURROUND type development for the last 6 months. Development is based around a local version of a CDM (inconsistent with "the" CDM). CIO and Gig. Res. IS Mgr "went to water" when they heard about it ("pity to waste money already invested").

4. INFERENCES AND EVIDENCE LINKS

In1

Concerns: Bull. [c63]
Inference: Bull's role as a proc. provider threatened even before the start of strategy development.
Support: Nt1, Nt2

In2

Concerns: EGM GAIS. [c1, c4]
Inference: Will jealously guard his role in and authority over proc. arch. development.
Support: Nt3, Nt4, Nt35, Nt36, Nt42a, Nt49, Nt58a, Nt59
Alternative explanations:
GAIS are best placed (because of experience and expertise) to develop and operate the proc. arch..

In3

Concerns: General (conflict string).

Inference: Proc. arch. development leads to proc. ownership which, in turn, is a source of funds.
Support: In2, In4, In8, In25, In30

In4

Concerns: EGM GAIS. [c2, c3]
Inference: Proc. resource ownership is important to the EGM GAIS as a source of funds.
Support: Nt4, Nt6, Nt37, Nt42a, Nt82
Alternative explanations:
Market forces should prevail (consistent with McKinsey doctrine). An efficient GAIS means a reduction in Gigante's total IT costs.

In5

Concerns: EGM GAIS. [c6]
Inference: EGM GAIS will resist any challenge to divisional/managerial autonomy.
Support: Nt4, Nt21, Nt28a, Nt60b
Alternative explanations:
Consistent with McKinsey doctrine.

In6

Concerns: PMs. [c10, c12]
Inference: PMs will resist any challenge to their app's development role, their technical authority and to the doctrine of divisional autonomy.
Support: Nt6, Nt19, Nt46, Nt54, Nt61a, Nt76, Nt80, Nt84
Alternative explanations:
Standards will prevent them from using the best tools for particular jobs.
Consistent with McKinsey doctrine.

In7

Concerns: General (conflict string).
Inference: Processor provision is a source of funds.
Support: Axiomatic.

In8

Concerns: CNSS. [c14, c15, c16]
Inference: CNSS will resist any threat to their role in proc. arch. development, proc. ownership and the funds generated from these activities.
Support: Nt5, Nt15, Nt18, Nt30, Nt37, Nt50, Nt50b, Nt51
Alternative explanations:
Distributed proc. will lead to major cost savings and other benefits.
Could reasonably argue that GAIS's management of the proc. arch. has been poor and that they cost too much.

In9

Concerns: CNSS. [c18, c19, c26]
Inference: CNSS will resist any threat to their systems development role, their authority over it and the funds generated from that activity.

Support: Nt5, Nt7, Nt11, Nt15, Nt30, Nt44, Nt46a, Nt67, Nt79, Nt81
Alternative explanations:
GAIS have not been innovative enough in SD and cost too much.

In10

Concerns: General (conflict string).
Inference: Applications development is a power source and a source of funds.
Support: In6, In9, In22, In25, In30

In11

Concerns: CNSS. [c20, c21, c27]
Inference: CNSS will resist any threat to their involvement in, and authority over, applications ownership and funds generated from that activity.
Support: Nt5, Nt7, Nt11, Nt15, Nt44, Nt46a, Nt67, Nt79, Nt81
Alternative explanations:
Centralising control over major systems is consistent with GIME.

In12

Concerns: General (conflict string).
Inference: Applications ownership is a power source and a source of funds.
Support: In19, In21, In25

In13

Concerns: General (conflict string).
Inference: "CNSS are Gigante's SD experts" is an org. rule (Rule-1).
Support: Nt5, Nt67, Nt73

In14

Concerns: General (conflict string).
Inference: "GAIS have done a poor job" is an org. rule (Rule-2).
Support: Nt5, Nt12, Nt15, Nt18, Nt48a, Nt58

In15

Concerns: CNSS. [c29,c30]
Inference: CNSS will resist any threat to Rule-1 and Rule-2.
Support: In13, In14

In16

Concerns: General (conflict string).
Inference: "Divisions and managers must have maximum autonomy" is an org. rule (Rule-3).
Support: Nt4, Nt6, Nt12, Nt16, Nt26

In17

Concerns: NAD PMs. [c12]
Inference: NAD PMs will resist any threat to Rule-3.

Support: Nt6, Nt19, Nt46, Nt54
Alternative explanations:
Consistent with McKinsey doctrine.
Accountability implies freedom.

In18

Concerns: Bull. [c63, c65]
Inference: Any proc. arch. standardisation initiative will seriously threaten Bull's role as a proc. provider and funds generated from that activity. They can be expected to resist.
Support: Nt5, Nt6, Nt32, Nt59, In7

In19

Concerns: CCD. [c44']
Inference: Applications ownership is very important to CCD. They desperately want to own the key service orders application (and, perhaps, other systems) and will resist any threat to their applications ownership ambitions.
Support: Nt7, Nt8, Nt9, Nt10, Nt33, Nt38, Nt48, Nt63
Alternative explanations:
Ownership is not the issue but they genuinely believe that their RASS plans can solve their IS problems. But - RASS criticisms made by CCD seem to refute this.
CCD did have urgent systems needs.

In20

Concerns: General (conflict string).
Inference: Control over information provision leads to a role in decision making. Control over information provision results from being able to specify db updates and to approve db access which, in turn, results from applications ownership.
Support: In19, In21, In28, In34, In42

In21

Concerns: CCD. [c44, c45, c46, c47]
Inference: CCD will resist any threat to their applications ownership and their consequential roles in db update specifications, approving db access, information provision and decision making.
Support: Nt9, Nt10, Nt33, Nt48
Alternative explanations:
Divisional autonomy implies that corporate management and other divisions should not have access to detailed information on CCD's operations.

In22

Concerns: GBS. [c57, c58, c59, c60, c61, c62]
Inference: GBS will resist any threat to Rule-2, Rule-3 and to their rights to own develop and process their own systems.
Support: Nt12, Nt31, Nt35, Nt38, Nt39, Nt40, Nt45, Nt47, Nt77
Alternative explanations:
Could reasonably argue that GAIS have done a poor job in the past.
Accountability and autonomy imply freedom in IS work.

In23

Concerns: General (conflict string).
Inference: Authority over applications development and ownership leads to an important role in the decision making process.
Support: In19, In21, In23

In24

Concerns: CNSS. [c28]
Inference: CNSS will resist any threat to their role in the decision making process (gained through their applications development and ownership authority).
Support: Nt15, Nt18
Alternative explanations:
Senior management should be able to go to only one point for all IS-related issues.

