4 CHAPTER 4: RESEARCH APPROACH AND METHODOLOGY

4.1 INTRODUCTION

The initial chapters of this report provided insight into the nature of the research problem encountered and the nature of the environment within which the research was done. Following from this the interpretation of relevant theory provided a firm basis for the researcher to interact with the research environment. This theoretical reference framework within the context of this research provided the basis for both the comparison of theory and practice and also allowed for the utilisation of an appropriate research methodology.

With this research primarily focused on the ability to realise change within the SA DOD as an enterprise, cognisance had to be taken of the specific characteristics or context that surrounded the research. The development of appropriate structural arrangements eventually became the focus for establishing an appropriate strategic ICT process for the DOD that could be utilised to ensure that strategic planning could be performed as an institutionalised function.

To the end of establishing an appropriate strategic ICT planning process for the DOD with due consideration of the triangular relationship between an appropriate research methodology, scientific theory and practice, the ability to successfully apply research methodology appropriately to the practical application of theory has been an ongoing endeavour for both researchers and practitioners. This stems from the requirement of both practitioners and theorists to be able to ensure that the relationship between practical knowledge and experience as gained in the workplace can be realistically based in theory with due consideration of the requirement for theory to be based on practice.

4.2 AIM OF THIS CHAPTER

The aim of this chapter is to elucidate the practical application of the action research methodology as part of an actual case study. The case study was undertaken with the imperative to develop an appropriate strategic ICT planning process for the South African National Defence Force as an example of a diversified (complex) organization with due consideration of the existing body of theoretical knowledge.

The intention is therefore to provide some insight into the application of the action research methodology in the DOD and so to ensure that the practical requirements for learning and delivery of output can be aligned with the imperatives for research as a scientific process. To this end the framework utilised as interpreted by the researcher will be presented and discussed in this chapter.

A short synopsis of the actual case study undertaken will also be provided to elucidate the context for the research. The analysis of the research findings and related conclusions given the existing body of knowledge and the specific circumstances of this research will serve to guide the confirmation or falsification of existing theory. These research findings can then also be used to present the contributions of this research as a single case study to the existing body of knowledge.

To provide context for the utilisation of a specific research approach and methodology that was cognisant of the actual research undertaken the following contextual depiction can be presented.

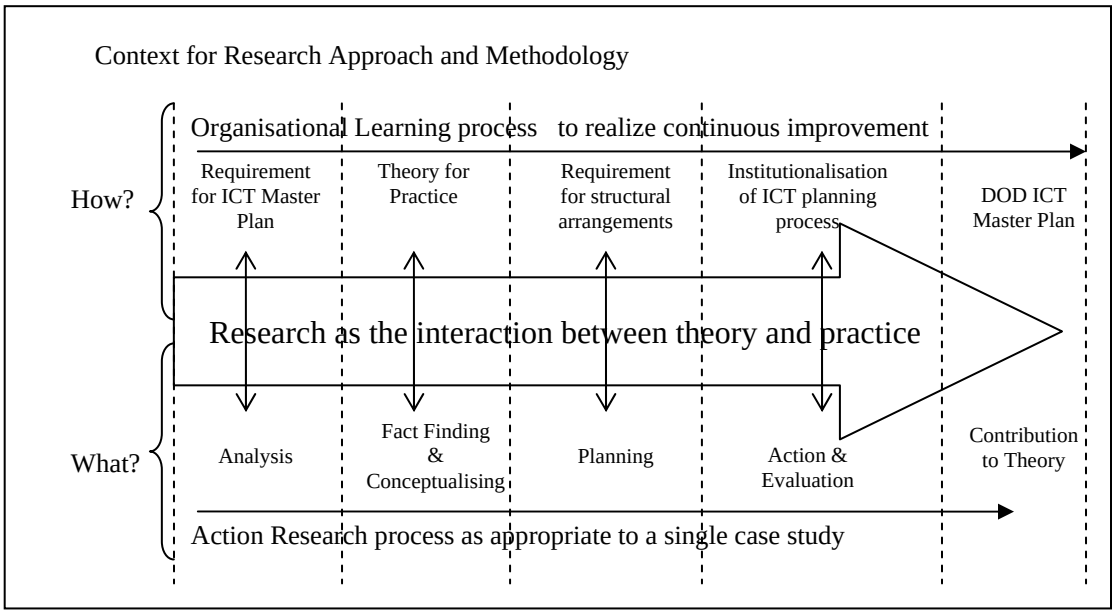

Figure 4.1: Context for Research Approach and Methodology

From the above depiction the ability to apply the principles and methodology of research to the point where the practical application of theory can dynamically and interactively be subjected to scientific scrutiny to augment existing theory, becomes the overall objective.

4.3 APPROPRIATENESS OF USING A SINGLE CASE STUDY

Researchers such as Klein and Myers (1999)[295] indicate that IS research is qualitative and interpretive in nature when focusing on its organizational implications as is relevant to this research as a case study. The issues of research complexity also come into effect when considering that the multi-disciplinary nature of IS research is described by Whitley (1984)[296] as a fragmented adhocracy. The ability to therefore identify those aspects that are considered relevant to the specific research undertaken during the specific case study will lead to a clear definition of the research paradigm in terms of the 'principles' defined by Klein and Myers (1999) *op. cit.*

From a research perspective the utilisation of case studies as scientific research within the ICT environment poses its own set of challenges that is has for a long time been a serious topic of discussion in the scientific community as clearly defined by Campbell and Stanley (1966:6-7)[297] when they stated that *"Such studies (*case studies*) have a total absence of control as to be of almost no scientific value"*. These discussions, however, do not distract from the requirement to be able to bring the science (theory), research methodology and practice together to scientifically enable the intention for learning and continuous improvement of both theory and practice. The use of single case studies is disputed by authors such as Campbell (1975)[298], who initially disputed the value of single case studies, but has changed to support the acceptance of single case studies as not being representative to the point where it supports the generalisation of research findings.

Authors such as Lincoln and Guba (1985)[299], also held the position that a single instance of deviation is not necessarily sufficient proof to support the generalised application of research findings. They - Lincoln and Guba (2000)[300] - have later also changed their position on the use of single case studies when referring to

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[295] Klein, H.K, & Myers, M.D. 1999. A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 1999, vol.23, no.1, p.67-94.
[296] Whitley, R. 1984. *The Intellectual and Social Organization of the Sciences*. Oxford: Clarendon Press.
[297] Campbell, D.T. & Stanley, J.C. 1966. *Experimental and Quasi-Experimental Designs for Research*. Rand-McNally: Chicago.
[298] Campbell, D. 1975. Degrees of freedom and the case study. *Comparative Political Studies*, 1975, vol.8(1), p.178-191.
[299] Lincoln, Y. & Guba, E. 1985. *Naturalistic inquiry*. Newbury Park, CA: Sage.
[300] Lincoln, Y. & Guba, E. 2000. The only generalisation is: There is no generalisation. In *R.Comm (Ed.) Case Study Method*, 2000, London, Sage, p.27-44.

"transferability" as opposed to "generalisation". The basis for this change in opinion was that it becomes very difficult to exactly "reproduce" or experience an exactly identical set of circumstances for any research undertaken to that which produced the original results.

