

# A Hybrid (Soft and Hard) Systems Approach to Project Management

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## Abstract

*Many firms face out of control projects and many report huge losses. Firms are hampered with many failures in project management, and the causes for these failures vary e.g. embedding of project management initiatives, poor quality, cost and schedule slippage, immature processes, adherence to processes, coordination of information flow, knowledge transfer, trust in project relationships, and, etc. This paper makes a contribution to knowledge by proposing a hybrid (soft and hard) systems approach to project management leads to successful project performance. Two case studies in the Information and Communications technology (ICT) industry are presented showing challenges in project management and the benefits which may be realized from adopting a (soft and hard) systems approach. Important lessons for managers and project management practitioners are provided.*

**Keywords** — *Systems Thinking, Holistic Approaches, Human Activity System and Project Management.*

## I. INTRODUCTION

The objective of this research is to make a contribution to knowledge by providing evidence through case study research that a hybrid, (soft and hard systems), approach to project management may lead to successful project performance.

Many firms are using projects on a day to day basis [22], firms have taken a strategic view to projects [54], firms initiate and participate in projects to improve their innovative capacity, to carry out system-wide change efforts, and to enhance their adaptive capability [56], and firms are implementing strategy through projects [60]. Reference [11] says many firms are managed through projects and it is difficult to find a firm which is not managed through some kind of project activity. Reference [53], [26]; and [58] say project management can add value to firms if it is developed in the right way both strategically and tactically. Firms often find it difficult to muster skills in project management and many firms report out of control projects, at least the following researchers provide some evidence: [34] provides a comprehensive list of cost overruns on large complex projects (LCP), [31] found similar results and more recently [42] found evidence supporting this trend. Poor performance in projects affects firm's performance and competitive position.

Customers (other firms) choose firms who are better at delivering goods and services. Therefore firms who are unable to muster the skills in project management are at a disadvantage. Reference [57] points out despite recent developments, project management continues to attract criticism for its lack of relevance to practice and consequently to improved performance of projects across different industrial sectors. Reference [2] adds there are very few studies in project management about the diffusion of project management standards and methods.

Reference [44] argues a 'soft' and 'hard' systems approach to project management creates the largest value to organizations. He also argues how to implement project management the 'right way' is still a relevant research topic. Therefore in this paper a hybrid (soft and hard) systems approach to project management is proposed. The research question posed: "Are we able to develop a hybrid (soft and hard) systems approach to project management which may lead to successful project performance?"

## II. LITERATURE SURVEY

There is a vast amount of research in project management, at least the following authors provide some evidence: project management, cost, time and quality [5], Project maturity in organizations [3], fundamental uncertainties in project management and the scope of project management [6], business strategy and project management [50], different perspectives on project management [27], project management performance assessments [40], project management offices in transition [4], business models in project based firms [28], exploring the value of project management [33], project management governance and normalization of deviance [38], critical success factors for project success [20], adoption of project management practices [21], project risk [37]; and strategy implementation through projects [61]. It is not the intention to give a complete overview of the project management body of knowledge but rather point to some gaps in the body of knowledge. Reference [14] says what is needed to improve project management practices, is not more research on what should be done or the frequency and/or use of traditional project management practices, but knowing more about the "actuality" of project based working and its management. Reference [44] argues the value of project management is related to implementation, therefore, the reasonable introduction and

implementation of project management and the critical factors related to project success are quite important in terms of creating value to an organization.

Reference [17] say's achieving effective project management is a challenge and embedding of project management improvement initiatives is a process rather than an event which requires adoption by all relevant individuals it is an organizational wide initiative. Therefore it is important that implementation of project management initiatives be seen as an organizational wide initiative, which require the involvement of many different stakeholders across the organization. The question then becomes, where can one learn from similar initiatives and bring such thinking into the project management arena? Reference [44] argues it is the coordination of 'soft' and 'hard' project management systems which gives organizations the largest value with the best investment.

Reference [47] provides the opportunity to learn from a hybrid (soft and hard) systems approach to business process management (BPM). BPM and project management involve problems of a similar nature both these disciplines involve the human activity system (HAS) or otherwise known as human dimension and include organizational wide initiatives and involvement of many different stakeholders. Therefore adopting lessons from the BPM initiative may be beneficial to project management. Others like [19] say the best known approach for tackling the human and organizational aspects of projects is through the use of critical success factors, they thereafter frame project critical success factors by a systems model. The systems model shows a holistic approach is beneficial to problems where the HAS is important, is organizational wide and involves many stakeholders. The principles of holism have been proposed by [48]. Other researchers like [7], [13], [43], [55] and [51] also support a holistic systemic view to organization wide problems. This approach was also supported by [39] who approach project management from a systematic level. Building upon this [15] takes a holistic view of project management, arguing a soft systems approach to project management gives better project results.

The holistic approach to project management views project management through the principles of holism and more importantly involves the HAS early on in the analysis. Reference [43] highlights important aspects of the HAS; e.g. modern firms are expected to become learning organizations where people continually expand their capacity to create the results they desire, where new patterns of thinking are natured, etc. Further evidence of this is provided by [35] who support the soft systems approach to project management; and [59] shows links between project management leadership styles and project success.

Reference [47] argues a wider systems view requires a paradigm shift, Figure 1 adapted from [47].

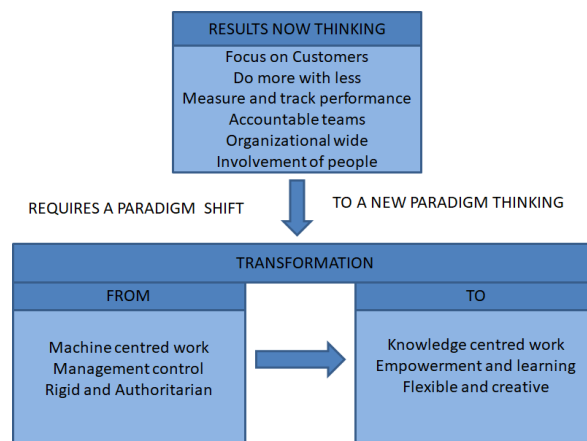


Fig 1: Paradigm Shift

A results now thinking approach is focused on customers, doing more with less, measurement and tracking of performance, accountable teams, the approach is organizational wide and involves people. A paradigm shift is the transformation from machine centered work, management control and; rigid and authoritarian processes, to a new paradigm thinking focusing on knowledge centered work, empowerment and learning, flexibility and creativity. The traditional approach to project management has focused on, machine centered work, management and control and rigid and authoritarian process little research has focused towards new paradigm thinking. Reference [17] says the implementation of project management methodologies vary from very ad hoc and informal approaches to methodologies which are formally defined and consistently applied. Some of these models include Waterfall model, Vee model and Spiral models, however these models are rather 'hard' and have not incorporated the 'soft' human dimension. Some authors like [30] have explored other models showing how operations strategy may be applied to project based firms, however research using operations based strategies to project based firms is limited. Researchers like [18], [41]; and [32] say systems thinking is interdisciplinary and can be applied across diverse disciplines. Evidence of systems thinking in project management has been explored by at least [7], [1], [36], [12], [43], [35], [39], [15], [24], [49], [9]. Notwithstanding the contribution in terms of viewing project management from systemic perspectives gaps exist in terms of developing a systematic approach to project management.

