# Sustainability of the Operational CBIS in SMEs: An Action Research PhD Using the CMIS Approach

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**Abstract**
Continuity Management for Information Systems (CMIS) was created as a holistic approach for evaluating success in management of the operational computer based information system (CBIS) towards continuity (sustainability). Several insights into the exploratory case application are provided as a basis for changes implemented in a planned PhD study, incorporating action research. New focuses of discovering inhibitors and motivators within SMEs, and the guidelines SMEs found useful for improvement are also introduced.

**Keywords**
action research; computer; management; continuity; soft; systemic; SME; small

## Introduction

Continuity Management for Information Systems (CMIS) was introduced last year at this conference as a holistic approach for evaluating success in management of the operational computer based information system (CBIS) towards continuity or sustainability (Himing 2002). Although this paper does revisit the CMIS concept and approach, the purpose of this paper is actually oriented to the current PhD study that commenced part-time in July. Continuing the previous work, plans for research design, and the learning achieved from the initial exploratory study are thus the focal points of this paper.

Sections in the remainder of the paper are now previewed as:

1. Background details in a similar format to last year, but citing more recent articles located via a preliminary topic analysis.
2. CMIS revisited both simplifies and adds to the explanations provided in last year's paper to provide a comprehensive overview of the concept and approach utilised in the research.

3. Exploratory study details are then provided in a somewhat different format to last year new insights provided.
4. The PhD foci announced support for an altered CMIS application in this study.
5. An overview of the PhD and the chosen action research methodology are then provided.
6. Sampling, data collection, analysis and contributions to research are then announced in separate sections, providing details of the research design and project significance.
7. Reflections then overviews lessons learnt during the exploratory study's application and how this has influenced the current PhD plan.
8. As usual, the conclusion section includes a summary and some final comments.

In essence, the article demonstrates that the planned PhD project focuses on some specific areas of literature to maximise potential benefits and outcomes relating to SMEs. Thus, the project provides the opportunity for a number of groundbreaking results.

**Background**

A computer-based information system (CBIS) involves the use of computers to support and enhance information requirements involved in the operation and management of business processes (Checkland and Holwell 1998; Parker and Case 1993). Thus, it can be seen that their use and management during day-to-day activities is at the core of business continuity – a fact that is promoted within both IS management and management texts/literature (Parker and Case 1993; Robbins, Bergman, Stagg and Coulter 2000). In today's information age, this has become even more essential. With a dynamic and competitive environment, rapid changes and small adaptations to the existing IS are required to ensure support for business operations remains up to date and that there are minimal down-times (Guimaraes 2000). However, operational costs are now escalating towards 90% of the overall IS/IT budget (Arthur 1998). This suggests that the field of operational CBIS management could benefit from contemporary research attention, both financially and business wise.

Six elements can be identified as part of a CBIS – hardware, software, telecommunications, database or data storage facilities, people, and procedures (Parker and Case 1993). Thus, management of the operational CBIS can become quite complicated. For instance, specific intricacies of the technical elements need consideration and there are well-developed literature sources available to assist in that area. However, the people element raises social aspects which receive little mention in IS management texts and literature (Orlikowski and Baroudi 2002). In fact, change management provides the most detail – usually a few pages within an eighty or more page IS management text. Yet, humans interact with all technical elements, plus establish the procedures. The area could thus benefit from further focus of human and social influences on the CBIS and its management.

Every CBIS must get their information from somewhere. This is usually via a number of sub-systems as per the tenets of systems thinking. These sub-systems may be computer-based, procedure-based, or communication/people-based (Checkland and Holwell 1998).

In addition, these subsystems constantly interact amongst each other and with the CBIS. With a technical CBIS focus, IS management texts do not emphasise this. As such, the viewpoint that results is not a systemic consideration of the whole (Gold 2001; Ryan and Harrison 2000). This means the current literature does not serve well in guidance for real life applications with managers forced to seek alternative sources for adequate coverage or employ ad hoc solutions (Finegan 2003; Warren 2003). In fact, because most of these guidelines are based on large organisations, they provide little relevance for over 97% of Australian businesses – the SMEs (ABS 2001a; McAdam 2002).

The ABS (2001b) defines small as those businesses that employ less than twenty employees, and medium relates to those with less than one hundred employees. The smaller context of SMEs means their firm characteristics are quite different to larger organisations (Meredith 1992). Associated to this smaller context are different resource limitations that arise – financial limitations with low-cost items often chosen; technical limitations caused through a lack of necessary technical knowledge and; human limitations through staff not having the skills to make necessary adjustments or knowing how to use the technology effectively (Kelley and Rice 2002; Levy, Powell and Yetton 2002). Consequently, some SMEs have experienced trouble with CBIS planning, implementation, and operations (Burgess 2002). Given that most Australian SMEs now have a CBIS (Yellow Pages Australia 2001), concerns on SMEs' ability to manage their operational CBIS successfully is a relevant and timely research topic for PhD focus.

In keeping with the concerns raised by these literature details, the CMIS concept was born as a new holistic and alternative approach of "the success of operational CBIS management within SMEs". The main tenets of CMIS link the literature concerns and demonstrates how they are addressed within CMIS.

**CMIS Revisited**

To support consideration of both social and technical aspects interacting with the CBIS, systems thinking was used (Checkland 1999). Not only is the interactions between the CBIS elements considered, but also all supporting CBIS, procedural IS and human activity systems.

