



Interactive information consulting system for South African small businesses – Part 1

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Contents

1. [Introduction](#)
2. [Theoretical background](#)
3. [Methodology](#)
 - 3.1 [Research design](#)
 - 3.2 [Population and sample](#)
 - 3.3 [Instrumentation](#)
4. [Report on intervention design](#)
 - 4.1 [System requirement specifications](#)
 - 4.2 [CONSIT: the concept](#)
 - 4.3 [CONSIT: the system](#)
5. [Summary](#)
6. [References](#)

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1 Introduction

The small business (SB) sector makes a valuable contribution to the economic development in South Africa. Research indicates that the SB sector contributed 53.9% to formal private sector employment and 34.8% to the total domestic gross product in 2001; small businesses form 98% of the total business population in South Africa (South Africa. Department of Trade and Industry 2001).

Despite the dynamics of the SB sector, it faces high failure rates in the first three years of existence. In South Africa, this failure rate is somewhere between 70 and 80 per cent, costing the South African economy millions (Barron 2000:1; Streek 2001:41). SB failures are due to internal factors such as managerial incompetence, a lack of managerial experience, inadequate planning and poor financial control. Research by Gaskill, Van Auken and Manning (1993), Pickle and Abrahamson (1990), and Scarborough and Zimmer (1994) supports these findings. The SB also exists in a hostile external environment containing legal and regulatory constraints, access to finance is limited and it operates within a global environment characterized by intensified competition (De Villiers 1997:82; Goodall 2000a:15; Goodall 2000b:2).

Information technology (IT) provides benefits to the SB, including gains in efficiency and business performance, increased managerial competence and the provision of information to increase flexibility and responsiveness to the external environment. The optimal use of IT with its inherent benefits can assist in driving the SB from the spectre of failure past mere survival and into growth for ultimate success. However, despite high IT usage by the SB and the benefits offered by IT, SB owner-managers are failing to adopt IT as effectively as their larger counterparts and, therefore, fail to exploit the benefits to the extent that they should. The reasons for this are as follows:

- Lack of general knowledge of computers
- Lack of expertise to computerize the SB
- Lack of financial resources
- Inability to identify the small firms' business information needs, resulting in the mismatching of information needs to IT requirements
- Failure to integrate strategic and operational management practices; small firms use IT predominantly for operational issues to increase efficiency and exclude strategic issues that promote growth and improved performance
- Reliance on outside sources (computer consultants and vendors). This reliance is associated with the problem of finding reliable, cost-effective independent advice that will attend to a SB IT problem and the presence of unscrupulous vendors and consultants concerned primarily with furthering their own gains
- There is no formal affordable means that exist to assist the SB in deciding what IT should be used where, when or how, for effective acquisition and application of computer power.

Research has indicated the existence of a positive and significant relationship between the capabilities of IT and the effective adoption thereof and business performance. Profit ratios are higher, operating expenses to sales are lower, and there is a reduction in client debts and improved access to information (Bharadwaj 2000:186; Dun and Bradstreet, cited in Doescher 1999). Research further indicates that systematic and greater planning sophistication has a positive effect on the financial performance and success of the SB (Gaskill et al.1993:23; Kent 1994:47; Robinson and Littlejohn 1981:47; Rue and Ibrahim 1998:32).

In the context of the above-mentioned situation, the main purpose of this research study was to design an intervention, the Interactive Information Consulting System, for small businesses in South Africa, and to implement the system into the SB to improve performance. The Interactive Information Consulting System had to be a stand-alone tool that should improve performance through the combination of effective management principles and a well-planned optimal use of IT to overcome the afore-stated problems.

The following were the specific objectives of the study:

- Review of the literature addressing the problem in terms of the nature of the SB, IT and consulting.
- Design of the Interactive Information Consulting System.
- Implementation of the Interactive Information Consulting System into small businesses.
- Evaluation of the Interactive Information Consulting System to determine its performance and the degree of performance improvement achieved in the SB as a result of intervention implementation.

Owing to the size and complexity of the study, a discussion of the design and development of a computerized information system (intervention) is emphasized in this article.

[top](#)

2 Theoretical background

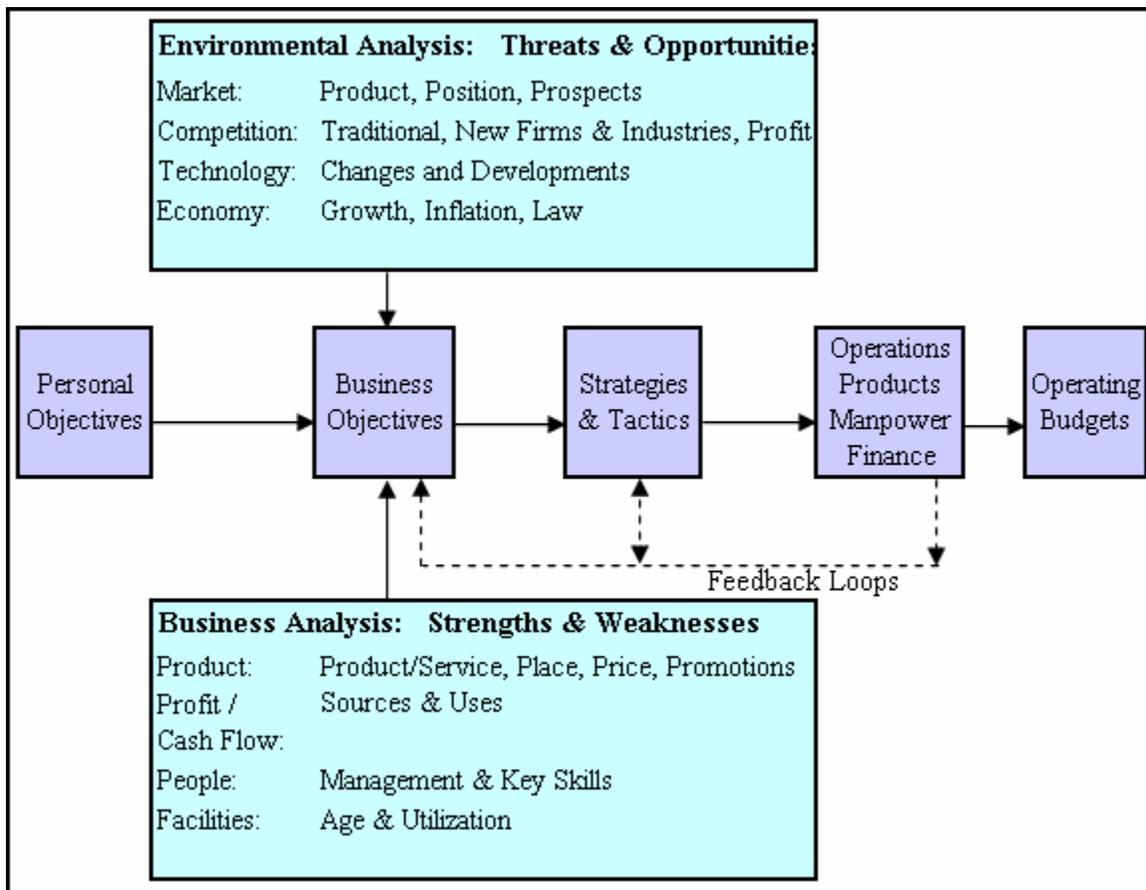
The design of the intervention had to address the nature of the SB in terms of its inherent characteristics and what theoretically constitutes management. This is important, since small firms are not miniature large businesses; they must be viewed as unique entities with unique needs that require unique solutions.