Reference [19] have pointed out projects are interconnected and a wider view is required, [25] also pointed out the importance of trust in project relationships, [16] says different stakeholder groups have different perspectives of project success.

Therefore a wider view to project management will provide further insight. The holistic approach to project management enables one to view project management from an organization wide level from sales to execution taking into account interfaces within and between firms. Within firms includes those interfaces between the project department, sales, procurement, logistics, manufacturing, engineering and quality, etc. Between firms includes those interfaces between suppliers customers and other stake holders like advisory bodies, environmental consultants and consulting engineers, Figure 2 shows the wider project management environment adapted from [19]. The wider system includes external stakeholders like consultants, customers, suppliers, other authorities like municipal authorities, etc. these external stakeholders influence project execution and therefore it is important to include them in the wider systems environment.

Viewing project management from a systems perspective requires an understanding of systems theory. Reference [46] says “In general systems may be classified in two extremes, soft systems and hard systems.” More importantly soft systems are fuzzy unstructured with purposeful behaviour (i.e. capable of setting its own objectives, the problem owner is part of the system) and hard systems on the other hand are more structured i.e. well defined and purposive (i.e. capable of meeting a certain given goal and unable to set its own objectives, the problem owner is outside the system). Looking at project management from a wider environment shows project management is often vague and unstructured and a more soft systems approach may be appropriate. Some researchers like [15] argue a hybrid (soft and hard) systems approach will give the best solution since most problem solutions have both the technical and human activity dimension.

The focus of this paper is on case study research in project management where a hybrid (soft and hard) systems approach has been adopted in two firms.

### III. METHODOLOGICAL FRAMEWORK

A similar process followed by [47] in setting up a methodology for a hybrid (soft and hard) systems approach, Figure 3, is used in this paper. Reference [47] did not give insight into each of the steps, which is now addressed in this paper.

#### A. Phase 1: Strategic formulation (SF)

- 1) Step [1]: identifying the problem owners, it is important to understand who are the problem owners, who is accountable for delivering the solution and equally important is who are the other stake holders involved in developing the solution. Soft systems methodology is all about

- including the HAS early on in the analysis and this is what is accomplished in this step.
- 2) Step [2]: Unstructured problematique (refers to a collection of problems); in this step all the relevant information about the problem is collected. Seldom does a problem occur in isolation it is usually a collection of problems. Often the problem is vague or too rigidly described, by the problem owners, therefore it is referred to as an unstructured problematique. In this step the intention is to gather information from all the stakeholders, this is normally done in a workshop scenario involving a group of people (8 to 12 is an ideal group size). This group needs to be a cross functional group of people who are able to give insight and views on the problematique. It is during this step the systems hierarchy or systems ecology is set up, this enables the stakeholders to understand the problematique occurs within a wider system (eco-system). Once all the relevant information is collected and a better understanding of the problem is gained the next step is to formulate the problem definition. The problem definition should not be formulated in this step.
- 3) Step [3]: Symptoms and world views, in this step all the ‘symptoms’ of the problem are collected. We refer to symptoms as at this stage it is still too early to identify the causes of the potential problem situation so everything is treated as a symptom and all stakeholder views are equally important. We are not trying to find solutions at this step; this is still a gathering and understanding phase.
- 4) Step [4]: Collect data, in this step all the hard data from reports, interviews with a wider group of people etc. are collected and analysed. Soft data is collected in Step [2] and [3].
- 5) Step [5]: Rich picture, in this step we build a rich picture of the problem situation, this is sometimes referred to as a messy picture, it involves all the different components, departments, stakeholders etc., An objective matrix is compiled, Appendix 1.
- 6) Step [6]: Identify relevant steps to be re-engineered. In this step the CAPETOWN, [46] and [47]) root definition of the “AS –IS” situation is completed. This involves completion of the CAPETOWN mnemonic