In25

Concerns: BMS. [c32, c33, c34, c35, c36, c37, c38, c42, c43]
Inference: BMS will resist any threat to Rule-1, Rule-2 and their involvement in proc. arch. development, proc. ownership, applications development and applications ownership (and funds generated from these activities).
Support: Nt16, Nt25, Nt28, Nt32, Nt59, Nt60, Nt60a'
Alternative explanations:
GAIS's efforts in the provision of management information have been poor and BMS do have MIS skills and experience.
Back-end db machines make sense for MIS work.

In26

Concerns: General (conflict string).
Inference: "UNIX/ORACLE is the only route to open systems is an org. rule (Rule-4).
Support: In27, In31

In27

Concerns: CNSS. [c31]
Inference: CNSS will resist any threat to Rule-4.
Support: Nt15, Nt18, Nt37, Nt50b, Nt67, Nt89
Alternative explanations:
GIME does not specify a clear route to open systems.

In28

Concerns: CNSS. [c22, c23, c24, c25]
Inference: CNSS will resist any threat to its role in specifying db updates, approving db access and its consequent roles in information provision and decision making.
Support: Nt18
Alternative explanations:
Unanswered questions on how Corporate DBA will manage their function (integrity, performance and privacy issues).
Failures at Westpac and elsewhere.

In29

Concerns: General.
Inference: MISU should have produced detailed costings and set the agenda for the debate on costs.
Support: Nt21, Nt53

In30

Concerns: Country. [c48, c49, c50, c51, c52, c53, c54]
Inference: Country will resist any threat to their role in applications development, applications ownership, proc. arch. development and proc. ownership (and funds generated from these activities).
Support: Nt23, Nt24, Nt26, Nt27, Nt29, Nt31a, Nt35, Nt38, Nt41a, Nt42
Alternative explanations:
Neither GAIS nor CNSS are adequately meeting their needs and both cost too much. Country's massive geographic spread means that they need different work practices (and, consequently, different systems and a different proc. arch.).

In31

Concerns: Country. [c56]
Inference: Country will resist any threat to Rule-4.
Support: Nt24, Nt26, Nt27, Nt29, Nt31a, Nt38, Nt41a, Nt42
Alternative explanations:
GIME does not specify a clear route to open systems.

In32

Concerns: General.
Inference: CIS should have placed more emphasis on producing early concrete deliverables.
Support: Nt22, Nt57, Nt62, Nt64

In33

Concerns: Country. [c55]
Inference: Country will resist any threat to Rule-3.
Support: Nt26, Nt27, Nt29, Nt35, Nt38, Nt40, Nt42
Alternative explanations:
Accountability and autonomy imply freedom in IS work.

In34

Concerns: BMS. [c39, c40, c41]
Inference: BMS will resist any threat to their role in specifying db updates, information provision and decision making.
Support: Nt16, Nt32
Alternative explanations:
They could reasonably argue that they have had more success in MIS work than any other group in Gigante.

In35

Concerns: General (conflict string).
Inference: Authority over proc. arch. development leads to a central role in the decision making process.
Support: In36

In36

Concerns: EGM GAIS. [c4, c5]
Inference: The EGM GAIS will resist any threat to his role in the decision making process (gained through his authority over proc. arch. development).
Support: Nt35, Nt43a, Nt58a, Nt59, Nt60d
Alternative explanations:
Using the alternative explanations presented in In2, In4 and In5, he could argue that he is only doing what is best for the "new Gigante".

In37

Concerns: General.
Inference: CIS should have made a more determined effort to get standards, guidelines, authorities and accountabilities out early. The "lack of CIS authority" issue should have been tackled head-on and early.
Support: Nt16, Nt28a, Nt35, Nt36, Nt48, Nt50a, Nt55, Nt57, Nt62, Nt64, In38

In38

Concerns: General.
Inference: An appropriate IS org. structure should have been established prior to strategy implementation. Strategy implementation should have been designated as the major responsibility and accountability of the CIO.
Support: Nt55, Nt68, Nt70, Nt71, Nt83, Nt86, Nt87, Nt88

In39

Concerns: General (conflict string).
Inference: Processor providers play an important role in proc. arch. development.
Support: Nt56, Nt59, In26

In40

Concerns: General (conflict string).
Inference: Authorised processor providers play an important role in the decision making process.
Support: Nt56, Nt59

In41

Concerns: Bull. [c64, c66, c67]
Inference: Bull will resist any threat to its role in, and authority over, processor provision and its consequent roles in proc. arch. development and the decision making process.
Support: Nt56, Nt59, Nt60c, In18

In42

Concerns: PMs. [c7,c8,c9]
Inference: PMs will resist any threat to their role in specifying db updates and their consequent roles in information provision and decision making.
Support: Nt59, Nt61, Nt64, Nt75, Nt84
Alternative Explanations:

They could present reasonable arguments, based on experiences in other organisations, that centralised DBA does not work.

In43

Concerns: General.
Inference: CIS should have taken advantage of CNSS-CCD competition in the service orders domain. They could have used the rivalry to encourage both parties to accept GIME principles and to use their resources to assist in the development of the GIME infrastructure.
Support: Nt8, Nt30, Nt44, Nt62, Nt79, Nt81

In44

Concerns: Contractors. [c13, c14]
Inference: Contractors will resist any threat to their systems development role and funds generated from that activity.
Support: Nt60a, Nt61a

5. DATA BASE EXTRACT FOR LABORATORY EXPERIMENT

	EGM GAI	GM NAD	NAD PM'	Cont	CNS	BMS	CCD	Gig Res	C'r	GBS	Bul	Fuj
Proc provn											c63	
Proc arch dev	c1				c15	c32			c48	c57	c64	
Proc ownershi	c2				c16	c33			c49	c58		
Funds source	c3				c17	c34			c50		c65	
Apps devlpt				c13	c18	c35			c51	c59		
Funds source				c14	c19	c36			c52			
Apps ownershi					c20	c37	c44		c53	c60		
Funds source					c21	c38			c54			
Spec db updat			c7		c22	c39	c44					
Approving db					c23		c45					
Info provn			c8		c24	c40	c46					
Decn making			c9		c25	c41	c47					
Authority ove Proc provn											c66	
Proc arch dev	c4											
Apps devlpt			c10		c26							
Apps ownershi					c27							
Decn making	c5		c11		c28						c67	
App of Rule-1					c29	c42						
App of Rule-2					c30	c43				c61		
App of Rule-3	c6		c12						c55	c62		
App of Rule-4					c31				c56			

Table 1: APPS Project - Actual Conflicts.

String	Root Conflict	Consequential Conflicts
s1	c1	{c2, c3}
s2	c4	{c5}
s3	c7	{c8, c9}
s4	c10	{c11}
s5	c13	{c14}
s6	c15	{c16, c17}
s7	c18	{c19}
s8	c20	{c21}
s9	c20	{c22, c23, c24, c25}
s10	c26, c27	{c28}
s11	c32	{c33, c34}
s12	c35	{c36}
s13	c37	{c38}
s14	c37	{c39, c40, c41}
s15	c44'	{c44, c45, c46, c47}
s16	c48	{c49, c50}
s17	c51	{c52}
s18	c53	{c54}
s19	c57	{c58}
s20	c63	{c64, c65}
s21	c66	{c67}

Table 2: Consequential Conflict Strings.

