Life Healthcare:

Design and validation of a centralized processing center at Life Healthcare

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Executive summary

Life Healthcare consists of an extensive network of hospitals and other healthcare services. There is potential for improvement in the administration department as well as the current ‘capture and confirm’ system. Delayed authorization processes in the hospital’s current system makes it difficult for the staff to run hospitals to their full potential. The need to centralize the confirmation of patient admissions authorizations, as well as pre-authorization requests and re-authorizations, have become a topic of great discussion. This project focuses on the centralizing of the process currently implemented to confirm authorizations at Life Healthcare institutions.

By introducing a centralized confirmation system into the network, less staff will be needed, vital time savings will be possible and quality service will be delivered because of a more standardized process. Overall, productivity and efficiency of the organization will increase, making way for a top notch service sector in the medical field. A geographical area will be chosen for this project to serve as a pilot model for future national implementation.
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## Glossary

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition of Terminology</th>
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<tr>
<td>LHC</td>
<td>Life Healthcare</td>
</tr>
<tr>
<td>BHF</td>
<td>Board of Healthcare Funders.</td>
</tr>
<tr>
<td>BOP</td>
<td>Best operating practice for the relevant process</td>
</tr>
<tr>
<td>Carrier/funder</td>
<td>An iMed/IMPILO code used to identify the payer of the claim. i.e medical scheme, private or WCA.</td>
</tr>
<tr>
<td><strong>Case Manager</strong></td>
<td>A medical professional who reviews cases where necessary determine necessity of care and to advise provider on payer’s utilization restriction and certifies ongoing care as well as managing hospital clinical and financial risk</td>
</tr>
<tr>
<td>Case Management</td>
<td>The ongoing review of cases by professionals to assure the most appropriate utilization of services.</td>
</tr>
<tr>
<td>LOM</td>
<td>Letter of motivation</td>
</tr>
<tr>
<td>LOC</td>
<td>Level of care</td>
</tr>
<tr>
<td>LOS</td>
<td>Length of stay</td>
</tr>
<tr>
<td>CC</td>
<td>Complications and co-morbidities affecting payment.</td>
</tr>
<tr>
<td>Coder</td>
<td>Professional who translates documented written diagnoses and procedures into numeric and</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
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<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>alphanumeric codes.</td>
<td></td>
</tr>
<tr>
<td>CRI</td>
<td>Clinical risk indicator</td>
</tr>
<tr>
<td>CPT-4 Code</td>
<td>Current procedural terminology. These five-digit numeric codes and their descriptions are copyright of the American medical Association, who developed and maintains these codes. CPT-4 is the fourth edition of CPT and the year, such as 2009, would be the most current version, as it is updated annually.</td>
</tr>
<tr>
<td>CSF (Critical success factor)</td>
<td>Those business factors that must be attained if a business is to meet its objectives. (The things that must be done to succeed and meet goals).</td>
</tr>
<tr>
<td>DSO</td>
<td>Days sales outstanding</td>
</tr>
<tr>
<td>FFS</td>
<td>Fee for service</td>
</tr>
<tr>
<td>FRI</td>
<td>Financial risk indicator</td>
</tr>
<tr>
<td>IV- Report</td>
<td>A report that can be extracted from the hospital’s system that contain all details regarding manual authorizations.</td>
</tr>
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CHAPTER 1 - Introduction and background

1.1. Project sponsors

This project will be part of an academic thesis and the deliverables will be the responsibility of Janine Potgieter (a final year Engineering student at The University of Pretoria). Fourier Approach (a privately owned industrial engineering company), will serve as a mentor during this period.

1.2. Background on the project environment

This project will be implemented at Life Healthcare, a leading private hospital operator in South Africa. Their primary business is concerned with acute hospital care and their network is widely spread across Southern Africa. Life Healthcare’s widespread acute care hospital portfolio includes sixty three hospitals. Fifty six of these are majority owned by them and they hold minority ownership in another seven hospitals. The Life Healthcare hospitals offer access to:

| Hospitals | 56 |
| Beds     |    |
| Total    | 7 665 |
| ICU      | 664  |
| HCU      | 316  |
| Operating theatre units | 308 |
| Cardiac units | 12  |
| Maternity units | 35  |
| Fertility clinics | 7  |
| Rehabilitation units | |
| Facilities | 6  |
| Beds | 229 |
| Renal dialysis units | |
| Facilities | 4  |
| Stations | 40  |
| Mental health units | 6  |
| Facilities |  |
| Beds | 172 |
| Emergency units | 40  |
| Life Esidimeni | |
| Hospitals | 12  |
| Beds | 4 171 |
| Life Occupational Health | |
| Clinics | 289  |
| Employees covered | 155 000 |

Figure 1 - Amount of beds and facilities at Life Healthcare
1.2.1. The geographic spread of Life Healthcare hospitals

Life Healthcare’s extensive hospital network includes 63 hospitals (of which 56 are majority owned by Life Healthcare and another seven in which the group holds substantial minority ownership), providing a range of healthcare services throughout South Africa. The group has hospitals in seven of the country’s nine provinces, and in the country’s most heavily populated metropolitan areas, including Johannesburg, Pretoria, Cape Town, Durban, Port Elizabeth, East London and Bloemfontein. Life Healthcare operates a range of facilities modified to meet the local demand in the different regions of the country, this includes high expertise, multi-disciplinary hospitals, community hospitals and specialized stand-alone facilities to offer the necessary scope of healthcare services. (HEALTHCARE, Life)
The following Hospitals & Clinics in Pretoria will be approached for data gathering and current operating practices. For the purpose of this project only the Pretoria region will be analyzed and data collections will be made from the following hospitals:

- Life Brooklyn Hospital
- Life Eugene Marais Hospital
- Life Faerie Glen Hospital
- Life Little Company of Mary Hospital
- Life Pretoria North Surgical Centre
- Life Wilgers Hospital

Life Healthcare has four drivers that they aim on improving and are currently investing in. These are (HEALTHCARE, Life):

- Quality
- Growth
- Efficiency
- Sustainability

1.3. Statistical overview and applicable data

By centralizing the confirmation division of each hospital, the quality of service and especially efficiency will improve. The project will also aim at improving the statistics for the ‘days payables are outstanding’, patients will receive their bills much quicker in a centralized environment. The following graph will give a better understanding of the efficiency over the last few years at Life Healthcare.
Improving the customer’s experience is greatly valued at Life Healthcare. Seeing that this organization falls within a service sector, the growth rate of the company will to a great extent depend on the customer experience. In a Harvard Business Review the article showed that "net promoter scores," which measure the difference between the percentage of customers who give high responses ("promoters") and those who give low ones ("detractors"), correlate closely with a company’s revenue increase. The following two graphs will give some background information on how customers experienced the hospital and the service that they received. This project will improve overall customer experience and improved statistics in this area will also mean a higher overall patient growth rate. (Would You Recommend Us?, 2011)
1.4. **Defining the problem**

Although Life Healthcare has a structured database in place, the amount of time lost due to capturing patient details as well as manually confirming authorizations with funds is not only time consuming but also costly. This process also limits the utilization of the business and keeps it from functioning at full capacity and efficiency. The amount of labour hours as well as high costs associated with the current process has been
identified as a key area for improvement at Life Healthcare. This resulted in the need for a central office that will confirm patient details and confirm authorizations and re-authorizations. This centralization of processes will ensure that all staff involved is trained to enable them to function in an effective and productive manner. Trained staff will thus ensure that the quality of service will be greatly improved. This will also standardize the process and ensure a better customer experience at Life Healthcare.

