

A Process and Procedure Documentation Framework for Financial Services Operations in MediaWiki: A Critical Evaluation

by

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Declaration of Authorship

I, Petrus Abrie Nel, declare that this thesis titled, ‘A Process and Procedure Documentation Framework for Financial Services Operations in MediaWiki: A Critical Evaluation’ and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Signed:

Date:

"Things are always at their best in their beginning."

- Blaise Pascal

"Art is never finished, only abandoned."

- Leonardo da Vinci

"Our life is frittered away by detail. . . Simplify, simplify."

- Henry David Thoreau

"High thoughts must have high language."

- Aristophanes

"To improve is to change; to be perfect is to change often."

- Winston Churchill

"Excellent firms don't believe in excellence - only in constant improvement and constant change."

- Tom Peters

"It is common sense to take a method and try it. If it fails, admit it frankly and try another. But above all, try something."

- Franklin Delano Roosevelt

"What deters is not the capabilities and intentions we have, but the capabilities and intentions the enemy thinks we have. The central objective of a deterrent weapons system is, thus, psychological. The mission is persuasion."

- WSEG Report No. 42, Weapons Systems Evaluation Group, Joint Chiefs of Staff, 20
October 1959

Abstract

A business process framework was constructed to assist companies in the Financial Service industry to rapidly gain control over their business procedure documentation problem. The requirement flowed from an existing engagement in which Plumb Line, a training provider, had to provide generic training in the South African financial services industry. In several instances the companies engaged in the generic training also had the requirement that their personnel were trained in specific business processes and procedures. This requirement was encapsulated in a MediaWiki platform that was developed and extended over four projects to support a rational and feasible approach to capturing and managing business procedures. The documentation approach was broadly based on ISO 9001 principles and captured the various aspects of activities in organisation, process, system and risk centric views. This approach was encountered in previous projects done by the author in the aerospace and defense industry. In this industry the maintenance operator had to provide clear visibility to both internal and external stakeholders about roles, tasks and infrastructure that supported maintenance operations on Aircraft. This was typically done using a "Maintenance Repair Organisation Exposition". This is a document structured around ISO 9001 principles. Despite its importance this document was quite compact and formed the basis for the idea of doing something similar for the financial services operations department, i.e. the "back office". The MediaWiki provided stability and flexibility and allowed for rapid prototyping of client training, documentation and risk management requirements.

This thesis presents the approach followed and then evaluates whether the drawbacks of the MediaWiki approach and platform could be mitigated through extensions of the MediaWiki platform such as charting, risk mapping, document status tracking and other tools and whether there is value to be had by examining techniques from the Semantic Web. Additionally the author investigates to what extent the final solution is appropriate for the financial services industry. Finally an evaluation is done to evaluate whether the platform is indeed ISO 9001 compliant. The conclusion is that the platform and solution has merit inasmuch as ISO 9001 does apply to the financial services industry and that the flexibility and rapid prototyping allows for the accommodation of a wide range of

requirements and a wide range of different clients. The collaborative nature of the MediaWiki platform also allows for rapid input and communication of process changes. It is however clear that the solution as presented in this thesis is not a replacement for more sophisticated systems but can find applicability in smaller departments and clients requiring rapid stabilisation of procedures and control documentation. With reference to the evaluation of whether the system is ISO 9001 compliant it is concluded that the system is compliant enough so that further development is not only practical but also recommended in order to close the gaps and improve the market position of the solution.

Opsomming

Die tesis analiseer die MediaWiki-gebaseerde Plumb Line besigheidsprosesraamwerk ¹. Die raamwerk is ontwerp as 'n oplossing vir die dokumentasie van besigheidsprosedures van die tipiese finansiële batebestuur bedryfsdepartement in Suid Afrika.

Die raamwerk komplimenteer die generiese opleidingsdienste en materiaal wat Plumb Line ontwikkel en verskaf aan hierdie departemente.

Kliëntmaatskappye het bo en behalwe generiese opleiding ook 'n behoefte om personeel op te lei in besigheidsprosedures en prosesse wat spesifiek van toepassing is tot die betrokke instelling.

Die addisionele opleidingsbehoefte word aangespreek deur 'n MediaWiki platform wat aangepas word vir elke spesifieke maatskappy. Die platform is ontwikkel, uitgebrei en verfyn deur die loop van vier projekte.

Die doel is om 'n rasonale, aanpasbare en prakties haalbare benadering daar te stel tot die versameling, oplaai en bestuur van besigheidsprosedures.

Die raamwerk is baseer op die populêre ISO 9001 bestuurstandaard. Die aktiwiteite in 'n maatskappy word dus vasgelê onder organisasie-, proses-, stelsel- en risiko-sentriese perspektiewe.

Die agtergrond tot hierdie benadering is vorige projekte gedoen deur die student in die verdediging en lugvaartindustrie, veral met verwysing na instandhouding van militêre en burgerlike vliegtuie.

In die lugvaartindustrie moet instandhoudingsoperateurs hulle prosesse, organisasie en fasiliteite duidelik sigbaar maak aan eksterne en interne partye deur die publikasie van 'n "instandhoudings eksposisie dokument"² geskoei op die gewilde ISO 9000 standaard.

Die sogenaamde "eksposisie" is 'n belangrike dokument maar is terselfertyd eenvoudig, kompak en duidelik verstaanbaar.

¹Plumb Line Business Process Framework (PBPF)

²Maintenance Repair Organisation Exposition (MRO Exposition)

Die MediaWiki platform is ontwerp om 'n soortgelyke oplossing te bied vir die finansiële batebestuur bedryfsdepartement, wat ook dienste verskaf aan verskeie interne en eksterne kliënte.

Die MediaWiki sagteware is stabiel, maklik om te installeer en maklik om aan te pas by die kliënt se spesifieke dokumentasiebehoefte. Nadele van die platform sluit in gebruikersweerstand teen die redigeringstaal ("markup") en die uitdaging om sterk struktuur te behou binne in hierdie baie buigbare raamwerk.

Die tesis verduidelik die benadering wat gevolg is en die voor en nadele van die MediaWiki platform vir die dokumentasie van die prosesse en prosedures van finansiële bedryfsdepartemente.

Die semantiese web is ondersoek as 'n manier om meer struktuur te verleen aan die buigbare MediaWiki platform. Die semantiese web is egter nog nie ontwikkel genoeg en eenvoudig genoeg om prakties gebruik te kan word in die tipe projekte en kliënte waarop die besigheidsplatform gefokus is nie.

Daar is ondersoek tot watter mate die uiteindelige oplossing toepaslik is vir die finansiële sektor. Dit is duidelik dat die oplossing as 'n geheel wel toepassing het in die finansiële sektor en dat die buigbaarheid en vinnige prototiperingvermoë die akkommodasie van 'n wye reeks behoeftes en 'n wye reeks verskillende kliënte toelaat. Die MediaWiki platform laat ook vinnige insette en kommunikasie van proses- en prosedureverandering toe. Die MediaWiki-gebaseerde raamwerk is egter nie 'n plaasvervanger vir meer gesofistikeerde risikostelsels nie. Dit kan wel kleiner departemente en kliënte ondersteun om vinnig beheer te kan neem oor die versameling en opleiding van prosedure en kontroledokumentasie.

'n Evaluasie is gedoen tot hoe 'n mate die raamwerk wel die ISO 9001 standaard ondersteun. Daar is gevind dat die stelsel genoegsaam konformeer met die ISO 9001 standaard en dat addisionele ontwikkeling gefokus op ISO 9001 nie net prakties is in terme van tyd en koste, maar inderdaad wenslik is om die bemarkingsmoontlikhede van die oplossing te verhoog.

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Glossary

ABAM ABSA Asset Management.

BPM Business Process Management.

CMS Content Management System.

D&M IS Success Model DeLone and McLean IS Success Model.

Enterprise Architecture Enterprise Architecture.

FSI Financial Services Industry.

FSS Financial Services Sector.

GRC Governance, Risk and Compliance.

HR Human Resources.

IDE Integrated Development Environment.

KM Knowledge Management.

KPA Key Performance Area.

PBPF Plumb Line Business Process Framework.

PDF Adobe Acrobat Portable Document Format.

PwC PriceWaterhouseCoopers.

Chapter 1

Introduction

For a modern company to function effectively employees and contractors need to know what tasks have to be done and why, how and when these tasks have to be performed. Inasmuch as procedures encapsulate the standard instructions for performing tasks and inasmuch as each company is unique, specific process and procedural documentation are required. All regulations and rules to do with process risk and safety management require that operating procedures, along with the associated training, be written and followed (Sutton, 2010, p. 426).

Therefore, a training service company providing generic training to customers in a particular industry for example financial services, will invariably encounter the need for company-specific training as well. The need for specific training is oftentimes more urgent because generic skills can be obtained through the recruitment of suitably qualified personnel.

Plumb Line is a company specialising in the provision of training material focused on the South African financial services industry. The main training product is titled *The Financial Markets Series*. It is complemented by an online examination service through which competency in each module is established and certificates of various levels issued.

The training modules cover a range of topics from a general introduction to specific areas of interest such as equities, fixed interest instruments, derivatives, collective investments and others. This focused curriculum has proven valuable to a host of different companies in South Africa and specifically in financial services operations departments, i.e. the so-called *back office*.

Although the training service forms part of the training and development program of these departments the company-specific training requirements cannot be fully addressed

through the generic training material. Company specific procedures and training of personnel in these company-specific procedures are essential. Plumb Line found that the majority of clients did not have procedural documentation at a suitable level of quality. Where such procedures did exist they were usually out of date or scattered all over company file servers and filing cabinets. This urgent need for training on company specific tasks evolved into an additional stream of services directly focused on the documentation of company procedures. The procedures were documented in Microsoft Word templates that had the same layout and formatting as the training material provided by Plumb Line.

Although primarily a training company with a defined set of training modules this requirement for specific procedures arose in almost every training engagement.

To provide structure to this requirement, Plumb Line approached the author to create a business process framework to unite the two requirements of company specific training and generic Plumb Line training.

The model is based on quality management principles where process, organisation and technology are documented. Additionally, risks and controls are identified within procedures.

The basis of the initial work were lessons learnt from the approach followed by safety critical industries such as the aviation industry. This industry require proper documentation of controls and procedures, even more so than the financial services industry. The risks and liabilities inherent in aviation maintenance require process and organisational models that are clearly defined. An aircraft maintenance operator cannot afford to make mistakes. They need to demonstrate clearly and simply what their capabilities are to perform maintenance on expensive assets that will fly hundreds of people over long distances on a daily basis. Important stakeholders are both regulatory such as aviation safety agencies, and commercial such as airlines, that will make use of their facilities.

Documentation work done for maintenance operators in the airline industry is strongly influenced by ISO 9000 concepts.

The author used these practices from the process documentation models from airline maintenance operators to frame the documentation problem for financial services operators.

The framework is evolving and adjusted as experience is gained in practical projects. At the same time the framework must support immediate customer requirements. This creates a contradictory set of requirements: On the one hand the framework must provide

structure and consistency yet on the other hand it must allow enough flexibility for rapid development, prototyping and customisation for specific customer requirements.

The initial rigid database-driven approach encapsulated in a Microsoft Visual Basic .Net application was simply not practical in a constantly evolving and highly collaborative environment and eventually had to be discarded. Different platforms were considered and eventually the Microsoft Visual Basic .Net application was replaced with a MediaWiki platform. This is the platform used in the process and procedural documentation for four projects at operations departments in the financial services industry. The four projects in which the PBPF were implemented on MediaWiki were varied: It included a small single department, a multi-department setup managing collective investments, an implementation extended to six African countries and a hedge fund company. The hedge fund managed a complex hierarchy of funds and clients crossing several different international jurisdictions.

MediaWiki was selected specifically for its online, collaborative aspect, its proven stability (as the basis for the popular and extensive Wikipedia website), its ease of implementation, its version control mechanism and most importantly for its flexibility. The flexibility provided by the MediaWiki platform made it possible to support the different client configurations in practical timescales. However, the flexibility came at the cost of less control over semantic and structural aspects of the business objects represented by individual wiki pages.

The rapidly evolving field of the *semantic web* attempts to reconcile the freeform, dynamic nature of the web with the requirement for proper structure and semantics as required for querying, information sharing and the further processing of knowledge contained in web resources. A question that will be addressed is whether principles from the semantic web will provide more rigorous semantics and structure while retaining the benefits provided by the flexibility of the MediaWiki platform. To answer this question, literature on the *semantic web* in general were reviewed and then MediaWiki frameworks making use of semantic web principles were investigated and then examined to what extent the existing core framework of the PBPF can benefit from adopting practices from either semantic web principles or existing *Semantic MediaWiki* implementations or both.

The financial services industry is a risk driven domain well serviced by auditing companies for both auditing and consulting services. The largest players in this domain are the "Big Four" auditing firms. However, a problem of projects driven by auditing companies is that of conflict of interest. This conflict of interest arises in that advisory services are provided by the same company that audits the books of the target of the advice!

Even if objectivity is guaranteed the desire of the customer to get good value will always conflict with the pressure on consultants and auditors to bill as many hours as possible.

Enron, an energy-trading firm in the USA, went bankrupt in 2001 and as a consequence caused the collapse of its auditing firm, Arthur Andersen. Subsequently and in response to this disaster, America's Congress passed the Sarbanes-Oxley corporate-governance reform, which banned firms from doing systems consulting for companies they audited. It is interesting to note that consulting firms like PwC are slowly slipping back into this conflict of interest: High-profile deals are struck with consulting companies like Booz, to provide consulting services in combination with the auditing skill in PwC. This could lead once again to some form of regulatory backlash (Economist, 2013, November 9). It is precisely here that a small, independent, non-auditing consultancy, like Plumb Line, can deliver services that cannot be provided directly by the "Big Four".

The core idea of the PBPF was to scope and define the documentation required for business transformation and due diligence projects. This would achieve two objectives. The first is to ensure that customers get the maximum benefit from the engagement by not having to pay for unnecessary documentation effort. The second objective is to make it possible for a small consulting company with limited capacity to complete complex projects in reasonable time. The challenge is to draw the appropriate boundaries to reduce the universe of analysis and documentation to a manageable level.

Small consulting firms are constantly challenged to establish their credibility and *legitimacy*. The small operator is often not considered for important project opportunities. Yet, it is primarily through practical application and proven experience that legitimacy is built. Power (2003) provides insight into the legitimacy and perception of legitimacy of a project. The procedure documentation project and the auditing project share characteristics: In terms of the scope of the processes covered, in terms of the personnel engaged and in terms of the outputs. Power (2003) contrasts the highly structured, mechanical approach based on accepted practices and expectations versus that of the input from an experienced practitioner as ways to arrive at the perception of legitimacy.

Schul & Mayo (2003) explore the dynamics between the *rational* and *experiential* modes of information processing in how individuals decide what the optimal strategy for the future should be. It is argued that the *experiential mode*, i.e. decisions based on what one has done before is the *default* mode of information processing and that everyday behaviour is determined by these specific episodes, narratives and anecdotes. This is where the analysis starts. Plumb Line completed four projects implementing a business process framework. This framework was extended and adapted based on concrete inputs from experience at a variety of clients. Reflecting on whether what was done was optimal and how to improve future work starts off by default at the "experiential mode" of

information processing. Schul & Mayo (2003) points out that this mode is used for processing highly complex narratives and events.

The only certainty in business in the modern world is that things will change. This is especially true in the financial services sector. In the last decade it has, for example, been buffeted by its most significant upheaval since the great depression of 1929. At present time the aftereffects of the global crisis that started in late 2007 are still felt. The financial services environment, already complex before the crisis, is even more challenging now. This complexity is compounded by the increasing number and sheer bulk of regulations and standards. These include the *ISO 9000* series of standards, *risk management standards* Avanesov (2009) and regulations such as the *Sarbanes–Oxley Act of 2002*, *Dodd–Frank Wall Street Reform and Consumer Protection Act of 2010* and even voluntary accords such as the *Third Basel Accord* adopted in 2013 (Davies & Green, 2013, pp. 32-110).

The financial services context has dramatically changed. Obviously it is not sufficient to limit one's focus towards the past to understand how to do things in the future. The problem with using experience as the basis for analyzing what was done in order to propose more optimal ways of working in the future is that, as Schul & Mayo (2003) points out, the dominance of the experiential over the rational mode leads to *a failure of individuals to use optimal decision rules consistently*. Thus, even if things stayed the same, it is better to look at a problem from a rational rather than a purely experiential point of view:

In fact, the tendency to behave according to the optimal rule in a repeated choice situation depends on the activation of the rational mode of thinking. Also, individuals who are forced to plan their strategy and justify their actions are more likely to discover and use the optimal rule than those that are not forced to do so. (Schul & Mayo, 2003, p.95)

In some cases the experiential mode is an appropriate way of looking at a problem and making decisions. It is however pointed out by Schul & Mayo (2003), that individuals tend to look more towards their experience in deciding what to do in the future than analyzing, rationally what the optimal course of actions should be.

Plumb Line completed four projects within a variety of customers. Enough experience has therefore been gained that a review is valuable both from a business ("experiential") and an academic ("rational") perspective and the question must be asked: "Are the Business Consultants of Plumb Line *doing the right things* for their clients and are they *doing it in the right way*? Given the experience of the past projects, and given the constraints that apply to a company of its size, how should things be done differently?"

The analysis will examine the work that was done and the business process framework that was developed by balancing both the *experiential* and *rational* perspectives. The *academic* approach, founded as it were in the *Scientific Method*, is at the heart of the *rational* approach to information processing. As Newton-Smith points out: *The scientific community sees itself as the very paradigm of institutionalized rationality.* (Newton-Smith, 2002, p.1) The *rational* perspective will be established by connecting the work in the field to a proper academic framework. This is done to increase the understanding of the work done and to identify areas for improvement by comparing it to and evaluating it with references to current rational practices. To ensure that lessons learnt from practical experience in the field are also given its proper due an overview of the *experience* gained in three specific business process documentation projects is also presented.

The purpose of the review is to end up with conclusions and recommendations for a *more optimal approach towards future projects* in the domain of process documentation for financial services operations departments.

In Chapter 2: [Research Question and Methodology](#) on page 7 the *research question* will be developed and presented along with the supporting research methodology followed.

Chapter 2

Research Question and Methodology

An ISO 9001 based software framework with multiple views was developed and implemented by the author in collaboration with *Plumb Line Risk Alignment* to support and facilitate the business process documentation projects at the operations departments of the financial services companies *Stanlib*, *Close Brothers* and *ABAM*.

The framework provided an online view of procedures and roles of the operations at these organisations.

The structure and objectives of the framework are derived from previous work done by the author in the aviation maintenance industry. The aviation maintenance industry emphasizes safety and quality. The *maintenance repair organisation* must demonstrate its competence to internal as well as external customers. This is the purpose of a *Maintenance Repair Organisation Exposition* (MRO Exposition). It is a compact document summarizing and presenting the capabilities of the organisation. These capabilities are presented in terms of process, organisation, facilities and systems. The objective of the framework developed by Plumb Line was to create an equivalent framework for the financial services operations department.

The financial services industry is financial-risk centric and it is therefore important to validate the use of the quality and safety centric approach borrowed from the aviation industry for use here. Shortfalls and opportunities thus identified can set priorities for future development.

This thesis presents the results from a research project to validate the assertion that the ISO 9001-based documentation approach as implemented in a MediaWiki platform

and installed for financial asset management operations departments of the financial-risk-centric environments of *Stanlib*, *Close Brothers* and *ABAM* is *rational* from an academic perspective, *value-adding* from a customer perspective and *sustainable* for a small consulting firm.

2.1 Research Question

Based on the above the research question that needed to be addressed was to evaluate the use of a MediaWiki platform built using ISO 9001 principles in supporting company-specific process and procedure documentation for financial services operators.

The desired outcome is to prove that such an approach is valid, and that the problems encountered are balanced in general by the benefits of the approach.

The hypothesis can therefore be stated as follows:

2.2 Hypothesis

The use of a MediaWiki platform built using ISO 9001 principles in supporting company-specific process and procedure documentation for financial services operations departments is valid and the problems encountered are generally balanced by the benefits of the approach.

2.3 Background Leading to the Research Question

From 1997 to 2005 the author did software selection and implementation in five projects in the aerospace and defense industry.¹ The projects differed in terms of the size of the client company, what part of operations they focused on and what systems was in current use. Despite the differences the approach followed in each project was the same:

- Start by describing the current processes.

¹ The projects were as follows:

- Falcon Air managed by British American Tobacco (Senior Consultant with PriceWaterhouseCoopers)
- Defense Aviation Repair Agency in the UK (Project Manager with IBM UK)
- Defense Store Management Project in the UK (Project Manager with IBM UK)
- El Al Airlines in Israel (Project Manager with IBM UK)
- Air Malaysia in Malaysia (Principal Consultant SAKS Consulting UK)

- Create a set of future processes based on a review of the current situation.
- Identify additional requirements and constraints and create a comprehensive requirements document (RFQ). This document is sent to a short-list of vendors and forms the basis of a system selection exercise to evaluate each vendor and system.
- Propose a solution based on the evaluation.
- If accepted by the customer, implement the selected solution.

The author was involved in all aspects of this cycle.

The aviation industry puts the emphasis on quality management and safety, as was the case in the aforementioned projects. The approach followed quality management, ISO 9001 principles in the documentation of corporate processes and procedures.

Plumb Line provides generic training in the financial services sector. A requirement also exists for company specific training.

From 2005 onwards the author was approached by Plumb Line Risk Alignment to address this requirement for company specific training for financial service operators. The author developed a framework within the MediaWiki platform to facilitate the development, maintenance and delivery of training for company-specific processes and procedures.

The framework was implemented in Stanlib, Close Brothers and Absa Asset Managers. The author was involved in all of the activities of these implementations right through from system development, to marketing, to client engagement as well as conducting interviews and finally populating the system. Setting up the system and post-sales support was also part of the activities.

The framework was based on ISO 9001 principles as was the case for the procedures and process documentation encountered in the earlier projects in the Aviation industry. Although the focus on systems and the support of systems for processes are the same, the industries are different. One difference is that the aviation industry deals with physical objects such as aeroplanes while the financial industry focuses on the exchange of securities such as cash, equities, bonds and derivatives, which for the most part are immaterial objects.

This thesis must determine if the ISO 9001 based MediaWiki platform based on the author's previous experience in the aviation industry should be used in the financial sector.

The research question is whether the solution for the three projects done in the financial sector is valid.

Part of the problem was therefore also to establish a framework to evaluate the Media-Wiki implementations that was done by the author in the financial services industry.

2.4 Methodology

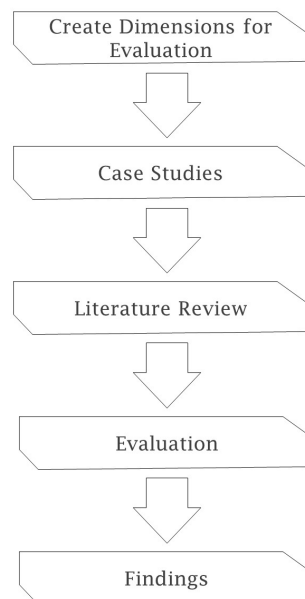


FIGURE 2.1: Overview of Methodology

The overview of the methodology is as follows:

1. Create dimensions and framework for evaluating solution. This will form the basis of the literature review and subsequent evaluation. The following dimensions were identified:
 - Client - Is the Financial Service Customer the right customer?
 - Business Case - Can a case be made that the solution is value adding?
 - Solution Framework - Is the solution framework with strong emphasis on ISO 9000 applicable to Financial Services?
 - Technical Solution - Is MediaWiki an appropriate technical platform for the solution?
 - Project - Was the approach followed for the implementation of the solution appropriate?
2. Select and document sample projects for evaluation: Three projects were selected for which the PBPF was implemented and a case study compiled for each project.

A case study was developed for each project focusing on client, technical and business aspects.

3. Conduct literature review: Literature was reviewed to support the evaluation of the target projects according to the evaluation framework.
4. Evaluate the solution: The field work done and implementation of framework in the three projects were evaluated based on insights gained from literature reviewed.
5. Conclusions and recommendations were made

The literature review Chapter 5: [Literature Review](#) on page 43 and the evaluation framework Chapter 6: [Evaluation](#) on page 119 used the same basic structure. The evaluation methodology is shown in [Figure 2.2 on the following page](#).

The purpose of the methodology was to be able to position and compare the work that was done ("experiential") with existing literature ("rational"). An evaluation is done on whether the solution was at least reasonable and what aspects would require improvement or further investigation and whether the assertion is true that the issues and problems encountered are balanced by the benefits of the approach.

The next chapter will present an overview of the the practical work done by the author.

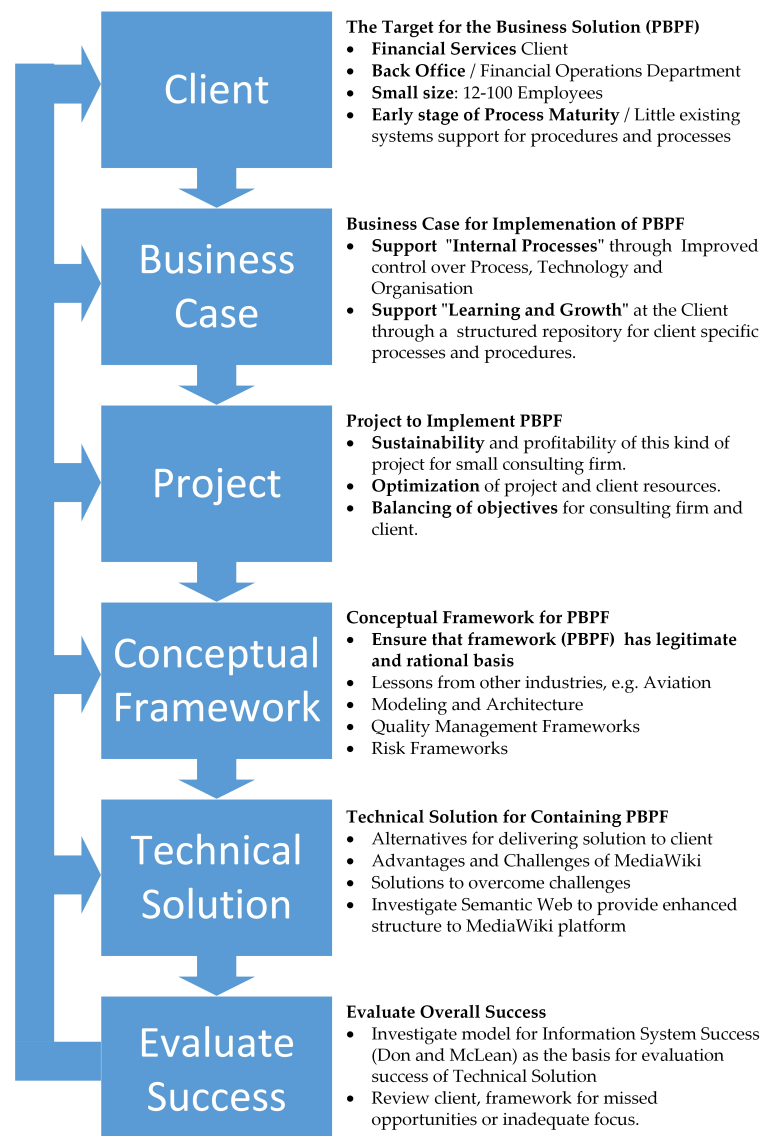


FIGURE 2.2: Overall Flow and Key Ideas to Explore in Literature Review

Chapter 3

Overview of Projects

Before looking at the relevant literature in support of the research question, it is necessary to introduce and provide background to the projects done in industry from 2006 to 2008 and ongoing up to 2012.

During that time the author was engaged by Plumb Line to develop and implement the Plumb Line Business Process Framework (PBPF) which forms the subject of this thesis.

The author developed and refined the core of the proposed model as part of the ongoing activities of these projects.

Plumb Line implemented the PBPF in several clients in the financial services industry in South Africa. The clients include *Stanlib*, *Liberty Africa* when Liberty acquired Stanlib, *Close Brothers* and then finally *Absa Asset Management(ABAM)*. Each of the clients included for discussion illustrates a different aspect or different view of the process framework. For example, the Liberty Africa project demonstrated how a company could create a central template and then rapidly roll it out to satellite offices.

3.1 Stanlib Project

Stanlib was the pilot project for the PBPF.

Stanlib completed a SAS 70 study documenting the risks and controls for 40 processes. The SAS 70 study is a requirement of the fund management activities at Stanlib. Stanlib was, at that point, the largest collective investments fund manager in the country.

The SAS 70 study consisted of a set of a process flow diagrams and procedures in Microsoft PowerPoint and Microsoft Word. The Microsoft PowerPoint process flow diagrams were in a swim lane format. These diagrams provided an overview of the process

activities, systems and of the internal and external parties involved. The Microsoft Word documents of the SAS 70 study provided more detail on the processes and tabulated the procedural steps as well as the risks and controls.

The study was expensive which meant that Stanlib wanted to retain the value of this asset over time. Plumb Line provides generic training in the financial services industry that covers the same process areas as the SAS 70 study. The Plumb Line Process Framework (PBPF) under development at the time seemed like a good fit to the requirement of maintaining these documents. The framework at that point was a simple model incorporating two views: The *process index* and *people index*.

The Stanlib project produced documentation of the activities of the various teams that made up the financial services operations department of Stanlib. The project used the SAS 70 documents as the basis for the first procedure documents. The information collected was captured into the process view and organisation view of the PBPF. The process view linked into a training view containing the Plumb Line training material. The processes and training material aligned to the same high-level process headings. The PBPF provided company-wide, online access to the generic training material and the company-specific procedure documents.

Plumb Line created an initial version of the PBPF for Stanlib as a *Microsoft Visual Basic .Net* application. Unfortunately, the difficulty of managing changes on corporate servers made a move to a more stable, maintainable platform necessary. MediaWiki replaced Microsoft Visual Basic .Net as the technical platform for the PBPF, for the following reasons:

- MediaWiki is the engine that drives Wikipedia. It is therefore a proven and reliable software platform.
- It is stable.
- The MediaWiki foundation updates MediaWiki regularly and provides excellent migration tools with every new release.
- It has a small footprint and needs little bandwidth and server capacity to work well.
- It facilitates a "*create once; edit many times*" approach to documentation. Collaborators can work together to refine one wiki page representing a corporate document, instead of having to manage dozens of versions of documents in shared folders. The same wiki page can *evolve* as more information becomes available and understanding of the particular aspect develops. An individual wiki page can

represent a process definition, a HR position definition, a system definition or even the definition of a risk.

- It is flexible allowing for quick prototyping of ideas regarding process structure, organisational structure and, later on, risk and measurement structures.
- It provides full version control and rollback features that provide continuous visibility of changes to a document. Prototyping is rapid when consultants and clients can make contributions without fear of making irreversible, possibly incorrect changes to an important corporate document. This facilitates collaboration. Changes made by the end-user to a procedure, even if not perfect, signal the need for more refinement and investigation. For this kind of collaborative working MediaWiki platform is ideal.

Plumb Line designed the PBPF to maintain process and organisation descriptions.

Each process description and procedure document encapsulated its own risks and controls. Initially, the risk and control perspective did not have a separate view. The focus on process, organisation and training is seen from the main screen as shown in Figure 3.1.



FIGURE 3.1: Pilot Main Screen Showing Process, Organisation and Training Focus

The process flows for this project were created as clickable bitmaps inside the process descriptions. It is labour intensive to maintain and the text on the blocks are also difficult to read. See Figure 3.2 on the following page. Later versions of the software

used a simpler and more readable flowchart tool, developed specifically to address these two issues. See Figure E.3 on page 203 of Appendix - E: [Additional Screen Prints from Plumb Line Business Process Framework \(PBPF\)](#).

Process Flow

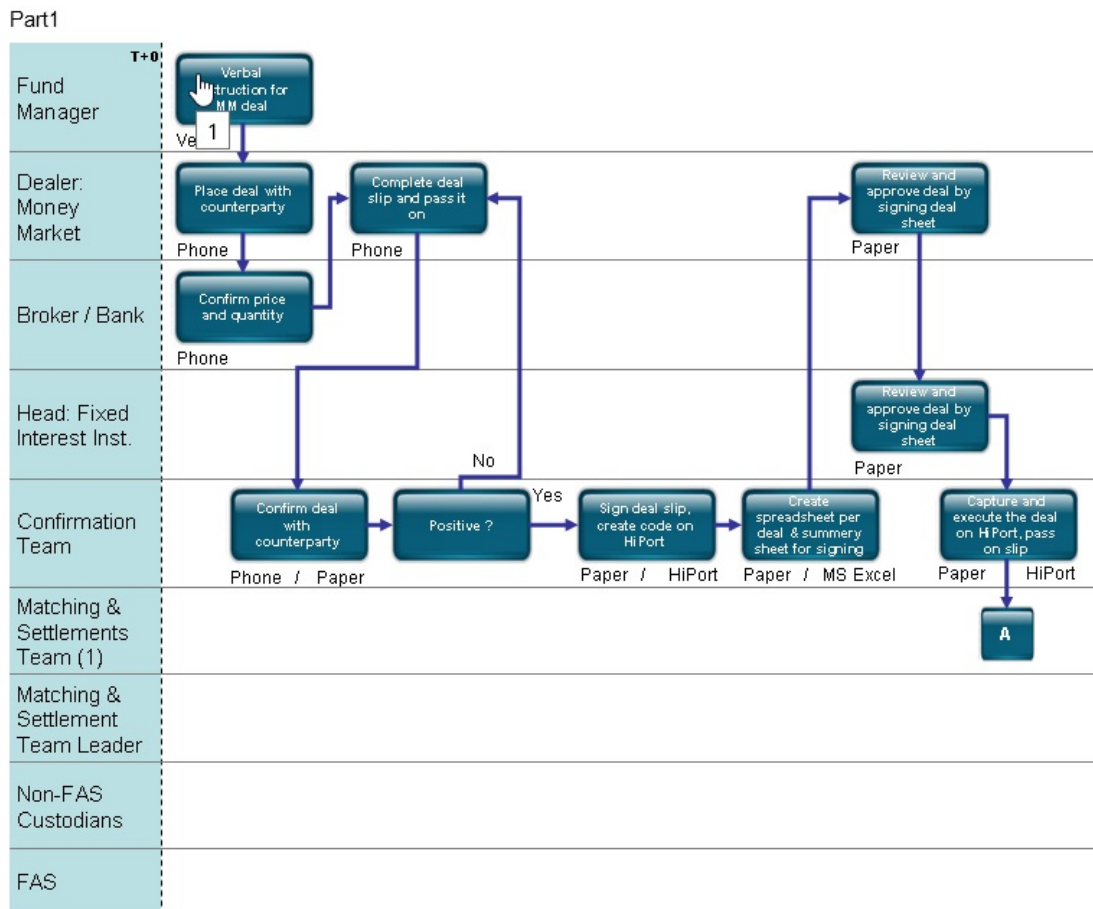


FIGURE 3.2: Example of Clickable Process Flow

Stanlib and its parent company, Liberty, were expanding into Africa and wanted to extend the process documentation to the satellite offices in the different countries.

Each satellite office is significantly smaller and has far fewer resources than the parent company. It is therefore harder for these offices to maintain the same quality of process documentation as the central office at Melrose Arch Johannesburg. The author created a pre-defined country template for process and organisation definitions. The process documenters then used it to rapidly extend and customise this information for these other countries. MediaWiki proved to be sufficiently flexible to accommodate both the overall structure as well as the detailed requirements of each satellite office.

A central view provided drill-down access to the detailed procedures of the satellite offices in other African countries. See Figure 3.3 on the following page.

STANLIB Africa is part of STANLIB and consists of the following divisions:



References

- [STANLIB African Unit Trusts](#) 

Categories: [Organogram](#) | [STANLIB Africa](#)

FIGURE 3.3: Entry Point for Stanlib Framework Showing Countries

Template-based views can incorporate both the generic components, i.e. procedural elements that were identical from office to office and even centrally, as well as the specific components, i.e. procedural elements that were specific to the individual situation of the country in question. Although the initial structure took a long time to set up maintaining the extended structure for all six additional countries proved to be straightforward. This idea of specific versus generic and the requirement to create once - edit many times proved to be a strong point of the MediaWiki approach. The user can drill down from this view to uncover process detail and detailed procedures applying to the satellite office of the specified country. See [Figure 3.4 on the next page](#).

The PBPF framework, as delivered by Plumb Line, at the end of the Stanlib and the Liberty Africa project was quite basic. On the other hand, it did provide a strong documentary structure, user interface elements in Adobe Flash and more sophisticated user access than the standard MediaWiki platform.

The challenge was now to get the users involved in maintaining the documents. Visibility alone is not enough. The PBPF had to facilitate stronger control over sign-off and ownership. This is a requirement that also manifested in the ABAM and Close Brothers projects. Later versions of the software therefore included a sign-off mechanism and progress reports.

Sustainability of the project throughout was always a challenge. The clients were large both in terms of number of personnel and size, variety and volume of transactions. Therefore, over and above the system implementation, the documentation work itself

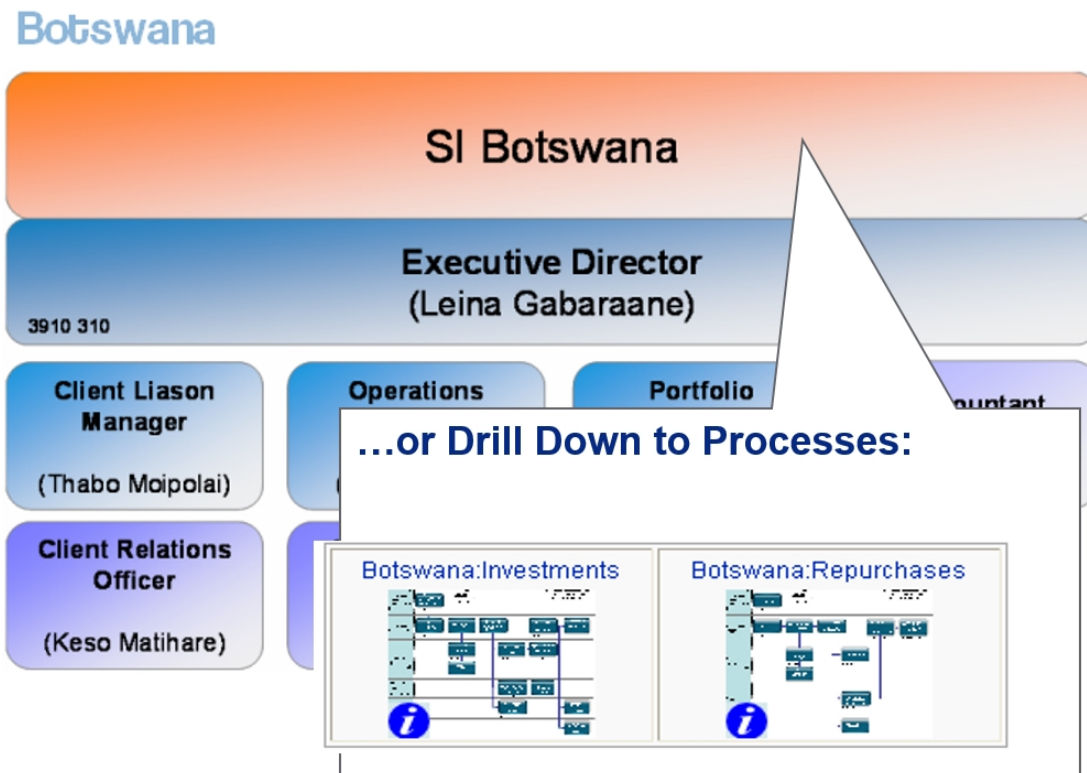


FIGURE 3.4: Organogram for Country Template Showing Next Level of Drill-down

took a lot of time to complete and capture. The client, as could be expected in an active operational department, is always busy. Client personnel rescheduled meetings constantly. It is difficult to get hold of key people. The changes in schedules or unavailability of people is hard for a small company like Plumb Line to absorb. This applies to both a cost and capacity point of view. Additionally the idea is not purely to sell training, process consulting and risk consulting. Another objective with the framework is to create a more regular income stream in the form of software royalties and license fees.

The team is small and at most five people work on a project at a time. They are responsible for a host of technical activities such as software development, software installation and software setup at the client. In addition to technical tasks they also do consultation, training and process documentation. Developers will do software development during a project to extend the MediaWiki system to address project specific requirements. The same developers are also partly responsible to implement the system. This consumes the available capacity of the people involved. It is even more difficult when the framework is installed at two clients simultaneously. Simple tasks such as loading the software onto a corporate server can turn into a nightmare unexpectedly. An IT crisis at the client company affects the scheduling of software installations and updates. This kind of event was experienced at least once per client, and some instances several

times. The impact is magnified because, as stated earlier, implementation and installation of the software are also done by the developers. This leads to a situation where key resources do not have enough capacity.

Another challenge was the several organisational changes took place at Stanlib, the pilot customer. This was especially true over the first two years of that project. The operations department head changed three times. The manager of the *trade execution team* changed twice. The *corporate actions team* leader changed three times. The *unit pricing team* had two management changes. All key positions experienced at least one or more changes. The change in managers meant that sign-offs had to be redone almost constantly. Agreements made regarding process structure and deadlines had to be revisited. Changes in personnel means that Plumb Line has to market and introduce the project and system again to new managers and employees. This eats into the capacity of the assigned project resources from Plumb Line. A positive aspect of the organisational turnover was that the system proved that it can provide continuity, i.e. it worked as planned!

It is challenging to perform both technical and consulting work. Yet, the direct engagement with the client feeds back into the system and methodology development. The best new ideas, such as that of the measurement framework, the risk view, sign-off came from the consulting projects.

The core offering appeared to provide good value to Stanlib. However, for the reasons outlined above, there was constant issues with sustainability. The total income generated by the project was not sufficient to make it profitable. The project was valuable, however, from a research and development perspective. It refined all aspects of the solution: Design, technical, services, implementation methodology and client contracting.

3.2 Close Brothers

The second group of customers, namely the Close Brothers Group, overlapped with the project at Stanlib. The client buy-in at Close Brothers was excellent. There was good sponsorship from management. A highly competent leader managed the project for the client and communicated their requirements to the project. This facilitated the identification, definition and implementation of additional system functionality during the course of this project.

The fund structures for which the project had to create documentation are quite elaborate with multiple layers of clients and funds. Close Brothers manages funds for a host

of separate clients from all across the world. From Denmark, to Saudi Arabia, to South Africa.

Close Brothers manages three different kinds of funds, namely Sovereign, Property and Corporate. These funds are managed in widely different jurisdictions. In total more than a hundred different funds each with its own unique process documentation requirements that had to be accommodated.

A more sophisticated process view had to be developed for the PBPF to accommodate and, hopefully, reduce this complexity. It took a while to understand the synergy between the different client situations. Each team had ownership of a set of funds. The system had to provide a similar sense of ownership to the team for the procedures supporting their funds. Given the vast number of funds the documentation solution also had to limit the number of unique procedures that had to be documented. Here the ideas from the Stanlib/Liberty Africa projects were extended and applied to the multi-client, multi-fund situation of Close Brothers. Liberty Africa and Close Brothers both had to maintain procedural consistency whilst accommodating differences: Liberty Africa managed different countries. Close Brothers managed funds for different clients in different jurisdictions.

To accommodate these requirements a set process templates were created. These templates reflected the skeleton process hierarchy in each of the different sets of funds. Within each template, different elements could be one of three things:

1. Generic across *all funds* and all groups of funds,
2. Generic across a *group of funds*,
3. Specific to *one fund* only.

A similar approach was followed for the procedures for African satellite offices of Stanlib.

The fund structure and the parties ¹ involved in the different funds were important descriptive information. This information described how the funds, in different jurisdictions and ownership structures were managed. It also clarified who reports had to go to. Reports are an especially important output from the activities here. A descriptive fund/client view was added to the PBPF to support this requirement, both for Liberty Africa and for Close Brothers.

The organisational view was modified to accommodate the more vertically integrated setup in Close Brothers: Each of the teams in Close Brothers perform a variety of functions for one group of funds.

¹Owners, business partners, custodians, directors, trustees and others

In contrast, Stanlib follows a *factory* setup and teams split their responsibility along process boundaries. One team performs all of the *client reporting* activities and another team all of the *trade processing* activities, and so on.

A team in Close Brothers has to know what funds they are responsible for. They would deal with almost all activities for one fund. ²

In contrast, a team in Stanlib has to understand what functions they are responsible for. They would perform an set of activities for a whole range of funds.

The user view structure in the two systems are modified to accommodate these differences. The flexibility of the MediaWiki software with its template mechanism makes this kind of variation straightforward to implement and maintain over time.

The PBPF evolved to accommodate additional requirements identified as part of the Close Brothers project. For this project the organisational information was presented in several additional views. The views included for example the *IT framework*, *organisation framework* and *review framework*. The idea here is to represent information of interest to a particular stakeholder in a view that is focused on the kind of information they would be interested in. The collection of views linked to the main screen is shown in Figure 3.5.