When these systems principles are used to examine interactions within an organisation, quite a different viewpoint of 'management' asserts itself. Traditionally, management is said to involve the four activities of planning, organising, leading and controlling (Maidment 2002; Robbins et. al. 2000). In contrast, systemically, management actions of organising and planning create links (interactions) between processes, humans, and the organisation's physical and technical resources. Controlling relates to the managing the interactions over time to form relationships between the resources. Leading is about how human resource relationships are built and maintained – both for organisational employees and their affiliated businesses. Overall, the role of management is thus being considered as 'relationship managing and maintaining' (Vickers 1995). The CMIS concept adopts this 'soft' approach to management.

Following these soft and systemic principles, four management considerations, plus the operational activities were drawn from IS literature, particularly those relating to IS 'success'. These five areas and their interactions are provided within Figure 1. More specifically, they include:

1. Planning, design, and implementation considerations towards providing appropriate business support within the current IS set up;
2. Provision and effectiveness of support mechanisms – such as strategic alignment, critical success factors, training and participation, change management, and resource availability;
3. Planning for future considerations – such as disaster recovery, preventative/system maintenance, and replacement planning;
4. Management and implementation of operational activities – i.e. activities and change processes performed, timeliness and how managed; and
5. How feedback on all of these interactions is provided and utilised – such as quantitative measurements and monitoring, accounting figures, 'failure' indicators, and qualitative information.

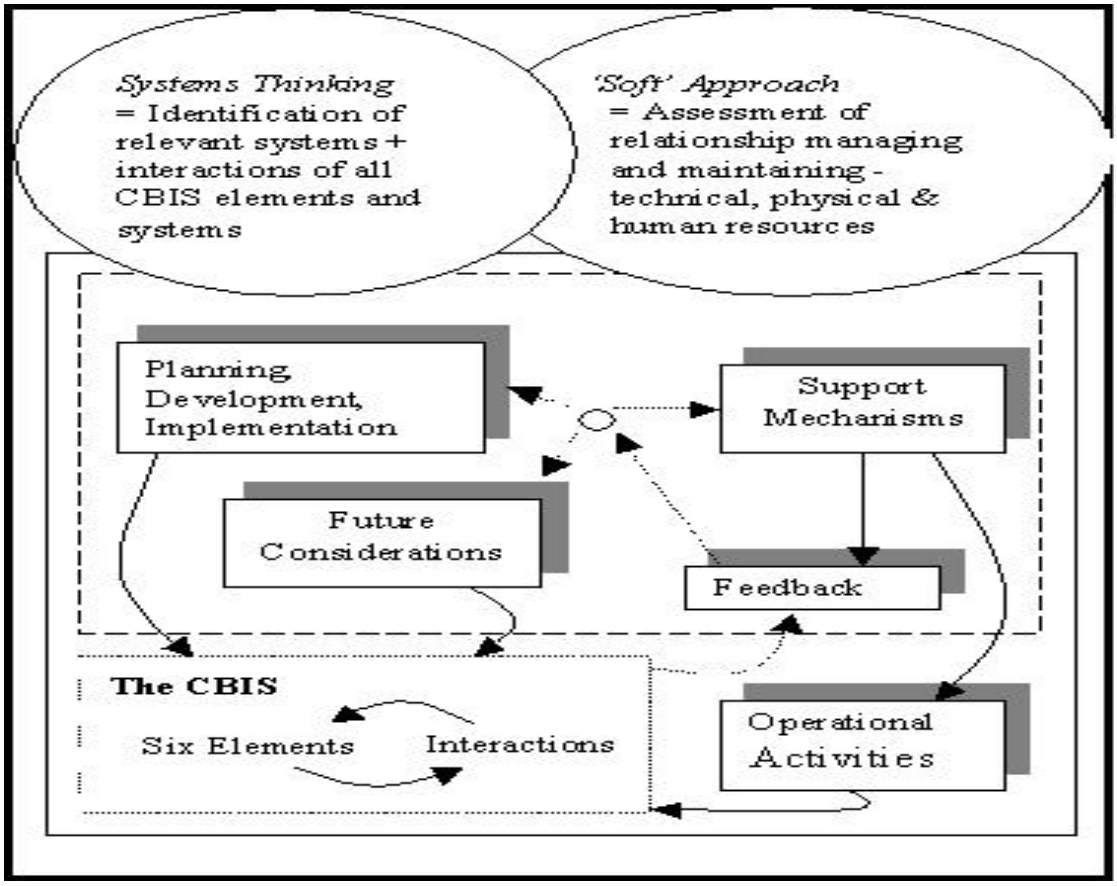


Figure 1: The CMIS Concept Simplified

The CMIS approach is the term used for the full research design protocol. This encompasses data collection documents, frameworks of reference, and outlines of how these would be used via multiple data collection methods and analysis procedures. Based on the CMIS concept, three main elements were synthesised from several different bodies of literature including IS/IT, accounting, psychology, sociology, software engineering, and management. Then used to formulate the remaining elements for the entire approach, these three elements – the activity listing, assessment principles, and the evaluation process – overview the resulting implementation process and are discussed next.

A CMIS activity listing was the first element formulated and guided most of the data collection documents. The aim of the list is to provide a comprehensive listing of relevant operational CBIS management activities and additional considerations in performance of those activities. This then acts as a guideline in application to enable sense making of what may or may not be discovered in practice, and is included as Appendix A for easy reference.

When examining how these details affect continuity, three distinct assessment principles were revealed within the literature:

1. Particular CBIS operational activities have a direct impact on continuity through the businesses ability to recover from disaster.
2. Other operational activities affect the efficiency and effectiveness of overall business operations and thus indirectly influences continuity.
3. Social construction of the operational situation is likely to affect the efficiency of activities and the overall effectiveness of management – in turn influencing the longevity or continuity of the CBIS as operational.

