An Awfully Big Adventure: Doing Cross-Disciplinary Interventionist Research

Vicki Baard

> *"An intervention is both a response and an initiative. It is a response to a situation that defines a need. It is a response to a deficit or to what is not present. At the same time it is an initiative to influence that situation – to fill in what is not present, to transform the deficits into assets. In short, an intervention is an attempt to make a difference."* (Carkhuff, 1983, p.163)

INTRODUCTION

Going to the movies allows escapism to another world, especially the adventure flicks such as *Indiana Jones* that are fraught with danger and risk. Yet there was always the discovery of treasure at the end of it all, which made the perils of the journey seem worthwhile. In fact, I was contemplating what had possessed me to elect management accounting as a career instead of archaeology, for example, where was the adventure? Whilst I am not a fan of science fiction, 'To go boldly where no one has gone before' seemed like an awfully big adventure to me. I wanted to be a navigator on the USS Enterprise travelling into an unknown universe. In fact, my transition or perilous journey from senior management in commerce into the intimidating universe of academe was going to be the biggest adventure that I would embark upon, second only to my undertaking cross-disciplinary interventionist research (IR) during my PhD. Earning one's PhD is rewarded with a license to research, a certification of my navigation skills to traverse the gateway into the kingdom of knowledge, the privileged world of an academic. It would seem logical, embarking on this journey, to engage with a PhD that is conventional, safe - employ positivist research! It represents rigorous research, relying on the importance of results, describing knowledge, and the reproduction of these results captured in a different study; it provides external validity, advances knowledge and contributes to the evolution of theory. Don't engage in dangerous and risky research. "…speaking from the heart as well as the head can reveal some of the underlying perspectives and prejudices that shape academic action," (Hopwood, 2002, p.777). The purpose of this paper is to provide such a 'head and heart' or practical and reflective perspective of IR, with the potential to provide useful outcomes for future IR researchers. More specifically to provide an example of how to do IR, using Intervention theory formulated by Argyris (1970) and an intervention research framework constructed by Thomas and Rothman (1994), both of which seemingly have not been used before in accounting research.

Ahead of the motivation for this paper, it is important to define what IR is. Intervention is action taken within a system of which the researcher is not a part of, or constitutes behaviours that interject into the ongoing social processes of a system, or are novel approaches to addressing problems involving intrusion into complex health, social, political, cultural, and/or technical environments (Cope, 2000; Beckhard, 1979; Lindenburg *et al.*, 2001; Schilling, 1997; Argyris, 1970). Mullen (1994, p.167) determines that the objective of intervention research is the development of a social technology to ameliorate a social problem; a statement of desired change in a social

problem or in some condition related to a social problem. IR draws on evaluation research, behavioural assessment, technology assessment, technological transfer, simulation and modelling, meta-analysis, knowledge utilisation, practice technology, and system engineering; it is the configuring of these methodological elements into a phased system of action that harnesses their potential as general practical intervening innovations (Thomas and Rothman, 1994). Action Research (AR) is considered the origin of all IR in the area of social sciences (Jönsson and Lukka, 2007, p.376), initiated by Kurt Lewin (1946, 1951) who posited the idea of doing change experiments, in the field rather than the laboratory. There is considerable literature on AR, which offer perspectives useful for enlightening our understanding of IR, for example:

- it is a balance between action, reflection and understanding, similarly between theory and practice;
- it embraces the pursuit of practical solutions to issues of concern for individuals, groups, communities and organisations, where continuous interaction and cooperation between practitioners and researchers is essential;
- IR facilitates the substitution of abstract generalisability for usable knowledge generalised to social systems, offering localised solutions, and requires different standards for issues such as validity and reliability, differentiating IR from traditional academic research;
- IR observes and experiences the ongoing dynamics of human interactions as part of social science, therefore gaining insights not ordinarily obtained through other methods[1];
- IR stimulates and supports change or seeks improvement through change; and
- its' purpose is to share knowledge with social systems that has been traditionally housed by higher learning institutions.

The aim of IR is thus to improve community life and well-being (including the organisational context) through the development of interventions, which are effective in various real-life contexts, involving a co-ordinated effort of all participants (including direct immersion of the researcher in the real-life context) who are actually experiencing the problem, resulting in the generation of knowledge for researchers and practitioners (Thomas and Rothman, 1994; Fawcett *et al*., 1994). Edmondson and Moingeon (1999, p.159) assert that an empirical study constitutes intervention research if it leads to the production of valid scientific knowledge and is undertaken with the aim of improving the situation under study; accomplishing these two aims together is an ambitious if not daunting prospect.

This paper is organised into four sections. The first section clarifies the motivation for this paper. The second section introduces practical aspects of intervention theory and its strategic orientation. The third major section considers the intervention research framework, including a discussion on the research participants, the intervention and the research design. The final section is a discussion section that addresses the issues encountered when undertaking IR.

MOTIVATION

The motivation for this paper materialised from a chronological reflection of IR occurrences, within the last decade. IR was used as a methodology in cross-disciplinary (management accounting and information systems) doctoral research that was undertaken between 2000 and 2003, in the small business environment. A review of the extant literature during this time disclosed rare instances of empirical evidence

that interventionist research had been used in management accounting and information systems (Kasanen *et al.*, 1993; Baskerville and Wood-Harper, 1996; Seal *et al.*, 1999; Brue and Peppard, 2003; Labro and Tuomela, 2003). A few more studies were published in 2004/2005; Arnaboldi and Azzone (2004), Malmi *et al.*, (2004) and Labro *et al.*, (2005). These studies used IR variants [2] that did not emphasise the essential elements of IR, and reference to intervention theory or an interventionist research framework was not evident. In comparison, IR was more prolific in disciplines such as Nursing, Education, Public Health, Dementia, Social Work, Organisational Development and Clinical Psychology.

CIMA (Chartered Institute of Management Accountants) in 2006, called for IR proposals to promote the usefulness of management accounting research using this approach, to organisations; this initiative was opportune given the paucity of academic IR in accounting, see Table 1.

Table 1 CIMA Interventionist Research

Date	Details	Source
August 2006	CIMA invites proposals examining management accounting issues using Interventionist Research	CIMA Website Press Release [I]
November 2006	Kari Lukka (Turku School of Economics, Finland) provides a statement of what interventionist research is and how management accounting research can make its finding relevant to practice	Financial Management (Lukka, 2006)
March 2007	Kari Lukka provides an explanation of what interventionist research is and involves.	CIMA Website Research Update [II]
September 2007	CIMA announces three projects selected under the Interventionist Research Initiative introduced in August 2006: 1. "Using management accounting and control to change the time frame of managers" Dr. Pieter Jansen, University of Groningen. 2. "Strategy Mapping". Professor Ken Merchant and Xiaoling Chen, University of Southern California. 3. "A test of a company's business model" Professor Ken Merchant and Tatiana Sandino, University of Southern California.	CIMA Website Research Update [III]
March 2008	CIMA introduces practitioner-led interventionist research for the Royal Botanic Garden in Edinburgh, Scotland, led by Alastair Macnab, the Director of Corporate Services at the botanic gardens.	CIMA Website Newsletter [IV]
March 2009	CIMA publishes an executive summary on a study by Dr. Petri Suomala (University of Technology, Finland), concerning the advantages of interventionist approaches producing practical and relevant management accounting research.	CIMA Website Newsletter [V]

May 2009	Xiaoling Chen, Melissa Martin and Ken Merchant provide a report on their CIMA funded research (Strategy Mapping).	Financial Management (Chen *et al.*, 2009)
September 2009	CIMA publishes a summary of three interventionist research projects, with indications of research outputs in 2010.	CIMA Website Research Update [VI]

Lukka (2006) supported this research initiative, emphasising that management accounting research presents 'findings of value to practice', and that 'IR aims to narrow the gap between practice and academic theory.' I found this initiative promising given its' capacity to promote collaborative inquiry between academe, practitioners and organisations, thus reinforcing the relevance of IR and its' potential influence on practice. However, we must exercise caution; CIMA is primarily business and profession-focused even though the organisation sponsors research undertaken by academics. "If academics become rather like consultants, focusing only on solving practical problems, we are likely to lose the innovative thinking which leads to greater creativity in the long run." (Scapens, 2008, p.918) With this practitioner-focused research, the point of difference between academics and practitioners is theory. In this context I refer to theory as the "theoretical knowledge researchers derive from thinking about accounting" (Scapens, 2008, p.918) [3], and theory that supports our methodological research strategies.

