A Decision Support Tool for Managing Organisation Change

Robyn Watters

School of Management & Information Systems, Victoria University, Melbourne, Australia

Email: Robyn.Watters@live.vu.edu.au

Michael McGrath

Centre for Tourism & Services Research, Victoria University, Melbourne, Australia

Email: Michael.Mcgrath@vu.edu.au

A Decision Support Tool for Managing Organisation Change

ABSTRACT

An organisation is comprised of a vast array of complex elements, relationships and dependencies, which together constitutes its environment. These elements can be described as organisation units, policies, processes, systems, roles and responsibilities, each with unique compositions and interfaces that generally interact at the coal-face of the organisation. Organisations over time have been continuously susceptible to change with change behaviour interpreted as either purposive or reactive. Previous attempts to manage organisation change through change management practices and associated tools have had less-than-successful outcomes. Our research demonstrates the mechanics of organisation change and we present a logical and robust solution for its management. This paper argues the case for Decision Support Tools (DSTs) in the form of a relational database as an accurate means of identifying, capturing, analysing and communicating potential change impacts within the organisation environment.

Keywords: Organisational Change; Change Management; Managing Change; Change Communication

INTRODUCTION

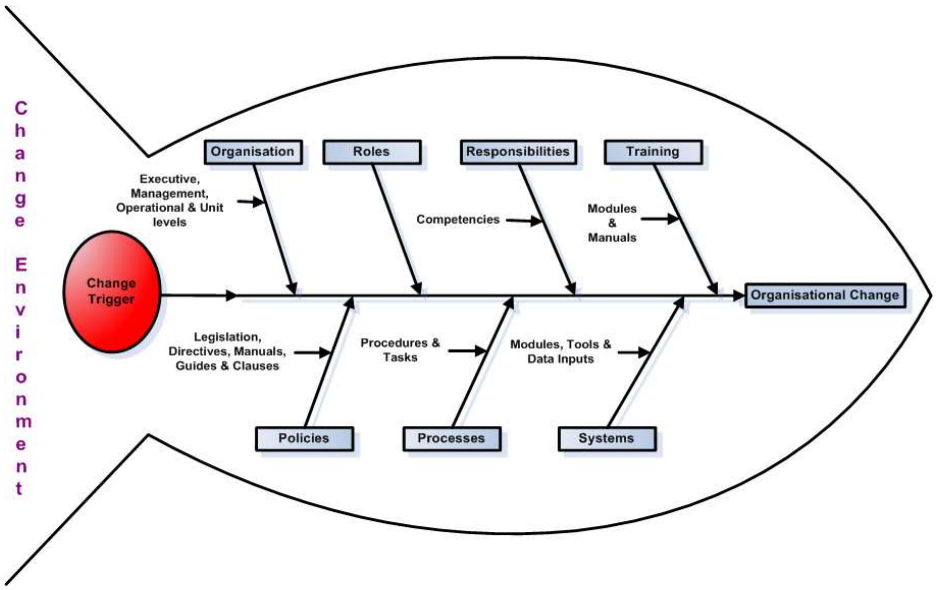
The organisational ethos as we know it today was shaped from the manufacturing industries of the Industrial Revolution (Drucker 1999; Hope & Hope 1997). Management theories and practices were formulated through the classical, scientific, and human relations schools of management (1700-1900s) to assist the operations of the industries of the Industrial Revolution (Crainer 1998; Morden 1996; Shafritz & Ott 1987). Mary Parker Follett, Chester Barnard, and the contributors of the Hawthorne studies (1930s), were the pioneers of organisation power and politics, behaviour, and human relations research (Shafritz & Ott 1987). Organisation theorists of that time also embraced Ludwig Von Bertalanffy's general systems theory that organisations were complex, dynamic, interrelated 'open systems' subjected to perpetual change (Shafritz & Ott 1987). Following World War II the Tavistock Institute of Human Relations formally identified the 'socio-technical' concept where the organisation was viewed as a system of delicately balanced interdependencies ('technical and social subsystems') with their sum comprising the organisation environment (Morden 1996; Trist & Murray 1990). Not dissimilar to these early theorists was the view expressed by Cao and McHugh (2005) and Lang and Zangl (2008) who advocated a multiple methods approach to understanding organisational phenomena - exploring the interconnectedness of the objective 'hard factors' and subjective elements 'soft factors'. More comprehensive was McGrath and Uden's (2000) approach to harness organisation power and politics and behaviour by capturing, analysing and representing the 'softer' organisation issues in the course of mainstream evaluations.

According to Morden (1996) the industrial revolution was the precursor of organisation change; a continuous change cycle triggered (or driven) by external or internal influences. Drucker (1999) viewed organisation change as a 'natural' and 'acceptable' occurrence; a sign of 'growth' and 'expansion', the raison d'être through the process of innovation. Evermore, organisations were subjected to change as a result of purposive or reactive influences and, given the complexity of the modern operational environment, organisations must

be intentional in their planning and control of change (Miner 1978). There are a plethora of organisational change management practices and theories accessible today but often these theories and practices have failed to deliver the desired or expected results (Cao & McHugh 2005; Coulson-Thomas 2008; Lang & Zangl 2008; Shafritz & Ott 1987). We acknowledge the contribution of organisation theorists in the analysis of post-industrialisation and as such we attempt to build on their input.

The approach we have taken is based on the premise that any attempt to manage or understand organisational complexity and change should be underpinned by an automated information technology (IT) solution or decision support tool (DST). Thus, the primary focus of this paper is on presenting a specification of a meta-schema that presents the core elements (and their relationships) involved in an organisation change process. Since the schema is represented in entity-relationship (ER) form (Chen 1976), it can readily be translated into a relational database (or DST). Consequently, an instantiation of this database for a specific organisation and its processes (or part thereof) allows the automated derivation of all parties, processes, systems etc. impacted by a change initiative. A simplified version of the schema elements shown at Figure 1 below, and discussed in detail in the section titled 'The ERD as a Decision Tool', depicts the core elements impacted by a decision to change the Company's (the organisation used as the basis of our case study) procurement process.

