**Group 1** **Feasibility and RCA**

2016

# GenNex Diagnostics and Devices Ltd

Group 1

Weekly meeting-Tuesday 7.30 pm @Icebox

**Contents**

# Version History:

| Version | Description | Author | Date | Comments |
|---|---|---|---|---|
| 0.1 | Initial Draft | Siddharth Shukla | 12 April 2016 | Technical Feasibility Draft |
| 0.2 | Modified | Ishani Jariwala | 14 April 2016 | Added Political Cultural and Legal Feasibility and People RCA |
| 0.3 | Modified | Shachi Kulkarni | 14 April 2016 | Added Operational Feasibility ,Candidate Matrix and Process RCA |
| 0.4 | Modified | Poornima Bhadauria | 14 April 2016 | Added Schedule Feasibility and Program RCA |
| 0.5 | Modified | Siddharth Shukla | 14 April 2016 | Added Technical Feasibility and Compliance RCA |
| 0.6 | Modified | Chaitra Masur | 14 April 2016 | Added Economic Feasibility and Product RCA |

# About GenNex Diagnostics and Devices Ltd

GenNex Diagnostics and Devices Ltd, is a diagnostic company with diversified products and service portfolios. We have partnerships with hospitals, insurance companies and hospital networks. We are the pioneers in moving from traditional revenue streams into information services, in healthcare industry. With the changing customer needs and new government regulation (Obama Care) the healthcare industry is changing vigorously in order to improve Heath Care in Unites States of America. GenNex being a forerunner plans to implement outcome-based fee by changing the traditional Fee-for service payment model. The fee-for-service system of payment for health care services is widely thought to be one of the major culprits in driving up U.S. health care costs. This system not only encourages volume but rewards poor quality and provides little incentive for care coordination. GenNex is partnering with likely and unlikely businesses to step-into new dimension in order to deliver best end-to-end experience to the consumer.
GenNex also volunteers for Bundled Payments for Care Improvement Initiative to collaborate in order improve both the quality and efficiency of individual episodes of care.

# Problem Statement

Currently, At Home Services at GenNex have the following manual processes:

- Customer information is maintained in a manual document.
- Accounts are maintained in a log which is updated manually.
- Inventory for GenNex Marketplace is maintained in a register.
- Tracking of doorstep personnel is done via a muster.

Daily operations of the system involve:

- Recording customer data in a manual document
- Updating accounts
- Maintaining product inventory
- Keeping a track of doorstep personnel and their vehicles

Performing all these activities on a daily basis without automation is a huge loss to GenNex. We expect the system throughput for each of these processes to improve drastically once we have an automated system in place.

# Candidate Matrix

The following candidate matrix has been made keeping in mind three options we are considering for fabricating the GenNex Automation System:

1. Use the existing manual process
2. Fabricating an in-house system
3. Purchase a custom-off-the-shelf solution or employ a consulting firm

| | Weight | Candidate 1 | Candidate 2 | Candidate 3 |
|---|---|---|---|---|
| **Operational Feasibility** | 15% | Current processes are all based on manual systems like registers, musters and logs. There is a strong need for an automated system.<br><br>**Score : 50** | An automated data system built in-house is the most effective way of ensuring operational feasibility.<br><br>**Score : 100** | Requirements of the business scenario will be met completely. However, costs incurred will be higher as compared to building the system in-house.<br>**Score : 80** |
| **Cultural Feasibility** | 15% | Division of labor among employees may propose a problem. However, there are not major problems as such with the current system with respect to culture.<br><br>**Score : 90** | Development of an automated system may cause general satisfaction among employees. However, it may cause layoffs as the need for manual work reduces as automation comes into picture.<br>**Score : 90** | Employing an outside organization may result into issues with respect to teamwork and co-ordination. The customer will bill as per resource used which may incur a lot of costs.<br><br>**Score : 70** |
| **Technical Feasibility** | 25% | Due to no automation, managing large amount of data manually is not a feasible option.<br><br>**Score : 50** | The current team at GenNex has subject matter experts who can be employed to build this system in-house.<br>**Score : 100** | It would be expected from a consultant to be technically adept.<br><br>**Score : 100** |
| **Economic Feasibility** | 25% | Lifetime Cost = $50,000<br><br>Payback – 1 year<br><br>**Score : 95** | Lifetime Cost = $150,000<br><br>Payback - 2 years - 3 years<br>**Score : 80** | Lifetime Cost = $180,000<br><br>Payback - 1.5 years - 2 years<br><br>**Score : 95** |
| **Schedule Feasibility** | 10% | Less than 3 months<br>**Score : 90** | 1 - 1.5 years<br>**Score : 100** | 1 year<br>**Score : 100** |
| **Legal Feasibility** | 10% | No legal issues<br><br>**Score : 100** | If a system is built in-house, it will need to be licensed.<br>**Score : 90** | No legal issues.<br><br>**Score : 90** |
| **Weighted Score** | **100%** | **62.33%** | **93.33%** | **89.16%** |

# Operational Feasibility –PIECES Analysis

## 1. P - Performance

**The Problem**

The performance of any system can be estimated based on its throughput. We calculate the efficiency of the current system based on the time it takes to handle transaction i.e. the total time taken to create a new user account or to place an order in the GenNex Marketplace.