Main Page

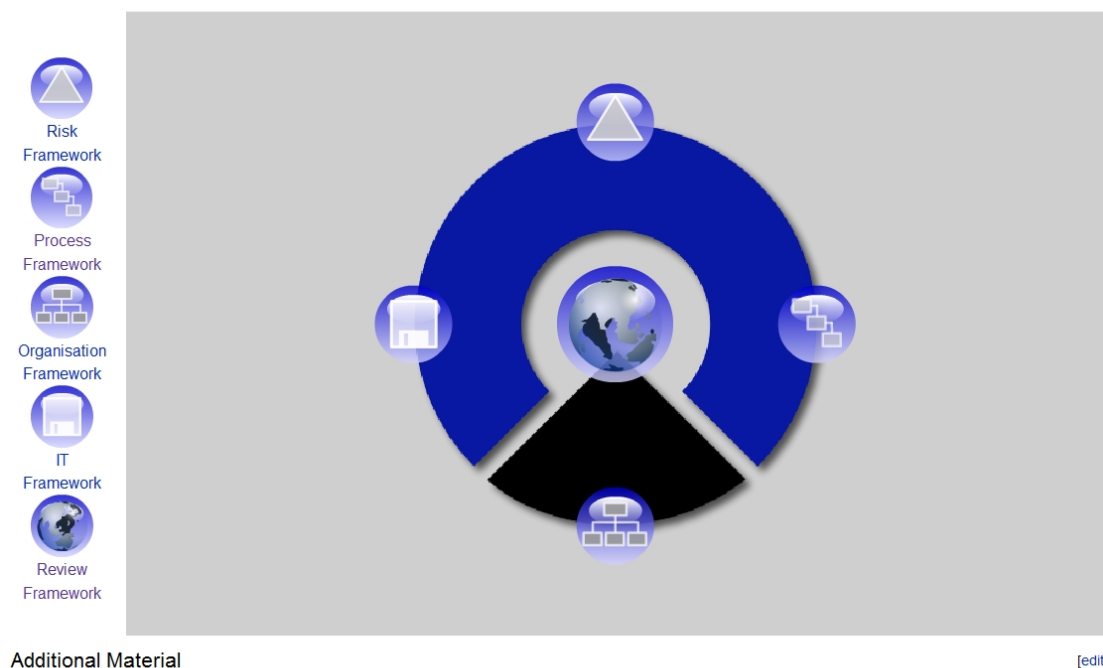


FIGURE 3.5: Main Screen of Close Brothers PBPF Installation

²Specialist teams perform support activities such as IT and HR.

Stanlib has between 200 and 300 procedures duplicated across 6 countries. About half of the procedures carried over in some form to the field offices. Close Brothers has thousands of different possible procedures duplicated over more than a 100 funds.

Figure 3.6 shows an example of a process template ³.

Template:Process Status [\[show\]](#)


1 [\[hide\]](#) **[[{{{1}}}] Fund Structure Chart|FUND STRUCTURE]]**

[[{{{1}}}] Fund Structure Chart]

3 VALUATION OVERVIEW [\[show\]](#)

4 VALUATION PROCESSES

4.1 VALUATION PREPARATION [\[hide\]](#)



4.1.1 Valuation Checklist Preparation

4.1.2 [\[\[{{{1}}}\] Fund Constitution and Signatories|Fund Constitution and Signatories\]\]](#)

4.1.3 Outstanding Queries, Previous Valuation

4.1.4 Previous Valuation Sign-Off Check

4.1.5 Check Open / Verified Dates in Invest One

4.1.6 [\[\[{{{1}}}\] Price Reporting Check|Price Reporting Check\]\]](#)

4.1.7 [\[\[{{{1}}}\] Historical NAV Record|Historical NAV Record\]\]](#)

4.2 VALUATION PROCESS [\[show\]](#)

4.3 FINALISE VALUATION [\[show\]](#)

4.4 OTHER ADMINISTRATIVE DUTIES [\[show\]](#)

FIGURE 3.6: Example of Process Template Showing Specific and Generic Procedure Headings

Note that a *fund specific procedure* has a numbered parameter in the template. This number is replaced with a *fund prefix* that makes this procedure title unique.

This results in a procedure name such as *HANSA:Reconciliations* for example. *Generic procedures* applicable across all funds using this template will not have a parameter.

³Some heading numbers are maintained in sub-templates and are not visible in this diagram. Some headings only applies to a specific template and other templates will skip its number to allow for consistency and comparison across templates.

A generic procedure name will be something like *Reconciliations* for example. No prefix this time. A specific procedure must be created and filled out for every fund. A generic procedure is created only once overall. The fund template will automatically include it in the fund procedure pack for all funds.

The framework incorporates a progress measurement module to track progress. This consists of a sign-off mechanism in each procedure and fund, as well as a review view that shows the documentation status for the project, the teams, and the individual funds. Progress report pages use pie charts or bar charts to show progress, depending of the level of summation involved: A pie-chart shows the completion status for one fund. A bar-chart will show the collective completion state for all of the funds a team is responsible for.

A procedure can have one of three states:

- A procedure is identified as required but document is not complete(*red*),
- A procedure is documented but not signed off by the process owner (*black*),
- The process owner signed off the procedure (*blue*).

This is shown in Figure 3.7 on the following page. Note that the Hansa fund uses the *process template* mentioned earlier. The specific procedure will have a *HANSA:* prefix. The generic procedure will not have a prefix, and will therefore apply across all funds making use of the template.

The progress summary for the funds rolls up into a combined team summary. This gives a team an overall view of progress for the documentation of all the funds they are responsible for. See Figure 3.8 on page 25.

This view provided each team with feedback regarding their documentation progress and was very effective in driving the documentation process. Especially as the teams could compare their progress with other teams!

A generic procedure, though created only once, would be signed off by every team that made use of it for their funds.

The client initially classified a substantial percentage of procedures classified as belonging to the *specific* category. Classifying a procedure as *specific* meant that the documenter had to create a separate procedure document for every fund. This means the amount of work multiplies as the number of funds increases. Fortunately, most *specific* procedures, are not so specific after all. In the majority of cases the bulk of the content of the

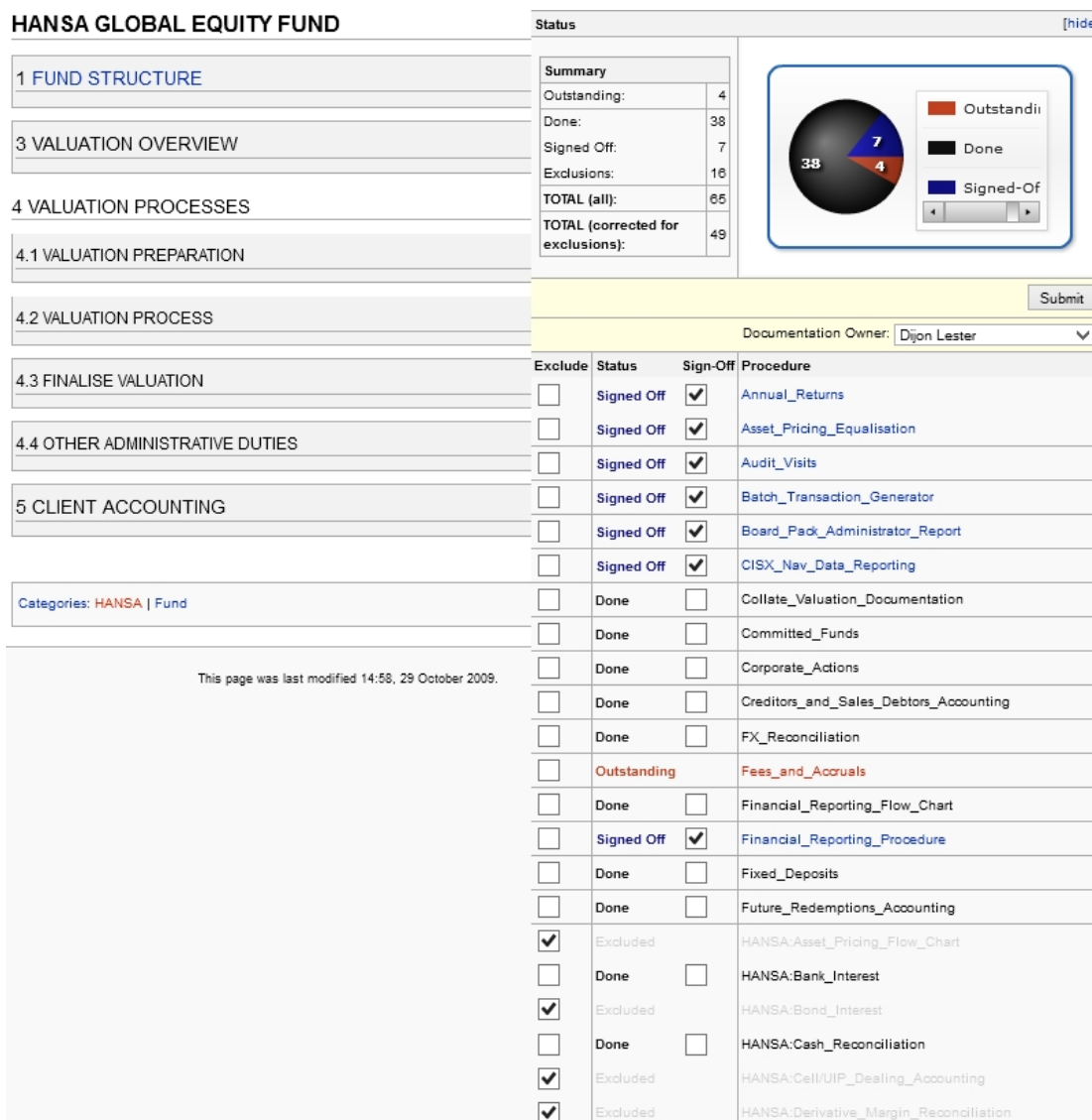


FIGURE 3.7: Procedure States for Fund

procedure are generic across funds. Most differences relate to jurisdiction, time-zones, custodians and custodian contact information.

The the number of procedures were drastically reduced by replacing sets of specific procedures with a generic procedure containing a table listing the differences between funds. Where several dozen procedures were necessary the documentation effort could then be reduced to a single document with a table explaining the differences. The client could now eliminate hundreds of redundant procedures.

Procedures could also now be standardised across funds, for both documents and the actual procedure followed! The procedures became better because more time could be spent on honing and refining each of the reduced number of procedures. The differences between funds for particular funds were also visible at a glance.

Review Framework

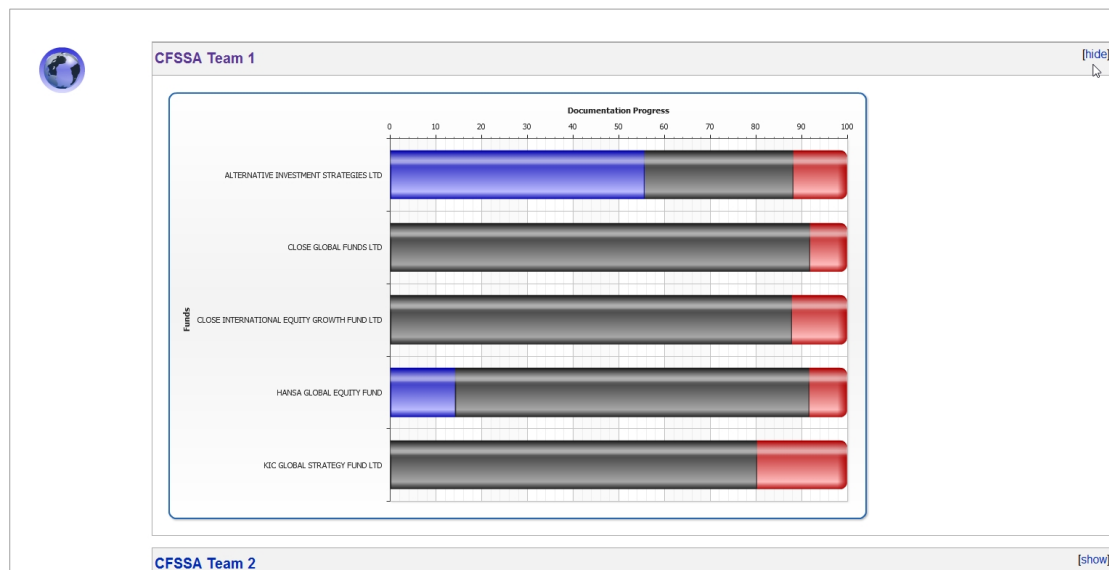


FIGURE 3.8: Procedure Status Overview Summarised for Team

The system was designed so that clients could maintain their own procedure documentation. The client assigns one person as responsible to document a procedure. Another person, a supervisor, would "own" the procedure. This person will review the procedure and, once satisfied, sign it off.

In most clients, it was difficult to make this theoretical process work in practice. Firstly, the users struggled to create documents of a sufficiently high quality and consistency to be useful for risk control or training purposes. Users resisted the use of the MediaWiki mark-up language. This language was a key mechanism for ensuring consistency. On the other hand, when Microsoft Word was used, it was difficult to ensure that documents followed the same standards. Documents vary because of inconsistent use of floating drawings, heading numbering, page numbering and text formatting options. This is the case even when Microsoft Word Templates are used. Secondly, the users processing securities transactions had to meet a relentless cycle of unmissable deadlines, whether it was at quarterly, month-end, day-end or T+5.⁴

In most instances, they simply did not have the time available.

It was not sufficient to implement a system, train the client in its use, charge them a monthly licensing fee and leave. The process documentation process requires a hands-on, professional input on a constant basis. If outputs and deliverables are to retain their usefulness and quality over time, documentation professionals are required. Initially Plumb Line did not do enough to manage the client expectations in this regard, and client contracts were not specific enough. Plumb Line changed the standard contracts to make

⁴"T+5" means "5 days after the trading day".

provision for the cost of additional work that is required as the client takes on new funds requiring new procedures. This necessitated additional contracting and negotiation late in the project. On the positive side the number of actual changes that happened to an existing set of documents after completion of a project were modest. Once the right contract for documentation specialists were in place it was straightforward and cost-efficient to maintain the consistency and currency of the procedure documentation. The history and change tracking mechanism made it easy to see what was changed by users recently and start from there. ⁵

One of the initial requirements set for the framework in Close Brothers was to extend the PBPF with a risk view. The PBPF now do include a risk view but only at a basic level. It never achieved the degree of integration initially envisaged.

The key benefit of the system was that it provided online visibility of how the client managed each fund and who was responsible for performing the activities.

It is not clear whether any alternative system, however sophisticated, could have achieved more in the same time period. The simplicity and flexibility of the solution made its implementation in a relatively short time interval possible. It was the author's experience that users make the most use of the basic functionality such as visibility and consistency. In contrast, complex functions are not used. Financial operations users are not eager to learn how to use yet another system. Even so, they want to be confident that all procedures and information are available for end of year audits, system changes, client audits and for when a new employee had to be trained. They use the system to demonstrate competence to internal and external clients. The Maintenance Repair Organisation achieved these same goals through the MRO Exposition mentioned earlier. In this sense at least, PBPF achieved its goal of providing a *MRO Exposition* for financial services operators.

Plumb Line also hosted the PBPF software on its own servers. This meant that changes could be made directly onto the source code as the project went along. The client could log into the system using a standard web browser and it was possible for Plumb Line to provide direct support.

This relieved the pressure on the developers enormously as it was seldom necessary to go to the client sites for technical reasons. The developers and implementers did not have to install client software on any client PC, reducing the technical support the system required. Hosting the software made it possible to sustain the implementation, operations, development and support for a system at a client that was rapidly evolving at the same time.

⁵The usage statistics in Appendix A on page 135, were compiled, for example, using these mechanisms.

3.3 ABSA Asset Management

The ABSA Asset Management (ABAM) project was ideally suited for the framework. ABAM management supported the project throughout, the number of users were manageable, staff turnover over the course of the project was low. Plumb Line also addressed the capacity issues that plagued previous projects. It helped that this was the fourth implementation. The complexity of the procedure set was at a manageable level and progressed rapidly from the definition of the *process index* and *people index* to the final documented set of processes. The assumption was made from the start that Plumb Line would create most of the documentation on the system after client interviews and a documentation specialist was employed to support this activity. The initial cost of setting up the documents was budgeted into the setup fee and the overall project from start to final edit was about three months. The quants team had an existing set of well-developed documents that were brought into the system unchanged.

The framework for ABAM included a strong IT view. There was excellent buy-in from the IT manager. This made it possible to build a focused vertically integrated view of the activities of the IT department. IT is a support function to the core business processes. There is however, an essential "flavour" to what happens in a corporate IT department. IT departments across different industries tend to be very similar! Activities such as *backup*, *database rebuild*, *batch jobs* relate to the specifics of a data centre, corporate mainframes and business applications. These activities must be performed correctly and support a wide range of processes. The documentation project will miss the IT-specific activities if it only covers customer facing core business processes.

ABAM follows the same structure as the Stanlib setup. In this setup, teams are *activity based* as opposed to *fund based* as is the case in Close Brothers. Organisational and user views were added to make sure that each user knew exactly what they were supposed to do on a daily, weekly, monthly, quarterly, biannual, annual and ad hoc basis. The activities identified from taking a user-centric, organisation centric approach was cross-checked with the activities identified from taking the process-centric approach.

This validated the multiple view approach: The same procedure can be referenced in different views. The IT view supported the identification of the many different systems used on a regular basis by the company. The organisation views and the process view served as a control on each other to ensure everything was covered and to eliminate duplicate procedures. Documents consisted of unique content as well as including pre-defined elements by way of reference. The pre-defined elements were elements such as standard notes, standard instructions and standard checklists. They are defined once and reused and referenced when required. This means that the unique bulk of

documentation that has to be created is significantly reduced. Documents are more standardised and changes in a standard instruction was immediately reflected in all documents that referenced it. Conversely it is also possible to get a list of all procedures that made use of a particular standard element.

In this project, another attempt was made at extending the risk view. The initial idea was to create a risk view consisting of all the corporate risks and its mitigating controls. These risks and controls would then be associated with the appropriate processes and procedures at the lowest level possible. In this way, it was possible to tie the processes and procedures to the highest level of decision-making in the organisation.

In practice this turned out not to be so useful. Extending the documentation project into the domain of the risk manager made the core activities difficult to understand for everyone involved.

Plumb Line created a solution that was a hybrid between risk and procedure: The refined list of identified procedures is used as the basis for a procedural risk classification exercise. Managers tag each procedure with both the level of impact if an error occurs in a procedure as well as the likelihood that an error will occur. The impact and likelihood of errors provides a measure of the relative importance of a procedure. The risk rating of the procedure list provide a guideline on how best to allocate limited documentation resources and sequence activities. The final system has about 270 procedures. For some procedures it was critical that the documentation was always 100 percent up to date. This is an excellent way to ensure that those important procedures are documented first and reviewed often. Once important procedures are completed and signed off, less critical ones can be processed.

The initial classification of activities in terms of likelihood for problems occurring and impact of errors is based on the experience of the customer built up over the years. The refined list of procedures and process areas and organisational areas makes it possible to assign incidents to a specific problem procedure. The client uses the incidents log to refine their understanding of the impact and likelihood of errors in specific procedures and departments. This exercise also provided an opportunity for risk managers to provide input into and obtain output from the procedure documentation process.

The incidents and incident logging functionality evolved into a wider requirement. The idea was that the weekly meeting and the activities discussed in this meeting should also be included in the incident logging system. Although the bulk of the discussion here is typically about incidents that occurred, not all the activities and discussion points are purely incident related. The requirements ballooned into a more sophisticated system than a pure incident logging system. The additional functionality was difficult to

maintain and implement and took away from the core focus of the system. The current system now makes only basic incident logging available.

A screen-print of what the incident logging system looked like is shown in Figure 3.9.

Log:Main Page

Telephones Technology Manager Procedures

Severity Status resolved

Date Logged Fri Aug 7 2009

Date Closed Fri Aug 7 2009

Category None

Incident Description
All telkom line went down at 7:00pm on the 6th August 2009.

Resolution
telkom fixed fault

List of Incidents

id	severity	status	text	resolution	category	dateloggd	dateclosed
1	1	resolved	IGNORE: Test inci	None applicable j	Other	Fri Mar 27 00:00:0	Mon Mar 30 00:00:0
7	0	resolved	nonedtru fg f fu :	none	None	Tue Aug 4 00:00:0	Tue Aug 4 00:00:0
14	0	resolved	TSS did not updat Investinating whv	Client Accounting	Calculation Error	Thu Aug 6 00:00:0	Thu Aug 6 00:00:0
17	0	resolved	All telkom line we	telkom fixed fault	None	Fri Aug 7 00:00:0	Fri Aug 7 00:00:0
18	0	resolved	some mail still we	pushed mail acro:	None	Mon Aug 17 00:00:0	Mon Aug 17 00:00:0
21	0	resolved	errol - mail hangin	mail started funct	None	Mon Aug 17 00:00:0	Mon Aug 17 00:00:0
24	0	resolved	rene - yield curve	patch removed	None	Mon Aug 17 00:00:0	Mon Aug 17 00:00:0

FIGURE 3.9: Incident Log

Complementing the incident log was a set of reports where the individual incidents could be tracked and an overall view of incidents obtained (Seen Figures 3.10 on the following page and 3.11 on page 31).

Additional functionality was added to the PBPF in the form of a task calendar as shown in Figure 3.12 on page 32 and Figure 3.13 on page 33. Note how the same list of procedures used in the aforementioned risk classification was now further refined by adding additional attributes. In this case with the frequency and deadline for each activity. This an excellent example of the *evolutionary* and *collaborative* nature of wiki systems and specifically the MediaWiki system. A basic set of pages is created and refined, over and over again as understanding and available information grows.

The ABAM project and system worked as intended and the client regularly updated, signed off and reviewed the procedures. Once again, the simpler functions of visibility and sign-off proved to be the most useful to the business over the lifetime of the project.

During the ABAM project the ABSA group as a whole undertook an enterprise architecture exercise. This caused friction between the different groups responsible for documentation. The enterprise architecture project, like most complex corporate projects, took a long time. The MediaWiki-based project provided immediate support to the

Summary Report

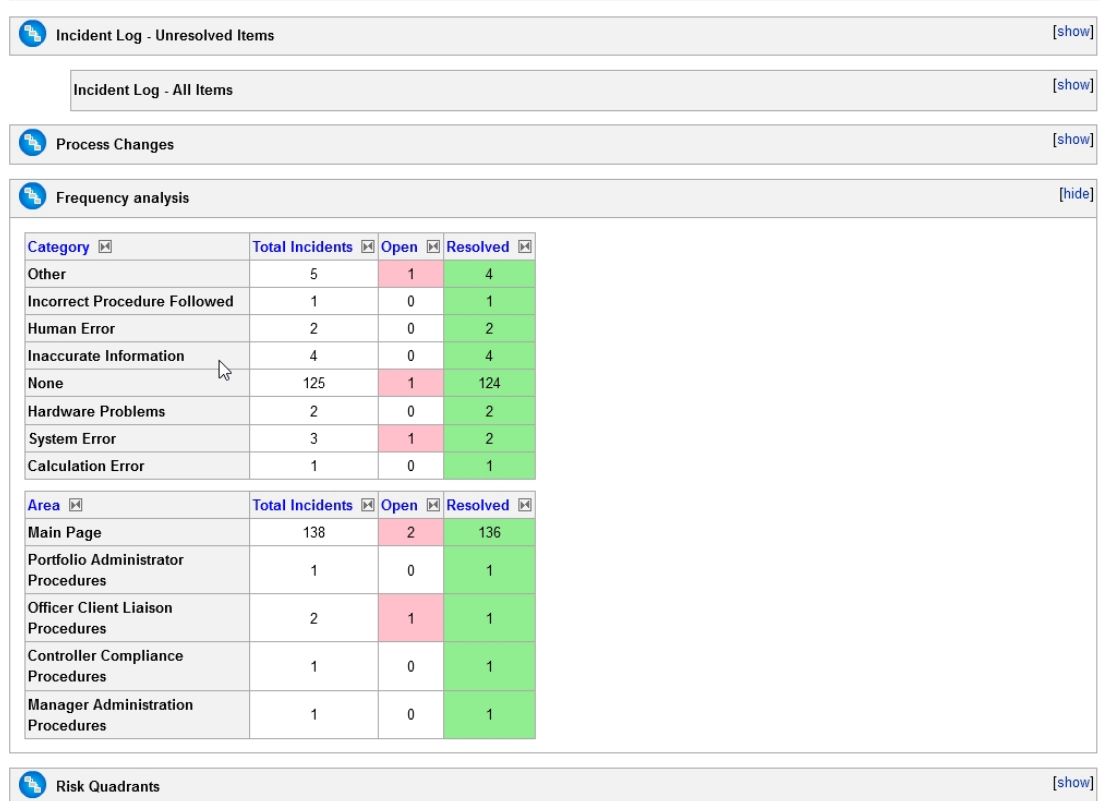


FIGURE 3.10: Incident Summary Reports

asset managers while the Absa corporate team were completing the other project. The scope of what was covered in the PBPF, was limited to the asset management department and was clearly outlined, which meant it could be completed in a relatively short time period. Plumb Line also had considerable experience in developing documentation for other companies in the same industry and could therefore rapidly translate documentation requirements into process documentation nodes in the PBPF. Big corporate enterprise architecture projects often takes a long time to produce useful documentation. This means, that even if eventually completed, the document was out of date by the time it reached the end users. Also the esoteric nature of some of the enterprise architecture tools meant that although it was conceptually more pure and semantically more advanced it simply went over the heads of the end user.

The main benefits of the PBPF are to *ensure completeness* and to *ensure visibility*:
Ensure Completeness: Cover all the required processes and organisational positions.
Ensure visibility: Does everyone know what they are supposed to be doing, when they are supposed to do it, why they need to do it and how they need to do it.

It initially looked as if the basic simplicity, i.e. lack of a whole host of sophisticated functions and linkages, was a drawback. It turned out that this very simplicity was

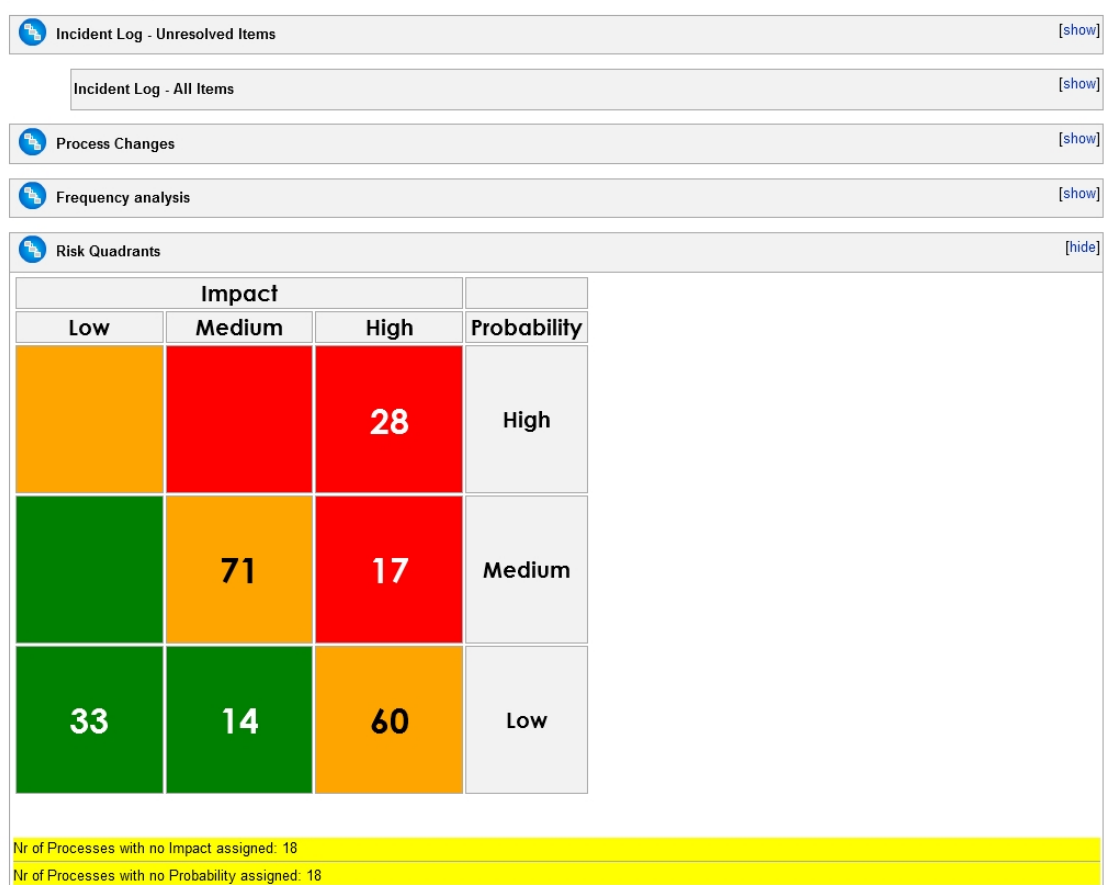
Summary Report

FIGURE 3.11: Incident Summary Reports, Risk Quadrant

what made the framework feasible to implement, useful and valid.

The problem of sustainability did arise in this project as well. Specifically this related to having to support different incarnations of the same software. At the time of the ABAM project four different versions of the framework existed. Each version supported a specific client and had more functionality than the previous version. Each version requires support and maintenance. It was difficult to transition the older clients to the new version of the software. In order to do so it is necessary to first undertake a marketing exercise to promote the newer version to the client. Even when the client buys in to the new software a significant amount of planning and resources are still required to migrate the client to the new software.

Category: Task Calendar

1 By Process

Procedure (241) [x]	[show]	Grouping [x]	Category [x]	Deadline [x]
---------------------	--------	--------------	--------------	--------------

2 By Responsibility

Procedure (232) [x]	[hide]	Grouping [x]	Category [x]	Deadline [x]
Client Agreements & Mandates		Controller Compliance Procedures	Adhoc	
Client Authorised Signatories		Controller Compliance Procedures	Adhoc	
FICA Documents		Controller Compliance Procedures	Adhoc	
Statpro		Controller Compliance Procedures	Adhoc	
Statpro - Issuer Codes & Rating Changes		Controller Compliance Procedures	Adhoc	
Statpro - Mandates & Rules		Controller Compliance Procedures	Adhoc	
Statpro - Compliance Reports & Rule Book Audit		Controller Compliance Procedures	Adhoc	12h00
Financial Services Board Levy		Controller Compliance Procedures	Annually	31 July
PVAL - Automated		Controller Compliance Procedures	Daily	09h00
Portfolio Valuations		Controller Compliance Procedures	Daily	09h00
Neuppt Price Download		Controller Compliance Procedures	Daily	12h00
Statpro - Compliance Reports & Rule Book Audit		Controller Compliance Procedures	Daily	12h00
Daily Trade Sheets		Controller Compliance Procedures	Daily	12h00 next day
Afternoon Reports		Controller Compliance Procedures	Daily	17h00
Interest Claims		Controller Compliance Procedures	Daily	Daily
Outstanding Settlements		Controller Compliance Procedures	Daily	Daily
Monitor Credit Limits		Controller Compliance Procedures	Daily	Daily/Monthly
Bank Reconciliations		Controller Compliance Procedures	Daily	Daily/Weekly
Breach Registers		Controller Compliance Procedures	Monthly	
Overdraft Breach Register - Unit Trusts		Controller Compliance Procedures	Monthly	10th of mth
Monthly Sign-off		Controller Compliance Procedures	Monthly	2nd work day of mth
ABSA Money Market Breakdown - Marketing		Controller Compliance Procedures	Monthly	3rd work day of mth
Monitor Credit Limits		Controller Compliance Procedures	Monthly	Daily/Monthly

FIGURE 3.12: Task Calendar Showing Process and Organisational Grouping of Activities

3.4 Summary

The subset of PBPF functionality that Plumb Line can deliver and support in a profitable way is constantly refined ⁶.

To keep projects sustainable Plumb Line must identify the right customer: In terms of size, of business areas covered and in terms of management support and understanding.

It is important to understand how to do these projects profitably.

The provision of services such as process documentation is an additional and substantial source of revenue. In the initial planning this was secondary to what Plumb Line had in mind for the PBPF: The plan was to create a great and practical framework and then facilitate the target clients to create and maintain their own process documentation in

⁶For additional examples and screen prints of the different kinds of functionality built into the system, please refer to Appendix E: [Additional Screen Prints from Plumb Line Business Process Framework \(PBPF\)](#) on page 201

Category:Daily

Daily Procedures:

1 Grouped By Process

[\[edit\]](#)

Procedure (72) <input type="checkbox"/>	<input type="checkbox"/> [hide]	Grouping <input type="checkbox"/>	Category <input type="checkbox"/>	Deadline <input type="checkbox"/>
Managing Files/Shares/Permissions		IT Procedures	Daily	
User Support		IT Procedures	Daily	
Missing Files		IT Procedures	Daily	00h30 daily
Copy Statpro Benchmarks		IT Procedures	Daily	02h00 daily
Go		IT Procedures	Daily	07h00 & 13h00 daily
Import & Recalc		IT Procedures	Daily	07h00 & 13h00 daily
LATE ODS Files		IT Procedures	Daily	08h00
ABV01R Files		IT Procedures	Daily	08h00 daily
EOD Import		IT Procedures	Daily	08h00 daily
Missing Securities		IT Procedures	Daily	08h00 daily
Investment Solutions Ltd Daily Reports		Client Reporting and Administration	Daily	08h15
Import the Bank Balances		Client Reporting and Administration	Daily	08h30
Unmatched Trades		Dealing Room:CONFIRMATIONS	Daily	08h30
Update Fund Spreadsheets		Dealing Room:F.I. SUPPORT	Daily	08h30
CONDB Import		IT Procedures	Daily	08h30 daily
Backup Procedures - Servers		IT Procedures	Daily	08h30 daily (to be completed by that time)
ABSA Group Pension Funds Daily Reports		Client Reporting and Administration	Daily	09h00
ABSA Life Disability Funds Daily Reports		Client Reporting and Administration	Daily	09h00
Public Investment Corporation Daily Reports		Client Reporting and Administration	Daily	09h00
PVAL - Automated		Compliance and Legal	Daily	09h00
Portfolio Valuations		Compliance and Legal	Daily	09h00
F.I. Maturities		Dealing Room:F.I. SUPPORT	Daily	09h00
ABSA Insurance and ABSA Life Daily Reports		Client Reporting and Administration	Daily	09h00/10h00
ABSA Fund Managers Daily Reports		Client Reporting and Administration	Daily	09h45

FIGURE 3.13: Task Calendar Showing Sequencing of Daily Activities

this framework. It turned out that the consulting company could also sell additional services directly related to support the client throughout this whole process. Providing structure and doing some handholding were not enough. The consulting company must provide comprehensive process documentation services as well. Different parts of the project and system setup required different skills. The creation of the initial process, organisational and risk skeleton requires industry knowledge, insight and experience. This would drive the documentation process to follow. If the framework was right, the more detailed activities followed, rapidly and efficiently. The wiki platform was reliable with almost no technical issues. The users did not like the specific mark-up, however simple, to create and maintain documents. The mark-up helps with the creation of standardised documents that did not need a lot of maintenance over the lifetime of the framework. The users did not want to learn how to use it or found it intimidating. Process documentation remains a specialty activity. Most clients require documentation assistance for practical, predictable and sustainable documentation creation and maintenance. Even when they make use of more familiar tools like the Microsoft Word-like RTF editor. Documentation experts interview the user doing a particular function and

document what they do. The process owner then signs off the process making minor edits and corrections inside the system.

Based on the experience over these four projects the solution and methodology of the PBPF evolved to provide rapid and cost effective process documentation for a department within a large financial services company. The experience gained helps with understanding the limitations of the software and what services the service provider can deliver successfully and profitably. The small system developer and service provider must ensure that it spends the right amount on research and development, implementation, support and consulting services.

Next, Chapter 4: [Evolution of Technical Framework in the Context of the Projects](#) on page 35 will briefly recap the evolution of the framework over the course of these projects.

Thereafter, Chapter 5: [Literature Review](#) on page 43 will review the literature relevant to the research questions and the field work presented here.

Chapter 4

Evolution of Technical Framework in the Context of the Projects

Figure 4.1 on the following page, shows the MediaWiki technical solution, and the initial design for the process, job, training and risk views.

The Plumb Line Business Process Framework evolved from a simple framework with a few representative views to a more advanced one where several additional views were included.

The initial design provided for the inclusion of a process index, a people index and a risk index.

Each project added to Plumb Line's understanding of the financial services operator's real requirements .

Currently the framework contains a host of additional views such as the task calendar view and the client view that directly support requirements identified during the projects discussed in Chapter 3: [Overview of Projects](#) on page 13.

This section will discuss how this evolution took place.

4.1 Initial Ideas

The motivation for including the "process" and "job" perspective was the direct link to the ISO 9001 type framework as found in the Maintenance and Repair Organisations in the Aviation industry. Training was already a product in the form of the Financial Markets Series maintained and sold by Plumb Line to the financial services Customers.

The view was that the Process documentation would be the "Specific" extension built onto the foundation of existing "Generic" training material provided by Plumb Line. Its inclusion here was therefore a natural result of the existing capabilities of Plumb Line. At the time that the framework was developed it was not quite clear how *risk* would be represented or integrated with other aspects of the model so its inclusion here was more representational rather than functional.

The initial technical design is shown in Figure 4.1. The functional model supporting the technical solution is shown in Appendix B: [Model Exposition](#) on page 154.

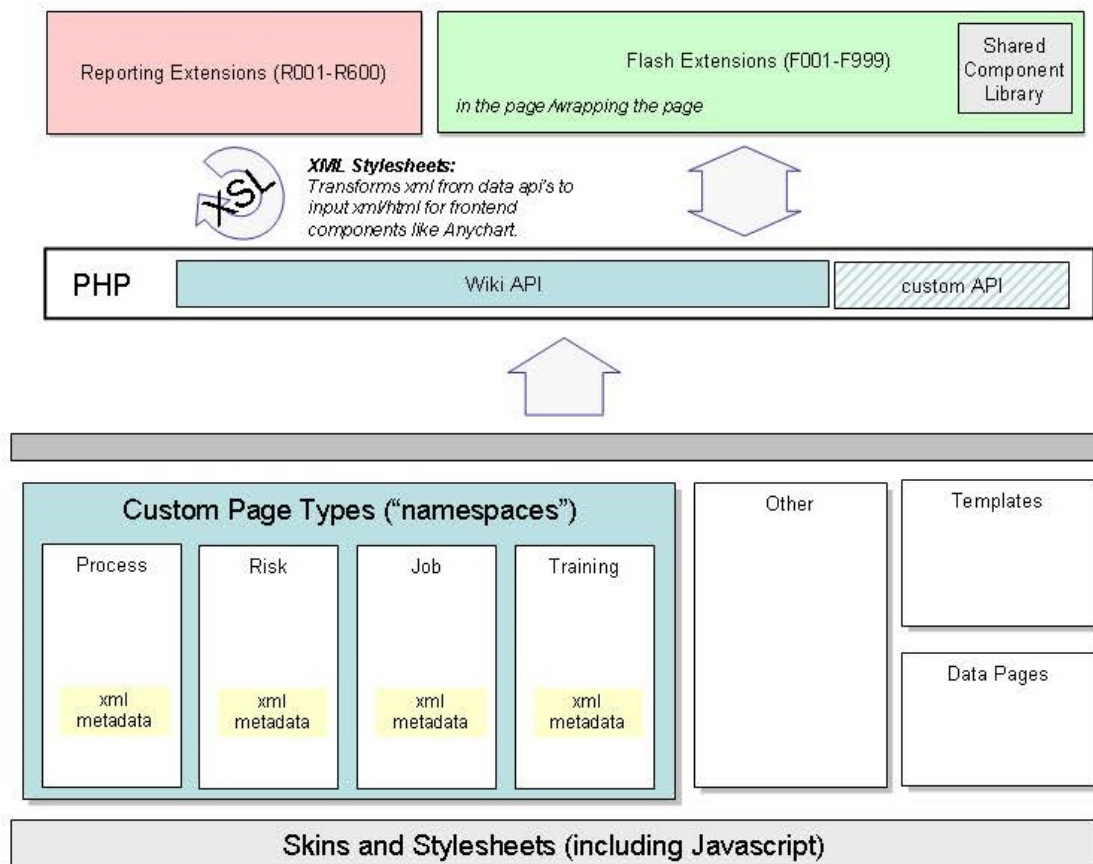


FIGURE 4.1: Initial PBPF Technical Design Overview

4.2 Incorporation of Source Material from Client

The implementation of the framework at Stanlib and the documentation of their processes and procedures from source material lead to a few extensions to the framework. For example, the bulk of process flows was documented from previous work done as part of a SAS 70 study. The process flows were done as a set of horizontal *swim lane* diagrams. A simple example is shown in Figure 4.2 on the following page.

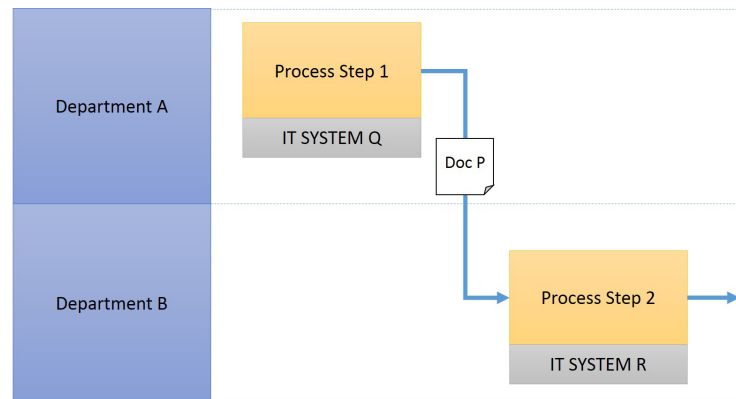


FIGURE 4.2: Swim Lane Diagram Example

4.3 Use of MediaWiki Categories to Build Additional Views

The Systems View was built to capture the rich detail on the PowerPoint process flow diagrams of Stanlib into the PBPF. The perspective of the individual was encapsulated in the Organisation View. The Systems View, was added to describe the Information Technology systems that supported the business. It was clear that the activities of the IT Department were largely self-contained. Merely, attaching the systems as an attribute to each of the documented activities obscured that fact. A distinct IT Focused view is necessary to fully represent the IT activities required for systems that support processes.

The flexible way in which documentation can be done in the MediaWiki platform made the creation of additional views or "perspectives" possible. A wiki page can be created to contain a set of references pages relevant to a particular corporate stakeholder. The different page types of MediaWiki are core foundational components. This formed part of the initial technical design as shown in Figure 4.1 on the previous page. In fact, all of the information in the PBPF was represented as a MediaWiki page. A powerful feature of the MediaWiki platform is its multilevel, hierarchical categorisation system. Each page can be annotated with one or more *categories*. These categories are displayed as hyperlinks at the bottom of the particular page. In turn each category can have its own MediaWiki page which can also be categorized allowing a powerful hierarchy of categories to be built up. The power of the system lies in its evolutionary nature where a page can rapidly be completed and then refined in an iterative manner to add layer upon layer of additional information to it without having to create a lot of additional pages to do so. An example of how this could work is shown in Figure 4.3 on the following page.

The power of this approach was that it was possible to accommodate a wide range of stakeholder perspectives without having to redesign or redo the system. Annotate

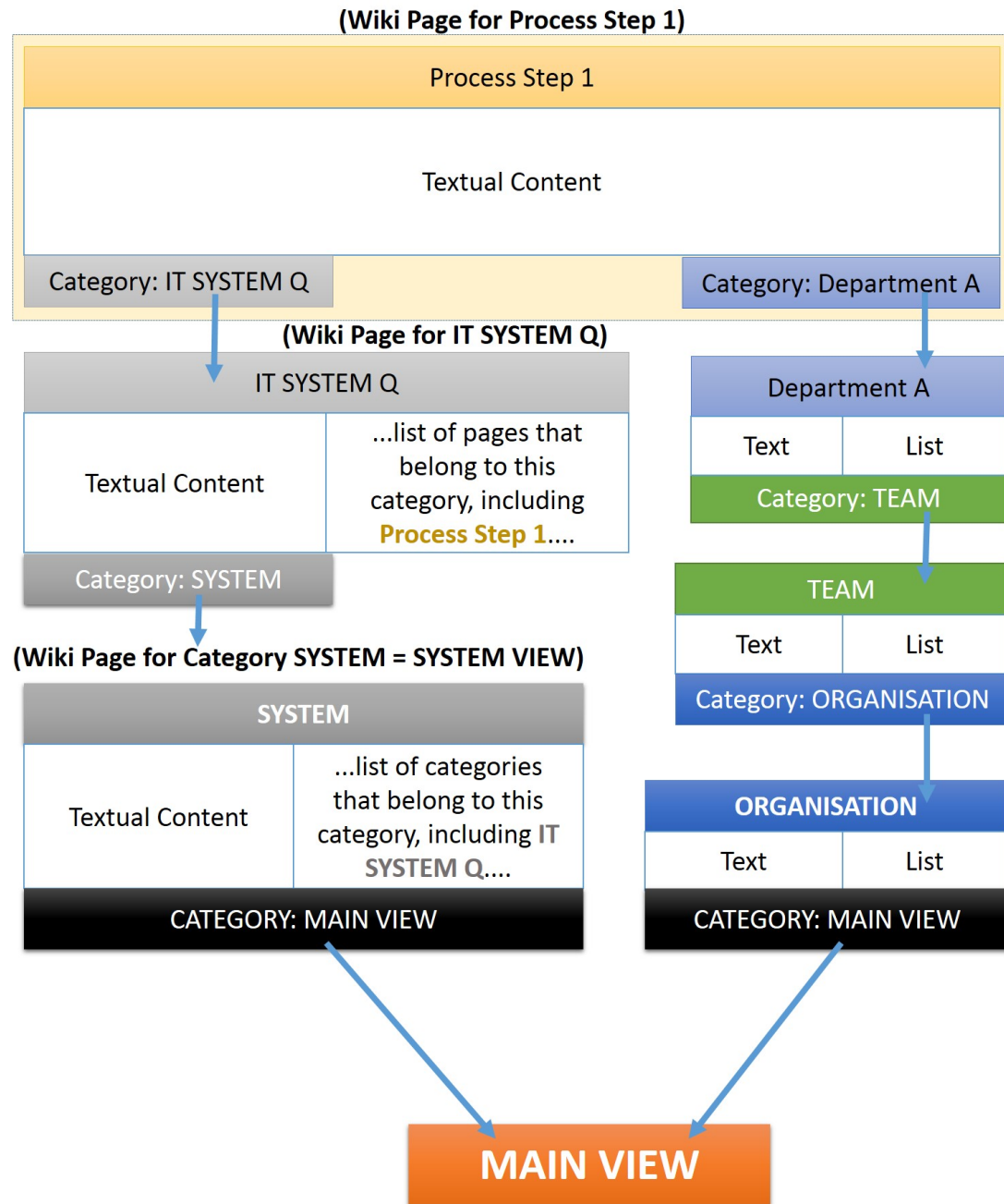


FIGURE 4.3: Example of Category Hierarchy in MediaWiki

existing pages with an additional *category* was often sufficient to achieve the desired result.