SWU Field Test Data Base Listing

1. INFORMANTS

Informant-id	Org./Org-unit
I1	Mgr CC W.
I2	Sen. A/P W.
I3	Mgr HR W.
I4	Mgr SP W.
I20	Mgr CC C.
I21	Sec. C.
I22	Sen. A/P C.
I40	Mgr CC S.
I41	Sec. S.
I60	ITM

2. DOCUMENTS

Document-id	Document
Dt1	Paper titled "SWU Draft Statement of Mission and Goals for the University" (Apr.90)
Dt2	Paper titled "Evolution of Info. Systems Arrangements in a Newly Federated Organisation: A Case Study" (1991)
Dt3	SISP report titled "SWU - Administrative Info. Systems Review" (May90)
Dt4	Paper titled "Info. Systems to Support a Networked University" (Feb.89)
Dt5	Paper titled "Implementing the Admin. Info. Systems Priorities: Allocation of Responsibilities" (1989)
Dt6	Paper titled "Data Management at SWU: Allocation of Responsibilities" (Nov.91)
Dt7	Paper titled "Admin. Information Systems Review - A Response and Action Plan"

3. NOTES

Nt1

From I1, in discussion, on 6/11/91.
W. HR have just implemented a package. They have little knowledge - when asked to spec. their needs, they came back with the vendors blurb.

Want control of their own info.. Package runs on their own PCs but needs to link in with a number of CC systems.
They believe their needs are unique (not so).

Nt2

From I1, in discussion, on 6/11/91.
W. Finance want commonality but may be concerned if they feel control over their own data is threatened. They are of the view that HQ info. needs are small and are keen to involve themselves in CDM modelling sessions.

Nt3

From I1, in discussion, on 6/11/91.
W. A/Ps may be concerned that centrally-imposed standards will threaten their technical autonomy - but, keen to have a better sd environment.

Nt4

From I1, in discussion, on 6/11/91.
SISP could be a threat to Strat. Planning's DSS and data extraction work. Will object if not involved. They see themselves as expert in sd and activities are focused on local needs (applies to W. and C. only).

Nt5

From I1, in discussion, on 6/11/91.
S. Sec.:
Hands-on and controls IS at S..
Will be protective of S's own recently-introduced systems.
Users seem to be fairly happy with new systems and they now have a more significant role in info. provision.
Has own vision and will object if directions not consistent with his views.
Powerful player and hard to predict his reaction.

Nt6

From I1, in dicussion, on 6/11/91.
S. CC Mgr under control of his Sec. - his views will be the CC Mgr's views.
Will resist any standard not consistent with their 4GL tool (W. will not agree to SB+ as a standard).
May resist any attempt to make data more easily accessible.

Nt7

From I1, in discussion, on 6/11/91.
S. CEO very protective of his data. Worried that project might be seen as a C. initiative.
Very strong on autonomy.
Will oppose any further inter-member committees (on grounds of lost time).

Nt8

From I1, in discussion, on 6/11/91.

C. Sec. is a strong player - will want SR project to go his own way and will want to control (and own) the application. May react badly if data management threatens SR schedule and budget.

Nt9

From I1, in discussion, on 6/11/91.
Doubts that C. CC Mgr has the skills and commitment to take on the data management project (W. could do it better).
I20 has gained most from project carve-up but will not go against his Sec./Bursar or CEO.

Nt10

From I1, in discussion, on 6/11/91.
Senior A/P at C. will resist - believes that any system should be small enough for him to develop himself.
Users at C. have almost no involvement in systems - development, ownership and ad-hoc info. provision are all controlled by A/Ps (exception is Strat. Planning - as for W.).
Signs that C. users want a greater role in info. provision.

Nt11

From I1, in discussion, on 6/11/91.
C. CEO very strong on autonomy. Wants control of own systems. Delegates very little decision making and well aware that info. is power.

Nt12

From I1, in discussion, on 6/11/91.
Lot of posturing from academic committees - will object on principle. Will not involve themselves in the SISP but will reject outputs.
Will not give up their own systems and will argue that they must be free to experiment.

Nt13

From I20, in discussion, on 27/11/91.
Skeptical that collaborative approach will work. What is required is for ITM to be given appropriate authority. Not enough resources to make data management happen.

Nt14

From I20, in discussion, on 27/11/91.
Has initiated some CDM work and has a general approach to CDM evolution. However, no detailed work on evolution approach, standards or arch. development.

Nt15

From I20, in discussion, on 27/11/91.
C. CEO not keen on cooperation and wants to retain control over C's systems and data - "Don't let them buggers dictate to us."

Nt16

From I20, in discussion, on 27/11/91.
There is friction between the other 2 CC managers on proc. arch. directions.

Nt17

From I20, in discussion, on 27/11/91.
A/Ps maintain they are looking forward to standards - but skeptical. previous attempts to standardise have failed. A/Ps have a strong emotional attachment to (and stake in) current systems.

Nt18

From I20, in discussion, on 27/11/91.
Academics against standards - want to experiment with new products (and should be free to do so).

Nt19

From, I20, in discussion, on 27/11/91.
Sec./Bursar will not allow outside interference with "his" SR project.
Will wear data management overheads for now - but not if overruns occur.

Nt20

From I20, in discussion, on 27/11/91.
Natural aversion from many areas (CEOs, Sec's, some A/Ps and users) to corp-wide data access. They want to protect their own data.

Nt21

From I20, in discussion, on 27/11/91.
Many users worried about moving away from their current systems.

Nt22

From Dt2 (dated 1991).
At early workshops, where issues of cooperation were addressed, staff were urged to be on guard against excessive centralisation.

Nt23

From Dt2 (dated 1991).
Following the entry of S. into the federation, consensus among CC Mgrs was more difficult to achieve.

Nt24

From Dt2 (dated 1991).
Some users felt that the existing systems were adequate and they felt comfortable with them.

Nt25

From Dt2 (dated 1991).
Competition between the CEOs (for funds in particular) is intense.

Nt26

From Dt2 (dated 1991).
"Concern was expressed by senior staff --- that their data should not be available to their major competitors (i.e. the other network members) -- ."

Nt27

From Dt2 (dated 1991).
Some managers saw improved access to data as weakening their power base.

Nt28

From Dt2 (dated 1991).
Many parties (e.g. CEOs, Sec's, senior managers, users and some A/Ps) are aware that control of info. and influence are linked.

Nt29

From Dt2 (dated 1991).
The key to successful strategy implementation is building the shared vision.