The throughput of the current system depends of the following factors:

1. Response time i.e. the time taken for the representatives to refer to record customer data and create an account.
2. The time taken for representatives to maintain a muster and keep a track of doorstep services offered by GenNex.

Due to all these factors, the total time taken for a particular process increases drastically resulting high response times and reduces customer satisfaction.

**The Solution**

We intend to reduce the total response time by automating all these processes. An automated system with a query and appointment booking functionality in place will facilitate the fast and accurate retrieval of information from the At Home Services.

## 2. I - Information

**The Problem**

We will analyze the problems related to the transfer of information to and from the current system based on the time taken to capture, human interpretation errors, accessibility etc.

1. Time taken to capture - The time taken for a representative to record customer information, update accounts and maintain inventory is substantial.
2. Human errors – There may be some errors in data entry or information retrieval dur to human intervention.
3. Accessibility - Manual documents are easily accessible by any representative of GenNex. This poses a great threat to confidential customer information.

**The Solution**

1. Having one centralized system which addresses all queries of customers is an effective way of reducing errors due to human interpretation.
2. This system will ensure that anyone who is able to query the database obtains timely and accurate information.
3. It will ensure consistency of data as there is minimum human intervention involved.
4. Database security measures will be taken to keep sensitive customer data safe.

## 3. E - Efficiency

**The Problem**

Efficiency of a system can be measured in terms of how efficiently a system uses its resources. Is it optimizing the resources it has or is there room for improvement?

The current system has the following drawbacks while utilizing its resources:

1. The response time of each process depends on manual intervention.

**The Solution**

Our new proposed IT system plans to utilize the following resources optimally:

1. Storage space – The proposed system will documents in a centralized database which makes effective use of the storage devices.
2. Human resources – An employee can make better use of his/her time which is saved because of this automation process to attend more number of calls.
3. Computer workstations – Workstations will be put to better use as this automated system will be used to store, access and query data as per need.
4. Time – An automated process would mean reduced response times for process.

**4. C - Control**

**The Problem**

Currently, there is no control over who is allowed to access the documents to obtain customer information. As sensitive customer data is at risk here, it may give rise to the following:

1. Information Leaks
2. Cyber-crime
3. Frauds
4. Embezzlements
5. Money Laundering

**The Solution**

While designing the new system, security will be given highest priority. The new system will have the following control measures in place:

1. Access rights only to admin and authority users
2. Encrypted information
3. Password protected gateway

**5. E – Economy**

Due to the current system, there is increased response time for each process. As a result of this, the throughput of the system drastically reduces increasing the overall costs incurred for GenNex. With the introduction of a new automated system, the response time will reduce thereby reducing costs and increasing efficiency.

**6. S - Service**

**The Problem**

Service requirements represent needs in order for the system to be reliable, flexible and expandable. The problems of the current system are:

1. Reliability issues – In case the documents are lost due to any reason, the whole At Home Services of GenNex will collapse.
2. Flexibility issues – The current system is not flexible to be used in different scenarios like adding new insurance provider specifications, healthcare practitioners etc.
3. Expandability – The process for adding new components manual documents is time-consuming and tedious. Moreover, it would require time investments.

4. Training requirements – Representatives need to be knowledgeable about various procedures and corresponding details in the Summary Plan Document. This calls for additional training sessions to train employees.

**The Solution**

Our proposed system plans to address the above issues in the following way:

1. The automated system has a provision for backup and recovery in case of system failure. This is a strong crises-aversion/crises-management technique which ensures the effectiveness of the system in the long run.
2. An automated system will enable the addition and deletion of data anytime by authorized personnel which reduces flexibility issues to a great extent.
3. Database administrators are knowledgeable enough about handling automated systems which reduces the need to train resources thereby reducing time consumed.

# Schedule Feasibility

Schedule feasibility is the feasibility of keeping a track of whether the project would be completed on time or not. It helps us define all the tasks that we would need to undertake to complete the project. Schedule feasibility tracks the deadlines set for each task and subtask and if there is scope for the deadline to change or not in case a task is not completed on time.

In our Schedule Feasibility, we have 10 major project phases. The total time for the project to be completed is about 16 weeks. The project has to be completed within this allocated time frame or the project would be delayed resulting in losses. Each phase has numerous deliverables. The deadline for each deliverable could be either mandatory or desirable. Mandatory means it has to be completed on the time set or else the project will lag behind and will not be completed on time. Desirable means the deliverable has buffer time already included in the schedule and a delay won't affect the project.