A case in point was the requirement to add a risk impact and likelihood perspective and a task calendar perspective in the ABAM procedure set. Categories are added to each procedure page to classify procedures as being more or less important from a risk point of view. The impact of a mistake in a procedure, is classified as high, medium or low impact. The likelihood of someone incorrectly executing a procedure can also be

classified. Normally this would be the kind of methodology followed in analysing risks in an organisation. Classifying procedures in this way reduces risk through the rapid and prioritized completion of documentation. The most important ones are covered first! The classifications are verified when incidents are logged against particular procedures.

To support the *task calendar* view categories were added for time categories such as Daily, Weekly, Monthly, Annual, Ad Hoc, etc. Additionally, where available specific times were added to the time categories, for example, 9:00AM, "1st day of Month" or "Mondays". These categories naturally yielded a view of the periodic and ad hoc activities of the company.

4.4 Extensions to MediaWiki to Complement Categories

As powerful as the *category hierarchy* of MediaWiki was it was not sufficient to provide all of the functionality that the users expected from a system such as the PBPF. As was envisaged in the initial technical design as shown in Figure 4.1 on page 36, the wiki platform was supplemented by *templates*, *CSS stylesheets*, *javascript*, *Adobe Flash*, *AnyChart*, *AnyGantt* and *PHP* extensions to the MediaWiki program. The *Adobe Flash* programs allowed for dynamic and visually pleasing elements to be added to the MediaWiki environment without having to significantly change the MediaWiki platform itself. Elements which were eventually developed in Adobe Flash included a *process flowcharter*, a *fund chart diagrammer* and an *organisation chart*. Several minor visual elements were added which improved the look and feel of the application.

Not all visual elements and extensions were developed in-house. In particular instances external 3rd-Party plugins were used, specifically as in the case of AnyChart that provided visually striking bar graphs and pie charts and AnyGantt that formed an important element of the PBPF incident logging and tracking module.

MediaWiki is developed in PHP. Where sophisticated front end changes were added to the environment it had to be supported by PHP extensions that were added to the MediaWiki platform. Fortunately MediaWiki provided a flexible set of mechanisms to do so. The mechanisms are not well documented. Thus, repeated code rewrites was done to achieve the right level of integration of the extensions with MediaWiki.

4.5 Templating Mechanism as a Powerful Evolutionary Driver

A mechanism that is powerful as a tool in MediaWiki is that of its templates. A MediaWiki template is a wiki page with *parameters*. Part of the page will consist of *fixed*

content. Other parts of the page will consist of *variable content*. The variable content will be controlled by *numbered parameters* or *named parameters*. Splitting variable and fixed content in this way makes the *MediaWiki template* particularly effective for creating standardised procedures.

If certain elements must always be present in the documentation of a particular page, for example a procedure, then these elements could be represented as a set of parameters. A documenter creating a procedure page fills in the variable content parameter by parameter. The actual representation would be managed in the template page itself. The template page could for example determine the layout, in what sequence the particular elements are to be represented, what additional, standardised information is to be represented on a page and so on. The power lies in the fact that only the information that are different is captured. This is very effective where a procedure is for the most part identical between different business areas. In this case a template is created that presents the core of the procedure and parameterizes the sections which are different. Then for the different business areas a short template is filled in for this procedure specifying only the values for the parameters. All of the identical parts are done once and only in the template. An example of this kind of structure is shown in [Figure 4.4 on the following page](#).

This kind of structure was used to good effect in the Close Brothers clients and funds structure that involved over a hundred different funds and dozens of clients that shared procedures that were essentially identical except for minor elements which differed from jurisdiction to jurisdiction or from client to client.

4.6 Platform Stability and Stakeholder Requirements

The initial idea was to have the following views:

- Process Index
- People Index
- Risks

The final version of the framework had the following views:

- Process View
- Organisation View

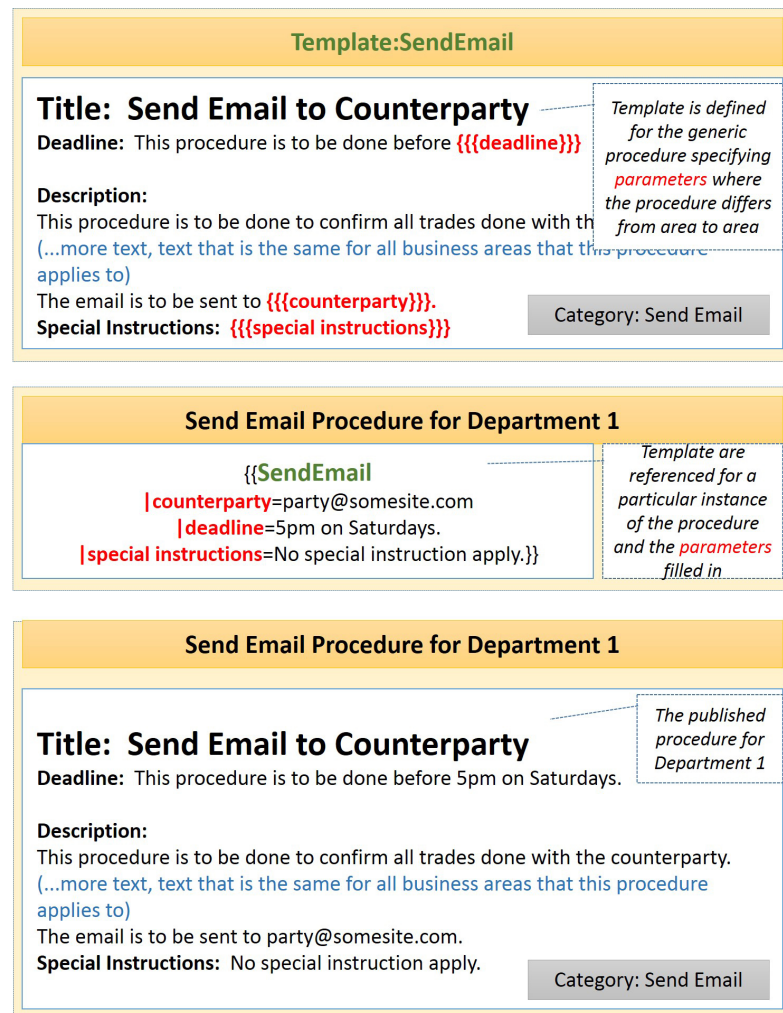


FIGURE 4.4: Example of a Procedure Template in MediaWiki

- Systems View
- Training View
- Risk View
- Review View
- Task Calendar
- Incident Log
- Country View
- Client View
- Fund View
- User Pages

- Team Pages
- Process Matrix

It is obvious from these two lists that the system evolved considerably from the initial concept to the final versions. It is a testament to the flexibility, extensibility and support for rapid prototyping of the MediaWiki platform that these extensions and evolutions could be accommodated without changing the core or affecting the stability of the platform.

A particular stakeholder could be accommodated in several different ways: A new index page can be created to link the pages of interest together. Alternatively a template can be created that would present information in particular way, without changing the core model. Yet another alternative was to simply add new *category* and *sub categories* to group a set of related pages together in a way that present a view more focused on the requirements of the stakeholder. In this way the core application was protected from spurious requirements that tended to change quite a bit from initial request to final version.

A more detailed presentation of the model supporting the PBPF is shown in [Appendix B: Model Exposition](#) on page 154.

In [Chapter 5: Literature Review](#) on page 43, literature relevant to the project covered in industry will be presented.

Chapter 5

Literature Review

The previous two chapters, Chapter 3: [Overview of Projects](#) on page 13 and Chapter 4: [Evolution of Technical Framework in the Context of the Projects](#) on page 35 provided background to the projects and financial services clients in which the PBPF were implemented.

A literature review was done relevant to the work that was done.

The review itself was extensive and included material covering the financial services client, the business case supporting the use of such a system in the financial services client, the project, the business solution and the technical solution.

An overview of the structure followed for the literature Review is shown in [Figure 5.1 on the next page](#).

The detail of how the sources were allocated to the proposed literature review structure is shown in [Appendix I: Detail of Literature Review](#) on page 216 and listed in the Bibliography on page 220.

The four projects introduced earlier required system setup, implementation, consultation and training. However, system development also formed an important part of the project activities. Plumb Line continually developed, extended and evolved the system to conform to client requirements.

The many aspects that were covered practically or experientially over the course of the projects made it quite difficult to complete all aspects of the literature study to the same level of detail. For example, when the overview was crafted it was envisaged that a significant part of the literature study would cover how ideas from work done in the semantic web could be used to evaluate the tagging and paging mechanisms in the web-based MediaWiki platform.

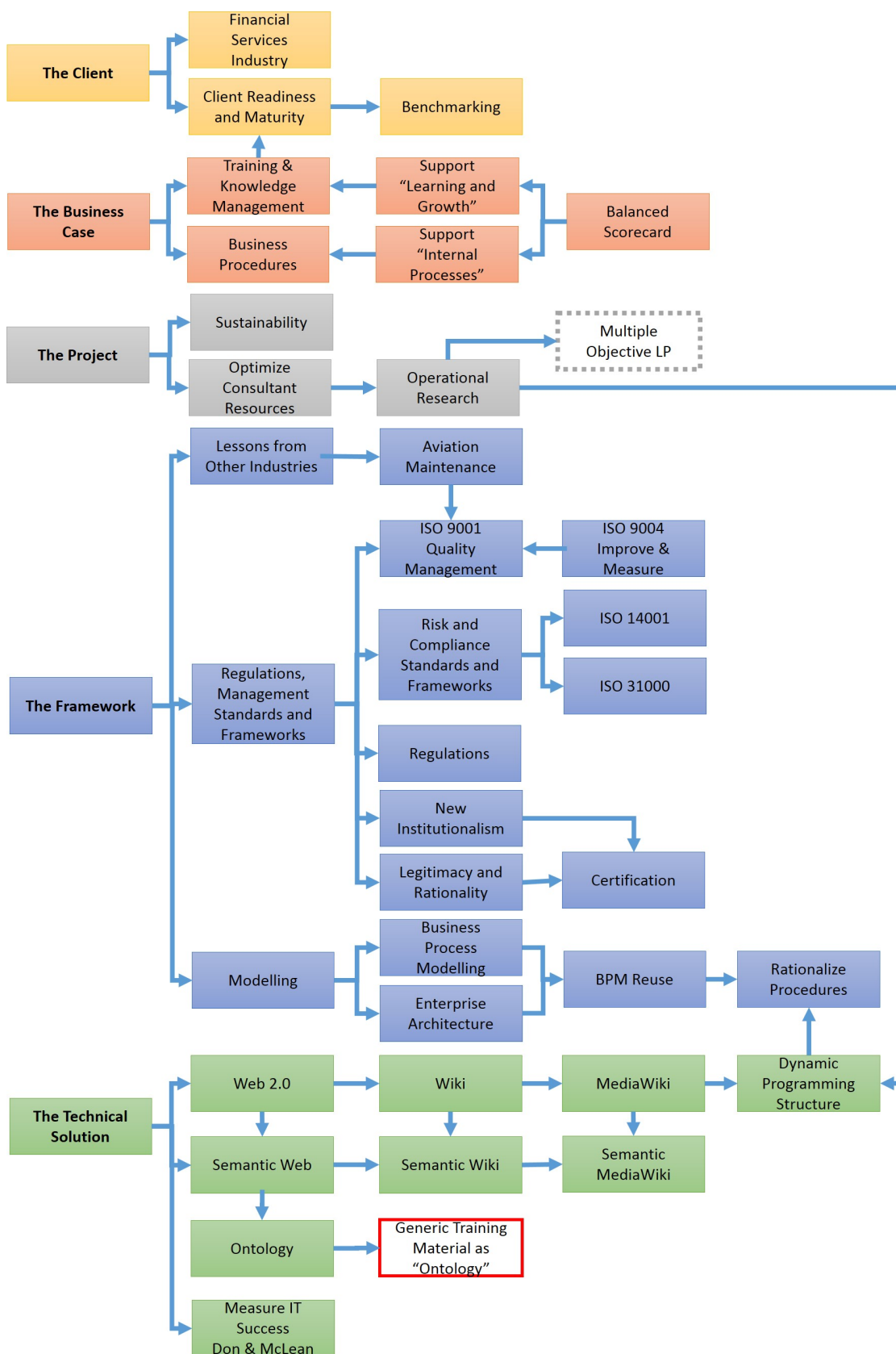


FIGURE 5.1: Outline of Literature Study

Alternatives to MediaWiki are database-driven applications or systems such as the SharePoint. However, the PBPF remains within the MediaWiki platform due to its flexibility and ease of implementation. Thus work done by other practitioners in wiki systems was reviewed in the literature study.

Whether the model as built into the PBPF conforms with accepted enterprise architecture practises could also form the topic of future work and to this end the exposition of what the model on which the PBPF is build is presented in [Appendix B: Model Exposition](#) on page 154. Various alternative modelling tools and standards currently used in enterprise architecture are shown in [Appendix F: Widely Used Modelling Tools and Standards](#) on page 207. Frameworks that could be considered for further evaluation of the detail of the PBPF in [Appendix G: Frameworks](#) on page 211.

An early idea as well was to explore cost and profit models of how to cost effectively, profitably and more optimally from both a client and service provider point of view deploy consultation and documentation resources when implementing and populating a system such as the PBPF. This was not done other than looking at the business case from a high level perspective, such as presented by the Balanced Scorecard in [Section 5.2: The Business Case](#) on page 55. In this context some aspects that could be optimized through the implementation of the system was investigated but only on a high level. A basic cost model and Microsoft Excel Simulation were created to support the work on cost models and supported in broad terms the experience in these projects. This model has not been rigorously tested and will be require further development to be useful in support of practical project decisions. The preliminary outline and results of this work is shown in [Appendix D: Quantitative Model of Cost and Profit for Business Process Documentation Project](#) on page 188.

The project of implementing the system is a large topic in itself and a lot of work was done looking at how to structure the evaluation and review of this aspect of the overall solution. This work will need additional refinement. The current summary and analysis of the work done here is shown in [Appendix C: Implementation Considerations](#) on page 172.

Ultimately the most interesting and relevant material from the perspective of the actual work done was found in the Client, Business Case and Solution Framework sections of the Literature Review, and more specifically in the area of management standards for quality and risk management. The dynamics and contrast between the "technical" and the "non-technical" corporate social aspects of why a process and procedure framework is useful for a client are also explored.

The literature review positions the material covered in the previous section in an academic context. An evaluation is then done to determine whether the solution is valid and identify aspects that require improvement or investigation.

Chapter 6: [Evaluation](#) on page 119 will use the insights in the literature review presented here, to evaluate the field work documented in Chapter 3: [Overview of Projects](#) on page 13 and Chapter 4: [Evolution of Technical Framework in the Context of the Projects](#) on page 35.

5.1 The Client



FIGURE 5.2: Outline of Literature Study:Client

5.1.1 Financial Services Industry

Before understanding the specifics of the *Business Solution Framework*, the *Technical Solution*, the *Business Case* and the *Project* through which the solution is delivered to a *Client* it is important to understand a bit more of the typical client that forms the target of these projects.

The *Business Solution Framework*, branded as the PBPF, is developed for financial services operations departments and specifically for *financial asset managers*. These businesses form part of the wider *financial markets* landscape. The financial markets is the subject of the generic training material provided by Plumb Line risk alignment, named *The Plumb Line Financial Markets Series*. The process consulting work supports and derives from Plumb Line's customers for training services in this industry. The processes and procedures described in the PBPF deals mostly with the trading and exchange of one or more securities. The size of the financial markets and the transaction volumes are huge. The two figures below show firstly the enormous volume of transactional amounts moving through these markets in Table 5.1 and then in Table 5.2 on the next page the scale of the financial markets themselves.

	<i>Net of Repayments, Billions of US Dollar</i>				
	2000	2004	2006	2008	2011
International bank loans	714	1,343	2,816	-1,279	185
International bonds and notes	1,148	1,560	2,617	2,436	1,212
International money-market instruments	87	61	168	82	-6
Domestic bonds and notes	865	2,461	2,322	2,282	2,566
Domestic money-market instruments	377	774	983	1,462	-611
International equity issues	318	214	371	392	485
Domestic equity issues	901	593	717	999	617
Total excluding domestic loans	4410	7006	9994	6374	4448

TABLE 5.1: Amounts Raised in Financial Markets ^a

^aFrom Levinson (2014, Table 1.1), original source *Bank for International Settlements; World Federation of Exchanges; Thomson Reuters*

Amounts as at year end, Trillions of US Dollar

	2000	2004	2006	2008	2011
International bonds and notes	6.1	13.2	18.4	23.9	28.5
International money-market instruments	0.3	0.7	0.9	1.1	1
Domestic bonds and notes	23.8	35.9	49.7	59.7	69.6
Domestic money-market instruments	6	8.2	10.1	12.8	11.5
International bank loans	8.3	13.9	18.9	22.5	22.3
Equities	31.1	37.2	50.7	32.6	47.4
Total value outstanding	75.6	109.1	148.7	152.6	180.3

TABLE 5.2: Size of the World's Financial Markets ^a

^aFrom [Levinson \(2014, Table 1.2\)](#), original source *Bank for International Settlements; World Federation of Exchanges; Thomson Reuters*

The different kinds of securities that are traded in these financial markets are legion. Fundamentally financial markets allow for the trade and exchange of securities from one form to another. A simple example would be where a fund buys shares in a company. The exchange will take place according to a predefined process with deadlines, controls, business partners, inputs and outputs. Depending on the type of security and also the jurisdiction, the process could be highly regulated or even informal. The different markets and categories of securities exchanged are well defined and reviewing the existing markets [Valdez & Molyneux \(2010\)](#), [Levinson \(2009\)](#), [Levinson \(2014\)](#) yields the breakdown of financial markets and securities shown in the list below.

- Foreign-exchange markets.
- Money Markets.
- Bond Markets.
- International fixed-income markets.
- Equity markets.
- Futures and options markets.
- Derivatives markets.
- Securitisation.

This is by no means the only perspective. A comprehensive breakdown is maintained by the *Financial Industry Business Ontology (FIBO)* initiative. The FIBO is a joint effort by the *OMG¹ Finance Domain Task Force* and *Enterprise Data Management (EDM)*

¹Object Management Group (OMG)

Council. Its purpose is to define financial industry terms, definitions and synonyms using semantic web principles such as *RDF/OWL*² and widely adopted OMG modeling standards such as *UML*.³

Karapetrovic & Willborn. (2001) points out that service providers in the *financial services industry* has to provide adequate confidence to investors that their investment goals will be met, must provide assurances in the quality of the investment services and also that *the quality assurance efforts must be visible to both current and potential customers*. The list of different types of securities are comprehensive. It is in this complexity and the associated risk of not performing a key aspect of a particular securities exchange transaction correctly that the opportunity for training, rationalisation, optimization and process management frameworks based on ISO9000 series principles lies.

The typical client for the PBPF, three examples being Stanlib, ABAM and Close Brothers are tasked with the management of a set of portfolios or funds on behalf of clients. The funds could be hedge funds, collective investments such as mutual funds or segregated funds where a fund is managed on behalf of an institutional investor such as a pension fund or a wealthy private investor.

A financial services company is logically broken up into three parts: the front office includes sales personnel and corporate finance; the middle office manages risk and IT resources; and the back office provides administrative and support services.⁴ The processes for a financial service provider can also be divided into *front office*, *back office* and *middle office* processes Safizadeh *et al.* (2003).

Responsibility is clearly defined between the front office and the back office in terms of the transactions and the systems they use.

The *back office* is the administration and support personnel in a financial services company. They carry out functions like settlements, clearances, record maintenance, regulatory compliance, and accounting.⁵

Plumb Line's clients were specifically departments focused on the *back office* processes of financial services. The PBPF, that is evaluated here is specifically focused on the *operations* department or *back office* of a financial services company. Occasionally some middle office processes would be included if required.

Fund managers make decisions either automatically, by setting predefined investment criteria, or through analysis regarding which securities are to be sold or bought. These

²Web Ontology Language (OWL) and Resource Description Framework (RDF)

³ Website: <http://www.omg.org/hot-topics/finance.htm>. This website lists RDF/OWL descriptions for *Business Entities* and *Securities* amongst others.

⁴From: Investopedia, <http://www.investopedia.com/terms/m/middleoffice.asp>

⁵<http://www.investopedia.com/terms/b/backoffice.asp>

transactions need to be captured, and followed through following industry accepted processes. In general this is an IT intensive set of activities and the back office would be supported by an *investment management system* like *HiPortfolio* or *Charles River* on which *portfolios* would be managed for investment customers. The back office personnel would spend the bulk of their day on of capturing, follow-up and reconciliation of transactions on these systems.

A visual representation of what the *value chain* of process for a financial services company looks like is shown in Figure 5.3. This example is taken from the Stanlib project. Note the clear division of responsibilities between the front office activities and systems and the back office activities and systems. The value chain consists of *customers*, *suppliers* and a *process flow* with *inputs* and *outputs* that can be the subject of process improvement and optimization principles [Safizadeh et al. \(2003\)](#)[Khalid \(2010\)](#). These aspects will be discussed in more detail in later sections.

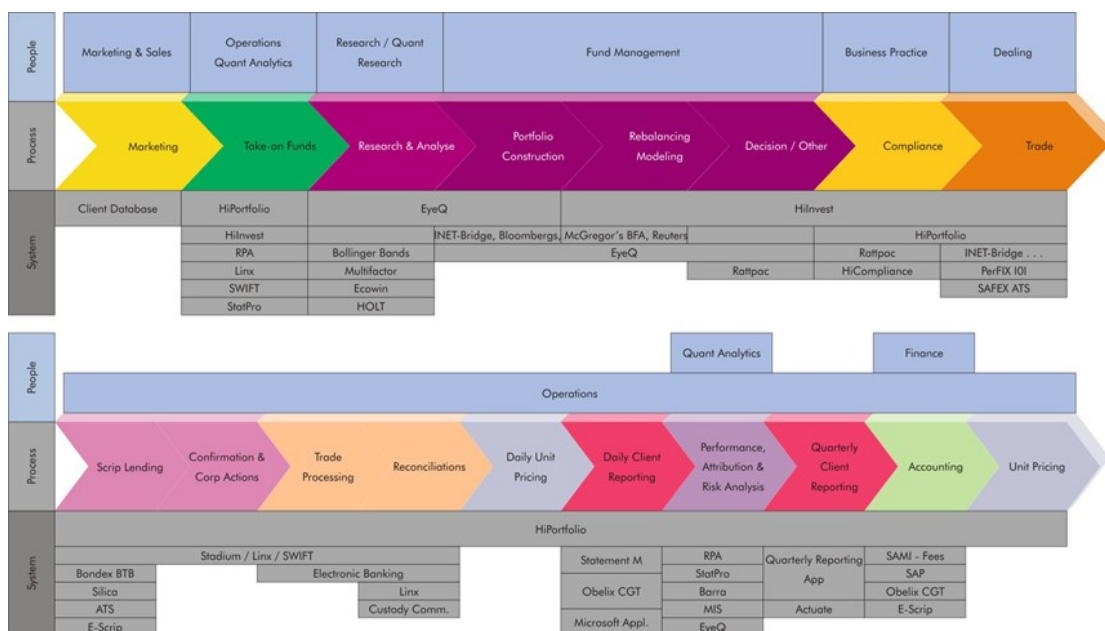


FIGURE 5.3: Financial Service Provider Value Chain Showing Division of Responsibilities between Front Office and Back Office

An equivalent example taken from *Hexaware*, presents an overview of a typical division of duties between front, middle and back-office as shown in Figure 5.4 on the next page.

In summary: It is clear that the financial markets are vast, totalling almost 180.3 trillion dollars in assets, excluding derivatives. A host of different securities are transacted between parties in these markets and the processes supporting these transactions provide significant opportunity for process modelling, improvement and consulting work. These operations are IT intensive. The focus of Plumb Line and the PBPF are on the back office

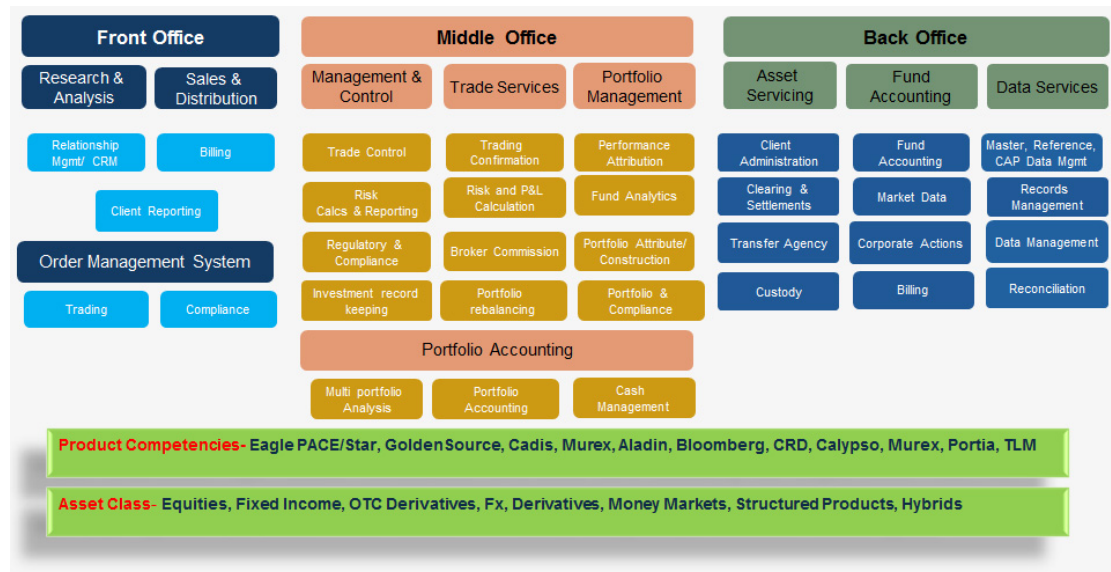


FIGURE 5.4: Division of Responsibilities between Front Office, Middle and Back Office

operations of financial service providers responsible for managing funds and portfolios for clients.

As expected, not all financial service providers are at the same level of sophistication or maturity when it comes to their systems, people, processes and technology. *Enterprise Maturity* is an important concept and materially affects the implementation of a management framework such as the PBPF in these organisations and will now be briefly discussed in the next section.

5.1.2 Client Readiness and Maturity

Any business change project, whether it is a radical change such as envisaged by the "breakthrough" *business process re-engineering* projects by Mike Hammer in the early nineties or just trying to implement a measure of control in business process documentation depends on the interaction between the client company and the consultant or service provider facilitating the change project. It is easy to read of the newest trend in a business magazine or make notes and collect business cards at a conference and expect radical change to happen overnight. Consultants are brought in to facilitate these radical changes. The real challenge is to keep projects feasible and expectations within reasonable bounds. These projects should be the "art of the possible". This is where a measurement framework of some kind is eminently useful, and is also the purpose of having a "Review View" in the process framework.

Both the consultant and the client must reach a common understanding of the current level of "maturity" that the client is at before the project commences in order to manage

expectations on the one hand but also to ensure that the customer understands the potential benefits of the project and in which areas those benefits are likely to be.

One way in which customer maturity is presented is to make use of a *customer maturity matrix*, *organisational maturity matrix* or *enterprise maturity matrix*. The reason why this is such a useful tool is that it combines a qualitative view of where the customer is at with the benefit having a numeric score that can be measured over time. The basic format of the maturity matrix is presented in Figure 5.5 on the following page to Figure 5.8 on page 54, and is characterised by a set of Performance Areas based on what "stage" a company has achieved for a particular area of interest. The number of levels is between four and five, in the typical matrix.

Not all customers are at the same level of sophistication when it comes to process documentation. Mike Hammer for example proposed an *PEMM* or *Process Enterprise Maturity Model* to audit the maturity of companies specifically related to business processes [Hammer \(2007\)](#).

Maturity models exist for the entire spectrum of IT activity, from enterprise architecture to software development. [Power \(2007\)](#) for example, identifies 10 different maturity models that can compete to some extent with the PEMM model proposed by Mike Hammer. Among the more interesting ones are for example the *Malcolm Baldrige National Quality Award*, the *European Foundation for quality management Excellence Model*, The *Business Process Management Maturity and Adoption Model* of the Gartner Group and *The Business Process Management Maturity Model* of John Alden and Bill Curtis.

The primary purpose of these models is to inform rather than to be absolutely normative. Thus instead of being absolute and based on objective data to determine the actual level of maturity attained [Walker \(2008\)](#) the models show the current stage of an organisation's development in terms of a specific aspect, but most importantly also the future stages in the path along its journey to maturity. It could for example facilitate a common understanding between the consultant and the client of where the organisation is at regarding particular aspects that will be affected by a project. [Walker \(2008\)](#) points out that the earliest step in the journey represents the state of *lacking awareness or being in a high-risk position*, whereas the loftiest level of maturity indicates the attainment of a *high degree of control and the minimization of risk*.

The maturity profile raises a company's *awareness* about their maturity relative to current practices in a particular area. It is a form of benchmarking, and specifically qualitative benchmarking.

	Innocence	Awareness	Competence	Excellence
Process Area 1	Description of what innocence in Process Area 1 looks like	Description of what awareness in Process Area 1 looks like	Description of what competence in Process Area 1 looks like	Description of what excellence in Process Area 1 looks like
Process Area 2	Description of what innocence in Process Area 2 looks like	Description of what awareness in Process Area 2 looks like	Description of what competence in Process Area 2 looks like	Description of what excellence in Process Area 2 looks like
Process Area 3	Description of what innocence in Process Area 3 looks like	Description of what awareness in Process Area 3 looks like	Description of what competence in Process Area 3 looks like	Description of what excellence in Process Area 3 looks like
Process Area 4	Description of what innocence in Process Area 4 looks like	Description of what awareness in Process Area 4 looks like	Description of what competence in Process Area 4 looks like	Description of what excellence in Process Area 4 looks like

FIGURE 5.5: Maturity Profile

	Innocence	Awareness	Competence	Excellence
Process Area 1	Description of what innocence in Process Area 1 looks like	Description of what awareness in Process Area 1 looks like	Description of what competence in Process Area 1 looks like	Description of what excellence in Process Area 1 looks like
Process Area 2	Description of what innocence in Process Area 2 looks like	Description of what awareness in Process Area 2 looks like	Description of what competence in Process Area 2 looks like	Description of what excellence in Process Area 2 looks like
Process Area 3	Description of what innocence in Process Area 3 looks like	Description of what awareness in Process Area 3 looks like	Description of what competence in Process Area 3 looks like	Description of what excellence in Process Area 3 looks like
Process Area 4	Description of what innocence in Process Area 4 looks like	Description of what awareness in Process Area 4 looks like	Description of what competence in Process Area 4 looks like	Description of what excellence in Process Area 4 looks like

As-Is

FIGURE 5.6: Maturity Profile Showing As-Is Position

	Innocence	Awareness	Competence	Excellence
Process Area 1	Description of what innocence in Process Area 1 looks like	Description of what awareness in Process Area 1 looks like	Description of what competence in Process Area 1 looks like	Description of what excellence in Process Area 1 looks like
Process Area 2	Description of what innocence in Process Area 2 looks like	Description of what awareness in Process Area 2 looks like	Description of what competence in Process Area 2 looks like	Description of what excellence in Process Area 2 looks like
Process Area 3	Description of what innocence in Process Area 3 looks like	Description of what awareness in Process Area 3 looks like	Description of what competence in Process Area 3 looks like	Description of what excellence in Process Area 3 looks like
Process Area 4	Description of what innocence in Process Area 4 looks like	Description of what awareness in Process Area 4 looks like	Description of what competence in Process Area 4 looks like	Description of what excellence in Process Area 4 looks like

To-Be

FIGURE 5.7: Maturity Profile Showing To-Be Target After Project

	Innocence	Awareness	Competence	Excellence
Process Area 1	Description of what innocence in Process Area 1 looks like	Description of what awareness in Process Area 1 looks like	Description of what competence in Process Area 1 looks like	Description of what excellence in Process Area 1 looks like
Process Area 2	Description of what innocence in Process Area 2 looks like	Description of what awareness in Process Area 2 looks like	Description of what competence in Process Area 2 looks like	Description of what excellence in Process Area 2 looks like
Process Area 3	Description of what innocence in Process Area 3 looks like	Description of what awareness in Process Area 3 looks like	Description of what competence in Process Area 3 looks like	Description of what excellence in Process Area 3 looks like
Process Area 4	Description of what innocence in Process Area 4 looks like	Description of what awareness in Process Area 4 looks like	Description of what competence in Process Area 4 looks like	Description of what excellence in Process Area 4 looks like

As-Is

To-Be

Compare As-Is and To-Be

Identify what will have to change (① , ② and ③) to reach the next level

FIGURE 5.8: Maturity Profile Showing Changes from As-Is to To-Be Position

5.2 The Business Case

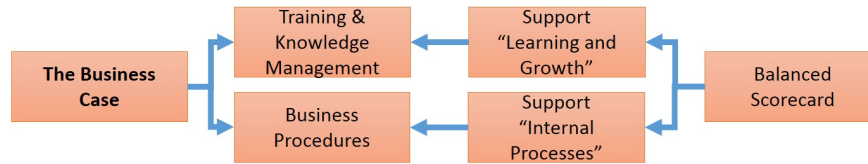


FIGURE 5.9: Outline of Literature Study:Business Case

In order to justify the allocation of resources to any kind of activity one usually focuses on the periodic financial bottom line of an enterprise.

As with all leading indicators, benefits in Supporting Processes are hard to link back to the financial bottom line.

This is especially true for activities relating to training. Bartlett (2001) points out that HR professionals are under constant pressure to demonstrate a return to organisations from their training and staff development investments.

This thesis reviews a wiki platform facilitating and supporting company specific training in processes and procedures. Grace (2009) points out that the usage of wikis as a knowledge management tool has provided intangible value to the users but that few organisations and literature reviewed have provided truly quantifiable Return-on-Investment on their use but that the valuation and calculation of ROI translating intangible benefits to tangible ones may be the catalyst to furthering the use of Wikis for businesses.

A promising model that challenged traditional views on how to determine the real value of an investment is that of the *Balanced Scorecard*. It was created because existing performance-measurement approaches, primarily relying on financial accounting measures, were becoming obsolete. (Kaplan *et al.*, 1996, preface).

Kaplan *et al.* (1996) structured the dynamic relationship between the different aspects an organisation must do right to be successful. They introduced the Balanced Scorecard, a framework of measures, defined in different quadrants designed to ensure a balanced corporate strategy. They point out that it is only with difficulty that a direct Return on Investment can be demonstrated for training and knowledge management activities.

The Balanced Scorecard is now mature and respected and is cited in thousands of academic articles and publications. It provides a model for the linkages between investments in employee re-skilling, information technology, and innovative products and services and potential dramatic increases in future financial performance. The wiki-based procedure and process framework can support corporate strategy by enhancing *Internal Processes*

and *Learning and Growth*. The Balanced Scorecard shows how these improvements links to *Financial Performance*.

The next section reviews the challenge to create the linkage between the bottom line and the PBPF in the context of the Balanced Scorecard. This idea is extended further by Norton and Kaplan through the use of *Strategy Maps* Kaplan *et al.* (2004). Strategy Maps shows directly the linkages between the different measures located in different quadrants of the Balanced Scorecard. Understanding of how these measures can be improved and relate to each other is necessary for long term business success.

5.2.1 History of Performance Measurement Frameworks

The Balanced Scorecard is not the only approach to performance measures and management frameworks. It forms part of a sequence of frameworks developed and used as time went by. Yadav *et al.* (2013) reviews the history of these frameworks over the last century. The overall sequence is shown in Figure 5.10 on the following page. The Balanced Scorecard is shown as *BSC* on this diagram. Also note the inclusion of *Quality Award and Business Excellence Model*, the basis of some of the enterprise maturity models, discussed in the previous chapter. The Sarbannes-Oxley Act forms the basis for the SAS 70 audit that was done prior to the initial work done by the author in the Stanlib project and was the source of the initial process material that was used to create the system piloted at Stanlib.

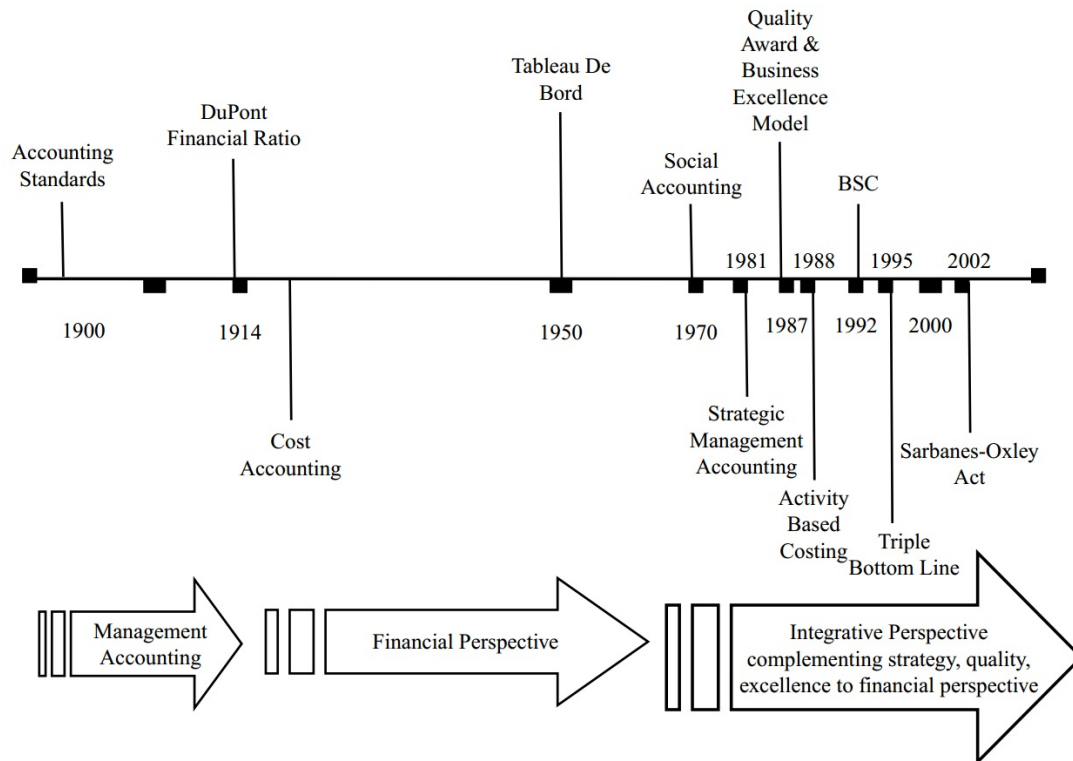
The Balanced Scorecard is not perfect. Some of its shortcomings are identified in an article by Yadav *et al.* (2013). They show that the Balanced Scorecard was abused and as a consequence updated by many scholars and specifically by Kanji. Kanji argues that the BSC approach should be consistent with *Business Excellence* and *Total Quality Management (TQM)* and amongst others to achieve process excellence and improve organisational learning.

This supports the combined use of the Balanced Scorecard (for performance measurement) and quality management(for the management system) as a rational framework within which to establish the business case for the PBPF.

5.2.2 Balanced Scorecard

5.2.2.1 What is the Balanced Scorecard?

The central idea of the PBPF as reviewed in this thesis is that a rational, auditable basis is to be used for all aspects of the framework.



From *Yadav et al. (2013)*

FIGURE 5.10: Transitions of performance measurement and management

As previously shown, a strategic measurement framework that has proven valuable as a basis for businesses to structure their business objectives around is the The Balanced Scorecard, as described by Robert S Kaplan and David P Norton in their seminal book, "The Balanced Scorecard: Translating Strategy into Action" *Kaplan et al. (1996)*. For a modern business purely financial and risk based objectives are not sufficient. For long term success other objectives are to be considered, for example in the domain of Organisational Learning and Growth. A core idea of the Balanced Scorecard is the linkages between the objectives in the different quadrants of the scorecard. For example: enterprise architecture projects find it difficult to demonstrate immediate short term benefit in financial and risk terms. However, by linking the objectives in the scorecard quadrants it can be shown that the benefits are significant.

The Balanced Scorecard upended the traditional corporate model of financial measures and proposed a "scorecard" of measures that is more balanced and contains "balanced" measures in four quadrants, namely: Financial, Customer, Internal and Innovation and Learning.

The leading indicators must be balanced by lagging indicators.

Lagging in this case meaning "Outcome focused" indicators or indicators that summarise past success or failure. Leading Indicators means indicators of activities that predict future success or failure.

A Balanced Scorecard should have an appropriate mix of outcomes (lagging indicators) and performance drivers (leading indicators) of the corporate or the business unit's strategy.

5.2.2.2 Quantification of Benefits for Process and Procedure Documentation

The Balanced Scorecard provides an instructive framework for the analysis and quantification of benefits.

Although initially it was tempting to look at the Balanced Scorecard as another "framework" that could be compared to the PBPF it is clear from looking at the detail of both models that they are quite different.

The PBPF contains *business process documentation*. When key personnel leave or become absent the documentation is used to train other people. When the primary business facility of the business is compromised and business must continue in a secondary, backup facility, this documentation is crucial for maintaining *business continuity*. It also supports *organisational learning* by allowing personnel to be trained in other areas of the business in order for example to give support during leave periods or purely for developmental reasons.

Additional *quadrants* can be created depending on the industry that the scorecard supports. An appropriate balance must be found. It is not enough to look only at the lagging indicators such as financial measures. *Leading indicators* measures activities that predict future success or failure. Thus, leading indicators" cannot be neglected.

Properly documented processes and procedures are not in itself an indication of success. The presence, or more often, lack of, proper documentation, is! Business documentation supports the leading indicators of *Organisational Learning and Growth*.

The Balanced Scorecard provides a model of how measured improvement in for example *Organisational Learning and Growth* relate to potential measurable improvement in the customer quadrant and the financial quadrant.

Norton and Kaplan makes this clear. Objectives in one quadrant must be linked to objectives in another quadrant. They elaborate on the concept of linkages between

objectives in the same and between quadrants in their book "Strategy Maps" [Kaplan et al. \(2004\)](#).

Strategy Maps is not a "new" framework but is a further refinement of the Balanced Scorecard. The objectives in and between different quadrants of the Balanced Scorecard are linked together to support the overall corporate strategy.

5.2.3 Support "Learning and Growth"

The PBPF supports objectives in the Internal quadrant and the Organisational Learning and Growth quadrant. The strategic linking as proposed by Norton and Kaplan show that it will therefore also support objectives and measures in the financial and customer quadrants.

5.2.3.1 Training and Knowledge Management

In the high-pressure environment of day to day operations of virtually any business the imperatives of getting things done almost always outweighs the more long term requirements of making sure that everyone involved in the process has the proper skill and training to perform the tasks in their remit. Training budgets are a small fraction of the total operating budget and even then do not get spent.

It is hardly surprising that some rather expensive errors get made in financial services. Three classic examples are Nick Leason a trader from *Barings Bank* that lost his company £827 million and caused its eventual bankruptcy, Kweku Adoboli a trader from UBS that lost his company £1.5 Billion and Jerome Kerviel who single-handedly broke Societe General by making bad stock market bets at a loss of \$7.14 billion. Clearly risk and control are not merely academic concepts and failure of procedures has catastrophic consequences. South African examples are Pretorius and Brown where considerable losses were made because of faulty controls over how funds were managed.

The reality is that controls do exist to reduce the risk inherent in securities trading and exchange transactions. Training is therefore not about reinventing the wheel or controls but making sure that the theoretical controls are translated into real practices.

