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Abstract (Provide an abstract of the mini-dissertation. An abstract is a short summary of the contents covered in the item.)	This project covers the proposal of the introduction of paperless processing in South African Financial institutions, to reduce the trail of paper being used and money spent on non-value adding resources.
Category (Enter the category in which the project was done. E.g. Operations Research, Simulation, Logistics…)	Engineering Economics, Business Engineering, Systems Engineering

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Paperless Environments: Fad or Fab

by

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submitted in partial fulfilment of the requirements for the degree of

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Executive Summary

Financial institutions are still tied to the historical ways of paper processing, in spite of the rising popularity of “green” processing and the high costs involved in paper processing and storage. This occurs especially when documents relate to compliance and legal documentation. The availability of workflow and enterprise content management solutions is no secret to these types of organisations, but it remains unclear as to why these organisations are reluctant to make transitions on large scales.

An analysis and business impact study will be done to motivate or disprove the use of electronic images by developing a financial model. This should however comply with the South African ECT Act. A further understanding of the barriers of change and the approach and methods needed to successfully make the transition from paper to image will be investigated in this dissertation.

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List of Acronyms

AeS	Advanced Electronic Signatures
CPA	Consumer Protection Act
DFM	Department of Facilities Management
ECT	Electronic Communications and Transactions
EDI	Electronic Data Interchange
IRR	Internal Rate of Return
JRP	Joint Requirement Planning
LAN	Local Area Network
MARR	Most Attractive Rate of Return
PM	Project Manager
POPI	Protection of Personal Information
ROI	Return on Investment
TCF	Treating Customers Fairly
UP	University of Pretoria

Chapter 1

1. Introduction and Background

This project was initiated by Deloitte to try and determine why South African financial institutions, a high percentage of their customer base, are still tied to old ways of processing. Deloitte specialises in finding financial solutions for their customers and the subject of going paperless is a fresh idea to pursuit. Technology is becoming more powerful and hence making the general processing much faster and more accurate. In Deloitte's eyes paper is old and inefficient; determining where it can and should be replaced is a new priority.

In present times the growth of information technology has taken the communication sector by storm. Telecommunication and e-mail currently form the main communication channels worldwide. Computers have changed the way the general public approach day to day tasks and organised daily activities.

Even though computer based documentation and communication rules all financial sectors activities in the present, paper is still being used in abundance. Financial institutions burry customers under stacks of paperwork when they register for services, attempt transactions or complete queries. These documents eventually have to be stored in some place safe, at a price, and it also needs to get there, digging further into company budgets.

Going paperless is the new trend amongst global leaders. Finding ways where ever possible to eliminate document duplication and printing, as well as minimising storage requirements and transportation costs are high on all of its agendas. By eliminating paper in most of the processing activities present, major savings can be made on annual budgets.

With the incorporation of the Electronic Communications and Transactions Act of South Africa, it was made possible to start doing business activities on computer documents and discard the old methods of paper processing. Why businesses are hesitant to take advantage of this and cut down on paper and paper processing costs will therefore be investigated in this dissertation. (Electronic Communications and Transactions Act, 2002)

1.1 Problem Statement

Being “greener”, the generic term used to label actions as environmentally friendly, is a popular reference in the current day business operations, but financial institutions do not always attempt to go all out in achieving a “greener” operational process. The evidence of this is hidden in paper warehouses all over the world. These warehouses are the final resting place for all legislated financial documents.

Why are institutions still tied to historical ways, when information technology has become so powerful and convenient? If the South African ECT Act allows digital images to be accepted as legal contracts, paying high fees for paper document processing, transport, storage and destroying seems unjustifiable. Technologies allow us to do all these actions without sheets of paper being used and information being duplicated to the annoyance of the customers.

1.2 Project Aim

The aim of this project is to create a better understanding of the tendencies of financial institutions in terms of its paper usage, reasons for this usage and also the reasons why the institutions are reluctant to move away from these methods of practice.

This study should eventually be able to either motivate or disprove the preference of paper processing above digital imaging with reference to the South African ECT Act.

1.3 Project Scope

1.3.1 Map the current state of possible beneficiary processes

Case studies will be completed at two different industries that may benefit from eliminating paper within its processes. Focus will be placed on a functional department of a tertiary institution and an investment institution.

The findings at these institutions will then be compiled into a current state analysis of the paper processing within these industries and how it may benefit from going paperless. Market research will be conducted to gather feedback from possible users

1.3.2 Develop cost breakdowns to understand drivers of transition

A cost breakdown will be developed with the information obtained from the case studies to determine the exact financial effects of paper processing. This will give clear indications as to which direct and indirect expenses are experienced due to paper processing and why it can be seen as unnecessary to experience these expenses.

These values will then be compared to the cost of implementing paperless processing operations as well as the indirect fees that will form part of the implementation, such as training.

1.3.3 Investigate the technology available and implications to consider

To estimate an accurate cost breakdown for paperless operation, an investigation into the current and possible future technology available to implement paperless processing will be required.

This will help understand possible advantages and disadvantages of change, as well as create a better understanding of the capabilities that a paperless processing operation may have and where shortcomings may be experienced.

1.3.4 Develop a high level model for transition

Finally a high level model for transition from paper processing operations to paperless processing operations will be required.

This model will include the steps of action to be taken, as well as how to approach the changeover from the existing paper documents to the new paperless process.

1.4 Deliverables

This project should create a better understanding surrounding paper processing costs within financial institutions and the breakdown of these costs. A better understanding will also be created as to why institutions are reluctant to large scale processing changes, what prevents them and how the process' customers feel about possible changes. The ultimate deliverable will be to determine whether going paperless is a more beneficial solution, in terms of customer satisfaction and financial benefits, and to create a high level model for the transition from paper to paperless processing.

These deliverables will depict the current situation within financial institutions within South Africa, but by being able to create an image of the South African situation, possibilities of implementation throughout Africa can be identified and expansion in these areas can also be investigated.

1.5 Chapter Summary

In this chapter the idea of paperless processing is introduced and defined. An overview of the subject is given, with reasons as to why it is being pursued by global leaders and what advantaged it may bring to institutions willing to move forward in a paperless direction. The subsequent chapter will provide a complete literature review on paperless processing with techniques and technologies available in this field and also a description of engineering and other methodologies available.

Chapter 2

2. Literature Review

2.1 History of Paper

The art of macerating the fibre of plants until each strand was separated was experimented with by the T'sai Lun Chief in 106AD. These separated fibres were mixed with water in a huge vat and a screen was dipped into the vat and lifted through the water, which caught the fibres on its surface. This layer of intertwined fibre was dried and the formed product was paper. (Handmade Paper, 2012)

Since then paper have grown in popularity becoming a major part of the present day society. For centuries paper has been used for communication over long distances and also to formalise agreements.

During 1975 George E. Pake, who headed the Xerox Corporation's Palo Alto Research Center, stated that by 1995 he will be able to access all his documents by a click of a button and receive any message electronically and finally stated that he will not see a need for hard copy then anymore. In present day his first two statements were absolutely accurate, but it still seems disturbing that his vision, for the need of hard copy documents, is still not shared by large scale paper utilizers worldwide. (Bloomberg, 1975)

2.2 Current State of Paper Processing in South Africa

From the initial creation of a record till the eventual warehousing and finally destruction thereof, financial institutions incur costs. A recent analysis, done by Deloitte Consulting, at a large retail bank proved streamlining processes and adding technology to this to eliminate paper usage within the bank, reduced operating expenses within the processing division. A reduction of 25% in expenses was recorded of which between 60% and 70% of savings was due to record management associated costs. (du Toit, 2012)

Initial investment may seem an issue, but when looking at the distribution of fees involved within the paper processing operations that can be cut, it certainly seems advisable. In the same case study as mentioned above, record management expenses could be broken down into the following drivers, as seen in Figure 1, with the cumulative value of the money spent exceeding R350 million per annum. (du Toit, 2012)

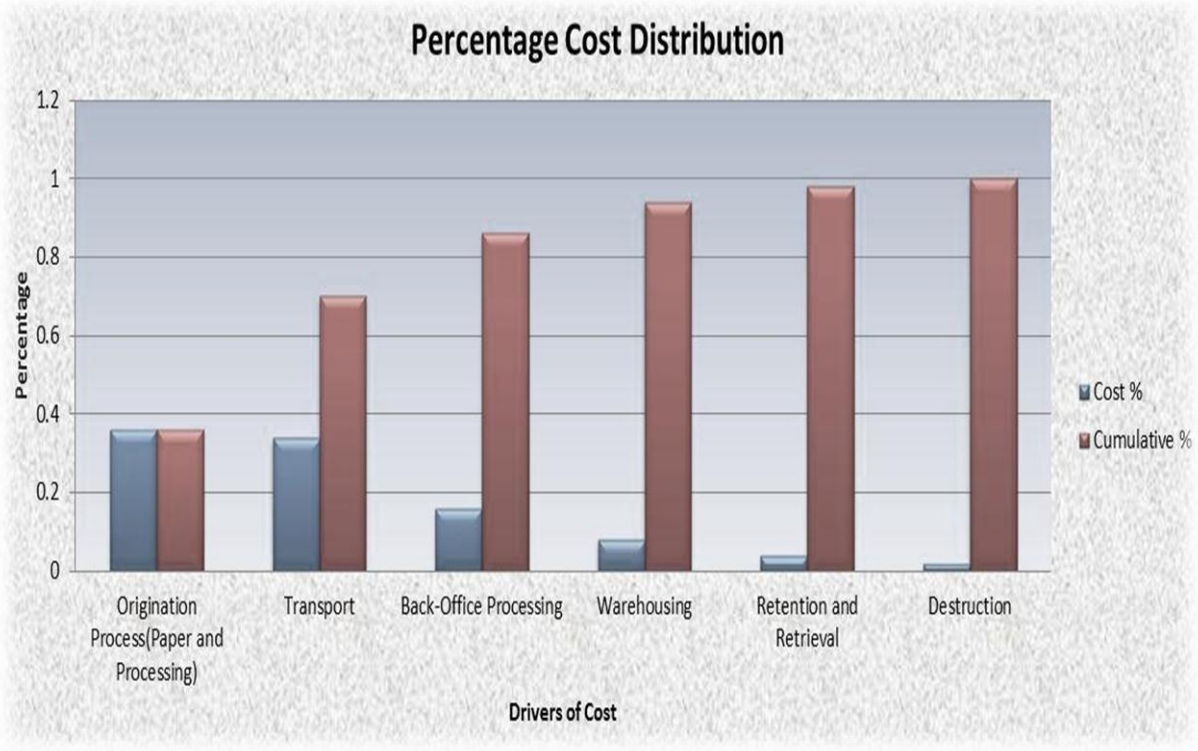


Figure 1: Driver Cost Contribution

2.3 Boundaries of Change

Due to increased regulations, increased insurance of effective record management needs to be provided from financial institutions. Increased transparency and the ability to provide effective reporting to regulators and management regarding financial stability, has to be addressed. Information regarding customers should be managed more often and effectively to comply with the Treating Customers Fairly, TCF, standards, the Protection of Personal Information, POPI, Bill as well as, the Consumer Protection Act (CPA). All of these aspects will have to be considered when deciding on the companion technology and how electronic data interchange, EDI, should occur. (du Toit, 2012)

The current systems that are in place will also form part of these boundaries, as it will need to be analysed and adjusted to be capable of handling paperless strategies. These systems can include daily meeting bookings to client registration documentation requirements. It is important to not bend these systems into its own destruction and ensure that its capabilities be synchronised with that of the technology being implemented.

Standardisation will also be required for the EDI between all parties concerned with transactions and documentations to ensure that everyone is capable of accessing the necessary data when desired to do so. (USA Department of Health and Human Services, 1994)

2.4 Barriers of Change

2.4.1 Resistance to Change

One of the biggest issues in changing any operation is the resistance provided from the human users or operators. Change intimidates people as they feel incompetent, or afraid of the uncertainty of how these changes might affect working experience. Optical Image Technology advises institutions to help staff share management's vision and get them involved in the development phases. A better understanding of the employees' skills is also created by doing this and limitations for software can be developed around this. (Optical Image Technology, 2011)

2.4.2 Capital Investment

Unfortunately most institutions stay away from large scale operational changes due to the initial capital investment required, without really considering the future implication that this investment can yield.

The necessary amount of capital to be invested will be dependent on the internal resources and competencies, the organisational size and the technology solutions selected. Thus to proceed on this transformation quest, a detailed business case defining these elements should be constructed. (du Toit, 2012)

Costs involved in the changeover will include:

- The design of the new processing system.
- The transition of old data if necessary.
- Hardware and software required for the new processing system.
- The training and information needed for workers to enable and facilitate the new processing system.