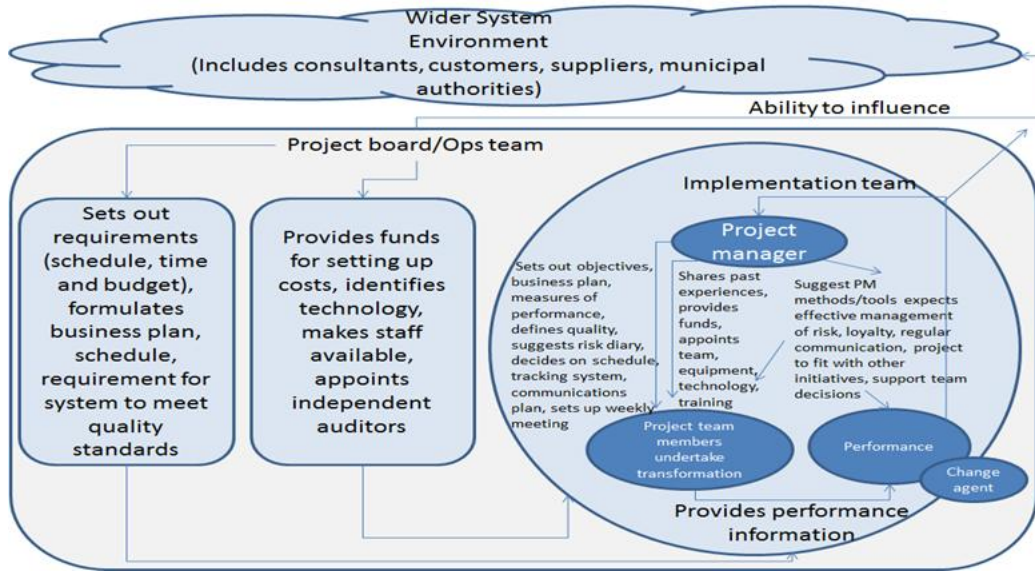


Fig 2: Wider Systems Environment

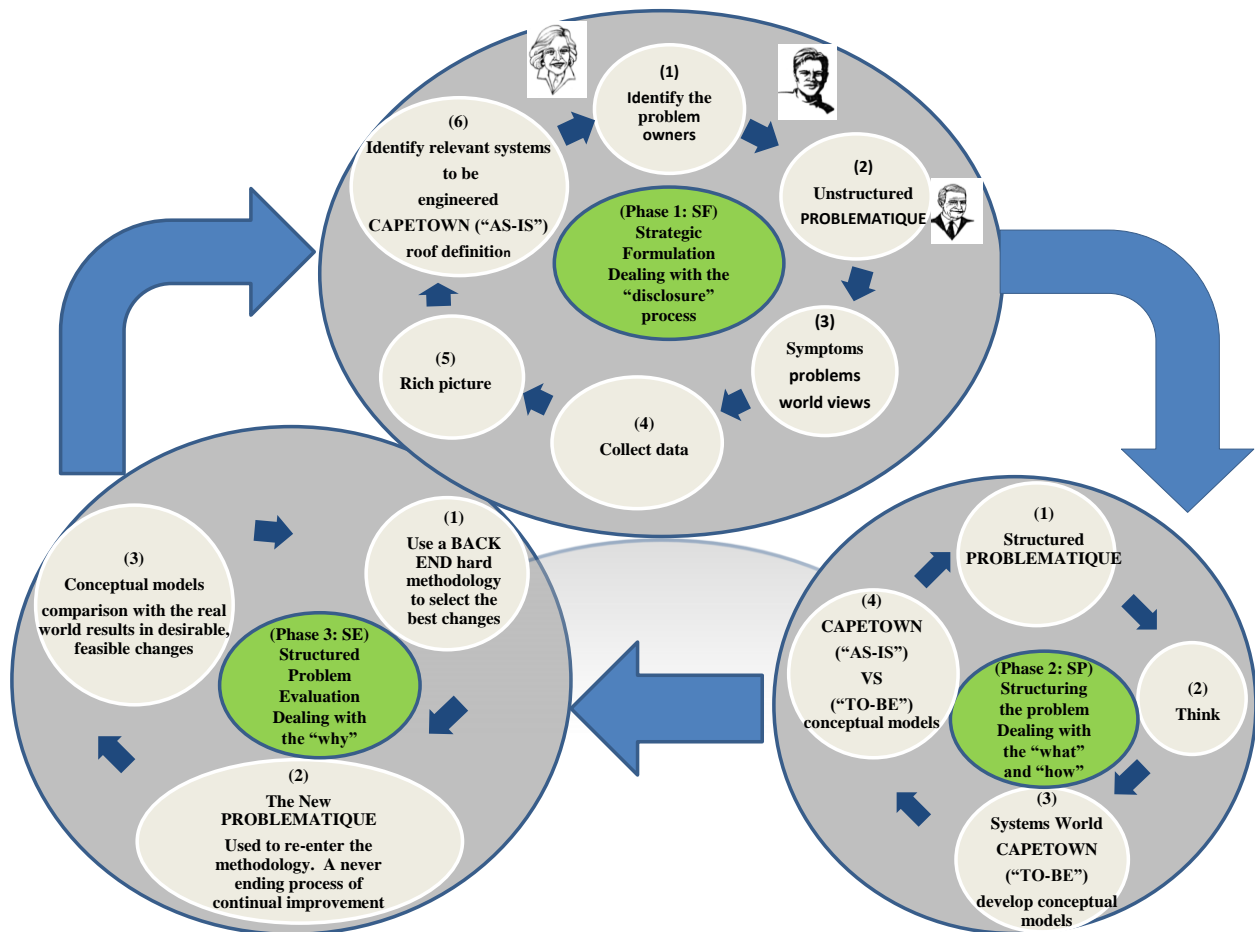


Fig 3: Triple S Methodology

as follows:

- C-Customers, the customers are identified.
- A-Actors, actors are identified this includes people, processes and systems.
- P-Performance, identify how and what performance measures are used in the system.
- E-Environment, defines the physical environment of the system, geographic location etc., as well systems constraints and other constraints imposed on the system.
- T-Transformation, this involves defining the function of the system i.e. the purpose of the system.
- O-Owner, identify the problem owner of the system this can only be one person.
- W-World view, identify world views relating to the problem situation, world view refers to issues like morale within the system, is this; a high pressure environment? Is this a reactive or proactive environment? is this a purposive or purposeful system?, and etc.
- N-Nature, In this step the system is looked at as open or closed, man-made, cybernetic, etc. (We also state whether the system is positive or negative, positive systems do not react to the external environment, negative systems react to the external environment, the system we seek should be negative in nature), [12].

From the CAPETOWN root definition opportunities for improvement are identified and this gives one an idea of what the “TO-BE” CAPETOWN root definition should be like. The “TO-BE” root definition is completed in phase 2, Step [3]. Once strategic formulation is completed, the next step structuring the problem is handled.

### **B. Phase 2: Structuring the Problem (SP)**

During this phase we structure the problem, phase 1 dealt with the unstructured problem, in this step the problem is structured we deal with the “WHAT” and the “HOW”. This phase consists of 4 phases, each of the four phases are next discussed.

- 1) STEP [1]: Structured problematique, here the team is required to bring structure to the problem. Contextualize the problem in the real world situation. Re-look at the systems hierarchy are there any changes that need to be made to the hierarchy developed in phase 1. Is the boundary of the system still relevant? If not realign the hierarchy, redefine the boundary, etc.
- 2) STEP [2]: Think, here the team is required to think conceptually generate alternatives, have an open mind.
- 3) Step [3]: Think conceptually here we look at the problem in the future state i.e. “WHAT” would we like the proposed situation to look like (i.e. what should it be), we use the CAPETOWN root definition to further structure the problem for the “TO-BE”

situation; in phase 1, the CAPETOWN root definition was used to analyse the problem in the “AS-IS” is state.

- 4) Step [4]: Conceptual models, here the “TO-BE” conceptual model is compared to the “AS-IS” conceptual model and the gaps are noted. The transition from the “AS-IS” to the “TO-BE” is the organizational transformation and the delta between the two stages is the gap. This is the new paradigm thinking. The journey from the “AS-IS” to the “TO-BE” has to be mapped.

Once the Problem structuring is completed, we move to the next phase structured problem evaluation.