This is not always easy, [Flin \(2003\)](#), points out that for example managerial factors have a strong influence on the standard of the safety and risk climate in a company. When asked why action was not taken when problems in the activities of Nick Leason became apparent, the company treasurer apparently replied, "But there always seemed to be something else more pressing." ([Flin, 2003](#), p. 262)

5.2.3.2 Knowledge Management

The PBPF was created to assist companies in the financial services industry to reuse valuable knowledge assets such as the output from a Controls Review process. The knowledge assets created by companies through expensive projects are buried in filing cabinets where it will gather dust and soon lose all relevancy. (Siemieniuch & Sinclair, 2004, citing Markus 2001) This also confirmed by the authors own experience. Obviously, this kind of obsolescence represents an enormous waste of time, effort and money. The pilot project for PBPF was at Stanlib and the drive for implementing and ultimately customising the PBPF here was to retain into the future and enhance the valuable output from a SAS 70 study that was conducted at this client.

It is the nature of complex projects that they tend to be "virtual" organisational groupings bringing together individuals from different parts and functions of a business internally as well as external service providers such as consultants and auditors. This means that at the end of the project the individuals may never work together on another project again and the learning gained and even the concrete output generated in this way is lost. (Siemieniuch & Sinclair, 2004, p.1105)

The aim of the PBPF was to provide a prototype framework to encapsulate organisational facts, process, organisation, system, risk and controls in a formal framework. This framework will then continue to provide *continuity* and value from these deliverables on an ongoing basis after the end of the implementation project.

Frameworks might delight academics but are of little benefit to society unless they are usable by people in organisations. A key aspect of usability is that the framework must be readily understood where people are not necessarily experts in what the framework tries to achieve. (Siemieniuch & Sinclair, 2004, p.1106)

Knowledge Management Frameworks such as the *CLEVER Framework* Siemieniuch & Sinclair (2004) exist that cover the wider problem of knowledge management. The PBPF contains business processes, procedures, role descriptions, system descriptions, risk descriptions and the links between these areas. Thus it manages a part of the "knowledge" of a financial services company.

The business case for the PBPF is based on translating corporate knowledge assets into real practices. It facilitates the identification, documentation, ownership and training of people on corporate activities and controls. It reduces operational risk by translating theoretical controls into real, visible and well understood, practices.

A study by [Wu & Liu. \(2010\)](#) in the opto-electronic industry, for example, confirmed the causal relationship between different measurement perspectives in the Balanced Scorecard for ISO certified companies. The Balanced Scorecard shows how quality based process and procedure documentation are causally linked to financial measurements. The aforementioned study was specifically focused on the demonstration of benefits of *ISO certification*, which is not something which is directly supported by the PBPF. It does suggest however that more formal support for ISO certification should be considered as part of the design of the system.

5.2.3.3 Specific Training vs. Generic Training

Organisations are dependent on functions to be performed by qualified personnel trained in their particular areas of expertise. For example in the financial sector position a company would expect that positions such as *financial accountant*, *fund accountant* and *senior accountant* would be supported by an appropriate tertiary qualification. Over and above these qualifications and associated implicit understanding of financial tasks a more specific understanding of the processes involved in trading securities in the particular jurisdiction, for example South Africa, would also be required to minimize the risk of committing obvious errors, omissions or oversights. The rules and regulations for example regarding deadlines and paperwork can differ quite considerably from country to country. A list of the type of differences that has to be considered for a jurisdiction:

- Different cut-off and dealing times for different markets.
- Different Settlement cycles.
- Availability of timeous and accurate pricing data.
- Different legal requirements i.t.o. processes.
- Time-zones could be different.
- Languages could be different.
- Brokers, custodial requirement.
- Foreign exchange hedging.

Each of these elements of variability is an area of potential error and therefore financial loss for a company. The generic tertiary, professional qualifications of employees is not enough to eliminate risk of errors. Risk is further reduced by ensuring that employees

working with financial services transactions are aware of the specifics of the securities trading transaction in a particular jurisdiction.

Unavoidably companies will do things differently from each other, even in the same jurisdiction. Companies have different shareholders with different reporting requirements. They will have unique business partner relationships. A company may have different computer systems. The most detailed level of training and risk reduction has therefore to do with training of an employee on the specific business processes on the specific systems with the specific business partner relationships of the specific company. It is surprising, given the risk involved and the amounts involved that this process of learning is often so uncontrolled and unmeasured.

Oliver (2008) reviews the role of knowledge management practices in *continuous improvement*. As also discussed later, under "Lessons from Other Industries", and specifically the example of the Aircraft Carrier, one of the conclusions the authors arrive at is that people and not technology is the major source of knowledge transfer as it appears that the active rather than archived memory is used for decision making. Organisations must become a *learning community*. In this community as the individuals learn the organisation also "learns" its way forward. Hitzler & Rudolph. (2011, p.10), points out that increasing amounts of knowledge are created by individuals, leading to a phenomenon that is described as a read-write culture as opposed to a read only culture. The wiki platform on which the PBPF is built, supports this new way of consuming information, of helping a company to become a learning community. The wiki platform has a mechanism for soliciting input and comment and thus also sharing of ideas for improvement for pages. Oliver (2008) points out that these mechanisms was a key part of the *learning community* present in companies where quality programs exceeded their expectations. The role of *trust*, *openness* and a *knowledge sharing culture* are also pointed out. As seen later on in the section on the role of the wiki platform, this is a strong point of this kind of platform.

5.2.4 Support "Internal Processes"

5.2.4.1 The Need for Operating Procedures

All regulations and rules to do with process risk and safety management requires that *operating procedures*, along with the associated training, be written and followed. (Sutton, 2010, p.426)

The *Risk and Failure Mode Analysis* of safety-critical industries regulated by *safety regulations* are different from the financial risk oriented *financial services industry* regulated by *financial regulations*.

Sutton (2010) outlines several reasons why operating procedures are beneficial:

- High quality procedures help managers and workers achieve safe and efficient operations. Obviously for the financial services industry the concept of "incident free" is considered analogous to "safe".
- The process of writing the procedures will itself identify better ways of operating and running the operations they cover.
- Properly written procedures help establish accountability within an organisation. The procedures will make it clear as to who is responsible for executing which tasks.

There are more. Whatever the differences between industries, proper operating procedures are beneficial. An example of this is demonstrated in the experience of the Airline industry where a significant reduction in fatal accidents has occurred over the last 50 years, from a value of 2.8 fatal accidents per million scheduled departures in 1950 to less than 0.2 after 2000. Standardisation of procedures and training played an important part in this improvement. Sutton (2010) However, procedures are not free. It takes time and effort to produce procedures. Sutton points out that because the writing and publishing of procedures are always more expensive than "it should be" management fails to dedicate sufficient resources to the effort. Sutton (2010) The same thing was found in Plumb Line's projects. This forms part of the justification for a framework that would simplify this effort. A framework that would make visible in a concise, clear, *reusable* way the outputs from the procedure documentation project. The PBPF, was broadly based on the idea of the "Maintenance Organisational Exposition" McDonald *et al.* (2000), McDonald *et al.* (2003). The core concept was to "make visible" the operations, organisation and systems of an operations department in a way that would inspire confidence in "clients" whether internal or external. The frame of reference for these "expositions" is the Management Standards for quality management such as ISO 9001. It was felt that creating an equivalent framework for a financial services operator would accrue comparable benefits to those organisations.

5.2.5 Optimization, Operational Research and Rationalization of Procedures

The *business process modelling* project and *enterprise architecture* is in itself an "optimization problem", balancing resources and benefits. The resources required to document a business and the processes in that business must be balanced with the benefits in the form of risk reduction and potential increased revenues, derived from doing so.

Within the field of optimization and *operational research* a whole raft of techniques is available. For example, *linear programming*, *dynamic programming*, *non-linear programming*, *stochastic programming* and even *queuing theory* and *inventory management* can also be included here.

The qualitative, less defined nature of the process documentation problem means coming up with the correct model of optimization is not easy.

Solving the model quantitatively is probably not possible. However, the formulation of the problem is in itself useful. It structures the problem and identifies constraints and optimization objectives for informed decision-making.

Definition of Operational Research

Operational research is the professional discipline that deals with the application of information technology for informed decision-making. Operational research professionals aim to provide rational bases for decision making by seeking to understand and structure complex situations and to use this understanding to predict system behavior and improve system performance. Much of this work is done using analytical and numerical techniques to develop and manipulate mathematical and computer models of organisational systems composed of people, machines, and procedures. [Marlow \(1993\)](#), [Bronson & Naadimuthu \(1997\)](#)

Clearly, operational research must be considered when dealing with "models" in "organisational systems composed of people, machines, and procedures"!

A list of objectives, grouped by quadrant:

- Maximize profit.
- Minimize risk.
- Maximize organisational learning and growth.
- Maximize customer satisfaction.

- Maximize product and service quality.
- Maximize timeliness.
- Minimize process errors.

The PBPF can be approached as an optimization problem. In this way the cost of the activities is balanced with its benefits. To *maximize profit*, is only possible if a service provider in the financial services industry can optimally make use of the resources they have.

Obtaining new clients is one way to increase revenue. Service providers can obtain new clients by demonstrating competency in management of risk, controls and the associated processes and procedures involved in managing funds. Profit is increased through more efficient use of existing, well-trained and informed resources using processes and procedures that are well under control.

In Section 5.4: [The Technical Solution](#) on page 98 it will be shown that the MediaWiki *template mechanism* and MediaWiki hyperlink structure facilitates a *rationalization of procedures* and *reduction of documentation effort*. Direct financial benefit result from the reduction of the cost associated with documentation.

Figure 5.11 on the next page shows how each of the objectives could drive an aspect of the PBPF.

If viewed as an optimization problem in this way then the process framework will have to be revisited in terms of specific measures, i.e. did revenue increase, was better results obtained in internal and external audits, what was the level of risk incidents recorded. Were these errors preventable, i.e. did it relate to insufficient training, incorrect or insufficient process documentation, was it a system error, was a deadline missed? What is the training status of the different users?

A rational framework for structuring, documenting and hosting processes and procedures, for example the back office processes of a financial services customer, could form the basis for continuous improvement of these processes and ultimately the financial bottom line as pointed out by [Khalid \(2010\)](#).

The Balanced Scorecard is a powerful way of communicating the business case for the Plumb Line Business Process Framework (PBPF), namely that it can support and improve a "balanced" set of both leading and lagging indicators.

Objective	How to Achieve	System Support
Maximize profit	<ul style="list-style-type: none"> - Demonstrate clearly control over procedures and processes 	<ul style="list-style-type: none"> - Process Index, Organisation Index and associated Measurement View - Risk and Control View with linkages to Process and Organisation
Minimize risk	<ul style="list-style-type: none"> - Identify risk - Record and measure risk incidents - Identify and document controls - Identify risk, control and process owners - Inform and Train organisation users 	<ul style="list-style-type: none"> - Training View - Risk and Controls View - Process View - Organisation View
Maximize organizational learning and growth	<ul style="list-style-type: none"> - Ensure that all users know what their responsibility are and that they have the processes and procedure documentation to support them - Ensure that generic training material is available 	<ul style="list-style-type: none"> - Training View - Training Status - Process View - Organisation View - Risk View
Maximize customer satisfaction	<ul style="list-style-type: none"> - Ensure that all customer problems are logged for resolution - Ensure that this links to the appropriate process and procedure for future update 	<ul style="list-style-type: none"> - Incident log, to identify non-conformities and resolve
Maximize product and service quality	<ul style="list-style-type: none"> - (As Above) 	<ul style="list-style-type: none"> - (As Above)
Maximize timeliness	<ul style="list-style-type: none"> - Highlight deadlines and make clearly visible to everyone by when they must do what 	<ul style="list-style-type: none"> - Task calendar identifying all procedures and all critical deadlines
Minimize process errors	<ul style="list-style-type: none"> - Ensure that process documents are updated and reviewed on a regular basis 	<ul style="list-style-type: none"> - Process Index - Risk View - Organisation View - Training Status

FIGURE 5.11: Framework Objectives

5.2.5.1 Objective Function

The central idea of the business modelling framework as reviewed in this thesis (from now on referred to simply as the PBPF) is that a rational, auditable basis is to be used for all aspects of the framework. A framework that has proven valuable as a basis for business to structure their business objectives around is the *Balanced Scorecard*. For

a modern business purely financial and risk based objectives are not sufficient. For long term success other objectives are to be considered, for example in the domain of *Organisational Learning and Growth*. A core idea of the Balanced Scorecard is the linkages between the objectives in the different quadrants of the scorecard.

This is important for enterprise architecture because it is difficult to demonstrate immediate short term benefit in financial and risk terms for projects but through the linkages between objectives in the scorecard quadrants the indirect benefits are significant.

5.2.5.2 Operational Research Ideas Relating to Documentation Projects

Processes and procedures are documented in many different ways. Each consulting company will follow a different approach. Standards such as *IDEF* and *Universal Modelling Language (UML)* and the *ARIS toolset* tries to standardise process documentation. Sophisticated tools and modelling approaches, impressive in theory, makes little sense to an end-user that satisfied with a set of screen-prints. A list of the more popular modelling tools and standards are shown in Appendix F: [Widely Used Modelling Tools and Standards](#) on page 207.

The problem for which the PBPF was that was not per se that of enterprise architecture. It was to ensure that the users were adequately informed and trained on the *specific* responsibilities and tasks they had to do at a *specific* company. A way had to be found that complied with theoretically sound process modelling and enterprise architecture approaches. At the same time the projects had to be feasible within the available budgets and time-frames.

The documentation was structured similarly to the outline of a *dynamic programming* optimization problem. The objective was to do everything, but only do it once!

The concept was to define a network of nodes, or *organisational facts*, to document these facts as quickly and efficiently as possible and then to link these facts together in different views without having to create additional pieces of information.

The idea throughout is to build up composite facts like for example a team description or a process flow from lower level nodes. Thus for example if a process flow diagram identifies an activity a procedure is added to the process index. If a procedure is identified on the process index this procedure should also be an activity on a process diagram.

5.2.6 Frameworks as Basis for Improvement

Management processes and programs are built around frameworks. This is the way in which the PBPF is presented to end customers: It is a *framework* in which *business processes* and *business procedures* is placed.

Section [5.3: The Solution Framework](#) on page [69](#), will now discuss the basis and concepts around *frameworks*, *standards* and *regulations*. It will show how this relates to the PBPF.

5.3 The Solution Framework

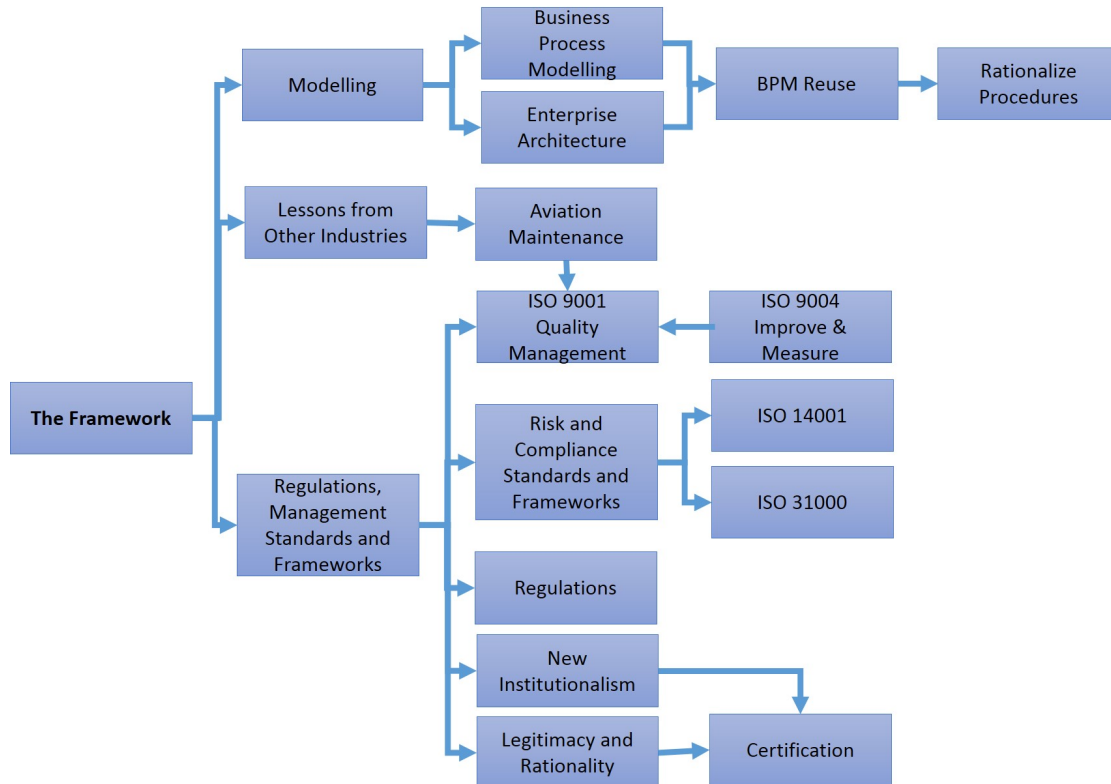


FIGURE 5.12: Outline of Literature Study:Framework

This section presents the review of the literature relating to various management frameworks, management system standards, regulations as well enterprise architecture frameworks and modelling language in order to prove or disprove the thesis that the approach followed in the PBPF was rational and legitimate in the context of operations in financial services.

The starting point of this review is the following assumption:

The PBPF is based on ISO 9001 principles derived from examples in the aviation maintenance industry.

The review will start with this assumption and review it in the context of the aviation industry under the heading, *Lessons From Other Industries*, subsequently the quality management framework will be covered. Based on this review it should be possible to confirm whether the approach is in broad terms compatible with these frameworks, or at least indicate where this is not the case.

The second question will then be investigated: Is the approach rational and legitimate in the context of the financial services operations.

This will be done by briefly looking at the wider environment of management standards available and specifically the *risk standards* and *GRC frameworks* available.

5.3.1 Modeling

Depending on what is modelled and what medium is used to do the modelling in, several different definitions of a model are possible. One definition from the financial services dictionary is as follows:

Definition: A representation of a system that allows for investigation of the properties of the system and, in some cases, prediction of future outcomes. Models are used in quantitative analysis and technical analysis, and in fundamental analysis.

A model "represents" the system. It is not the system itself. It is per definition simpler to allow for easier manipulation. It should be more cost effective to manipulate a model than to manipulate the actual system.

Another definition from the "New Oxford American Dictionary" that relates to three dimensional models: model /madl/ n. 1 a three dimensional representation of a person or thing or of a proposed structure, typically on a smaller scale than the original.

Items that can be highlighted from this definition are:

1. A model is a representation.
2. A model has dimensions - in this case three, but a multi-dimensional model is also valid. For a business model several different dimensions can form part of the same model, for example, organisational, process, risk and system.
3. A model can be of something that exist already or of a proposed structure.
4. A model is on a smaller scale than the original. It must be easy to create and manipulate the model for its effective use as a problem solving tool.
5. A model allows the investigation of the properties of a system.
6. A model allows in some cases for the prediction of future outcomes.

5.3.1.1 Importance of Different Modelling Perspectives-i.e. What Value Gets Added

Modelling is a demanding and time consuming element of enterprise architecture. It requires skilled and expensive business analysis specialists. Additionally it requires time, input and resources from the target client.

A model is a representation of a target business from different perspectives for analysis. It can expose flaws and reveal opportunities. However, as valuable as they are the different modelling perspectives cannot be ends in themselves. These different views, however semantically satisfying to the business analysis professional might not deliver the benefits which are expected from enterprise architecture by the client.

The value added by each view add must be considered. What is practical and feasible given time and budget constraints and the size of the client and the consulting company?

It is important, to understand how much modelling should be done and also what tools should be used in supporting this process.

The PBPF framework was developed to link the pieces of information in different business areas together, using the MediaWiki platform. An implicit *view* or *perspective* that must form part of any enterprise architecture project is that of Project Planning. The implementation process followed by Plumb Line itself was controlled through a number of indexes used for the *work breakdown structure (WBS)*. The indexes were the *process index*, *organisation index* and the *risk index*. The *review and control view* uses these indexes to measure and manage the completion of the work. ICASA makes use of the concept of *agile project management* in their suite of tools and techniques, labelled rather cryptically as *P3M (Project/Program/Portfolio management)*. They propose the use a *sliding planning window* to support *agile project management*. (Jiscinfonet.ac.uk, 2013). This approach share aspects of the approach Plumb Line followed in the management of the projects where they implemented the PBPF.

The concept is based on and supported by the premise that one should plan ahead in a sensible manner, keeping as many factors in mind as possible, but yet being pragmatic and realistic at the same time. Project managers and planners could try to consider every minute detail from the beginning till the end to try to eliminate the uncertainty inherent in any complex project. Pragmatically, this is not possible, as some uncertainty always exist in enterprise architecture and business analysis programs. In a running concern, especially one where huge amounts of money are in play such as in an operations department in the financial services sector, it is almost unavoidable that a critical client resource will be pulled away during an inconvenient time in a critical phase of a project to deal with a crisis. Making a detailed plan demands time and effort. However, a plan which is too detailed and comprehensive might consume a large amount of resources and become impractical in the long run (Jiscinfonet.ac.uk, 2013).

Most of the enterprise architecture practitioners and experts are of the view that one should do just enough modelling and that your models should be just good enough. Agility in enterprise architecture is fostered by the different forms of modelling in small

increments and is based on doing just enough in order to meet the requirements of the task. At the same, the demands and needs of the stakeholders are also to be given importance while the different enterprise architecture models are being executed. The needs of the different stakeholders in financial services such as the *operations manager*, the *HR manager*, the *IT Manager*, the *risk and compliance manager* and the *project sponsor* is reflected in the views of the PBPF. These views are respectively: The *process view*, the *organisation view*, the *systems view*, the *risk view* and finally *review and control view*. Breaking up the problem in these individual views and perspectives makes the project more feasible as it is possible to gather "bite-size" chunks of information from different areas of the business. The different views serve as important controls on each other. Information missed in the construction of one view is almost always identified when considered from another perspective. The different views provide an opportunity for stakeholders from different organisational functions and perspectives to contribute. The planning within the context of the PBPF implementation projects is therefore focused on constructing "Indexes", which are essentially lists on different levels of detail. At each stage of the project more detail is added, but at every point progress is clearly visible and responsibility for completion directly assigned.

The analysis and presentation of the use of views in the PBPF model is shown in Appendix B: [Model Exposition](#) on page 154.

5.3.2 Lessons from Other Industries: Aerospace and Defense, Nuclear Industry

The financial services industry is almost per definition the industry of risk. Although the risk is obviously of the financial kind and the consequences quantifiable in financial terms it is not the only "risk-intensive" industry. Other industries where significant risk forms part of the daily operation is, for example, that of the nuclear industry and the aviation industry. In these cases the risk is considerable but other than is the case for financial risk can lead to death, injury as well as significant financial consequences. The Fukushima nuclear meltdown as well as the tragic disappearance and probable catastrophic loss of flight MH370 are two recent cases in point.

5.3.2.1 "Normal Accidents" in the Nuclear, Aviation and Financial Industry

Normal life abounds with the kind of example of accidents-due-to-complexity described in the book on "Normal Accidents" by [Perrow \(2011\)](#). His argument is that a complex system is almost inevitably prone to accidents due to unforeseen interactions between

apparently unrelated events and apparently unrelated systems. Accidents are normal and should be expected if the system is sufficiently complex. Perrow (2011, p. 8) argues that when interactive systems are also tightly coupled, then it is "normal" for them have accidents, even if they are infrequent. It is not normal in terms of frequency but normal in the sense that it is an inherent property of such a complex system to occasionally experience this interaction. This is true for complex systems and organisations found, for example, in Aerospace and defence and nuclear powerplants. This is most certainly true for the Financial Markets and the complex web of transactions and vast amounts of money and securities exchanged on a daily basis and running on thousands of related systems distributed across hundreds of companies and managed by ordinary human beings on a daily basis. One needs to look no further than the financial meltdown of 2007/2008 where the global financial system almost collapsed disastrously due to subtle interactions between the securities based on sub-prime mortgages and the rest of the financial infrastructure.

5.3.2.2 Air Malaysia and the Aviation Maintenance Repair Organisation

In the author's own work in the aerospace and defense industry and subsequently in the financial services industry the author was struck by the relative simplicity of the Maintenance Repair Organisation Exposition (document) that exposed the competencies, organisation and facilities of the maintenance organisation that would be responsible for maintaining aircraft that would carry the lives of hundred of passengers on each trip it undertook over a service lifetime of several decades. In contrast none of the organisations encountered by the author in the financial services Operations organisation have high quality, compact "exposition" of what activities are performed, who performs them and the facilities that support these activities. It is not to say that these organisation did not have advanced risk management systems (they had), or that they had no process documentation (they did, sometimes thousands of documents) or that they had no roles defined (contained in Key Performance Area documents). The difference is that it was not possible, as was the case with the maintenance organisations in aviation, to request and receive simple, and easy to understand, "proof" of the activities of an organisation the support for those activities. Self-evidently, if this kind of system was considered sufficient evidence, in a an industry where accidents will have calamitous effects, then it would also be worthy of consideration in the financial industry where mistakes and errors could also have drastic effects. This formed the *raison d'être* for the PBPF.

Waikar & Nichols. (1997) explores *aviation safety* from a safety perspective. They argue that aviation safety is a team effort and position aviation Safety in the context of a

TQM framework of customer focus, continuous process improvement and total involvement. They point out that the concepts of process ownership and feedback are vital for continuous improvement. The idea of the process owner is a critical component of the measurement, quality review and completion of processes in the PBPF. [Waikar & Nichols. \(1997\)](#) stresses that as the process becomes the *owner's* responsibility they must take care of it and take pride in it. An example of how this idea of *ownership* and commensurate *measurement* or *feedback* is built into the PBPF is shown in [Figure E.5 on page 204](#), [Figure E.6 on page 205](#) and [Figure 3.8 on page 25](#).

[Wilf-Miron & Aviram. \(2003\)](#) argues that the primary objective of designing safe systems is to make it difficult for the individual to err. This is also one of the prime selling points of the PBPF: Having well documented financial services Operations process and procedures reduces errors made by individuals. Both [Waikar & Nichols. \(1997\)](#) and [Wilf-Miron & Aviram. \(2003\)](#) point out that ongoing reporting and feedback is important to realise continuous improvement. An Incident Reporting module was added to later versions of the PBPF to address this requirement. [Wilf-Miron & Aviram. \(2003\)](#) argues that a system should be designed to make it difficult for individuals to err but that they should be designed with the assumption that errors will happen and then to facilitate error detection and escalation to mitigate the effects of errors occurring. [Wilf-Miron & Aviram. \(2003\)](#) also points out the importance of teamwork in improving safety. In later versions of the PBPF the importance of teams and feedback on team level were emphasised as shown in example screenshots from the Stanlib, Close Brothers and ABAM systems as shown in [Chapter 3: Overview of Projects on page 13](#) and [Appendix E: Additional Screen Prints from Plumb Line Business Process Framework \(PBPF\) on page 201](#). An Event Debriefing Methodology, where the learning potential in an event is captured through a proper analysis of an event after the fact can also be value adding.

Other aspects of TQM in aviation such as the use of Statistical Process Control (SPC) as discussed for the use in Nozzle Assembly processes by [Vassilakis & Bessaris. \(2009\)](#), are less directly relevant to the financial services Sector. However, anywhere where a repetitive process, with elements of variation, exist, these techniques can be applied. Statistical techniques can be applied to the repetitive daily security trading transactions.

A study by [McDonald *et al.* \(2000\)](#) evaluated the Safety Management Systems and Safety Culture in four Aircraft Management organisations. The researchers used the Maintenance Exposition Document for each organisation. This document is compiled in compliance with the regulations of the European Joint Aviation Authorities governing maintenance organisations (JAR 145). [McDonald *et al.* \(2000\)](#). The document contains

information on Management (roles, responsibilities, accountabilities), Procedures and Quality System Procedures as it relates to Maintenance.

The power of MRO Expositions in comparing organisations in the aviation industry makes it a good starting point to evaluate how practices from this industry can be extended and reused to improve processes in the financial services Operations. [McDonald et al. \(2003\)](#)

Before examining some of the aspects of the MRO Exposition that formed the basis for the PBPF and to what extent it does incorporate ISO9001 elements another example, also from the Aerospace industry, namely that of the Aircraft Carrier, tests some basic assumptions regarding the rigid application of procedures.

5.3.2.3 Aircraft Carrier

This thesis hinges on the equivalency of risk in the operational environments of Aerospace industries and that of the financial sector. There is certainly no more high-risk environment than that of a modern aircraft carrier on active duty. [Rochlin et al. \(1987\)](#) considers the complexity of operations on a modern aircraft carrier: "The complexity of operations aboard a large, modern carrier flying the latest aircraft is so great that no one, on or off the ship, can know the content and sequence of every task needed to make sure the aircraft fly safely, reliably, and on schedule. No armchair designer, even one with extensive carrier service, could sit down and lay out all the relationships and interdependencies, let alone the criticality and time sequence of all the individual tasks. Both tasks and coordination have evolved through the incremental accumulation of experience to the point where there probably is no single person in the Navy who is familiar with them all." [Rochlin et al. \(1987\)](#) One would have expected that all the operations and procedures for such a dangerous environment would be carefully crafted and meticulously tested yet, it is pointed out: "There were no books on the integration of this new "hardware" into existing routines and no other place to practice it but at sea; it was all learned on the job. Moreover, little of the process was written down, so that the ship in operation is the only reliable "manual. No two aircraft carriers, even of the same class, are quite alike. Even if nominally the same, as are the recent Nimitz-class ships, each differs slightly in equipment and develops a unique personality during its shake-down cruise and first workup and deployment. Operations manuals are full of details of specific tasks at the micro level but rarely discuss integration into the whole. There are other written rules and procedures, from training manuals through standard operating procedures (SOPs), that describe and standardize the process of integration. None of them explain how to make the whole system operate smoothly, let alone at the level of

performance that we have observed. It is in the real-world environment of workups and deployment, through the continual training and retraining of officers and crew, that the information needed for safe and efficient operation is developed, transmitted, and maintained. It is therefore an important lesson that the assumption that detailed procedures are always necessary for safe operation is not necessarily valid. The "environment" of the organisation and the "culture" and the "people" are also fundamental in maintaining safe operations (or incident-free operation in the case of the financial sector). Another assumption, that high staff turnover leads to instability, is also challenged through the experience of the Aircraft Carrier: "The organisation is not stable over time. Every forty months or so there is an almost 100 percent turnover of crew, and all of the officers will have rotated through and gone on to other duty. Yet the ship remains functional at a high level. Behavioral and cultural norms, SOPs, and regulations are necessary, but they are far from sufficient to preserve operational structure and the character of the service. Three mechanisms act to maintain and transmit operational factors in the face of rapid turnover: First, and in some ways most important, is the pool of chief petty officers, many of whom have long service in their specialty and circulate around similar ships in the fleet. Second, many of the officers and some of the crew will have at some time served on other carriers, albeit in other jobs, and bring to the ship some of the shared experience of the entire force. Third, the process of continual rotation and replacement, even while on deployment, maintains a continuity that is broken only during a major refit. These mechanisms are realized by an uninterrupted process of on-board training and retraining that makes the ship one huge, continuing school for its officers and men." [Rochlin et al. \(1987\)](#)

This is a fascinating result: The idea of a "ship" as a huge, continuing "school" for officers and men. To some extent this validates the transition of Plumb Line as a "Training Company" providing generic training to its role in documenting procedures and processes for a specific company and facilitating training in the material. The aircraft carrier example shows that continual training is as important if not more so than the procedure and process documentation to maintain incident free operation. The role of training in a busy corporate is oftentimes seen as ancillary. The experience from the high-risk, complex environment of the aircraft carrier demonstrates that it is the only way to ensure operational continuity in a complex environment.

In summary: The examples from the Aerospace and Defense as well as the nuclear industries suggest, at least in terms of the articles considered here:

- In complex systems accidents are hard to avoid.
- Continuous Training is important, especially on-the-job.

- Not everything can be contained in SOPs.

5.3.3 Regulations Management Standards and Frameworks

Was the right things done and was it done in the right way?

Obviously looking at other industries and for lessons learnt from those industries can yield valuable insights.

For complex systems such as represented by the Financial Sector and all the hundreds of different kinds of securities, parties and counter parties it is desirable for a company to feel confident that they are approaching operations in the right way. This is even more true if one is implementing a system that supports the processes and procedures in operations. This desire of companies to conform to expectation is discussed further in the section on "New Institutionalism" an approach that creates a model to consider isomorphism in companies in the same industry.

This section will cover two sources of guidance:

- Regulations.
- Management Standards.

5.3.3.1 Regulations

As a risk based industry where money is obtained from and managed on behalf of customers it is self-evident that the financial services industry will be strongly regulated.

Even more so than in the context of manufacturing where the ISO-9000 type standards have long been expected to ensure quality in process and controls, the financial service customers expect that the companies managing their money will be diligent in ensuring that all of the controls are in place to ensure that unnecessary risk is minimized. In fact in all countries the financial system is more regulated and supervised than other industries and on systemic and consumer protection grounds it is almost universally accepted that this should be so (Falkena *et al.*, 2001, p.v).

The regulatory framework is constantly in flux and this is especially true in the aftermath of the global financial crisis that began in 2008. In 2007 the South African Government launched a formal review of South Africa's regulatory system, this review was expanded in 2009 to include the lessons learn from the 2008 crisis (Committee, 2013, p.6).

As a result of the review the Minister of Finance published a document in 2011, *A Safer Financial Sector to Serve South Africa Better*. The conclusion was that the domestic financial sector had weathered the global financial crisis well due to the country's sound macroeconomic fundamentals and a robust financial regulatory framework. ([Committee, 2013](#), p.6).

From a technical perspective what was proposed, however, was that the South African Financial Regulation should move towards a twin peaks model where the roles of the prudential regulator will be separated from that of the market conduct regulator. In this model the prudential regulator will be the South African Reserve Bank and will be focused on the continued financial health of regulated institution. The market conduct regulator will be the financial services Board and its role will be to protect consumers of financial services and promote confidence in the South African financial system.

South Africa is affiliated to several international standard setting bodies for financial regulation and subscribes to their principles and standards, as shown in [Table H.1](#) in [Appendix H: International Standard Setting Bodies](#) on page 213.

The financial sector is globally integrated, but regulated nationally ([Committee, 2013](#), p. 2), which obviously makes for a complex environment. This was reflected in the author's experience in setting up the procedural framework for Close Brothers who managed funds for clients from a wide selection of jurisdiction, all the way from the Middle East to Europe. In the author's experience a lot of the variation in procedures comes from different jurisdictions. Another example was the different procedures that had to be created within the PBPF for satellite offices in African Countries for Stanlib and Liberty.

It is self-evident that financial regulation is not a trivial subject and given the constant attention it receives from these standard setting authorities and also given the history of financial crisis in the past few decades that the regulation is in constant flux. This implies regular procedural changes that a process and procedure system such as the PBPF will have to accommodate. It also creates the problem of how to prove to stakeholders such as regulators or external customers that the appropriate controls are in place.

Interesting developments from the reforms as proposed in the Financial Markets Bill (2012) is the creation of a central clearing counterparty and a trade repository to better monitor and mitigate the risks posed by over-the-counter derivative instruments. This is a clear example of where changes in financial regulation directly implies changes in existing processes and procedures.

Obviously where procedures have been defined for OTC derivative instruments (as is the case for most of Plumb Line's clients) these procedures will now have to be reviewed, updated and signed off again.

A distinction, for the purposes of the PBPF has to be made between macro and micro perspectives, i.e. not all aspects of financial regulation will be equally relevant to the nitty gritty of procedural documentation. An example, taken from the twin peaks proposal, is where the role of the prudential regulator is defined on two levels ([Committee, 2013](#), p. 7): Macroprudential Regulation: Analysis of strengths and vulnerabilities of financial system as a whole (systemic risk), is not relevant to detailed procedures. Microprudential Regulation: Here the safety and soundness of individual financial institutions are analysed and regulated. This is directly relevant to a procedural and process documentation system, especially as risks are mitigated through documentation of controls and procedures.

A framework that formed the basis for the thinking behind the PBPF is the SAS 70 framework. This is the basis for the distinction in the first instance between "What" and "How", i.e. two levels of detail, and also on the necessity to include risk and controls and subsequently to prioritize and sequence the process documentation work.

5.3.3.2 Business Process Documentation as Modeling

The question can be asked whether "Business Process Documentation" is in itself a modelling exercise. It must be if one considers that reading the documentation will or should facilitate understanding of how the business works. However, an isolated document or set of documents will not in itself ensure that the understanding is valid. The document on its own cannot be a model in its most useful sense. An overall "model" or "framework" must exist so that the consumers of the model are confident of what they are looking at.

It is instructive to investigate the domains that are covered by the Plumb Line Business Process Framework (PBPF) and the possible models that are used in these contexts:

Process Approach: Quality Processes and Procedures – this maps to the ISO 9001 sets of standards. A systematic review was done in 2013 by Heras-Saizarbitoria and Boiral of the research that is currently done on Meta Standards such as ISO 9001 and ISO 4001 ([Heras-Saizarbitoria & Boiral \(2013\)](#)). From this study they conclude that "The ISO 9001 standard does not refer to compliance with an objective or with a particular result. Rather ISO 9001 proposes guidelines to systematize and formalize a series of company processes into a series of procedures, and to document this implementation. ISO 9001 standardizes procedures, duties and roles, rather than goals or outcomes"

Thus, the envisaged scope of the Plumb Line process framework is the same as that of the ISO 9001 for aspects such as defining processes and procedures, organisation and responsibilities.

This also correlates strongly with the concept of the Maintenance Management Organisation Exposition, that is essentially ISO 9001 applied to the Aviation Maintenance industry.

Inasmuch as the organisation is described to the quality and standards specified in the ISO 9001 it can then become a model, i.e. a simplified representation of the whole.

Why is this important? Complying to a recognized standard makes third-party certification possible and according to Heras-Saizarbitoria and Borial this like other forms of auditing is primarily aimed at creating trust and social legitimacy in the eyes of stakeholders. [Boiral & Gendron \(2011\)](#), [Power \(2003\)](#). This idea of using a structured, simple and standardised framework to create trust for stakeholders is one of the key implied benefits of the Plumb Line Process Framework. When coupled with the idea of certification and extended into the domain of accepted industry-wide standards it becomes especially powerful.

Reviewing literature it is also interesting to note that compliance with ISO 9001 does indeed provide the business with significant benefits - amongst others:

- Improvement of operational performance.
- Greater customer satisfaction.
- Improved relationships within the organisation.
- Improvement in the internal efficiency of the company.
- Improved image for competitors and stakeholders ([Brown et al., 1998](#)), ([Casadesús & Karapetrovic, 2005](#)), ([Terziovski et al., 2003](#)).

The ISO 9001 standard will therefore form the basis for further evaluation and review later in this thesis document.

Risk Approach: Governance, Risk and Compliance – documenting processes and responsibilities from a ISO 9001 perspective leads to a slightly different world-view than when approaching the same project from a risk perspective. Risk, risk appetite, controls, compliance and other risk related concepts are important in the financial industry. Reconciling the fields of quality and risk management with each other in a simple logical whole is not simple.

By using the process approach for an organisation's activities such as is proposed by the ISO 9001:2008 standard organisations are striving to meet the needs and expectations of both internal and external customers [Heras-Saizarbitoria & Boiral \(2013\)](#). This "process approach" means that quality management is no longer the exclusive preserve of manufacturing companies and has proven to be effective in service organisations, local authorities, health organisations, finance and transport. Avanesov points out that an additional benefit of using this standard is that ISO 9001 requires the continuous improvement of processes in the organisation [Avanesov \(2009\)](#).

A shortcoming that was found in the implementation of ISO 9001 concepts in the PBPF Implementation Projects was that it did not adequately focus on risks. It had to be more explicitly built into the Plumb Line Process Framework by incorporating a *risk view*.

Avanesov also points this out and indicates that the *Risk Approach Method* is an integral part of other generic management system's standards such as the Environmental Management Standard ISO 14001 and Occupational Health and Safety Standards such as OHSAS 18001. [Avanesov \(2009\)](#).

The author has to concur with Avanesov's conclusion: "It is a pity that the risk management approach has not yet become one of the cornerstones of ISO 9001."

Risk management is more strongly suggested by ISO 9004 [Heras-Saizarbitoria & Boiral \(2013\)](#).

A pure *process approach* will therefore not be acceptable in the financial services industry, an industry fundamentally based on the concept of *financial risk*.

A promising standard in this regard is ISO 31000:2009 [Purdy \(2010\)](#). As was proved by the author's experience in the financial services sector it is difficult to obtain a simple definition of risk on the one hand or a useful understanding of risk on the other hand. The ISO 31000 standard provides the following [Purdy \(2010\)](#):

- One vocabulary.
- A set of performance criteria.
- One, common, overarching process for identifying, analyzing, evaluating and treating risk.
- Guidance on how that process should be integrated into the decision-making processes of the organisation.

The ISO 31000 standard was not considered at all in the construction of the Plumb Line Process Framework as it was conceived before this standard became available. What is attractive, however is the idea of risk in ISO 31000 as a process of optimization. As stated by Purdy:

”Managing risk is, quite simply, a process of optimization that makes the achievement of objectives more likely. Risk treatment is then concerned with changing the magnitude and likelihood of consequences, both positive and negative, to achieve a net increase in benefit. Controls then are the outcomes of risk treatment, whose purpose is to modify risk.” Purdy (2010)

The idea of *Continuous Improvement of Processes of the Organisation* in ISO 9002 is the same as the idea of *Managing Risk as Continuous Process of Optimization* in the ISO 31000 standard.

5.3.3.3 Business Process Documentation

Not all activities of a modern business is or can be executed with a defined procedure. The procedure and way of working is embedded in the experience of the individuals performing these activities. It evolves over time. Where the company is small this way of working is part of the natural development of a business and the gradual evolution of business practices that underpin the success of a business that survives or thrives over time.

Over the medium and long term, however, it becomes necessary to encapsulate the critical business procedures to provide for contingencies such as staff turnover, staff absences and also corporate growth. The business might for example open additional branches, employ significantly more personnel, deal with more customers. To be able to manage the more complex, larger and growing enterprise some form of control and consistency is required.

When coupled with the requirements of modern HR practices business process documentation becomes important to support the Job Descriptions and key performance areas that form part of the employment contracts and continued personnel development and evaluation.

Process documentation is therefore a way to capitalize on the value generated over time in the way a business has learned to work and also to train, retain and develop personnel, whether currently in a particular job, new to the position or only there in a temporary support role. It facilitates understanding and agreement between managers and employees regarding what is expected of them.

Documenting what is done also allows for comparison between different businesses, for example when companies are merged, or within the same company such as when a company extends over a wide geographic region. Process documentation thus facilitates both external and internal *qualitative benchmarking*.

5.3.4 Frameworks

The financial services industry is covered by a host of different frameworks. Not all frameworks are regulatory or come from Standard Setting Authorities. Some of the frameworks are created by large auditing firms such as PriceWaterhouseCoopers. An example is the frameworks and methodologies related to *Governance, Risk and Compliance (GRC)* in the wake of the Sarbannes-Oxley Act [MorganFranklin \(2010\)](#),[Sochor \(2012\)](#). [MorganFranklin \(2010\)](#) points out that even well defined and focused methodologies, frameworks and management philosophies can evolve over time into murky solutions to ill defined problems. The "band wagon" mentality can result in management fads presented as silver bullets. This then is also fundamental aspect of what is examined in this thesis. To establish to what extent what was done in the PBPF was objectively rational as opposed to just being another variation on the "frameworks" theme.

Some frameworks will be mandatory (e.g. regulations). Other frameworks will arise naturally and voluntarily from industries (e.g. standards). The relationship between these two kinds of frameworks is shown in [Figure 5.13 on the next page](#).

The next section explores the dynamic and confusing world of frameworks and standards and makes some assumptions regarding the driving forces behind them, including corporate sociological perspectives such as New Institutionalism.

5.3.4.1 Management Standards

In an instructive study by Heras-Saizarbitoria and Boiral, [Heras-Saizarbitoria & Boiral \(2013\)](#), an analysis is done of the academic research on management system standards (also called meta-standards. [Heras-Saizarbitoria & Boiral \(2013\)](#) focuses on the two standards adopted by more than 1.3 million organisations worldwide, namely ISO9001 and ISO14001.

If the PBPF could be positioned within this "research agenda" this could clarify what areas to investigate to identify strengths, gaps and further opportunities for improvement. In the field of quality and processes, the ISO 9001 is the most important standard in terms of its worldwide adoption. As of 2010 more than 1.1 million ISO 9001 certificates have been issued in a total of 178 countries worldwide [Heras-Saizarbitoria & Boiral \(2013\)](#).

Given the wide adoption of ISO 9001 across the world and across all industries using this standard as the basis for structuring the process documentation for financial services is valid.