Evaluation of the levels of CMIS being enacted is framed as the researcher's "appreciative judgement" (Vickers 1995). The literature is used to form a "knowledge judgement" of 'what ought to be' whilst the enacted activities form the "reality judgement" of 'what is'. Similarities and differences between the literature and enacted situation; the CMIS concept; and the researcher's interpretive analysis of the enacted situation then result in the "appreciative judgement" of 'good', 'adequate', 'problematical' or 'neglected' aspects of CMIS. This then results in recommendations to assist the organisation to realise actions possible towards improvement. A pictorial representation of this process is provided in Figure 2.

Through the explanations in this section, it can thus be seen that the CMIS approach provides quite a different viewpoint than traditionally used for "The Success in Management of the Computer-Based Information System within SMEs". Further, a holistic approach oriented on management is evident. The CMIS approach was implemented via an in-depth case study in a tourism operation on the Sunshine Coast in the latter half of 2000. With between seventy (70) and eighty-five (85) employees, the organisation can be considered as a large SME by Australian definitions. Results from

this study are overviewed next, providing a basis for continued application in this area of research.

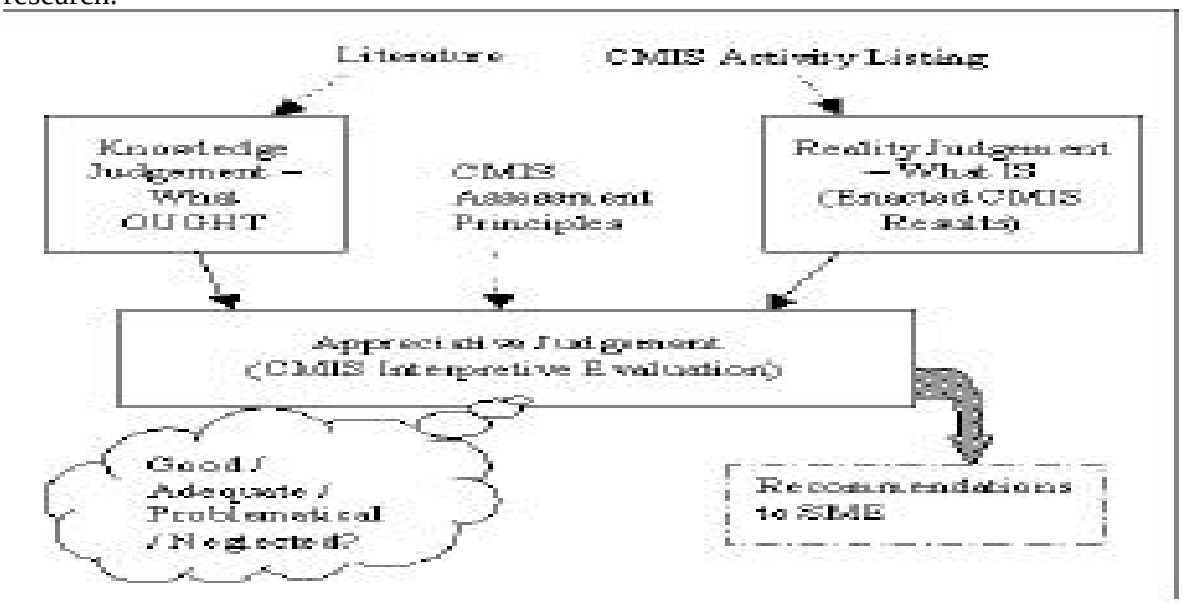


Figure 2: The CMIS Evaluation Process as per (Vickers 1995)

**Exploratory Study Revisited**

A summary of the actual situational results is provided in Appendix B. Overall, the situational CMIS was evaluated as:

1. Good levels of non-computer procedures and physical data storage;
2. Adequate utilisation of technology and formal communications to support current business requirements
3. Neglected computer-related procedures and consideration of future requirements
4. Problematical CBIS support and feedback due to:
   a. Inconsistencies in application of finance priorities
   b. Negative influence of power and control relationships

Of note, all CMIS activities were found as being largely constrained by financial resources, with many simply being ignored. Further, the level of human IT skills and knowledge was found to need attention so that an opportunity for improvement was possible if financial resource constraints were addressed.

This demonstrates that the SME resource limitations reported within the literature are still in force in today's SMEs. Thus, they may benefit from an explicit education program and guidance during actions towards improvement. CMIS offers a basis for this education and guidance if it is extended beyond the provision of feedback for the organisation. A longitudinal study could implement an explicit education program, action cycle, follow up on the learning achieved, and monitor consequential improvement actions.

**PhD Foci**

The plan is thus to refine the CMIS concept and approach into an educational program and action research study. Continued review of literature areas presently within CMIS, together with additional areas of knowledge management and activity theory is currently being explored for contributions to refinement of the CMIS concept. Some additional foci have been added though, and are elucidated upon within this section.

Rather than merely attempting to understand situation factors, the PhD seeks to create an explicit framework of inhibitors and motivators involved. The literature on SME computer management provides a number of problems arising from resource limitations (Ballantine, Levy and Powell 1998; DeLone 1988; Lees 1987; Lees and Lees 1987; Nooteboom 1988; Soh, Yap and Raman 1992; Thong 1999). Yet, there are no explicit motivators mentioned other than competitiveness. Considered as somewhat outdated, the extent that these findings still relate today is something worth pursuing.