Figure 1: Organisation Change Schema Elements



The knowledge and data required to construct the meta-schema (and associated database or DST) has been extracted from a current case study, investigating an organisational change process within the supply chain operations of a large Australian company. The research that underpins this paper is explorative and poses the following questions:

1. *To what extent can a model or schema be used to adequately and effectively reflect the impact of (organisation) change?*
2. *Can the resultant schema be transferred into a useful decision support tool?*

The paper is organised as follows: our case study is introduced in the subsequent section and this is followed by a discussion of organisational change. We then introduce our current research, with emphasis on the role of our decision support tool (DST) in change management. Possible directions for further research are then introduced and the final section contains concluding remarks.

CASE STUDY

Our research is a qualitative, exploratory study of a complex socio-technical environment. We investigated the operational and relational dynamics of a multifaceted change process within a large Australian company (henceforth identified as the Company), with an extremely complex organisation structure and supply chain. Given the Company's size, and magnitude of its operations, an intrinsic, single case study was deemed appropriate to explore the organisational elements, relationships and dependencies (Creswell 1998; Yin 1989). Case studies are recognised for exposing real situations and problems and have been used by organisations to assess or improve their operations (including the execution of change programs) (Coghlan & Brannick 2001; Schmuck 2006; Somekh 2006; Williamson 2000). (See also Watters & McGrath (2008) for our detailed case study).

Case Problem

We focused on the Company's supply chain procurement activities most vulnerable to external and internal change triggers. The Company, for a number of reasons, had been unable to respond readily to change leaving it in a state of constant flux. Analysis of the Company's operational environment identified a number of interconnected elements and dependencies, which became stressed when impacted by change. The extent of the conflict was recognised by stakeholders at the coal-face of the organisation but not at the executive level where the majority of the strategic decisions and subsequent changes were fashioned. In this instance we found the Company unable to comprehensively and accurately assess the impact of a specific change trigger; the decision to change existing procurement activities through mandatory legislation. This set in play a cause and effect scenario of dysfunctional actions resulting in procedural anomalies and operational inconsistencies; some examples are shown at Table 1, below.

Table 1: Cause and Effect Issues

Cause	Effect
New legislation conflicted with existing operational policy & procedures	Extreme risk of operational failure with fatal consequences
	Company restructured to effect policy changes
Policies & procedures (P&Ps) revised accordingly & new P&Ps introduced	Revised P&Ps misaligned with dependent organisational elements
Core ERP system & related inputs reconfigured without consultation	Dependent System interfaces inputs, outputs, position roles & profiles rendered invalid Manual system & procedural work-arounds required to

	maintain operational levels Suboptimal resource performance & data integrity issues
Demarcation of organisational responsibilities illogical or opaque	Turn-around-time for operational fixes overly delayed, considered low priority or uneventful
New P&Ps required revised operating standards	Training materials unavailable & activities erroneous or not undertaken
Objective consultation & feedback non existent or ad hoc	Outcomes dependent on subjective behaviour are difficult to identify and manage

Of major concern was that the Company's strategic decisions were fashioned without cognisance of its operational requirements but moreover there was minimal recognition of the need to communicate changes that may affect these requirements. In keeping with rudimentary 'best practice' management principles and standards the Company had implemented various quality management system (QMS) programs (inclusive of simulation modelling) to varying degrees of success. Thus, the research objective was to:

- systematically identify the organisational elements and relationships impacted by a change process;
- simulate those elements, together with any analogous dependencies; and,
- assemble the correlations into a decision support tool (DST).

The premise was that a DST would provide superior knowledge and management of organisation elements and their dependencies potentially impacted by change; therefore, enabling purposive rather than reactive organisation change behaviour.

Data Collection and Analysis

Our detailed research design is presented in (Watters & McGrath 2008) but, briefly, we used archival research (i.e. primary based or company files and records) and semi-structured interviews as the qualitative data collection methods because of their ability to provide an accurate and reliable account of an environment phenomenon (Creswell 2003; Myers 2006; Williamson 2000; Yin 1989). Data derived from both the archival materials and interviews was administered in accordance with emerging patterns or themes (Creswell 1998), together with a 'methods' and 'source' triangulation approach to validate the data, and to ensure its reliability (Creswell 2003; Punch 2001; Williamson 2000). We also drew from organisation theories, enterprise modelling (EM), and systems and design (SAD) practices for the purpose of data collection, analysis, and presentation of the findings. The aim was to communicate a visual and narrative solution to solve a socio-technical problem (Creswell 1998; IFIP-IFAC Taskforce 1999; PLAIC 2001; Williamson 2000).

ORGANISATION CHANGE

Managing organisation change, or organisation change management (OCM) as it is universally branded, is a practice attributed to Kurt Lewin (Coghlan & Brannick 2004), and adopted by the Tavistock Institute of Human Relations and other organisation theorists (Louis 1993). Lewin and Von Bertalanffy were seen as the major contributors to the development of the systemic analyses and rationale of the social factors surrounding the organisation environment (Trist & Murray 1990). Traditional management practices of the C19th were considered inappropriate because of the complex nature and intertwined relationships that underpinned organisations of the rising modern economy (Drucker 1999). Modern organisation theorists adopted the 'general systems' approach to gain better insight into the new multi-function, corporate entities (Miner 1978). Since then, there has been a succession of OCM practices - underpinned by divergent theories (Shafritz and Ott 1987) - sharing the common denominator that the elevation of OCM as a core competency leads to increased competitiveness, and therefore success (Burnes 2004).

Competitiveness and innovation is synonymous with change (Burnes 2004), a natural phenomenon of industrialisation that must be planned and managed to be effective (Drucker 1999). The new corporate entities (multinationals) of the C20th sought competitive advantage through new management practices; strategic, marketing, and customer relations, in addition to technology management initiatives; just in time (JIT) supply, and electronic data interchange (EDI) (Chang, Makatsoris & Richards 2004; Fredendall & Hill 2001; Ross 2004). Technology innovation flourished during the latter part of C20th with the emergence of virtual private networks (VPNs), strategic alliances, and business process re-engineering (BPR) (Attaran 2003; Daniels 1994). In the C21st there has been technology advancement with invigorated BPR to accommodate the virtual organisation (VO) (Attaran 2003), and innovation with development of integrated autonomic communications (Davy et al. 2006). However, it has been acknowledged that technology alone is not the primary mover of organisation innovation with a mix of inter- and intra-organisation elements and practices required to ensure integration across the 'system' (Alter 2006; Chang, Makatsoris & Richards 2004; Fredendall & Hill 2001). Given the growing complexity and changing nature of their environment, organisations sought more analytical and practical methods for determining and managing change (Cao & McHugh 2005; Ginsberg 1988; Lang & Zangl 2008; Rahimifard & Weston 2007).