| PHASE NO | PHASE | DELIVERABLE | DURATION | DEADLINE MANDATORY/DESIRABLE |
|---|---|---|---|---|
| 1 | Initiation | •Project Proposal<br>• Project Charter<br>• Sign off on Project Agreement | 1 week | Mandatory |
| 2 | Planning | •Value Proposition<br>•Swim Lane Diagram | 1 week | Mandatory |
| 3 | Requirements Solicitation and Analysis | •Meetings with the client<br>• Business Requirement Document<br>• Feasibility Analysis<br>•Fishbone Analysis<br>•Pieces Analysis | 2 weeks | Desirable |
| 4 | Design | •Data Flow Diagram<br>•Entity Relationship Diagram<br>•Use Case Diagram<br>•Pseudo Code | 3 weeks | Desirable |

| | | | | |
|---|---|---|---|---|
| 5 | Execution | •Setting up CRM and databases<br>•User interface<br>•Communication channels with other departments | 3 weeks | Desirable |
| 6 | Testing | •System Acceptance testing<br>•User Acceptance Testing<br>•Debugging errors | 2 weeks | Mandatory |
| 7 | Deployment | •Load data into production<br>•Test production data | 1 week | Mandatory |
| 8 | Training | •User Manual | 1 week | Mandatory |
| 9 | System Maintenance (Hyper Care) | •Providing maintenance support after successful project go live | 2 weeks | Desirable (This activity can take place only if the project is completed as scheduled) |
| 10 | Final Business Sign Off | •Client signature on Project sign off documents | 48 hours | Mandatory |

# Technical Feasibility

Technical Feasibility for a system can be considered in two ways. First, by considering the design of the system, which constitute factors like Input, Output, and Process. Also, these consideration needs to be quantified, and these can be quantified as volume of the data, frequency of data, and data transmission. Second, by considering the required capabilities to build and host the system i.e. software, hardware, environment setup, personnel required, and expertise level.

**Consideration of Capabilities:**

**Software requirements:**

- MS Office Suite (For documents and reporting)
- Adobe PDF Suite (For documents and reporting)
- Database Management System (Oracle or MS SQL)
- JIRA (Project Tracking and Monitoring)
- Confluence (Knowledge repository)
- JDK Suite
- SVN Tortoise (Code Repository)
- Database client (Toad or DB Embarcadero)
- Integrated Development Environment – IDE (Eclipse or Net Beans)

**Hardware requirements**:

- 5 PC's (for application developers and project manager) with below configuration

- ✓ i5 processor
- ✓ 16 GB RAM
- ✓ 500 GB Storage (Hard Disk)
- ✓ 64-bit architecture

- Web server
- DB Server

**Environment Setup**:

- Development (Developers will use for building the system)
- User Acceptance Testing (UAT) – User will use to test the system as its agile methodology project.
- Production (Actual product that will be used for daily operations)
- Disaster recovery (If production instance fails then to support the daily operations without halting business, this instance will be used)

**Personnel required**:

- 2 web developers for front-end development.
- 2 database developers for back-end development.
- 1 project manager cum business analyst for managing and monitoring the project.
- 1 Devops developer to manage the infrastructure like servers, network etc.

**Expertise:**

- 1 web developer with 5+ years of experience
- 1 web developer, can be an intern or entry level
- 1 DB developer with 5+ years of experience
- 1 DB developer, can be an intern or entry level
- 1 DevOps developer with 3+ years of experience
- 1 PM with 10+ years of experience

**Consideration of design of the system**:

**Input:**

| **Volume of Data** | **Frequency of Data** |
|---|---|
| Records of customer accounts as and when created in chunk of 1 – 10 i.e. minimum 1 and maximum 10 records from CRM to AT Home Services. | Every 5 minutes (Near Real-time). |
| A single file of up to 10 MB from billing and payments system. | Every day at close of business. |
| A single file of up to 100 MB from CRM for feedback reports | Once in a month i.e. Last working day of month. |
| A single file of up to 1000 MB for Analytics report from Analytics team. | Once in a month i.e. Last working day of month. |

**Output:**

| Volume of Data | Frequency of Data |
|---|---|
| A single file of up to 100 MB to billing and payments system from AT-Home Services for billing details. | Every day at close of business. |
| 2 files to patient and tracking system - one for patient details that AT-Home Services will get for case management. Another, for booked appointment details. | Near Real-time |
| A single file of up to 10 MB to construction company from AT-Home Services containing details of all construction related orders. | Every day at close of business. |
| A single file of up to 1000 MB with order details to pharmacy team from AT-Home Services. | Every day at close of business. |

**Process:**

| Delegate to | Volume | Frequency |
|---|---|---|
| **Account Creation Process** | | |
| CRM | 50 account maintenance request<br>10 account creation request | Every Day |
| **Equipment Renting Process** | | |
| Patient Tracking System | 10 requests for new booking<br>8 requests for surrendering | Every Day |
| **Benefit Quoting Process** | | |
| Benefit Quoting System | 100 requests | Every Day |
| **Billing and Payments Complaints** | | |
| Billing and Payments System | 5 requests for billing issues<br>10 requests for payment issues | Every Day |

# Economic Feasibility

The new IT system that will be built should fall under the budget of 30,000 USD that excludes the available internal resources and includes the external cost, software cost and system development with server hosting cost.

The project is scheduled to complete within 3 months and should ideally follow an Agile methodology of software development.