Guidance of current inhibitors and motivators in SMEs may be obtained from recent research on Internet and E-Commerce adoption such as (Goode 2002; Gray and Van Akkeren 2002; Mehrtens, Cragg and Mills 2002; Yellow Pages Australia 2001). However, these findings are based on the particular types of CBIS, rather than the general operational CBIS management context. This project will thus explore whether those specific details relate in this wider context.

A major inhibitor mentioned for years in SME research literature is the inappropriateness of existing guidelines for SMEs, for example Ghobadian and Gallear (1996); Lyytinen (1987); and McAdam (2000, 2002). Due to its promotion, this will be considered separately to other inhibitors and motivators in the research project.

**A PhD by Action Research**

The title of the accepted PhD provisional candidature is presently "Successful Management of SME Operational Computer-Based Information Systems – An Action Research Study of Motivators and Inhibitors". Essentially the PhD intends to continue refinement of the CMIS concept, and require major adaptations of the methodology for application. This first area is covered in one paragraph before the remainder of this section discusses methodology adaptations planned, reasoning, and data collection plans.

A framework of explicit motivator and inhibitors will be revealed via the aforementioned literature review. Lists of guidelines and assistance avenues available, and the type of services offered in each will also be added. By continued review of the literature areas already included in the CMIS concept, the CMIS will also be updated. A notable amendment will arise from the recent movement in IS success literature to consideration of social aspects. Further, additional areas of knowledge management and activity theory will add to both the social and systemic principles/details within the CMIS concept.

The research questions have been tentatively formed to reflect orientation on inhibitors and motivators, guidelines, and the results of guided action. In keeping with the human

and social aspects, and interpretive epistemology will be used (Neuman 2003). Action research is the chosen methodology, as explained next.

One particular methodology is often reported as supporting action or intervention in a complex social system – that of action research (Baskerville 1999; Jonsson 1991). It differs from consultancy in that action research is concerned with creating organisational change and studying that process simultaneously (Avison, Baskerville and Myers 2001), whereas consultancy only does the former.

A main tenet of action research (AR) is the wish to "do good" (McKay and Marshall 1999) and improve or enhance the situation. This requires careful attention not to cause inadvertent harm. One particular mode of AR is well reported within the literature as providing social and cultural considerations, which emphasises the principle of assisting rather than harming. Further, the researcher acts as a facilitator rather than collaborator or expert (Baskerville and Wood-Harper 1998). This is the soft systems methodology (SSM) mode of AR as per Checkland and Scholes' (1999).

An additional feature of this mode of AR is that there are set steps to form guidance for application which practitioners have found relevant and practical in application (Checkland 2000). Further, there is constant reflection of the framework of ideas, methodology / research design, and application situation (McKay and Marshall 1999; West and Stansfield 2001). An attractive aspect is that via consideration of different world-views, SSM mode of action research also allows communication across groups (Hindle, Checkland, Mumford and Worthington 1995). With a relatively strong following, several researchers have also created additional communication tools using SSM tenets, including Ledington and Ledington's (1999) expected, desired, importance (EDI) framework.

The SSM mode of AR has thus been chosen for suitability to the chosen epistemology, the additional features, and alignment with the goals of this project. It is also expected that firm guidance for application and analysis will be feasible.

**Sampling**

Action research requires an in-depth analysis of each situation researched. With a sequence of actions within each situation considered as optimal for research (Kock, McQueen and Scott 1997), a longitudinal study has been chosen for this project. Where it is feasible, results will extend over a twelve-month post action period, or at least six-months post action. This means that the sample should be small enough to allow for time limitations, but sufficiently large to demonstrate transferability and allow cross-situation comparisons. Although five cases are preferable as per (Yin 1994), the extra time action research takes means only three situations is feasible. This means that greater attention is required in the selection process of the participant situations so there are no problems caused by drop out of an organisation or a difficult collection situation. The selection paragraph in this section and preliminary data collection procedures address these issues.

The scope of the topic interest is Australian SMEs. Because of the systemic and people considerations, the SMEs selected are required to have a number of work areas that interact in some form with the CBIS. With the relatively large amount of time obligations involved in accepting participation, it is expected that the firms will have to be sufficiently large to continue normal business operations while participants are busy with the research project. Thus, businesses with between fifty (50) and one hundred (100) employees should allow for both of these requirements, whilst still being classified as a SME. Having similar sizes will also assist confirmability of cross-situ analyses.

To cater for the two main research sampling requirements as above, one particular business type has been selected for focus – that of "tourist attractions". With a mix of accounting, promotion, retail, food, exhibits, and entertainment, it is expected that this business type will provide sufficient similarities for transferability of some findings into other business types. Some focus on tourism CBISs has been located already to provide further background for instrument design, albeit with a focus on promotion (Carlsen 1999) or customer management systems (Office of National Tourism 1996). As an industry nationally promoted, government sponsorship of research is also feasible.

Occurrences of this type of business provide a geographical spread and sufficient numbers, so that there is a sufficient population to draw upon. A comparison of metropolitan (one case) versus rural settings (two cases) is also possible. As the businesses are founded on similar principles and operate within a relatively standard set of government regulations, selection of one particular state or territory (that is, Queensland) should still provide sufficient transferability of findings to other Australian settings.

Selection of actual participants will consider the above factors and research tenets encompassed within a selection criteria document. Research via business home pages on the Internet will be undertaken first for sheer convenience of the background details achieved through this medium. Each candidate business will then be contacted and the research overview document provided. If interest is expressed, in-person meetings with the gatekeeper and manager of the candidate businesses will ascertain the depth of commitment to the research tenets and create initial rapport. Only if the researcher is certain of commitment and that social/political are conducive to the research will they be elevated to a prospective participant classification. Final selection will be from those prospective participants based on possible similarities and diversity in cross-case analyses, in addition to the sought metropolitan/regional comparisons.