Nt30

From I41, in discussion, on 5/12/91.
Moving towards a S-wide data-centred approach.
S. should build payroll/personnel and finance systems (using current systems) as the next stage after SR. Will not throw away any recently introduced systems.

Nt31

From I41, in discussion, on 5/12/91.
Data management approach can work. Collaboration and cooperation are the keys. All parties must be in at the front-end.

Nt32

Maintains A/Ps will accept standards - but extolled virtues of S's development environment.

Nt33

From I41, in discussion, on 5/12/91.
Major obstacle to corp-wide data is the CEOs and their desire for autonomy.

Nt34

From I41, in discussion, on 5/12/91.

A/Ps and user areas may be threatened by easier access to data for all.

Nt35

From I40, in discussion, on 5/12/91.
Will fight hard to retain S's sd approach (especially SB+).

Nt36

From I40, in discussion, on 5/12/91.
A/Ps will accept standards but will be reluctant to change from the current sd environment. Disinformation and confusion is rife among A/Ps - vision has not been explained well.

Nt37

From I40, in discussion, on 5/12/91.
Sec. will not throw away recently-introduced systems. I40 and users support him on this. S's systems are better than those at W. and C..

Nt38

From I40, in discussion, on 5/12/91.
Little chance for CCs to move away from standard platform (because of lack of discretionary funds).

Nt39

From Dt3 (dated Mar.90).
Ownership and control of computing facilities, systems and data admin. systems is a very emotional issue. Any change is perceived as very threatening.

Nt40

From Dt3 (dated Mar.90).
Senior managers are in competition over data ownership - "Whoever controls the data controls the whole show."

Nt41

From I2, in discussion, on 18/12/91.
Accepts that current systems have to go but does not like it ("my babies"). Other A/Ps will be protective of their systems too.

Nt42

From I2, in discussion, on 18/12/91.
Little progress on standards (one good meeting, then stalled). I21 has said that he doesn't want anyone working on current systems involved with the SR project (is turning out that way).

Nt43

From I2, in discussion, on 18/12/91.

S. may object to common standards because they have recently invested in new tools. No problem at W. and C. - because the sd environment is ancient.

Nt44

From I2, in discussion, on 18/12/91.
Top management's desire for autonomy is the major impediment to effective data management.

Nt45

From I2, in discussion, on 18/12/91.
Academic independence permeates the whole org'n. i.e. they must be free to experiment with new tools and methods and this works against a standard approach.

Nt46

From I3, in discussion, on 18/12/91.
CHRIS package just installed should have a 5 year life at least.
But - so good its life should be extended.

Nt47

From I3, in discussion, on 18/12/91.
95% of HR system use is local and operational. Therefore, concentrate on local needs and worry about MIS later.
Rare that MIS data needs to be extracted from different systems. Very rare that anybody should need access to his data.
HQ can't spec. their info. needs. I3 prepared to participate in CDM modelling sessions to identify these needs and other HR areas would like to be involved also.

Nt48

From I3, in discussion, on 18/12/91.
W. HR function differs substantially from S. and C..

Nt49

From I3, in discussion, on 18/12/91.
Misrepresented I1's views as "everyone has the right to know everything."

Nt50

From I3, in discussion, on 18/12/91.
S. system not suitable for W. (W. system is much better). He is anti-S. systems, anti-in-house development and pro-packages.

4. INFERENCES AND EVIDENCE LINKS

In1

Concerns: General (conflict string).
Inference: "Network members must have max. autonomy" is an org. rule

(Rule-1).
Support: In9, In12, In15, In18, In20, In22, In24, In26, In28, In30, In32, In34, In36.

In2

Concerns: General (conflict string).
Inference: "Academics must be free to experiment" is an org. rule (Rule-2).
Support: In13, In36.

In3

Concerns: General (conflict string).
Inference: "We (net. member or org. party) are the IS experts" is an org. rule (Rule-3).
Support: In5, In7, In9, In12, In15, In20, In22, In26, In28, In32, In36.

In4

Concerns: CC Mgr W. [c1 - c5]
Inference: The CC Mgr W. may resist any threat to his involvement in and authority over apps development and proc. arch. development and his consequential role in decision making.
Support: Nt9, Nt16.
Alternative explanations:
Concerns over SB+ may be legitimate on technical grounds. Reasonable for him to be concerned about lack of involvement in standards development etc..

In5

Concerns: CC Mgr W. [c6]
Inference: The CC Mgr W. may resist any threat to Rule-3.
Support: Nt9, Nt16.
Alternative explanations:
Might even be true - given W's lead role in the SISP.

In6

Concerns: W. A/Ps. [c7 - c12]
Inference: The W. A/Ps may resist any threat to their role in and authority over apps development and ownership and their consequential roles in spec. db updates, info. provision and decision making.
Support: Nt3, Nt28, Nt41.
Alternative explanations:
Existing arrangements work well in that it is only the A/P's commitment to "their" systems that keeps them running.

In7

Concerns: W. A/Ps. [c13]
Inference: The W. A/Ps may resist any threat to Rule-3.
Support: Nt3.
Alternative explanations:
Could point to their acchievements in maintaining antiquated (but important) systems.

In8

Concerns: W. HR Mgr. [c14 - c22]
Inference: The W. HR Mgr the W. HR Mgr will resist any threat to his involvement in proc. arch. development, his involvement in and authority over apps development and ownership, his role in spec, db updates and approving db access and his consequential roles in info. provision and decision making.
Support: Nt1, Nt20, Nt21, Nt24, Nt26, Nt28, Nt40, Nt44, Nt46, Nt47, Nt48, Nt50.
Alternative explanations:
Could reasonably argue that his package is a big improvement on what he had before and that what the SISP is offering is uncertain.
Wants to protect his investment (including training and skills).

In9

Concerns: W. HR Mgr. [c23, c24]
Inference: The W. HR Mgr will resist any threat to Rules 1 and 3.
Support: Nt1, Nt44, Nt47, Nt48, Nt50.
Alternative explanations:
Consistent with org. philosophy.

In10

Concerns: W. users. [c25 - c29]
Inference: The W. users may resist any threat to their involvement in and authority over apps ownership and development and their consequential roles in approving db access, info. provision and decision making.
Support: Nt2, Nt20, Nt21, Nt24.
Alternative explanations:
They have invested considerable effort in taking most of the info. provision role from the CC - will want to protect that investment.

In11

Concerns: W. Strat. Planning. [c30 - c34]
Inference: W. Strat. Planning may resist any threat to their involvement in apps development and ownership and their consequential roles in spec. db updates, info. provision and decision making.
Support: Nt4, Nt20, Nt28, Nt34
Alternative explanations:
Reasonable for them to be concerned about possible changes in db access policies.

In12

Concerns: W. Strat. Planning. [c35, c36]
Inference: W. Strat. Planning may resist any threat to Rules 1 and 3.
Support: Nt4
Alternative explanations:
Consistent with org. philosophy.