2.5 Technological Consideration

2.5.1 Digital Signatures

Multiple aspects of an organisation's workflow processes and procedures require formal authorisation or approval. Every type of organisation has at some phases within their process flow some form of authorisation requirements. Digital signatures enable organisations a solution to now approach this without picking up a pen and prevent corruption. It helps the organisation sustain signer authenticity, accountability, data integrity and non-repudiation of electronic forms and documents. (Arx, 2012)

A digital signature transforms the concept of a traditional paper-based signature into an electronic fingerprint. This fingerprint is unique to both the document and the user and thus binding them together. Changes made to the document by the signer, just before agreeing to the document, or by the organisation responsible for the document, after the signature was placed, will invalidate the signature. This ensures that no signature forgery and information tampering can occur. (Arx, 2012)

Digital Signatures occur in three steps, namely:

1. Public and Private Key Provision
2. The Signing of the Electronic Document
3. Validation of the Signature

Public and Private Key Provision

In order to sign an electronic document the signee requires a Private and Public Key. The Private Key is used by the signee to place their signature on the document and is not shared amongst the interested parties. The Public Key however, is openly available to all the interested parties and is used to validate the signee's signature. (Arx, 2012)

Signing of the Electronic Document

If the signee agrees to the terms within the document or simply just want to acknowledge the content the signee must, depending on the software used, simply click on a button confirming contractual agreement.

A document hash, the unique fingerprint of the document, is created by making use of a mathematical algorithm. The slightest changes within a document will result in a different digital fingerprint.

The digital signature is then compiled by combining the hash result, encrypted by the private key, and the user's digital certificate, which includes the public key. This ensures that the digital signature is unique, to both the document and the signee, and appended to the document. (Arx, 2012)

Validation of the Signature

Using the signee's public key, the recipient of the document can decrypt the signee's digital signature and receive the document hash of the document to which the signee agreed.

The document hash of the opened document can then be calculated and compared with the original document hash which was received after decryption. This exact same process can be followed to ensure that the document the recipient initially sent, as a contract, to the signee, was not tampered with before it was signed.

2.5.2 Electronic Data Interchange Methodology

EDI is the transfer of information in a standard electronic format between partners. This technology allows entities within the system, connected to an integrated system of electronic communication networks, to exchange information and process transactions in a cost effective and efficient manner. This is mostly possible due to the significant reduction or elimination of paper usage in transactions. (USA Department of Health and Human Services, 1994)

EDI is used in all database form of communication between partners, providing extensive information on transactions and record information across all boundaries of business. However, most of the time this information is still duplicated in the form of hard copy documentation, due to the lack of trust in systems and the risk of losing information in extreme circumstances.

2.5.3 Companion Technologies

To ensure the complete functionality of the EDI systems that will be used to implement the flow of information between departments and organisations, a form of support will be required towards the systems from the record holders. This informational support can be provided by means of fingerprint scanning, smart cards or magnetic strip cards.

Fingerprint scanning is the latest measures being taken in the technological identification. Software capable of performing identification by measures of fingerprint detection has grown in popularity and functionality. It provides the ultimate level of security as fingerprints cannot be stolen or duplicated as they are unique for each person. However a database of over a million records can prove to cause difficulty with operation efficiency as due to the nature of a fingerprint it will not be possible to detect these records very quickly. Technology to implement fingerprint scanning is also very expensive.

Smart cards are credit card size and contain an integrated chip that acts as its own computer. These cards can be used to store all kinds of personal data, from banking details to medical history. Thus they can act over a wide variety of areas and be used for consolidation of information in some instances. Issues however with these cards as they become more sophisticated are their cost, as well as standardisation of their performance or characteristics. (USA Department of Health and Human Services, 1994)

Finally customers can make use of swipe or magnetic-strip cards for identification purposes and accessing of records. These cards are capable of storing the basic information required to discover the desired records and allow the amendment thereof. This method of access will be slower than smart cards and cannot provide as much details of client history as always desired, but may prove to be more cost effective. (USA Department of Health and Human Services, 1994)

Taking future demands into consideration, the smart cards seem to be the most appropriate way to go. The consolidation of information is becoming a growing tendency within all forms of industries and the smart cards are the only technology at hand that are capable of storing this growing amount of data. It will be capable of storing medical histories and past transactions, making it much easier to access these files. It may cost a bit more now, but will have to be implemented eventually, thus it will save the investment capital of having to invest in another technology initially.

2.5.4 Possible Electronic Processing Issues to Consider

With the implementation of electronic systems there are always the issue of trustworthiness and reliability of data as it is interchanged from one partner to another. This is one off the biggest concerns for clients with the technological advances that are being taken nowadays. (USA Department of Health and Human Services, 1994)

Specific issues with EDI system that should be considered include:

- Client record confidentiality and privacy.
- Internal controls, to protect assets against waste, fraud and abuse.
- Audits and certification, ensuring the reliability and trustworthiness of EDI and paperless processing systems.
- Valid contracts, determining the degree of compliance to national standards set in the ECT and other relevant acts.
- Legal use of information submitted, to ensure the integrity of information through agreements made by service providers.

2.6 South African ECT Act

The South African Electronic Communications and Transactions Act was passed in 2002. The Act started with the basic premise that digital communications are no less valid than paper based communications. An important consideration that was taken into account when the Act was drafted is that the Act should be technology neutral so that it is not quickly dated as technologies evolve.

An important consequence of the act is that digital messages, such as email, were from then on seen as acknowledgeable in court as a fax or written letter. Section 11(1) states, "*Information is not without legal force and effect merely on the grounds that it is wholly or partly in the form of a data message".* (Electronic Communications and Transactions Act, 2002)

When it comes to signatures the Act makes reference to an advanced electronic signature which is a digital signature that has been accredited by the Accreditation Authority, or the Director-General of the Department of Communications. This signature is required where a law specifies that a document be signed according to Section 13(1). What is also interesting is that where an advanced electronic signature is used there is a presumption that the document concerned has been properly signed unless the contrary has been proved. Therefore the institutes, like banks, that have contracts

signed no longer have to prove that it was signed and remained as it was if the signee claims different. (Jacobson, 2006)

Where there is no legal obligation in term of a signature, parties can decide amongst each other how electronic agreements, letters and other documents must be signed. They can hence decide whether the digital signature needs to be advanced or not. Normal digital signatures have been available for some time from companies such as Thawte and Verisign. (Jacobson, 2006)

The admissibility of data messages is provided for in Section 15(4) of the Act as, "*A data message made by a person in the ordinary course of business, or a copy or printout of or an extract from such data message certified to be correct by an officer in the service of such person, is on its mere production in any civil, criminal, administrative or disciplinary proceedings under any law, the rules of a self-regulatory organisation or any other law or the common law, admissible in evidence against any person and rebuttable proof of the facts contained in such record, copy, printout or extract."* This proves as to how the Act tries to achieve parity between paper based documentation and its digital counterparts. (Electronic Communications and Transactions Act, 2002)

2.7 Accredited Advanced Electronic Signatures Service Providers

The South African Post Office Limited was supposed to have been accredited as the initial authorised service provider. This was stated in the South African ECT Act in Section 28(2). This movement however fell through, as South African Post Office Limited never attempted to come up with a solution up to recently. (Electronic Communications and Transactions Act, 2002)

In May 2012 the South African Department of Communication announced the accreditation of the first advanced electronic service provider in South Africa, LAWtrust. The accreditation of authentication products and services allows the electronic signatures of such products and services to qualify as advanced electronic signatures (AeS); thus using a digital certificate issued by LAWtrust for this purpose is now deemed in terms of the ECT Act to be an advanced electronic signature.

LAWtrust embarked on its journey since 2007 when the regulations for accreditation were released to the general public. LAWtrust's AeS solution was submitted in September 2011 where after a stringent evaluation process, it received accreditation at the end of May 2012.

LAWtrust is currently the only AeS service provider in South Africa and thus leaders in the market. The solutions offered by LAWtrust will be explored in the forthcoming case studies.

2.8 Classifications of Methods

Embracing the big picture of paperless management will help alleviate the anxiety that comes from seeing the project in terms of countless calculated activities and specific tasks. When designing a paperless management system it is extremely important to engage with all the various departments. This will assist with the accuracy of data gathered, avoid conflicts and secure the meeting deadlines. (IntelliChief, 2012)

2.8.1 Map the Current Process

Process mapping will take place in the form of flow process charts. This will give a clear indication of the operations the paper documents go through up and till the final destruction thereof. It will show where which elements are present and the durations or distance of travel present during these elements.

The flow process chart is especially valuable in the recording and identifying of non-value adding activities during the lifetime of the entire process. Once these areas are highlighted it is possible to address and reduce these elements, or for this project's goal, eliminate it entirely. (Freivalds, 2009)

2.8.2 Identifying Goals and Requirements

When identifying the goals and requirements for the project, it basically comes down to what the institution would like to accomplish with the implementation of paperless processing systems. These goals should be from an operator's, as well as client's perspective. (IntelliChief, 2012) Goals and requirements can be categorised in terms of the following subgroups:

- Accessibility
- Automation
- Cost reduction or Time saved

The following two points are major factors in determining target values for the proposed project's performance standards. These standards will ultimately influence initial investment and upkeep costs.

Market Research

Market research will be done by means of distributing questionnaires to the general public. In order to touch down with as broad a variety of the population as possible, all forms of electronic resources will be used.

Questionnaires allow analysts to collect responses from a large number of people, while still maintaining uniform responses. No other fact-finding technique is as effective as questionnaires when dealing with large audiences. The questionnaire will be of a fixed-format, making use of multiple choice and ranking questions. (Whitten, 2007)

Key Users and Department Interaction

Interaction with key users and departments will be done through Joint Requirement Planning, JRP, and combining work environment observations with interviews and questionnaires.

JRP is a fact finding technique that actively involve users and management in the development of a project. Using this technique reduces the required time to develop a system as all inputs can be receive at once to create a general impression of all people being influenced by changes. However a downside to JRP is that generally operators are intimidated by management to accepting their ideas. Thus interviews during work environment observations will ensure their complete satisfactions with goals being set as well. This will make goals and requirements more accurate and realistic. (Whitten, 2007)

2.8.3 Economic Feasibility Study

An economic feasibility study is a study on whether a project is viable after taking into consideration its total costs and probable revenues. If the revenues cover the costs of the project, or if the expenses are lowered from one alternative to another, it is deemed viable. (Investor Words, 2012)

The economic feasibility study will create a representation of the costs involved in the current state of the paper processing within institutions. This will then be compared with an estimate of the costs that will be occurred in the changeover period of going paperless, including the upkeep of the paperless processing system. By creating this representation it will be easier to come to a final conclusion whether going paperless is not only beneficial for customer service and environmental aspects, but also for the finances of organisations. A final decision can be made by using a MARR-value, most attractive rate of return, specified by the involved institution and determining the net present values and the ROI, Return on Investment, of these alternatives over a long period of time. Without a MARR-value this analysis will not necessarily satisfy the investor's demands as the MARR-

value will be according to the analysts own judgment. Factors such as inflation and interests on loans and investments should also be considered. (Newman, et al., 2009)

Feasibility studies are crucial during the early development of any project and form a vital component in the business development process. Accounting and Advisory feasibility studies enable organizations to assess the viability, cost and benefits of projects before financial resources are allocated. These studies also provide independent project assessment and enhance project credibility. (Deloitte Global Services Ltd, 2012)

2.8.4 Alternative Methods

A method that could be used for the analysis of this project, but is deemed to be more than necessary is:

Period of Payback

The period of payback method of analysing an economic investment determines the break-even point of an investment. It uses the initial investment costs, upkeep and revenues earned to determine how long a project will have to be run before earning a profit. (Newman, et al., 2009)

This method creates a duration-based analysis, and in this project the focus is on the financial aspects and benefits that paperless processing could produce, therefore it can be seen as unnecessary additional figures.

2.9 Chapter Summary

In this chapter the current stance of paperless processing is discussed, especially in terms of the South African perspective. All available methodologies, for going paperless, are discussed and the most appropriate methods have been identified and elaborated on. In the next chapter the techniques chosen will be used to address the stance on paper processing within financial institutions and determine whether going paperless is the next actions to take within these institutions

Chapter 3

3. Case Studies

It is important to embrace the big picture of paperless processing. This will prevent the anxiety present from seeing the tasks at hand as countless activities. The ultimate journey from the present paper processing situation to a paperless solution will be addressed in this chapter.

3.1 University of Pretoria's Department of Facilities Management

This section will refer to work done with the University of Pretoria's paper processes within the Department of Facilities Management to date. These processes include the awarding of contracts for construction and maintenance activities within UP's boundaries.

3.1.1 Identify Key Users and Problem

Key Users

Upon initial inspection it seems that the key users of the paper processes within the Department of Facilities Management are all the parties involved with the contractual agreements of construction and maintenance activities. These key users are classified as:

- User Client
- UP Role Players
- Project Managers
- Consultants and Contractors
- Deputy Director of the Department of Facilities Management
- Director of the Department of Facilities Management

Problem Definition

Problems that are currently being experienced vary across a wide array of areas. Security concerns, accessibility, communication and storage space are all present and needs to be addressed.