Triangulation of data sources is sought within this project to enhance confirmability (Mathers and Huang 1998). Three to five work areas are considered a minimum and will be selected purposively to ensure the required variation of interaction with the CBIS is obtained. At least three participants, if not five or more to allow for maturation effects where staff leave the organisation during the study period (Cavana, Delahay and Sekaran 2001), will be the size of the sample for each work area within an organisation. A majority of data collection uses this sample size.

Participants will be allowed to self-nominate for a joint decision team used in stage 2 of data collection in keeping with this research's tenet of voluntary participation. Positions available on this team will reflect at least each work area, different types of computer users, plus key management personnel.

**Data Collection**

Triangulation of data methods is achieved in this project, with particular data collection methods chosen to suit the collaborative emphasis, the data provided by that method, and optimal time spent in data collection. Primarily using focus groups and joint decision teams, there are also in-depth interviews, document analysis, observation, questionnaires, and Delphi techniques to create a consensus of actions to be involved in the study.

In addition to using these different methods at different stages of the project, different instruments are utilised. This includes the educational package, application package, a constant SME operational CBIS management evaluation questionnaire for each type of CBIS user group, plus an additional questionnaire that differs according to stage.

Each stage is comprised of several activities, and allows several visits at one or two hours participant involvement each time. It should be noted that the only times the researcher intends to act in the expert role is when providing explanations, performing document analysis, or performing observations. For the majority of participant interaction, the researcher is merely a facilitator in keeping with the SSM tenets.

So, what are these stages?

1. Preliminary data collection ensures researcher understanding of the business. Further, support by all managerial staff involved must be evidenced. Doubts will result in alternative organisational selections.
2. Stage 1 educates participants on CMIS tenets, completes survey 1 for initial evaluations of CMIS, and involves the Delphi process for deciding actions for inclusion in the study, plus joint team members that will steer the action processes. In addition, management and support staff will complete the questionnaire relating to guidelines.
3. Stage 2 then plans implementation of actions and monitors the results of implementation via the joint decision team.
4. Stage 3 involves preliminary evaluations of action results, collaborative processes, and instruments via questionnaire. Survey 2 for revised CMIS evaluations is also obtained, before withdrawal of researcher.
5. Stage 4 is a review meeting two (2) months post action for informal discussions relating to points from stage 3.
6. Stage 5 is a review meeting six (6) months post action of the same nature.
7. Stage 6 is the final contact before pre-publication processes and held twelve (12) months post action. It includes completion of Survey 3 for final CMIS evaluations, and a questionnaire evaluation action results, research design, and the project.

**Analysis**
A number of techniques - both qualitative and quantitative - are used in analysis. They have been grouped within the discussions here.

Predominantly there will be statistical analyses on each evaluation survey/questionnaire to establish the mean, mode, distribution, variance, and outliers for each focus group and overall. Further, tests of significance will be performed on consequential evaluations.

Delphi techniques also play a major role in stage 2 of data collection, and will involve three rounds of ordering to assist in selection of actions for inclusion in the study. An analysis of similarities and differences in ordering between rounds will also be made for discourse purposes.

Content analysis will also play a predominant role. Prose comments arising from evaluations, questionnaires, interview transcripts, focus group transcripts, joint decision team transcripts, feedback meetings, review meetings, and observation notes will be coded using a qualitative software package, probably NVivo. Document analysis and observations are also included.

There will also be constant reflection of the social and political influences on the results, the results themselves, the framework of ideas, the methodology, and research design elements facilitated by the steps within SSM mode of AR.

**Contributions to Knowledge**
Contributions and benefits provided via this project arise in five areas:

1. Participant organisations via improved SME operational CBIS management.
2. Academia via the new approach, results, and study findings.
3. Government via the development of the educational package to comprise part of the research design. This may be used to promote and inform about successful SME operational CBIS management.
4. SME businesses via a higher profile of their requirements and assistance available.
5. General community via the flow on effect of continuity and improved SME operational CBIS management.

While the organisation benefits financially and intangibly via improved SME operational CBIS management, the individual staff-members should also benefit. Improved communication between stakeholder groups; increased assurance of job prospects resulting from improved continuity; and increased job satisfaction are expected.

Academia will benefit from concentrated effort in an area of little research attention providing current results; the provision of an alternative framework for investigation in the area; unveiling of the inhibitors, motivators, and guidelines involved; and a methodology for other researchers to consider using in future applications.

SME businesses should benefit from the planned government sponsorship of the project. In addition to the above stated benefits, access to the educational package provides a foundation for them to work from. In addition, planned dissemination of findings in both management and SME journals will heighten the general awareness of these issues, plus provide insight into similarities to their own situation. Widespread action towards SME operational CBIS management improvement is thus feasible.

**Reflections**

The only elements of the original CMIS approach that were discussed in this paper were those that warranted continued use after testing in the exploratory case study. A number of lessons were learnt about the research process, and particularly about the use of qualitative methods, during that earlier application. As a result, a number of the details articulated here have been influenced by those lessons. These are now overviewed, whilst more details can be located in (Himing 2003).