Management is defined as the achievement of business objectives through available resources, where management are concerned about the future, and allocate time to plan and guide the business through the various alternative strategies available (Meredith 1989:20). This definition highlights important SB and owner-manager characteristics.

Firstly, the definition infers reliance by the owner-manager on others to do the work; the SB owner-manager has a common tendency to exhibit one-person management doing everything and delegating nothing (Hankinson, Bartlett and Ducheneaut 1997:170; Hudson, Smart and Bourne 2001:1105; Yusof and Aspinwall 2000:283).

Secondly, the nature of the SB owner-manager is to think and create ideas induced by their entrepreneurial spirits, but those ideas and creative thinking then require conversion into plans and strategies. Planning is a task seldom undertaken by the SB (Orpen 1985:2; Orser, Hogarth-Scott and Riding 2000:47; Shrader, Mulford and Blackburn 1989:7; Van Auken and Sexton 1985:7). Planning is important because it charts the direction of the business and provides the foundation for the other management activities needed to achieve the objectives. Planning is also the most difficult of all the management activities to undertake, since it is a relatively high degree of uncertainty and involves an elaborate process of strategic and short-range planning, see Figure 1.

Figure 1 Planning process



Research suggests the simplification of the planning process to suit the SB needs and so encourage participation in this vital function (Jones 1982:15; Robinson and Littlejohn 1981:47; Scarborough and Zimmer 1993:83). The literature, however, does not seem to produce any functional mechanism or model to facilitate improved planning in the SB environment.

Thirdly, time is a scarce resource for the SB. Much of the time available to the owner-manager is consumed by daily operations and routines, and the allocation thereof to planning or any other management activity is either very limited or is simply non-existent.

Fourthly, resources such as financial, personnel and managerial skills are not readily available within the SB. Most owner-managers of small firms are generalists with a very broad level of practical experience, but lack the necessary managerial skills to integrate strategic and operational management practice, to exercise good decision-making abilities required to lead the firm to accomplish its goals and maintain the business as a going-concern. The SB relies on a few individuals to carry out the various managerial tasks in comparison to their larger counterparts, thus necessitating the owner-manager to acquire a number of management skills to operate the enterprise successfully. However, resource poverty restricts this acquisition.

To facilitate the well-planned optimal use of IT within the SB environment, the design of the intervention should address the issues surrounding SB adoption of IT and provide a process for IT acquisition.

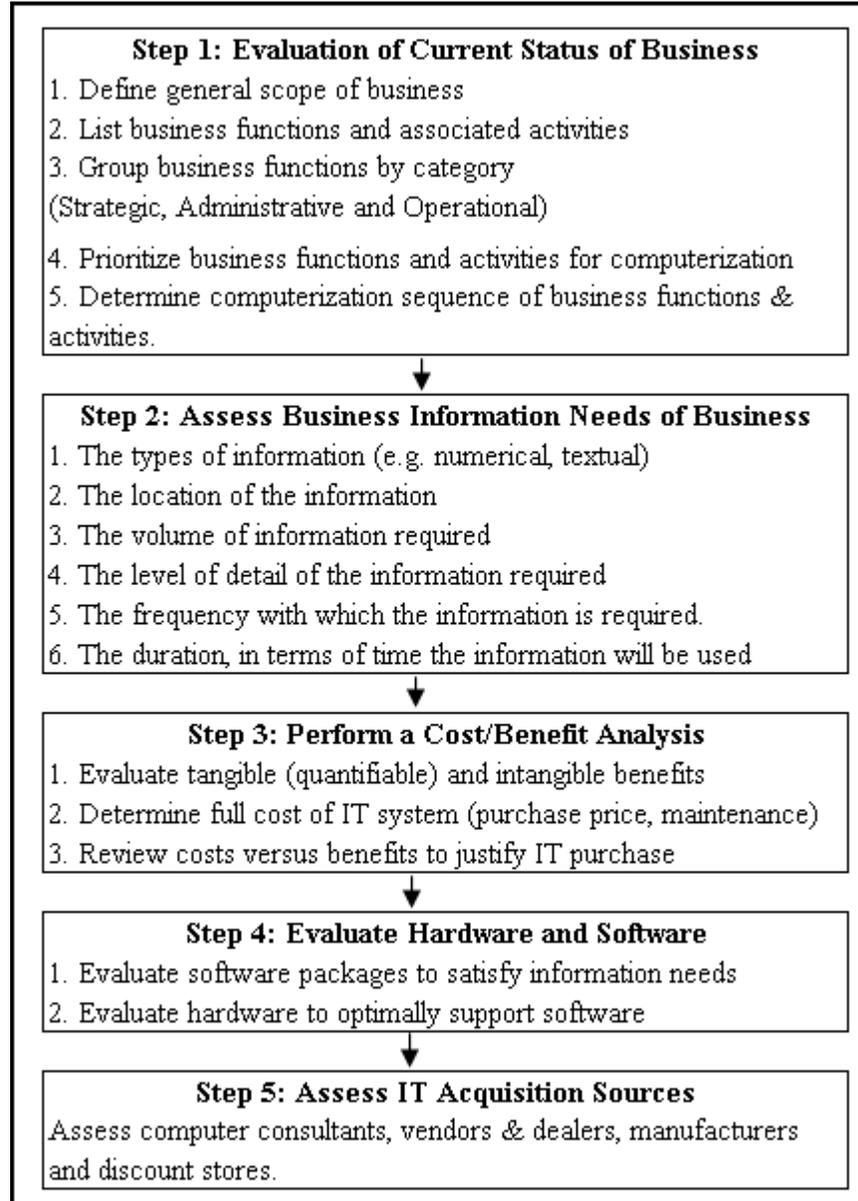
The adoption of IT is defined as the using of computer hardware and software applications to support operations, strategic activities, management and decision-making in the business (Lee