Currently the project documents are at all times in the possession of the respective project manager. These documents are contractual agreements and are of critical importance to the projects being completed. It states all the agreements of all parties, as well as remunerations for certain events.

The role players involved in the projects also do not have access to the documentation at all times and periods of receiving these documents after requesting it is an inconvenience. It is also not always possible for management to approve actions, as they are uncertain with which project it has to do and they cannot quickly get access to the relevant documentation to refresh their minds.

The University's archive is also filled to maximum capacity and they no longer know what to do with these construction and maintenance documentation. In order to keep these documents at a central storage place changes will be necessary. Building an extra archive however seems a waste of capital, transition of offices into paper storage areas seems to be a waste of capacity and outsourcing the storage makes access to the documentation tricky and tedious.

3.1.2 Goals and Requirements

The goals at hand will be categorised in the subgroups as stated earlier.

Accessibility

This project should eventually result in the improvement of authorised access to all the necessary documentation within projects being done by the Department of Facilities Management by logging into their profile from any location. This access should also be faster than present, but still be secure and limited. The use of digital signatures should warn if any documents have been tampered with.

Automation

The paper trail of the current processes must be cut to a minimum and all retrieval operations should be automated. It would also be better if tenders and documents can be received digitally, indexed automatically by making use of unique project codes and then sent to the correct destination by referring to the reference number. All the construction projects' documentation should be stored within a labelled folder in separate hard drives to ensure the security thereof. Finally automation should also be available in the distribution of the necessary documentation to the parties responsible for authorising and approving them.

Cost and Time Savings

The main paper based costs currently involved are those of document printing and copying. These costs will have to be cut to a minimum with the consumption of this project. Time savings should also result from the automation in the distribution and retrieval aspects of the system in place. The replacing of paper with digital documents should also result in cost saving in terms of the amount of fireproof safes required on site for storage.

3.1.3 Process Flows

The following diagrams show the breakdown of activities for each phase of a construction project from the viewpoint of the project manager. It breaks the phases down into their respective level within them to ensure a clear understanding of the tasks at hand.

Inception and Initiation

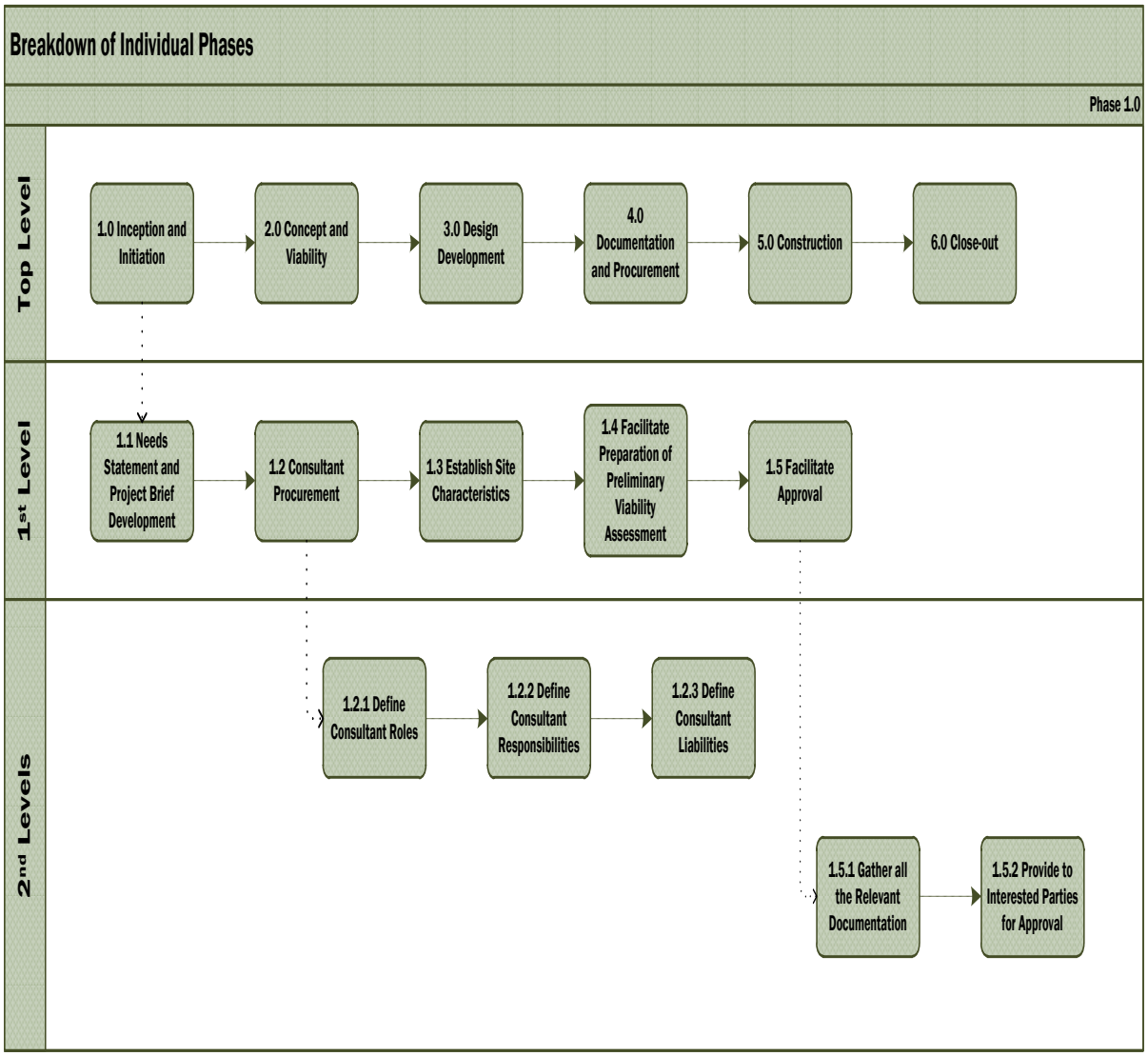


Figure 2: Inception and Initiation Phase Breakdown

The image above visually depicts the flow of the processes and the breakdown of them in the inception and initiation phase of the construction management procedure. During this phase two paper records are created. During stage 1.1 the needs statement is created and distributed and at stage 1.2 the procurement and appointment documentation is created and signed. Both these documents are of a similar form for every project and hence electronic templates should be capable of satisfying these documentations' requirements.

Concept and Viability

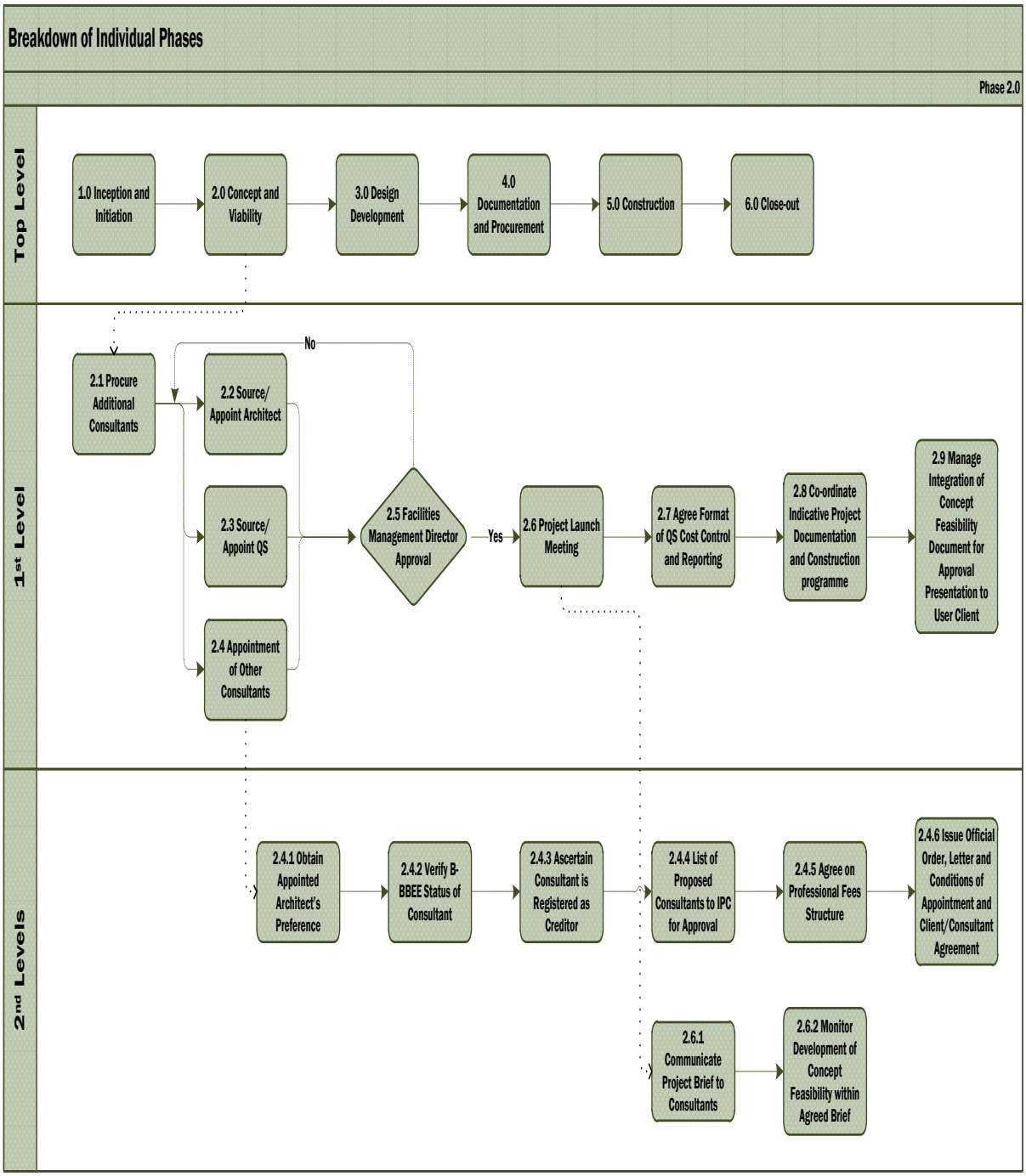


Figure 3: Concept and Viability Breakdown

Figure 3 shows the flow and breakdown of the second phase of processes in the system. Procurement and appointment documentation will once again feature at stages 2.2 to 2.4. The cost framework is also received from stage 2.7.

Design Development

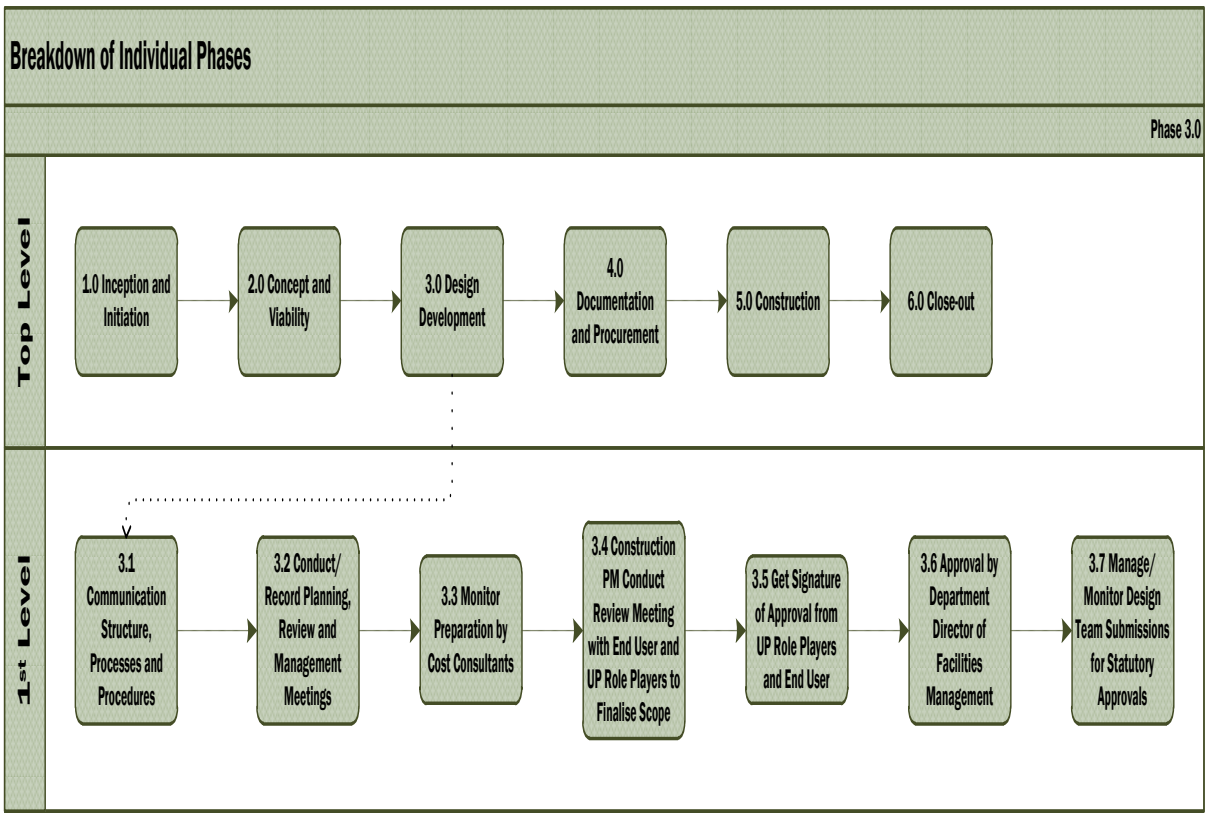


Figure 4: Design Development Breakdown

Design development is the third phase of the system being investigated. During this entire phase agendas are being created and minutes of meetings recorded. This however is largely electronic already and distributed via email. The signatures of approval are all done on the original copy of the documents approved. Building plans are generated at stage 3.1 and there is a lot of paperwork also generated for the review meeting at stage 3.4.