### **C. Phase 3: Structured evaluation (SE)**

During this phase we deal with the “WHY”, this step consists of the following three steps:

- 1) Step [1]: This step involves using hard systems methodologies like numerical evaluation (completed from the objective matrix, completed in phase 1, step [5]), perform primary root cause analysis, separate the primary causes from the secondary causes (symptoms) and select the best fit solution, we are not using the word “optimum solution” because this is a qualitative process (soft) and has been developed with the HAS.
- 2) Step [2]: the new problematique, this step involves re-looking at the problematique and critically evaluating the proposed solution and developing a road map to journey into the future.
- 3) Step [3]: This is a process of continuous improvement.

Having set out the methodological framework, the case study is next discussed.

## **IV. CASE STUDIES AND BACKGROUND**

Firms in the ICT industry are faced with rapid technological change [47], firms operating in this industry have to integrate functionality and support [8]. To develop functionality one has to build capabilities to support functionality (i.e. technology and infrastructure), in the ICT industry building capabilities lies in the project management area. The ICT industry in South Africa is a rapidly evolving industry there are four major ICT service providers in ICT industry in South Africa viz. Vodacom, MTN, Cell C and Neotel. Each of the service providers is aggressively evolving their ICT build capabilities. The service providers outsource the infrastructure build to specialist project management firms (tier one project management firms). There are many tier one project management firms operating in this area. The ICT service providers are investing in build capabilities so as to improve core network capabilities to improve

coverage and service delivery as a result the service providers need to build better capabilities in this area. ICT service providers have also identified tier one firms as not being able to meet expectations. This is putting pressure on existing tier one firms to improve their capabilities in project management. The author was approached by two firms one being a tier one project management firm and the other an ICT services provider. The brief in both instances was to develop a project management capability to support the needs of the ICT industry. Two case studies are presented, due to reasons of confidentiality the names of the two firms studied cannot be disclosed so the firms are referred to as Alpha (Tier one firm) and Beta (ICT service provider).

In this section, the application of the systems thinking model to a project management environment in the Information and communication technology (ICT) industry is demonstrated. The systems thinking model has been used previously to study the complexity in modern organizations, [46] and to study a (soft and hard) systems approach to BPM, [47]. The approach has proved to be successful in the two previous applications and is used here to improve the project management area. The case study is based on extensive analysis and evaluation of data gathered through structured workshops involving cross functional teams (involving project management, engineering, marketing, sales, logistics, finance, and etc.). A total of 35 workshops were conducted over an 18 month period, including both firms Alpha and Beta, the duration of each workshop ranged from two to three hours each. Review meetings between the steering committee and the project teams were held on a monthly basis. The information gathered through workshops and interviews were further verified and validated through documentation analysis. Each of the case studies is next discussed.

#### **A. General Company Information Case Study Alpha and Beta**

Alpha is a tier one, project management firm. Alpha was founded in South Africa in the 1970s. Customers are dominant in the ICT sector. Alpha is one of the biggest ICT tier one project management infrastructure firms in South Africa. The product portfolio includes project management capabilities in fibre long haul, fibre metro, turnkey projects, site builds, wireless technologies and; service and maintenance. The company employs more than 550 people, with annual revenue turnover of approximately R 1 billion. Alpha needs to improve its project management capabilities to meet the growing market conditions and improve revenue and market share.

Beta was founded in 1994 it is has 22 operations across Africa, Middle East and the Mediterranean. As off 2015 calendar year Beta had

over 300 million subscribers across its operations. It has a revenue turnover greater than R28 billion and has a staff compliment of more than 17 000. Beta plans to invest approximately R 30 billion in technology and infrastructure over the next three years. The firm wishes to build its in-house project management capabilities in support of this investment.

#### **B. Findings case study specific Case study Alpha and Beta**

Case study Alpha, the firm has been in a period of flux for the last 3 years with high staff and senior management attrition, they were unable to deliver on existing orders, they had a huge backlog and WIP was extremely high. In terms of professional project management their projects are governed by international contracts like FIDIC and commercial contract management. The expertise and knowledge in this area was weak resulting in huge project losses. As a result of this the firm could not generate revenue as certain key milestones were not met, the projects were hurdled with quality defects; the firm's culture was one of blaming. Key customers were holding back on orders or issuing orders to other firms because Alpha was unable to meet customer deliver expectations. Alpha did not possess the right critical skills, systems and processes were not adequate let alone being lived. Hence the firm needed to rethink how project management could be developed as a core capability and to develop project management as a centre of competence.

Case study Beta, the firm to a large extent was outsourcing most of its infrastructure build projects to tier one project management firms. Over time Beta eroded its in-house capabilities in project management so they were unable to effectively manage tier one project management firms. Beta had to a large extent become reliant on tier one firms to manage themselves. As a result of this situation Beta's projects were riddled with cost overruns and schedule delays. This situation was not ideal, and given the large amount of investment to be made, Beta needed to re-think how to re-position its in-house project management capabilities and to develop an in-house core capability to effectively manage projects and tier one project management firms. Next Figure 3, Triple S Systems methodology for each of case studies are discussed.

#### **C. Case Analysis Phase 1: Strategic Formulation (SF); Case Study Alpha and Beta, Findings are Case Study**

1) *Step [I]*: For both case studies the steering group structure shown in Figure 4 was followed. This was important to identify the problem owners and other stake holders. Setting up the steering group structure is an important and fundamental to soft systems methodology, it is a step which ensures that all the necessary stake holders are involved in the

project from the outset. The roles of the groups in the steering group structure have been set out by [46] and will not be defined here. What is important to note is the steering group structure needs to be a cross-functional team and participants need to be committed to the initiative i.e. attend all workshops, provide guidance to the cross functional team, keep an open mind, and etc. In both case studies the steering groups were falling short of adequate and the team members often needed to be motivated to attend workshops. This was a shortcoming in both these case

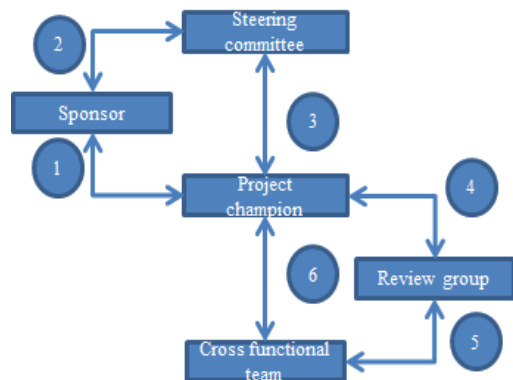


Fig 4: Steering Group Structure

studies. Not having a workable steering group is a potential for failure.