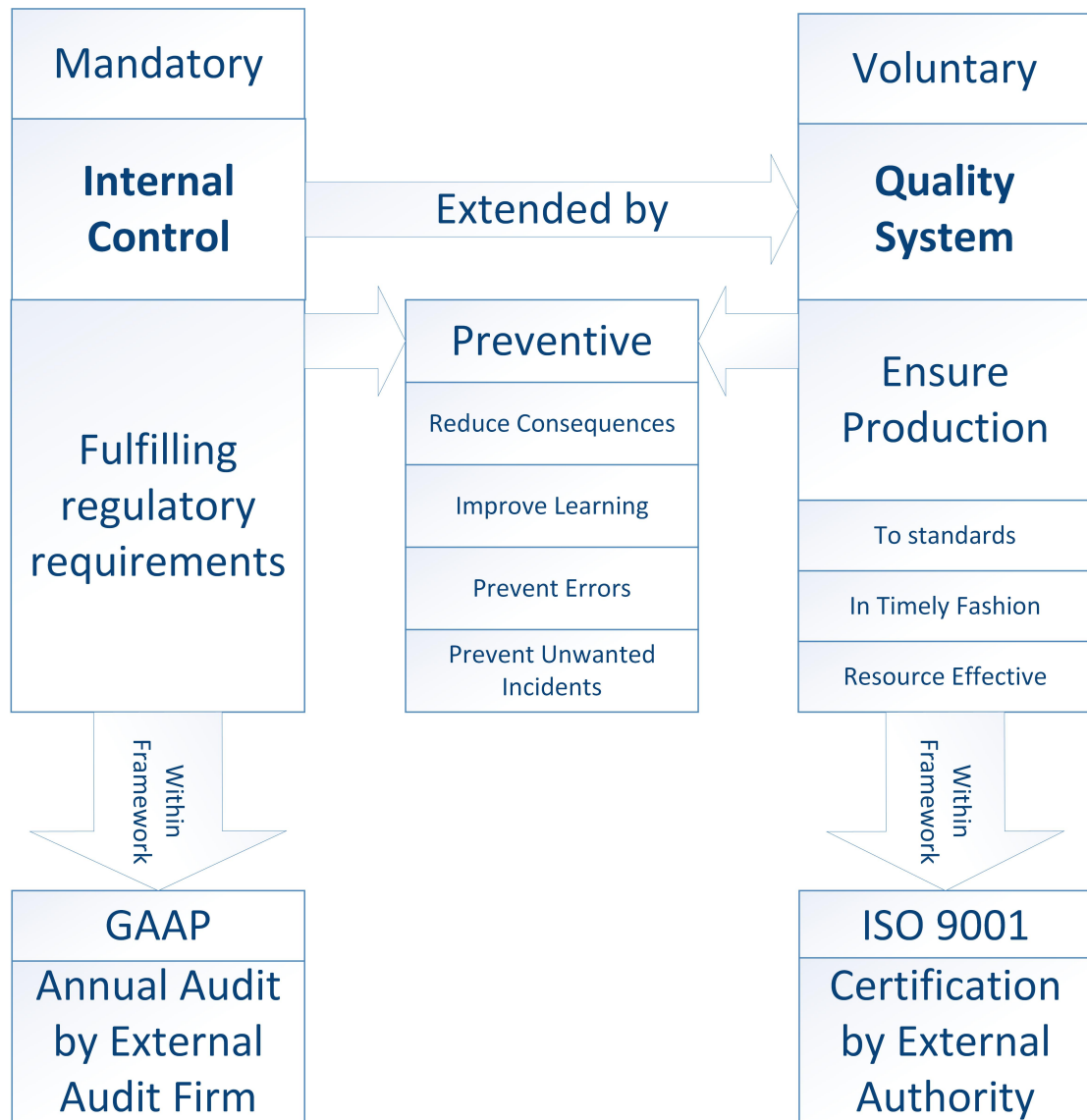


FIGURE 5.13: Internal Control versus quality management System

This study shows that the field of management standards is a huge and dynamic one.

Globalization and integration of markets leads to increased competition over time. Thus, in all industries, and in all positions, managers throughout the world experience similar uncertainties and subsequent pressures to conform to best practices *To et al. (2012)*. In a sense the quest to demonstratively position the PBPF in a legitimate and rational context is not dissimilar to the quest of any other company to ensure and be able to demonstrate that their management practices whether it relates to quality, the environment, risk or other aspects are rational.

Heras-Saizarbitoria & Boiral (2013) structures the research in streams containing the issues relating to management standards as is shown in Figure 5.14 on the following page. This also reflects partially some of the issues a consulting company such as Plumb Line

is faced with, with coming up with a rational framework and then selling this framework to the end customer.

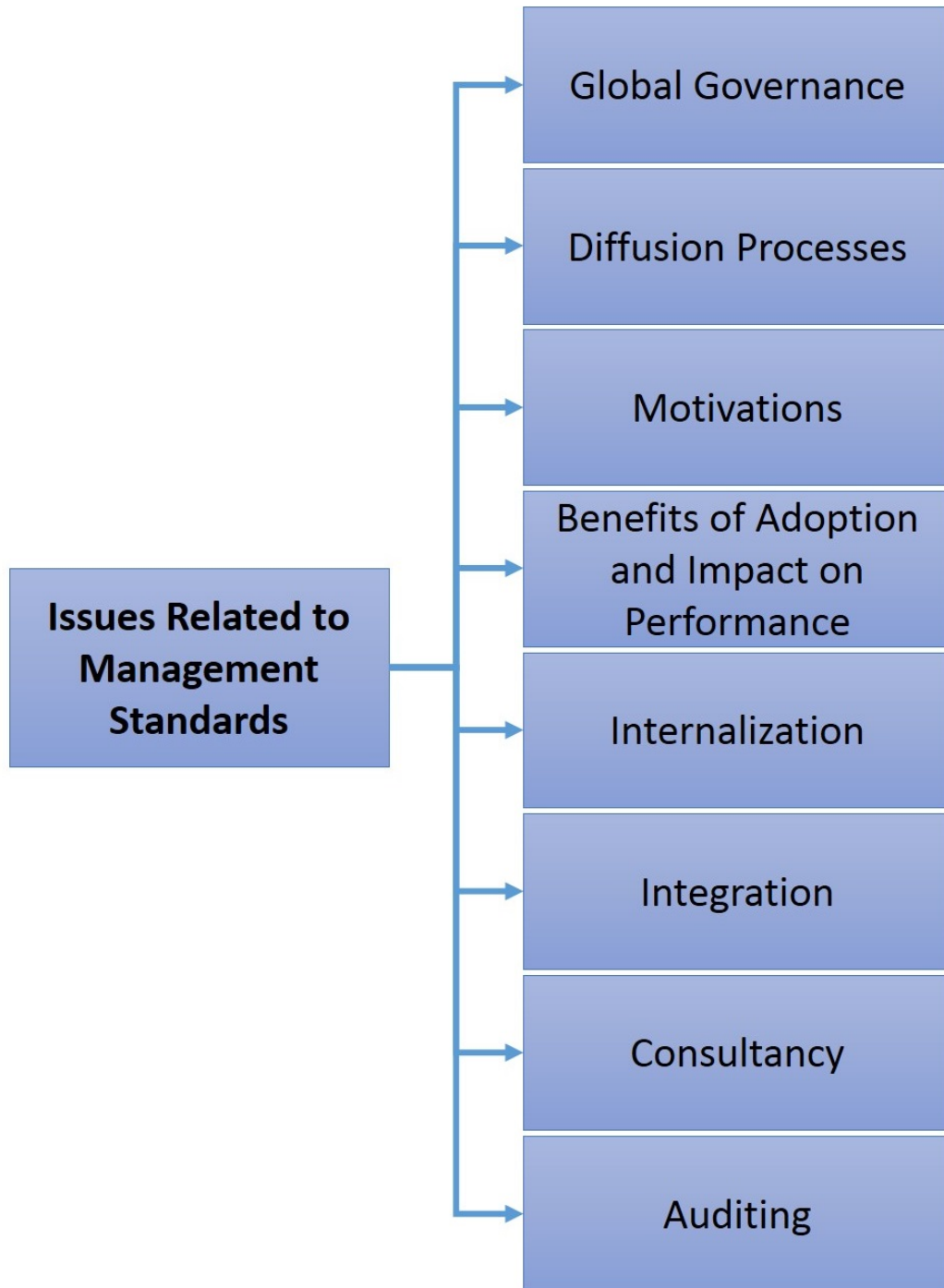


FIGURE 5.14: Issues Relating to Management Standards

Heras-Saizarbitoria & Boiral (2013) points out that because of the success of ISO9001 and ISO14001 standards tend to use the same methodology with respect to their creation, structure, implementation process and monitoring by a third party. It can thus be concluded that lessons learnt in terms of standards and the use of standards with relation to these two popular examples should be relevant to other standards as well.

Heras-Saizarbitoria & Boiral (2013) identifies the following stakeholders with reference to management standards: managers, consultants, policy-makers and researchers. Obviously in the context of this thesis the perspective presented is that of the consultants. The goal is to determine what approach a consultant should take to provide good advice to a company in the context of these standards. This will be affected by the requirement to be able to provide such advice profitably and with a high degree of confidence and legitimacy. This advice is structured and encapsulated in a framework, namely the PBPF.

For the purposes of this thesis the following assumptions are made:

- The legitimacy and rationality of management standards are well established when adopted by a vast number of organisations worldwide.
- Lessons learnt and perspectives gained from the adoption of rational management standards can be generalized to evaluate the rationality of other frameworks, such as the PBPF.

It was the experience of the author that sociological aspects were at least as important as technical aspects for successful delivery of solutions to clients. It was also an uncomfortable reality that what was documented and elegantly filed in reams of corporate procedures was not a perfect accurate reflection of the reality of what actually got done. The purpose of procedures seemed to be about more than purely the technical aspects. A "decoupling" exists between the procedures published and the actual activities performed. This did not make the procedures less valuable. The provable framework of processes and procedures completed to various dimensions served to provide legitimacy to various stakeholders because of the appearance of compliance and competence of the organisation in question. It was therefore interesting to note that although a vast volume of research deals with management standards, Heras-Saizarbitoria & Boiral (2013) reduces the approaches to the study to three areas: Technical, Non-Technical and other. This is shown in Figure 5.15 on the next page. Clearly this field cannot be covered by purely considering technical aspects. The first part of this section will therefore briefly look at the "technical" perspectives and in the last part also consider the "non-technical" perspectives such as the corporate sociological aspects of frameworks and their adoptions, based on New Institutional perspective and the author's own experience in this regard.

5.3.5 Applicability of ISO 9001 to financial services

Reviewing the ISO 9001 standard itself it states:

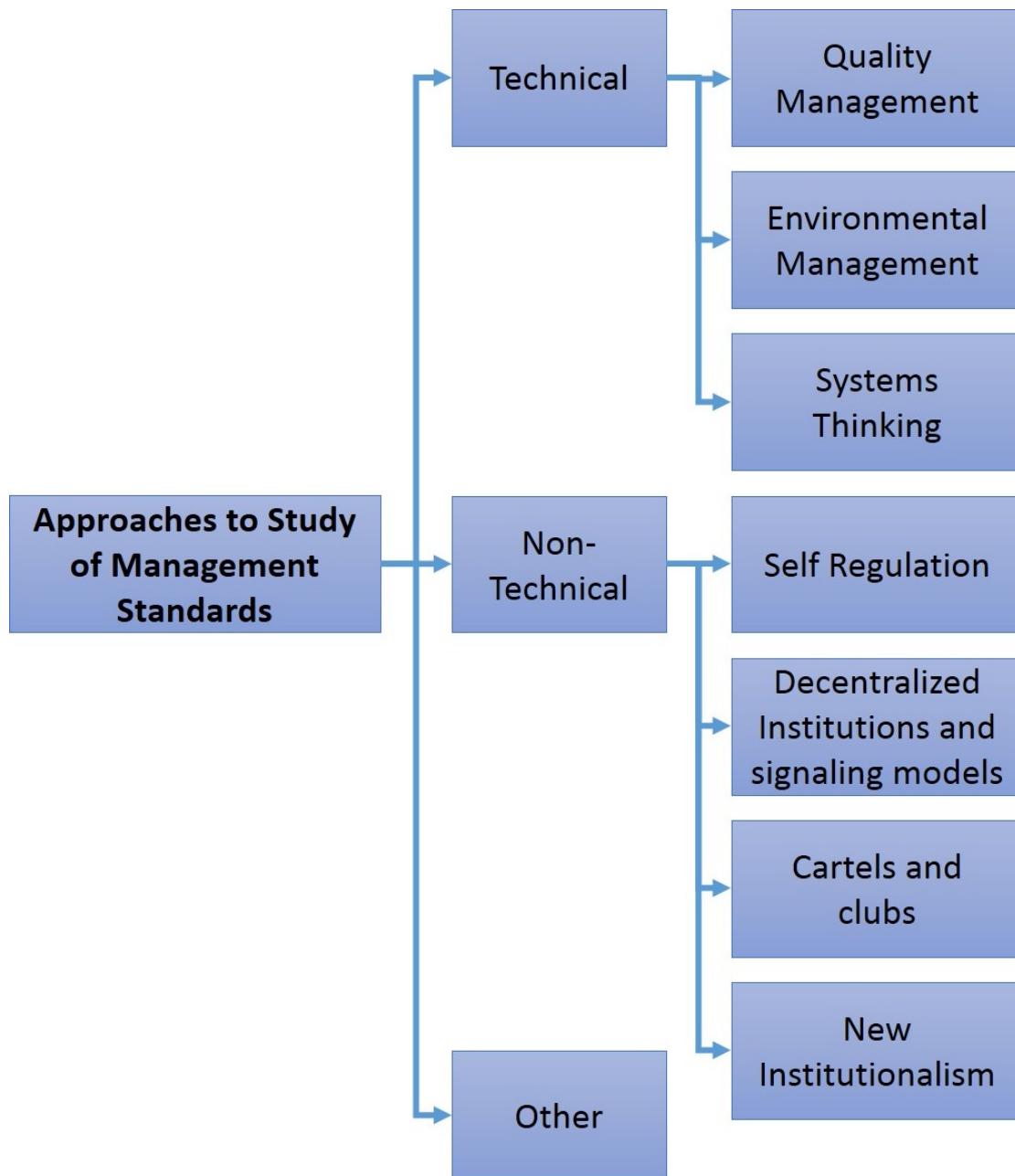


FIGURE 5.15: Different Approaches to Management Standards

All requirements of ISO 9001:2008 are generic and are intended to be applicable to all organisations, regardless of type, size and product provided. [ISO/IEC. \(2008\)](#)

At the least then, the *intent* of the standard is to be generic enough to encompass companies in the *financial services sector* as well.

Previous versions of the ISO quality standards require evidence of compliance with documented procedures.

An unfortunate side effect of this was that companies created cumbersome and extensive volumes of procedure manuals that were expensive to create and even more expensive to maintain over time. This effectively created an "ISO bureaucracy" and the weight and extent of these procedures and processes and the management involved in them could actually make process improvement of processes more difficult. [Ulvin \(2007\)](#)

Later versions of this standard such as the ISO 9001:2000 and ISO 9001:2008 addressed these concerns by placing more emphasis on the concept of *Process Management*. This requires the monitoring and optimisation of a company's tasks and activities, i.e. it now places an active focus on process improvement. [Ulvin \(2007\)](#), [Heras-Saizarbitoria & Boiral \(2013\)](#), [Mikes & Kaplan \(2013\)](#).

A second requirement is more involvement from higher levels of management. The responsibility for the quality function could no longer be delegated to quality administrators lower in the organisation.

An interesting third requirement is the stronger emphasis placed on *Process Metrics*. ISO 9001:2008 requires that tasks and activities are actively measured for effectiveness.

The quality system must support continual process improvement and tracking customer satisfaction.

From a documentation perspective the process that is now proposed is as follows:

- Approve documents before distribution.
- Provide correct versions of documents *at point of use*.
- Records must be used to prove that the requirements have been met.
- A procedure must be developed to control these records.

ISO itself advises that ISO 9001 can be implemented without certification, simply for the quality benefits that can be achieved.

5.3.5.1 Risk and Compliance Standards and Frameworks

[El Kharbili & Pulvermüller \(2008\)](#) points out that organisation do not only own processes they are also subject to, for example regulations, and that not being compliant diminishes the added-value business processes represent for the organisation.

Non-optimal alignment with compliance to quality standards and business partner service agreements [El Kharbili & Pulvermüller \(2008\)](#) incurs costs. These costs are divided

into short term costs (for example cost savings) and long term costs (liability for judiciary pursuits and loss of market confidence).

In the financial sector as a highly regulated industry Compliance Management with regulations, agreements, fund charters and other legal texts is an important function.

[El Kharbili & Pulvermüller \(2008\)](#) shows that by extension, Compliance Management includes the standards, frameworks and software used to ensure the company's observance of legal texts. [El Kharbili & Pulvermüller \(2008\)](#).

Regulations and standards overlap in the financial services Sector. An example is that of ISO/IEC 27002:2005, the internationally recognized standard for IT security, acts as a regulation when defining security policies. [El Kharbili & Pulvermüller \(2008\)](#).

The value of a processes and procedure framework is significantly enhanced if it can integrate regulatory compliance tasks with business process management, because compliance measures are usually implemented using procedures and controls, written in Natural Language, as is the case in the wiki-based PBPF [El Kharbili & Pulvermüller \(2008\)](#).

5.3.5.2 ISO 31000

ISO 31000:2009 Risk Management - Principles and guidelines, is a standard published in November 2009. This is the first standard that claims to be a standard for managing risk everywhere [Leitch \(2010\)](#), and is therefore of particular interest to us, because the concept of risk encountered in the financial sector is clearly quite different from the risk implied for example by ISO14001 that is more focused on environmental risk.

The clauses of the standards is compatible with the risk documentation encountered in the clients of the PBPF, such as Stanlib, Liberty, Prudential and ABAM and makes this standard particularly appropriate to use as the foundation to frame the *Risk View* in the PBPF [Leitch \(2010\)](#):

- Clause 1: Scope - defined as generic risk management, and it can therefore be assumed that the risk that covered in the Risk View of the PBPF is covered by this standard.
- Clause 2: Terms and definitions - of risk management terms.
- Clause 3: Principles - 11 principles of risk management are listed and could therefore form an interesting basis from which to test to what extent risk principles are appropriately incorporated in the risk view of the PBPF

- Clause 4: Framework - the cyclical process for developing risk management in an organisation.
- Clause 5: Process - cyclical process for managing particular risks.

It is also interesting to note that the intent of the standard is not to be certified against it. In other words it cannot form the basis of an independent "audit" but it would be more usual to say that a particular approach to risk management is "based on it". In this sense then this standard is useful as the PBPF is primarily focused is on procedure and process documentation rather than the detail of the risk management process at the organisation. The risk management view is intended to *support* risk management rather than *replace* risk management process at an enterprise.

Defining a proper framework for risk management that can be used by all organisations is not at all simple. [Leitch \(2010\)](#) is critical of the ISO31000:2009 standard on various aspects, most notable that:

- It is unclear.
- Leads to illogical decisions if followed.
- Is impossible to comply with.
- Is not mathematically based, having little to say about probability, data and models.

In fact: [Leitch \(2010\)](#) points out that given the right backing, a set of ideas perceived as agreed by experts can achieve incredible prominence and acceptance, even if they are bad ideas, potentially helping or hindering efforts to manage risk. Despite those shortcomings, aspects which seem to mesh well with ideas encountered in the clients of the PBPF and supported to a greater or lesser extent in the PBPF, for example:

- Concept of a risk register.
- Idea of Level of Risk, broken up into Impact and Likelihood.
- Idea of a Risk Source, which in the particular context of the PBPF would be related to a specific risk associated with a specific aspect of a business process, for example the risk that data is captured incorrectly. Every procedure that involves data capture will be a source of this particular risk.

The PBPF is inherently a descriptive model of how things work at a particular company rather than a quantitative model some of the drawbacks, such as the fact that ISO3100 is not mathematically based, makes it more compatible with the scope of the PBPF at least as far as its support for risk is concerned.

In summary, it was interesting to note from the evaluation of standards and frameworks for risk management that one defined, simple, all-applicable view of how risk should be managed was not available. The struggle to incorporate risk management in the PBPF and not succeeding in all aspects, parallels the struggle of the international business community to come up with such a standardised approach.

It is reasonable therefore to accept that perfect compliance with an ideal standard is not only difficult but at this point in time probably not possible or even desirable. Practical aspects will remain important in how the scope of support for risk management is defined and refined.

5.3.6 Non-Technical Approaches

5.3.6.1 Legitimacy, Rationality and Corporate Sociological Perspectives

One of the most important conceptual shifts in the analysis of organisations came in the 1970s, when the environments of organisations were increasingly viewed as critical in understanding organisational dynamics. (Abrutyn & Turner, 2011, 283)

People live in a socially constructed world that is filled with taken-for-granted meanings and rules. (Carruthers, 1995, p. 315)

Yet this congruence ("isomorphism" is the preferred new institutionalist term) between the inside and the outside of organisations is not dictated by technical criteria. The process is a cultural and political one that concerns legitimacy and power much more than efficiency alone (Carruthers, 1995, p. 315).

Selected elements of environments — the state, law, cultural ideologies and mythologies, professional norms, resources, and the like — are highlighted as key properties of environments to which organisations must adapt. (Abrutyn & Turner, 2011, 284)

The pressure to adapt to the expectations from external and internal stakeholders can be a stronger driver than technical reasons for adopting a system.

New Institutionalism provides an useful perspective to understand this behaviour, especially in the financial services industry. According to (Abrutyn & Turner, 2011, 287)

organisations in for example a sector such as financial services the environment of organisations will be disproportionately influenced by the ideologies of dominant domains. Examples here could be the "Too-Big-to-Fail" financial institutions, important regulators such as the American Government and so on. In the last decade this has manifested in the pressure that companies feel to comply to for example the Sarbannes-Oxley regulations.

The idea of "conforming" to expectations, or at least to present oneself as "legitimate" and "rational" is discussed in the context of the financial audit problem in [Power \(2003\)](#). This article is interesting in the sense that it provides an insight into the legitimacy and perception of legitimacy of a project such as an auditing project. Documentation of processes and procedures into a legitimate framework is analogous to the auditing process for the following reasons: 1) Produced externally through collaboration with people inside the organisation. 2) Must determine and present in a clear and transparent way what is done, how it is done, who does it, what outputs are produced.

The dynamics of the interaction between "auditor" or in the case of the PBPF "consultant/documentor" is similar: Input has to be made by different skills levels. On the one hand - structured methodological input. On the other hand intuitive input - based on experience and gut feel. A project cannot be in balance without both inputs. Common-sense judgement must be used to evaluate the outputs produced by a project. Conversely, the delivery of demonstrable structure with high quality deliverables and working papers builds confidence with the customer.

In designing a system such as the PBPF a large part of the problem is to present the system output or user interface in such a way that it appears "legitimate".

[Power \(2003\)](#) argues that audit projects can follow a structured or more intuitive approach to produce outputs that are perceived as legitimate. This is also true for process documentation projects.

The PBPF had to be established as a legitimate framework in the financial services industry. This was achieved by following and communicating a simple, and well-understood methodology. The deliverables were captured in an agreed process and organisational structure and signed of by the client. The lack of previous projects meant that it was not possible to rely on a more "intuitive" or less-structured approach. The client had to be convinced that the documentation was complete, relevant and correct.

Building a working set of procedures documents is a social enterprise, as pointed out by [Power \(2003\)](#) it is in the mutual work done in creating the documents that trust is gained and established between service provider and client and that the insight is gained to gather the information that is necessary.

The creation of process and procedure documents makes independent summary and review possible and this is therefore why this is so crucial in producing legitimacy.

It is possible, if the right views are built, to demonstrate in a structured way that a particular organisation is at a higher level of maturity.

An interesting point from [Power \(2003\)](#) is that before a particular technique, or as in the case of the PBPF, a framework and methodology, can become really effective it must become "Institutionalized" or regarded as "the way of doing things". "There Must be acceptance of the technique for the technique to be good." [Power \(2003\)](#) What this effectively means that if the company and the people in the company do not trust the technique then it won't work. Perceived legitimacy and rationality will therefore have a direct technical impact.

"New institutionalists view accounting practices as one of a larger set of features that can legitimize organisations through construction of an appearance of rationality and efficiency. Ceremonial adherence to legitimate norms may have little material impact because formal organisational structure is decoupled from actual organisational processes." ([Abrutyn & Turner, 2011, 313](#)) A dire warning is implied here, and this is also one of the results of this thesis: Do not overestimate the technical value of the process and procedure framework. Once the processes and procedures are documented it does not mean that this will necessarily directly translate one-to-one to actions actually performed by the organisation.

New Institutionalism is interested in institutions as Independent variables, ([Abrutyn & Turner, 2011, 314](#))

New institutionalists believe that institutions matter, and that in analysing how they matter, one must reject the assumptions of methodological individualism and individual rationality.

New institutionalists believe that people live in a socially constructed world that is filled with taken-for-granted meanings and rules.

This congruence ("isomorphism" is the preferred new institutionalist term) between the inside and the outside of organisations is not dictated by technical criteria. The process is a cultural and political one that concerns legitimacy and power much more than efficiency alone.

Organisations have frequently incorporated into their formal structure a variety of rational procedures, processes, and rules (including formal accounting systems). [Meyer & Rowan \(1977\)](#) deny, however, that the primary reason for doing so was that it would result in more efficient organisational decisions, or that it would make better outcomes. On

the contrary, rationalized elements are incorporated because they *maintain appearances*. *They help confer legitimacy upon the organisation.*

A central claim within Meyer & Rowan (1977) argument is that formal organisational structure, with its highly rationalized appearance, is decoupled from actual organisational practice. Formal structure has much more to do with the presentation of organisational-self than with how things actually transpire within the organisation.

Much more effort is expended in devising official statements of procedure than in subsequently adhering to them. (Abrutyn & Turner, 2011, 315)

New institutionalists are sceptical of claims that some organisational feature or procedure is necessary for technical reasons. Highly political and cultural features get hidden under a technical surface. (Abrutyn & Turner, 2011, 316) *Organisations come to emulate each other because they are in similar environments.*

In the context of New Institutionalism the convergence of organisations in terms of their forms are explored. It is argued that institutions have developed to become similar (showing an isomorphism) across organisations even though they evolved in different ways DiMaggio & Powell (1983). A few of the so called "isomorphisms" are as follows:

Competitive isomorphism concerns efficiency. When there is one best, cheapest or most efficient way to do things, then the forces of competition will eventually impose upon organisations that one best way.

Coercive isomorphism concerns the ways in which organisations may be subject to external pressure from organisations upon which they are dependent, or from more general cultural expectations. Government regulations, for example, can coerce organisations into adopting new procedures; a large manufacturing firm can force its suppliers to standardize their shipping operations.

Uncertainty is the moving force behind mimetic isomorphism. In situations where they are not sure what to do, organisations frequently look to a reference group, to kindred organisations, and emulate what they do in the same situation. There is reassurance if not actual safety in numbers, and in the absence of a compelling reason to strike out on their own, organisations do what others are doing. Organisational fads and fashions seem likely to spread through mimetic isomorphism.

Professions play the major role in the third category, normative isomorphism. Organisational personnel who are also members of a profession are recognized as possessing specialized training and knowledge, and frequently can define the terms and conditions

of their labour. The experience of a specialized education, and the involvement in professional networks, influences how professional personnel undertake their activities within the organisation.

DiMaggio & Powell (1983)'s analysis of isomorphism thus points to two actors, the state and professions, as being particularly important for how rationalized procedures spread among organisations. In general, new institutionalist take exception to rational-choice interpretations. If there is convergence among organisations, it is not necessarily because market competition or some other quasi-Darwinian process has forced them to adhere to the optimal form. If, for example, organisations devote considerable energy to the development and elaboration of rationalized rules and procedures, it may not be because these produce decisions or outcomes that are "objectively" better. Being technically efficient is not the only path to organisational survival. Achieving legitimacy in the eyes of the world, state, powerful professions, or society at large, is another effective survival strategy.

If efficiency and a means-ends logic is at the heart of the technical, legitimacy and a cultural logic constitute the core of the institutional.

Showing how seemingly rational procedures are fundamentally institutional allows new institutionalists to undercut the rational-choice perspective and reveal the particular cultural underpinnings of Western rationality.

Carruthers (1995) make reference to Dobbin (1994, p.135) who argues that technical criteria are indeterminate: "Utility functions have multiple maxima and so there is more than one way to be rational. Which structure emerges, how organisational processes actually unfold, is therefore culturally shaped. Technical criteria may constrain organisational structure, but they cannot determine a unique point of optimality, because no such point exists. They can only provide a set of viable alternatives."

For those who participate in a decision, how responsibility is allocated is often more important than the actual outcome of the decision itself. When outcomes are ambiguous, then the legitimacy of a decision may actually be easier to determine than its outcome. (Dobbin (1994, p.135) as referenced by Carruthers (1995).)

With high uncertainty, those charged with answering questions of responsibility frequently look to the formal procedural features of the decision. Was all relevant information dutifully and accurately collected? Did it enter into the decision? Were all the alternatives considered? Were potential consequences foreseen?

Whatever the effect of rationalized procedures, however large or small the extent of decoupling, it is important to understand the sources of formal structure. Early formulations were perhaps too simplistic in their answer to this question, for the sources were invariably external. Organisations imported their formal structure from outside. They emulated and reproduced the procedures, rules and structures that enjoyed external legitimacy. Formal structure came from the state, from professions, or from other "successful" organisations. In general, rationalized myths were the creation of Western culture. The legitimacy of accounting over time and across nations gave credence to this idea, but a more subtle approach seems necessary.

Generally accepted accounting principles are an example of a rationalized myth, but one that is shaped by the organisations which must comply with it to be legitimized.

The newest of the new institutionalism recognizes that rationalized myths, and formal structure, are not always imposed on an organisation by its external environment. Frequently, organisations play an active role in constructing rationalized myths, playing them off against each other, or shaping how they are applied in particular instances. Organisations are not only granted legitimacy; sometimes they go out and get it. This is especially relevant in the context of the PBPF because the legitimacy which a formal, well structured set of procedures can bestow on an organisation and department might be the primary reason why the system is selected! A humbling thought especially if the thousands upon thousands of man-hours spent on crafting the technical aspects of the PBPF are considered.

5.4 The Technical Solution

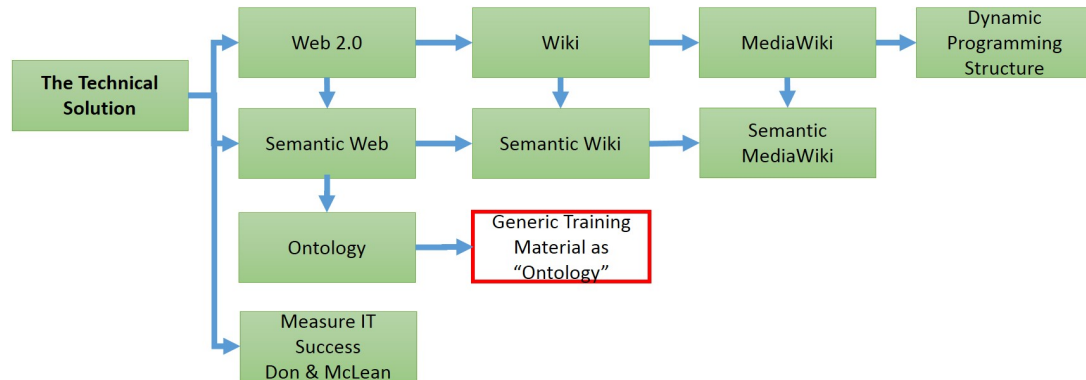


FIGURE 5.16: Outline of Literature Study:Technical Solution

5.4.1 Why MediaWiki?

The choice to use MediaWiki was not a simple one. It was the result of an evolutionary approach where several other software alternatives were used and discarded.

5.4.2 Alternatives to wiki Software

The MediaWiki artefact created and implemented by Plumb Line, is by no means the only attempt at creating a "Process and Procedure Framework". The software platforms that are used for previous versions of the PBPF include the following:

- A simple Microsoft Excel spreadsheet to control the procedure documents and responsibility for the procedure documents.
- A Microsoft Visual Basic 6 application.
- A Microsoft Access database.
- An Extensive Microsoft Visual Basic .Net application including provision for flowcharting and benchmarking.
- A Simplified Microsoft Visual Basic .Net application focusing purely on document control and organisational manuals. This application was supported by Web Services.

The MediaWiki application eventually replaced these applications. Some of the problems that were encountered in one or more of these applications included the following:

- Software licensing - for example in the case of the Microsoft Access database this required the end users to be licensed to use Microsoft Access. This was also true in the case of the Microsoft Visual Basic applications where licensing of the Microsoft SQL Server software was required. This is an issue in clients where the software the clients were licensed for was not compatible with the versions actually required for the "Framework" to run as implemented. The additional software required lead to licensing and versioning issues.
- Software development platforms were constantly changing. The most notable change was the change that was made from Microsoft Visual Basic to the "Managed Code" environment as represented by the Microsoft Visual Basic .Net software. This necessitated the rewriting of significant portions of code to be future proof. A futile exercise because every version of the .Net ("Dot Net") framework released by Microsoft was significantly different from the previous version. This was by no means trivial as the most complex code that took the most man-hours to develop, especially in the user interface sections of the program, was the most affected by new releases of the .Net software.
- Deployment of Microsoft Visual Basic code or any code that had to be installed on a client PC was a nightmare. Every client was different, and every client had a different level of control over what software could be installed on the client PC's. To convince an over-stressed corporate IT department, especially in the financial sector to install software on individual client PC's was hard work. This was compounded with the issue of *upgrading* existing software. Upgrading was a frequent activity at the start of the system development cycle. The system had to be changed constantly to accommodate changing requirements and understanding of client requirements at the start. Upgrading had to take place both on the client PC as well as on any back-end components such as databases and web services.
- Setting up security on the individual PC's was time consuming as well. Security for critical .Net components could only be set up on a PC by PC basis - resource intensive if this maintenance activity is to be conducted over several customers and hundreds of PC's.
- Every client PC was different, with dozens of different software products from different vendors installed on the same machine and competing for the same resources. Some errors were difficult to resolve especially where it related to issues such as memory and disk space, network access and a plethora of other issues. In cases where the corporate IT department had control over PC setups using scripts this was even more time consuming as the new setup had to be tested before deployment and if communication was not absolutely perfect then software installations

that were working perfectly yesterday might be overwritten by a script that was run in a new installation cycle.

Software development environments such as Microsoft Visual Basic .Net did have some benefits. In most instances this would also apply to Microsoft Access and Microsoft Excel, supported by the powerful Microsoft Visual Basic for Applications:

- Excellent providing a "rich" user experience, with sophisticated code supported by comprehensive graphical libraries that can use PC resources fully.
- Code execution is generally fast, menus, listboxes, forms and visual elements such as graphs can with a bit of effort be made to be visually striking and responsive. A flowchart, an organisational chart and a visual dashboard for risks are tools that made use of this functionality.
- Microsoft Visual Basic .Net simplifies development because all code runs in the same virtual machine as opposed to for example web applications that run in a Web Browser for which more than one target Web Browser has to be considered. Not a trivial exercise as anyone that had to make applications work for Internet Explorer 6 - legendary among web developers for the number of exceptions that had to be built into completed code to accommodate that particular Web Browser's eccentricities.
- Great IDE - Microsoft Visual Studio and the express version Microsoft Visual Studio Express are user friendly development environments and this makes it pleasant from a developer's perspective.

As experience was gained in developing the PBPF the following requirements became important:

- The software platform had to be stable.
- Multiple users had to be supported with concurrent access.
- Multimedia content such as PDF documents, spreadsheets and bitmaps had to be supported.
- Versioning was important - a full history of revisions made and who made the revisions.
- Sign-off of documents.

- Ownership of documents - every user had to know what document they were responsible for.
- Web enabled and online - No installation on client PC, install only on central server.
- Affordable - limit cost of licensing to Plumb Line and customer.
- Provide media rich experience.
- Provide user level security access.
- Support email, specifically where edits have been made and the document owner or interested parties, had to be informed of the change.

MediaWiki supported several of the requirements in this regard, most notably the stability, multiple users, web-enabled and versioning were important aspects that motivated its selection as a long-term platform. It is interesting to compare this with some other instances in literature.

Thirteen articles were analysed where reference in whole or part is made on the reasons why wiki's and in some instances specifically MediaWiki were selected for various projects listed a whole plethora of advantages and benefits from using a wiki system. The benefits / reasons for selections were tabulated. The process to compile this table was as follows:

- Review each article and list any selection criteria, benefits and advantages that could have motivate or could motivate the selection of a wiki system for any particular purpose.
- Where possible group criteria together and cross reference with all other articles in the sample.
- Generate a count of the number of times a particular criteria occurred over the sample set.
- Sort the criteria from most significant to least significant in terms of number of occurrences.
- Sort the sources from the most comprehensive to least comprehensive in terms of number of criteria referenced.

The result of this process is presented in [Table 5.3 on the following page](#).

TABLE 5.3: Wiki Selection Criteria from Literature

Criteria	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Collaborative aspect of wiki, anybody can contribute, discussion is supported, collaborative learning , two-way communication, buid- ing trusting culture				x	x	x	x	x	x	x	x	x	x	x	x	x	x
Wikipedia uses wiki technology and users are familiar with it. (Wikipedia uses Media- Wiki)				x	x	x				x		x	x		x	x	
Easy to use / Simple / Easy to Edit Pages / Simplicity / Focus on text				x	x	x		x	x		x			x	x		
History, change track- ing, revision visibility, monitoring and rollback				x		x	x	x				x		x	x	x	
User rights and man- agement , identification of activity of individual user				x		x	x	x	x	x	x				x		
Build-in Full-Text Search Function over entire textual content of wiki				x		x	x	x	x	x							

Continued on next page

Table 5.3 Continued from previous page

Criteria	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Flexibility, can be used for a wide range of purposes				x	x	x		x	x				x				x
Scaleable / Capability to expand and grow to support large volumes of users and content				x	x	x		x						x			
Linking of Pages and External References				x			x	x	x			x					
Share information within business and with other business partners				x						x			x	x			x
Central repository of information / documentation				x					x				x	x			x
Availability from within web browser, no need to install additional software, Any time and from any location				x	x	x						x					
Easy to configure and setup					x	x	x				x						
Easy to install and deploy					x	x			x		x						

Continued on next page

Table 5.3 Continued from previous page

Criteria	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Appealing to users / Users familiar with web based environment				x						x	x						
Low Cost/Free and Open Source					x				x								
Changes instantly visible in browser window when changes made						x	x					x					
Easy to maintain				x		x											
Saves Time				x						x							x
Reduces Training Cost for New Staff				x													
Adaptable / Provide Wide assortment of extensions or plugins and provision for own extensions					x			x			x						x
Wide assortment of features, including statistics management					x				x								
Very Stable					x												x
Mature Development Status					x												
Active Community of Developers					x												

Continued on next page

Table 5.3 Continued from previous page

Criteria	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Solving information overload by email / Reduce number of drafts floating around				x													
RSS												x					
Wiki Navigation Structures such as linking (internal and external), search and categories						x			x						x		
Support multiple languages (more than 140)					x												
Templates mechanism								x									
Support multimedia content					x	x	x										
Effective tool for project planning, documentation and knowledge management									x	x							x
Facilitate online learning									x								
Collaborative writing									x							x	x
Shows number of edits per user																x	
Collaborative Knowledge Management																	x

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Table 5.3 Continued from previous page

Criteria	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Enables the distribution of work and a focus on particular skills of individuals																	x
Improvement of Organisation Processes																	x

5.4.3 Discussion

Trkman & Trkman (2009) uses the DeLone and McLean IS Success model to evaluate the success or lack thereof, of using a wiki as an intranet solution. The DeLone and McLean IS Success model is highly respected Urbach & Müller (2012). In fact according to Google Scholar as at December 2013, the 1992 article, DeLone (2003), introducing the DeLone and McLean IS Success model is cited over 6000 times by other publications and articles and the ten year update of the model published in 2003, DeLone & McLean (1992), over 4000 times. It is therefore concluded that the DeLone and McLean IS Success model is a good basis to start from for structuring the results as presented in Table 5.3 on page 102 and Table 5.4 on page 108 containing advantages, selection reasons, disadvantages and challenges of wiki systems. Trkman & Trkman (2009) proposes using three constructs from the DeLone and McLean IS Success model, namely:

- Information.
- Systems.
- Service Quality.

Using these constructs it is now possible to order the items from the sample analysis.

- MediaWiki specifically was chosen because it is one of the world's most popular wikis. Wikipedia as well as more than 2000 wiki sites use it. [Kasemvilas & Olfman. \(2009\)](#) [IOANNOU \(2011\)](#)
- Collaborative aspect of wiki, anybody can contribute, discussion is supported, collaborative learning [Kasemvilas & Olfman. \(2009\)](#) [Brohée et al. \(2010\)](#), [IOANNOU \(2011\)](#) [Lazda-Cazers \(2010\)](#)
- Availability from within Web Browser, Any time and from any location [IOANNOU \(2011\)](#)
- Changes instantly visible in Web Browser window [IOANNOU \(2011\)](#)
- Easy to install [Kasemvilas & Olfman. \(2009\)](#) [Brohée et al. \(2010\)](#)
- Easy to configure and setup [Kasemvilas & Olfman. \(2009\)](#) [Brohée et al. \(2010\)](#)
- Easy to use / Simple [Kasemvilas & Olfman. \(2009\)](#) [Brohée et al. \(2010\)](#)
- Appealing to users [Brohée et al. \(2010\)](#)
- User rights and management [Brohée et al. \(2010\)](#)
- Scalable [Kasemvilas & Olfman. \(2009\)](#)
- Free and Open Source [Kasemvilas & Olfman. \(2009\)](#)
- Stable [Kasemvilas & Olfman. \(2009\)](#)
- Mature Development Status [Kasemvilas & Olfman. \(2009\)](#)
- Active Community of Developers [Kasemvilas & Olfman. \(2009\)](#)
- Support multiple languages (more than 140) [Kasemvilas & Olfman. \(2009\)](#)
- Wide assortment of features, including statistics management [Kasemvilas & Olfman. \(2009\)](#)
- History and revision visibility, monitoring and rollback [IOANNOU \(2011\)](#) [Lazda-Cazers \(2010\)](#)
- Linking of Pages [IOANNOU \(2011\)](#)
- Email and RSS [IOANNOU \(2011\)](#)
- Adaptable by providing Wide assortment of extensions and provision for own extensions [Kasemvilas & Olfman. \(2009\)](#) [Brohée et al. \(2010\)](#)

- Support Multimedia content

TABLE 5.4: Challenges and Disadvantages of Using Wiki

	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Security / Access Control / Safeguard Sensitive Information such as passwords / Information sensitivity				x						x				x	x		
Data Migration - difficult to migrate existing content				x													
Training in use of Wiki / Users are used to Word Processors				x													
Subjective Nature of Categorization of Information ("folksonomies" created by user community)				x													
Lack of direct support for project management / mandatory purposes / Cannot conclusively determine when document reaches finished version					x												
Lack of progress tracking / summarised status for entire project					x											x	

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Table 5.4 Continued from previous page

	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Lack of direct support for standardisation of how topics and details are added in articles and for formatting /How to set guidelines and standards				x						x					x	x	x
No standard way to enforce consistency with comments				x													
Lack of follow-up mechanism for comments by reviewers				x													x
Lack of control over who is responsible for making changes based on comments				x													
Generation of redundant topics / Lack of process in wiki for reducing duplication of information				x						x							
Lack of awareness of what tasks people are involved in or responsible for				x													

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Table 5.4 Continued from previous page

	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Poor discussion system (have to go to separate page, no chronological order, comments placed at any section)				x													
Difficult to standardise formatting			x	x													
Only a simple full-text search					x	x	x										
Knowledge connected across different articles cannot be aggregated in a unified manner					x												
Knowledge Acquisition Bottleneck: Source knowledge at different levels of formalization, little support in wiki for explicit knowledge (rules, decision trees) as opposed to tacit knowledge (text and images)					x	x	x										
Standard Wiki does not support reasoning					x	x	x										
Continued on next page																	

Table 5.4 Continued from previous page

	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Standard Text Editor not as popular as WYSIWYG / User Proficiency with Wiki Editor / Lack of user friendliness, especially in editing / Unfamiliarity with formatting and editing							x			x		x			x		
Content is modifiable by any user									x						x	x	x
Content is public									x							x	
Simultaneous edits are allowed on same page but not succesful									x						x		
Wiki is forever evolving									x							x	
Lack of "navigation trials" through content									x								
Reluctance to Share/ Sensitivity to / Fear of openness of the sharing enviroment										x					x		
Heavy reliance on other non-wiki tools										x							
Continued on next page																	

Table 5.4 Continued from previous page

	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Usage levels of wikis low / Unequal participation / Difficulty to get people to contribute										x		x	x	x	x	x	x
Extra work and cost to create and structure a wiki entry (as opposed to just emailing information around)										x							
Unwillingness to share "unfinished" work										x					x	x	
People do not want to or are not interested to learn another tool / Learning how to use wiki										x			x			x	
Wiki too passive / Not part of current work practice / Not part of current workflow										x							x
Lack of control people feel when putting information on wiki/ Loss of power - anyone can edit / Loss of ownership of individual pages										x						x	x

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Table 5.4 Continued from previous page

	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
People afraid of making changes to someone else's work (would rather email someone with requested change)										x			x				
Difficulty in using Wiki mark-up / Wiki format										x							x
Data not structured, generally represented in free text format / Lack of scaffolding											x						x
Technical difficulties such as login procedures												x					
Vandalism issue, especially for public wikis													x				x
Assessment of pages															x	x	
Page Export to different formats for archiving or retiring wiki															x		
Establishing guidelines for creation of content																x	x
Lack of accountability																x	
Cannot set deadlines for completion of articles																x	
Lack of control over quality																	x
Cultural Issues																	x

Continued on next page

Table 5.4 Continued from previous page

	<i>Information Quality</i>	<i>System Quality</i>	<i>Service Quality</i>	Grace (2009)	Kasemvilas & Olfman. (2009)	Baumeister <i>et al.</i> (2011)	Schaffert (2006)	Nalepa (2009)	Parker & Chao (2007)	Holtzblatt <i>et al.</i> (2010)	Brohée <i>et al.</i> (2010)	IOANNOU (2011)	Poole & Grudin (2010)	Dunn (2012)	Cubric (2007)	Lazda-Cazers (2010)	Trkman & Trkman (2009)
Intellectual Property Issues																	x

5.4.4 MediaWiki Extensions

The power of MediaWiki lies in the fact that it separates content creation from display.