In 2007, Jönsson and Lukka (2007) provide a useful introduction to the discourse on IR, through an exploration of the nature of IR, its' alternative forms, the process of conducting IR and the forms of IR output, in a management accounting context. These authors also offer a discussion on the philosophical underpinnings of IR, evolving from multiple authors, based on classical rationality (Searle, 2001), ethnomethodology (Garfinkel, 1967; Coulon, 1995, Lynch, 2001), decision-making (March, 1994), practice theory (Schatzski, 2001) and anthropological theory (Hastrup, 1997). The practical and perspective focus of this paper precludes a theoretical discourse on this philosophy; however Baard (2010) appraises it with alternative IR frameworks and intervention theory of Argyris (1970). To me the Jönsson and Lukka (2007) paper is a treasure chest of note because of its capacity to provoke thoughtful IR debate. This work was also referenced in a call for papers for a special issue on IR, for publication in March 2010 by *Qualitative Research in Accounting and Management (QRAM).*

In 2008, *Critical Perspectives on Accounting* debated the future of interpretive accounting research (IAR). From my reading of Ahrens *et al.* (2008) there are some materialising themes, relevant to the motivation for this paper. In the first instance there is the suggestion to include IR on the IAR agenda, where IR approaches producing practical and theoretical contributions can be applied in the field (cf. Granlund, p.856), and the advancement of IR which is an important opportunity for IAR (cf. Khalifa, p.847). Secondly, there is the view that IARs' vagueness is its strength because it provides the researcher with choices when working with various qualitative methods and social theories, highlighting the roles, use and limits of accounting practice in everyday life (cf. Menniken, p.848). Conversely that IARs' vagueness obstructs the engagement of 'Others' with this methodology (cf. Quattrone, p.852). Thirdly, interpretive accounting researchers need to engage with practitioners, devoid of association with consulting (cf. Chapman, p.844). The significance of these

themes lies in the use of theory. Brue and Peppard (2003) assert that progress concerning IR output in information systems is retarded, with interventionist approaches being dismissed as unscientific because of the purported absence of philosophical foundations compelling it to draw on a "hazy theoretical base". This may also explain the historical sluggishness of IR output in accounting, previously illustrated. This role of theory in IR serves two purposes. Firstly, theory is used to diagnose problems, to construct an appropriate intervention and to position the findings to contribute towards the production of publishable scientific knowledge. Secondly, there is the use of a theoretical framework to provide strategies to accomplish IR activities. Numerous contemporary studies have been published, containing empirical evidence of interventions that have stimulated significant change in their elected social system (e.g. Christopher *et al.*, 2008; McCarty Kilian *et al.*, 2005; Robitaille *et al.*, 2005; Stronks and Mackenbach, 2005; Fishbein *et al*., 2001; Snyder *et al*., 2001; Camp, 2001), including the accounting studies previously cited. However, no explicit reference to intervention theory or framework occurs. An intervention theory is therefore necessary and relevant because it serves as a guide for intervention researchers, it may provide some discipline, exactitude and ultimately legitimacy to IR as a research method. Therefore using a theory supporting IR activities, moreover demonstrating its functionality, may encourage its use by IAR researchers. It may remove the perceived obstacles to IARs' vagueness and encourage those 'research colleagues from differing traditions' (Parker, 2008, p.912), to participate in IAR. The use of theory will differentiate IR and/or IAR researchers from consultants; it means that our work will remain 'firmly grounded in theoretical understanding' (Scapens, 2008, p.918). I am not suggesting that interpretive researchers must undertake IR; merely that it may facilitate their engagement with the accounting profession, accounting practitioners, students, industry, and community groups.

Therefore there is a theoretical, practical and empirical motivation for this paper. The theoretical motivation is to initiate debate on the utilisation of intervention theory and the intervention research framework derived from social sciences, in accounting research. The use of the IR theory and framework to guide researcher engagement with practitioners and industry, may remove the consulting portend associated with IR. Given the scope of this paper, the discourse on the IR theory and framework focuses primarily on the practical aspect, rather than a profound theoretical review. Practically, it has the potential to provide valuable insights for interpretive researchers, novice researchers or higher degree research students who may consider undertaking IR. Empirically, this paper could contribute to redressing the paucity in empirical research on IR.

INTERVENTION THEORY

Parker (2008, p.911) warns us against temptations for 'commonly held theoretical positions, appealing for neat models and solutions' for Unitarianism of image, but also encourages us not to 'miss the greater opportunity – that of seeking the new, the different, the risky and the dangerous' (p.912). I caution the reader that intervention theory is not for the faint-hearted and reading Arygris' work was a challenging task. Extracting the practical value from his work was the first leg of my nail-biting voyage of discovery.

Background

The research domain for my study was the small service business (SSB) environment. Small businesses are important for the dynamics and stability of economies globally [4], making important economic contributions. However despite their significant contributions, many small firms struggle to survive and experience higher exit rates than other businesses, especially within the first three years of existence (Box, 2006; Hayward *et al.*, 2006; Van Eeden and Venter, 2004; Hall, 1992; Berryman, 1983). These exit rates are due to external and internal factors. External factors include a hostile environment containing legal and regulatory constraints, a limited access to finance, and operating within a global environment characterized by intensified competition (Everett and Watson, 1998; De Villiers, 1997; Hall, 1992; Hall and Young, 1991; Petersen *et al.*, 1983; Fredland and Morris, 1976). Internal factors include: 1) ineffective decision-making and integration of strategic and operational management practices in many instances due to critical information deficiencies, 2) insufficient planning (strategic and operational), and 3) deficient financial control (budgets, cash flow management, performance systems) and record-keeping (Orser *et al.*, 2000; Rue and Ibrahim, 1998; Hodgetts and Kuratko, 1998; Zimmerer and Scarborough, 1994; Gaskill *et al.*, 1993; Stoner and Freeman, 1992; Longnecker and Moore, 1991; Pickle and Abrahamson, 1990; Shrader *et al.*, 1989; Meredith, 1989; Hobbs and Hussein, 1985; Van Auken & Sexton, 1985).

Information Systems (IS) can be implemented into small businesses to provide critical and accurate information to support business decision-making, sustain strategic and operational planning and integrate associated management practices, improve internal control, increase productivity, and gain a competitive edge, thereby diminishing risk that endangers their existence (Scarborough and Zimmerer, 2006; Turban *et al.*,2001; Riemenschneider and Mykytyn, 1999; Palvia and Palvia, 1999; Dutta and Evrard, 1999; Fuller, 1996; Thong and Yap, 1995; Chen, 1993). Despite a high degree of IS usage by small firms, their owner-managers (OM) unsuccessfully adopt [5] information technology (IT) and systems, as effectively as the larger businesses do, thus forfeiting the aforementioned benefits. The primary rationale for this occurrence is: 1) an inability to analyse processes and/or systems driving business, consequentially identification of associated information needs does not ensue, 2) ineffectual use of IT resulting from disparity between IT requirements and information needs, 3) absence of a formal, affordable means to determine IS selection suited to business requirements, 4) limited financial resources, and 5) SSB lack in-house IS and IT expertise (Lee and Runge, 2001; Thong and Yap, 1995). Finally, research indicates the existence of a positive and significant relationship between the capabilities of IT, the effective adoption thereof and firm performance; profit ratios were higher, operating expenses to sales were lower, there was a reduction in client debts and improved access to information (Bharadwaj, 2000; Turban *et al.*,2001). Thus, based on these two issues, the research question was: How can SSB owner-managers exploit IS attributes to develop extant managerial proficiency and consequently enhance business performance? Managerial accounting can be used to enhance an organisations' value through the application of frameworks (e.g. planning and control) and techniques, system implementation (performance and information), alignment of managerial processes and resource allocation, and information provision to improve decision-making adeptness. Managerial accounting as an applied research field implies that researchers can contribute to organisations and society for the purpose of 'responding to a deficit', and/or stimulating change for the purpose of improving them through the application of these frameworks, techniques and so forth.

