ERP for Pharmaceutical

Distributors

By

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DEDICATION

In the name of Allah, the Most Gracious, the Most Merciful

To my dear Family
Specially to my parents

ACKNOWLEDGEMENTS

First of all I would like to thank Almighty Allah for providing me an opportunity to work with such a wonderful team and such a motivating team lead, Mr. Aatif Kamal who will always remain a source of inspiration for all four of us and for so many more. Secondly I would like to thank Mr. Aamir Rasheed from Novartis who provided us such valuable pieces and bits of information that are unmatched. Thirdly I would like to thank Miss Farah Naz from GSK (Glaxo Smith Kline Beecham) for providing such valuable information regarding the processes of MIO's. Lastly I would like to thank GM Novartis for providing us the permission to look into the processes of the MIO's.

ABSTRACT

The system is designed for the pharmaceutical distributors. The objective of the system was to automate the various mature pharmaceutical processes used in the Marketing and Distribution departments. The system provides external web and pda interfaces for the Sales Force and provides web interface to the Marketing Force. The system integrates sales and marketing data so as to facilitate an effective decision making capability with the technology of dynamic reporting (OLAP). The Sales information is fed into the backend system. Based on that information the Marketing Executives can manage their employees in a way as to maximize sales in their area of management. The system features a complete EMS, SFA, CRM, ERP for the pharmaceutical industry. A facility of dynamic reporting is provided for the EMS to manage the employees to the full extent.

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LIST OF ABBREVIATIONS

CRM	Customer Relationship Management
DFD	Data Flow Diagram
DTS	Data Transformation Services
EMS	Employee Management System
ERD	Entity Relationship Diagram
ERP	Enterprise Resource Planning
MIO	Medical Information Officers
MIS	Management Information System
NDA	Non-Disclosure Agreement
NSM	National Sales Managers
OLAP	On-line Analytical Processing
OLTP	On-line Transaction Processing
RIA	Rich Internet Applications
ROI	Return on Investment
RSM	Regional Sales Managers
SIO	Sales Information Officers

Chapter1

INTRODUCTION

Delivery and distribution industry has never offered more opportunities or challenges than it does today. Dynamic consumer demands and preferences require new ways of maintaining current customers and addressing new ones. With ever-increasing competition, companies must intensively court customers and offer high-quality products, efficient distribution, and low prices.

Success today depends on the ability to quickly capitalize on emerging opportunities, respond to new customer behaviors and tastes, and adapt to new market conditions. Gaining more visibility of your customer's buying habits creates a huge opportunity to increase revenue per sales person. To help in facing these challenges successfully we have developed Enterprise Resource Planning System for Pharmaceutical Distributors. This Powerful, end-to-end solution will help to manage business and mobile sales and delivery team enabling to ensure superior customer service and product availability without losing control of costs.

EPR system is a flexible and scalable Route Accounting System; that would be used in Pharmaceutical Distribution Industry. It will manage the supply chain from order taking and shipping to pricing and invoicing. It supports best practice methods in Route Accounting and Distribution and is easily configured to meet specific operational requirements. No business can achieve success without proper management of the Marketing and Sales team and for this purpose our system also features a comprehensive evaluation, tracking and management system for the Medical

Information Officers which are an integral part for Pharmaceutical companies. Without proper marketing no company can achieve desired sales so this area directly affects the Distribution system hence it was necessary to provide an integrated solution which could manage the Medical Information Officers along with the Information Management of the Sales and distribution process

WI-FI and GPRS configured Hand Held computers powered by Microsoft WINCE.NET allow the system to direct truck drivers in real time, so that urgent tasks are automatically prioritized and all work is carried out in the most efficient sequence.

It is powered by a proven set of industry-specific business processes, Microsoft .NET and Microsoft .Net Compact Framework. This ensures that all critical information is always ready for instant use at all times including all necessary process and enterprise information that needs to maximize operational efficiency-resulting in cost reductions that will significantly improve bottom lines. As the backbone of your distribution infrastructure, it would empower distributors to:

- Increase productivity and efficiency through dynamic visualization of the employees and the system.
- Improves supply chain efficiency by providing visibility to field level information
- Drives out excess inventory in the supply chain by providing accurate and timely information for proper production and distribution decisions

- Improves the bottom line through control and measure of the entire order to Cash process including: pricing, cash collections and improved delivery efficiency Significantly improve customer service

1.1 AIMS AND OBJECTIVES

Following objectives are expected to be met by this system.