1.5. **Project Aim**

The aim of the project would be to:

- thoroughly research previous methods used to centralize staff in a service sector and methods to determine the optimal amount of workers;
- design a centralized processing center and centralize most administration regarding the authorization activities;
- confirm authorizations, and
- amend IMPILO information as per the re-authorization requests.

1.6. **Project Scope**

This report will include all the details regarding the project that will be completed at Life Healthcare, as well as a background analysis of the company and an understanding of the conclusions and recommendations drawn from the study.

A lot of research will be done on how to centralize such a unique process, as a lot of information is available on telephonic and banking sectors but very little on centralization in the Health sector. A detailed description regarding the centralization of some administrative activities, and how this will be integrated in the system, will be described.

A high level design of the central office and the operating model will be part of this project. This includes:

- process design,
- organisation structure, roles and descriptions, and
- general procedures for, operations inside the central call centre.
A number of calculations and graphs will be constructed to analyze and indicate the impact of centralizing the hospitals confirmation activity at Life Healthcare. Seeing that this change in business processes will have a great effect on the staffing amount and how they are utilized, a re-engineered method of determining optimal staff levels will be constructed and implemented in the central office. It is envisaged that the actual current data will be used to obtain the best answer by means of scientific analysis.

The last phase of the project will consist of a simulation model of the call centre that will allow for the configuration of the proposed call centre and the analysis of alternatives to the processes and/or resources. The model will also give an indication whether the advised staffing level is appropriate. A final report, containing the approach, analysis, results and suggestions will be delivered as part of phase 3.

1.6.1. Specific scope inclusions

- The project will analyze the current authorization process.
- All activities regarding this process will be taken into account; including
  - Pre-authorization;
  - Authorization,
  - Confirmation, and
  - Re-authorization.
  - An optimal solution will be designed to make this process more time and cost effective.
  - Calculations to indicate an optimal amount of resources (staff members) that should be assigned to the central office.
  - High level design of the central “call centre”.
  - A simulation model to validate the call centre office design.
  - Calculations to indicate the impact of centralization.

1.6.2. Specific Scope exclusions

- The actual design of any software will be excluded.
- Training the hospital staff will only happen after the final report was handed in.
- Detailed Functional Requirement Specifications to be used for system development.
• Proposal on specific equipment and call centre systems to be utilised in the call centre.

1.7. ** Deliverables**

The following deliverables have been defined for this dissertation:

• Framework
• Full project report
• Final document
• Presentation
• Poster
Chapter one summary

This chapter outlines what exactly this dissertation will include and identifies the problem that needs to be solved over a specific period of time.

In short, the benefits of centralization will include a faster authorization and re-authorization response. Less staff will be needed for the job and a great reduction in paperwork will be achieved. The reasons for centralization are endless and the organization will not only increase their efficiency but the overall customer experience of patients visiting the hospital will also improve.
Chapter 2 - Preliminary Literature Study

This section will consist of two parts, a literature review study where a number of academic papers were researched on the dissertation topic, the next part of the information gathering section will include an information study. This will for most part focus on the non-academic aspects of the project topic.

Literature Review

2.1.1. Call Center Overview

There are a number of different types of call centers that should be considered when designing a central office. For the scope of this project, the following variations will be considered:

Inbound Call Centers: Inbound call centers answer calls. Their agents are in a reactive mode, answering the next call in the queue. Inbound call centers are equipped with ACDs (Automatic Call Distributors) to efficiently send calls to the "next available agent. (MANDELBAUM, Avishai, 2004, p.31)
Outbound Call Centers: Outbound call centers make calls to customers and sales prospects. Their work is hands-on. Even if agents’ work is not necessarily sales, they still need a sales state of mind. Agents are scheduled as needed to complete a set number of calls within a certain time frame, as restricted by law. (MANDELBAUM, Avishai, 2004, pp.30-32)

2.1.2. Engineering Techniques to consider

A few industrial engineering techniques that could aid in measuring the impact of this project and also predict the amount of staff needed for a central environment will be researched. This will not only set a theoretical basis for the project but will assist in the understanding of what has been done by others in this area:

- Simulation Modeling & Analysis
- Methods Study
- Forecasting

2.1.3. Simulation Modeling & Analysis

Simulation modeling and analysis is the process of creating and experimenting with a computerized mathematical model of a physical system. (Wikipedia) Simulation is used to pilot an existing or non-existing system, make the necessary changes, and then find the optimal solution to the problem. This technique will typically include a Model built within a software program eg. Arena Rockwell. Such a simulation model will be used as a measurement tool in the future to measure the efficiency of the call center.

Vincent Cheung stated that simulation models provide another method for detailed analysis of the complex real world systems such as the procurement. This technique is a good method for evaluating dynamic decision rules under ‘what-if’ scenarios. (CHEUNG, Vincent, 2009) The following figure illustrates the steps to follow when designing a simulation model. (simulation model design steps, 2011)
Figure 6 - Simulation design steps (simulation model design steps, 2011)
2.1.4. **Forecasting 2.1.5.**

Apart from simulating a model, forecasting can be done by means of some previously adapted methods. Forecasting is a major problem managers have to face when having to make critical business decisions. (EVANS, James R., 2010, p.257)

A wide range of forecasting techniques could be considered. The three main approaches are qualitative and judgmental techniques, statistical time–series models, and casual models.

The following techniques that could be considered for the purposes of this project:

- Historical analogy and the Delphi method
- Statistical Models: Moving average and exponential smoothing
- Time-series models

**Historical analogy**

The Judgmental approach includes the historical analogy. Here a forecast is obtained through a comparative analysis with a previous situation. This method often proves to be a good indication of what a certain situation will deliver, but one should be careful to recognize new or different situations.

**The Delphi Method**

This is another popular judgmental forecasting approach. With this technique a panel of experts is asked to complete a sequence of questionnaires. This method provides unbiased exchanges of ideas and usually a convergence of opinion is a result of this discussion.