What this means is that the author of a document can focus on content rather than appearance. The layout and appearance of the document is a separate problem and can be tackled by an expert in graphic design or document layout. This leads to better overall quality and more importantly consistency.

The content is described in a "mark-up" language that follows a few simple rules. These rules will dictate how formatting is done, specify headings, lists and tables. Hyperlinks, references and images can also be added using the mark-up language.

A few illustrative examples is shown in the mark-up language "cheat sheet" in [Figure 5.17 on the next page](#).

As can be seen from this figure the mark-up provides for the definition and use of "Templates". These templates are very flexible and allow for the construction of multiple layers of content built of from components. A template can for example be created for a special note or disclaimer. Another template can in turn make use of this special template and add other elements. Each template can take a number of parameters that are variable while the rest of the content of the template is constant. Extensive use was made of the templating mechanism in the PBPF.

The templates however is not enough to address all aspects of the technical solution. Once again, in this particular aspect, MediaWiki is very flexible and allows for the use

MediaWiki Cheatsheet



MediaWiki is the software used for Wikipedia and many other Wiki projects. Everyone can contribute to a Wiki. Simply click on the link "Edit this page" on top of an article and start writing. This cheatsheet shows the basic formatting tricks.

Wiki text	Result
<code>'italic'</code>	italic
<code>'''bold'''</code>	bold
<code>''''bold and italic''''</code>	bold and italic
<code>==heading==</code> <code>===level 2===</code> <code>====level 3====</code> <code>=====level 4=====</code>	Headings in different sizes
<code>[[Link to another page]]</code> <code>[[Link|different title]]</code>	Internal Link to another page on the wiki
<code>http://www.test.org</code> <code>[http://www.test.org Text]</code>	External link Link with description
<code>[[Category:Example]]</code>	Add article to category "example"
<code>----</code>	horizontal line
<code>* one</code> <code>* two</code> <code>* three</code>	Bullet list
<code># one</code> <code># two</code> <code># three</code>	Numbered list
<code>[[Image:File.jpg|Text]]</code> <code>[[Image:File.jpg|frame|Text]]</code> <code>[[Image:File.jpg|thumb|Text]]</code>	Image with alternative text Image aligned right with caption Thumbnail
<code>[[Media:File.ogg]]</code>	Download link
<code>{Name}</code>	Include template "Name"
<code>-----</code>	Signature (Link to userpage)
<code>-----</code>	Signature with timestamp
<code>#REDIRECT [[Other article]]</code>	Redirect to another article
<code>{|</code> <code>|header1 || header2</code> <code>|-</code> <code>|row1 cell11 || cell12</code> <code>|-</code> <code>|row2 cell11 || cell12</code> <code>|}</code>	Table with two columns, a header row and two normal rows.

<http://www.mediawiki.org>

 Wikimedia Foundation
<http://www.wikimediafoundation.org> • info-en@wikimedia.org

FIGURE 5.17: "Cheat Sheet" for MediaWiki Mark-up Language

and definition of "extensions". The extensions are coded in a combination of php and javascript and added in a special "extensions" folder in MediaWiki. The MediaWiki program is also liberally sprinkled with "exits" and "hooks" where functionality can be modified to fulfill specific user requirements.

MediaWiki already has an extensive library of extensions that can be incorporated. An example is the RTF editor that makes it possible to edit wiki pages in a way akin to Microsoft Word. Most users prefer this as opposed to having to use the wiki mark-up language.

A system that makes extensive use of the MediaWiki extensions and extends it with a few of its own is Semantic MediaWiki. Some of the MediaWiki limitations that they had to overcome in that framework, i.e. lack of structure, is very similar to what was encountered in the PBPF Krötzsch *et al.* (2006).

5.5 The Project

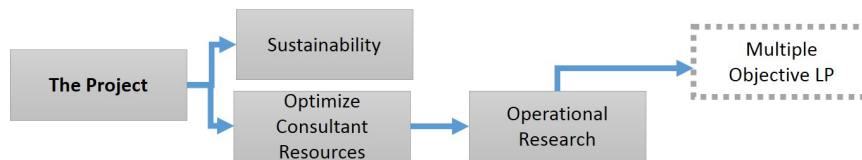


FIGURE 5.18: Outline of Literature Study:Project

5.5.1 What Is A Consulting Business

The primary objective of this thesis is to establish a sustainable framework for managing and documenting business processes for a client company from the perspective of a consulting business.

The products and services provided by a consulting business forms a core part of this sustainability.

Creating and maintaining an in-house enterprise architecture department is expensive and it is not always clear what real value is added over and above that which is added by the normal auditing functions.

The core of this conflict of existence lies in the fact that per definition the related domains collected under the field of enterprise architecture is "work about work" rather than work itself.

Once enterprise architecture projects finish it is difficult to justify the cost of retaining the enterprise architecture resources. A conflict of interest exist between the natural wish for the personnel in these function to remain relevant and useful to the company and their role effectively as "internal consultants", examining and improving business processes. "Internal Consultants" is per definition an oxymoron, as consulting implies independence.

Therefore external consultants makes sense both in terms of objectivity, being largely outside of corporate politics as well as providing a good deal of flexibility in terms of spend on enterprise architecture: Instead of having to pay for an in-house permanent infrastructure a skeleton structure can be maintained and supplemented in a series of one-off projects.

The problem of this arrangement from the perspective of the consulting company is that it leads to "feast" and "famine" cycles, where periods of high load is followed by periods of little or not work at all. This makes it desirable from the consulting framework to

have at least some "retainer"-like arrangement to ensure a constant monthly income. One way of doing it is to provide the client with a business process framework in software for which a monthly license fee is payable, enhancing the overall sustainability of the client-consulting relationship.

This thesis investigates the triangle relationship between consultant-client and business process framework as the basis for continuing sustainability both from the perspective of the consulting company as well as for the client company. Especially where the framework manifests as a concrete software platform.

An aspect that also deserves consideration is the conflict of interest between Audit Services and consulting. An arrangement which has possibly led to the bloated unnecessarily expensive Business Transformation projects of previous decades.

5.5.2 Sustainability

The small management consulting firm faces a set of unique challenges when it comes to sustainable operation. Some of the challenges relate simply to the small size of the operation. In the context of this thesis, "small" is defined as an operation with fewer than 12 employees, or about the size of operation that can operate from an average size house! Examples of the challenges that relate to size is as follows:

- Diverse business activities such as HR, Marketing, Research and Development and Financial Bookkeeping still has to be performed at some level and with far fewer personnel.
- Administrative burden to comply to fiduciary and legal requirements, i.e. although the operation is small it will still have to complete all of the returns, tax, social and otherwise that a company several times its size will have to.
- Legal fees for contracts, for dispute resolution, registration of trademarks, protection of intellectual property can be exorbitant relative to the turnover of the company.
- High cost of professional personnel. To function effectively in a competitive environment it is critical to provide a quality service and advice. Good, highly qualified, people are expensive.

HR can be defined as functions related to recruitment, retirement, staff development and training, discipline, leave, employment contracts. In the United Kingdom studies have shown that the mean HR staff ration is between 0.010 and 0.013. ([Brewster & Ommeren](#).

(2006) referencing Analysis of personnel activities and costs (APAC). (1997). London: APAC.) Obviously this figure will vary from country to country as the environment in which companies operate will vary as well. Brewster & Ommeren. (2006). Assuming for the moment that these figures are at least reasonable, if not accurate, then analysing the implications for different company sized, irrespective of industry, are quite interesting.

Figure 5.19 shows what the size of the HR function would look like for different company sizes and assuming a mean of 0.012. The median figure of 0.011 is close to 0.012 (1.2%) as well thus for the purposes of this analysis is not considered as it will not really affect the conclusion for small companies.

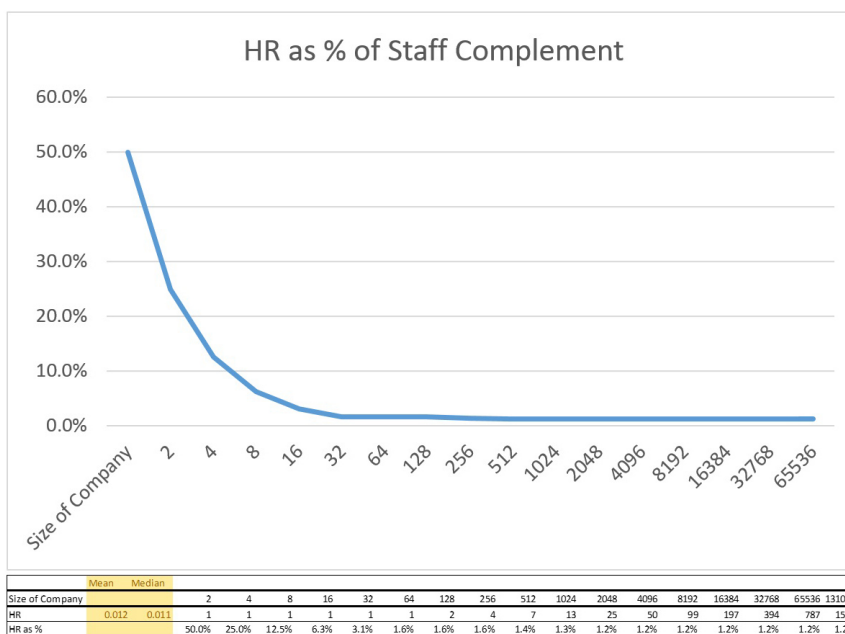


FIGURE 5.19: Size of HR as % of Staff Complement for Different Company Sizes

What is immediately striking is that , if the size of the HR function is rounded up , i.e. it is assumed that at least one person has to perform the function and if more than one person is required that the additional staff has to be in integer increments as well, then the load on small companies is proportionally significant. For a company of 16 staff members the 6.3% of staff will be involved in HR, which is 6 times larger than for a large company of 256 staff for whom the figure approaches the theoretical value of 1.2%. In this analysis, only once the company size approaches between 32 and 64 employees, the ratio of HR function to total staff complement starts approaching reasonable, sustainable values. The same analysis can be repeated for the Financial, Development, Operations and virtually every other function and would show the same result. Size matters!

Chapter 6

Evaluation

In this chapter the *research question* as set out in Chapter 2.1: [Research Question](#) on page 8 and the extent to which the solution addresses this will be analysed here.

This section will evaluate whether the financial services sector is the right client for the PBPF, whether the framework is sound from a business point of view, whether the technical platform as represented by the wiki platform is the right solution for this framework and finally whether the project approach is sound.

The chapter follows the same headings as the literature review (Chapter 5: [Literature Review](#) on page 43). Each subsection will try to bring together work done in the other chapters such as Chapter 3: [Overview of Projects](#) on page 13 and Chapter 4: [Evolution of Technical Framework in the Context of the Projects](#) on page 35.

6.1 Is the financial services industry the Right Client for the PBPF?

The PBPF was based on the combination of experiences from the aviation maintenance industry where a quality management-based approach to process and procedure documentation was followed and the risk centric work done at Stanlib following on the risk and control identification encapsulated in a SAS 70 study.

It can therefore be argued that the applicability of the PBPF could potentially be wider than the financial services industry.

Based on the fact, however, that the framework is an extension of current training activities at the clients, where generic training is provided, a framework for benchmarking

information for clients in this industry, namely the Plumb Line Benchmarking Framework for Financial Operations, already exist, it makes sense to build on these assets and client base. The fact that the framework presents a structured way of document procedures across departments in the same company and across different companies in the financial services industry makes it a good basis for qualitative benchmarking. In this way the experience gained across the industry can be used to improve processes for all companies using the same training material and using the same standardised approach to business procedures. [Teuteberg & Smolnik. \(2013\)](#) points out that it is this capturing of data in Key Performance Areas that is a prerequisite for improved efficiency. The two frameworks, the benchmarking framework for quantitative measures, as well as the PBPF for qualitative information relating to processes positions Plumb Line well to service these clients. The generic training material provides a regularly reviewed, standardised framework to structure work done in this industry, an "ontology" as it were, to support qualitative benchmarking.

Vendor and Package Selection work for maintenance operators is the primary business of SAKS Consulting. The author used a set of industry best practice processes for the work done with SAKS consulting in the Aviation industry. SAKS consulting used the best practices to conduct As-Is and To-Be workshops. The output from these workshops form is the primary input into the Request for Quotation document. The best practices served as input into other elements of the Vendor and Package Selection work, such as creating a brief for conference room pilots. The PBPF supports similar transitional requirements in software package selection for clients in the financial service industry.

The PBPF consists of an interrelated set of elements, such as training, process and procedure documentations and quantitative benchmarks. These elements were developed and adapted specifically for the financial services industry. This means that the solution will require significant changes if is to be used in the new industry. The changes will require investments of money, time, additional personnel. Additionally it will be necessary to create or purchase intellectual property specific to this new industry, such as best practice processes and benchmarks.

In terms of the applicability of the "quality management approach" to processes and procedures in financial services, as opposed to a primarily "risk centric" approach, [Kara-petrovic & Willborn. \(2001\)](#) points out that financial service providers must provide adequate confidence to investors that their financial goals will be met and must provide assurance in the quality of the investment service. To do this, it is essential that the quality assurance efforts are *visible to both current and potential investors*. This has been the experience with the PBPF as well. A large part, if not the biggest part, of the value that is added to customers in this industry is the assurance that is provided

through the visibility of procedures and responsibility for the procedures that is at the heart of the framework.

A weakness of the framework at the moment is that, although Risk and Controls are represented as elements, it is inherently not a risk focused framework. This is obviously an issue in a risk-centric industry and if the PBPF is to remain relevant and competitive would be something that should either be specifically excluded or enhanced. The reason why specific exclusion is to be considered is that the word risk is such a loaded and important term in this industry that using it in the context of the framework raises expectations that are hard to meet or create an incorrect impression of the domain of business problems that it attempts to support.

In conclusion: The framework provides good value to clients in the financial services industry. For now, they are the "right clients" for this framework. Other industries can only be targeted once the same comprehensive set of processes, procedures and services have been created for the those industries. How to market and position the framework and manage client expectations or alternatively how to extend the framework would be ongoing aspects to be dealt with as part of the natural development cycle of this product.

6.2 Is the PBPF ISO9000:2008 compliant?

The PBPF supports the ISO9001 standard in that responsibility for procedures are presented, provision is made for reporting of incidents and procedures are documented in an hierarchical framework where completeness can be checked and signed off by responsible personnel.

Thinking regarding quality standards has also shifted over time. For example, in [Hoyle \(2009, 91\)](#) it is pointed out that the implementation of previous standards in the ISO9000 series of standards has led to some issues, for example a criticism of ISO9000 is that it made *certification* the focus and not *customer satisfaction*. ISO9001 is criticised that it led to systems of documentation that made one lose sight of the objectives. This is relevant and important in the context of the PBPF that is focused on business process documentation.

The ISO 9001:2008 as one of the later manifestations of these standards attempt to overcome some of these deficiencies. Clause 4.1 of ISO 9001:2008 establishes a set of requirements for the a quality management system. One can map the functionality and methodology of the PBPF to these requirements to examine to what extent it does

or does not support a quality system as currently conceived by the ISO9000 family of standards.

Section 4 of ISO 9001 contains the basic requirements for establishing a management system [Hoyle \(2009\)](#): Visibility, Accessibility and Accountability.

Figure 6.1 shows an overview of the different elements of the ISO 9001 standard.

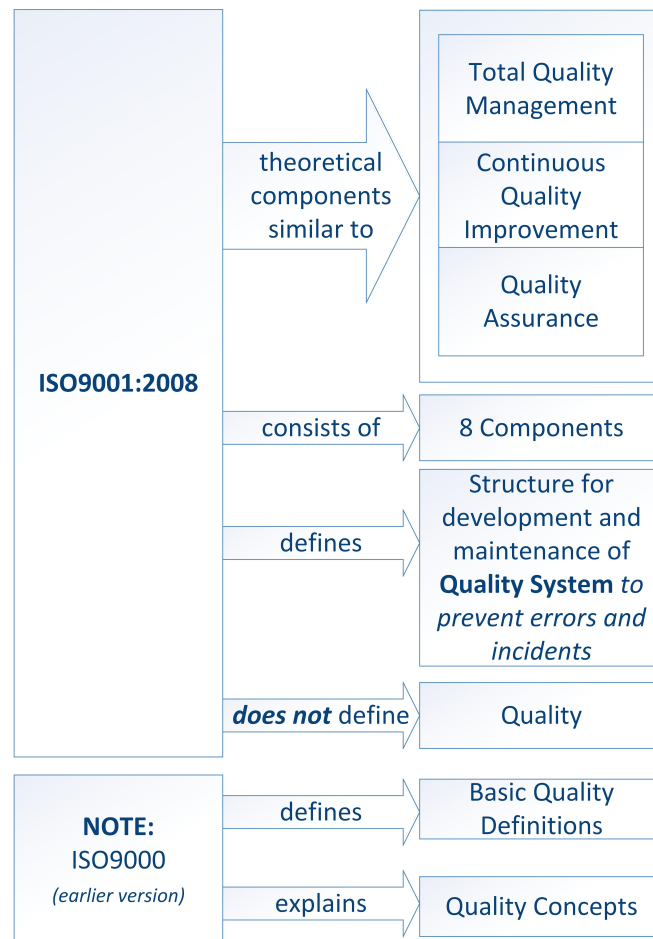


FIGURE 6.1: Overview of ISO 9001

From the New Institutional perspective the "appearance" of compliance is sometimes just as important as "actual" compliance. The legitimacy of a company in the eyes of customers and shareholders is very important. ISO 9001 certification enhances this perception of legitimacy. As the system is implemented currently it does not support ISO certification directly. For the system to remain relevant it is clear this should be included.

The areas of compliance with ISO 9001 requirements identified in [Hoyle \(2009\)](#) are as follows:

- Section 4: Quality Management System Development

- Section 5: Management Responsibility
- Section 6: Resource Management
- Section 7: Product Realisation
- Section 8: Measurement Analysis and Improvement

Taking these different areas in turn:

6.2.1 Compliance with ISO 9001 Section 4: Quality Management System Development

Customer requirements must be determined: Citing the example of the Close Brothers project as well as the Liberty Africa and Stanlib Africa customers, the customer requirements were represented in the form of a high level overview, a fund diagram as well as an freeform text description, that scoped the objectives for processes and procedures that were to be documented. Stanlib Namibia, for example had three industries with different process objectives and requirements. Although not formally structured from a database point of view, this is sufficient to brief a new employee or an external stakeholder on the proposed objectives of the procedures in the system.

Processes, their sequence and interaction must be determined: Process flow charts were included where relevant to clarify sequence and interaction between process activities or constituent procedures. For this purpose a process flowchart extension to MediaWiki was developed and added to later versions of the framework. The retrieval and reporting of information from the flowchart and further analysis of flows will require additional development.

Determine Criteria and Methods for Effective Operation and Control: Procedures were documented using templates that required the completion of controls, risks and where relevant key control points in procedures. These were supported by specially developed, in-procedure, templates that highlighted in green, orange or yellow important aspects in a procedure.

Information necessary to control and operate processes must be deployed and brought under document control: Each process area, process and procedure were assigned to an responsible owner and also assigned via the user pages to a person responsible for its execution. Changing the sign-off status of a documented affected the measurement graphs, visible on a overview level to all team members and managers. Logging an incident against a procedure also highlighted that a particular procedure needed review. All

of the wiki pages whether it was processes, procedures, risks, job descriptions, system descriptions or other elements could be assigned owners through extensions to the system. Using templates and customisation to the core MediaWiki system these ownership and status information was visible to users of the system.

Measurements must be taken to verify that the processes are delivering the required output and actions taken to achieve the planned results: The primary mechanism for achieving this was the Incident Log where any incident, failure or action could be logged against any procedure or process. Severity and due date for closing actions could be logged and an overall summary was available from the system, for use in weekly management meetings.

In summary then, the MediaWiki-based, PBPF system does provide elements consistent with what is expected for Quality Management System Development. The MediaWiki platform were extended with the flowcharter, the sign-off mechanism, the pie-charts and bar-charts to provide visibility of sign-off progress, the incident log and the summary report of incidents. Without these developments the standard MediaWiki platform would not comply with Section 4 requirements. The additional cost that had to be expended on extending the platform is therefore justified from a quality management System Compliance point of view.

6.2.2 Compliance with ISO 9001 Section 5: Management Responsibility

Vision, Policies and Values: Supported in free-form text and bitmaps in the Wiki background pages. This is not currently part of the methodology and should be added.

Objectives: Similar to previous point and also to point made for *Customer Requirements* in previous section.

Responsibility and Authority: Established from the organisational structure / organogram extensions, the user specific pages specifying areas and procedures of responsibility as well as the sign-off and ownership extension.

Management Review: Supported by Incident Log and associated report as discussed in previous section for quality management System, as well as the *review view* where relevant statistics and reports are shown in graphical and report form to indicate what the current state of process documentation and system incidents are.

Commitment, everyone pulls in same direction: Clearly visible process structure and measurement of documentation project. Shows how everyone is performing. Additional

tools that form part of the software but has not found wide use yet includes training status matrices that indicates as a final phase of documentation whether training, including cross-training has taken place on the signed off process documents.

In Summary: The MediaWiki because of its collaborative nature makes for good visibility and communication. When complemented with visual extensions for reports, graphics and extensions for sign-off and ownership, it makes the PBPF and effective tool to support this aspect of the ISO 9000:2008 standard. Work is required to make sure that the documentation methodology is more complete in terms of communicating vision, policy, values and objectives for the different process areas and organisational areas.

6.2.3 Compliance with ISO 9001 Section 6: Resource Management

The PBPF supports resource management in two distinct areas:

- It makes visible who is responsible for each procedure and provides for organisational and organogram views. Each procedure is tagged or assigned to a responsible "human resource".
- It provides a hierarchical category view specifically focused on IT Systems. In other words each procedure can be tagged with the specific system or systems that support that particular activity. This information is then available in separate "IT Centric" and "System Centric" views. These views are especially useful when a system is to be replaced with another kind of system and the impact of this on operations has to be determined. This was the case in for example the transaction system HiPortfolio used in ABAM. Additional reports with a quantitative slant could probably enhance this area.

In Summary: Implied support through categorisation and linking between procedures and human and IT resources. Additional quantitative support could help with mining data and information implicit in procedures and making statistics relating to resources available.

6.2.4 Compliance with ISO 9001 Section 7: Product Realisation

Not relevant other than with the setup of new funds or clients where an hierarchy of clients and associated funds exist. In this context the well developed templating mechanism of the MediaWiki platform as implemented and extended in the PBPF serves

as a strong driver for rapid completion of support for procedural documentation required for due diligence early in the life cycle of new funds. This support was crucial in the setup of three new funds during the life cycle of the Stanlib project.

6.2.5 Compliance with ISO 9001 Section 8: Measurement Analysis and Improvement

Preventive Action: Visible through highlighting of Risks and Controls in procedures.

Support Internal Audits and Monitor and Measure Compliance: Strong support. Process and Organisation Index as well as sign-off status and review status with associated incident reports.

Corrective Action: Desired action logged against incident logged for a specific procedure.

Summary: Through the incident log extensions as well as its complementary report set the PBPF makes visible where failures have occurred in specific procedures, systems or positions. This can then be supplemented with corrective actions and due dates and followed up with the "Weekly Review Report" summarising the status of incidents and actions on a overview level.

6.2.6 General Conclusion

In broad outlines then the PBPF is compliant to key elements of the ISO 9001:2008. This compliance is good enough that it is worthwhile to establish this compliance on a more formal level both from a methodology as well as a functionality point of view. This will enhance the legitimacy and marketability of the system.

6.3 Is the PBPF a Risk compliant system?

The concept of risk especially if reviewed in the context of the Risk Standards is insufficient to be to any degree compliant with the expectations of internal or external auditors.

The PBPF can however provide support in making visible in an accessible whole the procedural controls of a company in the financial services. The logging of incidents with reference to specific processes and procedures makes the evolution of compliance to effective risk mitigation practices as encapsulated in procedures possible. The flexible

nature of the MediaWiki platform allows a company to build additional required aspects into a process or procedures without having to re-implement the base framework.

6.4 What Levels of Maturity are Supported in the PBPF?

The key benefit of the PBPF is to be found in its overlap with concepts of the so-called Web 2.0, collaborative and social web technologies. It allows the company in collaboration with both internal stakeholders and external service providers such as consultants to rapidly prototype a procedural and risk framework. Combined with the measurement tools such as bar-charts and pie-charts built as extensions into the MediaWiki platform this facilitates rapid documentation of a procedure set. The support for revisions also keeps the growth in number of pages / documents under control because a new version of a page does not lead to a new page or document. This makes it possible to constantly refine existing pages using input initially from users and subsequently from subject matter experts without having to generate messy shared folders with a plethora of different versions of the same document.

Once the core set of documents is generated however, tight control is necessary to ensure that the flexible wiki system stays within control. This is not so easy to achieve in practice, although in the experience of the author it was found that the actual consulting hours that had to be expended over the course of the year to review and refine the system of the client on a constant basis was not substantial at all.

The PBPF is not a rigorous *enterprise architecture* system. The views built into the system are essentially just a way to make the same data accessible in a format that can be understood by different stakeholders. Given the strong compliance, at least in outline, to *ISO 9000:2008* concepts, it is probably better to limit the scope and therefore cost and complexity of the system to compliance with concepts and ideas rooted in this standard. Although enterprise architecture and the domain covered by the PBPF overlap in some aspects, the PBPF is *not* an enterprise architecture platform and should not be marketed as such.

Elements such as work-flow and easy exchange of documents using email is not well supported. It does not integrate with HR systems or risk systems and therefore once a certain level of maturity is reached a company would re-implement a more sophisticated system to accommodate these requirements. This will obviously be at significantly higher implementation and time cost but can still use the intellectual assets contained within the PBPF as the basis for this process. This has happened in for example the Close Brothers project.

Chapter 7

Conclusions

The thesis has achieved on balance the objectives set out in the original research question, as stated in Chapter 2.1: [Research Question](#) on page 8.

The aspects of the research question relating to the improved sustainability of these kinds of projects has only been addressed partially.

The study has however been useful in many respects.

For example, one useful, albeit unexpected benefit was that in addition to technical perspectives the corporate sociological perspectives have to be considered as well when evaluating the value of a process framework such as the PBPF. This clarified why the system could add value even in cases where the actual procedures performed did not fully comply with the processes and procedures documented in the system. The fact that a framework did exist in a client, and that the framework was well thought through and presentable was in itself a step forward. It allowed for discussion with stakeholders, for setting up new business or for migrating from existing systems to new systems. The ability of the framework to rapidly communicate aspects of the organisation represented in it is a key feature.

When examined against sections 4 to Section 9 of the ISO 9001:2008 standard it was also surprising that the PBPF, a flexible, partly freeform, system implemented in MediaWiki and extended where required, did in fact support in broad as well as specific aspects compliance with this standard. This is a valuable result inasmuch as it will now focus future development effort. The fact that the system is mostly compliant with some gaps, means that it will be cost-effective and desirable to close those gaps by adding a few additional extensions to MediaWiki and refining some of the existing ones. If the gaps were more significant, it could on the other hand have weighed more strongly towards

the selection of another more complete system to support future projects. MediaWiki based systems can and do provide powerful solutions for procedure documentation.

By positioning the PBPF in a wider scope of work it became clear that is important to emphasize and clarify what the system is and what it is not. The domains considered included enterprise architecture, regulations and measurement frameworks such as the Balanced Scorecard and maturity profiles.

To develop all the elements of enterprise architecture, for example, is not cost effective or realistic. It will not provide the focus on training for which the PBPF was designed.

Additionally, it was found that the concept of risk is ambiguous as encountered across industries with different areas of focus. It is therefore necessary to clarify what is included in the system and what is excluded. All aspects of the solution must be consistent with this decision: This should include the high-level views of the system, the system training material and marketing material.

It is concluded from the research in this thesis that using a simple process, organisation and systems approach as used for example in the aircraft maintenance industry is valid and desirable even in the operations department of a financial-risk-centric environment such as financial asset management. *The full treatment of risk must however, emphatically be declared outside of scope of the existing development as evaluated in this document, both in terms of overview documentation and system views the appropriate references to the actual corporate risk systems must always be made.*

The second part of the Thesis as stated in Chapter 2.1: [Research Question](#) on page 8 is partly proven: It is concluded that *The ISO 9001-based business process documentation approach as implemented in a MediaWiki platform and installed for Stanlib, Close Brothers and ABAM is rational from an academic perspective, value-adding from a customer perspective.* However, sufficient work has not been done to prove the last part of the thesis, namely that these projects are: *"...sustainable for a small consulting firm engaging operations departments in financial services companies"*. Here specifically, size of a company must be considered.

Especially in support functions such as HR and finance the smaller firm will work harder to do the same work. Experience from the three projects in this document demonstrated that there is a constant balancing act between development and implementation both from a technical and from a consulting perspective. The issue of sustainability must therefore be the subject of future research.

That the issue of "rationality" is not a simple one is self-evident in retrospect. Several approaches can be followed to achieve the same end result. It is always important to

consider issues of perceived legitimacy when it comes to determining whether a particular approach is "rational" or "right". This is especially true in a strongly regulated industry such as the financial services sector. In this regard, alignment with popular standards such as the ISO 9001 series of standards as well as the ISO 31000, is desirable.

On the whole though, the research question and hypothesis, was proven, and within acceptable bounds the solution provided both from a business and technical point of view was rational for clients within the financial services industry. It is also possible to create a good business case for the value that the solution could add to to these companies.

Chapter 8

Further Research

The author found during the execution of this project that some questions had to be left unfinished, i.e. "Will the small consulting company be able to do these projects sustainably?". In other instances important questions not imagined at the start were uncovered and answered, that was never envisaged at the start, for example: "Question: Why does the client really like your system? Answer from a New Institutional perspective: It makes him/her look good."

In other instances still question which looked important initially receded in importance when balanced against the overall value of the other areas to investigate. For example, the domain of the semantic web, though important and value adding in an overall academic context, was less so in the specific context of the actual financial services industry projects done and partially ISO 9001 compliant procedure documentation system that were actually developed. The issue of management standards for risk and quality just proved to be more relevant.

If an attempt is made to answer all questions that could be asked about something as complex as developing, implementing, sustaining a software system using limited resources in a rapidly evolving industry (and doing so profitably!), then such an attempt is bound to only ever partially succeed. With all the information in hand the answer is still not always obvious. The author was surprised for example, to find from the evaluation of standards and frameworks for risk management that one defined, simple, all-applicable view of how risk should be managed was not available. The struggle of the author over half a dozen projects to incorporate risk management in the PBPF and not succeeding in all aspects, parallels the struggle of the international business community to come up with such a standardised approach.

A brief overview was given in Chapter 5: [Literature Review](#) on page 43 of what work was covered in the literature review and what additional work still had to be done. For completeness some of that discussion is also summarised here with a few additions based on the overall work done on the Thesis.

8.1 Alternative Technical Approaches

Ideally, alternative technical solutions such as a database-driven application instead of a wiki platform or the relative merits of using other Content Management systems such as SharePoint, could have been explored. This was not done to any significant level of detail and instead the focus remained in the domain of wiki solutions and its merits and drawbacks as experienced by other practitioners.

8.2 Semantic Web and Financial Ontology

One of the initial ideas was to make use of concepts from the *semantic web* to extend the MediaWiki framework as for example done in the *Semantic MediaWiki* system. It was found however that the concepts such as *ontology*, *triplets* and various nefarious languages and mark-up that had to be mastered added complexity without adding much value. The categorisation system of the MediaWiki provided for the most part enough functionality to classify pages, yet at the same time kept the problem simple enough that it remained feasible. This does not mean that this concept is without merit and the further investigation of the semantic web, especially as regards to the idea of using the idea of a *financial ontology* as the basis of standardising terms used in the various framework elements like procedures.

8.3 Conformance with Enterprise Architecture Practices

Whether the model as built into the PBPF conforms with accepted enterprise architecture practises could also form the topic of future work and to this end the exposition of what the model on which the PBPF is build is presented in Appendix B: [Model Exposition](#) on page 154. Various alternative modelling tools and standards currently used in enterprise architecture are shown in Appendix F: [Widely Used Modelling Tools and Standards](#) on page 207 and frameworks that could be considered for further evaluation of the detail of the PBPF in Appendix G: [Frameworks](#) on page 211.

8.4 Profitability, Sustainability and Optimality of Documentation Projects

One of the early objectives of the research was to create a cost model of the documentation project. The question was how to more optimally and profitably assign consulting and documentation resources to PBPF implementation projects. Ideally the model would address this question from both the consultant as well as client perspective.

The work is not complete as at this point, but the preliminary outline and results of this work is shown in Appendix D: [Quantitative Model of Cost and Profit for Business Process Documentation Project](#) on page 188. This presents the business case from a high-level perspective, such as presented by the Balanced Scorecard in Section 5.2: [The Business Case](#) on page 55.

Some aspects that could be optimized through the implementation of the system were investigated but only on a high level. A basic cost model and Microsoft Excel Simulation were created to support the work on cost models. This model confirmed what was found in terms of resource allocation in these projects. The model was, however, not rigorously tested and will have to be developed further to be useful as a decision-making tool for projects.

8.5 Documentation Project

The project of implementing the system is a large topic in itself and a lot of work was done looking at how to structure the evaluation and review of this aspect of the overall solution. This work will need additional refinement. The current summary and analysis of the work done here is shown in Appendix C: [Implementation Considerations](#) on page 172.

8.5.1 Success of MediaWiki-based Software

An important and relevant question for which the author had good data but not enough time to pursue to its conclusion was to ask the question in the context of the Don and Maclean model of IT success to what extent the system was successful. To support this kind of analysis in future relevant usage statistics are presented in Appendix A: [Usage Statistics and Project Statistics for PBPF](#) on page 135.

8.6 Most Likely Area for Future Work: ISO 9001 and ISO 31000 in financial services

An particularly relevant area for future investigation is ISO 9001 documentation in the financial services sector in contrast to or complementing management aspects flowing from risk standards such as the ISO 31000 standard.

This overlaps with the work that was done in this Thesis. The compliance of the PBPF with the ISO 9001 suite of standards is high.

This means that the projects covered in this Thesis can be evaluated specifically as examples of applying ISO 9001 principles in the financial services industry (as opposed to a purely risk-based perspective).

Aspects which are interesting is to evaluate to what extent the perspectives centred on *financial risk* that are encountered in financial service providers influence how documentation is done for financial operations. This can be contrasted with the culture encountered in other industries such as the safety-centred industries such as utilities or airline maintenance. Based on the work that was done, the author is convinced that the typical service provider professional, Chartered Accountant for financial services vs Engineer for Safety Critical Industries, affects which approach will dominate. Therefore opportunities, self-evident to a professional in one industry can be invisible to someone approaching the same environment from a different perspective. The New Institutional perspective, or other corporate sociological perspectives, would be particularly relevant here.

Appendix A

Usage Statistics and Project Statistics for PBPF

The success of MediaWiki-based software can be evaluated using the *DeLone and McLean IS Success Model* as presented in [Delone \(2003\)](#) and [DeLone & McLean \(1992\)](#).

An updated version of this model was proposed by [Urbach & Müller \(2012\)](#).

Although the MediaWiki software worked as intended, several issues such as too much flexibility and user-resistance to the using the mark-up language were also encountered. [Holtzblatt et al. \(2010\)](#) elaborates on these and other factors, while [Ghapanchi et al. \(2011\)](#) discusses a taxonomy for the success of open source projects that can also structure the evaluation of the success of the PBPF projects. MediaWiki is an example of open source software.

The author compiled the project statistics and usage statistics so that DeLone and McLean IS Success Model can be applied to the measurement of the success of the implementations of the MediaWiki-based PBPF.¹ These statistics can also be used to compare the Plumb Line projects with other similar MediaWiki-based projects.

¹As discussed in Section 8.5.1: [Success of MediaWiki-based Software](#) on page 133

A.1 Outline of Data Presented

This Appendix consists of the following sections:

- *List of all Plumb Line MediaWiki databases*: This is all the MediaWiki databases created by Plumb Line. The detailed statistics are created for a subset of three of these databases relating specifically to the projects discussed in this thesis.
- *List of MediaWiki database tables*: This lists all the tables that a MediaWiki implementation consists of, and highlight specifically which tables can be used to create the usage statistics presented in this Appendix. Other MediaWiki projects can use these tables to compare their statistics to the set presented here.
- *Statistics*: SQL queries were created to extract comparative statistics from the three selected databases. These queries are presented here so that a similar analysis can be made for other MediaWiki implementations. The results of those queries are used to create the usage and installation statistics under the following headings:
 - Overall Site Statistics for the three projects:
 - * Number of pages
 - * Number of external files and images ("images")
 - * Number of page views
 - * Number of page edits
 - * Number of signed-of pages
 - * Number of users
 - * Number of admin users
 - Edits per Year
 - Edits per Month
 - Usage Patterns per User
 - Statistics for Number of Pages, Size of Pages, Type of Pages
 - Number of Pages Per Namespace
 - Analysis of Raw List of Size of Pages by Microsoft Excel Pivot Table

List of All Plumb Line MediaWiki Databases

This shows the databases for all of the Wiki Implementations hosted by Plumb Line. The three databases highlighted in Blue are covered by the analysis in this thesis document.

Database
01absadv2
02bankwdb
03closedb
04testdb
05frameworkdb
06developdb
07omfcidb
08libertydb
09lretaildb
10maitlanddb
11pframeworkdb
12ppmodb
13stanlibdb
14sretaildb
15absadb
16closetestdb
17demosite
18omfcidb2
19plumblinedb
20demodb
21slowdb

List of MediaWiki Database Tables

List of tables used for this analysis. Tables highlighted in **Blue** are the tables providing usage and editing statistics. Tables in **Orange** are tables that are added to extend Wiki functionality.

| Tables_in_01absadv2 |	|
| archive |	|
| category |	|
| categorylinks |	|
| externallinks |	|
| filearchive |	|
| hitcounter |	|
| image |	|
| imagelinks |	|
| interwiki |	|
| ipblocks |	|
| job |	|
| langlinks |	|
| logging |	|
| math |	|
| objectcache |	|
| oldimage |	|
| page |	|
| page_props |	|
| page_restrictions |	|
| pagelinks |	|
| protected_titles |	|
| querycache |	|
| querycache_info |	|
| querycachetwo |	|
| recentchanges |	|

| redirect	|
| revision	|
| searchindex	|
| site_stats	|
| templatelinks	|
| text	|
| trackbacks	|
| transcachecache	|
| updatelog	|
| user	|
| user_groups	|
| user_newtalk	|
| watchlist	|
| plclient	|
| plconfig	|
| plcontrol	|
| plflowchart	|
| plflowchartblock	|
| plfund	|
| plincident	|
| plprocedure	|
| plprocedurecontrol	|
| plprocedurerisk	|
| plprocess	|
| plprocesscontrol	|
| plprocessrisk	|
| plrisk	|
| plriskcontrol	|
| pluser	|
+-----+	

Statistics for Three Projects

Site Statistics

SQL Query for Site Statistics

```
select "STANLIB" as client, ss_row_id, ss_total_views,
ss_total_edits , ss_good_articles ,ss_total_pages , ss_users ,
ss_admins , ss_images  from 13stanlibdb.site_stats

UNION

select "CLOSE" as client, ss_row_id, ss_total_views,
ss_total_edits , ss_good_articles ,ss_total_pages , ss_users ,
ss_admins , ss_images from 03closedb.site_stats

UNION

select "ABSA" as client, ss_row_id, ss_total_views,
ss_total_edits , ss_good_articles ,ss_total_pages , ss_users ,
ss_admins , ss_images  from 01absadbv2.site_stats

;
```

Site Statistics

client	ss_row_id	ss_total_views	ss_total_edits	ss_good_articles	ss_total_pages	ss_users	ss_admins	ss_images
ABSA	1	20281	11890	380	1200	23	1	138
STANLIB	1	14526	7634	557	1276	60	2	471
CLOSE	1	24536	6354	582	2875	86	2	1779

Edits in Time Period

SQL Query for Edits Per Year

```

select "STANLIB" as client, left(rev_timestamp,4) as
Year,count(*) as Edits from 13stanlibdb.revision where
rev_timestamp>"2002" group by Year

UNION

select "CLOSE" as client, left(rev_timestamp,4) as
Year,count(*) as Edits from 03closedb.revision where
rev_timestamp>"2002" group by Year

UNION

select "ABSA" as client, left(rev_timestamp,4) as
Year,count(*) as Edits from 01absadbv2.revision where
rev_timestamp>"2002" group by Year

;

```

Edits per Year

client	Year	Edits
STANLIB	2007	4201
STANLIB	2008	2200
STANLIB	2009	839
CLOSE	2007	86
CLOSE	2008	4622
CLOSE	2009	2232
CLOSE	2010	494
CLOSE	2011	8
ABSA	2008	3614
ABSA	2009	795
ABSA	2010	208
ABSA	2011	1

SQL Query for Edits Per Year

```

select "STANLIB" as client, left(rev_timestamp,6) as
YearAndMonth,count(*) as Edits from 13stanlibdb.revision where
rev_timestamp>"2002" group by YearAndMonth

UNION

select "CLOSE" as client, left(rev_timestamp,6) as
YearAndMonth,count(*) as Edits from 03closedb.revision where
rev_timestamp>"2002" group by YearAndMonth

UNION

select "ABSA" as client, left(rev_timestamp,6) as
YearAndMonth,count(*) as Edits from 01absadbv2.revision where
rev_timestamp>"2002" group by YearAndMonth

;