2) **Step [2] to Step [6]:** all the information is collected through systems thinking workshops, the systems hierarchy and rich picture is developed (the systems hierarchy and rich picture are soft systems tools). As much information about the problem situation is collected. Appendix 2, gives a list of tools which may be used to gather information (These are soft and hard systems tools), the list is not exhaustive but gives an indication of some tools which may be used. Only a selection of the tools is to be used which is sufficient to gather enough information to get a better understanding of the problematique). Figure 5 and 6 gives a graphical representation of the systems hierarchies; the ecosystem (system hierarchy) is established which, is an approach to ensure all participants are of the same understanding in terms of the given situation. The current boundaries of the system are also established. In Figure 5, the 'green circle' depicts the boundary, in Figure 6 the 'red dashed square' depicts the boundary. The boundaries can be redefined in phase 2 step [1]. The boundaries indicate the limits of influence of the systems owner. Figure 7 and 8 shows the rich pictures, this helps contextualize the problem it allows one to understand the connectedness, and Figure 9 shows the "AS-IS" CAPETOWN root definition. It is important the team keeps an open mind and all relevant information be captured, they need to keep an open mind there should be no sacred cows. They need to be realistic and honest of what is happening and reflect reality. Note

the "AS-IS" CAPETOWN root definition needs to be true and reflect the actual situation as this sets the basis for further analysis.

**D. Case Analysis Phase 2: Structuring the Problem (SP); Dealing with the WHAT and HOW Case Study Alpha and Beta, Findings are Case Study Specific**

Steps [1] TO Step [4], here out of the box thinking is required the cross functional team needs to keep an open mind, the "TO-BE" CAPETOWN root definition is completed, Figure 10.

The systems hierarchy and boundary is re-evaluated, alternatives and possible solutions are generated. What is important to note is the gap between the two CAPETOWN root definitions the "AS-IS and the "TO-BE", (Only the "TO-BE" results for Alpha is given) e.g. some differences include: Alpha needed to expand the customer base, actors expanded to include land surveyors, geologists, PM@Alpha (An organisational wide PM initiative) is now an actor in the system; performance measures are more quantitative based, world view changed to be a proactive with a can do attitude. More importantly Alpha recognized they needed to change, they agreed on what needs to be changed and how they will go about the change process. This is a shift to a new paradigm thinking.

**E. Case Analysis Phase 3: Structured Evaluation (EV); Dealing with the WHY Case Study Alpha and Beta Findings are Case Study Specific**

1) Steps [1] to [2], Causes are separated from symptoms the different alternatives are compared against each other. The following figures show some of the data outputs that were generated; Figure 11: The primary and secondary causes are separated by numerical ranking (the results of the pairwise comparison are not shown, the interested reader may refer to [47] on the methodology for pairwise comparisons). The team can now focus on the primary causes, i.e. reductionism and the secondary causes (symptoms) are excluded from further analysis, which reduces complexity.

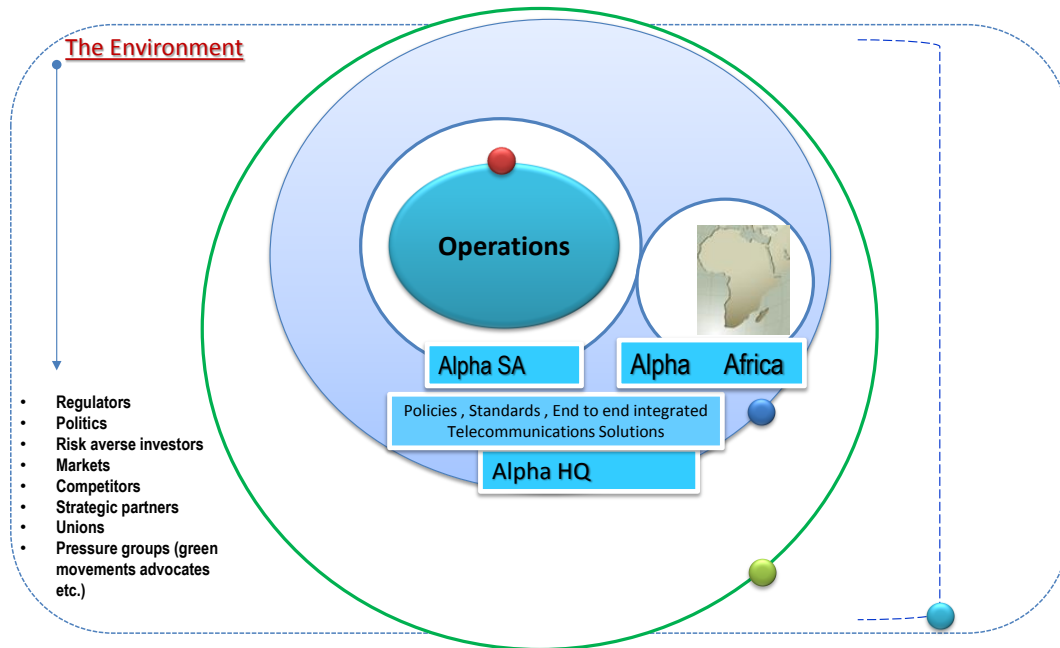


Fig 5: System Hierarchies for Alpha

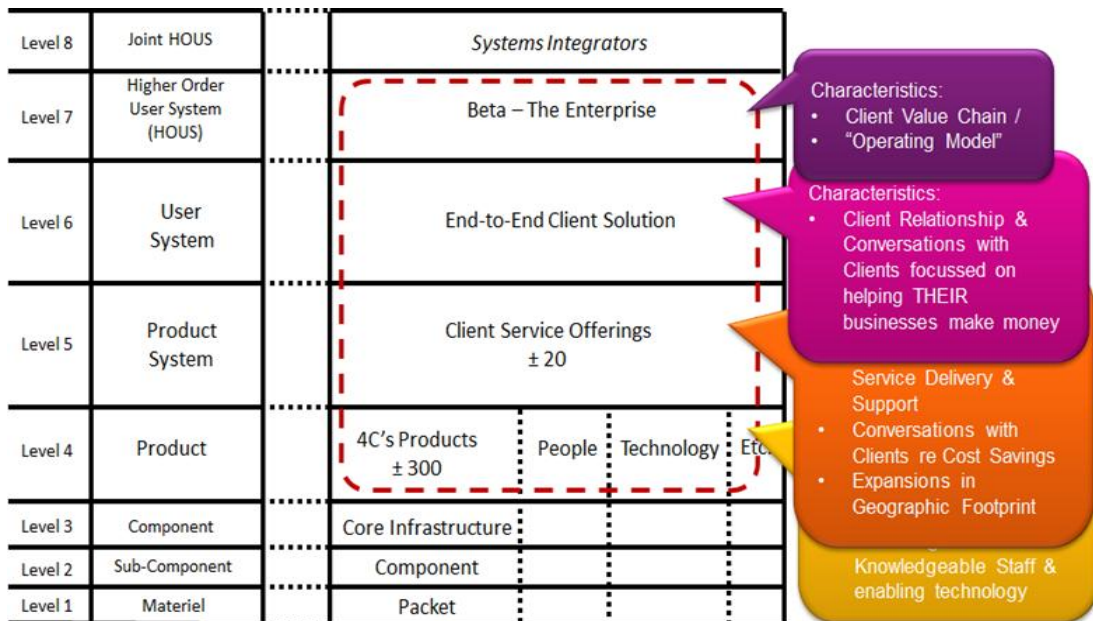


Fig 6: System hierarchies for Beta

Figure 12: WHAT, HOW, METHOD (only one example of this is given) showing some of the evaluation that was done.