Given the general requirement to develop a set of guidelines for any research as opposed to enforcing principles stringently, whilst at the same time ensuring and allowing for deviations from the current body of knowledge, Flyvbjerg (2001) *op. cit.* presents his "*Five misunderstandings about case-study research"*. These misunderstandings are summarised by Ruddin (2006:799)[301] as follows:

- Misunderstanding 1: Theoretical knowledge is more valuable than practical knowledge.
- Misunderstanding 2: One cannot generalise on the basis of an individual case; therefore, the case study cannot contribute to scientific development.
- Misunderstanding 3: The case study is most useful for generating hypotheses, that is, in the first stage of a total research process (followed by a rigorous approach).
- Misunderstanding 4: The case study contains a bias towards verification, that is, a tendency to confirm the researcher's preconceived notions.
- Misunderstanding 5: It is often difficult to develop general propositions and theories on the basis of specific case studies.

Eckstein (2000)[302] further confirms the opinion that case studies are in fact very appropriate to test existing theory in practice. Given that the focus of this research was to not only define a strategic ICT planning process, but also to institutionalise it, the establishment of an appropriate reference framework that addresses both the "what" and the "how" of the research methodology becomes a necessity. This is in line with

[301] Ruddin, L.P. 2006. You Can Generalise Stupid! Social Scientists, Bent Flyvbjerg, and Case Study Methodology. *Quality Inquiry*, August 2006, vol.12, no.4, p.797-812.
[302] Eckstein, H. 2000. *The case study and theory in political science: Case study method.* Edited by R. Comm. London: Sage, p.119-164.

the questions posed by Mårtensson and Lee (2004)[303] on issues of theoria and praxis and is once again confirmed as relevant to this research.

The issues of context as related to reflexivity and hermeneutics as described by Giddens (1984)[304] and Klein and Myers (1999)[305], and even Whitley (1984)[306] when referring to research complexity, impacts on the ability to understand complexity with the specific research objective to determine the nature of the relationship between theory and the specific practical circumstances to the point where the findings can be presented as specific to the research undertaken and not as generalised findings. The acceptability of a single case study to indicate deviation from generalised theory as presented by Popper (2000)[307] when referring to 'falsification' as opposed to 'generalisation' further legitimises limiting this research to the research undertaken in the DOD.

In presenting his *"Five misunderstandings about case-study research"* Flyvbjerg (2001)[308] expresses the opinion that case studies are in actual fact very appropriate to test existing theory in practice. This opinion is also held by Eckstein's (2000)[309], who points out that case studies can be used to determine deviations from the existing body of knowledge and that these can be considered to be appropriate to make a scientific contribution. The intention of this research to provide an indication of not only what should be done to do strategic ICT planning, but also how it should be done, renders the issues of combining theory and practice as appropriate to the specific circumstances and therefore it became acceptable. This is especially relevant when the research to be undertaken is steeped in the existing body of knowledge and the intention is to expand upon the understanding of the practical implications of the relevant theoretical body of knowledge. This is in line with the questions posed by

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[303] Mårtensson, P. & Lee, A.S. 2004. Dialogical Research at Omega Corporation. *MIS Quarterly (Special Edition),* September 2004, vol.28, no.3, p.507-536.
[304] Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*, Cambridge, MA: Polity Press.
[305] Klein, H.K, & Myers, M.D. 1999. A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 1999, vol.23, no.1, p.67-94.
[306] Whitley, R. 1984. *The Intellectual and Social Organization of the Sciences*. Oxford: Clarendon Press.
[307] Popper, K. 2000. *The logic of scientific discovery*. 6th ed. London: Routledge.
[308] Flyvbjerg, B. 2001. *Making social science matter: Why social enquiry fails and how it can succeed again.* Translated by S. Sampson. Cambridge, UK: Cambridge University Press.
[309] Eckstein, H. 2000. *The case study and theory in political science: Case study method.* Edited by R. Comm. London: Sage, p.119-164.

Mårtensson and Lee (2004)[310] on issues of theory (theoria) and practice (praxis) and is once again confirmed in the opinion of this researcher as being considered relevant to this specific research. "*Naturalistic generalisation*" as referred to by Ruddin (2006:804)[311] when quoting Stake (1982)[312] has the implication that it places emphasis on the perspective of the reader and that the researcher should provide "*sufficient contextual information to facilitate the reader's judgement as to whether a particular case can be generalised to a specific field of practice*". This once again tends to focus on the ability to balance theory and practice and ensure application of theory in specific practice by enlightened practitioners as is also the opinion of this researcher. This also adds emphasis to the layout of this thesis.

4.4 ACTION RESEARCH AS A RESEARCH METHODOLOGY

4.4.1 General Comments on Action Research

Due consideration of authors such as Klein and Myers (1999)[313], Behr (1983)[314], Baskerville and Wood-Harper (1998)[315] as well as Mårtensson and Lee (2004)[316] on action research as well as the critical analysis and interpretation of theory towards its application in practice, served to guide this research. The characteristics of action research are provided by these authors and others served to provide a clear understanding and focus for the use of action research to guide this specific research. A sound theoretical reference framework became particularly relevant given the imperative to institutionalise an appropriate strategic ICT planning process and to conduct the research in a scientific manner. This aspect was further necessitated by the requirement to contribute to both science and practice through the process of structured research and practical continuous improvement.

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[310] Mårtensson, P. & Lee, A.S. 2004. Dialogical Research at Omega Corporation. *MIS Quarterly (Special Edition)*, September 2004, vol.28, no.3, p.507-536.
[311] Ruddin, L.P. 2006. You Can Generalise Stupid! Social Scientists, Bent Flyvbjerg, and Case Study Methodology. *Quality Inquiry*, August 2006, vol.12, no.4, p.797-812.
[312] Stake, R. 1982. Naturalistic generalisation. *Review Journal of Philosophy and Social Science*, 1982, vol.7, p.1-12.
[313] Klein, H.K, & Myers, M.D. 1999. A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 1999, vol.23, no.1, p.67-94.
[314] Behr, A.L. 1983. *Empirical research methods for human sciences: An introductory text for students of education, psychology and the social sciences*. Pretoria: Butterworths.
[315] Baskerville, R & Wood-Harper, A.T 1998. Diversity in information systems action research methods. *European Journal of Information Systems*, 1998, vol.7, p.90-107.
[316] Mårtensson, P. & Lee, A.S. 2004. Dialogical Research at Omega Corporation. *MIS Quarterly (Special Edition)*, September 2004, vol.28, no.3, p.507-536.

From a business perspective the imperatives that drive the requirement for constant improvement have by implication been advocated for some time starting as far back as Sun Zu, John Adams and latter-day proponents such as Porter and Mintzberg. This is further expanded upon in articles related to for instance the interdependencies between strategic management, and the formulation of an ICT strategy as presented by for instance Kruger and Snyman (2002)[317] and many other authors.

The ability to combine theory (theoria) and practice (praxis) and to utilize an appropriate research methodology that can support this intention is advocated fairly vociferously by proponents such as Baskerville and Myers (2004)[318], Lindgren, Henfridsson and Schultze (2004)[319], Mårtensson and Lee (2004)[320], Baskerville and Wood-Harper (1998)[321], as well as Korpela, Mursu and Soriyan (2004)[322]. All of these authors refer to the action-research characteristic and the fact that the complexity of the research environment and the ability to ensure collaboration and participation between the researcher and the research environment and subjects should be deemed extremely important.