In13

Concerns: C. CC Mgr. [c37]
Inference: The C. CC Mgr may resist any threat to Rule-2.
Support: Nt18
Alternative explanations:
May genuinely believe in benefits of academic experimentation - only ps-related motive could be protection of academic allies.

In14

Concerns: C. Senior A/P. [c38 - c48]
Inference: The C. Senior A/P may resit any threat to his involvement in and authority over proc. arch. development, apps development and ownership and his consequential roles in spec. db updates, approving db access, info. provision and decision making.
Support: Nt10, Nt17, Nt20, Nt28, Nt34, Nt43.
Alternative explanations:
Given problems many organisations have with their large systems, a good case for a small systems approach might be developed.

In15

Concerns: C. Senior A/P. [c49 - c50]
Inference: The C. Senior A/P may resist any threat to Rules 1 and 3.
Support: Nt10, Nt43.
Alternative explanations:
Consistent with org. philosophy.

In16

Concerns: C. A/Ps. [c51, c52]
Inference: The C. A/Ps may resist any threat to their involvement in and authority over apps development.
Support: Nt10, Nt17, Nt28, Nt43.
Alternative explanations:
Hard to build a case based on their current systems - but could base one around their investment in the SR project.

In17

Concerns: C. CEO. [c53 - c57]
Inference: The C. CEO will resist any threat to her involvement in and authority over apps ownership and her consequential roles in approving db access, info. provision and decision making.
Support: Nt11, Nt15, Nt20, Nt22, Nt26, Nt28, Nt33, Nt40, Nt44.
Alternative explanations:
Right to be concerned about privacy issues.
Autonomy implies others should not have access to details of C's operations.

In18

Concerns: C. CEO. [c58]
Inference: The C. CEO will resist any threat to Rule-1.

Support: Nt11, Nt15, Nt33, Nt44.
Alternative explanations:
Consistent with org. philosophy.

In19

Concerns: C. Sec./Bursar. [c59 - c62']
Inference: The C. Sec./Bursar will resist any threat to his involvement in and authority over apps development and ownership and his consequential rol in decision making.
Support: Nt8, Nt19, Nt20, Nt21, Nt28, Nt40, Nt42, Nt44.
Alternative explanations:
Cuold use the poor state of existing systems to argue that his vision and approach is an improvement.

In20

Concerns: C. Sec./Bursar [c63, c64]
Inference: The C. Sec./Bursar will resist any threat to Rules 1 and 3.
Support: Nt8, Nt19, Nt42, Nt44..
Alternative explanations:
Consistent with org. philosophy.
Could possibly base his expertise argument on previous experience.

In21

Concerns: C. Strat. Planning. [c65 - c69]
Inference: C. Strat. Planning may resist any threat to their involvement in apps development and ownership and their consequential roles in spec. db updates, info. provision and decision making.
Support: Nt4, Nt20, Nt28, Nt34.
Alternative explanations:
Reasonable concerns about possible changes in db access rules.

In22

Concerns: C. Strat. Planning. [c70 - c71]
Inference: C. Strat. Planning may resist any threat to Rules 1 and 3.
Support: Nt4
Alternative explanations:
Consistent with org. philosophy.

In23

Concerns: C. users. [c72 - c76]
Inference: C. users may resist any threat to their involvement in and authority over apps ownership and their consequential roles in approving db access, info. provision and decision making.
Support: Nt10, Nt20, Nt21, Nt24, Nt28, Nt34.
Alternative explanations:
SR project gives them a level of control that they did not have before. SISP may mean that they will lose that (i.e. excluded before and may be again).

In24

Concerns: C. users. [c77]
Inference: The C. users may resist any threat to Rule-1.
Support: Nt10.
Alternative explanations:
Consistent with org. philosophy.

In25

Concerns: S. CC Mgr. [c78 - c87]
Inference: The S. CC Mgr may resist any threat to his involvement in and authority over apps development and ownership and proc. arch. development and his consequential roles in spec. db updates, approving db access, info. provision and decision making.
Support: Nt6, Nt16, Nt20, Nt28, Nt34, Nt35, Nt37, Nt43.
Alternative explanations:
Could use the same arguments as S. Sec. (In31).

In26

Concerns: S. CC Mgr. [c88, c89]
Inference: The S. CC Mgr may resist any threat to Rules 1 and 3.
Support: Nt6, Nt37, Nt43.
Alternative explanations:
Could use the same arguments as S. Sec. (In32).

In27

Concerns: S. A/Ps. [c90 - c97]
Inference: The S. A/Ps may resist any threat to their involvement in and authority over apps development and ownership and their consequential roles in spec. db updates, approving db access, info. provision and decision making.
Support: Nt20, Nt28, Nt34, Nt36, Nt43.
Alternative explanations:
Protection of investment in their new development and processing arch's.

In28

Concerns: S. A/Ps. [c98, c99]
Inference: The S. A/Ps may resist any threat to Rules 1 and 3.
Support: Nt37, Nt43.
Alternative explanations:
Consistent with org. philosophy.
Could argue superior skills on the basis of their recently-introduced systems.

In29

Concerns: S. CEO. [c100 - c104]
Inference: The S. CEO may well resist any threat to his involvement in and authority over apps ownership and his consequential roles in approving db access, info. provision and decision making.
Support: Nt7, Nt20, Nt22, Nt26, Nt28, Nt33, Nt40, Nt44.
Alternative explanations:
Could use same arguments as the C. CEO (In17).

In30

Concerns: S. CEO. [c105]
Inference: The S. CEO will resist any threat to Rule-1.
Support: Nt7, Nt20, Nt33, Nt44.
Alternative explanations:
Consistent with org. philosophy.

In31

Concerns: S. Sec. [c106 - c116]
Inference: The S. Sec. may resist any threat to his involvement in and authority over apps development and ownership and proc. arch. development and his consequential roles in spec. db updates, approving db access, info. provision and decision making.
Support: Nt5, Nt20, Nt21, Nt23, Nt28, Nt30, Nt32, Nt37, Nt40, Nt43, Nt44.
Alternative explanations:
Could argue that M's proc. and systems environments are superior.
Protection of investment in new arch. and systems.

In32

Concerns: S. Sec. [c117, c118]
Inference: The S. Sec. may resist any threat to Rules 1 and 3.
Support: Nt5, Nt37, Nt43, Nt44.
Alternative explanations:
Consistent with org. philosophy.
Could argue superior skills on the basis of recent achievements and their own IS planning process.

In33

Concerns: S. users. [c119 - c122]
Inference: S. users may resist any threat to their involvement in apps ownership and their consequential roles in approving db access, info. provision and decision making.
Support: Nt20, Nt21, Nt24, Nt28, Nt34, Nt37.
Alternative explanations:
Protection of considerable investment in recently-installed systems.