- 2) Step [3], during this phase the solution is re-assessed against the issues and concerns which were highlighted in phase 1, strategic formulation. Should there be any identified gaps the steering committee and team are to decide whether these gaps should be re-visited or if the solution developed will suffice. It is important that a complete project plan/road map is also

completed so the initiative can be rolled out with the required benefits tracking. The project plan and benefits tracking is not provided in this paper. What is important to note is in both case studies the projects were accepted to be rolled out and the problem owners in both cases believed the systems thinking approach adopting both a hybrid (soft and hard) systems approach was beneficial and they believed that without the systems thinking





C	ZTE	DFA	Telkom	MTN	Vodacom	IS	
A	Project support office	HOD	PM's/APM's	NTT/Didata	SHEQ	Finance/ Procurement	Subcontractors Municipalities Supply Chain
P	Gross profit level 1	Gross profit level 2	KPIs	Customer Satisfaction	Customer Savings	Quality	Audits
E	Gauteng	All regional offices controlled through Gauteng	Margins under pressure	Multi-reports with conflicting outputs reporting	No standardised documentation across regions	Process and procedures not well established	
T	Project execution						
O	COO						
W	Its slow	There is room for improvement	Things are disorganised	Its not automated	People are reactive and not proactive	There is resistance to change/ too many issues unresolved	People think they can't do/ lack of ownership
N	Negative system	Closed loop – we continue irrespective	In general System is closed				

Fig 9: “AS-IS” CAPETOWN Root Definition Alpha

C	Expand Customer base	ATC/Telkom/Cell C BBI/Trans Freight Rail	Neotel/Huawei/ Eskom/PRASA	Local Municipalities/ Sentech	Top TV		
A	Land surveyors	Community liaison manager	Civil engineers	Quality Surveyors/In house construction people	In-house fibre, trenching people	A geological expert and associated tools (CAD)	PM@Alpha manual
P	PM@Alpha integrated reporting	Run rate of > 200 km per month	PMA score > 65% per project	Project profitability > 18%	People resource utilization > 65%	360 degree evaluation for all project managers	Establish SLAs
E	South Africa	Regional offices, Gauteng, KZN, Cape town, PE and East London	Gauteng is the head office controlling all regions.				
T	PM as a core capability						
O	COO						
W	Proactive attitude	“Yes we can” “We can do it”	Right first time attitude	Taking ownership & accountability	Winning Culture	Innovative/Continual improvement	Professional/ Proud/Quality of work
N	Negative system	Open system					

Fig 10: “TO-BE” CAPETOWN Root Definition Alpha

**V. FORMALISING THE SYSTEM**

The systems thinking methodology enabled the teams in both firms (Alpha and Beta) to obtain a proper understanding and contextualization of the problem situation. Problems of this nature require organizational wide transformation, and as such are prone to people pulling in different directions and often the solution, which is found is based on

corporate political power, those that wield the most power are able to get their way. The systems thinking model counters this, every person’s view is equally important, the use of system hierarchies, rich picture tools allows all stakeholders to properly understand and, contextualize the challengers and view opportunities with an open mind. The real problems are solved, and root causes are separated from symptoms.