In terms of the continuous improvement imperative for both theory and practice Lindgren, Henfridsson and Schultze (2004) *op. cit*. refer to competencies within the context of *competence-in-stock, competence-in-use* and especially interesting aspects of *competence-in-the-making.* C*ompetence-in-stock* refers to the total ability that the organization (people) has as opposed to *competence-in-use* that refers to only that portion of the ability that is being used by the people in the organization. *Competence-in-the-making* on the other hand has the implication that this is the result of continuous improvement and learning that augments and enhances both the *competence-in-stock* and the *competence-in-use*. When combining 'competency-in-

[317] Kruger, C.J. & Snyman, M.M.M. 2002. The interdependability between Strategic Management, and the formulation of an Information and Communication Technology Strategy. *South African Journal of Information Management*, 2002, vol.4,2.
[318] Baskerville, R & Myers, M.D. 2004. Special Issue on Action Research in Information Systems: Making IS Relevant to Practice – Foreword. *MIS Quarterly*, September 2004, vol.28(3), p.329-335.
[319] Lindgren, R., Henfridsson, O. & Schultze, S. 2004. Design Principles for Competence Management Systems: A Synthesis of an Action Research Study. *MIS Quarterly*, September 2004, vol.28, no.3, p.435-472.
[320] Mårtensson, P. & Lee, A.S. 2004. Dialogical Research at Omega Corporation. *MIS Quarterly (Special Edition)*, September 2004, vol.28, no.3, p.507-536.
[321] Baskerville, R & Wood-Harper, A.T 1998. Diversity ion information systems action research methods. *European Journal of Information Systems*, 1998, vol.7, p.90-107.
[322] Korpela, M.; Mursu, A. & Soriyan, H.A. 2002. Information Systems Development as an Activity. *Computer Supported Cooperative Work*, 2002, vol.11, p.111-128.

the-making' with the concepts of theoria and praxis as discussed by Mårtensson and Lee (2004) *op. cit.* the identification of a specific application of action research as a critical methodology falls into this category of learning.

At the same time as the development of the ability to continuously improve business (practice), given the common adage that the only constant in life is change, the imperative to constantly improve research approaches and enabling methodologies can be considered to be subjected to similar changes towards continuous improvement and its ability to guide and enable research. The conclusion reached by this researcher is that just as functional theory is subject to continuous improvement given the imperative for change, research theory can also be considered to be subject to change and continuous improvement.

4.4.2 Contextual Aspects of Action Research

According to authors such as Klein and Myers (1999)[323] the ability to perform qualitative research with interpretation as an essential element requires a clear and unambiguous understanding of the nature of both the research methodology and its ontological dimensions. Baskerville and Myers (2004)[324] indicate that there are primarily two stages involved in action research being the *diagnostic stage* and the *therapeutic stage*. The enabling activities for these two stages place the focus firmly on analysis, fact finding, conceptualisation, planning, implementation of action and evaluation. The underlying focus of such research is the issue of problem solving where it is necessary to be able to understand the problem encountered given the overall objective, and then finding solutions whilst at the same time being able to define the improvement and its related learning.

The undertaking of such research is influenced by both theory and practice and the relationship between all three perspectives forms the basis of good research. As referenced from Baskerville and Myers (2004) *op. cit.* and their reference to the requirement for pragmatism they provide a framework to ensure that empirical answers can be obtained from the actual research undertaken.

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[323] Klein, H.K, & Myers, M.D. 1999. A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 1999, vol.23, no.1, p.67-94.
[324] Baskerville, R & Myers, M.D. 2004. Special Issue on Action Research in Information Systems: Making IS Relevant to Practice – Foreword. *MIS Quarterly*, September 2004, vol.28(3), p.329-335.

Given that both the action research process and the practical work followed a distinct process it is deemed appropriate that a clear understanding of the characteristics that influence both the application of methodology and the actual research undertaken should be made. It was furthermore considered important for purposes of this research that cognisance should be taken of the specific research context as being relevant to the research findings. As already indicated the research context, with due consideration of the arguments presented by Flyvbjerg (2001) *op. cit.* and Ruddin (2006) *op. cit.*, can be presented as follows:

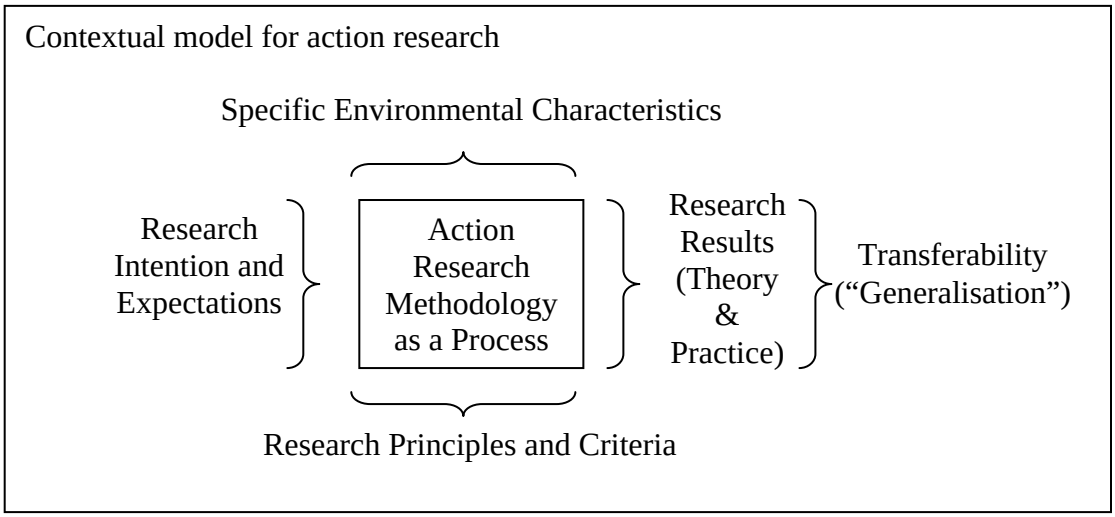

Figure 4.2: Context for Action Research Process

4.4.3 Action Research as an Appropriate Research Methodology

Baskerville and Wood-Harper (1998)[325] refer to the three dilemmas that are referred to, namely the "*goal*" dilemma, the dilemma where "*the role of the researcher and the consultant individual is served in a single individual*" and the dilemma that relates to the "*concomitant value*" of the research. Addressing the three dilemmas with due consideration of the interpretation of the 'progression of learning' as presented by Giddens (1984)[326], the ability to separate the roles of the researcher and the practitioner becomes very important to support the requirement for objectivity. If this aspect is not appropriately managed it could result in a potential conflict of interests between the practitioners and the researchers and could impact negatively on the research findings from both the science perspective and practical perspective. This

[325] Baskerville, R & Wood-Harper, A.T 1998. Diversity ion information systems action research methods. *European Journal of Information Systems*, 1998, vol.7, p.90-107.
[326] Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*, Cambridge, MA: Polity Press.

separation of roles becomes especially relevant to the issue of using single case studies and the requirement for this research to insure research integrity. This implication further contributes to the necessity of establishing a set guidelines or a framework for the research to be undertaken. The researcher then follows the guidelines or framework for the research to be undertaken to avoid conflict and increase the integrity of the research.