Change Practices & Support Tools

As noted, over the decades there has been an evolution of organisation change management practices aimed toward change control (Burnes 2004; Cao & McHugh 2005). Change management practices were generally linked to a program change tool (Coulson-Thomas 2008), with more sophisticated tools designed to capture both the 'objective' and 'subjective' factors of the change process (Lang & Zangl 2008). Statistics indicated the success rate of change programs questionable unless the 'objective' and 'subjective' elements were captured and analysed collectively to instigate an overall change solution (Cao & McHugh 2005; Lang & Zangl 2008). These elements form part of a change strategy initially developed by Kurt Lewin in his analysis

of social factors affecting organisation change (Carter 2008). Since then, organisation control tools such as governance or quality management system (QMS) programs were implemented to oversight enterprise compliance (Fredendall & Hill 2001) through the application of universal management best practices (Buchanan et al. 2005; Fredendall & Hill 2001). However, the majority of these control tools were too generic and merely documented instructions rather than facilitating the change process itself, while taking into account an organisation's uniqueness (Buchanan et al. 2005). Often change programs failed because they were implemented and administered in isolation of other requisite practices and with little understanding of the organisation environment and its elements (Cao & McHugh 2005). Indeed, our case participant with its state of the art change programs and control tools remained unable to meet its required challenges. In fact the Company had suffered for a number of years in its attempts to respond in a timely manner to change, resulting in inefficiencies with misalignment of its policies, processes, systems, roles and responsibilities, to name but a few. Some examples have already been shown in Table 1.

Enterprise architecture (EA) or enterprise modelling (EM), (see Watters & McGrath (2008)) for a detailed explanation of terms used), comprises an array of simulation tools and controls. EA (or EM) has been considered a key enabler of organisation optimisation since the 1970s, and more recent, adopted as an organisation change enabling practice (Bernus 2003b; Harrison & Varveris 2007; Porter & Siggelkow 2008; Weston 1998). Although EM is essentially 'systems theory' based it has failed to deliver holistic or effective change solutions. Notably, its implementation and sustainment has been considered too costly and difficult to control with EA solutions often deemed irrelevant to the problem at hand (Perks & Beveridge 2004). In addition, EA simulations have largely been applied to integration of the upper hierarchical levels of the organisation with modest attention paid to the socio-technical activities undertaken at the coal-face (Li & Williams 1994; PLAIC 2001). For similar reasons, our case participant had also failed in its attempts to implement an EA solution. These issues present similarities between the failure rate of management information system (MIS) implementations of the 1980s (Markus 1983), and the failed attempt to modernise United States (US) manufacturing companies (Majchrzak and Gasser 1991), which was largely attributed to their inability to capture and resolve socio-technical factors.

EA Methods: a brief evaluation

Notwithstanding the above, we adopted specific EM methods for the data analysis phase (see Watters & McGrath (2008) for detailed examples), namely, business process and ER models. However, investigation of EA (or EM) methods, including the more recent inclusions such as Service Oriented Architecture (SOA) and Business Process Reengineering (BPR), fell short in their ability to articulate the relationship between policies, processes, systems and human factors (Watters 2007; Watters & McGrath 2008). On the other hand, we found ER models, or similar, could accurately capture and reflect participatory organisational elements and coinciding relationships (Watters & McGrath 2008). The ER model enabled us to capture and analyse

the dependent elements within a 'system', including some socio-technical aspects. This is further discussed in the following section.

The ERD as a Change Tool

The entity relationship diagram (ERD) is generally regarded as a fundamental conceptual modelling tool, initially developed in the 1970s as a specification tool for database design (Chen, II-Yeol & Weizhong 2007). The ERD has since evolved to become synonymous with 'understanding real world phenomena' using entities, attributes, and relationships to define organisational elements and their environment (Chen, II-Yeol & Weizhong 2007). Although the ERD has been predominantly used as a systems analysis and design (SAD) tool (Burch 1992; Chen 1976; Yourdon 1989), and to simulate information flows (Bernus 2003a), the adoption of a relational modelling tool ER, or the like, to simulate organisation change has been raised previously by Mertins and Jochem (2001) through their 'computer-aided quality management system' (QMS), and the Small and Downey (2001) enterprise change model. However, Mertins and Jochem's automated QMS model is limited by its scope and depth of complexity while Small and Downey's model is conceptual rather than practical. Neither model captures the breadth nor depth of the elements nor the relationships involved in an organisation environment.

The ERD as a Decision Tool

The organisation is a socio-technical system comprised of interactive social subsystems (individuals, knowledge, skills, values etc) and technical subsystems (business processes and technologies etc) (Bostrom, Gupta & Thomas 2009). Pugh (1966) concluded that the general systems theory approach demanded the consideration of all factors within the organisation environment and that these analyses would be better served by 'empirical studies of actual decisions' as opposed to 'models derived from simulations'. In that light, our case data was derived from a change decision, which we considered could not adequately be simulated or managed using EM methods alone. Analysis of the data revealed that many factors (or elements) were affected by the change decision and that these factors interacted in multiple, complex relationships. ER modelling has been used previously to capture socio-technical (organisation subjective or soft factors) as demonstrated in (McGrath & Uden 2000), and to some extent we have represented these factors in our change schema, an approach discussed further in the section titled 'Current Research'.

A cross-organisation process flow diagram was initially used to investigate the decision to change the Company's procurement process. Data derived from the process flow diagram was then used to develop an ERD schema. The ER model enabled us to capture, comprehend and analyse the complexities and dependencies of the Company's procurement environment. The schema offered a logical approach for remediation of the gaps within the Company's existing change practices. For example we were able to categorise relationships (dependencies) between the elements impacted by the change decision; policies, processes, systems, training, etc, then apply mandatory conditions to those elements, effectively capturing

and enforcing the Company's business rules (see Watters & McGrath 2008). The significance of taking this approach meant that we could accurately gauge the depth and breadth of the change environment; even further we could identify those elements affected by the change process.