Documentation and Procurement

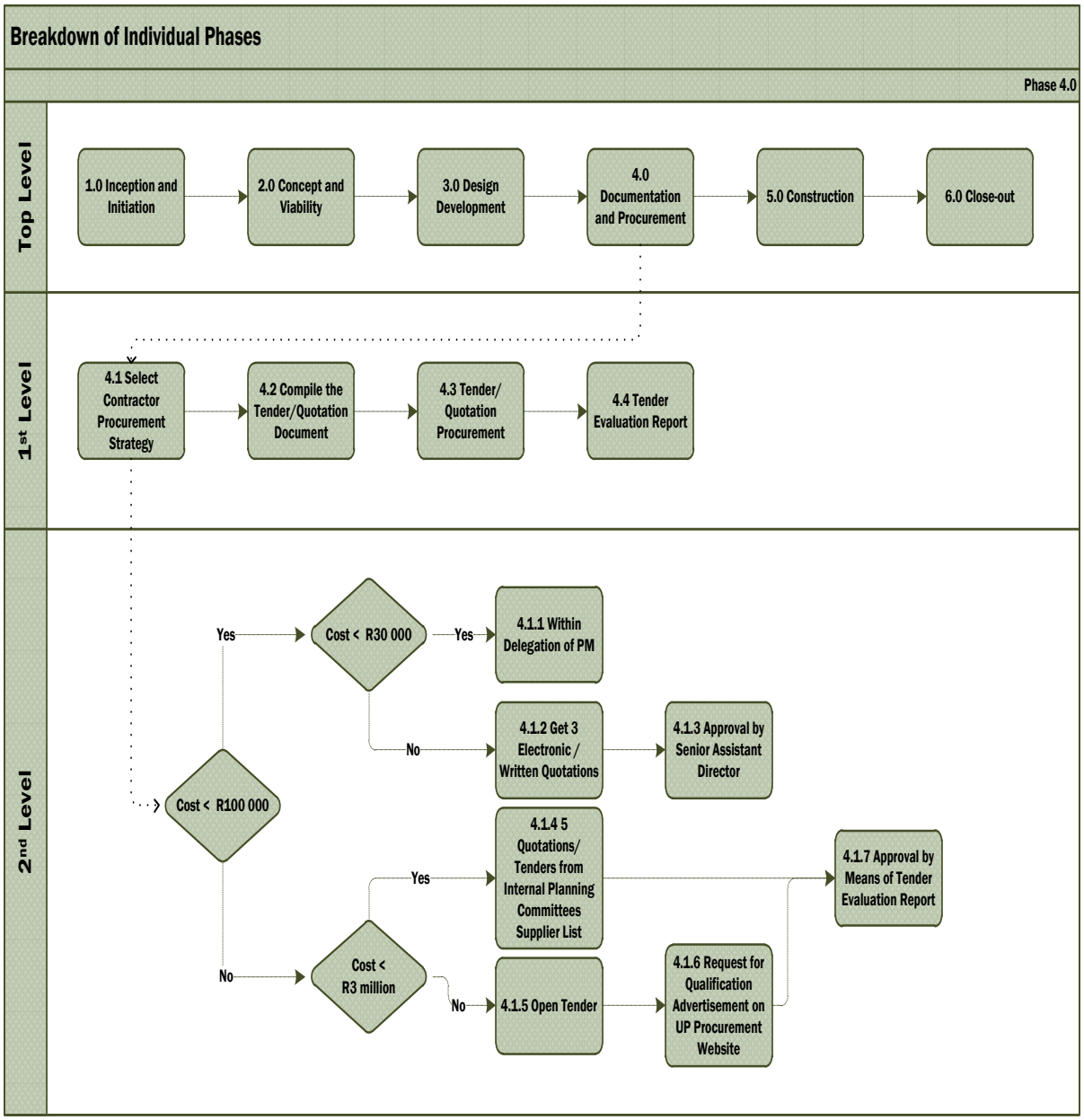


Figure 5: Documentation and Procurement Breakdown

In the figure above all the stages of the documentation and procurement breakdown is clearly indicated. This is the phase where the most paper is being used and should be analysed critically. At stage 4.2 the tender document is created and made available. The tender applications are received from all the applicants at stage 4.3 and these tenders are recommended and finally approved at stage 4.4 by completing the tender evaluation report. All of these steps require paperwork to be completed.

Construction

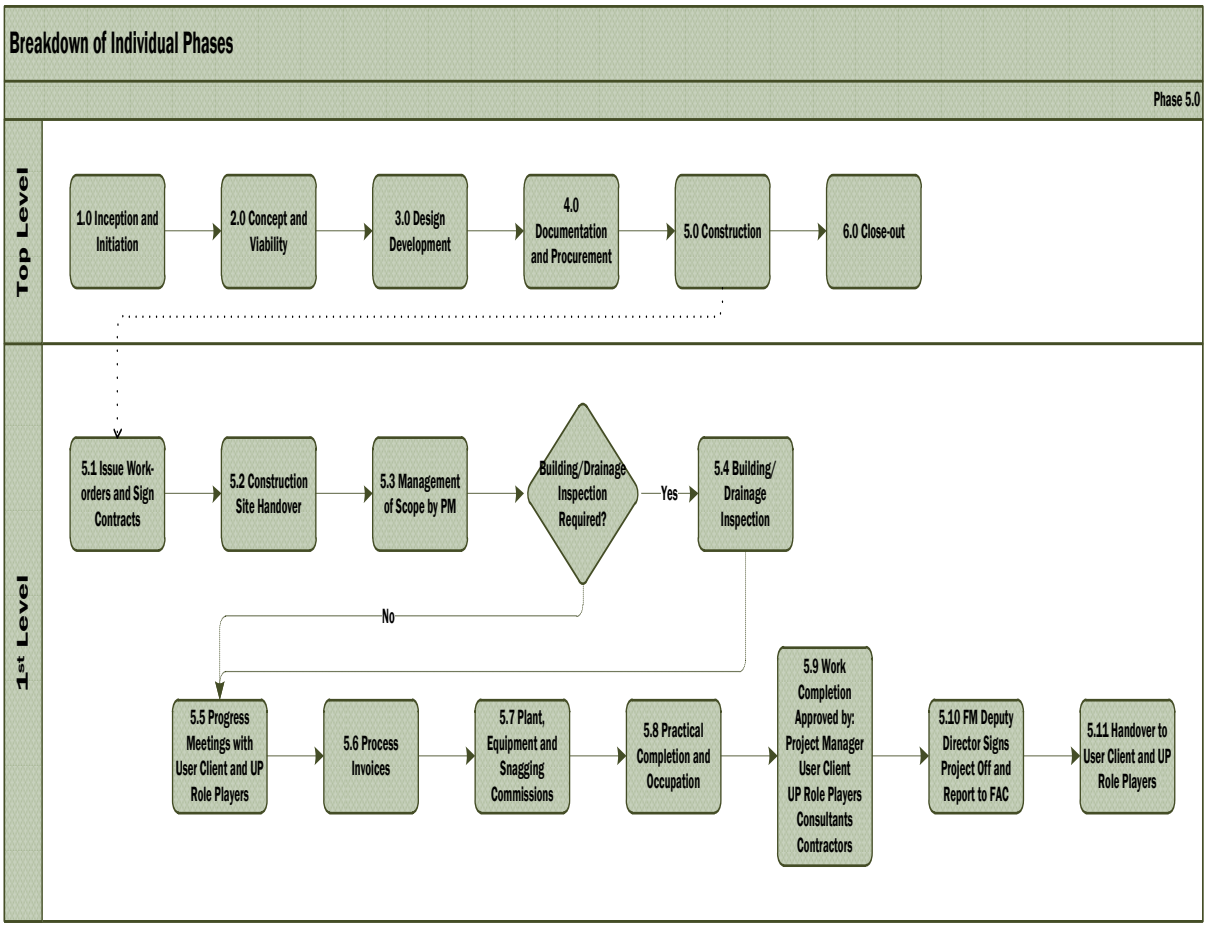


Figure 6: Construction Breakdown

The figure above describes the stages that occur during the construction phase. During this phase a lot of documentation needs to be constantly done and updated to keep up with the current completion percentages. Meeting agendas and minutes, as well as payment certificates are produced through the whole phase at different time periods as these documents are required. At stage 5.1 the contractor appointment and JBCC 2000 contract documents are introduced and need to be signed by the authorised personnel. At stage 5.7 the snag list is introduced to the fold to ensure that all is in order before occupation or to show what work still needs to be done after occupation. The completion and occupational certificates are produced at stage 5.8, further contributing the paper pile-up. Finally at stage 5.8 the warranties and user manuals are compiled. These are the last documentation that has to be produced for the process to occur as it has up to now. It may however be more beneficial to produce the user manual in paper format as the users will not have access to the destination of the files that will be created for a paperless movement.

Close-out

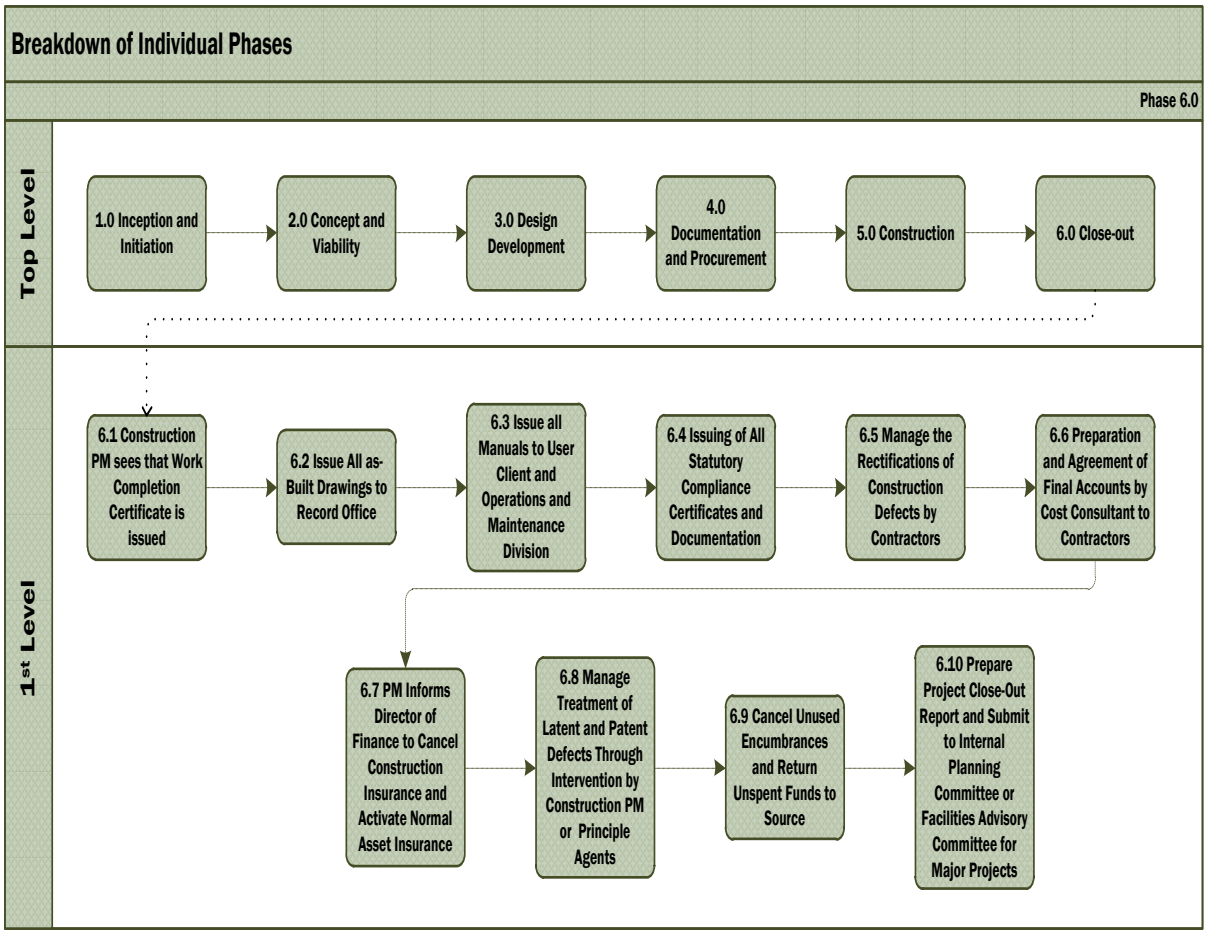


Figure 7: Close-out Breakdown

During the close-out phase of the project, no extra documents are created. All the documents created to date however are consolidated and issued to the respective parties responsible for the storage or safe-keeping thereof. This is where the paper creation will end for the construction period of the project at hand. The documents are mostly stored in the university's archive, but this facility is reaching full capacity presently.