To further enhance the objectivity of the researcher and the framework for the research methodology in addition to the three dilemmas as presented by Baskerville and Wood-Harper (1998) *op. cit.*, an appropriate understanding and application of the five methodological principles for research as presented by Davison, Martinsons and Kock (2004)[327] are required. These relate to aspects of *researcher-client agreement*, the *cyclical process model*, the *principle of theory*, as well as *change through action* and *learning through reflection*. Once again this is a clear indication of process with a clear understanding of the context as a strong prerequisite for rigorous action research.

Given the relationship between the research environment and objective and the research methodology Schein (1987, 1969)[328, 329] contributes by indicating that there is an increasing association between action research and organizational consulting. It is furthermore contended by Clark (1972)[330] that the ability to sustain objectivity becomes even more blurred when the implications of authority and power, or being beholden to role players and stakeholders start to influence the research undertaken and by implication the research methodology. The imperative for participation without negating the ability to maintain objectivity throughout the research project has the implication that there should be a clear and distinct definition, understanding and exercising of roles and functions within the research project. This was also found to be the case in the specific research undertaken.

[327] Davison, R.M., Martinsons, M.G. & Kock, N. 2004. Principles of Canonical Action Research, *Information Systems Journal*, 2004, vol.14, p.65-86.
[328] Schein, E. 1987. *The Clinical Perspective of Fieldwork.* Newbury Park: Sage.
[329] Schein, E. 1969. *Process Consultation: It Role in Organizational Development*. Reading: Addison-Wesley.
[330] Clark, P. 1972. *Action research and Organizational Change*. London: Harper & Row.

Given the potential for 'double-loop learning' as presented by Argyris and Schon (1978)[331] the relationship between reflection and action becomes necessary to manage change. This relationship is further elucidated by some of Lewin's (1947)[332] concepts for change management and the perspective presented by Checkland (1981)[333], emphasising the relationship between action research and systems thinking as influenced by Soft Systems Methodology where cooperation and collaboration become problematic. According to Baskerville and Wood-Harper (1998) *op. cit*. the five streams that developed were related to social and organizational science, organizational learning, process consultation, system science and IS Action Research. The issue of context and its influence on the ability to apply the action research methodology appropriately in an environment that is dependent upon collaboration and cooperation becomes more evident when it is done with recognition of these 'streams' that characterised the development of the action research methodology.

4.4.4 Dialogical Action Research

Given that there is a specific relationship that is expected to be sustained between the researcher and the practitioners (subjects) the ability to constantly manage the interaction between these two in accordance with the relevant criteria (characteristics) require specific skills from both the researcher and the practitioners. It is therefore considered appropriate by this researcher that an understanding of dialogical action research as presented by Mårtensson and Lee (2004:512)[334] be established to support this research. From the theory and also as experienced during the specific research undertaken it was confirmed that there is a constant and dynamically iterative and interactive relationship between the researcher and the subjects as influenced by their environment. This relationship and the ability to sustain it is dependent upon the fact that the researcher should "*pose a wide range of technical skills for carrying out scientific work*" as confirmed by Flyvbjerg (2000:424) *op. cit* with reference to the research done by Thomas Kuhn. These technical skills that are required to facilitate an interactive relationship is also appropriate to both the researcher/subjects and the

[331] Argyris, C., & Schön, D.A. 1978. *Organizational Learning: A Theory of Action Perspective*. Reading, Massachusetts: Addison-Wesley.
[332] Lewin, K. 1947. Frontiers in group dynamics II. *Human Relations*, 1947, Issue 2, p.143-153.
[333] Checkland, P. 1981. *Systems Thinking Systems Practice*. Chichester: Wiley.
[334] Mårtensson, P. & Lee, A.S. 2004. Dialogical Research at Omega Corporation. *MIS Quarterly (Special Edition)*, September 2004, vol.28, no.3, p.507-536.

organization with due cognisance of the concept of critical social theory and its focus on dialogical action research as presented by Mårtensson and Lee (2004:512)[335].

Mårtensson and Lee (2004) *op. cit.* indicate that there is an instantiation of two of Schutz's (1962)[336] concepts being "*the scientific attitude"* and "*the natural attitude of everyday life"*. The relevance of this comes to the fore when considering the research of Scarborough and Corbett (1992:157)[337] that indicates that "*the relationship of (between) technology and organization is neither one of "impacts" (of IT) nor of "choice" (made by managers) per se. Rather that technology and organizations are closely intertwined through the flows of knowledge and ideas which transcend the individual organization, but which find expression in, and are reinforced by, political interests and agendas at the organizational level. Therefore destinations between a hard and a soft approach would not even remotely be realistic*". The emphasis of this statement as specifically relating to the organizational and social issues is of interest for the purpose of this research.

The relationship indicated above pre-empts the possibility of there being a combination between the hard scientific theory and the ability to manage the organizational implications and as such the research methodology should indicate these 'flows of information' between the two instances. As such any framework should present this flow of information between theory and practice in such a manner that it enhances the integrity and veracity of the research and its findings with due consideration of the specific characteristics as appropriate to the specific research environment.

In describing action research Baskerville and Wood-Harper (1998)[338] characterise it as being iterative and reflective and having the requirement to be based in pragmatism. As such there are four primary tenets that provide the premises that arise from the whole approach towards pragmatism. These are the fact that pragmatisms relate the fact that "consequences define human concepts" described by Pierce (1839-

[335] Mårtensson, P. & Lee, A.S. 2004. Dialogical Research at Omega Corporation. *MIS Quarterly (Special Edition),* September 2004, vol.28, no.3, p.507-536.
[336] Schutz, A. 1962. *"Concept and Theory Formation in the Social Sciences," Collected Papers, Volume 1, M. Nijhoff,* The Hague, p.3-41.
[337] Scarborough, H. & Corbett, J. 1992. *Technology and Organisation*. London: Routledge.
[338] Baskerville, R & Wood-Harper, A.T 1998. Diversity ion information systems action research methods. *European Journal of Information Systems*, 1998, vol.7, p.90-107.

1914), the fact that "practical outcomes embodies truth" presented by James (1842-1909), the "logic of controlled enquiry" from Dewey (1859-1952) and the issues of the "social context of action" as presented by Mead (1862-1931). When considering these premises and therefore the related characteristics or expectation of action research as presented by Mårtensson and Lee (2004) *op. cit.*, as well as Korpela, Mursu and Soriyan (2004)[339] the issues of synthesis become all the more important as presented by Lindgren, Henfridsson and Schultze(2004)[340].

When considering the dynamic yet appropriate interaction between all of these characteristics of action research it can be presented as follows as a conceptual construct.