A simplified representation of these elements is shown at Figure 1. Here we illustrate the change elements; organisation, roles, responsibilities, training, policies, processes and systems, as comprising the change environment: a vital consideration in organisational change practices. Further, we breakdown those elements to the level required to identify a unique relationship or point of impact. For example, the element organisation is broken down to the unit level, policies cascade to the clause level, and systems have modules and data inputs at the change impact (transaction) point. In addition, we show that a change trigger may impact any number of change elements within a given change environment. Supplementary examples are shown at Table 2, with a more concise explanation provided in the section titled 'ERD Change Schema Enhancements'.

The Decision Support System (DSS)

According to Shafritz and Ott (1987), the context of organisation decision making continued to be the focus of organisation theorists, many of whom believed it synonymous with power, politics and authority. The authors also believed that organisation behaviour was underpinned by a prescribed paradigm framework that rendered the decision choice dependent on the existing behaviour model. A plethora of decision theories and associated decision process models have emanated from the linage of organisation theories. Quantitative and qualitative decision making tools (or DSS) were introduced in the 1950s to alleviate non-rational decision making within the organisation (Miner 1978), and more recently, to improve its ethical decision making (Mathieson 2007). The proliferation of IT from the 1970s onwards meant that DSTs could be implemented across a variety of organisations at various levels within the organisation to perform and support a range of decision making activities (Banker & Kauffman 2004; Drucker 1999). The DSS (or DST) was originally designed to provide both data and modelling assistance for semi-structured decision making, which according to Alter (2006) has evolved toward decision automation or knowledge management systems (KMS) and work systems. However, it is our view that any DSS, or the like, would be redundant if its implementation did not consider analysis of the relationships between all organisation elements (Watters 2007). This view is shared by Majchrzak and Gasser (1991), who, as previously noted, attributed the failure of many IT systems to their inability to capture and resolve socio-technical factors.

By tradition organisation change tools provided predetermined or pre-programmed statistical calculations or mathematical models based on manipulated or secondary data inputs (Miner 1978; Nickerson 1998). Nickerson (1998) described this type of analysis as 'model based' scenario building, which he saw as different to the analysis performed by DSTs. DSTs perform 'sensitivity analyses' on the reusable primary data stored in a database as opposed to the non-reusable secondary data used in model-based calculations.

However, in acknowledgement of the usefulness of mathematical models as change tools, it is our intention to explore the possibility of integrating them into our DST architecture. This body of work will be undertaken as future research. The significance of this approach will enhance the analyses and communication of the objective and subjective elements in organisation change situations.

CURRENT RESEARCH

Our organisation change schema is represented in entity-relationship (ER) form and readily transferrable into a relational database or decision support tool (DST). This is a significant factor because the DST outputs can be used to inform change agents of potential change impacts or to predict what will happen when different decisions are taken and implemented (Alter 2006; Nickerson 1998). Analysed data from the Decision Support Tool (DST) will be made available to all change agents throughout the organisation. At this stage, the data or information from the DST is presented in the form of textual query responses and reports. Standardised data formats will ensure commonality of their interpretation across the organisation, reducing the negative outcome of token formal and informal feedback loops within the organisation, which has been a major issue for our case participant. Current research has also included further tailoring of the ERD change schema to enable more effective representation of the core elements impacted by the decision to change to the Company's procurement process (Watters & McGrath 2008). The schema has been normalised to 3NF and 4NF to further rationalise the relational dependencies (Chen, 1976; Martin 1982). With the schema being translated into a DST and populated with 'real' data, it can provide automated derivation of all parties, processes, systems etc. impacted by a change initiative in query or report format.

Table 2 below presents a limited example of completed schema changes and enhanced values to effect 3NF and 4NF. When we translated the initial change schema into a relational database it was evident that the relationships were not unique to the level required for an effective DST (Watters & McGrath 2008). Normalising the database to 3NF and 4NF enabled the representation of data instances to be recorded as a single record and analysed and reported as meaningful information.

Table 2: Change Schema Enhancements

Element	Change	Value
Organisation	Levels with the organisation hierarchy have been designated as a separate element; i.e. expanded to the unit level	Relationships and activities can now be identified and managed at the appropriate level
Processes	Cascades to the lowest activity denomination; i.e. function to process to procedure to task	Relationships and activities can now be uniquely identified and managed at the appropriate level. Most transactional activity occurs at the lowest level of the process (task) but this activity is not mapped accordingly
Policies	Cascades to the lowest level of activity or interaction; i.e. sub clause or paragraph	Can identify unique dependencies through interaction at the appropriate level. Policies are generally grouped at a

		high level (if at all). Here we can derive the precise point of impact and any resultant dependencies
Systems	Identifiable in an integrated form through interfaces or modules (tools) to the lowest level of activity; i.e. data input mode (screen)	Data relationships & other dependencies easily defined at the appropriate level to enhance configuration management and re-engineering practices
Responsibility	Included as an element to resolve 'soft factors'; i.e. decision rationale	Activities linked to specific mandates to control decisions or behaviour