**The Moving Average Method**

The simple Moving Average Method is based on the idea of averaging random fluctuations in the time series to identify the underlying direction in which the time series are changing. This method assumes that the future observations will be the same as the past. The moving average for the next period is simply the average of the amount of k observations. Excel can easily generate a moving average by using inputs and outputs from a set of data. (EVANS, James R., 2010, p.265)
**Exponential Smoothing Models**

This method is highly effective when using short range forecasting. The basic exponential smoothing formula is:

$$F_{t+1} = (1-\alpha)F_t + \alpha A_t$$

Where $F_{t+1}$ is the forecast for time period $t + 1$, $F_t$ is the forecast for $t$, $A_t$ is the observed value in period $t$, and $\alpha$ is a constant between 0 and 1, called the smoothing constant.

This method requires only the previous forecast and the current time series value. An Excel spreadsheet may help in evaluating exponential smoothing models. (EVANS, James R., 2010, p.268)

**Time Series Models**

When trend and seasonality are present in a time series, different techniques are used to provide more accurate results than the basic moving average or exponential smoothing models.

**Models for Linear Trend**

This model is used for time series with a linear trend but no specific seasonality.

$$F_{t+k} = a_t + b_t k$$

**Models for seasonality**

Seasonal factors can be incorporated into a forecast by adjusting the level $a_t$ in one of two ways.

The seasonal additive model is:

$$F_{t+k} = a_t + s_{t-s+k}$$

The seasonal multiplicative model is:

$$F_{t+k} = a_t s_{t-s+k}$$

This model can be used when the amplitude of the time series is changing over time.

**Models for trend and seasonality**
When a time series exhibit both trend and seasonality, this model is used. A typical example will be sales of a seasonal product. These approaches are commonly referred to as Holt-Winters models. (EVANS, James R., 2010, p.269) The additive model that combines trend and seasonality is based on the equation:

\[ F_{t+1} = a_t + b_t + S_{t+1} \]

### 2.1.6. Queuing Models

This method can be used instead of a simulation model to determine the amount of staff needed for the central office.

The efficiency of this central office depends heavily on the department being staffed appropriately. The centralized system will be the channel to the manual funders, the office will handle mostly outpatient services. As Stated by Taylor & Agnihothri, poor service in the central office will cause a bottleneck, thus optimal staffing will be critical. (TAYLOR, Patricia F and Agnihothri, Saligrama, 1991)

When evaluating the work load, the emphasis should be on maximum telephone coverage and not on high server utilization. Taking into consideration that clerks do a lot of nontelephonic tasks during the day, a utilization factor 80 percent of the possible working hours should be a good service level. Queuing models could be used to find the staffing level needed to meet this desired 80% service level.

There is a strong relationship between Poisson distribution and exponential distribution (L.WINSTON, Wayne, 2004).

**Theorem 1:** Interarrival times are exponential with parameter \( \lambda \) if and only if the number of arrivals to occur in an interval of length \( t \) follows a Poisson distribution with parameter \( \lambda t \).

\[ P(N_t = n) = e^{-\lambda t} (\lambda t)^n / (n!) \quad (n = 0, 1, 2, \ldots) \]

**Theorem 2:** \( N_t \) follows a Poisson distribution with parameter \( \lambda t \), and interarrival times are exponential with parameter \( \lambda \). That is

\[ a(t) = \lambda e^{-\lambda t} \]

The following are Queuing systems that could be used in a problem similar to the this dissertation: Notation for characteristics of these systems that must be taken note of are:
• \( \Pi_j \) = steady state probability
• \( L \) = expected number of customers in system
• \( L_q \) = expected number of customers in line
• \( L_s \) = expected number of customers in service
• \( W \) = expected time a customer spends in system
• \( W_q \) = expected time a customer spends waiting in line
• \( W_s \) = expected time a customer spends service
• \( \lambda \) = average number of customers per unit time
• \( \mu \) = average number of service completions per unit time
• \( \rho = \lambda / (s\mu) \)

The Different Queuing Models

1) The \( M/M/1/GD/\infty/\infty \) queuing system. This system considers a single server queuing model in which interarrival times are exponential. We will let \( \lambda \) be the arrival rate and \( \mu \) be the rate of service provided. This model is used when the arriving entities are served by a single server. Assume exponential service times and interarrival times.

2) The \( M/G/s/GD/s/\infty \) queuing system. This resembles a “blocked customers cleared” system, where arrivals that find all servers occupied will leave the system. This model will be used where there is a certain amount of servers “s” that will be occupied throughout the process. Whenever all servers are occupied the system will lose customers and turn them away.

3) The \( M/M/1/GD/c/\infty \) queuing system. This system is a system with a total capacity of “c” customers. When the full capacity customers are present, all arrivals are turned away and are forever lost to the system. Assume exponential interarrival times with a rate of \( \lambda \), and service times with a rate of \( \mu \).

This model will now be researched in depth seeing that the aim of the model will be to optimally staff the centralized office. The following formulas will be used in numerous calculations:

If \( \lambda \neq \mu \)

1) \( \pi_0 = (1 - \rho)/(1 - \rho^{c+1}) \)
2) \( \pi_j = \rho^j \times \pi_0 \)
3) \( \pi_j = 0 \)
4) \[ L = \rho \left[ 1 - (c+1) \rho^c + c \rho^c \right] / (1 - \rho^{c+1})(1-\rho) \]

If \( \lambda = \mu \)

1) \( \pi_j = 1/(c+1) \)
2) \( L = c/2 \)

For all values of \( \lambda \) and \( \mu \)

1) \( L_s = 1 - \pi_0 \)
2) \( L_q = L - L_s \)
3) \( W = L / \lambda (1 - \pi_0) \)
4) \( W_q = L_q / \lambda (1 - \pi_0) \)
5) \( W_s = 1 / \mu \)

For this type of system a steady state will exist even if \( \lambda \geq \mu \). This is because even if \( \lambda \geq \mu \), the finite capacity of the system prevents the number of people in the system “blowing up”. (L. WINSTON, Wayne, 2004)

**Information Study**

An information study will be necessary to complete part of the deliverables of this project. This Information study will be divided into three sections:

![Figure 7 - Information study sub divisions](image)
Simulating a central office is not the main aim of this project but will give a better indication of how centralization will impact the hospital environment. Arena Rockwell simulation will be used. This Arena model will include a simulation of an as-is, as well as a to-be scenario.

Microsoft Excel will also be used to import data inputs via a spreadsheet into Arena, the model will be run where the necessary info will be exported back into an excel spreadsheet.

2.1.7. Analyze Arena Rockwell simulation software

Arena simulation software is used to help demonstrate, predict, and measure system strategies for effective, efficient and optimized performance.