The new system may gain more profits because of its high efficiency, use of less human resources to accomplish the automated tasks. The project may plan to hire human resources in the form of interns to accomplish the work and reduce the burden on the existing employees

## Cost Benefit Analysis

The current system 'AS IS' is compared to the 'TO BE' system to calculate the cost benefit if the automated system is implemented.

COST BENEFIT ANALYSIS

| No | Process | Employee (Number) | Time (hours/day) | Cost ($ / hour) | Current System Total Cost $/day | Automated process | Employee (Number) | Time (hours/day) | Cost ($ / hour) | Future System Total Cost$/day | Benefits or $ Cost Saved per day |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Manual Inventory Management (lab Equipments and health aid products ) | 5 | 4 | 25 | 500 | Automated Inventory Management | 2 | 4 | 25 | 200 | 300 |
| 2 | Manual Appointment Booking | 10 | 8 | 25 | 2000 | Manual & Automated Booking | 5 | 2 | 25 | 250 | 1750 |
| 3 | Resource Scheduling | 10 | 8 | 25 | 2000 | Automated Scheduling | 5 | 1 | 25 | 125 | 1875 |
| 4 | Data Entry to hand written reports | 10 | 8 | 25 | 2000 | Data Entry to System | 10 | 2 | 25 | 500 | 1500 |
| 5 | Generating Reports | 10 | 8 | 25 | 2000 | Automated Report Generation | 5 | 1 | 25 | 125 | 1875 |
| 6 | Billing and Payment | 10 | 8 | 25 | 2000 | Manual/Automated Billing and Payment | 5 | 1 | 25 | 125 | 1875 |
| 7 | Queries | 10 | 8 | 25 | 2000 | IVR | 3 | 1 | 25 | 75 | 1925 |
| 8 | Service and Resource Feed back | 10 | 2 | 25 | 500 | Online Feed back | 2 | 2 | 25 | 100 | 400 |
| 9 | Tracking Status /Progress | 10 | 4 | 25 | 1000 | Online Tracking Status | 3 | 4 | 25 | 300 | 700 |
| COST | Calling Costs ( Placing order, coordinating , managing schedule | 3 | 8 | 5 | 120 | Automated Email /Calls | 2 | 2 | 5 | 20 | 100 |
| | | 88 | 66 | 230 | 14120 | | 42 | 20 | 230 | 1820 | 12300 |

| CONCLUSION | | |
|---|---|---|
| | Cost Saved | 12300 |
| | Employee Count Reduced | 46 |
| | Time Saved | 46 |

## Cost Analysis

| Cost Analysis | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| Development Cost | | | | | |
| **Personnel** | **No of Employee** | **Estimated hours** | **Per hour cost rate** | **Total Cost** | **Responsibility** |
| Business Analyst | 1 | 200 | 25 | 5000 | Business Analyst will gather the requirements to build the IT system |
| System Developer | 2 | 100 | 20 | 4000 | Develop the System |
| System Tester | 1 | 50 | 20 | 1000 | Design a Test Plan and Test the system after integration plan |
| System Developer Intern | 2 | 200 | 15 | 6000 | Assist the System Developer in building the system |
| Database developer Intern | 2 | 100 | 15 | 3000 | Assist the System Developer in building the system |

| | | | | | |
|---|---|---|---|---|---|
| Testing Intern | 1 | 100 | 15 | 1500 | Assist the system Tester in testing the system |
| Business Analyst Intern | 1 | 200 | 15 | 3000 | Business Analyst Intern will gather the requirements to build the IT system |
| Database Administrator | 1 | 200 | 20 | 4000 | Develop the database schema |
| New Hardware and Software Cost | | | | | |
| Type | | | | | |
| Server Hardware | | | | 3000 | Hardware that incudes purchasing desktop and to facilitate building the software |
| Software installation | | | | 2000 | Software needed to facilitate development |
| Miscellaneous Cost | | | | 100 | Cost to install printers, fax machines |
| | | | Total Develop mental Cost | 32600 | |
| Maintenance Cost | | | | | |
| Maintenance Cost ( 1 year) | 1 | 60 hours/mo nth*20$* 12 months =(60*20*1 2) | | 14400 | Maintenance cost of the system will include salary of the system admin who updates the new version of software and also purges the data to history files used by the system. There will also be miscellaneous expenses. |
| Miscellaneous Maintenance Cost | | | | 10000 | Server maintenance and data archival and purge cost |
| | | | Maintena nce Total | 24400 | |

**Payback Analysis**

Based the analysis and calculation above, we can generate the cost and benefit analysis result in the table below:

| Cash Flow Description | Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|---|
| Development Cost | 32600 | - | - | - | - | - |
| Maintenance Cost | - | 24400 | 26640 | 29105 | 31814 | 33796 |
| Discount Factor for 12% | 1.000 | 0.88 | 0.7744 | 0.6814 | 0.5996 | 0.5276 |
| Time Adjust Cost | 32600 | 21472 | 20630 | 19832 | 19075 | 17830 |
| Cumulative Time Adjusted Cost | 32600 | 54072 | 74702 | 94534 | 113609 | 131439 |
| | | | | | | |
| Benefit Derived From the Operation | - | 3198000 | 3200000 | 3205000 | 3215000 | 3315000 |
| Discount Factor for 12% | 1.000 | 0.88 | 0.7744 | 0.6814 | 0.5996 | 0.5276 |
| Time Adjust Benefits | - | 2814240 | 2478080 | 2183887 | 1927714 | 1748994 |
| Cumulative Time Adjusted Benefits | - | 2814240 | 5292320 | 7476207 | 9403921 | 11152915 |
| | | | | | | |
| Cumulative Lifetime Adjusted Costs and Benefits | 32600 | 2760168 | 5217618 | 7381673 | 9290312 | 11021476 |