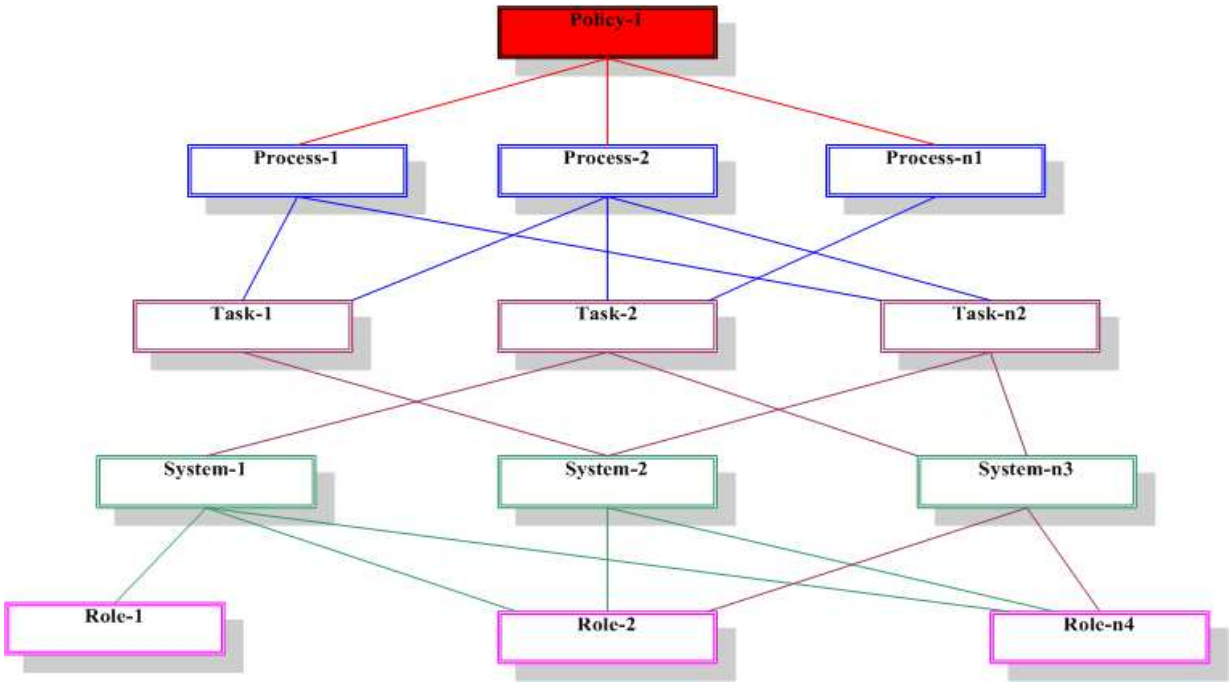
This approach is a substantial advancement on current enterprise or organisation simulation tools in that we can now accurately present the relational uniqueness between elements by drilling down to their equal and lowest point of interaction. A very simple example is that we can categorise and dissect policies to a sub-clause or paragraph level and relate it to a specific instance of a procedure or task, or even itemise it against a specific system, responsibility or role, which we demonstrate in the following section.

Change Complexity and Communication

An example of the complexity of the change management process is illustrated generically in Figure 2, titled: 'Policy Impacts – Network Representation'. Here, a change to policy, *Policy-1* impacts on the *n1* processes, *Process-1-----, Process-n1*. In turn *Process-1* is comprised of a number of tasks *(Task-1* and *Task-n2*, as identified in the diagram) and each of these must be analysed to determine if they are impacted by the policy (and subsequent process) changes. This procedure must be repeated for each policy and, moreover, analysis must be continued down through the system and role levels. Add the fact that there are also interactions at each level (e.g. a policy may impact on other policies, processes impact on processes etc) and it can easily be seen that complexity increases exponentially with the number of entity instances involved.

While our change DST does not reduce this inherent complexity it does enable us to manage it more effectively and rigorously by systematically searching the database for all 'possible' impacts, and converting the findings into a report format. Thus, the work involved in managing change is not necessarily reduced (although, it may be when one factors in recovery effort and costs) but missed impacts (and the negative consequences of these) should be greatly decreased.

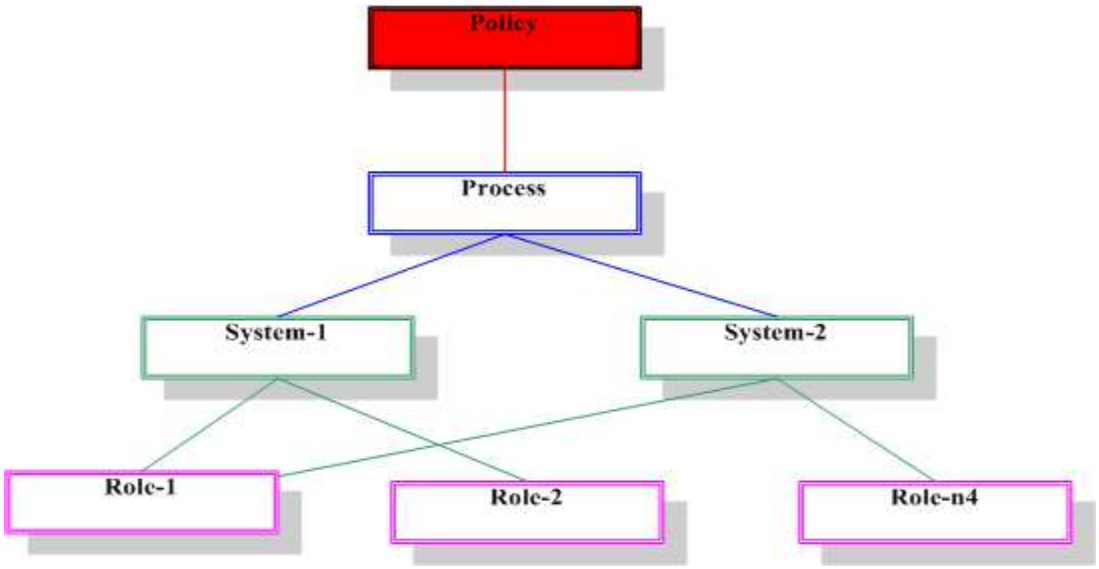
Figure 2: Policy Impacts – Network Representation



A more concrete example (drawn from our case study) is presented in Figure 3. In this instance the Government decreed that all companies governed by the Financial Management and Accountability Act (FMA Act 1997) would be required to comply with the revised Commonwealth Procurement Guidelines (CPGs), that underpinned the Government's Free Trade Agreement. Thus, individual companies (including our case participant) were tasked with implementing the new CPGs through revision of their own procurement, tendering, and contract management policies. Consequentially and, without cognisance of the fact, this had an impact on the Company's Policy-x, which stated that specific items of supply were to be procured using a particular purchasing method through authorised suppliers only. Unilaterally, it was immediately recognised that *System-y* (which was the core finance reporting system) would have to be amended to effect the CPG changes. Steps were taken to perform the necessary software maintenance, update operational manuals and to train personnel involved in key systems roles (particularly the finance, procurement & contract delegates).