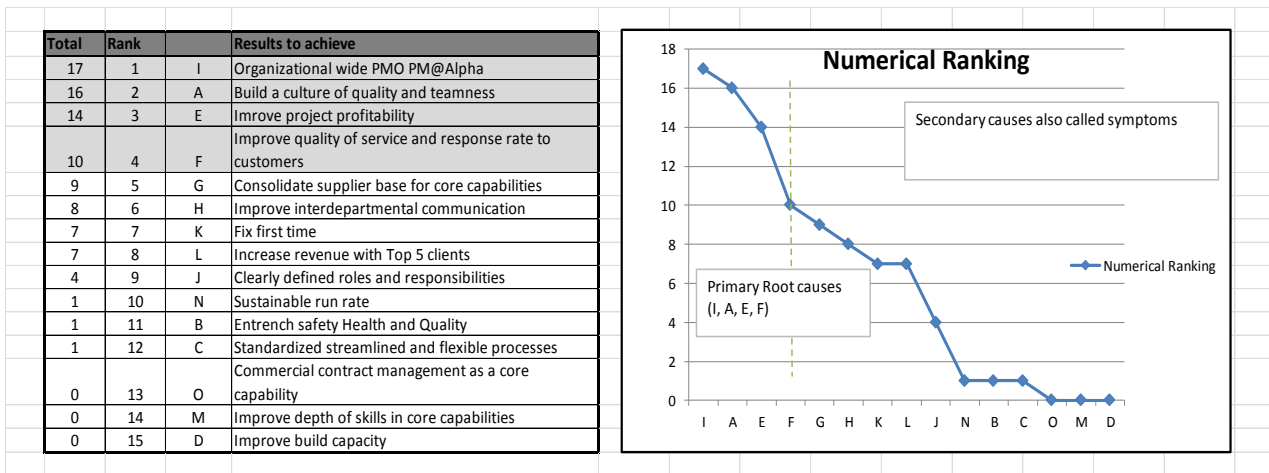


Fig. 11: Numerical Evaluation for Alpha

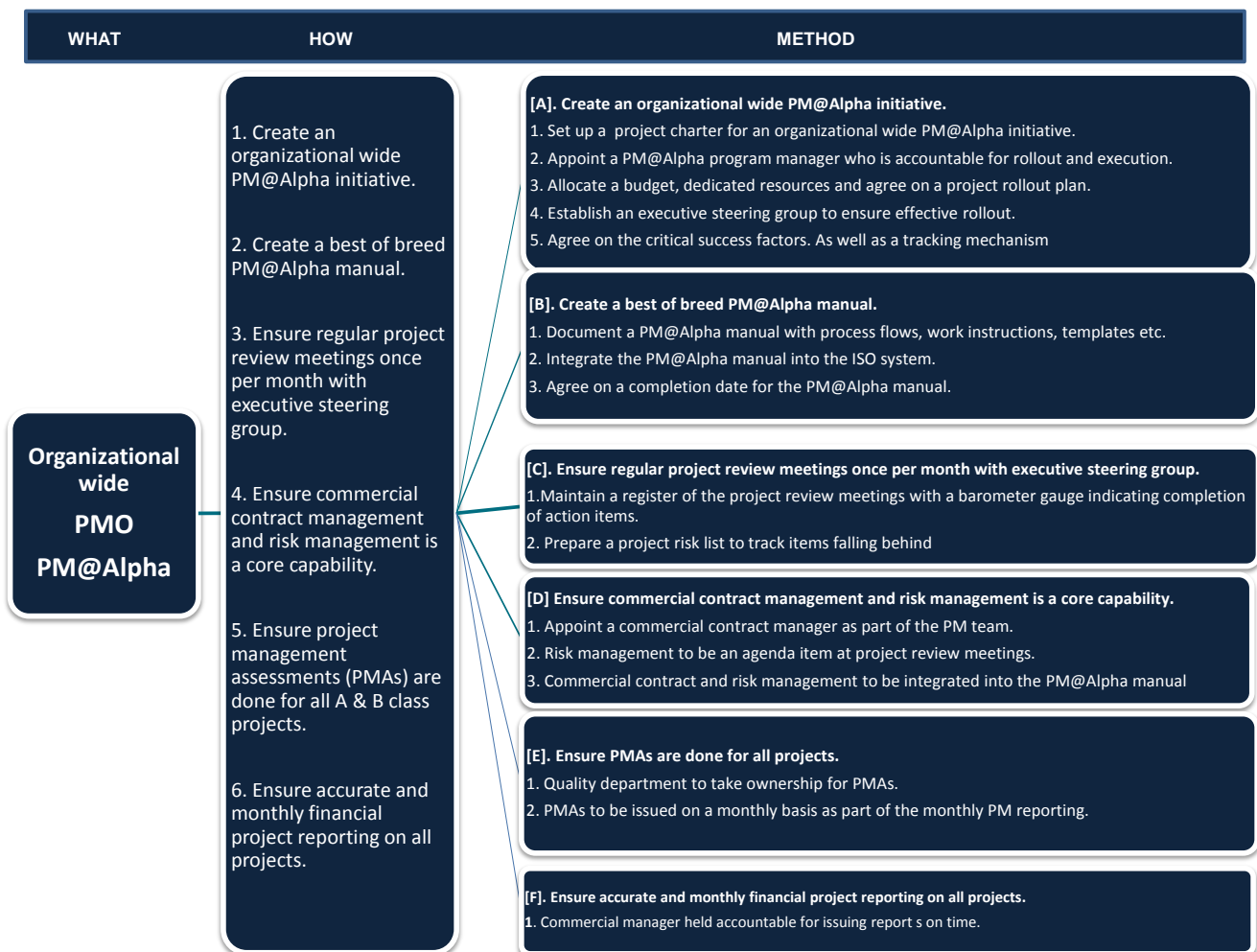


Fig 12: WHAT, HOW, METHOD for Alpha

#### **A. Case analysis Benefits and challenges**

In both case studies there were benefits and challenges that were realized some examples include:

- Benefits for case study Alpha, notwithstanding the implementation of the organizational wide PM@Alpha initiative some of the success include: a) project capacity increased from 30Km per month to 202km per month, this was maintained for a 5 month period (our engagement did not extend beyond this period so we are unable to comment beyond this point), b) PMA assessments scores increased from 48% to 62%, c) project profitability increased from 12% to 19%, d) customer order intake has increased indicating an improvement in quality of service and better response to customers.

- Challengers for case study Alpha, the biggest challenge with this group involved the human dimension. The team initially was reluctant to trust the process they had comments like “we tried this before and this will not work”. To overcome this a two day off site workshop was conducted to familiarize the team with the systems thinking process. This was a crucial step which was required to move the system thinking process forward and obtain buy-in which was eventually obtained.

- Benefits for case study Beta, implementation of an organizational wide PM@Beta initiative, some of the project success include a) project management processes were reduced from 280 to 20 relevant processes, b) Project management open order report reduced from 160 days to an average of 32 days, c) Project profitability improved from 9% to 13%.

- Challenger’s for case study Beta, the biggest challenge facing systems analysis is ensuring a proper root cause analysis is done and separating the causes from the systems. In Beta 40 problem symptoms were reduced to four root causes. The team found it hard to believe only four root causes exist. Even though this was done and successful project outcomes as per points 3a) to 3c) were realized the team is still sceptical about the systems thinking process. However they have engaged the author for further systems thinking initiatives, which indicate they are buying into the process.

In both case studies the problem owners and executive steering groups were pleased with the project results. The question however remains whether these firms will be able to sustain this new paradigm way of thinking and grow to even greater heights. Six months after completing these projects both firms Alpha and Beta have approached the author and his team to tackle other transformation initiatives in their organizations using the systems

thinking model. In Alpha we are currently busy with two more initiatives and they have subsequently referred us to other parts of the organization to tackle similar problems. problems.

#### **VI. DISCUSSION AND IMPLICATIONS**

In organizational transformation initiatives like project management the problem situation consists of a collection of problems which in soft systems methodology we call *problematique*. As a result of the *problematique* the system owner is often unclear of the real objectives or challengers which need to be addressed. This situation is further compounded by having to take many stake holders along the journey. The challenge is : a) how does the problem owner be sure of the real objective or challenge which needs to be solved, b) how does he/she convince the stakeholders of what needs to be done and c) how does he/she take these stakeholders along the journey. This is a culture shift and transformation initiative, the problem owner needs to move the organization to a new paradigm way of thinking. Soft systems methodology provides the vehicle to address these challengers, as is evident in the two case studies Alpha and Beta.

Soft systems methodology puts the emphasis on the human activity system (HAS) it allows for a) a process of collaboration, b) Everybody is equally important, no power struggles, c) opens up the problem through rich picture building, d) allows for out of the box thinking through the structured CAPETOWN mnemonic model, e) allows for qualitative (soft) and quantitative (hard) analysis. Soft systems methodology allows all stakeholders to pull in the same direction towards a common objective, thus enabling better adoption of the project management initiative and hence better gains.