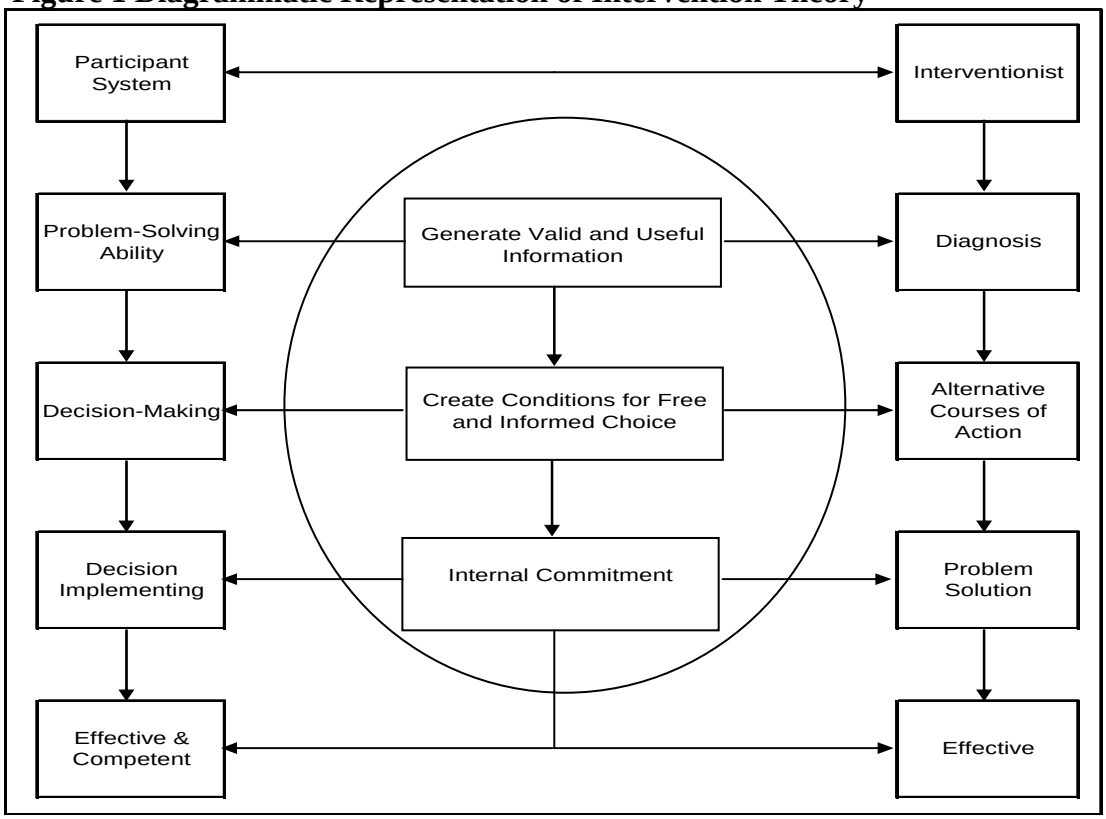
Researchers in IS are becoming more concerned with the social and psychological aspects of the introduction of technology into the human work place, rather than concentrating only on the technological aspects (Blackler, 1988). Brue and Peppard (2003) suggest that the output of empirical research will help practitioners improve the value they derive from IS investments and therefore would locate this within interventionist approaches that offer the potential for producing knowledge with greater relevance to practice. Intervention Research is a genre of applied research (Thomas and Rothman 1994, p.3). Applied research often builds on basic research, seeking to explore problems in real contexts, with the aim of providing practical solutions and creating knowledge with explicit application to organisational practice. Therefore, there is alignment between the discipline areas and the research methodology employed in the study.

What is Intervention Theory?

Argyris (1970) constructed a theoretical framework of consulting, referred to as Intervention theory. This theory originated from organisational theory (e.g. group dynamics, inter-group relations, organisational behaviour), the integration of borrowed concepts and empirical research from relevant behavioural sciences (e.g. psychology, cognitive science) (p.14). Intervention theory presents a broad spectrum of intervention activity principles including but not limited to: the primary tasks of intervention, intervention activities, qualities and behaviour of an effective interventionist, difficulties associated with client and interventionist interaction, effective and ineffective intervention activity, organisational entropy including resistance to change and dimensions of mechanistic and organic research. This section will briefly identify the primary tasks of intervention theory, discuss their implications, and describe the role of mechanistic and organic research dimensions in IR, from a practical perspective.

To facilitate my interpretation of this theory and for the purpose of a considered practical utilisation thereof, I diagrammatically organised the concepts, see Figure 1; elucidation of the key concepts is also provided. Argyris (1970) and Susman and Evered (1978) refer to the 'client system' as consisting of individuals, groups and organisations, a network of organisations, or a community. To avoid association with consultation, I renamed the 'client system', as the 'participant system'. The 'intervention system' refers to the collaborative relationship between the participant system and interventionist. Argyris (1970, p.36) indicates that the core activities of any system are; 1) to achieve its objectives, 2) to maintain its internal environment, and 3) to adapt to, and maintain control over, the relevant external environment. Thus a participant system is competent when it achieves these activities over time under different conditions, and is effective when it achieves these activities in any given situation. An intervention is effective when it enhances participant system competence and effectiveness through autonomous problem-solving, decision-making and decision implementation (Argyris, 1970). Hasenfeld and Furman (1994, p. 299) define 'effectiveness' as; 1) the intervention design was correct and the associated procedures and techniques ameliorated the problem, 2) the intervention has been tested (possibly refined) and works, and (3) the organisation has adopted the innovation aiding service delivery operationally. This definition is important when considering intervention design, implementation and validity and reliability issues, addressed later on.

Figure 1 Diagrammatic Representation of Intervention Theory



Source: Adapted from Argyris (1970)

The primary tasks of intervention theory are; 1) the generation of valid and useful information, 2) free, informed choice that maintains effective interventionist behaviour and client system integrity, and 3) internal commitment to choices made for decision implementation. Argyris (1970) proposes that these primary tasks have six implications for intervention activity. These implications provide a strategic focus for conducting IR using the intervention research framework and specifying intervention design requirements. Firstly, there should be congruence between effective intervention and participant system activities, forming part of normal operations. This would reduce the probability of intervention rejection and promote participant system competency for recurring problem solution, exclusive of the interventionist. Secondly, that change is not a principle interventionist task, nor is change production a criterion for effective interventions, even though primary task accomplishment inevitably leads to change. Change and adaptability could be construed as a by-product of a successful intervention, given the knowledge and practical product outputs of the IR process, thus preserving the long-range effectiveness of change. Thirdly, primary tasks serve as criteria for selecting participant systems (Argyris, 1970, p.24); the participant system must want to be helped to increase the probability of intervention strategy, based on the primary tasks, being successful. This implication also suggests that the

involvement of senior management is important for effective intervention activity stimulation. Fourthly, the intervention system must retain autonomy through minimisation of manipulation. In this instance, manipulation refers to the interventionist allowing or encouraging participant system dependence on the researcher, rather than learning to make choices themselves. Fifthly, the primary tasks can be used to determine the conditions, under which the interventionist will enter, inhabit and depart the participant system as well as determine the principles of engagement. Finally, primary task accomplishment should result in the advancement of knowledge in two areas, that of science (academic) and professional knowledge (practice).