This software aids in protecting your business by analyzing the impact of designed, “what-if” business strategies before implementation, without causing disruptions in service or associating high costs with this change in procedures. (Arena Simulation Software by Rockwell Automation: Home)

Figure 8 – Example of an animation of an Arena Simulated emergency room
Figure 8 shows an animation of a simulated emergency room. This animation can be viewed “live” and the what-if or as-is results would be obtainable after the model was run for a certain time frame. Figure 9 shows the model logic of this simulation and this involves the different entities with built in restrictions, variables and attributes. Arena enables the user to change the inputs and see how these changes will affect the output results.

**Figure 9 – Example of Arena simulation model logic**

![Diagram of Arena simulation model logic](image)

### 2.1.8. Data inputs for the Arena Rockwell simulation

Numerous visits to Wilgers-, Eugene Marais as well as Little Company of Mary hospital had to be scheduled to firstly understand their current process and then secondly to see if there is any form of standardized process that is followed amongst the hospitals. The capture and confirming of the different types of authorizations was difficult to grasp, as each confirmation clerk tend to deviate from the BOP (Best Operating Practice) prescribed to them.
The first 8 weeks of this project were spent inside the hospital analyzing their processes and determining what part of the process could be centralized. After this was done the following data were collected:

- All data concerned with the cost analysis (annual wages of confirmation clerks)
- All data to model the current capture and confirming process as well as a to-be scenario. This will include:
  - The number of emails received to be authorized;
  - Average time spent on an authorization request;
  - The number of confirmation clerks at each hospital will be taken into account;
  - Actual amount of labour hours spent on authorizations per day by confirmation clerks, and
  - Time intervals between emails received during the day.
- The percentages of incoming mails from the different schemes.

2.1.9. Data inputs for the queuing model

The following data needs to be collected to complete a queuing model that will give a proper indication of the amount of staff needed for optimal service delivery and telephone coverage in the central office (some of these data may coincide with that of the simulation model):

- arrival patterns of incoming emails;
- evaluation of this pattern to check for variations;
- service time per arrival. (time to confirm this email by means of a phone call)
Chapter Two Summary

After all the possible engineering techniques were analyzed and considered, the decision was made to use a simulation model to solve the problem and provide solutions to the deliverables mentioned in chapter one. A thorough analysis of data that needs to be gathered was made. The next chapter will include the design of the model and the understanding of the current process.
Chapter 3 – Selection of Techniques and Solution Design

This chapter elaborates on the various engineering techniques and data collected in the previous chapter, utilized to solve the engineering design of the central office. This chapter consists of the following sections:

- Selection of techniques;
- fully understanding the current confirmation process at Life Healthcare;
- identifying centralization opportunities;
- designing the Central process flow;
- calculating the amount of current incoming emails.

3.1. Selection of Techniques

The arrival times of emails from the funders do not follow an exponential distribution which is compulsory for the use of Queuing Models mentioned in this chapter. It was concluded that a gamma distribution would most likely fit the graph of this central office’s email arrival pattern. Due to these constraints when using Queuing models an Arena Rockwell simulation will be used to address the deliverables that should be met in this dissertation. This model will focus on the to-be central office and how the number of beds per facility, the bed turnover rate as well as the number of hospitals per region will affect the central staff capacity.

Simulating the central office in Arena will require a lot of pre-simulation assessment and the current process will have to be well understood to obtain a model that will be a replication of the current process, but in a central environment. The Arena simulation will not only address the staffing problem but also forecast how any changes inside the central office might affect the process in terms of quality of service and response time.

3.2. Fully understanding the current confirmation process at Life Healthcare

This process involves a number of different activities and scenarios. These processes will be more clearly understood by making use of a flow diagram.
3.2.1. **Scenario 1: The patient arrive with no authorization and admissions date is today**

- The admissions clerk will send the patient to pre-admissions to get an authorization number from the fund.
- The patient requests an authorization by either phoning the medical fund themselves or from the hospital at pre-admissions.
- The pre-admissions clerk will capture all the details regarding the patient and his/her current event were after the clerk will confirm that this is an un-trusted authorization.
- The patient returns to admission with a valid authorization number,
- Admit the patient – solicited process follows.

3.2.2. **Scenario 2: The patient arrives with a solicited (un-trusted) authorization and the admission date is today**

- The admissions clerk searches for the authorization number on the IMPILO system
- Authorization number found? >> Yes.
- The admissions clerk will call the fund and request an authorization update response.
- Admit the patient – Solicited process follows

3.2.3. **Scenario 3: The patient arrives with an unsolicited pre-authorization number and the admission date is today**

- Admissions clerk search for the IV Report
- Report found? >> Yes
- Admit the patient and mark the authorization request as confirmed.

3.2.4. **Scenario 4: The patient arrive with an unsolicited, electronic authorization number and the admissions date is today**

- Admissions clerk search for the unsolicited authorization number on IMPILO
- Auth number found? >> Yes
• Admit the patient and mark the authorization as confirmed

3.2.5. Scenario 5: The patient needs to get a re-authorization from the funder because of a change in event details

• The case manager contact the medical fund to request an update authorization response
• The fund will send their response to the confirmation clerk – the solicited process follows.
Figure 10 - Swim lane diagram of the current capture and confirm process
It is necessary to include the percentage annual revenue from the different funders that will be worth centralizing. These schemes do not make use of electronic confirmations (automatically confirmed) but still rely on manual capturing and confirming of authorizations by the hospital confirmations clerk. The following graph illustrates the percentage revenue that each of the top nine manual funds contribute per year. They are responsible for three Billion Rand’s worth of annual revenue and 190 000 visits. This is enough reason itself to implement a central office to improve this manual process.

Figure 11 - Pie chart representing the % of the total revenue that the different manual funds contribute.
3.3. Identifying centralization opportunities

The opportunities for centralization are evident from the Swimlane diagram of the current capture and confirming process at Life Healthcare. Seeing that Life Healthcare would like to keep all patient-hospital contact personal, the admissions clerk will still capture all the patient details inside the hospital. Only the capture and confirming processes will be centralized. To summarize the centralization opportunities, it will include the solicited process that follows when emails or faxes are received from the funders and then captured on the IMPILO system as well as being confirmed.

Figure 12 - The solicited process
3.3. Designing the central process flow and identifying system requirements

The central office will most importantly, be a means of effectively and economically communicating with the fund as well as capturing patient and event details which can become a very time consuming activity. The system should provide the user with different inboxes, so that there can be a clear division between pre-authorizations, re-authorizations and initial authorizations (solicited authorizations).

The central clerk will access an INBOX and then call one specific scheme to confirm all authorizations linked to that funder. This will enable the clerk to handle more than one confirmation per call. Not only does this saves time, but also makes the process much more cost efficient. There will be no time wasted in between calls to prepare for a next phone call to a different scheme.