**Net Present Value Analysis**

| Cash Flow Description | Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|---|
| Development Cost | 32600 | - | - | - | - | - |
| Maintenance Cost | - | 24400 | 26640 | 29105 | 31814 | 33796 |
| Discount Factor for 12% | 1.000 | 0.88 | 0.7744 | 0.6814 | 0.5996 | 0.5276 |
| Present Value of Annual Costs | 32600 | 21472 | 20630 | 19832 | 19075 | 17830 |
| Total Present Value of Life Time Costs | | | | | | 131439 |
| | | | | | | |
| Benefits Derived from | - | 3198000 | 3200000 | 3205000 | 3215000 | 3315000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| the operation | | | | | | |
| Discount Factor for 12% | 1.000 | 0.88 | 0.7744 | 0.6814 | 0.5996 | 0.5276 |
| Present Value of Annual Benefits | - | 2814240 | 2478080 | 2183887 | 1927714 | 1748994 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total Present Value of Lifetime Benefits | | | | | | 11152915 |
| | | | | | | |
| Net Present Value of this Alternative | | | | | | 11021476 |

**Return on Investment Analysis**

Lifetime ROI = (Estimated Lifetime Benefits - Estimated Lifetime Costs)/ Estimated Lifetime Costs

| | |
|---|---|
| Estimated Lifetime Benefits | 11152915 |
| Estimated Lifetime Costs | 131439 |
| Lifetime ROI | 8385% |

## Political and Cultural Feasibility

**Political Feasibility**

Political feasibility analysis is carried out to understand the outcome of the proposed system with respect to the system actors, events and environment.

- **Problem**:
  No customer gets favored due to the influence of the particular doctor/any network actor influence in the system. That means, if a doctor who has a lot of influence on At Home Services and hence his patience gets the treatment first; will not be allowed.

  **Solution**:
  All the customers will be catered as per their time stamp of interaction with the new automated system. The new automated system takes care of the time of which customer came for the service and hence he customer services will be served in that order only. Hence nobody can influence the system process.

- **Problem**:

Fear amongst the employee of losing the jobs due to the automation of the system

**Solution:**

The automated system will not replace all the employees. New system will just put the processing from manual to automation. At Home services will still have call-in customers for whom the employers will place their request in the system.

**Cultural Feasibility**

Cultural Feasibility analysis examines ethical, social and behavioral issues of GenNex. Organization's culture affects the system's operation.

- **Problem**:

Dependency on other sub-systems, causing deliberate delays or resistance in serving the services.

**Solution:**

The automated system ties up the databases for all the sub-systems. If At Home Services issues a request of a device from Pharmacy sub-system, than that request will be added to Pharmacy's order system and hence the political or deliberate attempts can be avoided.

- **Problem**:

Top management or network partners resisting change to adopt the new system.

**Solution**:

Automated system will be implemented taking proper permissions from the top management. Resistance than after will affect the entire system. Hence in this situation the problem can be resolved by talking to the influential person who can bring the change of attitude among all with power and respect.

- **Problem:**

Difficulty in handling different vendors.

**Solution:**

When customer requests for any services from the vendors, that service will be generated in the vendor's system. For Example: If the customer requests for a cab service, the request will be generated within the cab service providers system and hence there won't be a difficulty to handle them manually.

## Legal Feasibility

Legal Feasibility defines if the proposed system is in complaint with the Obama Care Act along with all the other compliances enforced by the government.

At Home services being a system depending on all the other sub-systems, it has to be complaint to the following listed compliances:

- The system must be complaint to HIPAA Compliance which protects sensitive patient data. At Home Services deals with protected health information (PHI) so it must ensure that all the required physical, network, and process security measures are in place and followed.

- All the network partners like vendors and doctors must have the license of practicing in United States.
- All the doctors and network practitioners should sign the Non-Disclosure Agreement (NDA).

- The system requires data protection as defined in the Privacy Act (of 1974)
- The system also requires to comply with the ten titles defined under Patient Protection and Affordable Care Act (PPACA) i.e. Obama Care
- The tax calculation has to comply with PPACA
- The system also requires strict compliance with the McCarran-Ferguson Act (of 1945) that authorizes the states to establish mandatory licensing for the insurance companies.