- Industrial Automation solution so that it could automate sales activities.
- Complete visualization of the employees with the support of tracking and evaluating system which is dynamic and on the fly.
- Paperless business environment by executing all the tasks on the handheld computer or through the web-based forms.
- Fast and reliable order management by providing all information at the order execution time.
- Better Schedule Management by giving comprehensive information set for better performance.
- Efficient resource utilization for sale and marketing.

1.2 SYSTEM OVERVIEW

ERP system has been designed to meet the modern business requirements and would be capable of benefiting business cooperation in a number of ways. Its flexible design ensure lesser errors which leads to higher reliability. Its initial investment is high but in the long run it would cut off a lot of cost. It includes services that would strengthen the business activities. Customer relationship management is inducted by keeping a

graceful track of all customers and by providing them facility to communicate with the company. Further CRM objectives are also achieved through quarterly based evaluation of the employees concerning the customers hence achieving the objective of getting a true picture of the system. Warehouse and inventory management ensures a close record of stock available and helps the company in keeping track of all stocks. A comprehensive financial record is kept of all the customers so that they could avail the financial facilities and any chance of fraud could be minimized. Order management is implemented to cater order problems. Schedule management and sales force automation would help to increase resource utilization. A cheap way of communication GPRS would be use to communicate between the backend servers and handheld computers which ensures just in time service and a major cost cut off. The system overall consists of a web portal, wireless front end client and a decision support system.

System can be visualized by considering figure.

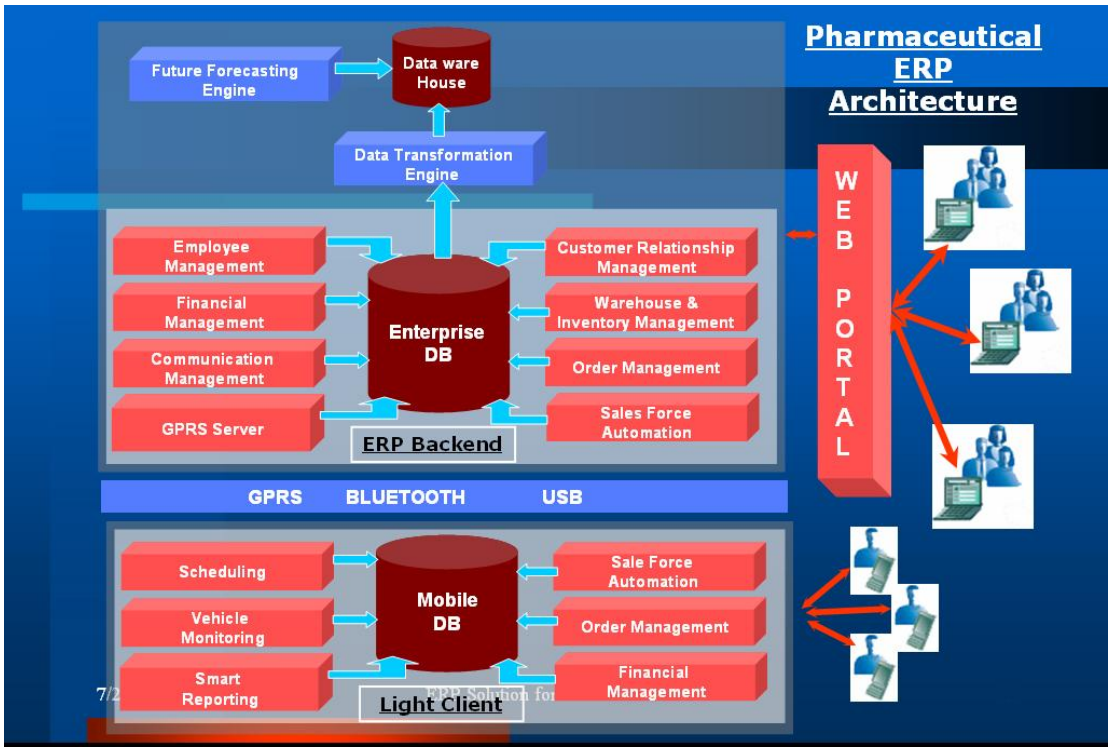

Figure 1.1: Architecture

The system comprises of three components as follows.