Documentation Summary

In table 1 that follows, a summary of all the documentation included in a project attempted can be viewed. It shows the phases where the documents are introduced and applicable, as well as the most-likely amount of pages to be included in the specific document. The table also shows who has to be approached for authorisation and who must be informed otherwise for each document. This is important for the generation of an AeS for each one of the parties required to authorise the document at hand.

Document	Phases Applicable		Pages	Authorisation Required							
				User Client	UP Role Player	Project Manager	Consultants	Contractors	Deputy Director	Director	Exec Director
Needs Statement	1.1		100	I		I	I		A	A	A
Appointment & Procsa	1.2	2.1	250	I		I	A		A	A	
Costing Framework	2.7		100	I		I	I		A	A	
Building Plans	3.1		50	I	I	I	I	I	A	A	
Planning revision meeting	3.4		50	I	I	I	A		A	A	
Tender Documentation	4.2		400	I		A	I	I	A	A	
Incoming Tenders	4.3		30	I		I	I	I	A	A	
Tender Recommendations	4.4		20	I		I	I	I	A	A	
Tender Approval Report	4.4		10	I		I	I	I	A	A	A
Order to Contractor	5.1		10	I	I	A	I	I	A	A	A
Agendas and Minutes	3.0	5.0	500	I	I	A	I	I	I	I	
Construction Revision meeting	5.5		50	I	I	I	A	I	A	A	
JBCC 2000	5.1		50			I	I	A	I	A	
Snag List	5.7		50	I	I	I	A	I	I	I	
Payment Certificate	5.0		100			I	A	I	I	I	
Completion Certificate	5.8		20	I	I	I	A	I	A	I	
Occupational Certificate	5.8		10	I	I	I	A	I	A	I	
Warrantees	5.11		100	I	I	I	A	I	A	I	
Operating Manuals	5.11		400	i	A	I	A	I	A	I	

Table 1: List of Documentation and Authorisation Requirements

3.1.4 Proposed Implementation

The proposed solution will attempt to automate the document generation and storage. By doing this it will allow easy access to the documents for all parties who may gain access. This also improves the safety of sensitive information and, as long as the paperless movement is embraced, will not require any other storage facility apart from a secured back-up drive. The use of an AeS, where signatures of approval is required, will allow the process to avoid the creation of a paper document for authorisation purposes.

The only people who will need access to the documents will be the project managers, deputy director, director and maybe the executive director. The other key users do not require full time access to data and therefore can request it from the project managers if it is needed. These users are outside the Department of Facilities Management and hence do not and should not have access to all documentation regarding projects.

The issue revolving around the difficulty of access to project specifications for a person acting as a temporary project manager for projects, when the PM is on leave or sick, can be addressed by creating a secondary PM. By allowing this person temporary passage to documentation, as controlled by either the Deputy-Director or Director, it will always be possible to have an active project manager on any project at all times.

Context Flow Diagram

The figure that follows depicts the interactions required between the external entities and the central storage system itself. It shows the connection and direction of this informational flow.

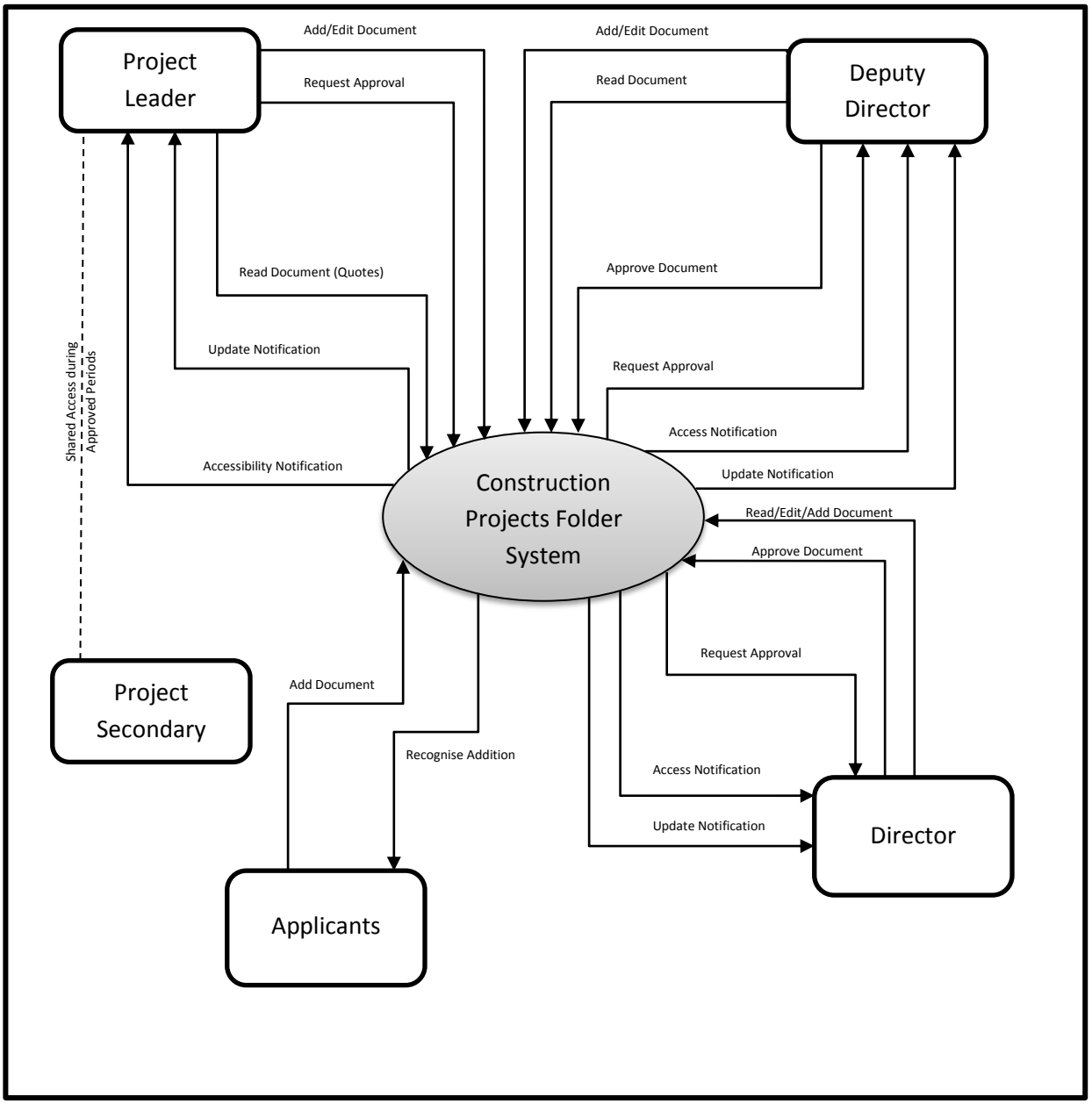


Figure 8: External Interactions Required with the Information System

System Requirements

The solution will require a minimum of eleven personal computers that are connected in a network structure to the information system. These PC's are for the nine project managers, the deputy-director and also the director of the Department of Facilities Management. All these parties however already have access to the UP network with the work laptops and PC's provided, so only software installation will be required for access purposes.

Another requirement for the system itself will be automated storage for all incoming documents against a reference number that should be created with the initialisation of the specific documentation phase. If these documents can be sensitive or should be hidden to prevent the impeding on the applicant's right to fair competitiveness, access restrictions should guard them.

Access to documentation should also be possible from any destination via an internet connection, to ensure that PMs have access to documentation whatever the situation may be.

3.1.5 Present Paper Processing Expenditures

Origination Process

The department is believed to have up to 300 projects on an annual basis, all of them varying in size, duration and paper usage. Most of these projects are smaller and of short duration and hence to accurately predict the paper requirements on an annual basis a Monte Carlo simulation was run to estimate the paper required by each project. The paper requirements provided in the documentation summary phase of the case study was implemented. Smaller project's documentation needs were calculated by eliminating tender related documents and limiting documentation categories that are dependant of the size of the project, like user manuals and agendas and minutes.

The values generated were in turn totalled to calculate the amount of paper packages used, as well as estimating total printing costs at six sent per page.

Transportation

The department do not have any transportation expenses that can be traced back to the paper processes, directly or indirectly. The paper stays on the premises or travel with PM to where the PMs need it to go for referral purposes, but there is no activities involved that require the transportation of the paper document as primary purpose.

Back-Office Processing and Storage

With the present process, no employees have dedicated responsibilities into the management or storage of project documentation. Therefore no wages are dedicated to the back-office processing activities that the process may experience.

The current storage facility is on-site. This is a small office space where most documentation is kept. As the available room is not able to be used as a work space it can be seen as wasted capacity. The room of about $20m^2$ needs to be covered at R75 per square metre per month.

Retention and Retrieval

This category is one of the critical reasons why the possibility of implementing a paperless environment is being investigated. It is almost impossible to place a monetary value on retention and retrieval as it cannot be simplified to this extent.

It is however a major nuisance to wait for documentation or having to search for it for long periods of time. It wastes the capacity of employees who could have been productive during these periods. It is therefore mentioned as it should contribute to the economic situation of the present process, but due to the difficulty of precisely defining the unproductive periods, it proves to be too complex to be evaluated as a monetary driver.

Destruction

Presently the Department of Facilities Management have no policies requiring or overlooking document destruction. Because of the nature of the projects done, it is unprecedented to destroy the documentation as some projects, like buildings, stay on the premises for decades.

The table below indicates the estimations of paper expenses within the DFM presently and in the upcoming years. The values were simply increased by a rate of 8% per annum as paper usage and the project capacity of the DFM is not expected to increase.

Year (Start)	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Present Paper Process						
- **Origination**	-	R 46 799	R 50 543	R 54 586	R 58 953	R 63 670
- **Storage**	-	R 18 000	R 19 440	R 20 995	R 22 675	R 24 489
Total	**-**	**R 64 799**	**R 69 983**	**R 75 582**	**R 81 628**	**R 88 158**

Table 2: Estimated Current Paper Expenses

3.1.6 Paperless Solution Expenditures

Hardware

Currently, all PMs and other employees who will require access to the paperless information system have laptops and/or personal computers with access to the university's network. Finances for the upgrade or update of this equipment are placed aside on an annual basis and the equipment's hardware will not have to be updated to move towards a paperless environment.

Printer and copier usage will also decrease, making it unnecessary to update with implementation of the solution. As paper may still move into the system, without being generated within it, it will be of extreme importance to have a scanning facility that is easy to use and access. This will allow the paperless environment to be preserved and prevent a mixture of storage locations, as well as mediums. A total of R20 000 will be adequate enough to cover this equipment's purchase, installation and setup as a scanning capacity and frequency of use will not be too high. The HP Scanjet 7500 was used as baseline.

An external hard drive will also be necessary for back-ups of the system on regular occasions. This drive can be stored within a fireproof safe within the DFM offices. This will ensure that access to documents will be available even after disastrous events. R3 815 will be enough for a Seagate BlackArmor NAS 220 4TB hard drive. Seagate is a global leader in network external hard drives, thus proving to be a reliable and effective solution.

Software

The main budgetary concern for going paperless for this solution is the information system design. The design, as previously explained, will have to conform to certain requirements and fit into the day to day activities being applied within the department. The software can be developed by the experts within UP, making the design far cheaper than outsourcing the solution's development.

For the purpose of this case study, an outside quote will rather be used to enable the solution to be applicable to similar situations in other areas and organisations. This ensures that the case study is more universal and of interest to a wider population. The quoted cost for a solution as stated previously will be around R72 000 and no development period will be necessary as "off the shelf" solutions are available from most outsourced suppliers. This quote was received from Nashua South Africa's Solutions and Innovations Manager, Ben Sheppard.