and Runge 2001:44). The following factors affect the degree of success of the IT adoption in the SB:

- The **owner-manager** is the main decision-maker and has a major bearing on IT usage. Research shows that a positive attitude toward successful IT adoption is fostered through the owner-manager holding a suitable level of IT knowledge (Delone 1988:56; Lee and Runge 2001:58; Palvia and Palvia 1999:129; Thong and Yap 1995:430). The greater the degree of knowledge, so the degree of uncertainty regarding IT should diminish, the associated benefits are highlighted, thus increasing adoption rates.
- **Organizational characteristics.** The flat, flexible organizational structure of the SB accommodates IT adoption; however, financial constraints, time and a lack of adequate management and specialized IT knowledge and skills will impede adoption. Financial constraints result in the selection of low-cost solutions that are inadequate for which they were intended. A large business has the resources to employ specialized skills; the SB owner-manager has to become a specialist in every facet of IT, which they are clearly not able to envelope.
- **Hardware and software selection.** There is considerable technology in the marketplace to choose from and, to compound the situation, it changes constantly. The previous two factors impacts on hardware and software selection. With no time to shop around, the choosing of IT occurs almost blindly and equipment is not bought from reputable vendors. The hardware is chosen before the software, leading to insufficient hardware capabilities to support the software. Off-the-shelf software packages, which are easily available, are selected to 'fix the problems' instead of applying a well-planned approach to purchasing relevant and beneficial software, which serves particular information needs.
- **Inadequate planning for IT.** Research confirms that careful planning prior to computer acquisition is not exhibited within the SB (Farhoomand and Hrycyk 1985:22; Lees and Lees 1987:13; Roberts and Senia 1998:5; Schleich, Corney and Boe 1990:8). This impacts negatively on IT adoption, inhibits the maximum exploitation of IT and in the absence of formal business planning prevents the successful purchase of IT to adequately support the business on its future path.
- **Poor external quality support.** The lack of IT knowledge within the SB leads to a high demand for consultants, computer vendors and technical support when selecting and acquiring IT, but the financial means of the SB determine the quality level of such external support. The reliance on external expertise for computer selection often exposes the SB to risks of incompetence, product bias and poor maintenance support.

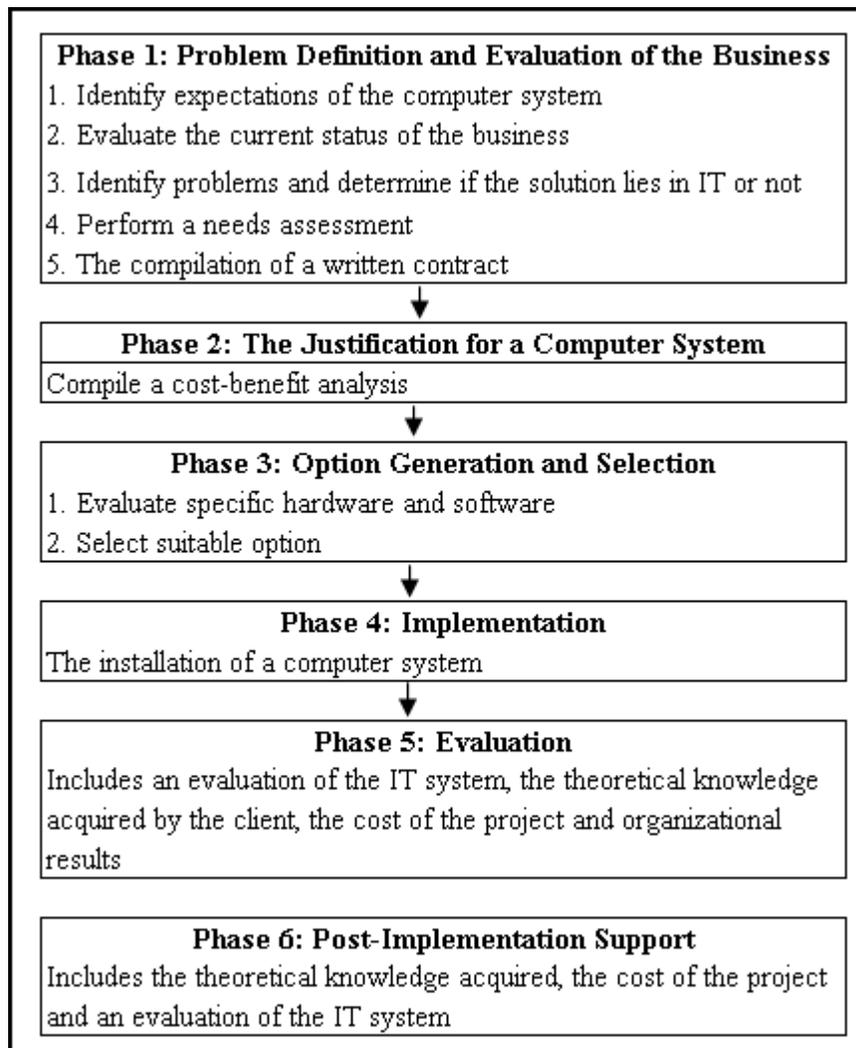
Expertise for SB computerization is broad in nature; the author saw it as the process for the acquisition of computers by the SB. Research provided many variations of a process for IT acquisition (most of which follow a sequential approach) based on theoretical formats rather than being a practical tool for SB utilization (Farhoomand and Hrycyk 1985:21; Fink 1998:252; Geisler 1992:79; Lees and Lees 1987:13; Mahmood 1982: 22–24; Pickle and Abrahamson 1990:319; Scarborough and Zimmer 1994:443; Williams and Spaul 1991:388–390). The author, therefore, formulated a systematic approach to IT acquisition; a standard recommended procedure that the SB can follow when purchasing IT (Figure 2).