1. Web Portal
2. Decision Support System
3. Front End Interface for Wireless Devices

Each component is a rich set of functionalities and addresses business requirements in its capacity. This division has powered the system to handle operations in a more flexible and smarter manner. Key functionalities in each component are discussed as below.

1.2.1 Web Portal

The Web portal is the main interaction point in the system. It controls all the main activities and helps the operations staff to handle the business process more flexibly. This component comprises of following modules.

1.2.1.1 Medical information officers

1.2.1.1.1 Employee management

- Territory tracking and assignment
- Evaluation and Dynamic Reporting Combo (RIA)
- Performance Indicator Monitoring (RIA)
- Employee Profile Management
- Employee Access Management
- Team Management
- Category Management
- Designation Management

1.2.1.1.2 Customer relationship management

- Doctor Registration
- Doctor Meeting Manager
- Doctor Viewer
- Pharmacist Manager
- Pharmacist Viewer

1.2.1.1.3 Communication management

- Online Survey Feedback (RIA)

- Online Survey Administration (RIA)
- Online Survey Facts Reporting (RIA)
- e-Chat (RIA)

1.2.1.1.4 Real-time dashboards

- Executive dashboards based on 3-D Graphical Reporting
- Key performance indicators of employees
- Graphical reporting of facts comparisons
- Latest Charting techniques
- All Reporting is on the fly and dynamic
- Have facility to save reports in word file format.

1.2.1.1.5 Data transformation workflows

- Full Designing and automation of task using "DTS" (Data-Transformation Services) feature of SQLServer2000
- Transformation of Employee Evaluation data to be viewed through Multidimensional OLAP cubes.

1.2.1.1.6 Data analysis by cubes

- Dynamic Facts Reporting through drag and drop interface using multiple dimensions of Employee.
- Cube can be refreshed from time to time to load the most current data.

1.2.1.2 Sales information officers

1.2.1.2.1 Product profile management

Its main concern is to maintain the record of all the medicine available in the warehouse or those in which distributor is dealing. For management of these stocks, Profiles of Vendors is kept.

1.2.1.2.2 Stock management

Pharmaceutical distribution business is different from other systems because of expiry dates which are a critical attribute of medicines. This is why stock record is most important. Each product is realized by its batch number and expiry date. At one time one product may have more than one lot and system caters this requirement.

1.2.1.2.3 Expiry date handling

In case of medicine expiry date of medicines is the most important factor that has to be catered because if some medicine expires the company has to pay from its own accounts. To handle this problem company ensure that stock is released in "first expire first out" fashion. This would ensure that stock with tighter stock expiry must be released first.

1.2.1.2.4 Price control management

In any company it's a daily routine that the prices of stocks change. So a company must ensure that delivery of all stocks is ensured at the right price. So every batch's (consignment) prices are saved separately by the system.

1.2.1.2.5 Customer profile management

Customers in this system are the retailers that deal with the general public. An up-to-date profile maintained for each customer. Customers are categorized in different categories which help the company to manage these customers more flexibly.

1.2.1.2.6 Order scheduling

Three type of schedules could be could be generated. First are new order collection schedules. Others are order delivery schedules and third are schedules for account receivable collection. These schedules are made by Order Manager and salesmen execute them.

1.2.1.2.7 Order management

Order Management is the management of customer's order. This module collects orders data and based on the demanded item, stocks are allocated for each order.

1.2.2 Enterprise Database

All the enterprise data is collected on the on the enterprise database and these module feed this database.

1.2.3 Decision Support System

Decision support system comprises of a data warehouse that collects employee data from the enterprise database and performs cubic transformation for generating dynamic cubic reports. These reports would help to visualize these summarized facts about the company's performance.