In34

Concerns: S. users. [c123]
Inference: S. users may resist any threat to Rule-1.
Support: Nt5
Alternative explanations:
Consistent with org. philosophy.

In35

Concerns: Academics. [c124 - c134]
Inference: Academics will resist any threat to their involvement in and authority over proc. arch development and apps development and ownership and their consequential roles

in spec. db updates, approving db access, info. provision and decision making.
Support: Nt12, Nt18, Nt20, Nt21, Nt45.
Alternative explanations:
Arguments for academic experimentation are reasonable.
Could argue that existing admin. systems are inadequate (and, particularly, that academics' needs not taken into account).

In36

Concerns: Academics. [c135 - c137]
Inference: Academics will resist any threats to Rules 1, 2 and 3.
Support: Nt12, Nt18, Nt45.
Alternative explanations:
Consistent with org. philosophy.
Could argue superior skills based on their academic qualifications and research.

5. DATA BASE EXTRACT FOR FIELD TEST PREDICTION SESSIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Proc provn																		
Proc arch devlpt	1		14				38						78			106		124
Proc ownership																		
Funds source																		
Apps devlpt	2	7	15		30		39	51		59	65		79	90		107		125
Funds source																		
Apps ownership		8	16	25	31		40		53	60	66	72	80	91	100	108	119	126
Funds source																		
Spec db updates		9	17		32		41				67		81	92		109		127
Approving db axs			18	26			42		54			73	82	93	101	110	120	128
Info provn			19	27	33		43		55		68	74	83	94	102	111	121	129
Decn making			20	28	34		44		56		69	75	84	95	103	112	122	130
Authority over: Proc provn																		
Proc arch devlpt	3						45						85			113		131
Apps devlpt	4	10	21				46	52		61			86	96		114		132
Apps ownership		11	22	29			47		57	62		76	87	97	104	115		133
Decn making	5	12					48			i1						116		134
App of Rule-1			23		35		49		58	63	70	77	88	98	105	117	123	135
App of Rule-2						37												136
App of Rule-3	6	13	24		36		50			64	71		89	99		118		137
App of Rule-4																		

Key to Parties

Western		Central		Southern	
1	CC Mgr	6	CC Mgr	13	CC Mgr
2	Devlpt	7	Senior A/P	14	Devlpt
3	HR	8	Devlpt	15	CEO
4	Other users	9	CEO	16	Secretary
5	Strat. Planning	10	Sec./Bursar	17	Users
		11	Strat. Planning		
		12	Other users	Common	
				18	Academics

Table 1: Field Test - Actual Conflicts.

"CONFLICT PREDICTION SESSION RESULTS"

1. LABORATORY EXPERIMENT

Subject	Experimental Group			Control Group		
	E1 (A)	E2 (B)	E2' (C)	C1 (A)	C2 (A')	C2' (B)
1	34	60	72	21	59	72
2	24	72	78	24	51	66
3	24	71	76	28	46	60
4	19	54	87	29	50	54
5	32	65	59	21	53	72
6	22	69	68	25	60	66
7	29	66	84	26	56	74
8	26	57	66	31	51	66
9	25	63	60	25	49	59
10	32	63	85	26	54	75
Mean	26.7	64.0	73.5	25.6	52.9	66.4
SD	4.64	5.57	9.67	3.07	4.21	6.68

Table 1: Correct Prediction Scores.

Subject	Experimental Group			Control Group		
	E1 (A)	E2 (B)	E2' (C)	C1 (A)	C2 (A')	C2' (B)
1	12	11	18	7	28	9
2	6	15	25	12	28	18
3	6	19	19	19	22	9
4	18	8	15	14	32	13
5	7	24	15	5	41	12
6	19	13	12	11	35	22
7	17	21	18	21	40	21
8	6	9	22	15	35	7
9	11	17	13	13	29	12
10	7	12	12	6	37	18
Mean	10.9	14.9	16.9	12.3	32.7	14.1
SD	5.07	5.01	4.11	5.05	5.72	5.03

Table 2: Incorrect Prediction Scores.

SUBJECT	CONFLICTS PREDICTED	TOTAL
Se1	1, 2, 4, 6, 10, 13, 14, 18, 19, 20, 21, 26, 27, 32, 35, 37, 45, 57, 59, 60, 63, 65, 67	23
Se2	4, 10, 13, 14, 18, 19, 20, 21, 27, 31, 35, 36, 56, 60, 63, 65	16
Se3	4, 18, 20, 26, 27, 28, 35, 56, 57, 58, 59, 60, 63, 65, 66, 67	16
Se4	1, 4, 10, 13, 14, 18, 19, 20, 21, 29, 35, 36, 48, 49, 51, 55, 57, 58, 59, 60, 63, 65	22
Se5	10, 12, 13, 14, 15, 27, 29, 31, 32, 35, 37, 45, 48, 51, 56, 57, 58, 59, 60, 63, 65, 67	22
Se6	1, 4, 10, 12, 15, 18, 19, 20, 21, 30, 48, 57, 62, 63, 65	15
Se7	4, 5, 10, 15, 18, 20, 21, 26, 27, 32, 35, 48, 49, 50, 53, 54, 57, 59, 63, 65	20
Se8	7, 10, 11, 12, 13, 14, 18, 19, 32, 35, 48, 51, 53, 63, 64, 65, 66, 67	18
Se9	1, 13, 14, 15, 17, 18, 19, 20, 27, 29, 35, 36, 48, 51, 60, 63, 65	17
Se10	10, 12, 13, 14, 15, 18, 20, 26, 27, 35, 48, 63, 65	13
Sc1	1, 10, 15, 18, 20, 35, 37, 39, 40, 41, 57, 62, 63, 65	14
Sc2	10, 13, 14, 18, 19, 20, 21, 31, 35, 48, 49, 56, 57, 58, 59, 60	16
Sc3	1, 3, 4, 10, 18, 19, 26, 28, 35, 36, 37, 38, 43, 56, 59, 60, 63, 65, 67	19
Sc4	1, 4, 10, 15, 18, 30, 32, 35, 36, 39, 40, 48, 49, 50, 55, 56, 57, 62, 63, 65	20
Sc5	4, 10, 13, 14, 18, 31, 35, 48, 51, 56, 57, 60, 63, 65	14
Sc6	1, 2, 4, 10, 12, 13, 14, 15, 16, 20, 21, 29, 30, 32, 35, 63, 65	17
Sc7	1, 4, 5, 10, 11, 12, 15, 18, 29, 32, 35, 51, 52, 53, 54, 61, 63, 65	18
Sc8	10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 27, 32, 34, 35, 36, 48, 51, 57, 59, 60	21
Sc9	1, 4, 6, 7, 15, 20, 21, 28, 32, 33, 34, 35, 36, 48, 62, 63, 65	17
Sc10	1, 4, 6, 13, 14, 15, 18, 20, 26, 35, 31, 48, 57, 58, 59, 60, 63, 65	18

Table 3: E1 and C1 - Pre-Test Results.