Figure 2 IT acquisition process



To ensure the inclusion of all activities regarding the provision of computerization expertise to the SB owner, in the intervention, the theoretical process of computer consultation was investigated to provide a crosscheck. Research provided computer consultation processes consisting of four, five and six phases (Gellis 1990:20; Nadel 1988:18; Reeb 1993:57 and Scanlon 1996:14). Figure 3 indicates an adapted computer consultation process of six phases for the SB. The similarities of the computer consultation process and the process of acquiring IT are conspicuous.

Figure 3 Computer consultation process for the SB



The nature of the Interactive Information Consulting System is such that the design thereof had to include some of the various theoretical aspects of consulting. To this end, the author reviewed the different types of consultants, the role of consultants, the nature of the client–consultant relationship, the interaction of consultants with small firms and consultation as an intervention technique.

The identification of performance indicators and measures used for this study was obtained from perusing previous SB studies that included performance as a variable for testing (Bento and White 2001; Bracker and Pearson 1985; Chaston 1997; Chrisman and Leslie 1998; Gadd, Oakland and Porter 1998; Hankinson et al. 1997; Kent 1994; Lu and Beamish 2001; McMahon and Davies 1994; Orpen 1985; Orser et al. 2000; Pelham and Wilson 1996). This research identified qualitative and quantitative performance indicators and measures. Performance is the core of this study, thus requiring the emphasis on performance measurement to be of a scientific nature; measurement occurs in strictly quantitative terms. Therefore, the following performance measures were selected:

- The percentage growth or improvement in turnover;
- an improvement in the net operating profit margin (i.e. profit before interest and taxation);
- fluctuations in operating expenses;
- movements in the levels of salaries paid; and

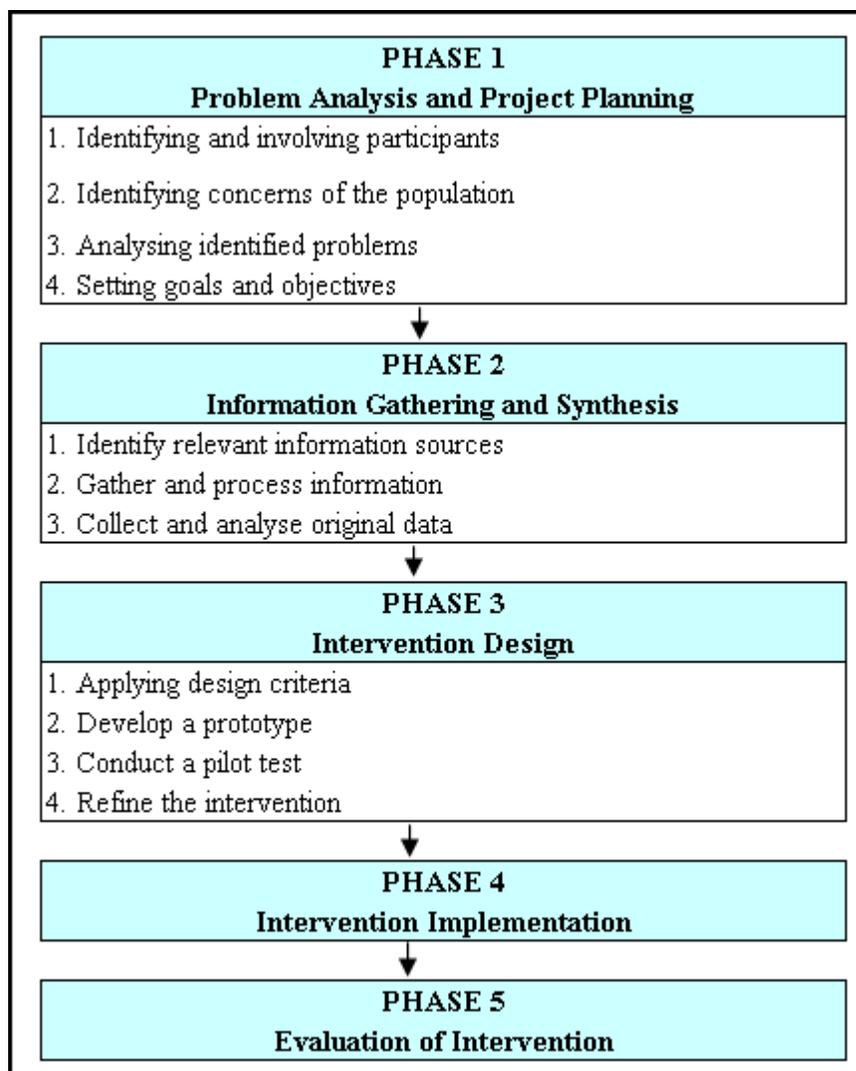
- positive variations in gross asset turnover (excluding fixed property).