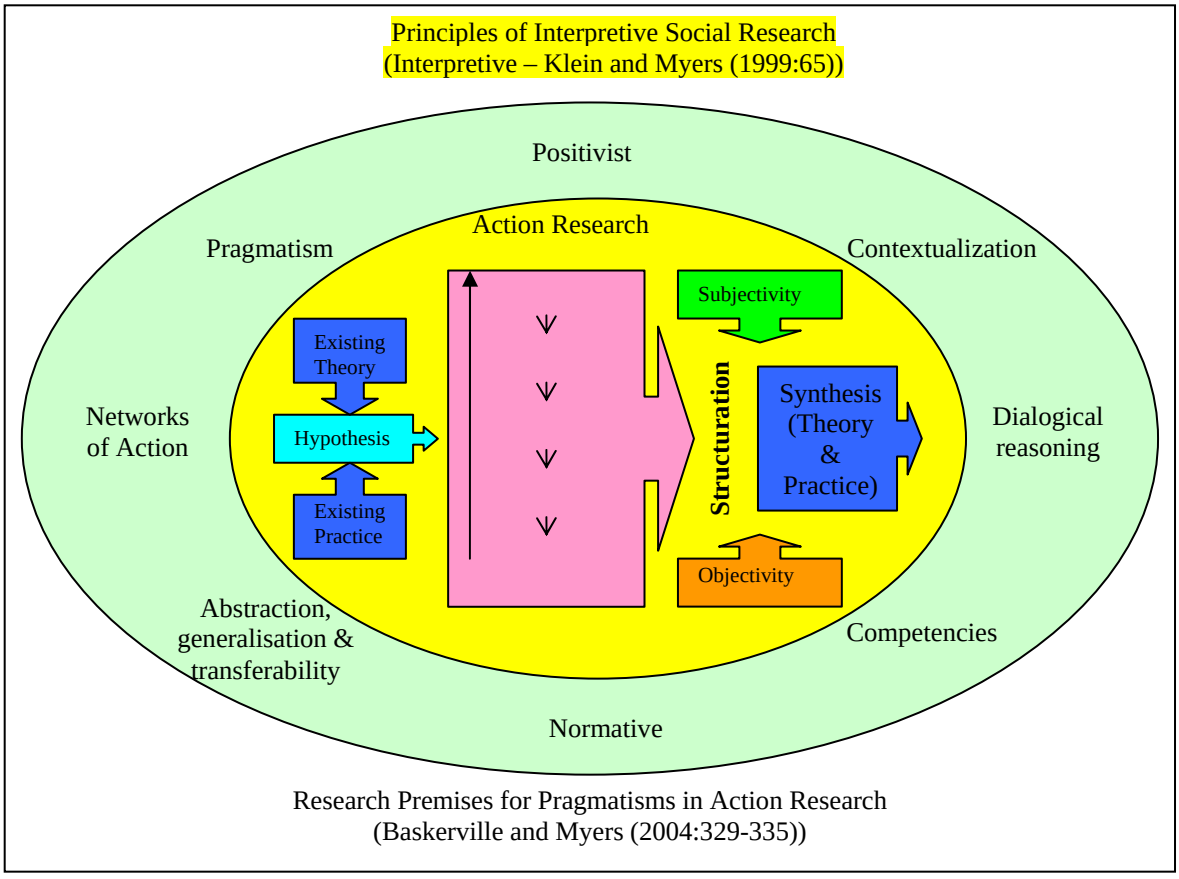

Figure 4.3: Contextual Construct for action research as an interpretation of theory and practice

The picture above at its core provides an indication of the process that would allow the research to be undertaken with due consideration of the characteristics and

[339] Korpela, M.; Mursu, A. & Soriyan, H.A. 2002. Information Systems Development as an Activity. *Computer Supported Cooperative Work*, 2002, vol.11, p.111-128.
[340] Lindgren, R., Henfridsson, O. & Schultze, S. 2004. Design Principles for Competence Management Systems: A Synthesis of an Action Research Study. *MIS Quarterly*, September 2004, vol.28, no.3, p.435-472.

activities of the research approach and the actual research undertaken. The outer circle provides some insight into the potential contextual considerations that might influence the execution of the process whilst still being required to sustain its scientific integrity the ability to make conscious decisions with due consideration of both the scientific objectives and the practical objectives of the research.

Given the relationship between the relevant theory of the research methodology and its practical application explicit contextual definition thereof becomes useful for the researcher to serve as a baseline reference for the research undertaken. Being appropriate to both the academic and practical perspectives, cognisance was taken of the implications of the issues relating to the "duality of structure" as defined by Giddens (1984:25) when defining the characteristics of structure as being contained in rules and resources and structuration as the ability to apply such rules.

4.5 ALIGNMENT BETWEEN THE RESEARCH ENVIRONMENT AND THE RESEARCH METHODOLOGY

It is considered appropriate to simplify the action research process to basic activities that can practically guide the formulation of a generic framework to guide this research at this point. According to Giddens (1984)[341] the fact that this interpretation has been verbalised constitutes an expression of learning in itself. The research activities take place in cycles as a process of continuous improvement and alignment as agreed by authors on continuous improvement. Alignment practice and theory should therefore focus on a comparison between theory and practice with clear cognisance of the prerequisite research methodological characteristics and principles to ensure an acceptable level of integrity and credibility of the research undertaken, the way in which it was undertaken and the findings.

From the discourses of especially Klein and Myers (1999)[342] on interpretive research and that of Baskerville and Myers (2004)[343] on action research it becomes clear that there are certain fundamental issues that have to be contended with during research of

[341] Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*, Cambridge, MA: Polity Press.
[342] Klein, H.K, & Myers, M.D. 1999. A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 1999, vol.23, no.1, p.67-94.
[343] Baskerville, R & Myers, M.D. 2004. Special Issue on Action Research in Information Systems: Making IS Relevant to Practice – Foreword. *MIS Quarterly* vol. 28 No. 3, p. 329-335/September 2004.

this nature. As such they have established some 'universal principles' and 'premises for pragmatism' that relate to the ability to establish a research paradigm for the research that was undertaken. One of these relates to the ability to ensure that the hermeneutic aspects of the research can be addressed. When applying the characteristics of the hermeneutic principle and therefore the context of the research environment, the first issue in terms of concludability and reflexivity comes to the fore when considering the nature of all those characteristics of the environment that will affect the research. The ability to therefore define the context and specific focus of the research becomes the first obstacle to be overcome as is also the contention Denzin and Lincoln (2000:103)[344] of praxis that is action based when drawing historical realism into dialogical methodologies.

4.6 SYNOPSIS OF THE CASE STUDY UNDERTAKEN IN THE SOUTH AFRICAN DEPARTMENT OF DEFENCE

Given the requirement for understanding the context that influenced the utilisation of the research approach and methodology and the characteristics discussed above the influences that might affect its use need to be presented.

The research was undertaken with a clear declaration of intention by the top management of the DOD that an appropriate ICT management function should be established and institutionalised in the DOD given the respective roles and responsibilities of role players and stakeholders. The primary focus was to move away from decentralised management approaches that led to the disparate and inefficient utilisation of ICT that was aligned to support the specific requirements of the respective Services and Divisions. The Services refer to the SA Army, the SA Navy, the SA Air Force and the SA Military Health Services and others whilst the Divisions refer to organizations such as the Logistics Division, the Finance Division, the Human Resource Management Division and others.

It was expected that in line with theory and practice there would be some common functions that require common ICT solutions that should be managed in a corporately orchestrated manner with full cognisance of unique requirements for ICT solutions and services. The nature of the organization in its complexity should be reflected in

[344] Denzin, N.K. & Lincoln, Y.S. 2000. *Handbook of Qualitative Research*. New York: Sage Publications.

the way in which the ICT function was managed and also in the very nature of the solutions to ensure that scarce resources could be optimally utilised to deliver maximum returns.