The main reason going paperless has become possible for all activities are due to the AeS technology, which will also form part of the solution's costs. Within the DFM, signatures are only required on documents by the Deputy-Director and the Director. Therefore 2 AeS solutions must be

acquired from LAWTrust. These AeS will allow the Deputy-Director and Director of the DFM to show approval of what a document states and also allow the parties involved with contracting to show and prove originality and authenticity of a document for a total of R300 per month for each of the entities' signature.

Integration & Implementation

The designed information system will have to be integrated with PeopleSoft. This will be the most challenging phase of development. As PeopleSoft has been around for some time, most developers have already made custom integrations for the software developed or that the developer implement. This means that by selecting the correct developer, integration will be very cheap and will not require extra time. The integration cost was included in the development quote.

After a discussion with Ben Sheppard, it was concluded that user training can be budgeted for one day only at a rate of R650 per day. Administrative training was also estimated to take five days at the same rate as previously mentioned.

The following table illustrates a summary of the expected cost for the implementation of the proposed solution at the rates specified above, including the annual cost of printing manuals and building plans, as these prints cannot be avoided by going paperless.

Year (Start)	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Proposed Process						
- **Hardware**	R 23 815					
- **AeS**		R 7 200	R 7 776	R 8 398	R 9 070	R 9 796
- **Software**	R 72 000					
- **Implementation**	R 3 900					
- **Paper Costs**		R 8 005	R 8 645	R 9 337	R 10 084	R 10 891
Total	**R 99 715**	**R 15 205**	**R 16 421**	**R 17 735**	**R 19 154**	**R 20 686**

Table 3: Annual Expected Expenses of the Paperless Solution

3.1.7 Economic Feasibility

The calculations have been done over a future period of five years, as after this period it will be necessary to re-evaluate the system performance and look at newer technological advancements and implementations.

The figure below shows the annual cash flow forecasted for the implementation of the solution. Values below the x-axis indicate expenses and above shows the income, or for this example the savings for the year due to reduced transport costs. Inflation for this period was selected as 5% per annum, as this is the repo rate specified by the South African Reserve Bank.

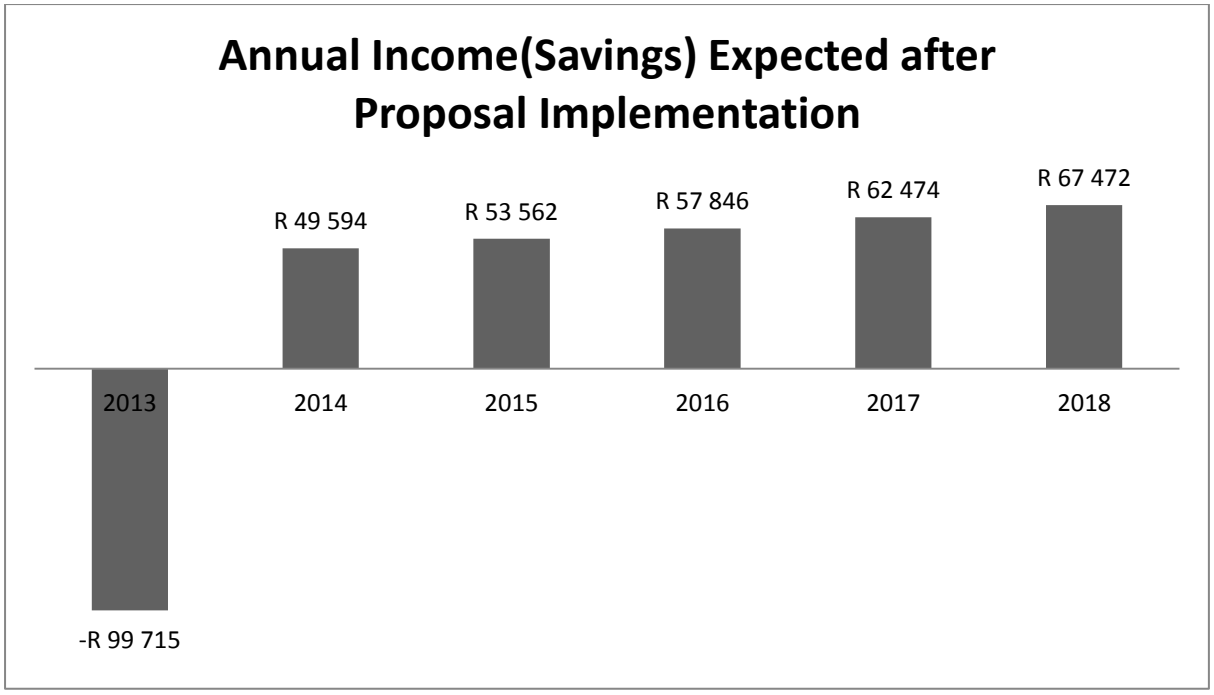
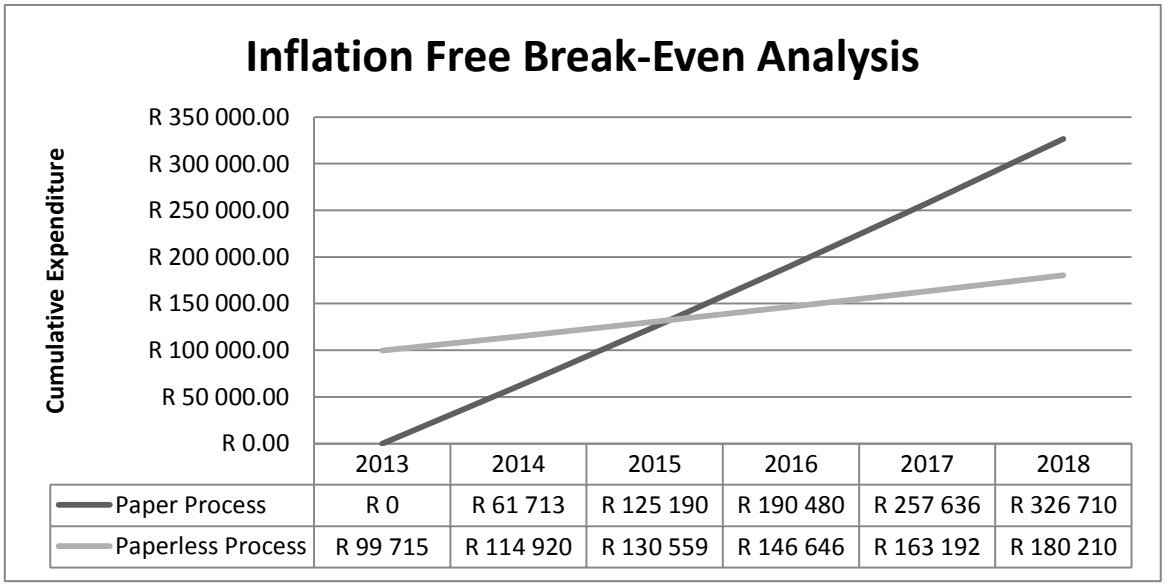


Figure 9: Expected Annual Income after DFM Proposal

By using engineering economic principles to eliminate the inflation values and to evaluate internal rate of return (IRR), an IRR-value of 39% can be calculated. This means that the savings made over this five year period is equivalent to an interest rate of 39% on the initial investment.



	2013	2014	2015	2016	2017	2018
Paper Process	R 0	R 61 713	R 125 190	R 190 480	R 257 636	R 326 710
Paperless Process	R 99 715	R 114 920	R 130 559	R 146 646	R 163 192	R 180 210

Figure 10: DFM Paperless Movement Break-Even Analysis

The figure above shows the cumulative, inflation free, totalled expenditures for each year. From this it can clearly be seen that the project will break-even during its second year of operation. The break-even point will be near the end of 2015.

Taking the IRR and break-even analysis into consideration, the project implementation should certainly be considered as it certainly is financially feasible.

3.1.8 Implementation Plan

The implementation of the paperless solution should be implemented through two phases. The first stage will be the trial period, where after the full scale implementation phase will occur.

Trial Phase

The trial period should be implemented as soon as possible to ensure sufficient testing and evaluation of the system requirements that should be developed. For this period a system, representative of the functions of the final implementation, must be developed on the central repository of the university. The development period of this was estimated to be no more than two weeks. This system should be used as a practise run and frequent feedback should be enquired from the system user to ensure all needs and issues are counted for in the final implementation.

It is further of utmost importance that management fully embrace the movement towards paperless processes as this will determine the employees' mood with respect to the acceptance of the changed working environment. A paperless philosophy must be put in place and employees should be encouraged to do business activities paperless, as far as possible. The figure below visually indicates which activities should occur when.

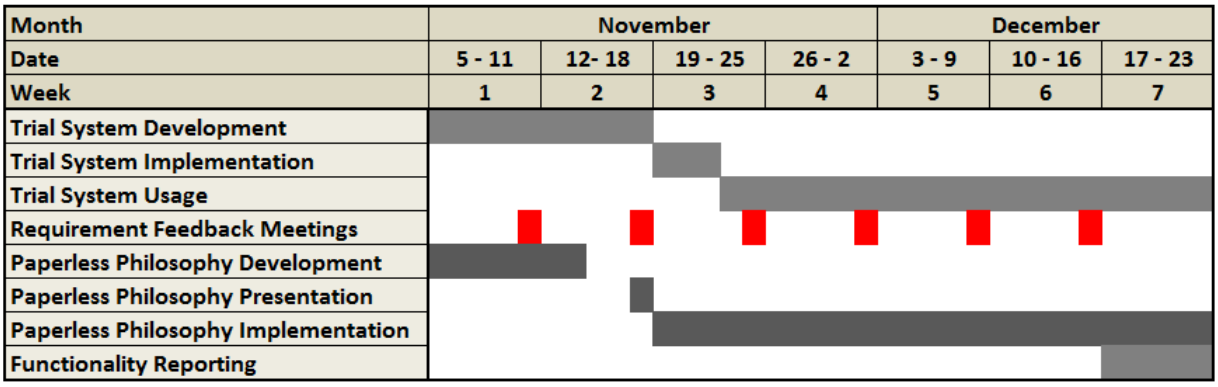


Figure 11: Trial Phase Gantt-Chart

Full Scale Implementation Phase

This phase should be started once a final decision, based on user requirements, is made in the trial phase. Ideally it should start at the beginning January 2013 to ensure all projects for the year be recorded from the start of the year. This phase consists of:

- The physical implementation of hardware and software
- The administrative training procedure
- The user training procedure
- The transition activities to eventually have all projects stored electronically

Upon the conclusion of this phase, the project should be completely up and running and functioning properly. All business activities will, with the closing of this phase, happen on the dedicated information system. The figure below visually indicates which activities should occur when during this phase.

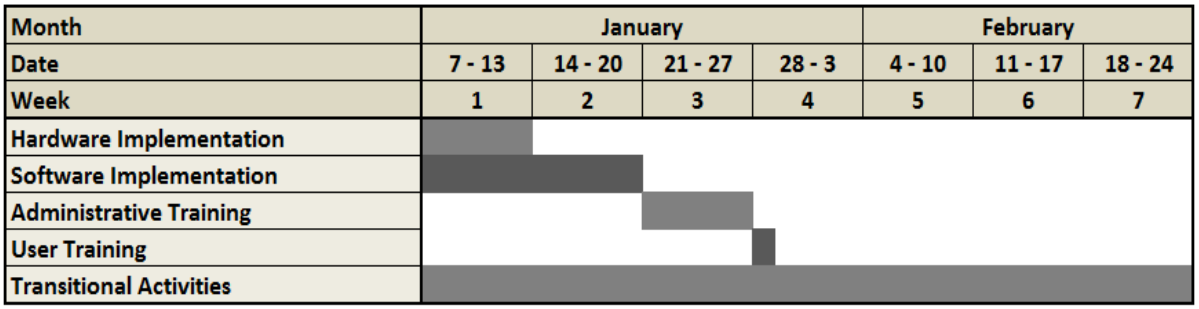


Figure 12: Full Scale Implementation Phase Gantt-Chart

3.1.6 Case Study Review

This case study open the debate as to why going paperless has not been considered earlier and why the development of AeS technology was not embraced earlier.

In this section the DFM is introduced and the current trend of paper processing within the department is identified. The process flows, requirements and costs of the paper process is analysed and evaluated to in turn be able to set requirements for a paperless solution.

The requirements set, made it possible to create a framework of the information system design that would be required to implement going paperless. These requirements and the framework were evaluated to a further extent to estimate a costing framework for the proposal.

With the completion of the financial feasibility study, it was clear that the proposed implementation would be extremely beneficial. The project breaks even close to the end of its second year of operation and renders an IRR of 39% over a five year period.

The implementation plan, concluding the case study, shows the way forward. It demonstrates the steps to take and how to integrate the solution into the operational procedures. Identifying two distinct phases and guiding the department into the future paperless environments and operations.