## Root Cause Analysis

At Home Services is a business unit of GenNex device and diagnostics limited. This business unit has incurred a loss of $10000. As a result of this we the business analyst of GenNex are required to perform a root cause analysis to get to the bottom of the reasons that are causing this loss.
The purpose of this document is to deduce the root cause of the problem-loss of $100,000. We will be identifying the symptoms using the Fishbone Diagram in various categories. The 5 Why's help reaching a root cause for each symptom and the resolution table resolves the root cause using BPR, IT System or Risk Mitigation or a combination of them

## Fishbone Diagram

This diagram helps us to categorize and list the symptoms on the different categories as described in the below diagram. The symptoms of the problem can be categorized as follows:

**Process**

(i) The current process of manual maintenance of accounts and inventory is tedious and time consuming.

(ii) As there is no automation, human intervention is required which results into a lot of manual errors.

**People**

(i) No co-ordination among departments which gives rise to improper maintenance of data.

(ii) Workforce is dissatisfied with manual methods of data-entry.

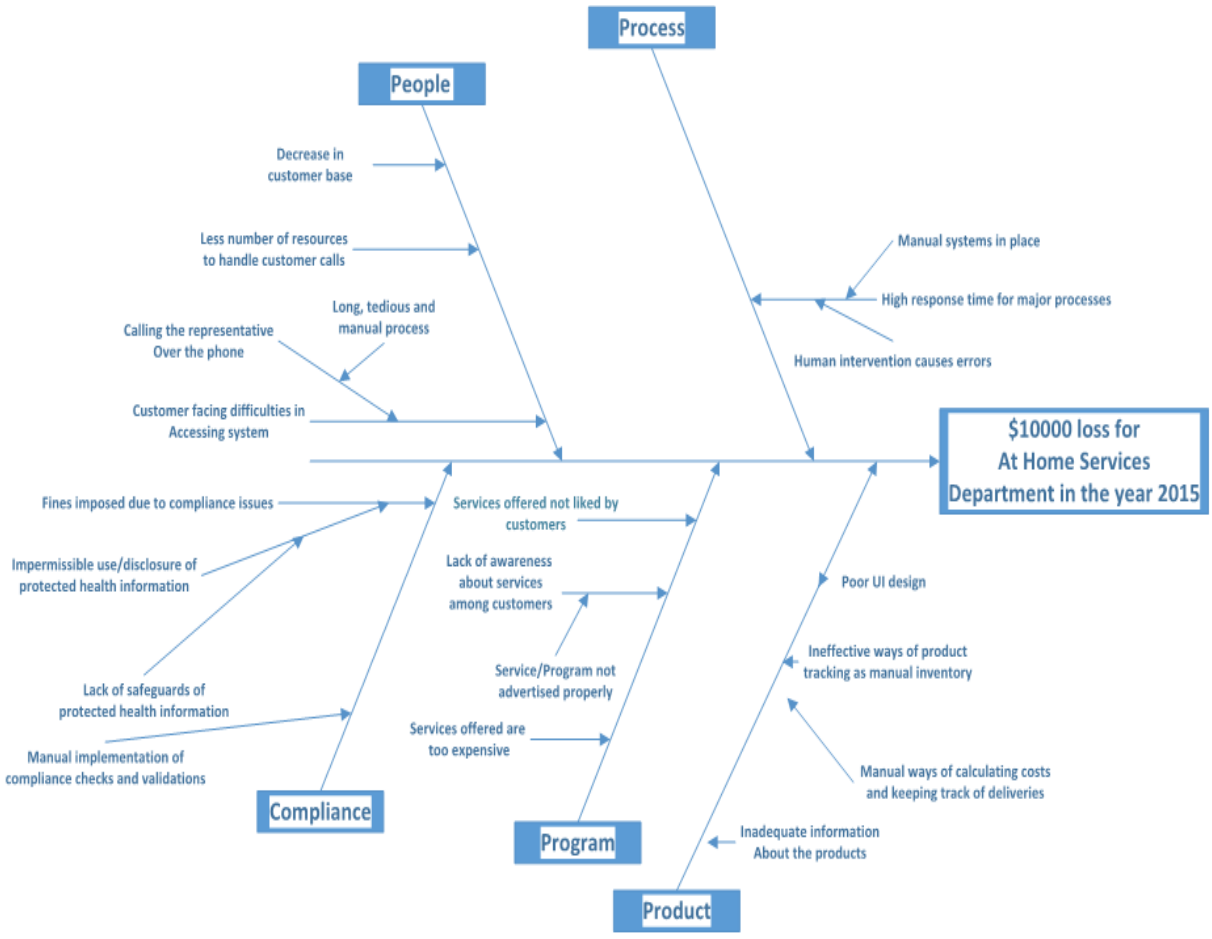
**Policy**

(i) Time gap in compliance department as there are manual ways of ensuring compliance with laws.

**Product**

(i) Manual tracking and inventory systems cause time-gaps in product deliveries.

(ii) Costs are calculated manually.