A business transformation team was established that had to ensure that through a process of business re-engineering an appropriate function of ICT management was established with commensurate capacity and management arrangements to ensure its institutionalisation. From this transformation team the corporately centralised ICT management organization was established that had its foundation firmly based on both practice and theory.

Problems were experienced with the establishment of the process itself that would not only adhere to the relevant management and specifically planning activities, but also to the structural (organizational) requirements for institutionalisation. As the transformation and the research progressed there was a gradual shift from a position where the initial emphasis was placed on the process itself to a position where the emphasis was placed on the process within the context of the organization and related issues. These organizational issues eventually became the primary focus for successful development and institutionalisation of an appropriate strategic ICT planning process for the SA Department of Defence. This situation required an ever-increasing understanding of the strategic ICT planning process and the organizational issues that surrounded the process.

This relationship between the process and the organization necessitated a clarification and formalisation of roles and responsibilities within the ICT management function that had a direct correlation to the clarification of roles and responsibilities as required for an action research approach and methodology. Given that constant change was the essence of everyday life during the transformation process the requirement for firm baselines of reference became more and more important due to the longitudinal nature of the transformation and the research undertaken. This requirement for structure was further expanded by the high turnover of participants in the project, but was counter-acted by the establishment of a centre of excellence that served as a core competency group for the project. The roles of researcher and practitioners were clearly differentiated within this group. Fortunately due to the change in role of the researcher and the commitment of top management the distinction between researcher and

practitioners was clearly drawn and enforced within top management and managed at corporate level.

The emphasis of the research revolved around the fact that it had the following characteristics:

- It was longitudinal in that it was conducted over a period of approximately eight years.
- There were issues that involved the separation of roles and responsibilities related to the practitioner environment and the scientific research environment.
- The development of the practical and the scientific learning experience followed a structural approach that was a continuous learning improvement.
- Continuity in both the practical and the research environment became a major consideration.
- Structural issues had to be addressed in conjunction with the process issues for both the strategic ICT planning process in the DOD and the process of action research.
- Inconsistent and disjunctive maturity levels were experienced in both the practical and the research environment that was progressively stabilised and improved as the transformation and research progressed.

4.7 INFERENCES AND DEDUCTIONS AS DRAWN FROM THE PRACTICAL APPLICATION OF THE ACTION RESEARCH METHODOLOGY AND ITS CHARACTERISTICS TO THE CASE STUDY

When interpreting the requirements or characteristics for the definition of a framework for action research it became apparent that the following should be addressed in such a framework:

- The ability to define the context, timeline and specific focus of the research in compliance with the hermeneutic principle as presented by Klein and Myers

(1999) *op. cit.* and also applied by Lindgren, Henfridsson and Schultze (2004)[345].

- A clear and distinct definition of the main activities that will take place in accordance with the action research approach and methodology provided by Lee and Baskerville (2003)[346].
- A clear and unambiguous identification of the respective participants in the research to be undertaken.
- A clear and unambiguous definition of the mandates and roles of the respective participant, role players and stakeholders that will be involved in the research.
- Presentation of relevant theory as appropriate to the respective research activities and functions.
- An indication of the contextual interpretation of the findings of the research.
- An objective definition of learning conclusions as relevant to both theory and practice.

Any framework should present this flow of information between theory and practice in such a manner that it enhances the integrity and veracity of the research and its findings. To this end the following can be indicated to ensure that there is a more standardised interpretation of these guidelines that can guide the "how" as opposed to the "what" of action research.

4.8 ESTABLISHMENT OF AN APPROPRIATE FRAMEWORK TO COMBINE AND PRESENT RESEARCH AND RESEARCH FINDINGS

Garfinkel (1963)[347] indicates that "*settings are used chronologically to explicitly state those generic characteristics to ensure a common framework*". This has the implication of process as opposed to mere procedures. The fact that a specific timeline

[345] Lindgren, R., Henfridsson, O. & Schultze, S. 2004. Design Principles for Competence Management Systems: A Synthesis of an Action Research Study. *MIS Quarterly*, September 2004, vol.28, no.3, p.435-472.
[346] Lee, A.S. & Baskerville, R.L. 2003. Generalizing Generalizability in Information Systems Research. *Information Systems Research*, September 2003, vol.14, no.3.
[347] Garfinkel, H. 1963. *'A conception of and experiments with, "trust" as a condition of stable concerted actions'*, in *O. J. Harvey, Motivation and Social Interaction*. New York: Ronald Press.

can be established for the research undertaken that is aligned with the research activities presented by Lindgren, Henfridsson and Schultze (2004) *op. cit*. as well as the main research activities presented by Baskerville and Lee (2003) *op. cit.* contributes towards the credibility of the research undertaken and is presented below as applied throughout this research.

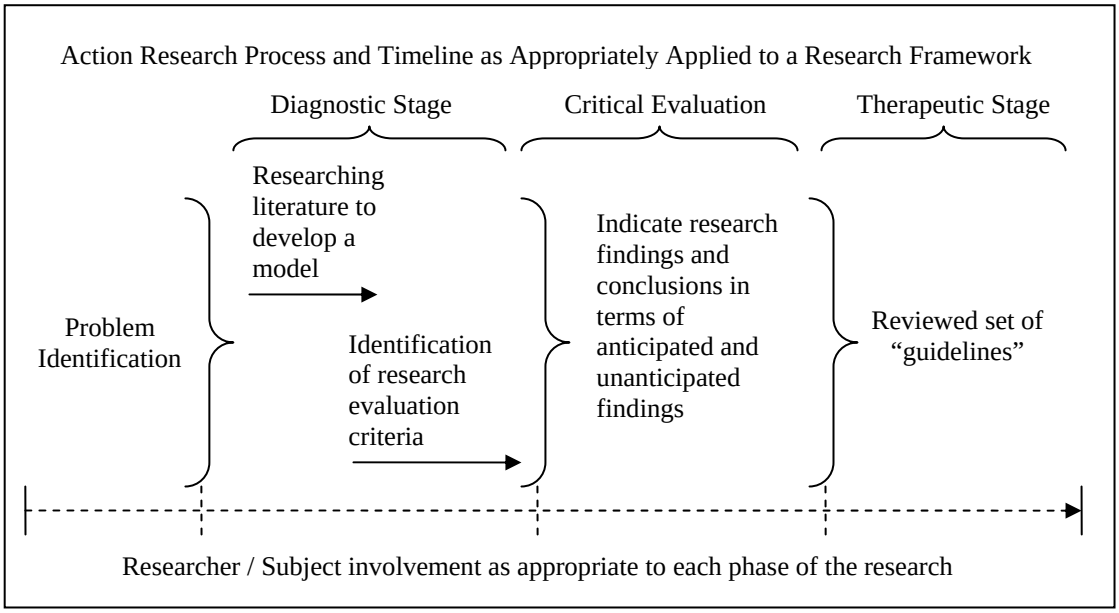

Figure 4.4: Action Research Process as interpreted from Lewin (1857) and Lindgren, Henfridsson and Schultze (2004) and Baskerville and Lee (2003)

As referred to above the very nature of action research and its requirement for collaboration between the researchers (actors) and the subjects or participants require the establishment of specific management arrangements and mechanisms when it occurs in a diversified organization. The use of such structural and management arrangements to support the research process was expected to result in a coordinated effort of checks and balances between the researcher and the practitioners as well as for practical and academic review. The quality and appropriateness of the research results for both scientific theory and for practice thus becomes a function of participation and cognition as confirmed by Giddens (1984)[348].