[top](#)

3 Methodology

The basis for the research design and methodology used for the study was the model of intervention research (IR). There are three facets of IR, namely knowledge development (KD), knowledge utilisation (KU) and intervention design and development (D&D). The D&D facet was utilized and consists of six phases, which were adapted to a five-phase model for the purposes of this study, indicated in Figure 4. The phases are performed linearly, but sometimes re-cycling back to earlier phases may occur. This study followed the phases of D&D closely.

Figure 4 Phases of D&D



While no particular research technique is utilized in D&D, a combination of the qualitative and quantitative methods (modalities) was used. This enabled generalization through triangulation of the results, as well as accuracy, and promoted an acceptable level of validity. IR produces two products, namely a knowledge product in the form of research data that defines the problem of

interest, and a practical product (intervention) that may be a technique or programme. The latter is applicable to this study.

3.1 Research design

The quasi-experimental comparable pre-test, post-test, two-group design, where one group is the treatment group and the other the control group, was selected for the study. This design was essentially the quasi-experimental non-equivalent control group design, which was modified by the author to overcome the validity threats posed by the conventional quasi-experimental design as indicated in Table 1, including those factors thought to be possible causes for concern.

Table 1 Sources of invalidity for experimental designs

Designs	Sources of Invalidity											
	Internal								External			
	History	Maturation	Testing	Instrumentation	Regression	Selection Bias	Mortality	Selection Interactions	Multiple -X Interference	Selection - X Interaction	Subject Effects	Pre-test Sensitization
Pre-experimental												
One-shot case study	-	-	NR	NR	NR	NR	-	NR	NR	-	NR	NR
One-group pretest-posttest design	-	-	-	-	-	NR	+	NR	-	-	?	NR
Static Group comparison	+	-	NR	NR	NR	-	-	-	NR	-	NR	NR
True Experimental												
Pretest-Posttest Control Group	+	+	+	+	+	+	+	+	NR	?	?	-
Posttest Only Control Group	+	+	NR	NR	NR	+	-	+	NR	?	?	NR
Solomon Four-Group	+	+	+	+	+	+	+	+	NR	?	?	+
Quasi-Experimental												
Nonequivalent Control-Group Design	+	+	+	+	-	+	+	-	NR	?	?	-
Time Series Design	-	+	+	-	+	NR	+	NR	NR	?	?	-
Counterbalanced Designs	+	+	+	+	+	+	+	-	-	?	?	-
'+' Factor Controlled; '-' Factor not Controlled; 'NR' Factor not Relevant '?' Factor Possible Cause of Concern												

The design is a one-way design, studying the effect of just one independent variable (IV), where the researcher selects two or more levels of the IV and compares the average performance of the subjects in treatment. For the purposes of this study, two levels of IV were selected, which was the exposure to the interactive system versus no exposure to the system. All participants in the study received the pre-test evaluation. Thereafter random assignment to the two groups occurred. At this point, the groups' averages were compared to confirm that the groups are as equivalent as possible on the pre-test. The treatment group was then exposed to the intervention, while the control group was not exposed. All the participants were then tested (post-test

evaluation) again.

Finally, the survey methodology was employed, since it was the most economical and efficient method for the purposes of the study.

3.2 Population and sample

Research statistics indicated the number of SBs spread over the nine provinces in South Africa, and operating within diverse sectors, to be 1065494 as at 2001 (South Africa. Department of Trade and Industry 2001). To base this study on all SBs was deemed to be too vast and it was decided to focus on small business service-based firms. In determining what constitutes an SB, the *South African National Small Business Act 102 of 1996* was consulted and the following cut-off criteria as applicable to the business service sector were used (South Africa. National small business act 1996:20):

- The total full-time equivalent of paid employees is fewer than 50;
- the total annual turnover is less than R 3-million rands; and
- the total gross asset value excluding fixed property is less than R 600000 rands.

Therefore, micro, very small and small businesses were included in the study in terms of the above criteria.

The study was restricted to the Gauteng Province of South Africa where the estimated SB population is approximately 352250. The small-firm business service population was identified as approximately 6% or 21135 firms.

The probability sampling method of simple random sampling was selected. There were two sampling incidences present in the study. The first was the selection of participants for the study. A list of small business service oriented firms with exact locations did not exist, and so a list of the municipal councils in Gauteng was obtained from the Greater Johannesburg Metropolitan Council, from which a list of shopping centers, business parks and districts were obtained, and allocated a consecutive number to facilitate random selection by means of a table of random numbers. The author personally visited each randomly selected location and identified small business service firms (participants) for inclusion in the survey. The planned sample size for the purposes of the study was 100 of the small business-service firms; the actual sample size after the pre-test evaluation was 87. The second sampling incidence involved the random assignment of 10 respondents to the treatment group and 15 respondents to the control group from the actual sample size. Research supported the experimental sample size (Furlong, Lovelace and Lovelace 2000:616; Gay and Diehl 1992:46; Sekaran 1992:254).

The study encompassed both those small firms who already use IT and those who do not.

3.3 Instrumentation

A self-designed questionnaire was used for the pre-test and the post-test in the study. A fully structured technique was employed in the design of the questionnaires to complement the nature of the SB environment, but also to facilitate data analysis to promote objective and efficient scoring. A semi-structured format however, was applied through the inclusion of a limited number of open-ended questions and the 'Other – please specify' multiple choice format option, to ensure the receipt of qualitative and quantitative data.

The questionnaires were pilot-tested by ten SB owners, to identify unclear or ambiguously

formulated items, to observe non-verbal behaviour signifying discomfort in responding to a particular section or question, to detect flaws in the measurement procedures and investigate the validity and reliability of the selected instrument. Convenience sampling for pilot-testing occurred and the respondents were not included or affiliated to the experimental groups.

In the absence of a mailing list, which also has a low response rate, the questionnaire was personally delivered to the participants. The instrument was pre-dominantly self-administered so that completion thereof could occur by the participants in their own time. This enhanced the honesty of the answers and ensured a reasonable response rate (39.54%). The author did however, exercise caution in the preservation of the ecological validity of the experiment with regards to experimenter bias.