## Root Cause – 5 Why technique

| Category | Symptoms Cause | 5 Why's? |
|---|---|---|
| People | 20% decrease in new customer registration | • **Why decline in customer registrations?**<br>Difficulty in accessing the system<br>• **Why difficulty in accessing system?**<br>The system is manual and one needs to give a call in order to get the services.<br>• **Why the manual system a problem?**<br>Process is long, tedious and over the phone.<br>• **Why the process long and tedious?**<br>Less number of resources to process the requests |
| Product | Inadequate Information | • **Why are the products not sold?**<br>Inadequate information available on the health aid products available at, At Home Services |

| | | |
|---|---|---|
| | | • **Why inadequate information is available?**<br>Insufficient e-marketing of health aid products<br>• **Why insufficient marketing?**<br>As the IT system was designed to just manage health aid product ecommerce and not marketing. Marketing of products traditionally happened by understanding individual customers and their needs and by word of mouth. The business process for marketing needs to reflect in terms of e- commerce as well.<br>• **Why no Business Process for e-marketing?**<br>No strategy or requirement to translate the marketing business process to reflect in the IT system.<br>• **Why no requirement?**<br>As the IT system concentrated only on product ecommerce and did not focus on sales and marketing |
| | Improper or Manual Tracking | • **What are the health aid products not sold?**<br>The health aid products are sold, but maybe they are not tracked properly.<br>• **Why are health aid products not tracked?**<br>Maybe there is no data accurate data capture for the number of products sold<br>• **Why no data for the products sold?**<br>Only Product ecommerce has a IT system associated with it, however may be sales information is not captured.<br>• **Why is sales information not captured?**<br>It is captured, but manually and thus no accurate result and count of the product sale<br>• **Why is the data captured manually?**<br>Because there is no requirement to capture the business process wrapped around the count of the number of products sold in the IT System. |
| | Poor UI design | • **What are the health aid products not sold?**<br>They are not sold because the UI is not friendly.<br>• **Why is the UI not user friendly?**<br>It has a lot of steps involved to choose and select a product, which may be time consuming. Thus because of a bad UI design.<br>• **Why is the UI design bad?**<br>The UI is not well equipped for the different customer segments that the website targets<br>• **Why is UI not well equipped?**<br>The UI is not designed for differently abled customers.<br>• **Why is the UI not designed for the differently abled customers?** |

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| | | There was no requirement for the website or the IT system to incorporate a UI which is friendly and easy to use for all the different customer segments. |
| Program | The project deliverables are not completed on time | • **Why are deliverables not completed on time?**<br>Employees are overworked and struggle to meet the deadline.<br>• **Why do employees struggle to meet the deadline?**<br>Employees are over burdened with work.<br>• **Why are employees overburdened with work?**<br>Lack of employees to share the work<br>• **Why is there a lack of employees?**<br>Poor hiring by GenNex |
| | Maintenance support cannot be provided after project Go-Live | • **Why maintenance support cannot be provided?**<br>The project completion date was postponed.<br>• **Why was the project completion date postponed?**<br>Some of the deliverables were not completed on time.<br>• **Why were the deliverables not completed on time?**<br>The requirements kept changing.<br>• **Why did the requirements keep changing?**<br>The scope/requirements were not well defined in the beginning.<br>• **Why was the scope not well defined in the beginning?**<br>Lack of proper require solicitation/gathering. |
| | End user not happy with the system | • **Why is the end user unhappy with the system?**<br>The end user is unhappy because he/she finds the system difficult to understand.<br>• **Why is the end user unable to use the system?**<br>The end user finds the user interface difficult to understand.<br>• **Why does the end user find the interface difficult to understand?**<br>The end user was not properly trained on how to use the system |

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| Compliance | Impermissible uses and disclosures of protected health information. | • **Why impermissible use or disclosure?**<br>Inadvertent errors are caused by staff while processing requests.<br>• **Why inadvertent error occurs?**<br>Staff is not completely trained on compliance related issues.<br>• **Why not trained properly?**<br>Not able to keep up with the changing regulations in this fast paced healthcare industry?<br>• **Why not able to keep up with changes?**<br>Regulations changes and incorporating them in manual business process is a very time consuming, which always leave a scope of wrong implementation.<br>• **Why implementation goes wrong?**<br>Because the system is not automated and needs lot of manual intervention to incorporate new changes. |
| | Lack of safeguards of protected health information | • **Why issues with safeguarding protected health information?**<br>Lot of paper work to deal with and keep it safe.<br>• **Why lot of paper work?**<br>Because all the forms are filled on paper and new file is created for every case and is being handled manually.<br>• **Why not trained properly?**<br>Not able to keep up with the changing regulations in this fast paced healthcare industry and it becomes difficult to engage staff in training?<br>• **Why difficult to engage staff in trainings?**<br>Staff is burdened so much with day to day activities that taking time out for training is not possible on regular basis.<br>• **Why there is so much burden in day-to-day operations?**<br>Lot of manual work involved, which could be automated to save time. |
| Process | High response time for major processes | • **Why does human intervention cause errors?**<br>As there is no automated system in place<br>• **Why is response time high?**<br>Manual system in place<br>• **Why is there a manual system in place?**<br>No innovation in GenNex<br>• **Why is there no innovation in GenNex?**<br>Corporate mentality |