However, the fact that *System-z* (the core supply system) would also be impacted was initially missed and this was not detected until sometime later after errors were detected in the data exchange between *System-z* to *System-y*. The total cost to effect the CPG changes to both the finance and supply systems was of the order of several 100 million AUS dollars with some changes unresolved that require manual workarounds. Given that this was, by no means, an isolated incident, it is readily apparent why the Company is now so concerned with improving and communicating its change management processes.

Figure 3: The Commonwealth Procurement Guidelines (CPG) Impact Assessment



According to Levasseur (2001), change communication is a vital and fundamental component of Lewin's change model. Our change DST enables the communication of change decisions in the form of textual information (reports) to all change agents or other nominated stakeholders. For example; a particular role performs a specific activity through a designated system and input screen or template, in accordance with the sub-clause of the related policy. In a change environment, if any of these elements are modified, our DST will show the associated activities that may be compromised by a change decision. The DST can readily analyse and communicate these activities using a variety of queries and textual reports. An example of our DST query is shown below at Figure 4.

Figure 4: Change Procurement Process Query

Task	Responsibility	Policy	Sub-Clause	Data Input	System
Identify Covered Procurements	Delegate	DPPI No 1/2009	02	MS0210	SDSS
Identify Covered Procurements	Delegate	DPPI No 1/2009	02	MS0582	SDSS
Identify Covered Procurements	Delegate	DPPI No 1/2009	02	MSR0035	SDSS
Identify Covered Procurements	Delegate	DPPM (6.0)	S01C102	MS0210	SDSS
Identify Covered Procurements	Delegate	DPPM (6.0)	S01C102	MS0582	SDSS
Identify Covered Procurements	Delegate	DPPM (6.0)	S01C102	MSR0035	SDSS

Here we illustrate in text format those elements; process activity (task), responsibility (role), policy and related sub-clause, input screen (data input), and system, impacted by the decision to change the Company's procurement process. In this instance the trigger was an external legislative change requiring the Company to amend its procurement policies, which it did without cognisance of repercussions to related dependencies

(elements). Another textual format in the corresponding report is shown at Figure 5. Reports and queries from the DST are made available to all change agents throughout the organisation ensuring change is widely communicated, anticipated and all socio-technical impacts understood.

Figure 5: Change Procurement Process Report

Change Procurement Process Report

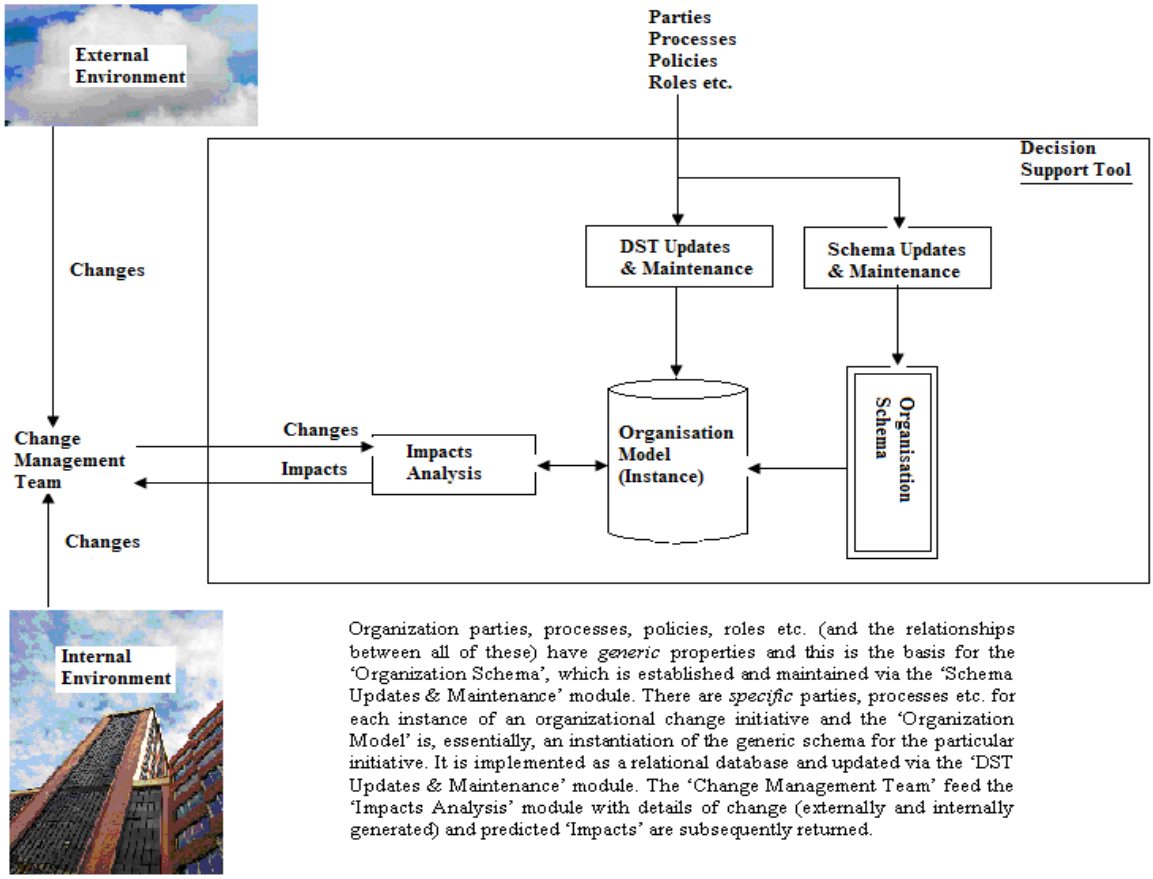
Task	Role	Policy	Sub-Clause	Data Input	System
Identify Covered Procurement	Delegate	DPPM (6.0)	S01C102	MSR0035	SDSS
				MS0582	
				MS0210	
		DPPI No 1/2009	02	MSR0035	
				MS0582	
				MS0210	

Change Decision Support Tool (DST) Architecture

Maintaining a DST as change tool will provide timely and accurate assessment of potential change impacts, and facilitate purposive rather than reactive organisation change behaviour. The architecture of our DST illustrated in Figure 6 demonstrates that organisation, parties, processes, policies etc. (and the relationships between all of these) have generic properties, which is the basis for the 'Organisation Schema'. The 'Schema' is established and maintained via the 'Schema Updates and Maintenance' module. There are specific parties, processes, policies, roles etc. for each instance of an organisational change initiative and the 'Organisation Model' is essentially, an instantiation of the generic schema for the particular initiative. It is implemented as a relational database and updated via the 'DST Updates and Maintenance' module. The 'Change Management Team' feed the 'Impacts Analysis' module with details of change (externally and internally generated) and predicted 'Impacts' are subsequently returned in the form of queries or reports as shown in Figures 4 and 5.