SUBJECT	CONFLICTS PREDICTED	TOTAL
Se1	1, 2, 3, 4, 6, 10, 12, 13, 14, 18, 19, 20, 21, 25, 27, 28, 29, 30, 32, 33, 35, 36, 37, 38, 41 42, 43, 44, 44', 45, 46, 47, 57, 58, 59, 60, 62, 63, 65, 66, 67	41
Se2	1, 2, 3, 4, 5, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33 34, 35, 36, 37, 38, 40, 41, 43, 48, 49, 50, 53, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 66, 67	49
Se3	1, 2, 3, 4, 5, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 26, 27, 28, 31, 32, 33, 34, 35 36, 37, 38, 40, 44', 45, 46, 48, 49, 50, 51, 52, 53, 54, 56, 57, 58, 59, 60, 62, 63, 66, 67	48
Se4	1, 3, 4, 5, 10, 12, 13, 14, 18, 19, 20, 21, 24, 25, 27, 28, 29, 30, 35, 36, 37, 38, 40, 41, 48, 49, 50, 51, 52, 55, 57, 58, 59, 60, 62, 63, 65	37
Se5	1, 4, 6, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 43, 44', 45, 46, 47, 49, 51, 53, 55, 56, 58, 59, 60, 62, 63, 65	44
Se6	1, 2, 3, 4, 5, 6, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 25, 26, 27, 28, 30, 32, 33, 34, 37, 38, 40, 41, 43, 48, 49, 50, 53, 54, 55, 56, 57, 58, 60, 61, 62, 63, 65, 66, 67	47
Se7	1, 3, 4, 5, 10, 11, 12, 15, 16, 18, 19, 20, 21, 25, 26, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 41, 42, 43, 49, 50, 51, 52, 53, 54, 55, 56, 58, 59, 60, 61, 62, 63, 65, 66, 67	45
Se8	1, 3, 5, 6, 7, 9, 10, 11, 12, 14, 18, 19, 20, 21, 23, 24, 25, 27, 28, 29, 32, 33, 34, 35, 36, 37, 38, 40, 42, 48, 49, 50, 53, 55, 56, 60, 62, 63, 65	39
Se9	1, 2, 3, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 42, 43, 48, 49, 50, 51, 52, 57, 58, 59, 60, 61, 62, 63, 65, 66, 67	43
Se10	4, 5, 6, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 48, 49, 50, 55, 56, 59, 60, 62, 63, 65, 66, 67	43
Sc1	1, 2, 3, 4, 7 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35 , 36, 37, 38, 40, 42, 43, 46, 57, 58, 59, 62, 63, 65, 66	40
Sc2	1, 4, 6, 10, 12, 13, 14, 15, 18, 19, 20, 21, 31, 35, 36, 37, 38, 40, 45, 46, 48, 49, 51, 52, 53, 55, 56, 57, 58, 59, 60, 61, 62, 63, 66	35
Sc3	3, 4, 6, 13, 14, 18, 19, 20, 21, 25, 26, 27, 29, 32, 35, 36, 37, 38, 41, 48, 49, 51, 53, 55, 56, 59, 60, 62, 63, 65, 67	31
Sc4	1, 2, 3, 4, 10, 12, 13, 15, 17, 19, 20, 21, 23, 26, 27, 30, 31, 33, 34, 35, 36, 40, 41, 48, 50, 56, 57, 58, 59, 60, 61, 63, 65, 66	34
Sc5	1, 2, 3, 4, 10, 12, 13, 14, 15, 16, 17, 20, 21, 24, 27, 29, 30, 31, 32, 33, 34, 37, 38, 40, 43, 46, 48, 49, 55, 56, 57, 58, 60, 61, 62, 63	36
Sc6	1, 4, 5, 6, 7, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 28, 29, 30, 40, 41 42, 43, 48, 49, 50, 51, 52, 55, 56, 60, 62, 63, 64, 65, 66, 67	41
Sc7	1, 2, 3, 4, 5, 6, 10, 11, 15, 16, 18, 19, 25, 26, 28, 32, 33, 34, 35, 36, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 65, 66, 67	38
Sc8	4, 5, 6, 10, 11, 12, 13, 14, 15, 16, 18, 20, 25, 26, 27, 28, 29, 30, 32, 33, 35, 37, 40, 41, 43, 48, 49, 51, 53, 55, 57, 58, 59, 60, 62	35
Sc9	1, 4, 6, 7, 12, 13, 14, 19, 20, 21, 25, 29, 30, 32, 33, 34, 35, 36, 40, 41, 42, 43, 48, 49, 51, 52, 55, 56, 60, 62, 63, 65, 66	33
Sc10	1, 2, 3, 4, 5, 6, 13, 14, 15, 16, 18, 20, 21, 23, 25, 31, 32, 33, 34, 35, 36, 40, 41, 42, 48, 49, 51, 53, 54, 55, 56, 59, 60, 61, 62, 63, 65	37

Table 4: E2 and C2 - Exercise 2 Results.