By organizing the incoming messages into their different inboxes, the central office will be able to prioritize the responses from the funders. Figure 13 shows how the different inboxes will be integrated into the centralized environment. For future use, cases with a very high risk (high rand value attached to the event) or an emergency case should be attended to first.

Better control can be exercised in terms of efficiency and customer response time. The central office will also function in a standardized manner. This will improve quality service and prevent errors when capturing or confirming authorizations. Billing will also be able to take place soon after the confirmation of an authorization. This will enable Life Healthcare to improve on their Return-on-investment rate and patients will receive a bill on the date of release.

Seeing that Life Healthcare values their patients and the quality of service delivered, customer experience and their feedback is a top priority for the organization. Patients will still be served on a face-to-face basis inside the hospital when being admitted and no patient interaction with the hospital staff will be centralized.
Figure 13 - Swimlane diagram of the central proposed processes with the different inboxes
3.4. Calculating the amount of current incoming emails on a daily basis by using the available data.

This dissertation will include both the TO-BE as well as the AS-IS Arena Rockwell simulation model that will be compared at a later stage. This will serve as a validation for the central office design as well as a way to measure the effect of any changes in the office. The sensitivity of the central office will also be evident from the model reports.

Table 1- Information on bed occupancy at Life Healthcare

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of acute hospitals*</td>
<td>56</td>
<td>54</td>
<td>54</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>Number of active beds*</td>
<td>7298</td>
<td>6,846</td>
<td>6,690</td>
<td>6,417</td>
<td>6,318</td>
</tr>
<tr>
<td>Number of registered beds*</td>
<td>7,665</td>
<td>7,190</td>
<td>7,021</td>
<td>6,705</td>
<td>6,543</td>
</tr>
<tr>
<td>Paid patient days*</td>
<td>1,806,730</td>
<td>1,761,964</td>
<td>1,693,925</td>
<td>1,613,934</td>
<td>1,501,974</td>
</tr>
<tr>
<td>Occupancy (%)(^3)</td>
<td>69.6</td>
<td>71.6</td>
<td>69.8</td>
<td>69.7</td>
<td>68.3</td>
</tr>
<tr>
<td>Length of stay (days)*</td>
<td>3.27</td>
<td>3.20</td>
<td>3.12</td>
<td>3.06</td>
<td>3.04</td>
</tr>
</tbody>
</table>

The following calculations were made by using information on a hospital report that was written by Mr. Roger Hogarth. These findings, as calculated in Table 1 were applied to obtain the number of admissions per day per bed and then also the number of admissions per province per bed. (HOGARTH, Roger, 2010).

Table 2 shows the different calculations per geographical area for the different facility groups. The number of beds was obtained as well as the percentage of beds occupied on an average basis. The bed turnover rate was calculated to serve as an input in the simulation model.

**Bed Turnover Rate =**

$\text{(The average amount of beds occupied) \times \text{(The amount of patients admitted per day/bed)}}$

After this rate was obtained the amount of daily admissions could be calculated. The last column of Table 2 will indicate these results.
Table 2 - Regional calculations including the bed turnover rate per day

<table>
<thead>
<tr>
<th>Region</th>
<th>#Beds</th>
<th>% Beds Occupied (average)</th>
<th># Beds Occupied</th>
<th>Avg length of stay per patient (days)</th>
<th># patients admitted per day/bed</th>
<th># Admissions per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauteng</td>
<td>2981</td>
<td>69.6</td>
<td>2074.776</td>
<td>3.27</td>
<td>0.305810398</td>
<td>634.4880734</td>
</tr>
<tr>
<td>KZN</td>
<td>1019</td>
<td>69.6</td>
<td>709.224</td>
<td>3.27</td>
<td>0.305810398</td>
<td>216.8880734</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>414</td>
<td>69.6</td>
<td>288.144</td>
<td>3.27</td>
<td>0.305810398</td>
<td>88.11743119</td>
</tr>
<tr>
<td>Free state</td>
<td>415</td>
<td>69.6</td>
<td>288.84</td>
<td>3.27</td>
<td>0.305810398</td>
<td>88.33027523</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>1561</td>
<td>69.6</td>
<td>1086.456</td>
<td>3.27</td>
<td>0.305810398</td>
<td>332.2495413</td>
</tr>
<tr>
<td>Western Cape</td>
<td>522</td>
<td>69.6</td>
<td>363.312</td>
<td>3.27</td>
<td>0.305810398</td>
<td>111.1045872</td>
</tr>
<tr>
<td>North West</td>
<td>493</td>
<td>69.6</td>
<td>343.128</td>
<td>3.27</td>
<td>0.305810398</td>
<td>104.9321101</td>
</tr>
<tr>
<td>Botswana</td>
<td>132</td>
<td>69.6</td>
<td>91.872</td>
<td>3.27</td>
<td>0.305810398</td>
<td>28.09541284</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>7537</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>1604.205505</strong></td>
<td></td>
</tr>
</tbody>
</table>

Because of the level of detail needed for simulation purposes, the Gauteng region’s facilities will be analyzed in greater detail. Table 3 shows the number of beds per facility in the Gauteng region. (HEALTHCARE, Life)

Due to time constraints and the scope of this dissertation only the Pretoria region will be used in the Arena Rockwell central simulation model. Table 4 summarizes these figures. Each facility has one employed confirmation clerk to capture as well as confirm authorizations. Thus a total of 6 confirmation clerks are active in this region.

For simulation purposes the number of updates per admission was confirmed by Pennie Philips (Life Healthcare) to be 1.75 per visit. The number of updates for the Pretoria region facilities was calculated in Table 5. These results will be used to simulate the current process as well as the proposed central office.
Table 2 - Number of beds per facility in the Gauteng region

<table>
<thead>
<tr>
<th>Gauteng Region</th>
<th># Beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Bedford Gardens Hospital</td>
<td>140</td>
</tr>
<tr>
<td>Life Birchmed</td>
<td>20</td>
</tr>
<tr>
<td>Life Brenthurst Clinic</td>
<td>233</td>
</tr>
<tr>
<td>Life Carstenhof Clinic</td>
<td>113</td>
</tr>
<tr>
<td>Life Dalview Clinic</td>
<td>75</td>
</tr>
<tr>
<td>Life Flora Clinic</td>
<td>360</td>
</tr>
<tr>
<td>Life Fourways Hospital</td>
<td>350</td>
</tr>
<tr>
<td>Life New Kensington Clinic</td>
<td>96</td>
</tr>
<tr>
<td>Life Riverfield Lodge</td>
<td>66</td>
</tr>
<tr>
<td>Life Robinson Private Hospital</td>
<td>109</td>
</tr>
<tr>
<td>Life Roseacres Clinic</td>
<td>148</td>
</tr>
<tr>
<td>Life Wilgeheuwel Hospital</td>
<td>319</td>
</tr>
<tr>
<td>Life Brooklyn Hospital</td>
<td>27</td>
</tr>
<tr>
<td>Life Eugene Marais Hospital</td>
<td>449</td>
</tr>
<tr>
<td>Life Faerie Glen Hospital</td>
<td>102</td>
</tr>
<tr>
<td>Life Little Company of Mary Hospital</td>
<td>238</td>
</tr>
<tr>
<td>Life Pretoria North Surgical Centre</td>
<td>12</td>
</tr>
<tr>
<td>Life Wilgers Hospital</td>
<td>341</td>
</tr>
<tr>
<td>Life Springs Parkland Clinic</td>
<td>222</td>
</tr>
<tr>
<td>Life St Mary’s Women’s Clinic</td>
<td>74</td>
</tr>
<tr>
<td>Life Glynnview</td>
<td>80</td>
</tr>
<tr>
<td>Life The Glynnwood</td>
<td>383</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3651</strong></td>
</tr>
</tbody>
</table>