[top](#)

4 Report on intervention design

The design of the intervention incorporated information obtained from the literature review and the results and findings from the pre-test questionnaire (needs analysis).

4.1 System requirement specifications

The specifications for the system included the following areas:

- The SB as an entity and the owner-manager.
- The details of the information facilities required by the system, taking into account the results of the pre-test evaluation (needs analysis).
- General requirements including the size and format of the system.

4.1.1 The SB

The intervention had to suit the nature of the SB as previously identified and therefore had to:

- Be systematic and easily understood;
- have a simple structure with defined activities from which the SB could benefit;
- provide special knowledge or expertise in layman's terms that is not readily available to the SB;
- provide independent advice to the SB and recommend appropriate actions;
- have the ability to present clear links between the elements that comprise the intervention;
- have a level of generality to suit the different contexts as determined by the classification of types of small service businesses;
- offer a synergistic approach to complement and collaborate with the SB;
- stimulate the SBs to examine themselves through the asking of questions;
- provide an information service that is ongoing; and
- be in a form that enables implementation of the intervention.

The criteria for inclusion in intervention design, taking into account the nature of the owner-manager within the SB environment were as follows:

- It had to cater for users who had no computer knowledge as well as users with high levels of computer literacy and knowledge.
- It had to be user-friendly to enable the user to know exactly what was required to commence, work through and complete each of the elements of the system.

- The system had to be presented in a format that was easy to read and comprehend and that comprised of tables and matrixes, since time is a scarce resource.
- It had to provide periodic training, training at the convenience of the owner-manager when time allows. It also had to be an educational tool for the SB owner-manager.
- It had to influence the owner-manager to become an active problem-solver through the presentation of a learning experience that could be employed critically and creatively.
- It had to encourage a need for planning and a constant review thereof to promote survival, profitability and growth.
- It had to assist in the development of the necessary expertise required to computerize the relevant sections of the business.

4.1.2 Facilities provided by the system

Table 2 is a summary of the seven facilities, including the functions of each facility, and the associated activities.

Table 2 CONSIT facility specifications

FACILITY 1: CURRENT EVALUATION OF THE BUSINESS	
FUNCTION:	ACTIVITY:
Reduce managerial incompetence levels through: (a) Introducing basic planning skills (including IT) (b) Integrating strategic and operational management practices. To determine whether the SB should be computerized to not (if not computerized). To optimise the current use of computers (if computerized).	Provide general overview of business to include simplified strategic and operational planning elements.
	List strategic, operation and administration areas and activities.
	Prioritize above areas & activities.
	List tangible and intangible benefits.
FACILITY 2: AN INFORMATION NEEDS ASSESSMENT	
FUNCTION:	ACTIVITY:
Enable optimal matching of business information needs to IT requirements.	Indicate types of information needed relating to strategic, administration and operational areas, for immediate and future needs.
FACILITY 3: COMPUTER SOFTWARE AND HARDWARE EVALUATIONS	
FUNCTION:	ACTIVITY:
To ensure the purchase of appropriate hardware and software that are suited to the business operations.	To critically assess software features.
To ensure that the selected IT contributes to optimal information extraction as determined by facility 2.	To critically assess hardware features.
FACILITY 4: COST ASSESSMENT	
FUNCTION:	ACTIVITY:
To adequately determine ALL the actual costs associated with IT.	Budget and/or assess ALL costs associated with IT.
To provide a budgeting tool that encourages financial planning prior to IT purchase.	
Enable an in-depth cost-benefit analysis.	
FACILITY 5: THE ASSESSMENT OF A COMPUTER VENDOR OR DEALER	
FUNCTION:	ACTIVITY:
To enable a well-informed decision when selecting a suitable vendor from whom IT will be acquired.	Obtain background information on vendor.
	Assess all applicable vendor attributes.
	Ascertain level and quality of service support and product maintenance.
FACILITY 6: THE ASSESSMENT OF A CONSULTANT	
FUNCTION:	ACTIVITY:
To ensure a thorough preparedness for the arrival of the consultant.	Determine the need for the consultant.
To ensure clarity about the role and purpose of the consultant.	Select the consultant as indicated in the activities for computer vendor selection.
To facilitate the optimal selection of a consultant for the SB computerization project.	
FACILITY 7: THE PROVISION OF GENERAL KNOWLEDGE OF IT	
FUNCTION:	
To provide help at any time when utilizing the intervention.	
The provision of a glossary that defines IT terminology and provides hints and/or general advice related to the concept of IT.	

4.1.3 General requirement specifications

The pre-test evaluation indicated that 89.66% of the respondents already used computers and 10.34% indicated that they did not as yet. This influenced the format of the intervention; it had two formats, namely, a hard copy format (printed book format) and an electronic format (software programme). The requirements for the electronic format were that it had to:

- be compatible with the Windows Operating Systems;
- have an acceptable level of reliability so that breakdowns were minimized and quick recovery occurred from breakdowns without having long-lasting effects;
- be flexible to cater for change and adjust to the needs of the user; and
- have elements of portability to adjust to the needs of the user.

The format for both the electronic and manual versions was standardized. This allowed uniform treatment of the SB using the same intervention procedures and facilitated the achievement of optimal quality control. A non-standardized intervention could confound an evaluation and produce non-interpretable results. Finally, the implementation of both formats into the SB had to occur within its available resources.