Importance of the role of gatekeeper cannot be under-emphasised. In reality, there are usually a series of gatekeepers – each with the power to stop or alter the usability of the results obtained. The exploratory case study revealed an early misunderstanding of the scope of the project that resulted in blockage of access to IS vendors contracted by the organisation. Thus this project places a lot of emphasis on meetings with gatekeepers and management staff as early as possible. The aim is twofold: to ensure understanding and support is substantial; and that social/political aspects will not influence the quality of data collected via biases or unresponsive participants.

When using interviews as the major data collection technique in a customer-oriented organisation, it is necessary as a researcher to accept last minute rescheduling. A significant amount of time was lost by such instances in the exploratory case study. Further, the sheer time involved in creating the full interview transcripts and context analysis by hand was extremely cumbersome. Thus this project seeks to use data collection techniques that ease the time involved in both collection and analysis – focus groups, surveys and questionnaires. A qualitative software program is also being used to aid this factor.

One of the major lessons for this researcher was about facilitating tracking of details throughout the different stages and elements so that discourse provides credibility. To this end, the part-time schedule allows some twelve months for first outlines of creation through to completed refinement of the instruments to be used throughout the data collection and analysis. Even by full-time standards, it has been tentatively scheduled to last three months. It is hoped that by spending significant time attending to possible research limitations, emergency changes should be minimal and later analysis and discourse stages relatively simple to complete.

**Conclusions**

This paper has revisited the area of CMIS, providing some new insights on development since the original application in an exploratory case study. Expected outcomes and

processes involved in the literature review and research design are also articulated. In particular, the choice of SSM mode of AR was shown to be relevant and appropriate to the research area. Of note, several areas for contributions to knowledge were demonstrated, including for participant organisations, academia, government, SME businesses, and the general community. A well thought out "plan of attack" has been demonstrated, particularly given that the researcher only commenced part-time studies in July. From the details shown here, we can look forward to hearing further details about successful progress and findings in the years to come.

**References**


ABS (2001a) *Business Use of Information Technology Australia 2000-2001*, Australian Bureau of Statistics. http://www.abs.gov.au/ausstats/ABS%40.nsf/b06660592430724fca2568b5007b8619/9c7742890adec989ca2568a900139423!OpenDocument [Accessed: 15 May 2001].

ABS (2001b) *Small Business in Australia Update 1999-2000*, Australian Bureau of Statistics. http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/Lookup/13977C904ADE6169CA256A3E00017BCA/$File/1321040001_2000.pdf [Accessed: 24 May 2001].

Arthur, L. J. (1998) *Software Evolution: The Software Maintenance Challenge*, New York: John Wiley & Sons.

Avison, D. E., Baskerville, R. and Myers, M. (2001) "Controlling Action Research Projects", *Information Technology & People*, 14 (1), pp. 28-45.

Ballantine, J., Levy, M. and Powell, P. (1998) "Evaluating Information Systems in Small and Medium-Sized Enterprises: Issues and Evidence", *European Journal of Information Systems*, 7 (4), pp. 241-251.

Baskerville, R. and Wood-Harper, A. T. (1998) "Diversity in Information Systems Action Research Methods", *European Journal of Information Systems*, 7 pp. 90-107.

Baskerville, R. (1999) "Investigating Information Systems with Action Research", *Communications of the AIS*, 2 (3), pp.

Burgess, S. (2002) *Managing Information Technology in Small Business: Challenges and Solutions*, Hershey: Idea Group Pub.

Carlsen, J. (1999) "A Systems Approach to Island Tourism Destination Management", *Systems Research and Behavioral Science*, 16 (4), pp. 321-327.

Cavana, R. Y., Delahay, B. L. and Sekaran, U. (2001) *Applied Business Research: Qualitative and Quantitative Methods*, Milton: Wiley.

Checkland, P. B. and Holwell, S. (1998) *Information, Systems, and Information Systems*, Chichester: Wiley.

Checkland, P. B. (1999) "Soft Systems Methodology: A 30 Year Retrospective", in Scholes, J. (Eds.), *Soft Systems Methodology in Action*, Chichester: John Wiley. pp. A1-A66.

Checkland, P. B. and Scholes, J. (1999) "Soft Systems Methodology and Action", in (Eds.), *Soft Systems Methodology in Action*, New York: Wiley. pp. 1-10.

Checkland, P. B. (2000) "The Emergent Properties of SSM in Use: A Symposium of Reflective Practitioners", *Systemic Practice and Action Research*, 13 (6), pp. 799-823.