Table 3 - Information on the Pretoria region’s facilities

<table>
<thead>
<tr>
<th></th>
<th># Beds</th>
<th># Confirmation clerks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Brooklyn Hospital</td>
<td>27</td>
<td>1</td>
</tr>
<tr>
<td>Life Eugene Marais Hospital</td>
<td>449</td>
<td>1</td>
</tr>
<tr>
<td>Life Faerie Glen Hospital</td>
<td>102</td>
<td>1</td>
</tr>
<tr>
<td>Life Little Company of Mary Hospital</td>
<td>238</td>
<td>1</td>
</tr>
<tr>
<td>Life Pretoria North Surgical Centre</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Life Wilgers Hospital</td>
<td>341</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td></td>
</tr>
</tbody>
</table>
Table 4 - Number of updates at the Pretoria facilities

<table>
<thead>
<tr>
<th>Facility</th>
<th># Beds</th>
<th># Admissions (daily)</th>
<th>Updates (daily)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Brooklyn Hospital</td>
<td>27</td>
<td>5.746788999</td>
<td>10</td>
</tr>
<tr>
<td>Life Eugene Marais Hospital</td>
<td>449</td>
<td>95.56697262</td>
<td>167</td>
</tr>
<tr>
<td>Life Faerie Glen Hospital</td>
<td>102</td>
<td>21.71009177</td>
<td>38</td>
</tr>
<tr>
<td>Life Little Company of Mary Hospital</td>
<td>238</td>
<td>50.65688081</td>
<td>89</td>
</tr>
<tr>
<td>Life Pretoria North Surgical Centre</td>
<td>12</td>
<td>2.554128444</td>
<td>4</td>
</tr>
<tr>
<td>Life Wilgers Hospital</td>
<td>341</td>
<td>72.57981662</td>
<td>127</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>249</td>
<td></td>
<td>435</td>
</tr>
</tbody>
</table>

By using the last column’s figures of Table 6, and keeping in mind that an average of 1.75 updates per admission will be assumed, the total number of daily authorization updates could be calculated. This figure is an approximation of the number of emails/faxes and electronic confirmations that will be received on a daily basis at the central office.

An AS-IS Arena Rockwell simulation model was build using the data inputs gathered in chapter two and calculated in chapter three. The inputs will be as follows:

- The number of emails received to be authorized as calculated in Table 6.
- Average time spent on an authorization request is 5 minutes.
- The number of active confirmation clerks in total in the Pretoria region was confirmed to be six.
- The time intervals between emails received during the day were confirmed to follow an Erlang-k distribution. (Waiting Lines, 2011)
- The workers schedule for confirmation clerks follows a standard 8am-5pm shift. (No night shifts will be introduced in the central office)
- Currently the average time between calls, when confirming authorizations with the funds is confirmed to be 5-10 minutes (Prepping time between calls).
- The amount of manual authorizations can be calculated to be 30% of all incoming authorization requests. (Confirmed by Pennie Phillips)
The following figure represents the AS-IS simulation model. This model does not differentiate between the different authorization requests but all emails are received in the Hospital Inbox. There are six clerks in the Pretoria region that is currently capturing as well as confirming authorization requests. Emails are accessed by the confirmation clerk where the necessary process follows. This system is not standardized and there is a lot of variation between the different hospitals. This makes it a difficult process to evaluate in terms of quality service and efficiency.
Figure 14 – AS-IS simulation model
Figure 15 represents the Arena Rockwell TO-BE simulation. Two clerks will be simulated and the utilization of these two resources will be analyzed by viewing a category overview report of the simulated model.

The amount of staff that should be employed in the proposed central office will be evident from the Arena Simulation reports. Because of a faster confirmation process and the fact that only one telephone call will be needed to confirm more than one patient request, the handling time will be faster and fewer clerks will be needed inside the office. There will be no delays for prepping between calls. The calls may be longer and greater intervals between calls may result.

The simulation model will use 2 clerks to start with. The utilization of these clerks will be analyzed and the necessary changes will be made. When resources’ utilization is too high, an additional confirmation clerk will be added to the model and the results will be re-analyzed.

Besides the current AS-IS process and the TO-BE process, the following extreme scenario will be modeled in Arena by changing the input variables. The reason for simulating this scenario is to analyze the sensitivity of this model and to indicate what the effect that such a high workload would have on the central office. This scenario is unlikely to happen to such an extent, but will challenge the model and the capacity of the central staff. The following condition will be simulated:

- A 250% increase in the total amount of beds in the Pretoria region will be simulated. This will influence the total number of admissions on a daily basis. This could be due to additional Life Healthcare facilities that occur and thus an increase in the number of beds in the Pretoria region.
Figure 15 – Centralized, TO-BE Arena simulation
3.5. Input calculations for the different simulation scenario's

The following section will show the calculations that were made in Microsoft Excel to determine the inputs needed for the AS-IS and TO-BE models as well as a scenario with a 250% increase in the number of beds.

3.5.1. **AS-IS process:**

The inputs from Table 5 and 6 will be used for this simulation purposes. The AS-IS model will be a good, but not a 100% accurate representation of the real life process. The data may vary from the real life process due to seasonality and human intervention in the current system. The precise amount of time that the clerks spent on confirming authorizations can also differ from day to day. The time spent on preparing for a next call after each confirmation may differ from person to person. Only one hospital inbox will be used and there will be a delay between confirmed authorizations and the next call.

3.5.2. **TO-BE process:**

Again the inputs from Table 5 and 6 will be used but different handling times will be incorporated. The amount of central staff will also differ from the AS-IS model. Two resources will now be used to confirm the authorizations instead of the six clerks previously employed. The different types of confirmations needed from the funds: Re-authorization, pre-authorization or initial authorization requests will be divided into different inboxes. This will save time and a much more standardized process will be possible, this ensures a controlled environment. The average talk time of each call will be less for this model seeing that no introduction is needed for each call. This was estimated to be 5.55 minutes talk time on average per call.