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| | Improper compliance procedures | • **Why are there improper compliance procedures?**<br>Compliance department is busy in maintaining manual records<br>• **Why is compliance department busy in maintaining manual records?**<br>No automated system to maintain compliance procedures |
| | Improper methods of maintaining data | • **Why are there improper methods of maintaining data?**<br>Because workforce is not satisfied<br>• **Why is workforce not satisfied?**<br>No automation in place to make work easy<br>• **Why are there manual errors?**<br>Because of lots of human intervention |

# Resolution Table

| Resolution Number | Root Cause | Symptoms | BPR | IT System | Risk Mitigation |
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| 1 | Manual system | 20% decrease in new customer registration | Automating the system and training the customer representative to deliver quick and fast service | New IT System will have the registration section where the customers can directly register with system and request for services. Those customer who can't access internet can still call the representative and get the service. | **Risk**: Long procedure and loss of data in communication |
| 2 | No Existing system to promote the health aid products at AT Home | People are unaware of health aid products availability | Reengineering the existing marketing strategy to incorporate e marketing of the health aid | New IT system will have business logic that will bridge the patient an products need by predicting and suggesting health aid products | **Risk:** Users of the system might resist new IT system by ignoring the suggestions and would want to |

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| | Services | | products | patient would need | work in old fashion.<br>**Mitigation:** Engage users/patients by understanding the product need and proactively call them for the product they may need. |
| 3 | Manual tracking of sales | Sales margin of the product is not as expected | Automating the health aid sales tracking process by generating statistics of sold products over time | New IT system will have requirement that centrally calculates the number of health aid products accurately | **Risk:** Automated process might not work as expected for historic data.<br>**Mitigation:** Document the manual process, collate the product purchase history |
| 4 | Unfriendly User Interface | No product purchase from the website | The business process has to be reengineered to incorporate a website that can be used by the different patient segments that include the differently abled people. | New IT system will have requirement that have less number of steps and friendly for the different types of users using the system to purchase a health aid product | **Risk:** Users of the system might resist new IT system and would want to work in old fashion.<br>**Mitigation:** Engage users from the very start, so that system can be developed as per their needs |
| 5 | Hiring is not done correctly by the GenNex Human Resources departmen | The project deliverables are not completed on time | Automating the allocation process and using MS Project to avoid over allocation of resources | New IT system will check the resource allocation and availability/time sheet | **Risk**: Current employees may leave due to overburden of work.<br>**Mitigation**: Hiring skilled |

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| | t due to which the current existing employees are overworked. | | | and alert managers of overburden of work. | employees as soon as the need arises. |
| 6 | Lack of proper requirement solicitation /gathering at the beginning of the project | Maintenance support cannot be provided after project Go-Live | The existing requirements process is manual. Automating this process by a portal were the requirements are freezed will help the development team | New IT system will include Agile methodology and include sprints. The requirements would be frozen and revisited from time to time to see if the requirements are being met. | **Risk**: Failure of the project and the end product not being of high quality. **Mitigation**: Meeting as often with the client to understand all the requirements properly and getting a sign off on the requirements document from the client to seal all the requirements. |
| 7 | Lack of proper training to the end user makes it difficult for the user to use the system efficiently | End user not happy with the system | In the current system, there are no assessment exams to test how well the end user has understood the functioning of the system. Having online tests will help the end user use the system smoothly. | New system will check the assessment marks of the end user and raise flags if it does not meet minimum requirement. | **Risk**: Constant complaints from the end user resulting in law suits from the client. **Mitigation**: Taking ample time to train end user properly and conducting assessment tests in the end. |
| 8 | No existing | Ineffective | Creating a new | New IT system will | **Risk:** Users of the |

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| | IT system which can ensure close integration of AT-Home services with compliance related policies. | communication with compliance department. | automated system will enable close integration of AT-Home Services with Compliance department. | have business logic checks that will validate the transactions against the compliance related rules. | system might resist new IT system and would want to work in old fashion. **Mitigation:** Engage users from the very start, so that system can be developed as per their needs. |
| 9 | Manual process consumes much time and engage staff in unproductive activities. | Not able to train employees on compliance issues to keep up with regulatory changes. | Automating the process by reducing waste like motion, overproduction, and defects can save time. | Automated system will help avoid manual intervention and will reduce errors. | **Risk:** Automated process might not work as expected after implementation. **Mitigation:** Document the process first, then create new process and get user sign off on new process before starting work. |
| 10 | Non-existence of an IT system which facilitates all functionalities | At home service not meeting revenue goals | Automating all manual systems and providing hands-on training to all employees involved | The proposed IT system will have following functionalities: Account creation, Online Marketplace, Appointment Booking, Inventory Management, Tracking | **Risk:** Manual intervention can give rise to human errors. **Mitigation:** Eliminate manual intervention by implementing automation. |

# Conclusion

This analysis tries deducing the root cause of the problem using the Fishbone diagram and the 5 Why techniques. The resolution process aims at capturing the root cause, symptoms, and business process reengineering techniques. It also captures how the system should be automated to maximize profits and outnumber losses. Associated risks and mitigate strategies are also a part of this resolution table.