DeLone, W. H. (1988) "Determinants of Success for Computer Usage in Small Business", *MIS Quarterly*, 12 (1), pp. 51-61.
Finegan, A. D. (2003) "Wicked Problems, Organisational Complexity and Knowledge Management: A Systems Approach", *The Third International Conference on Knowledge, Culture and Change in Organisations*, Penang, August 11-14. http://managementconference.com/ProposalSystem/Presentations/P000026 [Accessed: 12 September 2003].
Ghobadian, A. and Gallear, D. (1996) "Total Quality Management in SMEs", *OMEGA*, 24 (1), pp. 83-93.
Gold, J. (2001) "Storying Systems: Managing Everyday Flux Using Mode 2 Soft Systems Methodology", *Systemic Practice and Action Research*, 14 (5), pp. 557-573.
Goode, S. (2002) "Management Attitudes Toward the World Wide Web in Australian Small Businesses", *Information Systems Management*, 19 (1), pp. 45-48.
Gray, D. and Van_Akkeren, J. (2002) "An Exploratory Study of the E-Commerce Experiences of Real Estate Agencies Guided by Checkland's F, M & A Framework", in Ledington, P. W. J. and Ledington, J. (Eds.), *Proceedings of the 8th Australian and New Zealand Systems Conference*, Mooloolaba, Queensland, December 10-12.
Guimaraes, T. (2000) "The Impact of Competitive Intelligence and IS Support in Changing Small Business Organizations", *Logistics Information Management*, 13 (3), pp. 117-125.
Himing, T. L. (2002) "Towards a Systems Approach in Continuity Management for Information Systems (CMIS)", in Ledington, P. W. J. and Ledington, J. (Eds.), *Proceedings of the 8th Australian and New Zealand Systems Conference*, Mooloolaba, Queensland, December 10-12.
Himing, T. L. (2003) "Discovering Research on the Management of the Operational Computer-Based Information System within Small to Medium Enterprises: Reflections and Future Directions", *Women in Research (WiR)*, Rockhampton, 13-14 November.
Hindle, T., Checkland, P., Mumford, M. and Worthington, D. (1995) "Developing a Methodology for Multidisciplinary Action Research: A Case Study", *Journal of the Operational Research Society*, 46 (4), pp. 453-465.
Jonsson, S. (1991) "Action Research", in Nissen, M. E., Klein, H. K. and Hirschheim, R. (Eds.), *Information Systems Research: Contemporary Approaches and Emergent Traditions*, Proceedings of the IFIP TC8/WG 8.2 Working Conference on the Information Systems Research Arena of the 90's Challenges, Perceptions and Alternative Approaches, Copenhagen, Denmark, Dec 14-16, 1990. Amsterdam: North-Holland.
Kelley, D. J. and Rice, M. P. (2002) "Leveraging the Value of Proprietary Technologies", *Journal of Small Business Management*, 40 (1), pp. 1-16.
Kock, N. F., Jr., McQueen, R. J. and Scott, J. L. (1997) "Can Action Research be Made More Rigorous in a Positivistic Sense? The Contribution of an Iterative Approach", *Journal of Systems and Information Technology*, 1 (1), pp. 1-24.
Ledington, P. and Ledington, J. (1999) "Extending the Process of Comparison in Soft Systems Methodology", *Journal of the Operational Research Society*, 50 (11), pp. 1149-1157.

Lees, J. D. (1987) "Successful Development of Small Business Information Systems", *Journal of Systems Management*, 38 (9), pp. 32-39.
Lees, J. D. and Lees, D. D. (1987) "Realities of Small Business Information System Implementation", *Journal of Systems Management*, 38 (1), pp. 6-13.
Levy, M., Powell, P. and Yetton, P. (2002) "The Dynamics of SME Information Systems", *Small Business Economics*, 19 (4), pp. 341-354.
Lyytinen, K. (1987) "Different Perspectives on Information Systems: Problems and Solutions", *ACM Computing Surveys*, 19 (1), pp. 5-46.
Maidment, F. H. (Eds.), (2002) *Annual Editions: Management*, 10th edn. Connecticut: McGraw-Hill/Dushkin.
Mathers, N. and Huang, Y. C. (1998) "Evaluating Methods for Collecting Data in Published Research", in Crookes, P. A. and Davies, S. (Eds.), *Research into Practice*, Edinburgh: Balliere Tindall. pp. 131-161.
McAdam, R. (2000) "The Implementation of Reengineering in SMEs: A Grounded Study", *International Small Business Journal*, 18 (4), pp. 29-45.
McAdam, R. (2002) "Large Scale Innovation - Reengineering Methodology in SMEs: Positivistic and Phenomenological Approaches", *International Small Business Journal*, 20 (1), pp. 33-52.
McKay, J. and Marshall, P. (1999) "2 x 6 = 12, or Does It Equal Action Research?", *Proceedings of the 10th Australasian Conference on Information Systems*, Wellington, December 1-3, pp. 597-609. http://www2.vuw.ac.nz/acis99/Papers/PaperMcKayMarshall-129.pdf [Accessed: 14 November 2002].
Mehrtens, J., Cragg, P. B. and Mills, A. M. (2002) "A Model of Internet Adoption by SMEs", *Information & Management*, 39 (3), pp. 165-176.
Meredith, G. G. (1992) *Small Business Management in Australia*, 4th edn. Sydney: McGraw-Hill.
Neuman, W. L. (2003) *Social Research Methods: Qualitative and Quantitative Approaches*, 5th edn. London: Allyn and Bacon.
Nooteboom, B. (1988) "The Facts about Small Business and the Real Values of its 'Life World'", *American Journal of Economics and Sociology*, 47 (3), pp. 299-314.
Office of National Tourism (1996) *Projecting Success: Visitor Management Projects for Sustainable Tourism Growth*, Canberra, AGPS.
Orlikowski, W. J. and Baroudi, J. (2002) "Studying Information Technology in Organizations: Research Approaches and Assumptions", in Myers, M. D. and Avison, D. (Eds.), *Qualitative Research in Information Systems: A Reader*, London: Sage Publications.
Parker, C. and Case, T. (1993) *Management Information Systems: Strategy and Action*, 2nd edn. Watsonville, California: McGraw Hill.
Robbins, S. P., Bergman, R., Stagg, I. and Coulter, M. (2000b) *Management*, 2nd edn. Frenchs Forest: Prentice Hall.
Ryan, S. D. and Harrison, D. A. (2000) "Considering Social Subsystem Costs and Benefits in Information Technology Investment Decisions: A View From the Field on Anticipated Payoffs", *Journal of Management Information Systems*, 16 (4), pp. 11-40.