Given the requirement for critical analysis the ability to juxtapose the actual research process, appropriate theory, research findings and to subsequently draw conclusions from the research as a critical interpretation of theory and research findings, provides the opportunity to define a framework for its presentation. The *Summary of the Action*

[348] Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*, Cambridge, MA: Polity Press.

*Research Proj*ect can therefore be presented as follows with consideration of the model of Lindgren, Henfridsson and Schultze (2004)[349] and the fact that this table will be utilised to present the research data:

[349] Lindgren, R., Henfridsson, O. & Schultze, S. 2004. "Design Principles for Competence Management Systems: A Synthesis of an Action Research Study. *MIS Quarterly*, September 2004, vol.28, no.3, p.435-472.

<table>
<tr><th colspan="3">SUMMARY OF ACTION RESEARCH PROJECT</th></tr>
<tr><th>Research Activities</th><th>Practice (Praxis)</th><th>Theory (Theoria)</th></tr>
<tr><td colspan="3">Research Sites and Competency Management System: Provides contextual information to elucidate the activities and the nature of research and its findings. As such its sets the scene for the determination of the specific characteristics that are considered appropriate to the research problem and its expected results. The definition also sets the parameters for the research to ensure that research focus as a collaboration between the practitioners and the researcher can be sustained.</td></tr>
<tr><td colspan="3">Activity 1: E.g. Initiating the Strategic ICT Planning Process for the DOD. These activities will be strongly influenced by the research timeline as defined for the research as undertaken. The fact that this should not only follow the activities of the research methodology, but should do so in combination of the practical implications further enhances the ability to strike the balance between practice and theory.</td></tr>
<tr><td>The ability to pre-emptively plan and execute any activity provides the opportunity for review of the activity to serve as a basis for corrective actions. These are in accordance with any control function that needs to be performed where continuous improvement is the objective. This should however be done with due consideration of the fact that the changes required should be expressed as learning that can be substantiated in terms of its practical and theoretical implications. The actions relate to the following activities as described by Lindgren, et. al (2003) op. cit:
➢ Diagnosing:
➢ Action Planning:
➢ Action Taking:
➢ Evaluating:
Note: In the case of the SA DOD the research activities were driven by specific objectives related to the function of strategic ICT Planning as an appropriate process for the DOD. To this end the following objectives drove the research:
o The development of a plan to perform the function.
o The establishment of an appropriate ICT. methodology for the DOD
o Appropriate participation by all role players.
o The establishment and sustainment of appropriate skills and staff capacity to perform the ICT function.
o Implementing appropriate tools to support the strategic ICT planning function of the DOD.</td><td>The ability to apply research methodology and ensure that its practical implications can be utilised to enhance practice has the characteristic that it guides practice. This is however a two-way interaction between practice and theory that is dynamically iterative in nature. As such this interaction has to be formalised to ensure that the interaction can be formalised in a structured manner and focused on issues that are mutually agreed to. These should be relevant to practice, scientific theory and research methodology. From the application of Action Research Theory by Lindgren, et al. (2003) op. cit. this can be described as follows
➢ Researcher – Client Agreement:
➢ Cyclical process:
➢ Guiding Theory:
➢ Change through Action:
Note: In the case of the SA DOD these issues were addressed as part of the transformation process of the ICT function, whilst the implications from a research perspective were actively and consciously integrated and aligned with the process. Specific care had however to be taken to ensure that the focus and conditions of research and the maintenance of its objectivity was sustained. This sometimes placed the researcher and the organization in situations of conflict, but this was decreased as the organizational and process maturity of both the researcher and the organization improved.</td><td>The requirement for a continuous evaluation of both the theoretical or scientific implications of the research and the practical implications can be simplified by utilising the respective classifications for “competency” as defined by Lindgren, et al. (2003) op. cit. It provides a clear and distinct framework to indicate the improvement in ‘competency’ as the research progresses for both the scientific interests and the practical interests.
➢ Transparency of Competence-in-Stock:
➢ Real-time Capture of Competence-in-Use:
➢ Interest Integration as Competence-in-Making:
➢ Flexible Reporting as Contribution to Competence-in-Making:</td></tr>
<tr><td colspan="3">Activity 1: Summary of Learning / Contribution: The presentation of the learning / contribution can be focused by the systems model or framework as established for each organization. In the case of the SA DOD it was focused by issues such as Strategy and Governance, Culture, Organization, Competency, Facilities and Equipment, Process, IS / ICT, Finances, Performance. The learning experiences as derived from the research can be presented as that which is relevant to practice and that which is relevant to scientific theory. The interaction between the two environments and the fact that there is a direct correlation between the two environments results in a situation where the theory becomes “theory in practice” and not merely “competence in practice” or “competence in theory”.</td></tr>
</table>

Table 4.1: Framework for Presentation and Summary of Research as adapted from Lindgren (2004) *et al.*

From the above presentation the researcher sequentially indicates the respective activities as undertaken during the research. It also allows the researcher to indicate the contextual issues that relate to the research in terms of the hermeneutic requirements. This becomes extremely important for the reader as it can be expected that the cycle of diagnosing and implementing therapeutic action is largely dependent upon the environment or context. From the research undertaken it can be expected that the corrective actions taken could influence the environment and therefore the context for following activities.

Such a manner of presentation provides a clear and distinct opportunity to explicitly describe the timeline of activities that occurred during the research. The fact that the ability to present the findings of the research in a structured manner provides the reader and/or assessor with the opportunity to be able to directly relate the specific theory and practice as appropriate to the relevant research activity sets the scene for a more direct analysis of the results.

4.8.1 Framework for Findings

To ensure that the research findings can be presented with due consideration of the research data in a manner that will be cognisant of the systemic and therefore contextual functional considerations related to the research undertaken, a framework can be constructed to present such findings. In the case of the DOD the organization already established and accepted a holistic framework to guide the systemic approach towards systems management. These components of the systemic framework focused on ensuring that the dynamic relationships between the respective components of successfully institutionalising the function of strategic ICT planning are managed with the expectation that this will improve the functioning of the organization as a whole. This concept is in line with the interpretation of a systemic approach as defined by Checkland and Scholes (1990:18)[350]. As such the systemic approach includes ICT products that are subject to the influences of all the other aspects that will ensure a systemic approach towards ICT management for the DOD. The framework can be presented as follows:

[350] Checkland, P.B. & Scholes, J. 1990. *Soft Systems Methodology in Action*. Chichester, England: John Wiley & Sons.