3.5.3. **Scenario 1:**

Seeing that the amount of beds increase with this scenario, the inputs will change and different utilization results would be obtained. Table 6 indicate the increase in the number of beds per facility. The number of beds was calculated to be 250% of the current capacity. This will increase the workload on confirmation clerks in the central office.
Table 5 - This Table shows the increased number of beds per facility

<table>
<thead>
<tr>
<th></th>
<th>Old Number of Beds</th>
<th>New Number of Beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Brooklyn Hospital</td>
<td>27</td>
<td>67.5</td>
</tr>
<tr>
<td>Life Eugene Marais Hospital</td>
<td>449</td>
<td>1122.5</td>
</tr>
<tr>
<td>Life Faerie Glen Hospital</td>
<td>102</td>
<td>255</td>
</tr>
<tr>
<td>Life Little Company of Mary Hospital</td>
<td>238</td>
<td>595</td>
</tr>
<tr>
<td>Life Pretoria North Surgical Centre</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Life Wilgers Hospital</td>
<td>341</td>
<td>852.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1169</strong></td>
<td><strong>2922.5</strong></td>
</tr>
</tbody>
</table>

Considering that the number of beds could be obtained, the number of admissions was calculated in the same way as in the current scenario. This resulted in a much higher number of update responses from the funders to be handled by the confirmation clerks. The figures from Table 7 and 8 will be used as inputs in the Arena simulation model.

Table 6 - This Table shows the daily number of admissions as well as the daily update responses from the funds.

<table>
<thead>
<tr>
<th></th>
<th># Beds</th>
<th># Admissions (daily)</th>
<th># Updates (daily)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Brooklyn Hospital</td>
<td>67.5</td>
<td>14.3289</td>
<td>26</td>
</tr>
<tr>
<td>Life Eugene Marais Hospital</td>
<td>1122.5</td>
<td>238.2843</td>
<td>417</td>
</tr>
<tr>
<td>Life Faerie Glen Hospital</td>
<td>255</td>
<td>54.1314</td>
<td>95</td>
</tr>
<tr>
<td>Life Little Company of Mary Hospital</td>
<td>595</td>
<td>126.3066</td>
<td>222</td>
</tr>
<tr>
<td>Life Pretoria North Surgical Centre</td>
<td>30</td>
<td>6.3684</td>
<td>12</td>
</tr>
<tr>
<td>Life Wilgers Hospital</td>
<td>852.5</td>
<td>180.9687</td>
<td>317</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2922.5</strong></td>
<td><strong>620.3883</strong></td>
<td><strong>1089</strong></td>
</tr>
</tbody>
</table>

The daily emails received in total in the Pretoria region that will be used for Simulation purposes will be calculated as follows: 620 admissions x 1.75 updates per admission x 0.30 percentage of manual emails = 326 manual emails to be confirmed.
Chapter three Summary

This chapter includes not only calculations that were used in the Arena Simulation models but also the design of the model itself. Inputs for the different scenarios that will be run in Arena were calculated. The current AS-IS model inputs were also calculated and will be compared to the central proposed model at a later stage. The next chapter will focus on analyzing the results of the model outputs and comparing the AS-IS scenario to the TO-BE scenario in a cost analysis.
Chapter 4: - Running the Arena Simulation Model, Validation and Results.

The following Arena Simulation models are representations of the different scenarios discussed in chapter 3. This simulation model’s base time units are in minutes and will be run for 5 replications to ensure more accurate results. One replication will be a period of one week.

4.1. Running the AS-IS scenario with six active confirmation clerks.

This model will assume an average time of 5 to 10 minutes between calls (as observed at Life Healthcare facilities). During this time the clerk will access a new authorization to confirm and the number for the different fund will be dialled. The biggest difference between this model and the TO-BE scenario is the fact that the clerk will phone a different fund with every call. This wastes time and is not a cost effective process. The hospital inbox doesn’t separate the different types of authorization requests (pre-authorizations, re-authorizations and initial authorizations).

The following inputs were used for this simulation model:

- Six confirmation clerks;
- average handling time distribution in minutes is TRI (2,5,15);
- the incoming emails daily are 435;
- clerks evaluated on a ‘longest available’ clerk basis;
- the time between calls on average is confirmed to be between 5 and 10 minutes.

Figure 16, is a representation of the utilization of the 6 clerks. These clerks were utilized by the model on a “resource longest available” basis. The blue column is a representation of the overall utilization of the resources. The resources are not optimally utilized with an average of 29.64%. This makes room for a more effective process with less staff and a more focused procedure to confirm the authorization requests.
As stated previously, the simulation reports shows that the staff is not optimally utilized and that there must be times where these clerks are used for other purposes besides confirming authorizations. This creates problems in the system and the resources could be applied more effectively. An average handling time of 14.505 minutes is worth taking note of. This time include the prepping of a call as well as the actual talk time of 7.2 minutes. A full report of this simulation scenario can be viewed in Appendix A1.

By critically analyzing the reports, the capture and confirming process that is currently followed is not efficient and have to be re-evaluated if not centralized in the near future. A summary of the results can viewed in table 8.
4.2. Running the TO-BE model with 2 active confirmations clerks in the central office

The following inputs were used for this simulation model:
- Two confirmation clerks;
- average handling time distribution is TRI (2,5,10);
- the incoming emails daily are 435;
- Evaluated on a ‘longest available’ clerk basis.

There are two clerks that are processing incoming emails from the different inboxes. The report for this model can be viewed in Appendix A2. Figure 17 is a representation of the utilization of the 2 central resources.

Figure 18 indicates the number of clerks busy for thirty minute intervals. This graph clearly shows the relatively low utilization of the central staff. Figure 17 shows clerk one and two with a utilization of 42.5 and 32.8 percent respectively. This is because of a decrease in call times and no prepping times in between calls.

This model shows that by centralizing the staff, a much more efficient system will be in place, saving time and improving the quality of the customer service delivered by Life Healthcare. The amount of staff needed for a central processing system will be less than...
with the AS-IS process (>60% less staff needed). This will create an opportunity for immense savings related to labour costs. This will be discussed at a later stage in this document.

The model further specifies that the average talk time is 5.558 minutes per confirmation. The amount of emails waiting to be confirmed is minimal because of the reasonably low utilization and high availability of staff. The model offers 946 responses from funders per week (both manual and electronic responses). 234 of these received emails are not electronic and these responses were handled by the central office.
The utilization of the two confirmation clerks in 30 minute intervals

Figure 18 - Agent Statistics for the Parent group of the TO-BE process
4.3. **Scenario 1: An increase in the total amount of beds in the Pretoria region.**

The following inputs were used for this simulation model:

- Two confirmation clerks;
- average handling time distribution is TRI (2,5,15);
- the daily incoming emails are 1089;
- Evaluated on a first available clerk basis.