1.2.4 Front End Wireless Interface for Handheld Devices

This component is to support sales staff activities. It compromises of set of functionalities that cater sales process. This components would run on handheld computes powered by WinCE and would be interfaced with the backend system by WIFI, USB and GPRS medians. This component majorly comprises of following modules.

- New Order Collection
- Order Delivery
- AR Collection
- GPRS Reporting
- Daily Notes
- Data Synchronization

1.3 PROJECT DIVISION

Project has been divided into 4 workspaces and 4 individuals are responsible for every workspace. Each group member has clear and distinct boundaries in which he would develop his own system. Table shows the task distribution of every group member.

Table 1.1: Project Division

S.No	Name	Workspace
01	Ali Hassan Bokhari	Wireless Interface (Salesman Operations)
02	Naveed Ahmed	Wireless Interface (Communication and Supporting Services)

03	Sufyan Masood	Web Portal (Sales Backend Services)
04	Syed Mohammad Ali Hasnain	Web Portal (Medical Information Officers)

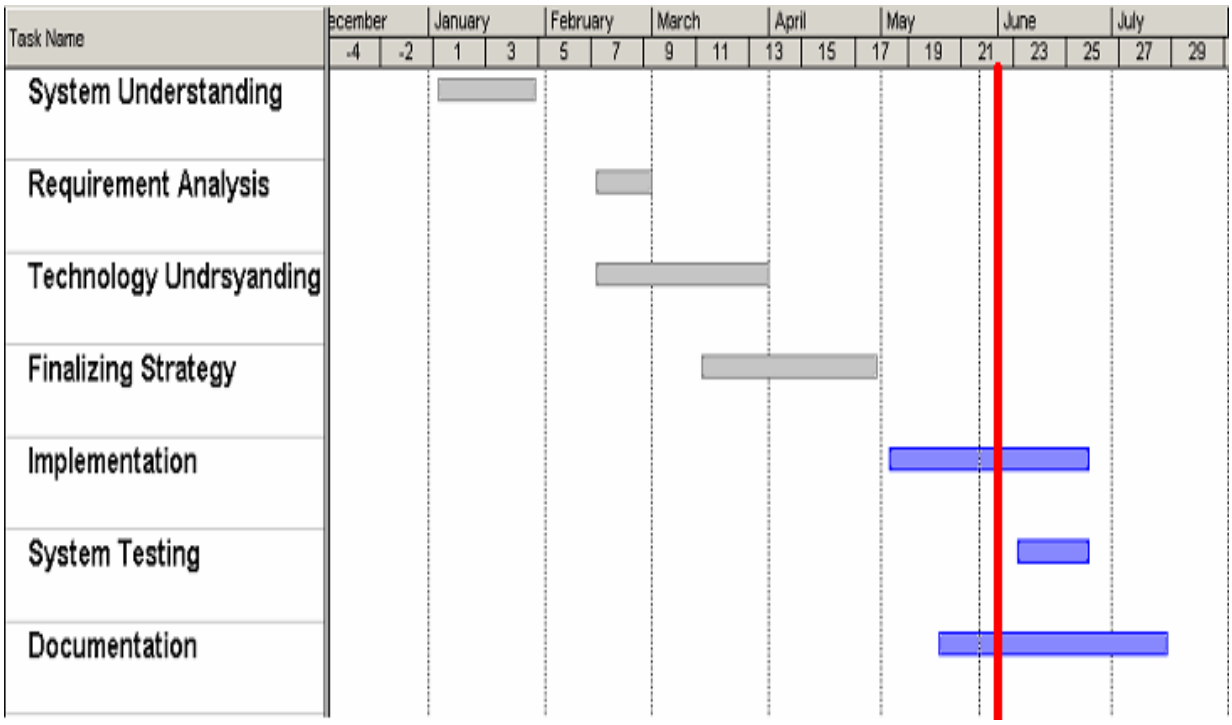

Figure 1.2: Project Time-Line Overall

Chapter 2

LITERATURE REVIEW

Before going into the details of proposed solution, let us have a look on the work that has been done by several communities in this domain. Their work provided us with a guideline to follow and helped us to carry out our work plan.