Focus Area (Systemic)	**New Findings**
Strategy and governance	Findings for Practice and Scientific Theory
Culture	
Organization	
Competency	
Facilities and equipment	
Process	
IS / ICT	
Finances	
Performance	

Table 4.2: Framework for the Summary of Research Findings as appropriate to Practice and Scientific Theory

4.8.2 Framework for Testing Pragmatism

From the work done by Baskerville and Myers (2004)[351] it is clearly indicated that in its essential form action research relates to problem solving and has the primary activities of a diagnostic stage and a therapeutic stage. As such it can therefore be expected that any framework that is presented should reflect these activities. Given the nature of the process of action research as initially presented by Lewin (1947)[352] and the steps for action research that started off as being analysis, fact finding, conceptualisation, planning, implementation and evaluation and further defined within the construct of a diagnostic phase and a therapeutic stage, any framework should also reflect these activities. This can in combination with the premises for pragmatisms as discussed above, be presented as follows:

Premises	Diagnostic Stage			Therapeutic Stage		
	Analysis	Fact Finding	Conceptualisation	Planning	Implementation of action	Evaluation
Pierce's Tenet						
James's Tenet						
Dewey's Logic						
Mead's Tenet						

Table 4.3: Premises for Pragmatism in Research as interpreted from Baskerville and Myers (2004) and Lewin (1957)

[351] Baskerville, R & Myers, M.D. 2004. Special Issue on Action Research in Information Systems: Making IS Relevant to Practice – Foreword. *MIS Quarterly*, September 2004, vol.28(3), p.329-335.
[352] Lewin, K. 1947. Frontiers in group dynamics II. *Human Relations*, 1947, Issue 2, p.143-153.

The table presented above has the implication that it not only serves as a checklist for pragmatism that covers the action research activities, it also provides a framework that can be utilised to summarise comments. Such comments can in fact be utilised to present the respective learning aspects as experienced during the research project.

4.9 CONCLUDING DISCUSSION

The ability to ensure that the findings of specific action research can have wider application resides in the generalisation of the findings. According to Giddens (1984:xix)[353] generalisation refers to two aspects that relate to situations when "*that which actors know and apply in actions even though the actor might give new discursive form to them"* and where *"those circumstances or aspects of circumstances of which agents are ignorant which acts on them unbeknownst to them*". In addition to this Giddens also indicates (1984:xx) *op. cit.* a dualism that relates to the ability to be objective as opposed to subjectivity of which researchers might make themselves guilty. This is irrespective of the fact that such knowledge might be ontological or epistemological in nature. Giddens further contends that there is a strong causal relationship between ontology and knowledge and epistemology and circumstances and that the issues of relativism become more important in the process of verification and even falsification. It is the opinion of this author that this is also appropriate to the process of presenting an interpretation of Action Research in an example of a framework. Even this single interpretation should not be considered as generalised, but rather as an instance of application as appropriate to the specific circumstances of the research undertaken.

The interpretation referred to above can be enhanced when combined with the opinion of Mårtensson and Lee (2004)[354] when they refer to the concept of Dialogical Action Research as forthcoming from their research at the Omega Corporation. One of the aspects presented by them has the implication that there are seven potentially significant ramifications that should be recognised when 'bringing scientific research and the knowledge of the practitioner into contact'. With due consideration of the "hermeneutic principle" and its implication for recognising context as presented by

[353] Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*, Cambridge, MA: Polity Press.
[354] Mårtensson, P. & Lee, A.S. 2004. Dialogical Research at Omega Corporation. *MIS Quarterly (Special Edition),* September 2004, vol.28, no.3, p.507-536.

Klein and Myers (1999)[355], the relationship between the scientific researcher and the practitioner can be presented as follows:

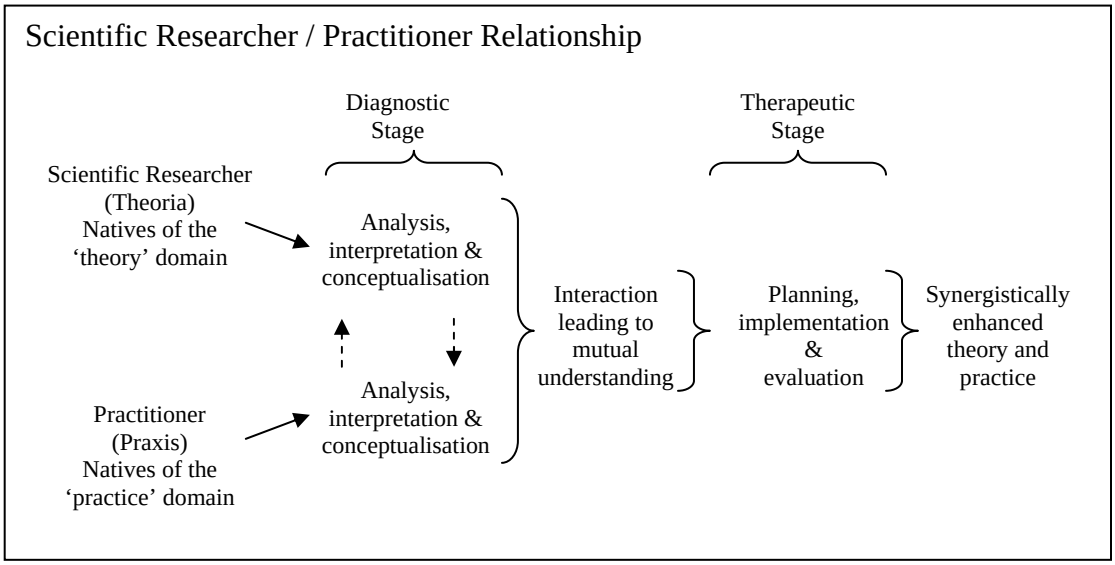

Figure 4.5: Illustration of the researcher / practitioner relationship

Given the fragmented nature of ICT and the variety of circumstances that surround the possible application an action research process in such a diversified environment, generalisation should be based on an understanding of those general principles that will guide the application of such a research process. Cognisance should also be taken of the fact that in the "*codification of rules*" as alluded to by Giddens (1984:21) *op. cit.* in consideration of Wittgenstein (1972)[356] the focus is placed on procedures of "*actions as aspects of praxis*" (practice). To this end with due consideration of the hermeneutic implications and requirements Giddens (1994:22 & 23) clearly states that "*most of the rules implicated in the production and reproduction of social practices are only tacitly grasped by actors: they know how to 'go on'. The discursive formulation of a rule is already an interpretation of it and may alter the form of its application*".

As such the formulation of generalised rules to set up frameworks should be such that it can be applied with specific tailoring to any set of circumstances with the clear and unambiguous understanding that it should be contextually interpreted in its application.

[355] Klein, H.K, & Myers, M.D. 1999. A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 1999, vol.23, no.1, p.67-94.
[356] Wittgenstein, L. 1972. *Philosophical Investigations*. Oxford: Blackwell.

4.10 CONCLUSIONS

Given the fact that the development and presentation of the framework for the application of critical action research in this instance, was derived from actual research where complexity was the essence of the research and the research environment, the ability to determine firm reference baselines that could serve to guide the research became imperative. The ability to ensure collaboration between the environments and perspectives of the researcher and the practitioners whilst still being able to ensure that objectivity of both the research methodology and the actual research undertaken was sustained, would have been greatly augmented if such a framework had been established prior to the research being undertaken - as opposed to having been established as a result of the research undertaken.

The opinions expressed is therefore a combination of theory and practice to try and get to the point where there is alignment and balance between “practice-in-theory” and “theory-in- practice” as opposed to “competence-in-practice” and “competence-in-theory”. The essence of this is that there should be a dynamic and iterative yet causal relationship between the ‘what’ and the ‘how’ of theory and the ‘what’ and ‘how’ of practice as being mutually inclusive yet two distinct environments. This is considered appropriate to the triangular relationship between research methodology, scientific theory and practice as will be presented in terms of this framework in the next chapter.