3.2 MMI Holdings Ltd Africa Claims and Account Processing

3.2.1 Problem Description

During December 2011 Momentum Africa, now known as Metropolitan International, started investigation into the company's health and life insurance claims and account processing procedures.

The processing was being done at a centralised location in Houghton, South Africa. The costs of transporting the physical paper documents, which mostly consisted of claims and new membership subscription, were starting to put pressure on the department's economic situation. These documents had to be transported over long stretches of African roads and risks of losing confidential client documents were very high.

A solution for the costing issues, as well as the risk of losing the documentation had to be investigated. The decentralisation of the document processing was considered and has since been implemented.

This case study will further present details of how this strategic change, to eliminate the prominent paper processing cost driver, can help a financial institution without that institution having to eliminate paper as a whole.

3.2.2 Initial Processing Procedure

The figure below will create a better understanding of the physical paper flow and processes that were at hand during claim and membership recording at Momentum Africa during December 2011.

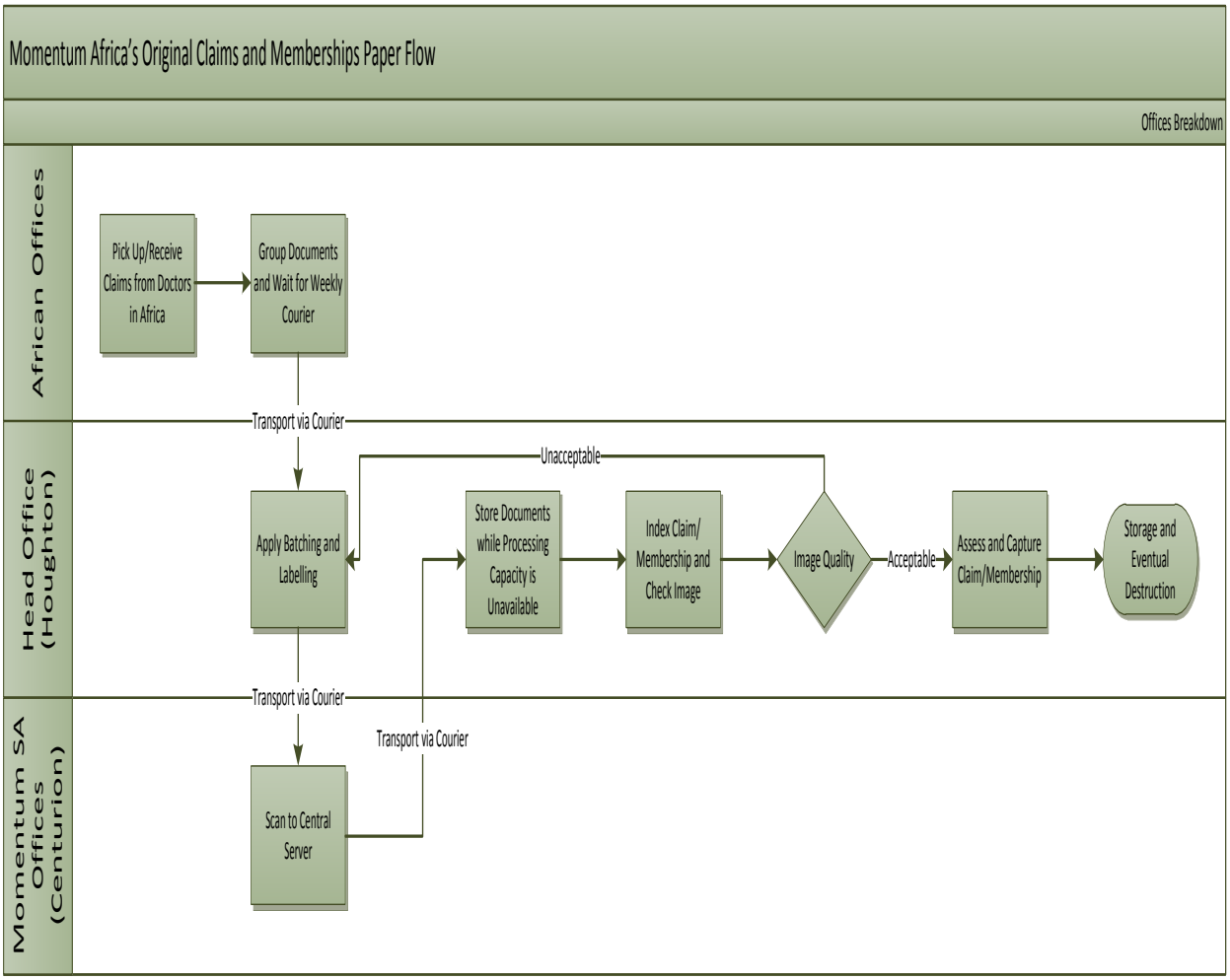


Figure 13: Momentum Africa's Claims and Memberships Paper Flow December 2011

As can be seen from the figure, a lot of courier phases were involved with the initial process. This was largely due to the lack of scanning facilities at the Houghton and the African Offices. The Momentum South Africa Headquarter in Centurion had excess capacity to their scanning facilities and hence was used as a solution. This did however add costs to the processing phase and added little value. This step was unavoidable as quick and immediate access is required by operators when dealing with queries from customers and doctors.

3.2.3 Changed Processing Procedure

The claims and membership processing processes have since been alternated to address the main cost driver, transport. Scanning solutions were implemented in all the countries and employees have been trained to decentralise the processing activities. The new network setup can be viewed form the figure below, depicting the connections within the organisation. The LAN indicates the new decentralised processing area.

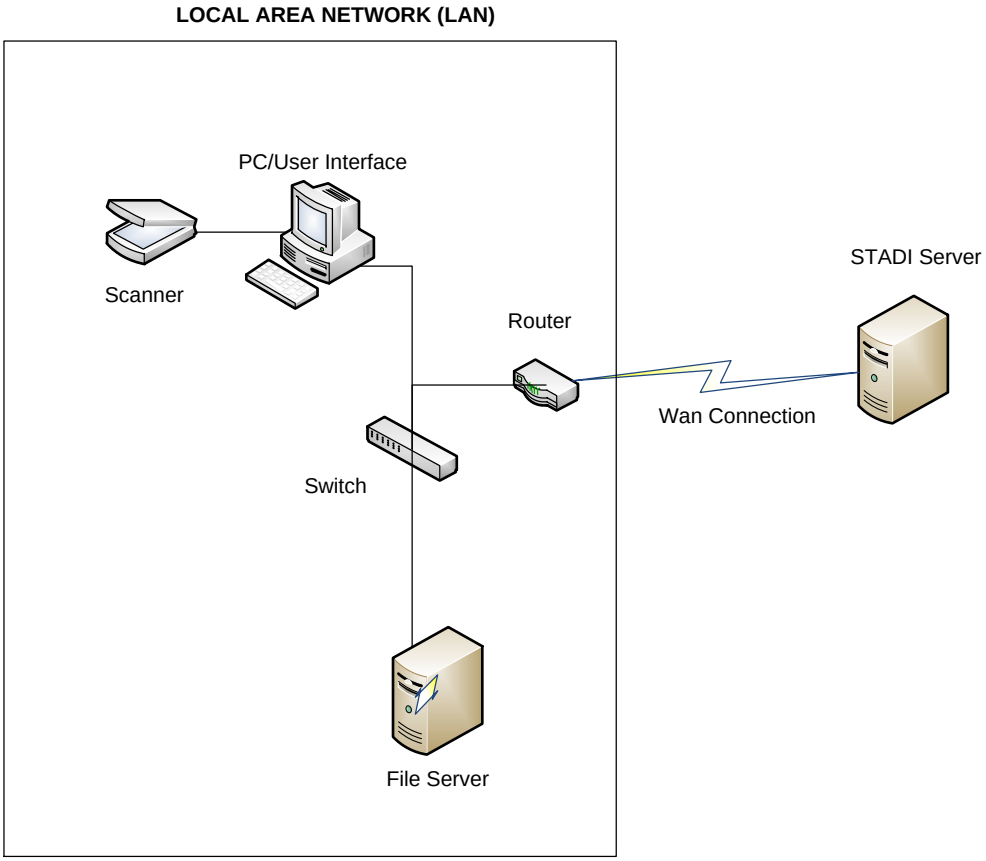


Figure 14: Metropolitan International Processing Network

By scanning the documents at its country of origin, meant that as large a facility as was required for the bulk processing was not required. Thus space and rent was no longer an issue. The biggest positive from the switch however, was the elimination of all paper based courier costs between countries and within the South African Offices. The flow of processes was also dramatically influenced by this decision, as the phases within the flow was reduced drastically and made less complicated. The figure below depicts the “as-is” newly implemented flow of processing activities at Metropolitan International.

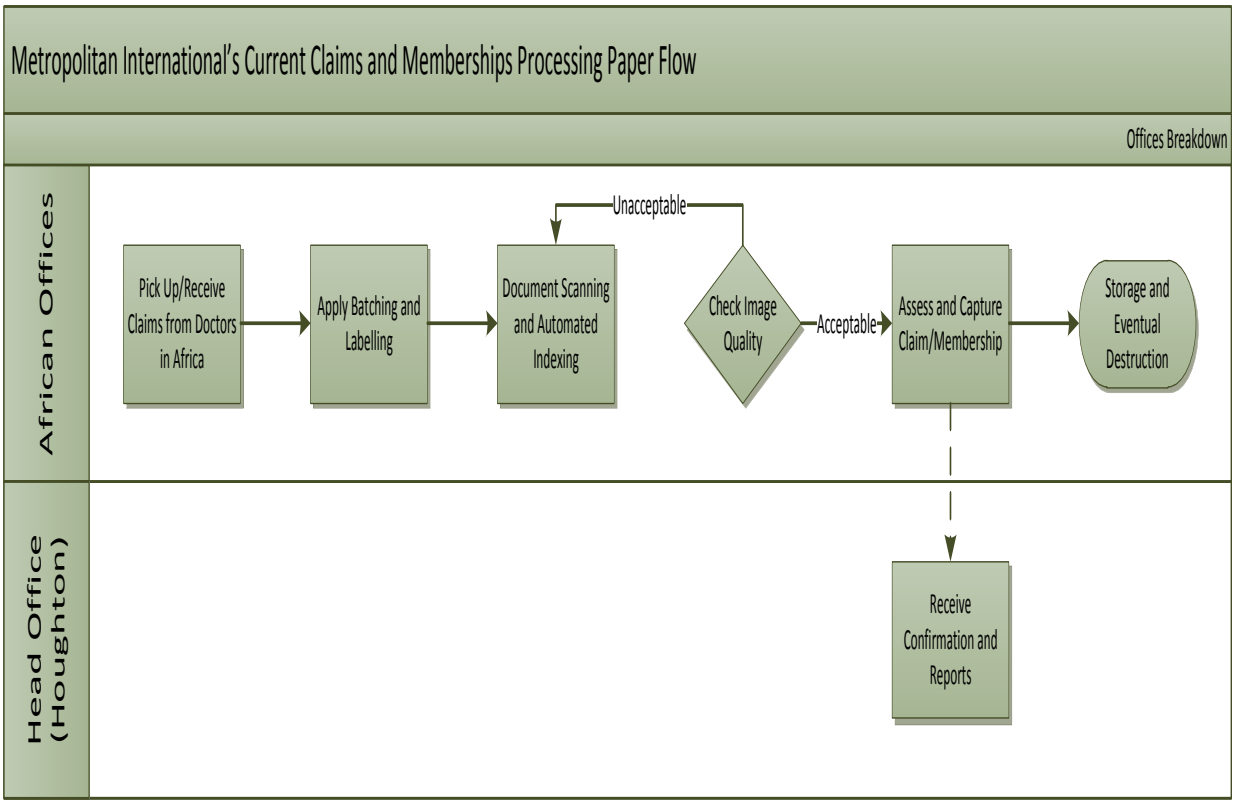


Figure 15: Metropolitan International's Current Claims and Memberships Processing Paper Flow

By implementing a decentralised scanning and processing solution, it was possible to exclude the Momentum SA Headquarter from the processing flow entirely. This streamlined the processing and made the processing environment more flexible and productive.

The benefits of making use of a procedure whereby all paper documents are being transformed from paper to an electronic version are enormous

- The tracking thereof (Paper content are linked to the client via an indexing process – Thus cannot get lost)
- Easy to recall
- Visible to the client (Client can track via an Internet logon the status of the document and where within the process the document is)
- Makes turnaround times from receipt through to handling thereof much faster
- Are safely stored and retrieved via proper access control methods.

3.2.4 Economic Influence

The biggest challenge with the implementation of a project of this size is, most of the times, the capital investment that is required. A large amount of money needs to be invested into a solution that still may not fit the organisation's working force. This predominantly makes management tentative and sceptical.