Maintaining a change DST will also assist with the management and identification of organisation soft factors through the inclusion and reporting of business rules (mandatory compliances) and decision making responsibilities. It is proposed that decision makers will reference the DST and assess potential change impact information with decision outcomes then guided by the DST findings. This supposition will be further explored in future research.

Figure 6: Change Decision Support Tool (DST) Architecture



FUTURE DIRECTIONS

The next research phase will be a comprehensive evaluation of the change DST against its ability to record, analyse and report on change impacts within the Company's procurement environment. The evaluation will be performed using the DST projected deliverables, which is the remediation of the Cause and Effect issues listed under the section entitled 'Case Problem', with explicit examples shown at Table 1. In addition, it is proposed that mathematical models be included in the change impact analysis to assist with scenario building in relation to change decision alternatives. Further, we will explore the DSTs ability to comprehensively identify and manage organisation 'soft factors'.

CONCLUSION

An organisation is comprised of complex elements and relationships requiring the identification, capture, analysis and communication of their uniqueness and profundity. Through our case study we have demonstrated the importance of adequately managing these complexities, particularly in an organisation change environment. Our findings have significantly advanced the practice of organisation simulation, specifically change impact. Through this paper we have presented a logical and strong argument for the adoption and benefits of using DSTs as an organisation change tool. The future direction of our research will substantially further innovation in organisational change practices.

REFERENCES

Alter, S 2006, *The Work System Method: Connecting People, Processes, and IT for Business Results*, 1st edn, Work System Press, Larkspur.

Attaran, M 2003, 'Information Technology and Business-Process Redesign', *Business Process Management Journal*, vol. 9, no. 4, pp. 440-58.

Banker, R & Kauffman, R 2004, 'The Evolution of Research on Information Systems: A Fiftieth-Year Survey of the Literature in Management Science', *Management Science*, vol. 50, no. 3, pp. 281-98.

Bernus, P 2003a, 'Enterprise Models for Enterprise Architecture and ISO9000:2000', *Annual Reviews in Control*, vol. 27, pp. 211-20.

---- 2003b, 'Introduction to Enterprise Architecture', <http://www.cit.gu.edu.au/~bernus/taskforce/geram/versions/geram1-6-3/v1.6.3.html>.

Bostrom, R, Gupta, S & Thomas, D 2009, 'A Meta-Theory for Understanding Information Systems Within Socio-technical Systems', *Journal of Management Information Systems*, vol. 26, no. 1, pp. 17-47.

Buchanan, D, Fitzgerald, L, Ketley, D, Gollop, R, Jones, J, Lamont, S, Neath, A & Whitby, E 2005, 'No Going Back: A Review of the Literature on Sustaining Organisational Change', *International Journal of Management Reviews*, vol. 7, no. 3, pp. 189-205.

Burch, J 1992, *Systems Analysis, Design, and Implementation*, Thomas Walker, Boston.

Burnes, B 2004, 'Kurt Lewin and Complexity Theories: back to the future?' *Journal of Change Management*, vol. 4, no. 4, pp. 309-25.

Cao, G & McHugh, M 2005, 'A Systemic View of Change Management and Its Conceptual Underpinnings', *Systemic Practice and Action Research*, vol. 18, no. 5, pp. 475-90.

Carter, E 2008, 'Successful Change Requires More Than Change Management', *Journal for Quality and Participation*, vol. 31, no. 1, p. 5.

Chang, YS, Makatsoris, HC & Richards, HD 2004, *Evolution of Supply Chain Management, Symbiosis of Adaptive Value Networks and ICT*, Kluwer Academic Publishers, Massachusetts.

Chen, C, II-Yeol, S & Weizhong, Z 2007, 'Trends in Conceptual Modelling: Citation analysis of the ER conference papers (1979-2005).' paper presented to 11th International Conference on the International Society for Scientometrics and Informatrics CSIC Madrid Spain, June 25-27.

Chen, PPS 1976, 'The Entity-Relationship Model – Towards a Unified View of Data', *ACM Transactions on Database Systems*, vol. 1, no. 1, pp. 9-36.

Coghlan, D & Brannick, T 2001, *Doing Action Research in Your Own Organization*, Sage Publications, London.

---- 2004, 'Kurt Lewin: The Practical Theorist for the 21st Century', *The Irish Journal of Management*, vol. 24, no. 2, p. 7.

Coulson-Thomas, C 2008, 'Leading and Managing Change', *Management Services*, vol. 53, no. 1, pp. 31-7.

Crainer, S 1998, *Key Management Ideas, the Thinkers Who Changed the Management World*, 3rd edn, Prentice Hall, Great Britain.

Creswell, JW 1998, *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*, SAGE Publications, Inc., Thousand Oaks.

---- 2003, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 2nd Edition edn, SAGE Publications, Thousand Oaks.

Daniels, HC 1994, *Information Technology: The Management Challenge*, Addison-Wesley Longman, Great Britain.

Davy, S, Barrett, K, Balasubramaniam, S, van der Meer, S, Jennings, B & Strassner, J 2006, 'Policy-based Architecture to Enable Autonomic Communications - A Position Paper ', paper presented to 3rd IEEE Consumer Communications and Networking Nevada USA, 8-10 Jan.

Drucker, P 1999, *Management: Tasks, Responsibilities, Practices*, Butterworth-Heinemann, Oxford.

Fredendall, L, D. & Hill, E 2001, *Basics of Supply Chain Management*, The St.Lucie Press/APICS Series on Resource Management, CRC Press LLC, New York.

Ginsberg, A 1988, 'Measuring and Modelling Changes in Strategy: Theoretical Foundations and Empirical Directions', *Strategic Management Journal*, vol. 9, pp. 559-75.