Argyris (1970) also argues for alignment of the primary tasks with IR activities, specifically entertaining dimensions of rigorous and organic research. Intervention theory does not discuss these methods, but suggests a balanced approach is required to successfully complete the primary tasks. Rigorous, traditional or scientific research ('mechanistic research') should not be used throughout the IR process, because it results in unintended consequences (e.g. participant system dependence on the interventionist, physical and psychological withdrawal from the intervention process, ineffectiveness of the problem-solving process and hostility toward the research being undertaken), that do not advance primary task achievement. Conversely, Argyris (1970, p.104) also asserts that rigorous research methods are the interventionists' best chance for obtaining valid data (an objective view) in relation to problem diagnosis and intervention efficacy. With hindsight this notion is consistent with Jönsson and Lukkas' (2007) emic and etic perspectives under which IR is conducted, and Kakkuri-Knuuttila *et al.* (2008) who argue that interpretive studies include subjectivist and objectivist elements. IR should therefore include elements of organic and mechanistic research. For example, incorporate research methods that manage observation of behaviour and engage the participant system in the introduction, design, implementation and intervention evaluation providing opportunities for the development of confidence and trust, responsibility and feelings of essentiality, consequently increasing the probability of primary task accomplishment. This aspect of intervention theory influenced the research design selection discussed in the next section.

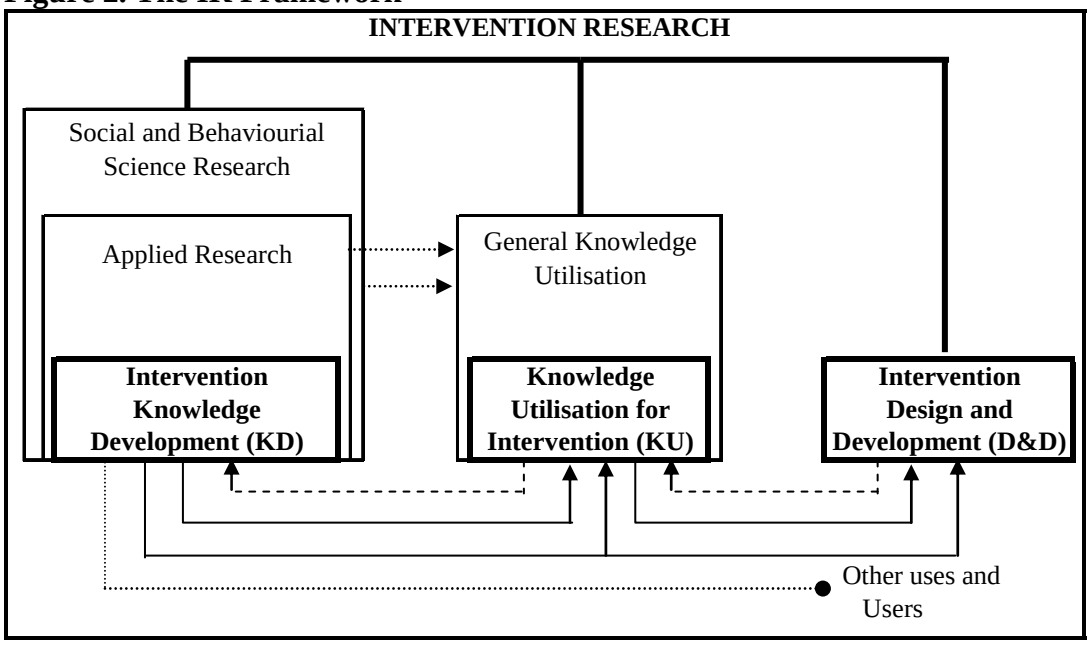
INTERVENTION RESEARCH FRAMEWORK

This section reviews the intervention research framework, its adaptation to the doctoral study, descriptive detail on the participant system and the change that it experienced, followed by an overview of the intervention. The section concludes with a discussion on the research design.

Thomas and Rothman (1994) constructed an intervention research framework, grounded in information science, social science including social work and allied disciplines of Psychology, Psychiatry and Sociology. Atkinson and Shaffir (1998, p. 59) assert that sociology has a long history and experience with field research from which accounting researchers should learn and profit, thus providing motivation for using this framework. This framework consists of various approaches used to address applied research, described by Thomas and Rothman (1994, p.3) as: (a) empirical research to extend the knowledge of human behaviour relating to human service intervention (Intervention Knowledge Development – KD); (b) the means by which the findings from Intervention Knowledge Development may be linked to, and

utilised in practical application (Intervention Knowledge Utilisation – KU); and (c) research directed toward developing innovative interventions (Intervention Design and Development – D&D). Figure 2 illustrates an integrative perspective on these approaches: the arrows with solid lines indicate explicit linkage between aspects; arrows with broken lines represent indirect or developing linkages. The linkages between the facets provide flexibility when conducting IR. For example KD can be conducted on its own, without D&D, or it can be followed by KU activities, or it can be incorporated into D&D. KD, KU and D&D can also be conducted sequentially.

Figure 2. The IR Framework



Source: Thomas & Rothman (1994, p.5)

The extant literature did not disclose a framework with comparative facets to the Thomas and Rothman (1994) framework. However, Argyris (1970) refers to three intervention activities, prevalent in intervention theory, which are analogous to KU, KD and D&D. Thomas and Rothman operationalise KD, KU and D&D, but without specificity concerning participant and interventionist resources. In this instance, Argyris (1970) refers to a sliding scale of resources including skills, time, incumbent degrees of effectiveness and competences required for each activity, with activity three (or D&D) characterised as extremely demanding on the resources of the intervention system. This was an important consideration in intervention design and implementation.

The D&D component was primarily utilised in my doctoral research, whilst drawing on KD and KU for grounding my research in theory; it is the methodology and practice of D&D that provides the uniqueness of intervention research (Thomas and Rothman, 1994), see Table 2. D&D incorporates different overlapping paradigms [6] that seek to construct a systematic methodology for intervention development (Fawcett *et al.*, 1994), similarly to the 'borrowed concepts' constituting intervention theory. In contrast to the accentuation of interrelationships between variables characteristic of traditional research, D&D enjoys a primary focus on the evolution of intervention technologies. Examples could include an activity-based costing system, a new or modified policy, and a new strategy, training materials or a motivational system. D&D is a problem-solving process, seeking effective intervention tools to

manage given human and social difficulties; this process is systematic, deliberate, and immersed in research procedures, techniques and other instrumentalities. D&D constitutes a critical research planning tool and contributes to the validity of IR. Practically, there are challenges associated with IR. Firstly, time constraints; ideally the entire D&D process if undertaken can range from three to ten years, which usually exceeds the expected duration of a doctoral study and can extend beyond the usual cycles of grant funding. Secondly, the nature of the participant system may not be able or willing to accommodate a researcher, for extended periods of time. Thirdly, the nature of the research problem and question may require a variation in D&D activities.