SUBJECT	CONFLICTS PREDICTED	TOTAL
Se1	1, 2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 27, 28, 29, 30, 32, 33, 34, 35, 36, 42, 43, 44, 44', 45, 46, 47, 48, 49, 50, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65	49
Se2	1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 28, 29, 30, 31, 35, 36, 37, 38 39, 40, 41, 44, 44', 45, 46, 47, 48, 49, 50, 53, 54, 56, 57, 58, 59, 60, 62, 63, 64, 65, 66, 67	53
Se3	1, 2, 3, 6, 7, 8, 9, 12, 13, 14, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 48, 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65	52
Se4	1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62 63, 64, 65, 66, 67	59
Se5	1, 2, 3, 4, 5, 6, 13, 14, 15, 16, 17, 18, 19, 27, 28, 29, 30, 31, 44, 44', 45, 46, 47, 48, 49, 50, 51, 52, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65, 66, 67	40
Se6	1, 2, 3, 4, 5, 6, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 33, 34, 37, 38, 39, 40, 41, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67	46
Se7	1, 2, 3, 4, 5, 6, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 35, 36, 37, 38, 39, 40, 41, 42, 43, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64 65, 66, 67	57
Se8	1, 2, 3, 4, 5, 7, 8, 10, 12, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 43, 48, 49, 50, 53, 54, 56, 59, 60, 61, 63, 64, 65	45
Se9	1, 2, 3, 6, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 29, 30, 32, 33, 34, 37, 38, 39, 40, 43, 48, 49, 50, 51, 52, 57, 58, 59, 60, 61, 62, 63, 65	41
Se10	1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32 33, 34, 35, 37, 39, 40, 41, 44, 44', 45, 46, 47, 48, 49, 51, 52, 53, 54, 56, 57, 58, 59, 60, 61, 63, 64, 65, 66, 67	58
Sc1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 26, 27, 28, 29, 31, 32, 33, 34 35, 36, 37, 38, 40, 42, 43, 48, 49, 50, 51, 52, 57, 58, 59, 62, 63, 64, 65, 66	49
Sc2	1, 2, 3, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 20, 21, 23, 25, 26, 27, 28, 31, 35, 36, 37, 38, 40, 41, 43, 44', 46, 47, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 64, 65	45
Sc3	1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 18, 19, 20, 21, 2326, 27, 28, 30, 31, 35, 36, 37, 38, 40, 41, 43, 48, 49, 50, 53, 54, 55, 56, 59, 60, 62, 63, 65, 67	41
Sc4	1, 4, 5, 6, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 24, 25, 26, 29, 30, 31, 32, 33, 34, 37, 38, 41, 48, 49, 50, 55, 56, 57, 58, 59, 60, 62	37
Sc5	1, 2, 3, 5, 6, 7, 8, 10, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 28, 29, 30, 32, 33, 34, 35, 36, 37, 40, 42, 43, 44', 45, 46, 48, 49, 50, 51, 52, 53, 55, 57, 59, 60, 62, 63, 65, 66, 67	49
Sc6	1, 3, 4, 5, 6, 10, 11, 12, 15, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 42, 43, 48, 49, 50, 53, 54, 55, 56, 59, 60, 61, 62, 63, 65, 66, 67	45
Sc7	1, 4, 5, 6, 10, 11, 13, 14, 15, 16, 18, 19, 20, 21, 23, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 40, 41, 42, 43, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 65, 66, 67	50
Sc8	1, 2, 3, 4, 5, 10, 12, 13, 14, 15, 16, 18, 19, 21, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34, 35, 36, 37, 38, 41, 42, 43, 49, 50, 51, 53, 54, 55, 56, 60, 61, 62, 63, 65, 66, 67	45
Sc9	4, 5, 6, 10, 12, 13, 14, 15, 17, 18, 19, 20, 21, 23, 26, 27, 28, 29, 30, 32, 34, 35, 36, 37, 38, 40, 48 49, 50, 51, 52, 55, 56, 59, 60, 62, 63, 65, 66, 67	40
Sc10	1, 2, 3, 4, 5, 6, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36 37, 38, 40, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67	51

Table 5: E2' and C2' - Exercise 3 Results.

String	E2 (Method B)			C2 (Method A')		
	F'ns id.	Conseq. confl's	No. id.	F'ns id.	Conseq. confl's	No. id.
s1	9	18	13	8	16	10
s2	8	8	6	10	10	4
s3	1	2	1	5	10	1
s4	9	9	7	8	8	3
s5	8	8	8	9	9	9
s6	7	14	12	9	18	13
s7	9	9	9	8	8	6
s8	10	10	10	9	9	8
s9	10	40	15	9	36	12
s10	10	10	9	10	10	6
s11	9	18	17	8	16	13
s12	9	9	9	9	9	8
s13	10	10	10	5	5	4
s14	10	30	14	5	15	7
s15	1	3	3	0	0	0
s16	7	14	14	10	20	14
s17	5	5	4	8	8	5
s18	6	6	3	5	5	2
s19	6	6	6	7	7	7
s20	10	20	9	10	20	11
s21	7	7	7	8	8	4
Total:	161	256	186	160	247	147

Table 6: Consequential Conflicts Predicted with Methods A' and B.

String	E2 (Method C)			C2 (Method B)		
	F'ns id.	Conseq. confl's	No. id.	F'ns id.	Conseq. confl's	No. id.
s1	10	20	20	9	18	15
s2	7	7	7	8	8	8
s3	5	10	9	3	6	5
s4	5	5	3	8	8	4
s5	8	8	8	9	9	8
s6	9	18	18	9	18	12
s7	9	9	9	9	9	9
s8	9	9	9	9	9	9
s9	9	36	31	9	36	19
s10	9	9	9	10	10	9
s11	8	16	16	8	16	15
s12	7	7	6	9	9	9
s13	8	8	7	10	10	8
s14	8	24	22	10	30	14
s15	4	16	16	2	8	4
s16	9	18	16	8	16	16
s17	6	6	6	7	7	6
s18	6	6	6	7	7	6
s19	9	9	9	6	6	5
s20	10	20	19	9	18	12
s21	6	6	6	7	7	6
Total:	161	267	252	166	265	199

Table 7: Consequential Conflicts Predicted with Methods B and C.

2. FIELD TEST RESULTS

PHASE	CONFLICTS PREDICTED	TOTAL
Phase 2	15,16,53,56,58,59,60,61,62,i1, 63,64,78,94,95,98,100,102,107,108, 114,115,116,117,118,124,125,126, 135,136,137	31
Phase 3	1,2,3,4,5,7,9,10,12,15,16,18,19, 20,21,22,23,26,27,28,30,31,33, 34,35,39,41,43,44,46,48,49,50, 53,54,55,56,57,58,59,60,61,62, i1,63,64,65,66,68,69,70,73,78, 79,80,81,82,83,84,85,86,87,88, 90,92,93,94,95,96,97,98,100, 101,102,103,104,105,107,108,109, 110,111,112,114,115,116,117,118, 124,125,126,127,128,129,130,131, 132,133,134,135,136,137	102
Phase 4	1,2,3,4,5,7,8,9,10,12,15,16,18,19, 20,21,22,23,25,26,27,28,30,31,33, 34,35,39,40,41,43,44,46,48,49,50, 53,54,55,56,57,58,59,60,61,62, i1,63,64,65,66,68,69,70,72,73,78, 79,80,81,82,83,84,85,86,87,88, 90,91,92,93,94,95,96,97,98,100, 101,102,103,104,105,107,108,109, 110,111,112,114,115,116,117,118, 124,125,126,127,128,129,130,131, 132,133,134,135,136,137	107

Table 8: Conflicts Predicted - Field Test.

Systems	
APPS	All Products Provisioning System
CABS	Gigante's major billing system
CONDOR	Gigante's customer information system
DCRIS	Provisioning system for basic services
FAMIS	Gigante's suite of accounting packages
IMIS	Integrated Management Information System
PURCHASE	Gigante's supplier purchasing system
RASS	Provisioning system for special services
Parties	
CEO	Chief Executive Officer
CIO	Chief Information Officer
CIS	Corporate Information Strategy
CNSS	Customer National Support Systems
DMD	Deputy Managing Director
EGM	Executive General Manager
MD	Managing Director
GAIS	Gigante Australia Information Systems
Technology	
DBMS	Data Base Management System
DISNET	CNSS's District Network
GACONET	Gigante Australia Computer Network
GIME	Gigante's Information Management Environment

Table 1: Glossary of Case Study Acronyms.