Harrison, D & Varveris, L 2007, 'TOGAF: Establishing Itself As the Definitive Method for Building Enterprise Architectures in the Commercial World', viewed 7 September 2007, <http://www.developer.com/design/article.php/10925_3374171_1>.

Hope, J & Hope, T 1997, *Competing in the Third Wave: The Ten Key Management Issues of the Information Age*, Harvard Business School Press, USA.

IFIP-IFAC Taskforce 1999, *GERAM: Generalised Enterprise Reference Architecture and Methodology*, IFIP-IFAC, viewed 15 November 2006, <http://www.cit.gu.edu.au/%7Ebernus/taskforce/geram/versions/geram1-6-3/GERAMv1.6.3.pdf>.

Lang, R & Zangl, J 2008, 'The Importance and Use of Analysis in Change Management', in JKR Langen (ed.), *Change 2.0*, Springer, Berlin.

Levasseur, R 2001, 'People Skills: Change Management Tools - Lewin's Change Model', *Interfaces*, vol. 31, no. 4, pp. 71-3.

Li, H & Williams, TJ 1994, *A Formalization and Extension of the Purdue Enterprise Reference Architecture and the Purdue Methodology*, 158, Purdue University, Indiana.

Louis, MR 1993, 'The Contributions of Eric Trist to the Social Engagement of Social Science', *Academy of Management Review*, vol. 18, no. 3, p. 24.

Majchrzak, A & Gasser, L 1991, 'On Using Artificial Intelligence to Integrate the Design of Organisational and Process Change in US Manufacturing', *AI & Society*, vol. 5, no. 4, pp. 321-38.

Markus, ML 1983, 'Power, Politics, and MIS Implementation', *Communications of the ACM*, vol. 26, no. 6, pp. 430-44.

Martin, J 1982, *Strategic Data-Planning Methodologies*, Prentice-Hall, New Jersey.

Mathieson, K 2007, 'Towards a Design Science of Ethical Decision Support', *Journal of Business Ethics*, vol. 76, no. 3, pp. 269-92.

McGrath, GM & Uden, L 2000, 'Capturing Softer Factors During Requirements Elicitation: A Case Study', paper presented to 5th Australian Workshop on Requirements Engineering (AWRE-2000), Brisbane, Australia, 8-9 December.

Mertins, K & Jochem, R 2001, 'Integrated Enterprise Modelling: a method for the management of change', *Production Planning and Control*, vol. 12, no. 2, pp. 137-45.

Miner, J 1978, *The Management Process: Theory, Research, and Practice*, 2nd edn, Macmillan Publishing Co, New York.

Morden, T 1996, *Principles of Management*, 1st edn, McGraw-Hill, UK.

Myers, M 2006, *Qualitative Research in Information Systems*, ed. M Myers, MISQ Discovery, viewed 6 October 2006, <http://www/qual.auckland.ac.nz/>.

Nickerson, R 1998, *Business and Information Systems*, Addison Wesley New York.

Perks, C & Beveridge, T 2004, 'A Case for Change', in *Guide to Enterprise IT Architecture*, Springer, New York, pp. 419-30.

PLAIC 2001, *A Handbook on Master Planning and Implementation for Enterprise Integration Programs*, eds TJ Williams, GA Rathwell & L Hong, Purdue University, Indiana, viewed 2 May 2007, <http://www.pera.net/Pera/Report160(1996)Handbook/PERA_Handbook.pdf>.

Porter, M & Siggelkow, N 2008, 'Contextuality Within Activity Systems and Sustainability of Competitive Advantage', *Academy of Management Perspectives*, vol. 22, no. 2, pp. 34-56.

Pugh, DS 1966, 'Modern Organization Theory: A Psychological and Sociological Study', *Psychological Bulletin*, vol. 66, no. 4, pp. 235-51.

Punch, KF 2001, *Developing Effective Research Proposals*, Essential Resources for Social Research, Sage Publications, London.

Rahimifard, A & Weston, R 2007, *Simulation Based Organisation Change in Multiple Product Assembly Systems*, Digital Enterprise Technology Perspectives and Future Challenges, Springer, US.

Ross, DF 2004, *Distribution: Planning and Control: Managing in the Era of Supply Chain Management*, Kluwer Academic Publishers, Boston.

Schmuck, R 2006, *Practical Action Research For Change*, 2nd edn, Corwin Press Inc, California.

Shafritz, J & Ott, J 1987, *Classics of Organisation Theory*, 2nd edn, The Dorsey Press, Chicago.

Small, A & Downey, E 2001, 'Managing Change: Some Important Aspects', paper presented to Change Management and the New Industrial Revolution. IEMC '01 Proceedings, New York, USA, 7-9 October.

Somekh, B 2006, *Action Research: a Methodology for Change and Development*, Doing Qualitative Research in Educational Settings, Open University Press, Berkshire.

Trist, E & Murray, H 1990, 'The Socio-Psychological Perspective', *The Social Engagement of Social Science: A Tavistock Anthology*, vol. 1, p. 625, <http://moderntimesworkplace.com/archives/archives.html>.

Watters, R 2007, 'An Enterprise Architecture Approach to Organisational Interoperability - A Discussion Paper ', paper presented to 8th International We-b Conference, VU, Melbourne, Victoria, 28-30 November.

Watters, R & McGrath, GM 2008, 'A Modelling Approach for Dependency Management: a case study', paper presented to 22nd Australian and New Zealand Academy of Management (ANZAM) Conference 2008, Auckland, New Zealand, 2-5 December.

Weston, RH 1998, 'The Importance of Holistic Model Driven Manufacturing Systems', *Proceedings of the Institution of Mechanical Engineers*, vol. 212, no. Part B, pp. 29-44.

Williamson, K 2000, *Research Methods for Students and Professionals: Information Management and Systems*, Topics in Australasian Library and Information Studies, Centre for Information Studies, Wagga Wagga.

Yin, R 1989, *Case Study Research Design and Methods*, Revised edn, vol. 5, Applied Social Research Methods Series, Sage Publications, London.

Yourdon, E 1989, *Modern Structured Analysis*, Yourdon Press Computing Series, Prentice-Hall Inc, Englewood Cliffs