Table 2 The Lifecycle of Intervention Design and Development

	Operations (Thomas and Rothman)	**Activities (Fawcett *et al.*, 1994)**
Phase 1: Problem Analysis and Project Planning	Key problems are identified and analysed. Broad state of the art review is initiated to provide general orientation to the problem. Feasibility of the D&D project is determined.	• Identifying and involving participants. • Gaining entry and cooperation from settings. • Forming collaborative relationships. • Identifying concerns of the population. • Analysing identified problems. • Setting goals and objectives.
Phase 2: Information Gathering and Synthesis (Developmental Research)	Various types of data serve as the basis for intervention development: • Basic and applied research. • Main contributions of KD research. • Original research conducted including a needs assessment, survey of practitioners regarding current practice. • Professional / personal experience	• Using existing information sources (e.g. a literature review). • Studying natural examples. • Identifying functional elements of successful models (interventions).
Phase 3: Design (Developmental Research, Social Research and Development, Behavioural Research)	Interlaced with researchers and users in close interaction. Design must include usability. Design domain, requirements & problems must be outlined.	• Designing an observational system. • Specifying procedural elements of the Interventions.
Phase 4: Early Development and Pilot Testing	Pilot testing to explore feasibility of intervention. Interventional refinement. Trial implementation techniques.	• Developing a prototype or preliminary intervention. • Conducting a pilot test. • Applying design criteria to the preliminary intervention concept.
Phase 5: Evaluation and Advanced Development (Experimental Social Research, Behavioural Research)	Determine effectiveness of intervention. Additional development of intervention.	• Selecting an experimental design. • Collecting and analysing data. • Replicating the Intervention under field conditions. • Refining the intervention.
Phase 6: Dissemination (Model Development Research)	Process of diffusion and adoption. • Packaging/Fabrication of intervention for user readiness. • Reinventions if required.	• Preparing the product for dissemination (e.g. price, standards for use. • Creating a demand for the intervention.

	• Employ modes of motivation and persuasion to use intervention.	• Encouraging appropriate adaptation. • Providing technical support for adopters.

Source: Adapted from Thomas and Rothman (1994) and Fawcett *et al.* (1994)

Therefore a modification of the D&D research process may be required, which is what I did, see Table 3. Please note, Table 3 is representative rather than exhaustive of all the research activities undertaken, adapted to the challenges previously outlined.

Table 3 D&D in a Doctoral Study

	Planned Activities
Phase 1 **Problem Analysis and Project Planning**	❖ Do a literature review ❖ Identify and analyse key potential problems satisfying scientific[1] knowledge and practical outcomes. ❖ Identify research domain (SSB) and associated participants (SSB owner-managers). ❖ Select research design ❖ Set research goals and objectives
Phase 2 **Information Gathering and Synthesis**	❖ Conduct original research (surveys, interviews) ❖ Gain entry into research domain and engage potential participants ❖ Analyse empirical data collect ❖ Identify the functional elements of the proposed intervention. ❖ Consider intervention implementation strategies
Phase 3 **Design**	❖ Construct the design objective ❖ Determine intervention requirement specifications (specific to participant system and problem resolution) ❖ Construct intervention components. ❖ Design the intervention concept (logical design) ❖ Develop a prototype of the intervention ❖ Test the prototype in controlled conditions
Phase 4 **Intervention Implementation**	❖ Develop implementation strategies ❖ Pilot test the intervention using the developed implementation ❖ Refine the intervention (if required) ❖ Live intervention implementation in the field (research domain)
Phase 5 **Intervention Evaluation**	❖ Collect and analyse data to determine intervention effectiveness ❖ Identify additional intervention development requirements
Phase 6 **Dissemination**	❖ Research participants retain ownership of the intervention. ❖ Professional report of results. ❖ Academic output.

Source: Adapted from Thomas and Rothman (1994) and Fawcett *et al.* (1994)

[1] By scientific, I mean technical, logical or systematic output from an academic perspective distinguishable from the practical output; I am not referring to positivist research outcomes.

The Participant System

The success of IR is highly dependent on the recruitment and retention of suitable and adequate numbers of participants. Comprehensive knowledge of the participant is also critical because this influences the 'rules of engagement', the research design, and the design and implementation of the intervention. The participant system for my research consisted of small service businesses (OM), employing generally less than 10 employees. The OM is the most influential decision-maker in the SSB; hence I approached them concerning my research, and not an employee. The OM has an inherent entrepreneurial spirit, energy and determination, exhibits goal-directed and demanding leadership styles, readily embraces hard work and possesses innovative qualities; they play a dominant role in the SSB functioning and are pivotal to the existence of the business. Most OMs' are generalists enjoying a broad level of practical experience yet possess few specialist skills required for managerial activities such as planning and financial control. Additionally OMs' have a very wide span of control, are disinclined to delegate tasks, are reliant on their own skills, talent and hard work; the tendency to be a 'one-person show'. Hence, they spend more time 'doing' activities (day-to-day operations) rather than 'thinking' activities such as planning, which require time and seclusion. Given the nature of SSBs' there are uncontrollable variables that increase the OMs' discomfort concerning planning activities, because the process can reveal weaknesses and problems feared by them; the fear of failure can be greater than the failure itself. OMs' often criticise the use of controls, citing them as inhibiting creativity and innovation. Resistance to employing control systems also arises out of a perception that control systems are highly sophisticated and costly. SSBs' have flat, flexible organisational structures thus the OM is highly visible, close to the point of service delivery with high levels of customer interaction. Small firms are highly reliant on a small number of customers, employing differentiation strategies to maintain their customer base. Given the large number of small firms and the power of large businesses, intense competition is experienced. Many OMs' are extremely reluctant to divulge any performance information for fear that their competitors might gain access to the information. The sharing of this information, especially with researchers is viewed with some suspicion and distrust. Therefore employing organic research dimensions into IR as indicated by Argyris (1970) is extremely important in this context. Finally, SSBs' experience consternation regarding financial resources, which precludes the OM from skill development because large amounts of time are spent trying to manage their businesses for survivalist purposes. This particular aspect was critical to my research because the design of the intervention had to be sensitive to this and its implementation could not demand additional resources (personnel, time, money, additional equipment) from the participant system.

The Intervention

The intervention is an important component of the validity and reliability of IR, where intervention validity and reliability is contingent upon its design (Baard, 2010) and implementation (Cook and Campbell, 1979) respectively. The purpose of this section is to briefly describe the intervention and provide some guidelines to influence its validity. Given, the nature of the problem and the research question, the intervention (an interactive learning instrument) consisted of managerial accounting and information systems components. The managerial accounting component, although rudimentary in nature, was based on the premise that information produced by a

managerial accounting system serves two important organisational roles, namely; to provide information required for planning and decision-making, and to motivate individuals (Zimmerman, 2000, p.3). Demski and Feltham (1976) referred to these roles as the decision-facilitating and the decision-influencing role respectively. The decision-facilitating role was emphasised in intervention design, intended to advance managerial proficiency through knowledge acquisition, thus promoting effective decision-making. These managerial accounting activities included, for example, a business review consisting of strategic planning elements, a business activity (strategic, operational and administrative) analysis and associated information needs assessment. The information systems activities, included computer hardware and software evaluation based on the managerial accounting activities, and a cost-benefit analysis activity; these activities supported the IT adoption capabilities.

A primary condition for intervention validity is that they work or are truly effective. The intervention should include objective capability, ethical suitability, feasibility given the participant system, compatible with participant system operations, solve the problems in question and be relevant, simple and easy to use (Ramp, 1984; Paine, 1984; Thomas, 1984; Kasanen *et al.*, 1993; Lindenburg *et al.*, 2001). The intervention requirement specifications were determined through a rigorous literature review and analysis of the results of a semi-structured survey, interviews and other informal conversations conducted with owner-managers. Based on this data collected, the intervention concept in the form of a logical flowchart was designed. Intervention design was user-centric, incorporated elements to promote validity and fashioned to ease implementation. The business services segment of the service industry is diverse and so the intervention was standardised where possible. Many interventions have been unsuccessful or discarded because they were overly ambitious in their development and design (Thomas and Rothman, 1994), and with implementation in mind, the complexity of the intervention was carefully monitored throughout design. The down-stream process where the OMs worked with me on the intervention concept and its metamorphosis into a practical tool can only be described as ‘sporadic engagements’ during their normal workday over several months. Between these ‘engagements’ I was permitted to passively observe typical daily operations, which were carefully documented. This enabled the incorporation of SSB environmental considerations including managerial practices, resource availability, existing operational routines, in intervention design and its implementation methodology.