In soft systems methodology the emphasis is first on a collective understanding of the *problematique* only once a complete understanding of the *problematique* is obtained then potential opportunities for problem resolution may be embarked upon. Using a hybrid (soft and hard) systems approach to project management allows one to integrate qualitative (soft) and quantitative (hard) analysis. The hybrid (soft and hard) systems approach proved to be meaningful, insightful and value adding; this is evident from both firms Alpha and Beta seeking further application of the hybrid (soft and hard) systems approach in other areas of their organizations.

## VII. LIMITATIONS AND FURTHER RESEARCH

The research has focused on using an integrated (soft and hard) systems approach to setting up a project management capability in the ICT industry, previous research by [46] and [47] also focused in the ICT industry the previous work covered business process management (BPM) and IT, even though the work in research by [46] and [47] also focused in the ICT industry the previous work covered business process management (BPM) and IT, even though the work in this paper is focused on project management it is also in the ICT industry. It will be beneficial to expand this methodology to other industry sectors. The research was internally focused i.e. no stakeholders external to the firm were used or consulted during the interactive sessions, nor were any stakeholders part of the review group. Reference [19] argues project management should involve a wider environment, Figure 2 in the Literature survey section. Therefore it would be interesting to involve external stakeholders in the process and note the dynamics in the interactive sessions. Reference [45] and [47] have pointed out case study research on soft and hard systems is limited and there needs to be further research in this area to contribute to the repository of knowledge, this research provides two more cases to the repository however still more case study research in this area is required.

Reference [44] also pointed out there is a lack of research about how to find the best path to implementing project management based on the coordination of soft and hard systems to gain largest value for organizations based on least investment. Researching worldbank projects [23] also seeks further qualitative (soft) research to better understand critical success factors for project management. There are difficulties in driving the adoption of systems thinking as pointed out by the following two researchers; [29] points out the concepts of systems (the author uses the word “system dynamics”) are often overwhelming further consideration on how to introduce the concepts without turning people away will be beneficial; and [10] says to encourage the adoption and practice of systems thinking, the first step is to understand how people tend to think and see. By researching and communicating the wide spread benefits of the practice of systems thinking through actuality e.g. practicing qualitative (soft) and quantitative (hard) research in systems thinking, it is hoped people will see the benefit and more organizations will gravitate towards this way of thinking, thereby allowing the repository of research in this field to grow. Finally it was not the intention of this research paper to give inner workings of systems thinking tools and techniques, some tools and techniques have been used, further evidence may be

found in the research evidence which may be found by referring to the reference list provided in this paper.

## VIII. CONCLUSION

Reference [44] pointed out the lack of research evidence in coordinating the path between (soft and hard) systems in project management. In terms of the central question posed: Are we able develop a hybrid (soft and hard) systems approach to project management which may lead to successful project performance. Evidence from this paper indicates using a hybrid (soft and hard) systems approach to project management leads to successful project outcomes. Therefore this paper makes some contribution to the concerns raised by [44].

The framework used (Figure 3) allows for the complexity that one is faced with in organizational wide transformation initiatives, it allows for early involvement of the HAS, which has resulted in positive benefits for both firms. In conclusion a hybrid (soft and hard) systems approach to project management has been beneficial in at least these two cases and provides important lessons for researchers and managers.

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### Appendix 1: Objective Matrix

**Goal: To create a Project Management Model to Increase Revenue Growth and Improve Margin Quality**

RESULTS TO ACHIEVE	RESULTS TO PREVENT
<ol style="list-style-type: none"> <li>1. Implement an organizational wide PMO initiative (PM@Alpha)</li> <li>2. Entrench safety, health and quality.</li> <li>3. Standardized, streamlined and flexible processes.</li> <li>4. Improve build capacity.</li> <li>5. Improve project profitability.</li> <li>6. Improve quality of service and response time to customers</li> <li>7. Consolidate supplier base for core capabilities.</li> <li>8. Improve interdepartmental communication.</li> <li>9. Build a culture of quality and team-ness.</li> <li>10. Clearly defined roles and responsibilities for all project related staff (PMs, quality, draftsman, QS).</li> <li>11. Increase revenue with the top 5 clients through excellence in project delivery.</li> <li>12. Improve depth of skills in core capabilities.</li> <li>13. Sustainable run rate of R80M per month.</li> <li>14. Do it right the first time.</li> <li>15. Commercial contract management as a core capability.</li> </ol>	<ol style="list-style-type: none"> <li>1. Staff attrition.</li> <li>2. Red tape and complicated processes.</li> <li>3. Turn customers away.</li> <li>4. Make it difficult to do business with suppliers due to long payment process and terms.</li> <li>5. Under investment in resources to execute projects.</li> <li>6. Adding cost without value.</li> <li>7. Rework and waste.</li> <li>8. Reduce quality defects and non-conformances.</li> <li>9. Duplication in reporting.</li> </ol>
AVAILABLE RESOURCES	CONSTRAINTS
<ol style="list-style-type: none"> <li>1. Access to funds.</li> <li>2. Our brand name and reputation.</li> <li>3. Experienced staff and management.</li> <li>4. Logistics and warehousing facilities.</li> <li>5. Long term relationships with suppliers.</li> <li>6. ISO and BEE (black economic empowerment)</li> <li>7. Offices in four regions and experience in SA and Africa.</li> <li>8. Ability to execute large projects&gt; R1 billion.</li> </ol>	<ol style="list-style-type: none"> <li>1. Shortages of competent people in the market.</li> <li>2. Short term investments.</li> <li>3. Staff attrition.</li> <li>4. Our foot print is small thus making it expensive to expand.</li> <li>5. Red tape our processes and systems are not flexible and do not reflect reality.</li> <li>6. Tight timelines committed to the customer.</li> <li>7. Inability to deliver on time and within budget.</li> <li>8. Resource limitations and skills.</li> </ol>

**Appendix 2: Information Gathering Tool Box**

<b>No.</b>	<b>Description of tools</b>
1.	List of issues and concerns
2.	Systems hierarchy
3.	Rich picture
4.	CAPETOWN root definition
5.	SWOT
6.	SWOTE
7.	Ishikawa diagram
8.	Porter's Five Forces Model
9.	Affinity diagram
10.	Process Decision Program Chart (PDPC)
11.	PERT (Program evaluation and review technique)
12.	Queuing models
13.	Supplier quality matrix
14.	Quality function deployment (QFD)
15.	Failure mode and effectiveness analysis (FMEA)
16.	Process FMEA
17.	Service FMEA
18.	TAGUCHI methods of experimentation
19.	IDEF process definition
20.	Design structure matrices (DSM)
21.	Simulation modelling
22.	Multi team decision making tools and NGT(Nominal Group Technique)
23.	Evolutionally operation (EVOP)
24.	Operations research decision management tools