Courier Costs

Three countries; Ghana, Tanzania and Mauritius was on a similar solution package already due to the extreme nature of transporting documents from these corners of Africa to South Africa. Therefore these destinations had no courier costs, but still had to be updated with the other customer countries to ensure continuity amongst all partnerships. The partnership countries and each countries courier costs are included in the table below.

	Botswana	Ghana	Tanzania	Lesotho	Zambia	Mozambique	Mauritius	Swaziland	Malawi	Total
Courier Cost - 2010/11	R 76 737	-	-	R 23 513	R 149 796	R 116 388	-	R 5 597	R 46 984	
70% Related to Claims	R 53 716	-	-	R 16 459	R 104 857	R 81 472	-	R 3 918	R 32 889	**R 293 311**
SA Portion/Year	R 14 000	-	-	R 14 000	R 14 000	R 14 000	-	R 14 000	R 14 000	**R 84 000**
Courier Cost/Month	R 4 476	-	-	R 1 372	R 8 738	R 6 789	-	R 326	R 2 741	**R 24 443**
SA Portion/Month	R 1 167	-	-	R 1 167	R 1 167	R 1 167	-	R 1 167	R 1 167	**R 7 000**
10% Increase for 2011/12										**R 406 642**
10% Increase Monthly for 2011/12										**R 33 887**

Table 4: Origin Courier Cost Breakdown

The values for the 2011/2012 financial year were estimated by adding 10% to the previous financial year's totals to accommodate price increases and growth. It is also pivotal to notice that from the courier cost of 2010/2011 a total of 70% was assigned to claims and membership associated costs. This will allow reasonable safety in calculations for breaking even and return on investment calculations as some types of documentation and other items will still be couriered.

Volumetric Requirements

When having a solution in mind, it is important to ensure that it meets the demands of the processing structure. Due to the capabilities, ease of use and promotional offering made available the Kodak i420 scanner was selected as the hardware product that best fits management's expectations. Before buying this scanner, an evaluation of the capacity loading demand had to be done and passed. The table below lists the paper loading created at each origin country and how it measures against the capacity made available by the scanner. The values in red are the destination documents that have to be couriered to SA for scanning and processing.

	Botswana	Ghana	Tanzania	Lesotho	Zambia	Mozambique	Mauritius	Swaziland	Malawi	Total
Claims Received	11 921	9 678	5 809	2 697	12 000	7 746	8 174	579	3 000	51 260
Number of Pages	29 803	24 195	14 523	6743	30000	19365	20435	1448	7500	154010
Membership docs	1200	1500	1000	600	3500	700	1500	300	600	10900
Total Pages	***31003***	***25695***	***15523***	***7343***	***33500***	***20065***	***21935***	***1748***	***8100***	***164910***
Average pages to be scanned daily	**1550**	1285	776	**367**	**1675**	**1003**	1097	**87**	**405**	
% Of Kodak i1420 Daily Capacity	*17%*	*14%*	*9%*	*4%*	*19%*	*11%*	*12%*	*1%*	*5%*	
Pages Currently Scanned in SA/Day	**5088**									

Table 5: Paper Loads Created by each Country

The table clearly show that the Kodak i420 scanning solution will have more than enough capacity to handle the desired load for each destination. One scanner is destined for each of these countries, as well as one for the offices in South Africa. Therefore a total of 10 will be bought.

Proposal Cost

To ultimately determine the economic feasibility of the proposed solution, the cost of the whole proposal needs to be determined and compared with the initial expenses recorded. The costs involved with the proposal are as follows:

Budgeted	**R 1 080 000**
Actual Spend:	
- Scanners (X10)	R 339 471
- PC's (X10 - Complete)	R 100 000
- Software	R 130 200
- Integration & Implementation	R 410 000
- Delivery of Hardware	R 50 000
Total	**R 1 029 671**
Cost Per Country	**R 114 408**

Table 6: Budgeted and Actual Proposal Expenditures

The expenses for the proposal can be seen in the table above. It consists of the hardware, software, integration and implementation and finally the delivery costs of the proposed solution.

Feasibility

The calculations have been done over a future period of five years, as after this period it will be necessary to re-evaluate the system performance and look at newer technological advancements and implementations.

The figure below shows the annual cash flow forecasted for the implementation of the solution. Values below the x-axis indicate expenses and above shows the income, or for this example the savings for the year due to reduced transport costs. Inflation for this period was selected as 5% per annum, as this is the repo rate specified by the South African Reserve Bank. Because the investment is made in Africa, companies see this as high-risk and therefore will not settle for a most attractive rate of return (MARR) value of less than 15%.

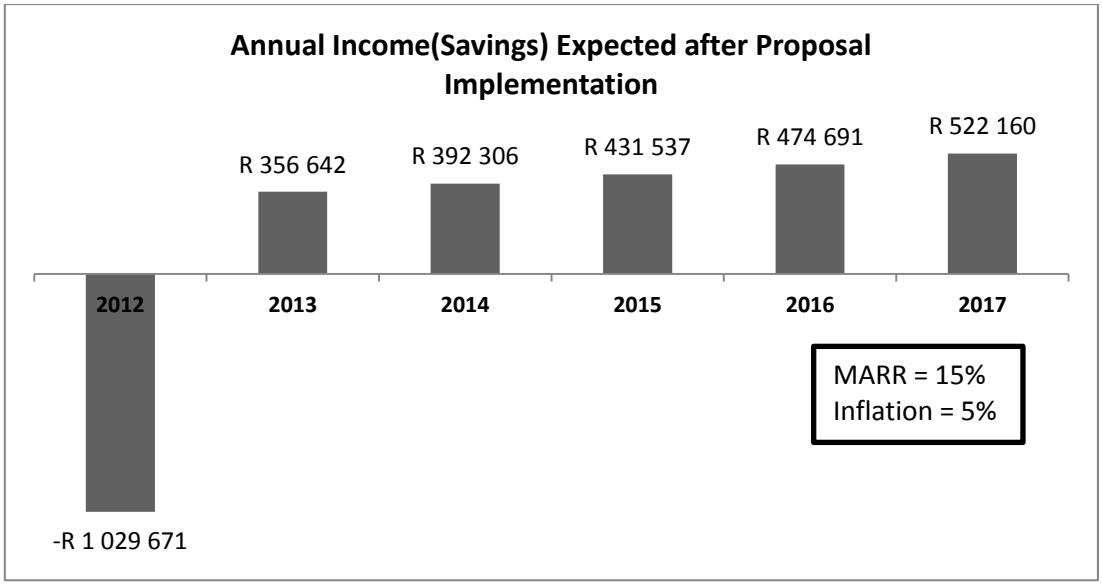


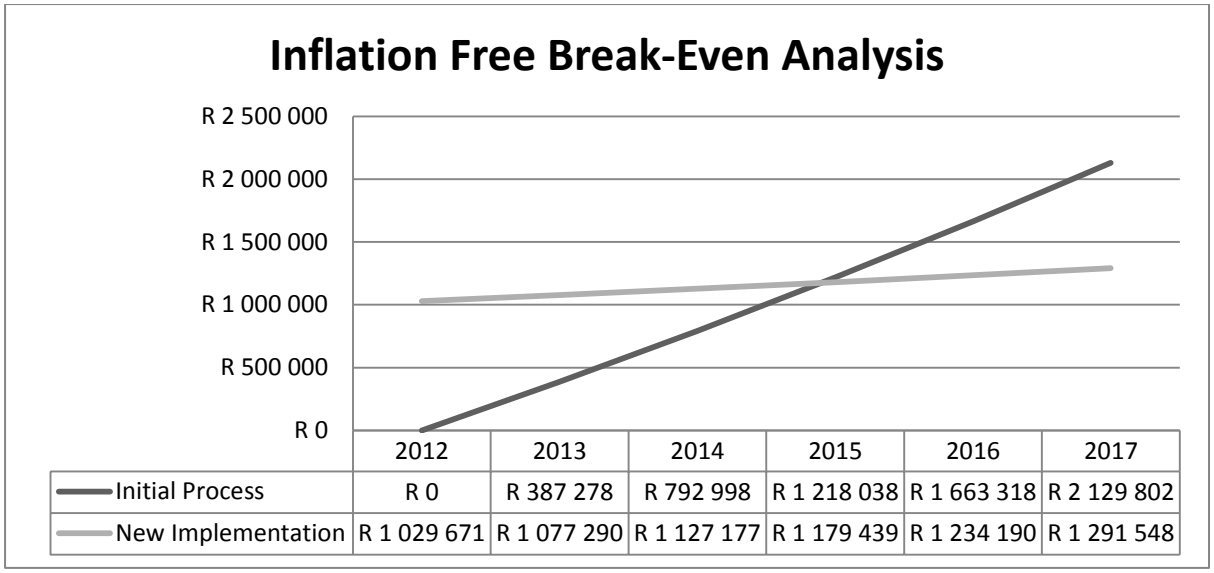
Figure 16: Cash Flow from Solution Implementation

By calculating the net present values for the annual saving and expenditures separately, it is possible to determine the ROI percentage for the initial investment made. The table below illustrates the results of these calculations.

NPV Expenses	R 1 029 671.00
NPV Income	R 1 884 178.43
NPV Overall	R 854 507.43
Return on Investment	**82.99%**

Table 7: MMI ROI Results

The break-even analysis done on the inflation free annual expenditures is shown in the figure below. It indicates a break-even point during the third year after implementation, more or less at the third quarter. This together with the high ROI shows the economic feasibility of this solution implementation.



	2012	2013	2014	2015	2016	2017
Initial Process	R 0	R 387 278	R 792 998	R 1 218 038	R 1 663 318	R 2 129 802
New Implementation	R 1 029 671	R 1 077 290	R 1 127 177	R 1 179 439	R 1 234 190	R 1 291 548

Figure 17: MMI Break-Even Analysis

3.2.5 Case Study Review

This case study shows how, by addressing the most critical paper processing cost driver, an organisation can achieve major savings. This opens the debate to whether paper is the issue or the process at hand itself.

Metropolitan International had to change the paper processing system due to relocation, which made the original claims and membership processing process impractical. A solution had to be found and as the whole process was paper driven, paper processing drivers were identified and addressed. The most critical driver was the transport of the documentation; therefore a solution making this phase redundant was sought.

By making use of decentralised processing, Metropolitan International was able to eliminate the transportation expenses recorded for paper processing purposes. It can clearly be stated through this investigation that by streamlining paper processes, savings of note can be achieved. Metropolitan International will regain their initial investment within three years and will record savings over a period of five years almost equal to the initial investment, with a ROI of 82.99%.

A reduction in turnaround time for the claims and membership processing process of three days was also recorded. Therefore productivity was also successfully enhanced by the changes made.

3.3 Chapter Review

This chapter shows how the case studies were approached and what factors influenced management into exploring the paperless concept, as well as whether or not change can be deemed feasible and implementable.

The chapter includes two case studies with different perspectives into paper processing activities. The first case study identifies large scale paper dependent processes and investigates how it can benefit from moving towards a paperless operating environment. The second case study identifies a critical paper processing driver that needs urgent attention. This driver is eliminated, without having to implement a paperless working environment.

The chapter finally shows the critical method of approaching a paper processing dilemma and how to identify driving factors. These factors in turn will be used to investigate a paperless environment's feasibility and ultimately create guidelines for development and implementation of the proposed solutions.

Chapter 4

4. Conclusion and Recommendations

The South African Institutions' paperless movements at the start of this process were questioned, as the ECT Act made it possible to go paperless from 2002, or that was the perception. Upon further research into the Act and interactions with case study participants it was clear that most parties were not knowledgeable about the implications of the Act and the business areas that could have been exploited from an earlier stage have the Department of Communications not taken up to the start of April 2012 to accredit the first advanced digital signature service provider. The accreditation however will now start to motivate more institutions into going paperless with their processing activities.

The case studies performed for the investigation into paperless environments, further prove that the time has arrived for organisations to scale down on paper usage or address paper processing's driving functions.

The debate might still exists as to if it is necessary to embrace a paperless environment if streamlining processes and addressing major paper related cost drivers can be as beneficial as experienced by Metropolitan International.

Therefore it is important to accurately determine the needs of a paper process and to which extent automation and accessibility can be improved. Major saving was recorded by going paperless at the University of Pretoria's DFM, but this was not the biggest advantage for the department. Traceability, accessibility, automation and fraud prevention were all addressed and are the main reasons for going paperless.

Financial Institutions should not start looking into paperless environments due to the fact that it seems to most-likely be financially feasible. These institutions should start embracing paperless environments for the supplementary advantages. Making the day to day business operations a walk in the park and cutting errors to a minimum due to operation automations.

It is finally possible for South Africa to embrace paperless movements on a large scale, due to the authorisation of its first advanced electronic signature. Acting early will ensure a competitive advantage. Paperless environment will soon be streamlining all aspects of business processes. Paperless environments are, without a doubt, no longer just a fad.

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