```

Edits per Month

Client	YearAndMonth	Edits
STANLIB	200701	3
STANLIB	200702	1539
STANLIB	200703	1717
STANLIB	200704	552
STANLIB	200705	82
STANLIB	200706	104
STANLIB	200707	46
STANLIB	200709	1
STANLIB	200710	157
STANLIB	200801	14
STANLIB	200802	673
STANLIB	200803	85
STANLIB	200804	17
STANLIB	200806	286
STANLIB	200807	98
STANLIB	200808	198

| STANLIB	| 200809	| 604	|
| STANLIB	| 200810	| 35	|
| STANLIB	| 200811	| 16	|
| STANLIB	| 200812	| 174	|
| STANLIB	| 200901	| 386	|
| STANLIB	| 200902	| 309	|
| STANLIB	| 200903	| 143	|
| STANLIB	| 200911	| 1	|
| CLOSE	| 200712	| 86	|
| CLOSE	| 200802	| 12	|
| CLOSE	| 200803	| 485	|
| CLOSE	| 200804	| 2010	|
| CLOSE	| 200805	| 1782	|
| CLOSE	| 200806	| 140	|
| CLOSE	| 200807	| 9	|
| CLOSE	| 200808	| 11	|
| CLOSE	| 200809	| 168	|
| CLOSE	| 200810	| 4	|
| CLOSE	| 200812	| 1	|
| CLOSE	| 200901	| 1	|
| CLOSE	| 200903	| 6	|
| CLOSE	| 200904	| 35	|
| CLOSE	| 200905	| 60	|
| CLOSE	| 200906	| 330	|
| CLOSE	| 200907	| 3	|
| CLOSE	| 200909	| 219	|
| CLOSE	| 200910	| 782	|
| CLOSE	| 200911	| 796	|
| CLOSE	| 201002	| 14	|
| CLOSE	| 201003	| 63	|
| CLOSE	| 201004	| 44	|

| CLOSE	| 201005	| 41	|
| CLOSE	| 201006	| 90	|
| CLOSE	| 201007	| 47	|
| CLOSE	| 201008	| 58	|
| CLOSE	| 201009	| 50	|
| CLOSE	| 201010	| 58	|
| CLOSE	| 201011	| 20	|
| CLOSE	| 201012	| 9	|
| CLOSE	| 201101	| 8	|
| ABSA	| 200802	| 12	|
| ABSA	| 200803	| 40	|
| ABSA	| 200804	| 40	|
| ABSA	| 200805	| 77	|
| ABSA	| 200806	| 383	|
| ABSA	| 200807	| 378	|
| ABSA	| 200808	| 370	|
| ABSA	| 200809	| 290	|
| ABSA	| 200810	| 1195	|
| ABSA	| 200811	| 769	|
| ABSA	| 200812	| 60	|
| ABSA	| 200901	| 439	|
| ABSA	| 200902	| 207	|
| ABSA	| 200903	| 11	|
| ABSA	| 200905	| 23	|
| ABSA	| 200906	| 19	|
| ABSA	| 200909	| 15	|
| ABSA	| 200910	| 49	|
| ABSA	| 200911	| 1	|
| ABSA	| 200912	| 31	|
| ABSA	| 201006	| 15	|
| ABSA	| 201008	| 12	|

| ABSA	| 201009	| 66	|
| ABSA	| 201010	| 112	|
| ABSA	| 201011	| 3	|
| ABSA	| 201103	| 1	|

Usage Patterns per User

SQL Query for Usage Patterns per User

Usage Patterns per User

Client	User ID	Year	Edits
STANLIB	0	2007	1501
STANLIB	1	2007	2600
STANLIB	2	2007	17
STANLIB	3	2007	6
STANLIB	5	2007	77
STANLIB	0	2008	268
STANLIB	1	2008	1892
STANLIB	6	2008	20
STANLIB	24	2008	15
STANLIB	51	2008	1
STANLIB	59	2008	4
STANLIB	1	2009	838
STANLIB	53	2009	1
CLOSE	1	2007	86
CLOSE	0	2008	1
CLOSE	1	2008	4410
CLOSE	14	2008	9
CLOSE	18	2008	3
CLOSE	30	2008	194
CLOSE	34	2008	1
CLOSE	36	2008	4
CLOSE	1	2009	2098
CLOSE	30	2009	91
CLOSE	31	2009	2
CLOSE	42	2009	41

| CLOSE	|	1	| 2010	|	51	|
| CLOSE	|	9	| 2010	|	15	|
| CLOSE	|	16	| 2010	|	85	|
| CLOSE	|	33	| 2010	|	86	|
| CLOSE	|	47	| 2010	|	44	|
| CLOSE	|	79	| 2010	|	99	|
| CLOSE	|	85	| 2010	|	42	|
| CLOSE	|	86	| 2010	|	72	|
| CLOSE	|	85	| 2011	|	8	|
| ABSA	|	0	| 2008	|	185	|
| ABSA	|	1	| 2008	|	3323	|
| ABSA	|	5	| 2008	|	14	|
| ABSA	|	6	| 2008	|	10	|
| ABSA	|	9	| 2008	|	9	|
| ABSA	|	10	| 2008	|	22	|
| ABSA	|	11	| 2008	|	11	|
| ABSA	|	12	| 2008	|	5	|
| ABSA	|	13	| 2008	|	2	|
| ABSA	|	15	| 2008	|	2	|
| ABSA	|	17	| 2008	|	1	|
| ABSA	|	18	| 2008	|	19	|
| ABSA	|	19	| 2008	|	10	|
| ABSA	|	20	| 2008	|	1	|
| ABSA	|	1	| 2009	|	92	|
| ABSA	|	4	| 2009	|	15	|
| ABSA	|	5	| 2009	|	38	|
| ABSA	|	6	| 2009	|	139	|
| ABSA	|	7	| 2009	|	260	|
| ABSA	|	9	| 2009	|	73	|
| ABSA	|	10	| 2009	|	18	|
| ABSA	|	12	| 2009	|	142	|

| ABSA	|	15	| 2009	|	18	|
| ABSA	|	1	| 2010	|	192	|
| ABSA	|	6	| 2010	|	15	|
| ABSA	|	12	| 2010	|	1	|
| ABSA	|	1	| 2011	|	1	|

Statistics for Number of Pages, Size of Pages, Type of Pages

SQL Query for Number of Pages Per Namespace

```

select "STANLIB" as client,
page_namespace,tesis.namespaces.name as
Namespace,count(page_id) from
tesis.namespaces,13stanlibdb.page where page_namespace=ns_id
group by page_namespace

UNION

select "CLOSE" as client, page_namespace,tesis.namespaces.name
as Namespace,count(page_id) from
tesis.namespaces,03closedb.page where page_namespace=ns_id
group by page_namespace

UNION

select "ABSA" as client, page_namespace,tesis.namespaces.name
as Namespace,count(page_id) from
tesis.namespaces,01absadbv2.page where page_namespace=ns_id
group by page_namespace

;

```

Number of Pages Per Namespace

client	page_namespace	Namespace	count(page_id)
STANLIB	0	Main	595
STANLIB	1	Talk	7
STANLIB	2	User	58
STANLIB	3	User talk	17
STANLIB	4	Wikipedia	4
STANLIB	5	Wikipedia talk	1
STANLIB	6	File	471
STANLIB	8	MediaWiki	9
STANLIB	10	Template	57
STANLIB	12	Help	1
STANLIB	14	Category	56
CLOSE	0	Main	815
CLOSE	1	Talk	39

| CLOSE	|	2	| User	|	68	|
| CLOSE	|	3	| User talk	|	1	|
| CLOSE	|	4	| Wikipedia	|	3	|
| CLOSE	|	6	| File	|	1779	|
| CLOSE	|	8	| MediaWiki	|	17	|
| CLOSE	|	10	| Template	|	44	|
| CLOSE	|	14	| Category	|	17	|
| CLOSE	|	102	| Risk	|	87	|
| CLOSE	|	104	| Job	|	7	|
| ABSA	|	0	| Main	|	420	|
| ABSA	|	2	| User	|	24	|
| ABSA	|	4	| Wikipedia	|	2	|
| ABSA	|	6	| File	|	138	|
| ABSA	|	8	| MediaWiki	|	34	|
| ABSA	|	10	| Template	|	56	|
| ABSA	|	14	| Category	|	46	|
| ABSA	|	900	| Data	|	480	|
+-----+-----+-----+-----+						

Query for Size of Pages - Raw List

```
select "STANLIB" as client,page_id,name as
Namespace,length(old_text) as PageSize from
13stanlibdb.page,13stanlibdb.revision,13stanlibdb.text,tesis.namespaces where page_latest=rev_id and rev_text_id=old_id and
tesis.namespaces.ns_id=page_namespace

UNION

select "CLOSE" as client,page_id,name as
Namespace,length(old_text) as PageSize from
03closedb.page,03closedb.revision,03closedb.text,tesis.namespaces where page_latest=rev_id and rev_text_id=old_id and
tesis.namespaces.ns_id=page_namespace

UNION

select "ABSA" as client,page_id,name as
Namespace,length(old_text) as PageSize from
01absadbv2.page,01absadbv2.revision,01absadbv2.text,tesis.namespaces where page_latest=rev_id and rev_text_id=old_id and
tesis.namespaces.ns_id=page_namespace;
```

Analysis of Raw List of Size of Pages by Microsoft Excel Pivot Table

Row Labels	Average of PageSize	StdDev of PageSize
STANLIB	880.9	2246.4
Category	36.3	40.5
File	11.4	24.7
Help	15.0	-
Main	1797.1	3011.0
MediaWiki	47.4	47.1
Talk	1109.3	2791.7
Template	339.9	770.4
User	27.2	25.9
User talk	1049.0	431.5
Wikipedia	45.5	40.9
Wikipedia talk	258.0	-
CLOSE	595.5	2193.0
Category	49.1	30.9
File	23.4	28.3
Job	3413.9	1660.6
Main	1880.4	3784.5
MediaWiki	59.2	92.1
Risk	255.6	86.5
Talk	1279.2	677.3
Template	686.7	1525.2
User	160.1	111.6
User talk	66.0	-
Wikipedia	12.7	0.6
ABSA	593.8	1609.0
Category	85.5	95.5
Data	170.8	809.7
File	41.9	32.5
Main	1409.9	2366.0
MediaWiki	38.4	66.0
Template	284.8	335.5
User	474.5	240.4
Wikipedia	15.0	7.1
Grand Total	663.1	2093.2

Appendix B

Model Exposition

B.1 Overview

B.1.1 Objective

Reduce the operational risk of a financial services organisation by diligently ensuring on an ongoing basis that everyone competently knows why, what, when, by whom and how things are done.

B.1.2 Summary of Model

TABLE B.1: Process Framework: Model Summary

Model View and Elements	Purpose
Organisation View Elements <ul style="list-style-type: none"> • People index • Teams • Organogram • Contact list • Organisation manual 	Define the organisation
Continued on next page	

Table B.1 Continued from previous page

Model View and Elements	Purpose
<p>Process View Elements</p> <ul style="list-style-type: none"> • Process index (what) • Procedure document (how) • User's procedures (whom) • Process timeline (when) • System (with what) • Process flowchart (dependencies) 	<p>Define the work</p> <ul style="list-style-type: none"> • Identify what activities a financial services organisation does. • Document how and when and by whom these activities gets done and with what system. • Show dependencies between activities.
<p>Risk View Elements</p> <ul style="list-style-type: none"> • Risk index • Control index • Incidents • SAS 70 <ul style="list-style-type: none"> – Link between process and risk – Link between process and control – Link between control and owner – Link between risk and owner 	<p>Identify what can go wrong, what did go wrong and how to prevent it, i.e. "why" thing are done and who is responsible.</p> <ul style="list-style-type: none"> • Identify the operational risks and what controls are in place to mitigate them, and how these controls are done. • Track incidents and refine process definitions, understanding and competence. Update training status. • Summarise risk and control status of processes in the organisation (SAS 70)
<p>Training Status</p>	<p>Ensure everyone is competent</p> <ul style="list-style-type: none"> • Make sure people know what, why, how and when to do things. • Train on processes, risks and controls • Train on industry
Continued on next page	

Table B.1 Continued from previous page

Model View and Elements	Purpose
Review View Elements <ul style="list-style-type: none"> • Process sign-off status • Incident log • SAS 70 • Training status 	Be constantly diligent <ul style="list-style-type: none"> • Regularly review organisation and process definitions. • Review risk, controls and incidents. • Review training status.
Concluded	

B.2 Concept of Views

The idea of views is to reduce complexity. To reduce the documentation and modelling process to a set of activities that are clearly bounded. It refines the scope and focus of the modelling activities to a particular aspect.

For example, when considering procedures to document one view could be to take the industry standard processes and start from there. This would lead to an analysis where a standard process hierarchy is refined. This refined, yet finite list of process will then form the basis of defining what processes and procedures are created for the company.

The procedures can also be considered from the perspective from the people actually employed at the company at a particular point in time. In normal operation some tasks are performed periodically, for example, daily, weekly, bi-weekly, monthly, quarterly and annually. Other tasks may only be performed on an ad-hoc basis. Yet once again the list of tasks will be finite - constrained by what people identify as part of their responsibility.

Process and organisation perspectives are intertwined. The procedures identified by starting from the process perspective should in principle be the same as the procedures identified from looking at the individual desks. The two views can therefore serve as a check on each other.

The diagram above presents an example of an arrangement of different views that could be used as the basis for analysing the processes and procedures of an organisation.

B.3 Process View

B.3.1 Description

The process modeler defines and maintains the core business processes that drives the business. It maintains a hierarchical model based on IDEF0 modelling techniques defining activities at increasing levels of details.

B.3.2 Core Concepts

The process modeler revolves around the maintenance or generation of the following core concepts:

- Process / activity
- Input, outputs
- Controls
- Mechanisms
- Risks
- Time categories and deadlines
- Procedure document
- Sign-off and sign-off status
- Process questions
- Incident log, Incident reports and Task manager
- SAS 70 report
- Process templates

B.3.3 Process / Activity

An organisation in the financial as with any other organisation is built around the execution of a series of related activities. Every industry is characterised by a set of core processes.

Definition of Process from ISO 9001:2008:

An activity or set of activities using resources, and managed in order to enable the transformation of inputs into outputs, can be considered as a process. The output from one process can form the input to the next. [ISO/IEC \(2008\)](#)

The process modeler must document the processes and activities of a business and ultimately allow comparison, alignment and optimisation.

Whether a particular element is a "process" or "activity" is largely a matter of level of detail and convention. Breaking up the processes and activities into too much detail can be as counter-productive as oversimplifying it. The process modeler must allow flexibility in documenting an organisation while at the same time keeping the documentation simple, relevant, maintainable and useful.

A general rule of thumb here is that the following levels of documentation in ascending order of detail could be useful:

- Organisation (e.g. ABAM)
- Sector (e.g. Asset management)
- Process Area (e.g. Client services and administration)
- Process (e.g. Client reporting)
- Sub-process (e.g. Daily reporting). This and the previous three levels are roughly equivalent to "process".
- Activity (e.g. Print batch report, roughly equivalent to "procedure")
- Step (Individual procedural "step" within the activity)

Depending on what level of detail or what views are associated with a particular process Node, different types of information will be available for user input. The views or information associated with each level of detail can be configured using the configuration console.

The following information can be defined for a process:

- id
- number
- parent

- text
- responsibility and ownership
- process owner (responsible for sign-off)
- reviewer (responsible for review)
- responsibility for execution
- backup for execution
- Generic/Specific Indicator (for use in templates)

B.3.4 Inputs and Outputs

Every process or activity will convert inputs into outputs. In the context of the financial services industry a defined set of concrete inputs and outputs will be manipulated and generated. To structure the definition of inputs and outputs these items can be broken up into forms, reports, documents, files and so forth.

The summary or process objective of a process must indicate in brief what a process does in terms of this conversion process from input to outputs.

The process modeler therefore provides the following:

- Identify input/output
- Identify previous/next process
- Classify Input/output as form/report/document/etc.
- Specify the process objectives

B.3.5 Mechanisms

Mechanisms are the resources consumed in the process. In the specific context of the financial service models this will be the Personnel and the Systems involved in a particular activity.

The allocation of mechanisms to processes makes different Views of the process model possible, i.e. Organisational focus, systems focus, etc.

Quantitative aspects, i.e. the quantity of time or resources used of a specific mechanism could also be maintained.

The following information can therefore be maintained as part of the specification of the mechanism:

- id
- number
- name
- type (i.e. Position/ system)
- position id / system id
- Optional measurements

B.3.6 Risks and Controls

The financial services industry is focused on risk and the management of risk. Therefore the subject of risk and risk mitigation(i.e. controls) is important.

Although from the generic modelling approach as encapsulated in the IDEF0 standard every process can have one or more controls, controls in this context will be far more explicitly identified and contextualised in terms of the broader risk policy and management of the company. The process modeler therefore not only provides for the identification of controls but also for integrating the controls identified with the overall risk and controls framework of the company.

Every process could be measured and controlled regarding the efficiency in terms of time and other resources utilised: i.e. when the process takes place, how long it takes on average and target times for delivery of outputs.

The identification of deadlines and standard times are therefore an essential part of the control identification process of a process. It is just a specific type of control.

The following information is important when it comes to maintenance of controls and risks

RISKS

- id
- number
- name

- risk group - when a risk is a detailed risk that forms part of a larger, generic risk identified for the company, it can be associated with this generic risk for reporting purposes.
- risk owner
- likelihood
- impact
- rating (product of likelihood and impact)
- notes

{emphCONTROLS

- id
- number
- name
- risk (many to many) - i.e. the same control can mitigate more than one risk.
- control owner
- notes

B.3.7 Time Categories and Deadlines

A critical Constraint for the execution of procedures in the financial services industry is the exact frequency and deadlines for completion and initiation of activities.

The time categories and deadlines tend to fall into the following:

- Daily
- Weekly
- Monthly
- Quarterly
- Annual

Most procedures are classified as belonging to one of these intervals. In addition to the interval a deadline can be assigned to an activity, for example 09:00 AM, 12:00 AM, 05:00 PM.

These time categories and deadlines are used to structure the production pipeline and drives the task calendar, which is an additional view of a company's activities.

B.3.8 Procedure Document

The procedure document is the lowest level of detail in the process model. Where most of the other aspects of defining the process has to do with what is done in a company, the procedure document also specifies in detail how it is done.

It is in this document where one would expect to see detailed screen-prints and keystrokes.

To facilitate the documentation of controls a procedure document itself can be broken up into discrete Steps. Where the allocation of controls to a procedure or activity will specify what controls are in place, tagging an individual procedural step with the control implemented by that particular step. This tagging of procedural steps are important to deliver the lowest level of detail of the SAS 70 report of risks and controls that is the most important summary product of the process model.

The process modeler provides for full version tracking and history on a particular procedural document.

Additional information that can be associated with a procedure document is categories. This is based on the MediaWiki concept of categories to provide for different views and search criteria, i.e. effectively different views of the same material.

In principle every node of a process model can be associated with a procedure document. Different types of documents can therefore be created dependent on the nature of the node:

- Process overview
- Procedure document

B.3.9 Sign-off and Sign-off Status

Depending on the review policy every process will have a sign-off status and associated deadlines. The review policy are configured using the *configuration console*.

The process owner should be able to change the sign-off status by signing off the document. The process reviewer should be able to change the sign-off status by reviewing the document.

B.3.10 Process Questions

An important output of the process framework is that the staff of the organisation should ultimately be aware of and trained on the documentation created. The process questions module allows for the creation of one or more questions associated with a particular process node. These questions feed into the examination module that links to the organisational module to allow for the examination of personnel on the process material.

Each question can be associated with a process, control or risk to make explicit how to test detailed knowledge of these aspects in order to minimize overall risk for the company.

B.3.11 Incident Log, Incident Reports and Task Manager

Part of the process of managing process risk is the provision of an orderly and systematic way to record and resolve process related incidents.

The following information can be captured for an incident:

- id
- number
- name
- incident category
- process
- risk
- date logged
- target date
- resolution
- responsibility

- area
- type: incident/action

The incident report provides a summary of the status of open and closed incidents as it relates to the process model.

The task manager is a specialized console that allows for the definition of open issues and tasks and for the planning and control of those issues and task. It provides for both tasks related directly to process (in which case it overlaps with and is effectively the same as the incident log) as well as other tasks which are identified from time to time as part of the operations process of a company.

For detail of what information can be captured against the task see the previous section.

The difference between the incident log and the task manager is that the task manager is focused on the regular operational management meetings and actions and tasks flowing from that while the incident log is the primary vehicle for logging incidents relating the operational activities of the business to serve as input into the risk and control perspective of the operation. Naturally incidents which occurred should also be reviewed at the regular meetings and therefore will also form part this perspective.

B.3.12 SAS 70 Report

The SAS 70 report is a summary document that provides a snapshot view of the process and controls on the processes of a company. It will also provide an indication of any open incidents logged against a process and what actions have been taken.

It is structured from the top down making use firstly of the process Hierarchy and secondly of the detailed control hooks in the Procedure documents.

B.3.13 Process Templates

To facilitate the setup and management of complex situations where several funds and clients are, for example, managed in the same company but rework and duplication of process and procedure documents should be kept to a minimum the concept of process templates are provided for in the process modeler. A process template is a process model that provides a generic framework that can be customised within the context of another view, i.e. fund, client or some other hierarchy.

The key point is that when another hierarchy is used as the primary view then the core process node that should be used as template is to be specified for each node in that hierarchy. When a process model is used as a template it also provides for a generic/specific indicator that specifies whether the Procedural detail for a particular node can be different depending on what fund/client/other context the process model is created for.

B.4 Organisation View

- Team List - Spreadsheet-like data grid
- Team Form - Form with Fields with detailed fields for team.
- Organisation Tree - TreeView, can drill down from teams downwards to people.
- Team Page - A wiki page that can be used to contain additional overview information.
- Organogram - Link from team row/form/page to external document containing organogram. Image can also be directly embedded into wiki page and made clickable using the ImageMap MediaWiki extension.
- People index - Spreadsheet-like data grid of users.
- User Form - Form with fields with detailed fields for user.
- User Page - A wiki page that can be used to contain additional overview information.
- Contact List - Documented as part of process documentation. If required as a separate list, link to SharePoint or Excel.
- Organisation Manual - ISO 9000-like description of organisation, listing teams, people and responsibilities. Using User Procedures from process responsibility mapping optionally generate detailed procedure manual. These two manuals are programmatically generated from all of the above information into a PDF document.

B.5 Systems View

The IT Department in financial services provide critical functions. The financial services rely on record keeping and manipulation of information and custodianship over financial information.

Therefore the systems on which financial services institutions conduct their day to day operations are critical.

Controls over processes manifest directly in the form of user rights on a system, supervisor rights and through transaction screen on the system. Even manual controls are facilitated through reports that come out of the system or precede a capture step on the system.

The concept of an IT System can be drawn quite widely and can extend to office automation systems such as email and also shared external system such as the SWIFT messaging system.

B.5.1 List of current financial services Systems

These systems will provide a vast number of functions relating to the financial institutions it is designed to support. Not all of the functionality will in general be used and there would be aspects relating to the setup and maintenance of the system that do not directly relate to financial processes. The point is that these systems come with comprehensive user, technical and training manuals that would be pointless to duplicate in in-house developed procedures. It is however important from a completeness point of view to identify such as material and ideally link to it from within the process framework.

Additionally, IT procedures form part of a consistent, self-contained set of procedures that are the same across all industries. Functions such as "backups" and "user access", for example, are universal.

The systems view is to provide a IT-centric entry point into the process framework and catalog the systems and related documents as well as the IT-centric procedures designed to support these systems.

Because of the importance of the IT systems and the integrity of the IT systems it is important to be able to clearly and separately manage the risks associated with this infrastructure.

B.6 Training & Reference Model View

The financial services industry is one of the most regulated industries. It is incredibly difficult, for example, to start a bank. The services that can be provided by various parties in this industry are strongly governed and controlled by legislation. The roles of

parties like “custodians” and “trustees” and “financial advisors” are defined and limited in law.

Therefore, for large parts of the industry at least, processes will tend to follow the same patterns. As countries like the United States and Japan, the countries in Europe and emerging powerful states like Russia, China, Brazil, India are all part of the international movement and exchange of capital it means that the legislation enacted in one country will not be significantly different from that in another country, if only from the requirement of interoperability of capital markets.

Similar problems lead to similar solutions. This is true, first within an industry in a particular country and then also more generally for the same industry when examined across different countries.

A simplifying and useful requirement when looking at processes and activities within a company is therefore to contextualise it within the larger domain of accepted, best practices. That is why, providing a standardised view such as that provided by suitably scoped generic training material can be useful. To understand what can be done better some form of benchmarking, internally or externally can be done, especially if specific measures of performance can be compared for processes between company to company in the same industry.

B.7 Risk View

The primary functions of the risk view in this model is threefold:

1. Tie the documentation process to corporate decision-making processes and imperatives.
2. Define an outer boundary for the overall problem of documentation.
3. Tie the documentation process to corporate decision-making processes and imperatives

The reality is that for the most part that process documentation is hard, repetitive work. The scope might be defined in initial workshops and the high-level process flows and organisation charts are defined in sessions where the project assumes an ‘executive’ feel. For the most part the project would consist of repetitive interviews and interruption of people’s work and refinement of bone-tired descriptions of the menial day to day

activities that make up the operation of the corporation. It is not always clear to senior management why the details matter.

The risk view provides a singular opportunity to tie the detail of what is done at the coal face bottom to the risks and mitigating controls considered by the gods in the corporate sky.

The SAS 70 study documents the controls that are in place in a financial service provider. This study can be performed on one of two levels: The first level is where the risks and associated controls are identified in the various processes of the organisation. A second more detailed level is where the detail behind these controls are exposed and the organisation actually proves that the controls are mitigated at this level.

This is an expensive exercise. In 2005 for an asset management organisation of about 50 employees with about 300-400 procedures this would amount to 1.5 million Rand for a study on the first level of detail.

Although the amounts involved in these studies can be considerable it is a necessity of doing businesses in these industries. Clients of the company can insist that a financial service provider undertake a SAS 70 study. The lack of proper controls can and have led to millions and in some cases billions of Rand of damage. In most cases because of the oversight of a small procedural control such as hedging foreign exchange in other cases such as the famous case of a trader such as Nick Leeson, this has led to substantial losses.

B.8 The important components of the risk view

B.8.1 Risk Index

The same risk can be repeated in different processes, for example, there could be a risk of missing a trading deadline – this risk will exist in virtually all securities that are traded. A systematic view of risk should show risks relate to lower levels of procedural detail. This is the first component of the risk view: Identification of risk.

B.8.2 Risk Classification

Secondly these risks will have to be classified for their severity and also for their likelihood. While it is obviously possible that a terrorist attack may happen on the World Trade Centers in New York, this most certainly did not feature in the risk analysis of

the time. The severity was however extreme. In some cases the backup servers was housed in the opposite tower and all data was lost when both towers were catastrophically lost. Other risks, while the general value, might be small are more likely to occur. For example, incorrect data entry. It is clear then that when looking at how important risks are for the day to day operation of a financial services department both severity and likelihood needs to be considered. The assumptions that are made regarding these two attributes will be tested over time and that is why an incident report, i.e. a log of risk related incidents and preferably the impact, whether financial, reputational or other needs to be maintained. This will allow the financial services operation to refine their risk model over time.

B.8.3 Controls

Each risk, also depending on likelihood and severity, will necessitate steps to reduce the likelihood that they will happen or to mitigate the effects of the risk. These steps and procedure components are controls and for a complete view of risk it is important that risk and control are linked. The same controls can be reused across the organisation. For example, division of responsibility, control report, double signature and these kinds of actions could be used in a variety of circumstances. A central view of especially controls are critical if consistency is to be achieved across the organisation and if best practices are to be developed and implemented. The complexity of reams and reams of process documentation that has to be reviewed in short periods of time means that lacking controls are not visible until the controls failed, sometimes dramatically and expensively.

The most important function of process documentation is to facilitate risk mitigation through the enactment of process controls throughout the organisation.

B.8.4 Control Owner

To ensure that controls are reviewed and updated on a regular basis each control must be owned by someone in the organisation. The regular review, feedback, correction and update of controls are the responsibility of these control owners.

B.8.5 Risk Measures and Risk Incidents

Ideally risk must be measurable. An organisation must have a handle on how important specific risks are and how frequently these risks actually manifest themselves in concrete incidents and losses.

B.9 Risk View As Constraining Boundary

B.9.1 Not all risks are operational risk

The concepts of control and procedure are strongly related when it comes to operational risks. An operational risk can be mitigated by an operational control documented as an operational procedure. To this extent it can then be argued that risks and controls are an extension of the process modelling exercise. It is important to consider however that not all risks are Operational Risks. The domain of all risks includes for example Strategic Risks, Human Resources risk, Environmental risk that are contained in corporate strategy documents, human resources policy and environmental policy. A particular class of corporate risk might not even have a direct control procedure. It can be seen that the domain of risk is wider than that of process and operation. In this way the risk view can be used to define an outer boundary for the overall problem of documentation. This is then also a view to ensure that the documentation activities of a part of the organisation (e.g. Operations) are tied into the overall strategic framework for the rest of the company.

B.10 Review And Sign-off View

Business evolve and change constantly, also in the financial services industry. A problem with expensive documentation projects is that of the continued relevance of the documentation process. In manufacturing these problems were addressed with the ISO 9000 documentation standards for which a company has to subject itself to frequent compliance audit. The whole approach to documentation is also strongly weighted towards making sure that on a regular basis all of the process documentation that underlies its ISO 9000 certification is reviewed and updated. Ownership is a core component of this approach. A close equivalent to this kind of "certification" is that of the SAS 70 audit. At least to level 1, preferably to level 2. this kind of study is the ISO 9000 of the financial sector. The two components: Ownership and Review is the foundational pillars of the Review and Sign-off view. Every procedure can go through a life cycle of three to four different states as it relates to its documentation:

- Stage 1: Identify: "What" to do, by "When" to do it and "Who" should do it.
- Stage 2: Document: "How", i.e. detail of procedure.
- Stage 3: Reviewed and Signed Off. The owner of the procedure in the organisation assumes responsibility of the procedure document. It is now released for use.

- Stage 4: Communicate and Train. In the ideal case this fourth stage will also exist: When changes are made to a procedure, or even when it is newly created it is important that the ultimate users of the document is trained in the procedure or at least informed that it exists or that an updated version of it now exists. Without this stage a document will languish in a filing cabinet already spilling reams and reams of other ignored documents, reports and rusty arch-lever files full of papers that only the previous generation of team members know about.

The purpose of the Review and Sign-off view is to make visible at the highest level the current state of the documentation, review, Sign-off and training process at an organisation or part of an organisation. This view will consist of a set of complementary sub views. From the one perspective the status could be viewed as a function of the process hierarchy that is currently considered, i.e. Sign-off by process. From another perspective the sign-off could be considered from the perspective of the owner of the procedures or controls. This view is the same as the status of processes and procedures by "team", where the process owner that signs off the documents is also the team leader. The key thing is, visibility.

Someone must be responsible to update the document. Someone must be responsible to sign off on the final state of the document and release it for use. The simpler and more transparent the whole review and sign-off can be the better. Where documents are updated by external consultants it is imperative that sign-off happens by someone in the organisation. This reassures the organisation and clients of the organisation that the risks are identified and proper controls are in place.

Appendix C

Implementation Considerations

A model is only as good as its implementation in practice. Several factors will work into making a project succeed or a project fail. A list of factors that can be considered, by no means exhaustive is as follows:

- Contracting
- Personnel
- Client commitment
- Project Structure and Planning
- Customer Maturity
- Consulting Company

C.1 Contracting, Project Brief and Scope

A consultation project is a piece of work that will depend on the inputs of at least two interested parties. The one party is the client, represented by a sponsor or project owner. The second party is the consultant, contracted to perform the work within the defined boundaries of time and cost and within other constraints set by the customer.

The relationship as defined, for example by a contract, rests on the initial negotiation of the consultant brief. If the agreement is flawed, and the foundation on which the project is undertaken is flawed then the overall sustainability of the project is doomed from the start.

A project that is too expensive and related to this, too extensive, for the requirements of the customer will lose support within the client company rapidly. On the other hand if a project is not worthwhile from the consultant perspective it will either affect the sustainability of the consulting company itself, especially true when the consulting company is a small one, or it will eventually result in the consultant company deploying the wrong resources on the project or even get side-tracked by a potentially more lucrative arrangement that comes along over the course of the project.

It is therefore essential from day one that the right balance is struck. A successful project is not ensured by proper contracting but it a project will not be successful without this foundation.

C.2 Consultants

An old adage goes: “The prince that does not want to take the time to understand will have to embrace the not insignificant risk of trusting.”

A consultant firm finds itself in the unfortunate position where the trust of the client determines the success of the projects that they undertake. There is the expectation from the part of the client that the consultant must bring fresh ideas and an in-depth understanding to the situation of the customer.

Unfortunately it is also true that the party that understands the situation the best and will provide most of the real benefits of a project is the customer company itself. It is rare that the solution or ideas to solve a particular problem or to improve a particular problem is not already present in the client company itself. The best consultant facilitates the customer to solve their own problems. This is the ideal. The role of consultant as that of facilitator is not an easy one and the consultant must retain and protect the independence which makes this role possible.

There are however different types of consultants, especially, when it comes to a, on first analysis, mundane project such as a business process documentation project.

Three input components were found to be critical, in the projects where the PBPF were implemented:

- *Defining the scope, boundaries and strategy of the overall project:* This requires a consultant with a high degree of both business experience as well as detailed knowledge of the field involved. Concrete outputs from this stage would be an outline of the business process index. Critical business processes are covered and

linked into an overall model. It is not enough to rely only on the customer, however experienced and competent, for this kind of input.

- *System Implementation Consultants:* Once the scope is defined and a decision is made to implement Plumb Line Business Process Framework (PBPF), then use would be made of system implementation consultants. These consultants will set up the business model in the system to serve as an outline to drive the rest of the project. The organisation structure as provided by the client will also be set up in the system. This will drive the project forward because it will make measurement of the documentation project possible. The skills required here would be IT Technical with specific industry knowledge desirable but not essential. This part of the project will rely on the input from the initial scoping, requirements and strategy workshops. The end result will be a configured system containing the skeleton of the project and allowing all users to log in. The System Implementation Consultant will provide input throughout the lifecycle of the project, to help with standardisation of documentation templates and bulk uploads of existing documents. This is a major time saver when documentation, at an acceptable level of quality, already exists.
- *Documenters:* It was found during the implementation of the PBPF that documentation is difficult for clients. The quality of process documents vary from person to person. It is difficult to obtain and sustain good quality documentation. By far the most effective process of getting documents done is as follows:
 - Process documenter will interview a person to understand how a procedure works and come up with a rough draft of the procedure.
 - This is captured in the system by the documenter and refined and standardised according to the standards for process and procedure templates. All the necessary linking to task calendars, organisational responsibility and risk indexes are done by the documenter.
 - The resulting output is reviewed by the person with whom the interview was conducted initially and revisions made. In some cases where the revisions are minor the user can then make the changes directly on the system. An important outcome from this process is that the user is also trained on using the system – maybe not to the level of proficiency achieved by the professional documenter but to a sufficient level of competency that the documents can now be maintained by the user on their own with only occasional external input and support.
 - The procedure document is signed off by a manager, or “owner” of the procedure. The team member resources create and document the processes and

procedures. The team leader or manager subsequently review and “sign off” on the document. In this way a second pair of eyes from the customer will have an opportunity to review and improve the document before its final publication.

The project itself has to be managed from a project management perspective as well and normally this role would be fulfilled by the system implementation consultant who will also fulfil a senior project management role. Alternatively the senior consultant who originally defined the project scope could continue managing the project and liaise with the client on an ongoing basis.

C.2.1 Steady State

The process index is derived from tasks on the process model. It is cross reference to industry processes. It is also cross-referenced to tasks and responsibilities identified from HR information such as job description and performance contracts.

It was found during the course of the PBPF project that this model tends to remain stable over time.

Therefore, once all the processes and procedures have been documented procedure work dramatically reduces. The project reaches a “Steady State”.

Work will increase when a new system is implemented, a new client with new requirements is taken on, existing manual processes are automated, a merger or acquisition takes place or a part of the business is outsourced.

Other than these changes most of the changes would be organisational – a department gets restructured, responsibilities gets shifted around.

Most of these changes just shuffles things around but for the most part does not lead to significant process change.

C.3 Certification

C.3.1 Certification of Personnel

Certification is a powerful tool used in for example the aircraft maintenance industry to ensure that quality systems are in place and maintained over time.

In the case of Aircraft Maintenance, through international agreements, and arguable, pure common sense, before a maintenance organisation are allowed to service an aircraft it has to prove that it is a “Certified Aircraft Maintenance Organisation”. An important part of this process is to make available what is called a “Maintenance Manual” where an exposition is made of the maintenance organisation and processes in place at a particular organisation. This manual constructed according to ISO 9000 type standards will publish the facilities, the processes and the organisation that is in place to perform maintenance. Obviously this cannot be purely a paper exercise as the consequences of failure can be dramatic, fatal and costly. Yet what is immediately striking when paging through one of these documents is the simplicity of something so important. The purpose of this manual is to “expose” and “make visible” as opposed to obfuscate and document every little aspect.

A key part of the foundation on which the quality systems of this risk and liability conscious industry rests is the concept of “Certification”. With reference to the personnel for example it is important to establish that particular important maintenance activities is done and supported by “Licensed Aircraft Engineers” and “Licensed Aircraft Mechanics”. This licensing is the result of years of training and experience and there is a high degree of confidence that once this level of competence is reached then the personnel involved is in a position to competently executed the tasks required from them.

It is interesting to contrast this to the activities performed in financial services organisation.

Whilst there are clear legal requirements regarding bookkeeping and accounting it can and does happen that activities are performed by inexperienced personnel and that the “certification status” of that person with regards to the performance of the particular activity is unknown. Additionally, although risks and controls, and the definition of risks and controls might be in place via the annual risk view conducted by internal audit, up to date procedures might not exist and there is a lot of dependence on the skills and knowledge of the individual people performing the activities to perform the tasks without making substantial and important mistakes. It was the experience of Plumb Line that expensive oversights are more likely to happen when responsibility is handed over from one individual to another. Handover of responsibility takes place, for example, after staff gets promoted, staff takes leave or staff depart for another company.

It important to ensure the following:

- that a procedure is described,
- that critical controls and risks inherent in a particular activity are identified,

- that key deadlines, responsibilities, dependencies and external and internal suppliers and customers of this activity are identified and clear.
- That the personnel who perform a particular activity is certified in competence in this activity. This certification must have some formal basis if it is to be measured across the organisation and appropriate corrective steps to be taken if necessary.

C.3.2 Certification of Process

Continuing with the analogy of the Aircraft Maintenance organisation and ISO compliance, mechanisms exist in the FS industry where a service provider can demonstrate that their controls are in place. This can for example be demonstrated using a SAS 70 or similar study. The SAS 70 study exposes the controls that are in place for core activities performed in an FS organisation.

The SAS 70 study is done at two levels of detail. The simplest, level 1, study will identify the controls. The more detailed, level 2, study will demonstrate how those controls are effected in the particular activity. This involves the actual documentation to a lesser or greater extent of that activity.

C.3.3 Certification by Consulting Companies

This is not the only kind of certification that could exist. As part of the marketing and “branding” of the consulting organisation it could also be proposed that a particular process set can be “Plumb Line Certified Processes” where the consulting company follows a structured methodology and risk reduction methodology and when there is enough confidence in the quality of the work and the diligence of the company involved then that kind of certification can serve as proof that a certain level of excellence has been achieved in documenting the risks, controls, processes and organisation of a particular company or department.

C.3.4 Signoff vs. Certification of Individual Process

The sign off on a process is another form of “certification”. The only difference is that normally “certification” would imply a level of independence and that the certifying party is external to the process involved. But inasmuch as “certification” has a definitive “reputational” aspect associated with it, i.e. an certifying authority takes responsibility over the state of a person’s readiness (to be, for example, a licensed aircraft

engineer), over the quality system (ISO 9000 compliant), over the existence and adequacy of controls (SAS 70 Audit), over the statements of the company (auditor) then it can be argued that a manager signing off on a process document, or on the readiness of a particular person to perform a particular task, is a form of “internal certification”. The managers puts their reputation on the line and takes professional and legal responsibility for their decision.

C.3.5 Conclusion

The most obvious benefit of certification is that it make communication simpler. When someone is a qualified medical doctor, or a professional engineer, or a chartered accountant or a Licensed Aircraft engineer, then there is a defined understanding of what that implies. This is true in the generic sense and with reference to the personnel supporting the activities in an organisation. Some activities my legally only be performed by suitably certified and qualified persons. In other cases this requirement is part of risk reduction and confidence building, i.e. to demonstrate to a nervous customer that their interests are in safe hands.

When the concept is extended to the processes of an organisation it can be as effective. In this case certificates like an ISO certification, SAS 70 Audit and, yes, even a “Plumb Line Certificate” can be useful to communicate to interested parties such as the government, shareholders, clients and senior management that a proper, and verified, level of quality exists in all aspects of the organisation and its processes.

C.4 System

The bane of the existence of a small consulting company that develops their own software is the requirement to juggle a host of different activities concurrently. Activities just related to “System” can include having to 1) research and develop a software product, 2) install this product at a customer site, or 3) externally host the software, 4) train the end users in using the system, 5) setup the end users and the appropriate software rights, 6) support the end users to change their passwords, or deal with user queries, 7) fix bugs and provide minor upgrades, 8) perform major upgrades, 9) deal with security issues and security policy and changes in this policy, 10) deal with network speed issues, 11) accommodate changes in client infrastructure and organisations affecting the system installation, 12) accommodating and support customer customisations to the vanilla platform, 13) Juggle different versions chronologically and functionally of the software across different customers.

These are just the activities that relate directly to “System”. In addition all the normal activities of a consulting project will continue. In a large company these functions and responsibilities would be split across different people and departments. In a rapidly growing and evolving small business the boundaries are not that clear and a host of different activities could be performed by the same unfortunate set of individuals.

A system can be externally sourced or internally developed. These two alternatives are shown below:

- Focus on consulting, implement an external system:
 - Installed in-house at customer site on:
 - * Consultant hardware plugged into Customer WAN/LAN
 - * Customer hardware, either dedicated or on existing server.
 - Installed externally on consulting company supported host:
 - * At consulting company
 - * At external hosting company, e.g. Hetzner
 - Installed at customer site by external service provider
 - Installed externally on external service provider platform
- Provide Consulting and Develop Own System
 - Same as 1a
 - Same as 1b

C.5 Project Structure

Depending on the client involvement the project structure will vary. In principle at least the following elements would be in place:

- Client resources
 - A client sponsor – a senior manager that, ‘sponsors’ and take overall ownership of the project. Liases with the senior manager and responsible party at the consultant regarding progress and high-level concerns. Chairs the steering committee meetings (which is basically just a periodic high-level review of project progress and issues). Would typically sign the invoices!

- A Client IT Manager - a critical resource as costly technical hurdles result from not having buy-in from client IT or not fully understanding the constraints of the client environment.
 - Client Business Analysts – Not all clients have this in place and where a client business analyst can support the project this greatly facilitates the information flow between customer and consultant. If this role is not available then the consulting company itself will largely fulfil this role. Making use of the internal auditors of a company also provides useful support as the objectives of internal audit and that of the process documentation project overlaps significantly. The periodic threat of the internal auditors crawling with green pens and yellow sticky notes through sorely lacking departmental documentation and producing risk and control exception reports to senior managers involve and retain the interest of Financial Services managers in the process documentation project.
 - Team managers – invariable a client organisation will consist of a set of teams, or small departments. Dependent on how the client organisation is structured, in the case of financial services operations these teams could have names such as “Client Reporting”, “Unit Pricing”, “Team A”, “The Atlas Team”, and so on. Even in flat organisations there would be a manager responsible for a group of users.
 - Personnel – the people executing tasks on a daily basis. Obviously managers will also execute tasks but for the purposes of this model this would be the people who will be interviewed to document their activities. Managers would sign off on their work.
 - Other – support personnel such as secretaries are essential to get meetings with personnel scheduled (and rescheduled), desks, access cards and parking locations organised, logistics such as flipcharts, whiteboard markers and coffee arranged and most importantly invoices signed! Ignoring these critical gatekeepers could make the difference between success and failure, even if they are not part of the formal project structure!
- Consultant Resources
 - Senior Project Manager – a senior member of the customer’s staff that liaises with the project sponsor at the client and takes direct responsibility for the project. High-level concerns are directly escalated to and managed at this level. Keeps the project on track by regular review with the customer sponsor as well as consultant personnel on the progress of the project according to the agreed project plan and time tables.

- Senior Consultants such as Business Analyst, supported by industry expert if required – responsible to ensure that the high-level model consisting primarily of process, organisation, risk and controls are clearly defined and drives the detailed process. Will facilitate workshops to develop these models as required and will produce the process flow charts where a cross-functional view of activity flow over critical business processes are required. Ensures compliance with external standards and frameworks such as ISO, SAS 70, Sarbannes-Oxley, Legal Frameworks, etc. Because the sophistication and correctness of output here is expected to be high, industry specific and also referenced to external standards, requiring an appropriate level of experience and skill it is also typical that this resource will be a more expensive resource.
- Analysts / Documenters – Once the high-level model is in place the process documentation is to be produced in the appropriate sequence. I.e. there may be more value in documenting critical areas first and then progressing to areas of lower risk and impact. The bulk of the interview work and creation of physical documents in the appropriate format, whether it is Microsoft Word documents or direct capture in a content management system or business process framework is done by documenters. The core skill that they should bring to the project is an understanding of how to create simple, high quality, procedure documents from focused interviews. They must also provide feedback to the Business Analyst and Architects where inconsistencies are found in the lower level model that necessitates changes in the higher level model. Where the Business Architects would be more focussed initially on the What, Where, Why and When of activities and the relationships between activities, the process documenters will focus their time in documenting “how” things are done and linking the document into the higher level framework. Documentation of processes is definitely an art form and the best procedures are those that are just, and no more detailed, to be useful for a user to execute a procedure correctly. Doing more work than is necessary increases the maintenance load over the life cycle of the business document collection and reduces its relevance as it gets outdated because of an inability to keep it up to date because of the enormity of the task.
- System Implementation Consultant – this consultant will install and configure the system. Depending on the complexity of the system this role might break up into that of a more IT technical role and then that of a configuration consultant – although the role of system configuration once set up is that of the system architect. The key point is that someone would be responsible for setting up the specific software on specific hardware and then making

the system available to a set of users. After system implementation this role will have to be handed over to a client resource. Once the system is set up a continued role of IT support will be fulfilled. Where the software is installed at the client it is almost unavoidable that the people that installed the software will also be responsible to provide additional support over the course of the project.

- System developers - especially important where critical customer requirements could not be accommodated in the core system and an extension or customisation will have to be developed. This is also important where interfaces are required to existing systems. It might be necessary to integrate into an incident logging system and provide process headings to the external system.
- External Service Providers (3rd party)
 - Even in the simplest case, where a consultant company develop all their own software and perform all their own activities some external party will invariably be involved. Examples are where a custom plugin such as a charting tool or reporting tool (e.g. Any Chart , Any Gantt or Crystal Reports) are integrated into the core offering. Another example is where use is made of an external hosting company (e.g. Hetzner) and obviously most directly when the consulting company implements a 3rd party software product such as a process framework, content management system or risk system.