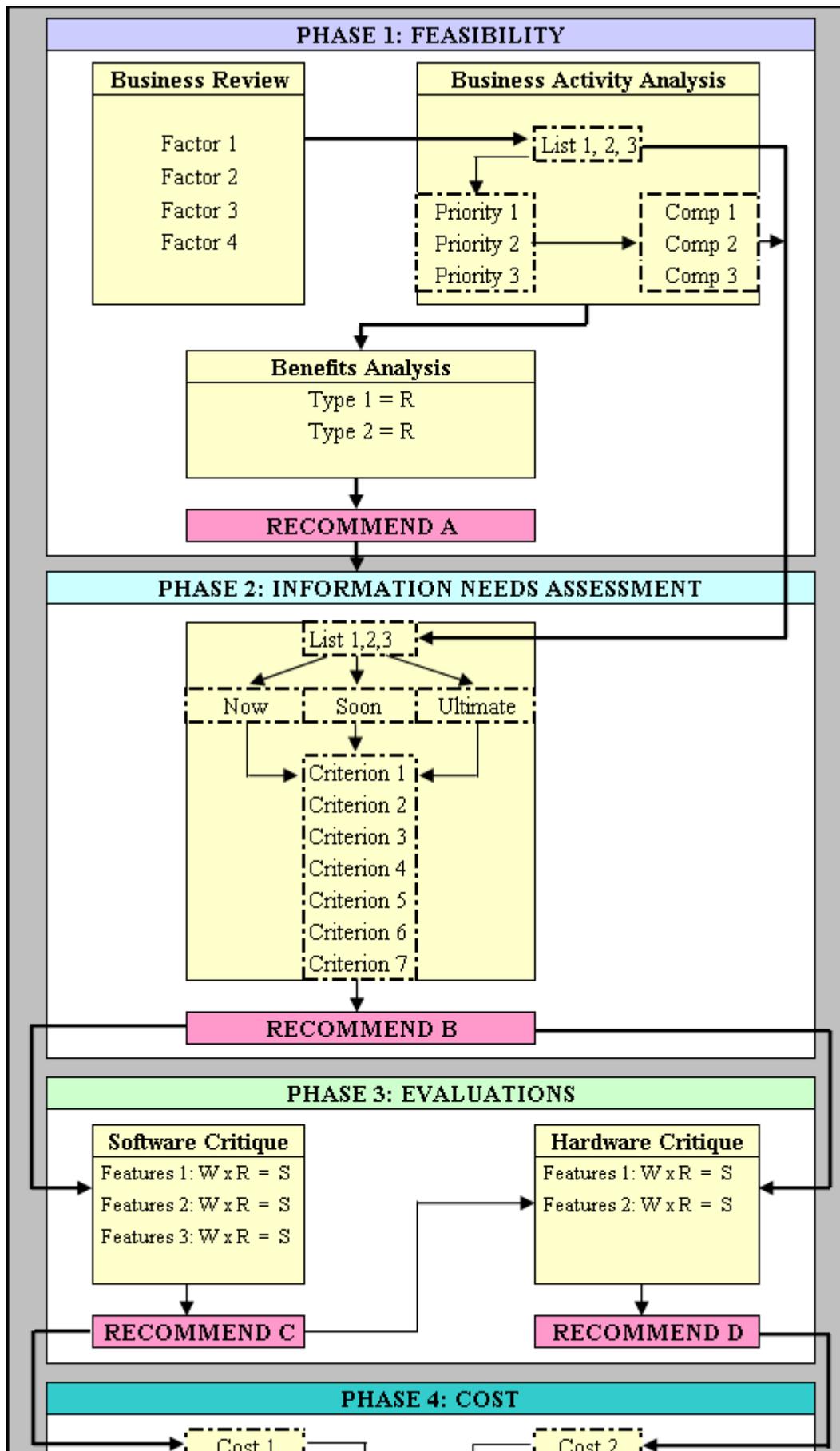
4.2 CONSIT: the concept

Based upon the pre-test analysis and the system requirement specifications, the six phases that form CONSIT are:

1. Feasibility
2. Information needs assessment
3. Evaluations (hardware and software)
4. Costs
5. Vendor (assessment)
6. Consultant (need analysis and assessment)

The author used a system flowchart (see Figure 5), which was developed from top to bottom, showing flows from one phase to the next, using arrowheads to represent direction. It provided an important blueprint for the construction of CONSIT.

Figure 5 Schematic representation of CONSIT



The nature of CONSIT is that it encourages interaction from the user. To achieve this, each phase and its sub-systems consist of pre-formatted forms or worksheets that request information from the user in order to achieve a result.

Each of the above-mentioned phases consists of tasks that the user needs to complete on the worksheets. Therefore, the way that the system operates is as follows:

- CONSIT presents an objective (purpose) for each of the phases for perusal by the user before commencing with a particular phase.
- A list of tasks belonging to each phase is presented.
- The user completes the tasks.
- Based on the information obtained from the completion of the various tasks, certain calculations may be required.
- The results of the calculations are summarized and CONSIT then provides a recommendation.

The tasks comprise activities that the user needs to participate in. The completion of the activities occurs in the following ways:

- Textual and numerical information, provided by the user, that requires recording on a specific task form – examples for expected user input are provided where necessary;
- a pre-determined list of items that need to be checked or ticked;
- items that need to be weighted, rated and scored;
- a list of statements that require ratings;
- questions to ask vendors and consultants; and
- calculations.

4.3 CONSIT: the system

CONSIT is composed of various phases or modules as indicated previously and, therefore, CONSIT, the software program, had to follow the same structure. Most software programs are developed using modular design. The approach to the design of CONSIT was no different, except that the author simplified the concept of modular design significantly, since the study is not attempting to assemble completely different software packages into a collection of sub-systems as for an intricate information system. Modular design presents advantages that make the design of a program easier; however, the main advantage is that it facilitates the use of simple interfaces, which was important for the design of CONSIT.