There is a dearth of intervention implementation literature. Rosen *et al.* (1999, p.12) indicates that only three percent of all published articles (social work literature) could inform a practitioner of how to reliably implement the intervention that was studied. This was an unanticipated glitch, which made me feel edgy, but also proved to be an opportunity! Overcoming this problem was achieved by using project management which offered a structured and innovative approach to intervention implementation. Additional implementation strategies considered the capability (skills, cognitive knowledge, and behavioural components) of the people conducting the implementation; to influence the success in intervention implementation and retention. The pilot-testing of the intervention must include the proposed implementation methodology to reduce risk of intervention rejection during implementation. This also serves to preserve validity and reliability of the intervention, see Table 3 phase four. Whereas the reliability asks whether the research can be replicated with the same results (Atkinson and Shaffir, 1998, p.62), the

reliability and validity of an intervention is dependent upon its implementation (Cook and Campbell, 1979). Implementation serves two purposes; (1) it means that the research process has been successful, and (2) that the intervention is technically feasible (Labro and Tuomela, 2003, p.428).

The Research Design

The research design employed for my study was a quasi-experiment in a field-setting, specifically a comparable pre-test post-test two group (treatment and control) design; a modification of the non-equivalent control-group design. It was a one-way design to determine the effect or intended change expected from the intervention (independent variable). This design therefore provides an opportunity to implement the intervention in a real-world setting, and determine what would happen in a participant system without intervention implementation. As previously stipulated, there was scarce management accounting and information systems research using IR, with a few exceptions using IR variants, all of which used case studies. Furthermore these studies occurred in large organizations where the dynamics are significantly different than in small firms. This is why I made the choice to engage in something that to me seemed unique and novel, but more importantly was better suited to the small firm environment. Thomas and Rothman (1994) indicated that there is no one particular research technique that is employed in D&D; both quantitative and qualitative research modalities are used in relation to the particular type of intervention that is being produced. Therefore, there is no prescription or precedent as to what research design should be employed when conducting IR, especially in small firms.

Every adventurer experiences ominous moments, where danger is imminent, this was one of them, and I was sufficiently concerned, more honestly, I was scared out of my wits! However, as IR had been undertaken in alternative disciplines, herein lay my succour. Social and health science literature advocates the use of quasi-experimental research within the IR context, specifically in field settings; social program and innovation evaluation (Fairweather, 1967; Fairweather and Tornatzky, 1977), performance appraisal systems (Mayer and Davis, 1999) nursing and health care interventions (Pruitt and Privette, 2001), feedback systems (Smither *et al.,1995*) and management research (Punnett, 1988), industrial medicine (Goldenhar and Schulte, 1996; Zwerling *et al.* ,1997) and organizational studies (Narayanan and Raghu, 1984; Eden, 1986; Schuster *et al.*, 1997; Cohen *et al.*, 1994; Luthans *et al.*, 1987). Zwerling *et al*. (1997) and Schulte *et al.* (1996) acknowledge that rigorous experimental research methods are not possible in field research, yet refer extensively to the work of Cook and Campbell (1979) who use quasi-experimental designs in field settings. I therefore had empirical evidence to support my research design and the published work of Cook and Campbell (1979) to guide the implementation thereof. Cook and Campbell (1979) also explicate sources of invalidity that may occur in quasi-experiments in field settings and provide strategies for their management, not that dissimilar from McKinnon (1988). Non-equivalent group and interrupted time series designs seem to be more conventional examples of quasi-experimentation, but they were not suited to this study. In particular non-equivalent groups use pre-existing groups that threaten the validity of the study because the groups may contain differences prior to the implementation of the intervention; it is then problematic to determine whether the effects of the intervention are real or due to chance (Campbell and Stanley, 1963; Gay and Diehl, 1992). It was therefore important that the participants were randomly assigned to the treatment and control groups. The issue of random assignment in this context requires some clarification. This study was

conducted in South Africa, and it proved to be an extremely complex, almost impossible task to precisely identify the population of SSB [7], especially precise location and identity, due to extensive information deficiencies; a little like only having half a treasure map. This would also perhaps bring into question whether random sampling was being used in its true form. In the absolute sense of a quantitative study seeking generalisable results, the answer would be no, this is not a quantitative study, so my parameters were less stringent. I obtained a list of all the Metropolitan Councils in the province in which the study was being undertaken. Each council has a town-planning department which has a list of business hubs, parks and districts, where each one was allocated a number consecutively. Using a random table of numbers, random selection of these areas occurred. I then personally visited each one (to control for researcher bias, given that questionnaire posting and emailing was not possible), approached all businesses (except obvious large businesses e.g. Hewlett-Packard, KPMG etc.) and distributed the questionnaires [8]. From the respondents who identified themselves to me, random assignment to the treatment and control group occurred. Ten participants were assigned to the treatment group and fifteen to the control group (Sekaran, 1992; Gay and Diehl, 1992; Furlong *et al.*, 2000). At this point both the groups' averages on the performance variables were compared to determine equivalency based on the data collected from the pre-test questionnaire, using inferential two-tailed T-tests and the Mann-Whitney U Test for independent samples. Equivalency of groups was confirmed with no statistically significant differences between them. This equivalence provides a greater degree of accuracy concerning the effect of the intervention. The intervention was then implemented into the treatment group. The intervention was implemented and integrated into the treatment group for four months. Thereafter post-testing using a similarly structured questionnaire was administered to both groups. Participants in the control groups were more likely to withdraw, thus a delayed intervention was offered to control group participants so that all participants benefited from the study.

DISCUSSION

The aim of this paper was to provide a practical ('head') and reflective ('heart') perspective of doing IR. On the one hand a limitation of this paper is that the perspective is constrained to doctoral research where resource concerns may have limited the scope of IR activities. Conversely, it provides evidence of a novel approach to IR, not limited to use in management accounting research, which may provide a useful example of how to do IR. There are several issues that I would like to discuss in this final section.

Firstly, the utilisation of intervention theory (Argyris, 1970) and the intervention research framework (Thomas and Rothman, 1994). Currently, there are rare instances where empirical research has only used parts of the intervention theory (e.g. Dirks *et al.*, 1978; Argyris *et al.*, 1985; Argyris and Kaplan, 1994). To my knowledge Van De Vliert (1977) offers the only critical evaluation of intervention theory in three decades. The problem exists that the theory may contain loopholes detracting from its' contribution to knowledge and practice, but then is that not a hazard inherent in any new theory? Theory refinement advances the more it is tested and used. Although I felt overwhelmed at times with the intricacies of this theory, it does provide a great deal of insight into the role of the interventionist, assists in the understanding of social relationships within the intervention system, and attempts to provide strategies to overcome typical problems arising from intervention activity. An example is the

matter of using positivist (mechanistic) or interpretive (organic) research. However, if we do not use this theory as the basis for conducting IR, then this research may remain bound in the practitioner or consultants' domain. An example of this is already occurring, see Table 1 (March 2008) where CIMA introduced practitioner-led IR for the Royal Botanic Garden in Edinburgh.