Few main areas, which were required to be covered for getting complete understating of domain and the problem, which finally drive us to its solution are given as follows:

1. Why and How ERP Systems can be selected [1]
2. Enhancing ERP Architectures for Business Networking [2]
3. Data Profiling: The Foundation for Data Management [3]
4. Why .Net Technology is Important for ERP [4]

2.1 WHY AND HOW ERP SYSTEMS CAN BE SELECTED [1]

An **ERP system** is your information backbone and reaches into all areas of your business and value-chain. [1]

Now a days attention is being given on processes of the company. That how these processes can be made mature. Replacing current traditional ways is very difficult. But if we see the companies who have mature processes and have developed fast and efficient ways of doing things, are earning profit a lot more than the companies who don't have mature processes. Now the problem is that how we can select a system that can help us in making our work fast, reliable and efficient.

There are certain criteria's on the basis of which we can select a good system.[1]

2.1.1 A Future Proof Decision

To understand what the next ten years will bring for manufacturing, and what impact it will have, look at the last ten years and double that rate of change. Technology will provide information to the knowledge worker at any time on any device. Information will be personalized and will anticipate the needs and activities of every organizational role. It will focus on providing data to make decisions on exceptions and automating routine daily processes. And it will have to adapt to new business and technology strategies that few of us can accurately predict today.

2.1.2 Rock-Solid Solutions

Now companies have to see which provider can offer better ERP solution that can help in making their work efficient. There are a lots of ERP system but is there any solution that has been made especially for the domain in which company is working. Rock-solid solutions generate rock-solid results. Companies that use functionally superior ERP report measurable improvements that are orders of magnitude greater than they had expected:

- 90% reduction of order-to-ship time
- 86% reduction of order entry steps
- Increased inventory turns from 7-8 to 30
- 40%-50% reduction of lead times
- Reduction of time to "configure" orders from hours to minutes

- Lot size reductions from 50 to 10
- 99% next day shipping of service parts
- $120,000 reduction in finished goods inventory in four months
- 99% on-time off-the-shelf fulfillment and delivery rate
- Over $400,000 total inventory savings
- 50% reduction of labor and overhead
- 1/3 reduction in manufacturing lead times for complex engineer-to-order products
- 80% reduction in labor to create bills of materials

2.1.3 Elimination of Implementation Guesswork

The success of your new system depends on two dimensions: the length of time it takes and the amount of business change and value delivered. Quick advantage occurs when the implementation is fast and results in high strategic value. This type of implementation is the greatest strength of the software vendor you are looking for.

2.1.4 Manufacturing and Distribution Mastery

With extensive manufacturing and distribution experience and expertise, a vendor will be equipped to offer you the kinds of support services and tools that allow you to successfully solve your most difficult business challenges, rapidly deploy applications and maximize your return on investment. The number one weakest link in IT implementations has been reported to be consulting expertise, so make sure a vendor's staff of design professionals, systems analysts, technical, manufacturing and distribution consultants, and financial experts understand manufacturing and

distribution inside and out. In addition, they need to know how to provide you with the most cost-effective software solutions.

2.1.5 Stacking the Technology Odds in

Your Favor As a manufacturer, you need technologies that can grow with you, help you compete successfully and effectively run your operations now and in the future. The technology principle in support of that need is that information technologies are evaluated and employed based on their relevancy and ability to provide sustained business advantages to manufacturers like you. Reliable and proven technologies are then seamlessly integrated into the total suite to ensure the utmost return is derived.

Today, **ERP** systems support a broad range of collaborative applications to improve the flow of information across the supply chain. These technologies support:

- E-commerce
- Web storefronts
- XML-based EDI
- Fast, interactive electronic communications
- Browser-based viewers
- Web publishing
- Dynamic XML-based menus and "how-to" help documentation
- Secure Internet access
- Automated workflow
- Roles-based Enterprise Knowledge Portals

2.1.6 Delivering Return on Investment

In a 2001 survey by Information Technology Toolbox, 59% of 1124 respondents, by a margin of 3 to 1, saw their highest return on investment (ROI) coming from **ERP**. That has been the case for over two decades due to strategic, enterprise resource planning solutions that streamline, integrate, automate and improve manufacturing operations in companies like yours around the globe. An extended **ERP** solution manages processes across your value chain.