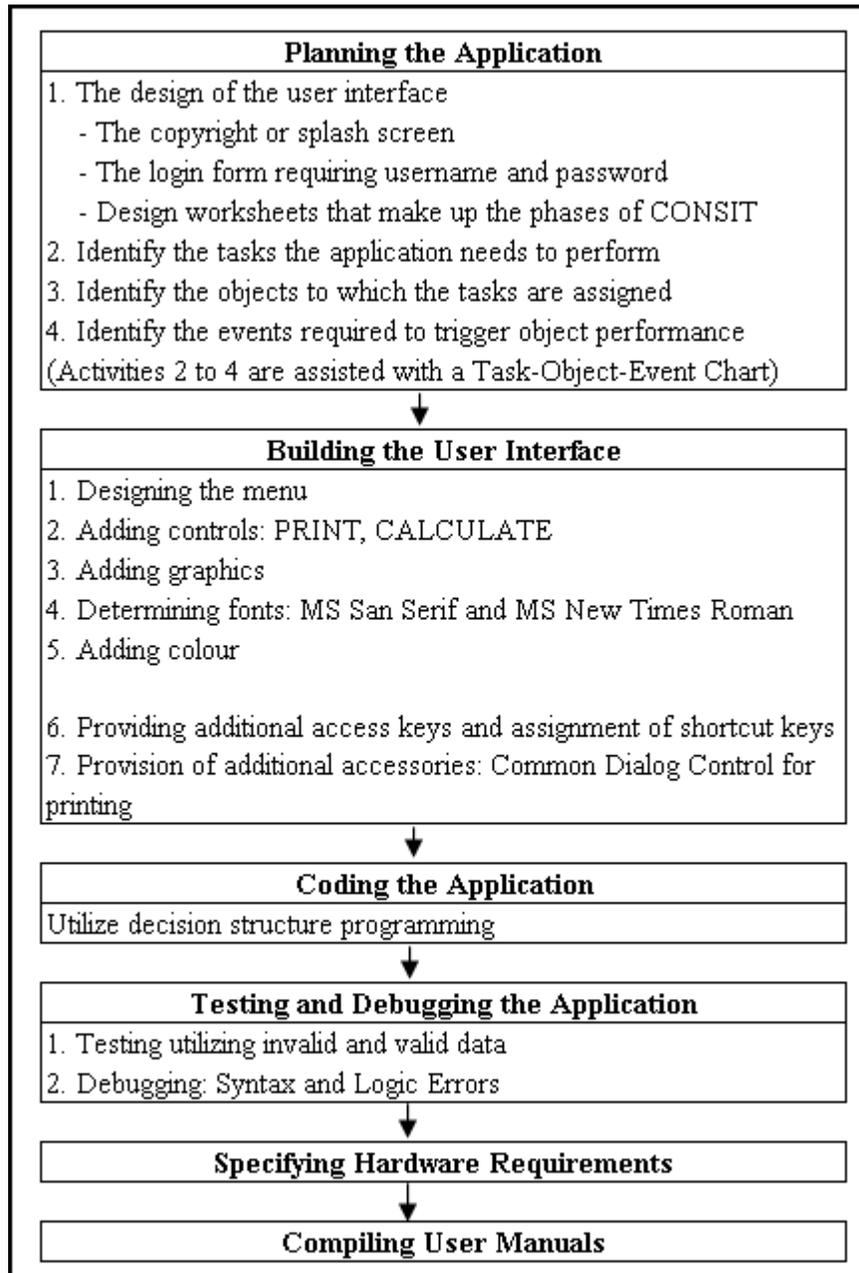
The detailed design of CONSIT included several activities.

- The determination of the design team that consisted of the author, a programmer and the user (SB owner-manager). The users did not participate in the review of each component of the system during design, but their input in the pre-test questionnaire significantly contributed toward the content of CONSIT.
- The identification of a design and development site, which was a studio in the computer school of a local college.
- The identification of an application used to build CONSIT, which was Visual Basic Version 6 (VB). The Enterprise Edition of VB was selected, because it had more advanced application development features as compared to the other available editions. VB also enables construction of customized professional-looking applications and components for the Windows Operating System that anyone can use.

- Finally, the coupling of VB with other technologies such as M4 to enable the building of powerful applications with VB, which are useful when wanting to advance the development of CONSIT at a later stage.

Figure 6 shows the process used for the building of CONSIT Interactive.

Figure 6 System development process for CONSIT



CONSIT required screen input and screen or printed output, which is generally controlled by the application. The forms are visible on the screen, the user inputs the information into the form, and the completed worksheet is the output both on the screen and printed output. The worksheets or forms that make up the phases were 'sketched' by the author, utilizing Microsoft Excel. This was instrumental in the building of the graphical user interfaces.

In brief, the factors considered in the design of the screen and worksheets are the following:

- The model of the user (owner-manager) is casual and passive, because CONSIT must function in a real-life environment where time is limited. The users are therefore best served with menus and fill-in forms, which are not excessively time-consuming.
- It is not necessary to complete each phase in full at one sitting; each phase consists of individual worksheets that can be completed at a time suitable for the user.
- Logical screen presentation is emphasized to reduce input error, user fatigue and rejection of the system.
- The format of the CONSIT Interactive screen, as seen by the user, has some of the same standard Windows features such as the title bar, menu bar, maximize and minimize, and close buttons.
- Graphics are only used on the 'Objective' and 'Recommendation' interfaces that mark the beginning and end of a phase. 'Tip of the day' forms are used on which standard icons are already placed.
- A conservative use of colour occurs, since colour is subjective and what may seem attractive to one user, may be highly irritating to another.
- Labels prompt the user for the required data while the user is completing the forms. Frames or spaces allow for the input of the specified data. During form filling, the user is able to use the TAB key and space bar to move the cursor between the fields.
- The form contains command buttons such as print. The response time to the commands have been kept short to substantially reduce user irritation and rejection of the system.
- Controls were built into the user interface to ensure quality of input. When a user makes a mistake, the input result in a recommendation to the user.
- The type of user is both expert and novice and therefore a help function is available at all times. Pressing F1 summons the function. The help facility is unobtrusive to the expert and on-hand for the novice.
- The design of error messages assists the user in identifying the error and facilitating recovery.

[top](#)

5 Summary

A rigorous analysis of the literature provided a sound theoretical platform for intervention design activities. The design and development of CONSIT considered inherent SB characteristics and the needs of owner-managers. The author successfully bridged the gap from the conceptual design to the finished product.

The ultimate objective was the implementation of CONSIT into the SB environment. This was taken into consideration throughout the entire design phase. CONSIT is a tool that can easily be implemented into the SB, with little or no risk to the SB.

Part 2 will include post-intervention design, activities of intervention pilot-testing, implementation and the results and findings of the post-test evaluation.

[top](#)

6 References

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[_top](#)

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