The intervention research framework has also experienced rare use outside of social work. Abell and Wolf (2003) undertook a partial application and adaptation of the D&D framework to harness a creative approach to social work doctoral education. This study adapted D&D to include a research agenda for a doctoral project encompassing intervention development over a three year period. This framework is a little less daunting than the intervention theory, but does require patience and stamina and is extremely labour intensive, yet exhibits flexibility for adaptation to doctoral and other empirical research. It provides clear methodological stages constituting a logical flow of IR activities, and a planning tool for doing IR. I also found that accomplishing D&D activities in each phase could occur linearly, but re-cycling back to earlier phases occurred during the course of my research. Resources required cannot be overlooked, although if carefully constructed, the research can be accomplished with little funding. Nonetheless, given the time constraints associated with doctoral research or with the pressures of research publication, it is advisable to secure funding especially when undertaking intervention implementation in multiple research sites. The activities and work associated with IR are multifaceted, and demands a variety of interpersonal and research skills, ranging from gaining entry into and appreciating the complexities of the participant system, anticipating and strategising any problems encountered during the D&D process, to intervention design, implementation and evaluation. Finally, do we need to use the intervention theory and the intervention framework when undertaking IR? Upon reflection, perhaps not, but in my view the theory constituted the strategic elements of IR and the framework an operations manual to implement the strategy successfully.

Secondly, intervention theory and the intervention framework include important strategies for conducting IR, but they are not forthcoming in providing equally important strategies or a 'how-to' guide for intervention design. The accounting literature is equally scant in providing advice thereon. The social services literature whilst not explicit on this topic, do provide some practical guidelines, which I found beneficial (e.g. Rothman, 1992). There is no doubt in my mind that this task would certainly be easier if an existing innovation, for example, the activity-based costing technology, was modified to solve the organisational problem. This may be a choice worth considering when doing IR, especially if there are time and other resource constraints. If you are going to be the valiant hero in your awfully big adventure, then design and develop an original intervention. Irrespective of whether the researcher modifies an existing intervention or is innovative, the intervention should integrate some basic principles. The identification of participant system issues or problems requiring an intervention, retrieving information relevant to the problem from the extant literature, theoretical support (e.g. traditional learning theory or communication theories depending on the nature of the problem and the participant system), situational knowledge and a synthesis thereof, outlines the intervention design domain. The researcher may pose certain questions concerning intervention design requirements. What type of intervention do I want to make? This does not just refer to a new costing model, a managerial training programme or a social critique; it is a little

more abstract in nature. This is where additional theoretical support is required, and in the instance of my research I turned to organisational and consulting theory. Reddy (1994), see Table 4, and Beer (1980), see Table 5, identify different types of interventions.

Table 4. Types of Interventions (Consulting Theory)

Cognitive interventions	Interventions that are abstract, intellectual or idea oriented.
Skill and Activity interventions	Interventions suggesting training or skill learning (e.g. problem-solving) activities that are structured and defined.
Behaviour description interventions	Intervention that describes what behaviour the consultant observes in the group (group processes).
Emotional or Reflective interventions	Intervention is the emotional or feeling component observed in the group surrounding an event. These interventions require a great deal of skill, particularly when the focus is interpersonal or personal.
Interpretive interventions	This intervention is most appropriate following a behaviour description of emotional/reflective intervention. Intervention is a hypothesis (conjecture or speculation) or insight of what is occurring at a dynamic level.

Source: Adapted from Reddy (1994)

Table 5 Types of Interventions (Organisational Theory)

Diagnostic intervention	Interventions used for learning about individuals, groups or systems; gathering data about the total system or its parts and creating a set for feedback and diagnosis; assessment of organisation's problems, determination of factors and opportunities for change (e.g. survey feedback).
Individual intervention	Interventions focus on helping humans develop to a higher level of functioning, using techniques for selecting, training and developing individuals to improve matching between people and social systems. Takes the form of workshops, seminars and other educational approaches (e.g. counselling and coaching).
Process intervention	Interventions that assist people experiencing the problem that have an intrinsic ability to solve the problem but need help to examine and understand the problem more clearly (e.g. group and inter-group development).
Structural intervention	Interventions to change human behaviour, beliefs and feelings or to change the organisational structure and so improve organisational effectiveness (e.g. job design / enrichment, organisational culture building, strategic planning approaches).

Source: Adapted from Beer (1980)

Finally, what or who will enjoy the focus of this intervention? The focus of the intervention may be an entire organisation or community, specific groups, two or more individuals interfacing at an interpersonal level, or a specific individual only. This may seem an obvious question but it has implications for intervention design. Reddy (1994) also indicates that the intensity of a selected type of intervention should be considered. As the intensity of a type of intervention increases so does the risk associated with a higher probability of intervention resistance or rejection. The intensity of an intervention increases as the focus moves from an organisation to an individual. Harrison (1970) and Reddy (1994) suggest that interventionists should

consider how deep they want to intervene with any given project, see Table 6; this is also important from an interventionist resource and skill requirement perspective.

Table 6. The Depth of Interventions

Levels	Name	Description
1	**Content**	Work, task, project or service accomplishment
2	**Overt Group Issues**	Basic and obvious observable member interactions Task behaviours, problem-solving, decision-making, conflict resolution. All behaviours are observable
3	**Covert and Core Group Issues**	Inferred from Level 1 and 2 Inclusion, belonging, control and power, independence, competence, autonomy.
4	**Individual Values, Beliefs & Assumptions**	Least manageable characteristics of the individual e.g. defence mechanisms, history and personality Not targeted in organisational settings Not recommended for IR studies
5	**Unconsciousness**	Reservoir of individuals' basic instincts, motivations, impulses and so forth. Not targeted in organisational settings Not recommended for IR studies

Source: Adapted from Reddy (1994)

The issues concerning the type, focus and intensity of interventions can be viewed from two perspectives, namely the interventionist and the intervention itself. I will use my research as an example. As the interventionist, a diagnostic intervention (questionnaire, interviews and other informal communication) was employed for information gathering purposes. The type of intervention employed was an individual intervention since the intervention was using an educational approach to assist small firm owner-managers in aspects of strategic planning to promote business sustainability, to appropriately harness information technology and systems as a strategic asset to provide critical information for control and improved performance. Additionally, the intervention integrated a cognitive and a skills and activity intervention type in its design. Given the intervention type, the organisation and individual focus of the intervention, the depths of intervention was level one, two and to a very small degree level three (competence and autonomy), see Table 6, to reduce the probability of intervention rejection.

Thirdly, the choices inherent in using a research design are contingent upon the nature of the research process, the research question, the purpose of the research, data collection methods, the form of reasoning used in the analysis (deductive or inductive), validity and reliability issues and the communication of the findings (Page and Meyer, 2000; Vaivio, 2008; Ahrens and Dent, 1998). Argyris (1970) suggests the use of mechanistic research for the generation of valid information, with an organic modification to produce an effective intervention system, but is non-committal to a specific research design. Thomas and Rothman (1994) assert that there is no prescribed research technique or modality employed in IR, specifically in D&D, but allude to the type of intervention as a consideration in the choice of research design. The accounting and management literature, previously identified, offers no research design prescription, but there are precedents favouring case studies when undertaking AR and constructive research in larger organisations. Jönsson and Lukka (2007)

suggest that IR is not limited to case studies only, although in practice this appears to be the situation. These authors also assert, "IR is a kind of field experimentation where the researcher, not having complete control over the design of the experiment, seeks to determine the experimental situation through observation, acts on that situation in concert with the host organisation, observes process and outcome, and analyses findings in view of the relevant literature" (p.74). To me this seems to be an unintentional invitation to explore alternative research designs when employing IR. Other disciplines, previously identified, seem to be predisposed to a quasi-experimental design in field settings. So where does this leave the interventionist researcher, concerning the choice of research design at this point in time? Given the paucity of the literature concerning IR in accounting and the uncertainty this represents concerning the choice of research design, the one issue that prevails concerns validity and reliability that cannot be ignored irrespective of the research design selected.