C.6 Project Plan

Large consulting houses such as PriceWaterhouseCoopers, McKinseys, IBM, Ernst and Young, EDS and others spend significant resources both in terms of time and cost to develop methodologies. It is instructive however to consider for a moment some of the evolution of thinking regarding large business transformation projects, especially in the context of the implementation of the leading ERP system, SAP. In the early nineties there were numerous large SAP projects conducted across the world. South Africa was no exception with projects at companies such as Stellenbosch Farmers Winery, Distillers, KWV, SASKO, Bokomo, Unilever, Pick and Pay and almost every large company. At the time that these projects were conducted the context was that of the large “Business Transformation Project” such as the radical “Breakthrough Business Process Reengineering” pioneered by prophets such as Michael Hammer. Before that large change projects took place in the context of Total Quality Management, and ideas

such as Total Productive Maintenance, World Class Manufacturing, Just In time Manufacturing and other ideas inspired by or directly taken from Japan that was at that time at the forefront of business innovation. These projects tended to be huge, expensive and radical. The focus was on the customer and streamlining core business processes and eliminating non-value adding activities. The problem was that a lot of the changes were quite difficult to “make stick” where new systems were not implemented or radical changes were not made to existing, “legacy” systems. SAP capitalized on this and through its links to the ARIS modelling toolset from prof Scheer and stable, comprehensive and integrated accounting, logistics and HR modules it provided the opportunity to get rid of these “legacy” systems and implement a new “integrated” ERP/ERM system that would provide the new ideal world of “Integration” and the promised land of “Systems Led Business Process Transformation”. Now, SAP is a behemoth of a system with literally millions and millions of lines of codes interwoven in multiple layers of programs written in a language called: “ABAP/4”. It provided a strong configuration management framework where you could play in a “Sandpit” client, make changes in a “Development” client, “Transport” these changes over into a “Testing client” and then finally “Transport” the change requests over to the “Production” system. To make changes to the core system required every developer to be registered with SAP Germany, an eye-watering change code also needed to be entered when core programs were changed. Because of the integrated nature of the SAP system changes have ranging repercussions. (Try to explain to the MD why he just “lost” R3 billion of his balance sheet because of a minor error in a stock transport order of crates between two minor sites yields to a clear understanding of the enormity of changing this kinds of a system)

The point is that the traditional “process oriented” methodologies where a long process of gathering “Business Requirements” in a process of documenting the “As-Is” and the “To-Be” was leading to a situation where the complexity of projects were simply spinning out of controls. The reality was that the system constrained the process. Implementing a system such as SAP necessitated a commitment to the processes it implied.

SAP then came up with their own methodology named ASAP that radically simplified the SAP implementation process.

This lead to projects that were implemented with greater speed and cost efficiently. Not ideal for large consulting firms still banging on the BPR drum for they were making far less money.

The use of a business process master list as the basis for driving a project forward is an idea lifted from the ASAP methodology. Far less emphasis is put on changing process, for more emphasis is put on working through the list of activities and getting to the end

result of implemented and document *business process procedures* (the lowest level of the Business Process Master list).

The project plan for the business process documentation project follows the same approach. Colours (red, blue, black) are used to show the status of project elements.

- Phase 1 – Initial Client Meetings, decide overall project scope and brief.
- Phase 2 – Install System, ready to contain framework, prepopulated with templates from consultant or existing process headings from customer process documentation manuals.
- Phase 3 (red) – Identify What, Why, Who and When is to be done and create the Business Process Index. Create the Business People Index, identifying personnel. Created by interviews and workshops with managers.
- Phase 3b – If possible risk rate the Business Process Index to get an idea of how critical processes are – normally a rating of low, medium, high in terms of importance and low, medium, high in terms of likelihood that a problem will occur is sufficient to form an idea of where to focus initial documentation efforts. Created by interviews and workshops with managers.
- Phase 4 (black) – Interview and Document the How, i.e. create the Procedures. Created through one on one interviews with personnel.
- Phase 5 (black) – Refine Documents and create linkages, linking up controls, risk, responsibility and task calendar links. Created by consultant on system.
- Phase 6 (black) – Review of Documents – review and refine document in consultation with original interviewee. Once they are satisfied then:
- Phase 7 (blue) – Signoff by Document Owners
- Phase 8 – Periodic Review
- Ideal: Continuous: Train and Certify Users on Material (green)

It is clear that the focus of this project plan is not “Radical Process Transformation”. The focus is to derive a list that will drive the project and then work through that list systematically scheduling all resources as simply and efficiently as possible.

A core principle, related to the idea of the “Dynamic Programming Methodology” explored earlier is that every organisational fact is handled only once. Some Organisational Facts such as the set of user procedures and responsibilities will be constructed by reference from existing “child nodes”. Therefore if, for example, the bank reconciliation

procedure is changed and this form of Joe Soap's job description then it should not be necessary to make any changes to the job description. The changes should roll up to that level automatically by way of reference.

Another principle related to this is to break up the problem of describing the organisation and its processes into a set of sub problems that could be viewed in turn and by the appropriate experts. The following would be examples:

- People Index and Position Description – review with HR. In some cases duplication of activities takes place but this is missed because of ambiguous and inconsistent job labelling between departments.
- Job Description listing ad-hoc and periodic (daily, weekly, monthly, annual, etc.) tasks – constructed from process index enhanced with appropriate attributes. Reviewed with Managers and HR Manager. Check with consistency to KPA's. Reverse check is also possible. Could find, based on KPA's that some procedures were missed.
- Risks and Controls – reviewed with internal auditors, Risk and Compliance Officers, Senior Manager. Maintained in Risk Index and Control Index and linked to processes where appropriate. Also link to appropriate risk and control owners via People Index.
- Process Index – Reviewed by Senior Manager, Team Managers.
- Team Responsibility – Reviewed by Senior Manager and Team Manager.

The point of these different views and contexts is that because of the principle of non-duplication and inclusion by way of reference this means that an input in one area invariably leads to corrected material in another area. The different areas serves as a control on each other without increasing the overall number of organisational facts.

C.7 Customer Maturity

It goes without saying that not all customers are the same level of sophistication when it comes to process documentation.

Both the consultant and the client must reach a common understanding of the current level of "maturity" that the client is at in order to manage expectations on the one hand but also to ensure that the customer gets the benefits of the project and understand in which areas those benefits are likely to be.

One way in which customer maturity can be presented is to make use of a “Customer Maturity Matrix”. The reason why this is such a useful tool is that it combines a qualitative view of where the customer is at with the benefit having a numeric score that can be measured over time. The basic format of the customer maturity matrix is presented below:

C.8 Drivers of Costs

The cost elements can be divided into the following categories:

Overhead

C.9 Complexity - Calculation of Number of Unique Procedures, Drivers of Complexity

There are a few drivers of complexity that works together to either lead to a simple or a more comprehensive procedure set (the example below are focused on the financial services industry):

- Number of business processes
- Number of clients for which segregated funds are managed
- Number of funds under management (segregated as well as collective investments)
- Number of personnel
- Degree of outsourcing
- Number of jurisdictions for which funds are managed.

This is by no means a comprehensive list but analysing the relationships between a few of them is quite interesting.

Let’s represent the documentation process as a tree:

Each branch is a process group, for example, Human Resources, Operations and Financial and so on.

Each process group can in turn be sub-divided into smaller branches. Operations could for example be subdivided into Client Reporting, Trade Cycles, Valuation, Quantification and Evaluation and so on. Each of these subgroupings can be further divided.

Trade Cycles can break up into the different securities that are traded: Equities, Fixed Interest Instruments, Money Market, etc. At a certain point the branches will terminate at a specific procedure executed by a specific person. A procedure might be shared between different branches. For example a bank reconciliation is normally a standardised procedure that is the same across all kinds of funds and clients and although the fund specific management client reporting procedures might require a bank reconciliation to be conducted beforehand this does not necessarily mean that each fund or even client will require the use of a unique procedure. Differences are for example for what parameters is to input into a particular system screen for a particular fund.

Clients: If all an asset management company did was to trade securities in a generic way then the core business processes of the industry will lead to a standard set of procedures. Each client of a financial asset management company can require a different set of reports. This means that multiplying the number of clients will also increase the number of procedures in areas such as “Valuation” and “Client Reporting”.

Number of Funds under management: This is a driver of complexity because each fund will have its own set of characteristics as defined by the fund charter. The funds themselves might be managed in the same way but the outputs will be more complex. This does not necessarily lead to more procedures.

Appendix D

Quantitative Model of Cost and Profit for Business Process Documentation Project

D.1 Introduction

This chapter describes a quantitative model constructed to evaluate key decisions that can be made to affect the cost and income of projects in the business process documentation project.

The purpose of this model is to provide a firmer, if not exact, quantitative basis for evaluating alternatives.

Obviously, given the endless variations of possible project configurations, consulting companies, client companies and sizes it would be impossible to construct a model that is valid in all aspects. This is not the objective of this exercise. The objective is to determine what would be important drivers for cost, income and profitability and whether decisions can be made that would make large differences in outcome.

An example of a decision that could affect project duration is the number of consultants. Clearly having more people available to perform project documentation and interviews would lead to faster project completion rates. However, this would also increase cost and there would be a trade-off between these two aspects. The model is an attempt to establish linkages between these opposing considerations and establish some basis for predicting what the values for cost, income and project duration would be. This can obviously then be tested against real projects and the model refined.

A degree of sophistication is built into the model in that actual scheduling is done of consulting resources and client personnel to complete specific procedures and the workload determined.

This is then tested against a real world example, ABAM, where values are input and the actual project outcome is tested against what the model predicts (at least as far as the scheduling is concerned).

The idea is to use this model in the future as an input into a multiple objective optimization problem.

D.2 Description of Model

The model will be described with reference to the following headings:

- Output
- Assumptions
- Input Standards
- Input Distributions
- Input Models
- Input Parameters
- Input Tables
- Scheduling Algorithm
- Decisions and Scenarios

D.3 Quantitative and Qualitative Output

The core output of this model is profitability for the consulting company and Total Cost of Ownership and Business Benefits for the customer.

These outputs are calculated based on a number of scenarios defined by collection of input parameters.

Profitability and Cost of Ownership is a result of the difference between total cost and total revenue generated over the period of consideration. It is not a final value but will be

a series of inflows and outflows and the associated risk. It is the same as the forecasted cash flows included as part of a business plan. In the case of Cost of Ownership the Business Benefits of the project to the customer should also be considered.

Total Cost and Cost of Ownership is constructed from the sum of all the cost elements in any specific period under consideration. Ideally these elements can be affected by decisions that can be made. There are Consultant Cost, i.e. cost elements that are incurred by the consulting company, and there are Client Cost, i.e. cost elements that are incurred by the client company.

D.3.1 Primary Output Elements

The Cost:

- Consultant Cost
 - Research and Development
 - Consultants
 - Software Licenses
 - Offices and Infrastructure
 - Hosting
- Cost Elements for Client
 - Hardware Cost
 - Software Cost
 - Purchase
 - Licensing
 - Hosting Cost
 - Consultant Resources
 - Client Resources

The Income and Benefits:

- Consultant Income
 - Consultant Resources
 - * Implementation

- * Consulting
- * Audit and Review
- * Documentation
- Software
 - * Licensing
 - * Support
- Client Benefits from Project
 - Savings – cost of an equivalent system that does not have to be purchased
 - Cost saving from reduction in risk of process related failure
 - Fewer people
 - * More efficient and properly documented processes require fewer people
 - * Effective support from external consultant resource reduces requirement for internal business analysts
 - Outsourced IT saves cost
 - Marketing opportunity due to:
 - * Ability to prove capability to take on new business through a set of demonstrably clean, logically documented and certified set of processes
 - More efficient internal audit
 - More efficient Key Performance Area (KPA) construction
 - More efficient SAS 70 projects
 - Less capital has to be allocated to operational risk
 - More rapid start up for new personnel
 - Opportunity cost – continuity of framework means that this kind of project do not need to be repeated but can be maintained in an incremental fashion
 - Training benefit – use can be made of own intellectual property to train personnel
 - Increased relevance of procedure documentation due to rapid turnaround in process documentation
 - More rapid transition to new system
 - More effective logging, reporting and resolution of risk incidents
 - Increased and provable organisational learning and growth
 - Business continuity – procedure are firmly in place and documented, business can continue even if core personnel are absent and transition has to be made to mirror site.

In most instances the benefits are more qualitative in nature and are incorporated by way of the distinction that is made between soft benefits and hard benefits. Two benefit figures can then be calculated. One that includes only the elements that can be directly related to a (more easily) calculated figure and those that are related to a more qualitative derivation of benefit and where the monetary value is determined by estimates based on experience.

An important premise of this model is that decisions will affect outcome. Therefore in cases where the decisions result in benefits / drawbacks of a more qualitative nature the output that is generated will contain a set of benefits and drawbacks particular to the scenario implied by the particular collection of decision parameters.

Obviously range of implied output can also be harvested from the model.. For example once the project end date is calculated various time related measures such as project end dates and consultant utilisation (absolute and as a curve) and load curves on customer resources can be derived. This can help with decisions relating to project phasing and how to integrate the project into the overall business calendar.

D.3.2 Secondary Outputs, Models and Calculations

- Number of unique procedures
- Effective Available Hours per Day
- Hours per day to refine Document
- Interview Customer Users (hours)
- Dead hours available in Elapsed Months to refine document
- Total hours required to refine document
- Extra elapsed months to refine documents
- Elapsed Days for Customer Interviews
- Elapsed Days for Documentation Completion
- Consultant Utilisation %
- Client Resources Loading
- Total Elapsed Months to interview and refine

D.4 Assumptions, Standards and Distributions

To support each decision scenario a set of configurable simplifying assumptions are made relating to for example the length of the working day, the number of days in a months and so on. In other instances assumptions have to be made regarding more nebulous aspects such as the “Standard time for a client interview for one procedure”. As there will be a wide range of possibilities in how long a client interview will actually last two possible approaches are possible. One is to set a standard, in the case below, a figure of 1.5 hours is assumed and translated into 4 available interview “slots” per day. In other cases, such as was done with user availability a distribution can be used to represent the overall assumption.

D.4.1 Assumptions

- Hours per working day
- Average Workdays available per month

D.4.2 Standards

- Interview hours per procedure requiring user input
- Consultant Hours to refine document
- User Hours to Review and Sign-off Document
- Percentage of reschedules required
- Average Number of Unique Procedures per User
- Maximum Number of Interviews per day per Consultant
- Maximum Number of Interviews per day per User
- Maximum duration of the project in days
- Time Window over which user availability is to be calculated – the purpose of this assumption is to ensure a gradual impact if required on the user where the load on the user in terms of time taken for interviews never exceeds the available time % over this time window.
- Project Phasing – assumed flow of project activities. Items in italics below would for most part be based on assumed and standard values from previous projects.

The format of the workshops that drives these activities are predetermined making it possible to come up with a reasonable estimate for how much client and consulting resources are required:

- Prepare Request for Initial Information
 - * Consultant Input
 - * Client Input
- One Day Workshop
 - * Consultant Input
 - * Client Input
- Define Process Index
 - * Consultant Input
 - * Client Input
- Refine Organisational Responsibility
 - * Consultant Input
 - * Client Input
- Interview Employees for Business Process Procedure
- Draft Initial Business Procedure
- Review Business Procedure with Employee
- Manager Review and Sign-Off of Business Process Procedure
- Periodic Review

D.5 Distributions

D.5.1 Employee Availability

- Average Client Employee Availability %
- Standard Deviation for Client Employee Availability It is assumed that not all employees have equal availability. In fact, as is proven in previous projects such as discussed in the section on case studies, the resources in the customer that perform the most important and critical functions have the lowest availability for interviews and process documentation. A part of the challenge of process documentation projects is to work around these constraints and still get the work done. The scheduling engine in this model tries to account for this by including a distribution that supports the following assumptions:

- “Busier” people as defined by the number of “unique” procedures that they perform are less available and conversely people with fewer unique procedures will on average have more time available to be interviewed.
- “Busyness”, or the number of unique procedures that every user is responsible for has a normal distribution. I.e. most people will have an average number of unique procedures and only a few will have a lot or almost none at all. This distribution is shown in the curve below:

D.6 Parameters

- Number of consultants
- Number of Users

D.7 Scheduling Algorithm

D.7.1 Description

The purpose of the scheduling algorithm is to schedule client and consultant resources for the primary activity of detailed process documentation. It is assumed that the initial phases of the project such as creating the process, organisation, risk and control index are complete and that the outputs from these phases are now used to drive the scheduling process.

D.7.2 Calculate Business Procedure Set

Two possibilities exist here. One is to take the Process Index with the associated responsible user as an input directly.

The second is to calculate a theoretical Process index based on the assumed distribution for the number of procedures per user and the number of users in the organisation. This is the approach followed for the initial analysis. Obviously if a real schedule is to be created for an actual organisation the first alternative will be more logical to use as the basis for scheduling.

Once the Business Procedure list is processed it is represented as a table with three columns, an extract is shown below:

TABLE D.1: Business Procedure Set

Procedure	User	Slot
1	1	1
2	2	1
3	2	2
4	2	4
5	3	1
6	3	2
7	3	4
8	4	1
9	4	2
10	4	4
11	4	6
12	5	1
13	5	2
14	5	4
15	5	6
16	6	1
17	6	2
18	6	4
19	6	6
20	7	1

- Procedure – a unique identifier to which this procedure will be referred to.
- User – a unique identifier for the user.
- Slot – a unique identifier for the timeslot for which the interview is scheduled for this particular procedure – obviously this is only allocated once the scheduling algorithm is run.
- In the example above Procedure 19 has been allocated to User 6 and the interview is scheduled for Time Slot 6.

D.7.3 Calculate Time Available

For user the time that they are going to be available for interviews are to be allocated. In a real project this will form part of the project brief and agreement and can be entered directly into the model. For this theoretical analysis an availability percentage is assumed based on the user availability distribution. The result is an input table of three columns, an extract is shown below:

TABLE D.2: Calculated Time Available

User	UserProcedureCount	UserTimeAvailable
1	1	58%
2	3	56%
3	3	56%
4	4	53%
5	4	53%
6	4	53%
7	6	48%
8	6	48%
...and so on...		

- User – a unique identifier for the user.
- UserProcedureCount - the count of unique procedures that this user is responsible for.
- UserTimeAvailable – the maximum percentage of time that the user can make available to the project over a given Time Window (part of the assumptions)
- In the example above User 6 is responsible for 4 unique procedures and this user has 53% of time available for procedure interviews in a given time windows.

D.7.4 Generate User and Consultant Time Slots

This is the heart of the scheduling algorithm. The first step is to generate a table of user “time slots”. These slots are created based on the assumption of the number of time slots for interviews available in a working day. For example and average interview

time of about an hour and a half would imply about four daily time slots of about two hours each. Initially these slots will be unallocated but as the procedures gets allocated for interviews the procedure number will be entered against the time slot and user. An extract of this sequential time slot table showing users and time slots together with some scheduled procedure entries is shown below:

TABLE D.3: Generated User Time Slots

Slot	User 1	User 2	User 3	User 4	User 5	User 6	User 7	..and so on
1	1	2	5	8	12	16	20	..
2	0	3	6	9	13	17	0	..
3	0	0	0	0	0	0	21	..
4	0	4	7	10	14	18	0	..
5	0	0	0	0	0	0	22	..
6	0	0	0	11	15	19	0	..
7	0	0	0	0	0	0	23	..
..etc	..	..	..	..	..	..	..	..

- Slot – a unique, sequential identifier for the timeslot
- User 1, User 2, etc. – Unique identifier for each user.
- Procedure Number – when a procedure is scheduled for interview its unique identifier is entered against the time slot for which the interview is scheduled and against the user for which the interview is scheduled.
- In the example above, Procedure 19, the responsibility of User 6 is scheduled for interview during Time Slot 6.

A table is also created for the consultants allocated to the project. In addition to the user a consultant will also have to be allocated to a time slot and procedure for the interview to proceed. An extract from the consultant time slot table is shown below:

TABLE D.4: Generated Consultant Time Slots

Slot	Consultant 1	Consultant 2	Consultant 3	..and so on
1	1	2	5	..
2	3	6	9	..
3	21	27	33	..
4	4	7	10	..
5	22	28	34	..
6	11	15	19	..
7	23	29	35	..
..etc	..	..	..	..

- Consultant 1, Consultant 2, etc. - Unique identifier for each consultant.
- Slot, Procedure Number – as in previous table.
- In the example above, Procedure 19, is scheduled for interview during Time Slot 6, and Consultant 3 will be conducting the interview.

D.7.5 Phase 1 Scheduling - Schedule Interviews

The scheduler follows the following process:

- For every procedure in the business process procedure index:
 - For every time slot in the project time line:
 - * Evaluate whether a consultant is available, if so then
 - Evaluate whether the user responsible for this procedure has this time slot open, AND
 - Evaluate whether the user available time over the Time Window has not been exceeded.
 - If both conditions above have been met then schedule this interview, and update the Business Process Procedure Index accordingly: Now, skip to the next procedure in the list.

The algorithm is not a particularly efficient one, but has the benefit of simplicity!

D.7.6 Phase 2 Scheduling - Schedule Consultant time to refine procedures

The scheduler follows the following process:

- For every procedure in the business process procedure index:
 - For every time slot in the project time line:
 - * Evaluate whether a consultant is available, if so then schedule this action, and the Business Process Procedure Index is updated accordingly

Clearly the second phase will be far more dependent on consultant availability.

D.7.7 Phase 3 Scheduling

A number of alternatives presents itself regarding Phase 3, which is the review of the final document by the client.

- Pro-actively scheduled specifically with each consultant to ensure predictability and force completion, which will then mean the same approach as for the scheduling in Phase 1.
- User can sign it off on the system in which case an assumption will have to be made regarding the length of time this is going to take based on previous input and project experience. Given practical experience some provision is going to have to be made to follow up tardy sign off and assumption will have to be made and standards sets regarding how often a specific intervention is required.

D.7.8 Additional Phases

Because the Business Process Procedure Index is the tool used to drive documentation completion additional phases will still be scheduled using it as the main input. Every additional phase refines the view of what the real consulting and user input is going to be.

Appendix E

Additional Screen Prints from Plumb Line Business Process Framework (PBPF)

Process Framework

1 Investment Philosophy and Process

2 Client Service and Administration

2.1 Client Maintenance

2.2 Client Reporting and Administration

2.3 Management Fees

2.4 Performance Reporting

3 Compliance and Legal

4 Accounting

5 Fund Management

5.1 Fund Management

5.2 Dealing Room

5.2.1 Confirmations

5.2.2 Equities and Futures

5.2.3 Fixed Income

5.2.4 F.I. Support

6 Human Resources Policies and Procedures

7 Information Technology and Systems

FIGURE E.1: Main Process Framework of ABAM

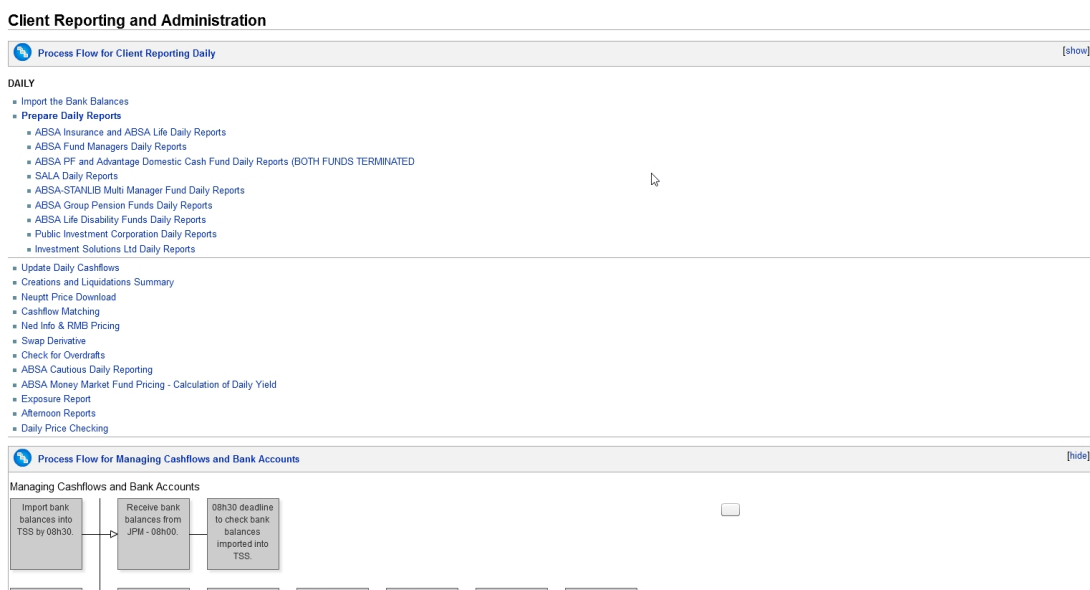


FIGURE E.2: Process Section Showing Flow Chart

Flowchart: Termination of Client

Termination of Client

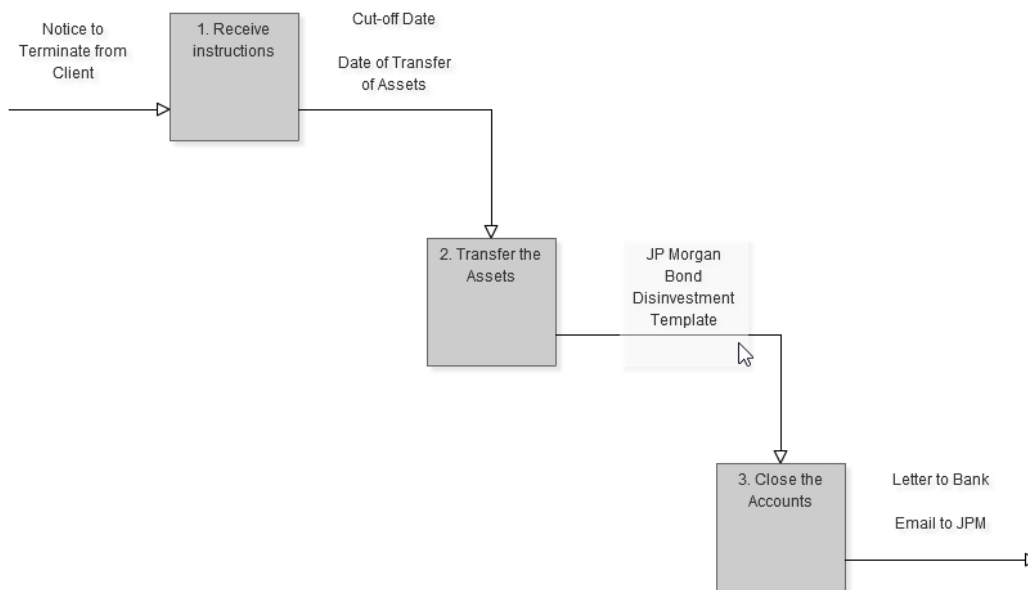


FIGURE E.3: Process Flow Chart in MediaWiki

user page | edit | history | protect | delete | move

User:Poobalanmu

Poobalan Munyippa - Technology Specialist





- 
[1 User Procedures](#) [show]
- 
[2 Organisation Chart](#) [show]
- 
[3 Training Status](#) [show]
- 
[4 Signoff](#) [show]

FIGURE E.4: User View of ABAM

User:Poobalanmu

Poobalan Munyippa - Technology Specialist

 **1 User Procedures** [hide]

1.1 DAILY

- Archive Mail
- Backup Procedures - Servers
- Breach Age Analysis Report
- Event Logs
- Exmerge Mail
- Managing Files/Shares/Permissions
- Managing Mail Infrastructure
- Scan Mail
- Server Health
- IT Systems Update Report
- User Support

1.2 WEEKLY

- Sign-off IT Systems Update Report
- Patching

1.3 FORTNIGHTLY

- Disaster Recovery Maintenance


1.4 MONTHLY


- DRP Testing
- BCM Documentation
- DRP Documentation


FIGURE E.5: User View Showing User Specific List


User:Poobalanmu

Poobalan Munyippa - Technology Specialist


1 User Procedures
[show]

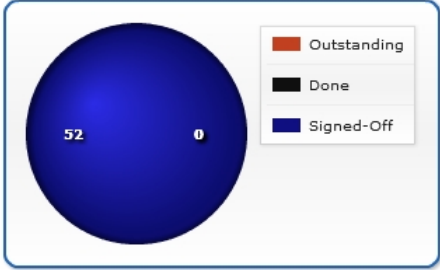

2 Organisation Chart
[show]


3 Training Status
[show]


4 Signoff
[hide]

4.1 Technology Specialist Procedures

The **Technology Specialist Procedures** of **Poobalan Munyippa** are reviewed and signed off by **Stathi Anagnostatos**.



Status	Count
Outstanding	0
Done	0
Signed-Off	52

FIGURE E.6: User View Showing Signoff

Examination 1

See: Example1

Learner taking exam is Admin.

Submit

Question01

True or False: An investment portfolio is a collection of securities owned by an individual or institution.

true
 false

Question02

What is the function of the Portfolio Manager?

To assess the client's risk profile and recommend funds.
 Review the client's portfolio on an annual basis.
 To manage the pool of money from investors and to decide which instruments to hold or not.

Question03

Which of the following options describe the term "diversification"?

To place an investment in a specific sector in the market.
 Spreading an investor's investments over a range of products or asset classes.
 Placing all one's eggs in one basket.
 To only invest in one product or asset class that would yield the highest return for the investor.

FIGURE E.7: Example of Examination for Process Area

Appendix F

Widely Used Modelling Tools and Standards

This appendix discusses examples of some widely used Modelling Tools and Standards available today.

F.1 The ArchiMate Modelling Language

By identifying that multiple dialects, perspectives and languages exist, pursuit for one language would be like shooting in dark. Therefore, there is always a flexibility to make use of different languages as the need can be addressed through superior levels of specialization. In terms of an *ArchiMate* project it is the enterprise architecture language which forms the core of a particular enterprising approach (Jiscinfonet.ac.uk, 2013).

To experience start of the art enterprise modelling, the language should always consider the organisation, processing modelling and all other related factors. Moreover, analyzing the relationships between the different organisation processes and information systems is also important. In other words, it is referred to as the Business-IT alignment. The conceptual domains which are to be covered while using the different modelling tools differ from one language to the next. It is also to be noted that the domains are not defined properly in some languages. Also, most of the languages do not happen to be suitable for describing architectures, as they are only suitable for applying concepts to models but not effective in determining the high-level connections and relationships. As Archimate is more like a standard than a tool, there are a number of modelling tools which use this language (Jiscinfonet.ac.uk, 2013).

F.2 Archi

The members of the *JISC Enterprise Architecture Practice Group* assert that there is a lot of value in using the Archimate, but the tools which are suited for the application of the language are really expensive. For this reason, JISC funded the development of an effective entry level tool named as Archi (Jiscinfonet.ac.uk, 2013).

Archi can be defined as a free and open source platform used for creating the Archimate tools. It has been designed to offer a low cost solution for all users looking to take their very first steps in the domain of *Archimate Language*. It is also best suited for those companies and organisations which are in search of a cross platform *Archimate modelling tool*.

Since the time of its introduction, Archi has been extensively adopted for real world commercial usage by a number of top notch global organisations and companies. It is now termed to be a de facto Archimate Modelling Tool. There are numerous case studies which can be useful in understanding the scope and implementation of this tool.

F.3 BizDesign Architect

BizDesign Architect is another commercial tool based on Archimate concepts and standards. It is being extensively used by the Liverpool John Moores University (Jiscinfonet.ac.uk, 2013).

F.4 IBM Telelogic

IBM Telelogic is used for a number of business process models and enterprise architecture designs. It has been subject to an in depth evaluation by the Cardiff University.

F.5 Unified Modelling Language

Unified Modelling Language (UML) is termed to be an international standard which is used in the domain of software development, information systems and process mapping. The language has been supported by the Object Management Group which is an international and a non-profit consortium. It specialized in the provision of several enterprise integration models and standards (Jiscinfonet.ac.uk, 2013).

F.6 Business Process Modelling Notation

Business Process Modelling Notation (BPMN) is defined as the standard for high-level business process modelling. It makes use of a graphical notation in order to specify the varying business process using a business process diagram. The diagram is based on a specific flowcharting technique that is quite similar to the different activity diagrams which can be seen in the *Unified Modelling Language (UML)*. The prime objective of BPMN is to offer support for the business and technical users through the provision of a notation which is both, intuitive and all-encompassing. In addition, this notation is also adopted for the representation of the complex semantics. There are numerous modelling tools which are centered on the BPMN (Jiscinfonet.ac.uk, 2013).

The advantages and benefits of enterprise architecture emerge from the holistic and integrated business process. In other words, it is holistic view of an organisation which can help in identifying and solving the complex business issues, lowering down or reduce duplication and making an effective business plan for the uncertain future that lies ahead. Having this all in one or holistic view is a big advantage in itself, but still a lot more is needed.

This model can help in:

- Re-designing and re-structuring the business processes to be better, cheaper and faster
- Cutting the costs and layering the infrastructure so that it may withstand the uncertain times
- Making use of the open ended industry standards
- Optimizing the equilibrium between the in-house as well as the outsourced service processes and activities
- Planning the technology implementation and update effectively
- Undertaking the impact analysis and understanding the options appraisal
- Avoiding and reducing the costs by making some better decisions
- Delivering the organisational change in an agile manner

F.7 TOGAF 9

When it comes to developing an Enterprise Architecture, *TOGAF 9* can be subject to an effective use. It can be defined as a method for detailed analysis that uses a wide range of modelling options and resources. It has been developed by the Open Group's Architecture Forum. TOGAF 9 is used for presenting an industry consensus framework and a method for carrying the out the enterprise architectural modelling. As it happens to be a comprehensive and an open ended model for enterprise architecture, it can be used in conjunctions with a number of other frameworks. That's not all, as this model is also being widely used in the vertical sectors like the financial services. For this reason, the support of tools is highly significant in this regard (Schekkerman, 2004).

Appendix G

Frameworks

A review of literature by [To *et al.* \(2012\)](#) has reviewed the following frameworks to consider: Management System Standards such as:

- ISO 9001 [Racz *et al.* \(2010\)](#)
- ISO 9004 [ISO/IEC. \(2008\)](#)
- ISO14001
- OHSAS18001
- ISO 38500:2008
- ISO 42010 – the new international standard for the description of system and software architectures [van Heesch *et al.* \(2012\)](#)

ISO 31000:2009, a new globally accepted standard for risk management [Purdy \(2010\)](#)

Strategic Management System such as Balanced Scorecard [Kaplan *et al.* \(1996\)](#),cite-Source009

Operational Integrity Management as proposed by [Sutton \(2010\)](#)

GRC (five frameworks identified by [Racz *et al.* \(2010\)](#)):

- GRC Capability Model (from OCEG) 9 categories and 29 sub elements
- Mitchel Principled Performance Framework
- Sachar Paulus GRC Reference Architecture

- Frigo and Anderson Framework (mixes processes with organisational entities and objectives)
- Tapscott GRC Approach (four values but not translated into process model)

COSO ERM

BPM – is a convergence of a number of existing technologies and approaches. Its primary roots are in the process management capabilities of workflow tools but it also includes the capabilities that derive from document management [Karaulova & Tauno \(2006\)](#)

Minimum Necessary Contingency Framework [Mikes & Kaplan \(2013\)](#)

Triple Bottom Line [Gimenez *et al.* \(2012\)](#)

Knowledge Lifecycle Management [Siemieniuch & Sinclair \(2004\)](#)

Collaborative Knowledge Management Practices (CKMP) [Li *et al.* \(2012\)](#)

Appendix H

International Standard Setting Bodies

TABLE H.1: International Standards Setting Bodies for Financial Markets

Standards Body	Description
Basil Committee on Banking Supervision	Established by the G10 central banks in 1974, this committee provides a forum for regular cooperations among member countries on banking supervisory matters. Its objective is to improve the quality of banking supervision worldwide.
Committee on the Global Financial System	Consisting of major advanced and emerging economy central banks, this committee monitors global financial systemic conditions and analyses financial market functioning to improve market functioning and promote financial stability.
Committee on Payment and Settlement Systems	Provides a forum for cooperation among member central banks on issues related to payment, clearing and settlement stems. It monitors and analyses developments in such systems and formulates broad oversight standards in these areas.
Financial Action Task Force	This 36-member intergovernmental body, established by the Group of Seven, aims to developed and promote national and international policies to combat money laundering and terrorist financing.
	Continues on Next Page...

Standards Body	Description
International Association of Deposit Insurers	The association represents over 70 jurisdictions and provides a forum for deposit insurers, central banks and international organisations to discuss issues related to financial stability, deposit insurance and resolution activities.
International Association of Insurance Supervisors	Represents insurance regulators and supervisors from nearly 140 countries. It aims to promote effective and globally consistent regulation and supervision of the insurance industry.
International Accounting Standards Board	A privately funded board with members from nine countries that aims to develop, in the public interest, a set of high-quality, understandable and enforceable accounting standards.
International Auditing and Assurance Standards Board	Develops auditing and assurance standards and guidance for all professional accountants.
International Financial Consumer Protection Network	Recently recognised by the Group of 20 (G20) and Financial Stability Board as the body to take the lead on global financial consumer protection as the sole international organisation for consumer protection regulators.
International Monetary Fund	The fund analyses its members' macroeconomic and financial policies, as well as the international monetary system in general, to develop and monitor global monetary standards and codes.
International Organisation of Pension Supervisors	An international body that sets standards on pension supervision and regulation, taking into account the variety of private pension systems.
International Organisation of Securities Commissions	The international policy forum for national regulators of securities and futures markets. It develops standards of securities regulation to maintain efficient and sound markets.
	Continues on Next Page...

Standards Body	Description
Joint Forum	Established in 1996 under the aegis of the Basel Committee on Banking Supervision, the International Organisation of Securities Commissions and IAIS to deal with issues common to the banking, securities and insurance sectors, including the regulation of financial conglomerates.
Organisation for Economic Cooperation and Development	Aims to promote policies designed to achieve sustained economic growth and employment in its member countries. Encourages the convergence of relevant policies, laws and regulations to promote efficiency in financial markets and enterprises.
World Bank	Develops international standards to promote financial-sector development. Together with other standards-setting bodies it has developed international standards for insolvency and creditors' rights, financial infrastructure and public debt management. In cooperation with the International Monetary Fund, the World Bank assesses compliance with the core international financial-sector standards and the issuance of reports on the observance of standards and codes.

Appendix I

Detail of Literature Review

The Client([Economist \(2013\)](#))

- Financial Services Industry([Karapetrovic & Willborn. \(2001\)](#))
- Client Readiness and Maturity([Teuteberg & Smolnik. \(2013\)](#))
 - Benchmarking([Teuteberg & Smolnik. \(2013\)](#))

The Framework([Daft \(2009\)](#),[Feltus \(2008\)](#),[Jørgensen & Mellado. \(2006\)](#),[Labodová \(2004\)](#),[Shah & Kourdi \(2007\)](#))

- Lessons from Other Industries
 - Aviation Maintenance([McDonald *et al.* \(2003\)](#),[McDonald *et al.* \(2000\)](#),[Sutton \(2010\)](#),[Vassilakis & Besseris. \(2009\)](#),[Waikar & Nichols. \(1997\)](#),[Wilf-Miron & Aviram. \(2003\)](#))
- Regulations, Management Standards and Frameworks([Davies & Green \(2013\)](#),[Labodová \(2004\)](#),[To *et al.* \(2012\)](#))
 - ISO 9001 Quality Management([Beattie \(1999\)](#),[Casadesús & Karapetrovic \(2005\)](#),[Casadesus & Gimenez. \(2000\)](#),[Heras Saizarbitoria \(2006\)](#),[ISO/IEC. \(2008\)](#),[Karapetrovic & Willborn. \(2001\)](#),[Lewis & Lalla. \(2005\)](#),[Lewis & Lalla. \(2006\)](#),[Psomas & Kafetzopoulos. \(2013\)](#),[Psomas \(2013\)](#),[Sampaio & Gomes. \(2013\)](#),[Singh \(2008\)](#),[Terlaak & King. \(2006\)](#),[Terziovski *et al.* \(2003\)](#),[Vassilakis & Besseris. \(2009\)](#),[Wu & Liu. \(2010\)](#))
 - ISO 9004 Improve and Measure([Boys & Wilcock. \(2004\)](#),[Karapetrovic & Willborn. \(2001\)](#),[Lewis & Lalla. \(2005\)](#),[Lewis & Lalla. \(2006\)](#),[Wu & Liu. \(2010\)](#))

- Risk and Compliance Standards and Frameworks(El Kharbili & Pulvermüller (2008),Feltus (2008),Labodová (2004),Leitch (2010),Racz & Seufert. (2010),Racz *et al.* (2010),Sadiq *et al.* (2007),Sutton (2010),Vicente & da Silva. (2011),Wiesche & Krcmar. (2013))
 - * ISO 14001(Heras-Saizarbitoria & Boiral (2013))
 - * ISO 31000(Leitch (2010),Purdy (2010))
- Regulations(Davies & Green (2013))
- New Institutionalism(Abrutyn & Turner (2011),Carruthers (1995),Eggertsson (1997),Ingram & Clay. (2000),Senge (2013))
- Legitimacy and Rationality(Lounsbury (2008),Newton-Smith (2002),Power (2003),Schul & Mayo (2003))
 - * Certification(Farinha & Kumar. (2013),Terlaak & King. (2006),Terziowski *et al.* (2003),Wu & Liu. (2010))
- Modeling(Ambler (2002),Holt & Perry (2010))
 - Business Process Modeling(El Kharbili & Pulvermüller (2008),Elias & Johannesson (2013),García-Borgoñón *et al.* (2014),Gottschalk & Rosa. (2009),Hepp *et al.* (2005),Hepp *et al.* (2007),Reijers & Dijkman. (2011))
 - * Business Process Model Reuse(Becker & Laue. (2012),Becker (2007),Becker & Knackstedt. (2007),Bouchbout & Alimazighi. (2012),Dijkman & Mendling. (2011),Gottschalk & Rosa. (2009),Hepp *et al.* (2005),Hepp *et al.* (2007),Markovic & Stojanovic. (2008),Markovic & Pereira. (2008),McDonald *et al.* (2003),Yan & Grefen. (2012))
 - Enterprise Architecture(Burns *et al.* (2009),Holt & Perry (2010),Roeleven (n.d.),Ross (2006),Shah & Kourdi (2007),Tamm *et al.* (2011),Urbaczewski & Mrdalj (2006),Van Den Berg & Van Steenberg (2006),van Heesch *et al.* (2012))

The Technical Solution(Markus & Tanis (2000),Poole & Grudin (2010))

- Web 2.0(Hitzler & Rudolph. (2011))
 - Wiki(Brohée *et al.* (2010),Cubric (2007),Dunn (2012),Grace (2009),Holtzblatt *et al.* (2010),IOANNOU (2011),Lazda-Cazers (2010),McKiernan (2005),Parker & Chao (2007),Poole & Grudin (2010),Ravas (2008),Trkman & Trkman (2009),Yang & Lai. (2011))

- * MediaWiki(Kasemvilas & Olfman. (2009),McKiernan (2005),Yang & Lai. (2011))
 - Rationalize Procedures(Weber & Reijers. (2011))
- Semantic Web(Boiral & Gendron (2011),d'Aquin & Guidi. (2008),El Kharbili & Pulvermüller (2008),Elias & Johannesson (2013),Hepp *et al.* (2005),Hitzler & Rudolph. (2011),Janev & Vraneš. (2009),Kohlhase (2008),Shadbolt & Berners-Lee. (2006),Sheth (1999),Stojanovic & Studer. (2001),Teuteberg & Smolnik. (2013))
 - Semantic Wiki(Baumeister *et al.* (2011),Hitzler & Rudolph. (2011),Li & Huang. (2011),Millard & Wills. (2008),Monticolo & Gomes. (2011),Nalepa (2009),Schaffert & Kiesel. (2008),Schaffert (2006),Sedbrook (2010),Völkel *et al.* (2006))
 - * Semantic MediaWiki(Hitzler & Rudolph. (2011),Kröttsch *et al.* (2006))
 - Dynamic Programming Structure(Marlow (1993),Bronson & Naadimuthu (1997))
- Ontology(Beetz & Vries. (2009),Hepp *et al.* (2007),Ishizu & Nagai. (2008),Minegishi & Ishizu. (2008),Peroni & Vitali. (2013))
- Generic Training Material as "Ontology"

The Business Case

- Training and Knowledge Management(Grace (2009),Lazda-Cazers (2010),Li & Huang. (2011),Li *et al.* (2012),Millard & Wills. (2008),Monticolo & Gomes. (2011),Parker & Chao (2007),Cubric (2007),Schaffert (2006),Sedbrook (2010),Siemieniuch & Sinclair (2004),Stojanovic & Studer. (2001),Yang & Lai. (2011))
 - Support "Learning and Growth"(Chen & Hwang. (2005),Cubric (2007),Kaplan *et al.* (1996),Kaplan *et al.* (2004))
 - * Balanced Scorecard(Kaplan *et al.* (1996),Kaplan *et al.* (2004))
- Business Procedures(Dunn (2012),Ravas (2008),Sutton (2010))
 - Support "Internal Processes"(Kaplan *et al.* (1996),Kaplan *et al.* (2004))

The Project

- Measure IT Success - DeLone and McLean IS Success model(Delone (2003),DeLone & McLean (1992),Trkman & Trkman (2009),Urbach & Müller (2012),Yadav *et al.* (2013),Ghapanchi *et al.* (2011))

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- Optimize Resources([Brewster & Ommeren. \(2006\)](#),[Levinson & McLaughlin \(2004\)](#),[Van Den Berg & Van Steenbergen \(2006\)](#))
 - Operational Research([Bronson & Naadimuthu \(1997\)](#),[Marlow \(1993\)](#))
 - Multiple Objective Linear Programming([Marlow \(1993\)](#),[Bronson & Naadimuthu \(1997\)](#))

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