Soh, C. P. P., Yap, C. S. and Raman, K. S. (1992) "Impact of Consultants on Computerization Success in Small Businesses", *Information & Management*, 22 (5), pp. 309-319.
Thong, J. Y. L. (1999) "An Integrated Model of Information Systems Adoption in Small Businesses", *Journal of Management Information Systems*, 15 (4), pp. 187-214.
Vickers, G. (1995) *The Art of Judgement: A Study of Policy Making*, Centenary edn. Thousand Oaks: Sage.
Warren, L. (2003) "Towards Critical Intervention in Small and Medium-Sized Enterprises: A Case Study", *Systemic Practice and Action Research*, 16 (3), pp. 197-211.
West, D. and Stansfield, M. (2001) "Structuring Action and Reflection in Information Systems Action Research Studies Using Checkland's FMA Model", *Systemic Practice and Action Research*, 14 (3), pp. 251-281.
Yellow_Pages_Australia (2001) *Yellow Pages Business Index Small and Medium Enterprises: Survey of Computer Technology and E-Commerce in Australian Small and Medium Businesses*, Melbourne: Yellow Pages Australia.
Yin, R. K. (1994) *Case Study Research Design and Methods*, 2nd edn. London: Sage Publications.

## Appendix A: SME CMIS Activity Listing

| *Element* | *Category* | *Strategies/Activities/Considerations* | |
|---|---|---|---|
| People | Management<br>Administrative<br>Operational<br>Internal Support Operations<br>External Support Operations | Work hours<br>Pay<br>Training<br>Participation<br>Satisfaction | |
| Communications | Telecommunications | Use of Email, fax, phone, LAN/intranet. | |
| | Formal Communications | Circulation and format of letters, memos, and forms | |
| | Informal Communications | Verbal + body language in communication exchange<br>Power and control relationships | |
| Hardware | Computer Hardware | Printers, PCs, Server | Physical maintenance and monitoring devices or measurements |
| | Administrative Hardware | Photocopier, fax & others | |
| | Operational Hardware | All operational equipment | |
| Software | Office Suites<br>Specialised Software<br>Operational Software | What version<br>What used for what<br>Who performs changes | |
| Procedures | Formal Policies | Health & Safety, Organisational | |
| | Normal Procedures | Section operations<br>Chain of command<br>Work station security measures | Retail, Accounting specifics<br>Documentation, forms |
| | CBIS Normal Procedures | Audit reviews<br>Scandisk, defrag, other systems checks or maintenance<br>Anti-virus measures | Location of relevant manuals<br><br>Computer security measures |
| | CBIS Analysis / Expense Procedures | Vendor choice / in house operations<br>Suggestions change, upgrades, problems etc.<br>Procedures for enacting changes | |
| | Informal Procedures | What procedures done informally or circumvented by informal means | |
| Data Storage | Software Database | What kind (RDBMS & If so, Interfaced?)<br>Designed properly? | <br>Functions used |
| | Computerised Data Storage | Backups | File cleanups |
| | Administrative Data Storage<br><br>Operational Data Storage | How organised<br>Instructions<br>Others follow? | |

## Appendix B: SME CMIS Results Snapshot

| *Element* | *Category* | *Strategies/Activities/Considerations* |
|---|---|---|
| People | Management<br>Administrative<br>Operational<br>Internal Support Operations<br>External Support Operations | Work hours<br>Pay<br>Training<br>Participation<br>Satisfaction<br>❖ All have different influencing factors |
| Communications | Telecommunications | Email, fax, and phone for preliminary communication.<br>Organisational Internet site only became operational during data collection period.<br>Internet infrequently used for searches. |
| | Formal Communications | Confirmatory and legal matters always by letters, memos and forms.<br>Circulation to relevant staff + general notice board. |
| | Informal Communications | Differences between verbal communication and body language by some power-holders.<br>Influence of power and control relationships. |
| Hardware | Computer Hardware | No maintenance on printers, PCs, and server unless problem warrants vendor attention.<br>No monitoring or measurements employed. |
| | Administrative Hardware | Photocopier and fax maintenance regular by vendors. |
| | Operational Hardware | Operational equipment maintenance differs. |
| Software | Office Suites<br>Specialised Software<br>Operational Software | Different versions of office and publishing suites<br>Specialised software allows little adaptation and report building facilities.<br>Limited changes to spread sheeting facilities.<br>No other change operations. |
| Procedures | Formal Policies | Health & Safety, Organisational Policies differ in places but well documented and disseminated. Health & Safety strictly adhered to. |
| | Normal Procedures | Retail, Accounting, and Section operations well documented and disseminated.<br>Chain of command strictly adhered to.<br>Documentation and forms regularly reviewed and adapted. |
| | CBIS normal procedures | Tenuous location of relevant manuals, mostly outdated.<br>No details available for network connection order or layout.<br>No audit of IS discovered.<br>No systems check or maintenance programs used.<br>No anti-virus measures or security setup. |
| | CBIS analysis/expense procedures | Vendor choice through recommendation + service delivery.<br>Most activities hugely limited by financial resources.<br>Suggestions, change and upgrades – differences influenced by power and control relationships.<br>Major problems resolved by vendor. |
| | Informal procedures | Some procedures performed informally. |

| *Element* | *Category* | *Strategies/Activities/Considerations* |
|---|---|---|
| Data Storage | Software database | RDBMS.<br>Not Interfaced.<br>Mail listing function only.<br>No search facilities built in, but not required considering functions used. |
| | Computerised data storage | Tenuous backups.<br>Infrequent file cleanups. |
| | Administrative data storage<br>Operational data storage | Organised by requirements and regularly reviewed/adapted<br>Instructions located within relevant area.<br>Others advised where to locate details, with relevant persons receiving training. |