IR conducted in the social realm generally cannot avail itself of the controlled designs possible in evaluation settings; thus the challenge of IR is to conduct credible studies where truly rigorous experimental research methods are not possible (Schulte *et al.*, 1996, p.286). A means to achieve this "credibility" or "plausibility" (Covaleski *et al.*, 1998) is through a scientific view of the IR framework. Our goal is helping society through concepts or frameworks to make action effective in improving society (Davila and Oyon, 2008, p. 891). Niiniluoto (1984 cited in Kasanen *et al*., 1993) suggests criteria under which research is scientific, namely, objectivity, criticalness, autonomy, progressiveness; these criteria were applied in a constructivist research context. Table 7 presents a framework for conducting constructive research, which constitutes a series of phases and steps, similar to although not as comprehensive as the Thomas and Rothman (1994) framework. Such a framework facilitates a critical assessment and verification of each phase and step relating to the construct (innovation or intervention) development and indeed the construct itself. The development of the construct is 'an independent self-supporting activity' and is objective because the constructions either work or they don't.

Table 7 Constructive Research Framework

Phases and Activities
1. Find a practically relevant problem which also has research potential. Theoretical significance must be identified.
2. To examine the potential for long-term research co-operation with the target audience, including available resources.
3. Obtain a general and comprehensive understanding of the topic. Knowledge from previous literature required.
4. To innovate and construct a theoretically grounded solution idea.
5. To implement the solution and test whether it works in practice.
6. To examine the scope of the solution's applicability (including issues of validity).
7. Show the theoretical connections and the research contribution of the solution.

Source: Labro and Tuomelo (2003, p.415)

Furthermore, constructions are progressive because of their capacity to solve problems and highlight emerging problems scaffolding new research questions. Therefore the application of scientific criteria to an IR framework provides validity and reliability to IR. Labro and Tuomela (2003) indicate that steps three, four and five (see Table 7) are related to ensuring internal validity; additionally these authors also

referred to the work of McKinnon (1998) when considering validity strategies and tactics. This demonstrates that we don't need to discount the merits of validity strategies, but that the IR framework can use these strategies and the framework itself to promote validity. Given these examples, the IR framework of Thomas and Rothman (1994), specifically the D&D facet, can also become a tool for achieving validity within an IR project, through the application of the scientific research criteria identified by Niiniluoto. Therefore in the case of D&D, phase two, three and four could be used to address internal validity.

There are also external validity issues in IR. External validity refers to the extent to which we can generalise the results of a research study to people, settings, times, measures, and characteristics other than those used in that study (Gravetter and Forzano, 2009, p.159). Broadly speaking, Needleman and Needleman (1996, p.330) argue that the point of IR is not to uncover distributions and typical characteristics for the purpose of generalisations, but rather to gain in-depth insight into the complexities of human interaction and social meanings evident in the particular case under study. More specifically within the IR context, generalisability relates to whether interventions would also work in settings similar to those which they were originally constructed for (Kasanen *et al.,* 1993; Lindenburg *et al.,* 2001). The issue of intervention validity was also addressed in a previous section. Replicating interventions under various field conditions assists in the assessment of the generality of the effects of the intervention (Fawcett *et al*., 1994). This was another compelling reason for my employment of a quasi-experiment in the field. Davila and Oyon (2008, p.890) indicate that interpretive researchers rely to a larger extent on case studies where external validity happens through an audit of the research process and theoretical generalisations (a common approach in case studies also under a 'positivist" perspective) rather than from reproducing the study. Therefore, the IR framework of Thomas and Rothman (1994), representative of an intervention research process, can also be subject to audit to address external validity issues. Labro and Tuomela (2003) indicate that step six addresses external validity issues, which relates to the interventions' applicability. In the D&D context this would be phase five (see Table 2) examining intervention evaluation and advanced development. However when using an IR framework for validity issues, common sense should prevail and these issues should be considered from the first phase. There is insufficient evidence to prescribe a research design particularly suitable for IR and the diverse nature of field research presents further complexity in design selection. The Thomas and Rothman (1994) D&D framework has the capacity to contribute to the reliability and validity of IR. Given that the body of knowledge concerning IR in accounting and management is in infancy, using a quasi-experiment research design in a field setting represents a different option to treasure hunting.

CONCLUDING COMMENTS

And so ends this particular chapter of my awfully big adventure. This paper provided a reflective and practical perspective of doing cross-disciplinary research reviewing the practical application of intervention theory and an intervention framework, the participant system, intervention design and implementation, a 'quasi-experimental in the field' research design and a discussion addressing some related issues. These issues will hopefully entice other 'adventurers', using this discovery, providing fewer scary moments. Did I find the Holy Grail in a bat-infested cave? Unfortunately, not quite! I did however discover treasure at the end of my perilous journey, in the form

of an intervention theory and framework, not yet used in accounting research, and a navigation license to unearth jewels and other precious objects in the kingdom of knowledge.

Notes

[I] http://www.cimaglobal.com/About-us/Press-office/Press-releases/2006/August/CIMA-Interventionist-Research-Initiative-academics-and-practitioners-working-together/

[II]http://www.cimaglobal.com/Documents/ImportedDocuments/tech_resup_research_update_march07.pdf

[III]http://www.cimaglobal.com/Documents/ImportedDocuments/tech_resup_research_update_sept07.pdf

[IV]http://www.cimaglobal.com/Documents/ImportedDocuments/cid_resup_research_update_mar08.pdf

[V]http://www.cimaglobal.com/Documents/ImportedDocuments/cid_resup_research_update_mar09.pdf

[VI]http://www.cimaglobal.com/Documents/ImportedDocuments/cid_resup_research_update_sept09.pdf

[1] Atkinson and Shaffir (1998, p.43) assert that the qualitative methodology recognises that human behaviour cannot be adequately understood by observing it from the outside, rather understanding a social world from the perspective of the actors, experiencing reality as others experience it.

[2] Jönsson and Lukka (2007) assert that alternative forms of IR include action research, action science, clinical research, design science, constructive research. Baard (2010) argues for a distinctive identity for IR, embraced by its theory and frameworks, since these alternative forms may lead to misconceptions concerning the processes and outcome from IR.

[3] This theory could also be defined as "organisational or sociological theories to examine the development, maintenance and change in managerial accounting practices, thus providing intellectual approaches from which to study managerial accounting as problematic aspects of the organisational and social context", (Covaleski *et al.*,1996, p.1).

[4] Ninety-five percent of Australian private sector businesses are small, employing 48% of the workforce (Australia. Bureau of Statistics, 2001:8127). United States small firms represent 99.7% of all employers, and employ 52% of private sector employees (SBA, 2004). Ninety-nine percent (99.3%) of United Kingdom businesses are small and provide 46.2% of non-government employment. (SBS, 2003)

[5] 'Adoption' is defined in this context as the using of computer hardware and software applications to support operations, strategic activities, managerial functions and decision-making in the business (Lee and Runge (2001). IT is also considered a sub-system of management information systems in this context.

[6] These paradigms include developmental research (Thomas, 1984), social research and development (Rothman, 1980), behavioural research (Fawcett, 1990, 1991), experimental social innovation (Fairweather, 1967) and model development research (Paine *et al.*, 1984); their applicability to the D&D phases is illustrated in Table 3.

[7] The Ntsika Enterprise Agency had empirical research to determine an approximate number of small firms, by province and industry, but no further research in progress at the time of doing this research.

[8] These questionnaires, also referred to as the pre-test instrument were semi-structured therefore containing open-ended questions, providing an opportunity for candid participant responses, to invite for respondent participation in interviews to collect qualitative data, and clarify any responses on the open-ended items. Those OMs' identifying themselves in the questionnaires provided the pool of participants from which random sampling occurred for the experimental groups.

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