This scenario will be implemented in a case where either more Life Healthcare facilities are built or where the number of beds increases at a certain facility in the Pretoria region. For simulation purposes the number of beds in each facility was increased by 250%. This will in have an effect on the number of updates received on a daily basis.

The report that followed after the simulation was run emphasized, that the utilization of the staff did increase. The utilization for the confirmation clerks were 98.7% and 94.62% respectively. The number of emails offered increased to 2357 (both electronic and manual responses from the funders). This is a very high utilization level and another temporary clerk will have to be employed for similar conditions. A total of 472 manual emails were handled during a period of 7 days. This report validates the fact that the central office will be able to handle a much higher workload if necessary. Although the resources will be fully utilized, the central office will still function in a sufficient and effective manner.

Figure 19 indicates the number of clerks busy for every thirty minute interval. A full report on scenario 1 can be viewed in Appendix A3.
Agents Busy per 30 minute intervals for scenario 1

Figure 19 - A graphic representation on the utilization of the two clerks in 30 minute intervals
4.4. Cost Analysis and -

The amount of working days was calculated in the following manner:

- There are 12 public holidays and 52 weeks in a year plus 1 day (ignoring leap years)
- \(= (52 \times 5) + 1 - 12\)

This gives 249 working days in the year.

- \(249 - 15\) days leave = 234 working days per annum

The following Table will give an overview of the total amount of labour hours saved. As well as a cost analysis where the TO-BE process is compared to the AS-IS process.

**Table 7 – The amount of labour hours saved**

<table>
<thead>
<tr>
<th>Labour Hours</th>
<th>AS-IS</th>
<th>TO-BE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg handling time/call</td>
<td>7.216</td>
<td>5.558</td>
</tr>
<tr>
<td>Total handling time including prepping/call</td>
<td>14.54</td>
<td>5.558</td>
</tr>
<tr>
<td>Time saved per call</td>
<td>7.324</td>
<td>minutes</td>
</tr>
<tr>
<td>Daily time saved</td>
<td>955.782</td>
<td>minutes</td>
</tr>
</tbody>
</table>
Table 8 – A cost analysis of the TO-BE vs. AS-IS process

<table>
<thead>
<tr>
<th>Cost analysis</th>
<th>AS-IS</th>
<th>TO-BE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telkom standard peek rates/min</td>
<td>R 1.64</td>
<td></td>
</tr>
<tr>
<td><strong>This gives a total of 19.92 labour hours saved daily at Life Healthcare by implementing the Central processing office.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg cost per call</td>
<td>R 11.83</td>
<td>R 9.12</td>
</tr>
<tr>
<td>Daily cost for all calls</td>
<td>R 1 544.37</td>
<td>R 1 189.52</td>
</tr>
<tr>
<td>Daily saving</td>
<td>R 354.85</td>
<td></td>
</tr>
<tr>
<td>Monthly salary per clerk</td>
<td>R 11 000</td>
<td>R 11 000</td>
</tr>
<tr>
<td>Total monthly labour cost</td>
<td>R 66 000</td>
<td>R 22 000</td>
</tr>
<tr>
<td>Monthly labour cost saving</td>
<td></td>
<td>R 44 000</td>
</tr>
<tr>
<td>Annual telephonic call saving</td>
<td></td>
<td>R 83 033.77</td>
</tr>
<tr>
<td>Annual labour cost saving</td>
<td></td>
<td>R 528 000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>R 611 033.77</td>
</tr>
</tbody>
</table>
The cost analysis in Table 8 predicts that an annual saving of R611 033.77 will be made on telephonic calls and labour cost savings. This will have to be compared to the cost associated with setting up a central processing centre for future implementation. Due to time constraints this project will not analyze the costs of implementing such a center.

Table 9 - Summary of the different outputs of each scenario

<table>
<thead>
<tr>
<th></th>
<th>Avg Parent_Group Utilization</th>
<th>Average Speed of answer (minutes)</th>
<th>Average Handling Time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS-IS</td>
<td>29.64%</td>
<td>304.12</td>
<td>14.5</td>
</tr>
<tr>
<td>TO-BE</td>
<td>37.67%</td>
<td>358.07</td>
<td>5.558</td>
</tr>
<tr>
<td>Scenario 1</td>
<td>96.64%</td>
<td>448.29</td>
<td>_</td>
</tr>
</tbody>
</table>

Table 9 gives a summary of the most important outputs of the different scenarios that were simulated.
Chapter Four Summary

The reports showing the different outputs for each scenario can be critically analyzed by looking at the utilization of the resources. These reports clearly indicate that resources should be applied in a more effective manner. These reports will give the manager a good overview of the process and how efficient the current system is operating. The number of emails handled for each scenario can also be viewed as well as the central staff’s utilization. This chapter confirms that by centralizing the current solicited process, the hours decrease and a more effective process will be introduced; labour and other annual costs will also decrease as seen in the cost analysis.
Conclusion

The crux of the project is to analyze the current ‘capture and confirming’ process and then to design a centralized system that will effectively handle incoming authorization responses from the funders. The current process had to be analyzed and a detailed study of the AS-IS process was done. Seeing that the hospitals are constantly growing in capacity and the need for a more efficient system is evident, the designed simulation model will aid management in making changes to the designed central process, and then analyzing these changes in Arena.

There will always be numerous solutions to a given problem. The solution designed for this dissertation is therefore not the only solution but a valid indication of how the central office should function. The simulation model can be witnessed in this document, as a reflection of the real world solicited process. This enables Life Healthcare to change the input variables and analyze the sensitivity and the impact of these changes on the processes. This will be a cost effective way to implement future recommendations.

If this study is utilized correctly, Life Healthcare will be able to make changes in the simulated model, and analyze the results before implementation. This will not only be cost effective, but the system does not have to go through a trail period where the implementation of these changes will have to be evaluated on a trial and error basis. A thorough analysis on the designed office was given in chapter 4. The recommended staff capacity was simulated to be 2 clerks. Having more than two clerks will result in employees that are not optimally utilized. This project also analyzed possible future scenarios that could greatly impact Life Healthcare if they were to take place.

Therefore, according to the proposed changes, from a decentralized process, to a centralized, monitored process, it can be concluded that if applied correctly, that this model holds great value for Life Healthcare. It has the ability to increase their labour efficiency and quality of service, and thus have a positive effect on the customer’s experience, which is highly valued at Life Healthcare.

The cost analysis in Table 8 predicts that an annual saving of R611 033.77 will be made on telephonic calls and labour cost savings. This will have to be compared to the cost associated with setting up a central processing centre for future implementation. Due to time constraints this project will not analyze the costs of implementing such a center.
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