Some of the results of this coordinated effort that help you achieve the maximum return on investment with the shortest payback period include:

- Reducing your lead-times and cycle-times
- Increasing the accuracy of your costing
- Protecting your profit margins
- Increasing your market share
- Reducing your inventories
- Shortening your product lifecycles
- Increasing loyalty of your customers by responding faster and more effectively
- Streamlining communications

2.2 ENHANCING ERP ARCHITECTURES FOR BUSINESS NETWORKING [2]

Many organizations have **ERP** systems in place and are confronted with initiatives from their functional departments, consultants or software vendors that aim at implementing solutions for Business Networking. This concept includes the design and

management of IT- enabled relationships between internal and external business partners. It provides a holistic perspective on strategies, such as electronic commerce, supply chain management, and customer relationship management. Since a new array of applications to address these inter-business relationships is swiftly implemented, architectural considerations are often left out. Reasons for this include time pressure, a lack of experience, methods, and concepts. Consequently, existing **ERP**-centric architectures are not modified or have to be modified after the fact.

SAP Management aims to manage heterogeneity by including Business Networking systems into its business application architecture. This means that reference installations with pre-configured processes, standards, and guidelines are offered to the departments. For example, integrating Siebel with SAP might require a tool for enterprise application integration which can handle the differences in semantics and application logic of the two solutions.

2.2.1 Basic Architecture Components

In a workshop with Deutsche Telekom executives following trends and assessed their influence on the future application architecture.

These points influences on the Future Application Architecture

Overlapping Trends
- Business Networking
- E - Services

- Knowledge Management	
IS/IT Trends - Internet Applications - Smart Appliances - Object Orientation - **ERP** Systems	**Business Trends** - Customer Centricity - Core Competence Focus - Globalization - Value Management

Figure 2.1: Future Application Architecture Trends

The collaborative assessment of the workshop and further work with Deutsche Telekom elaborated two major questions to be answered in order to meet future challenges:

- How does a future application architecture that includes Business Networking systems look like? What are guidelines, rules and methods are useful for designing it?
- How do guidelines, rules and methods for implementing the future application architecture on the level of single implementation projects look like?

2.2.2 Advanced Architecture Components

From an *activity* perspective an architecture describes the path and the prerequisites to achieve an agreed upon architecture. This contains all rules, prescriptions, concepts and methods, which underpin the design, usage and development of application

architecture. This part can be supported by knowledge management tools and methods for designing strategic application **architectures**.

- Firstly, **ERP** system vendors have set-up initiatives to encompass solutions to integrate the Internet and inter business challenges into their software packages. For example, SAP has started its mySAP.com initiative and presented its Internet Business Framework Architecture. Oracle has its Portal Framework and an Internet Platform for Internet components to name the most influential.
- Secondly, vendors of enterprise application integration (EAI) software like Crossworlds or Tibco position themselves as solution providers for integrating **ERP** systems within and between companies.
- Thirdly, the academic research in object oriented software **architectures** and framework **architectures** delivers considerable input on the design and the benefits of this investment.
- Fourthly, consultants like Gartner Group, Aberdeen Group or PWC offer support when integration **ERP** systems and designing E-Business **architectures**.
- Finally, users like Cisco offer recommendations of how successful eBusiness **architectures** should look like from their experience.

2.2.2.1 A business bus

It characterizes a set of standards that supports the exchange of information and services among business partners? It is a logical space where (complex) services and products are flexibly and efficiently exchanged with the support of service providers.

The standardized infrastructure to exchange data is extended to exchanging business information, services and knowledge. This concept builds upon the increasing availability of modular eServices and standards for processes, data, and interfaces.

2.2.2.2 Business port

It consists of Applications and services, which denote a company's ability to interface with a large number of partners. Business Ports use the Business Bus standards and implement the physical connectivity to in-house systems. First solutions for Business Ports are already on the market (e.g. SAP Business Connector) and are expected to develop with the diffusion of XML-related standards.

Presentation Layer					
Manager	Sales	Technician	Partner	Customer	Supplier
Enterprise Application Integration Layer					
Custom SW	Customer	CRM	DW	ERP	
Business Bus					

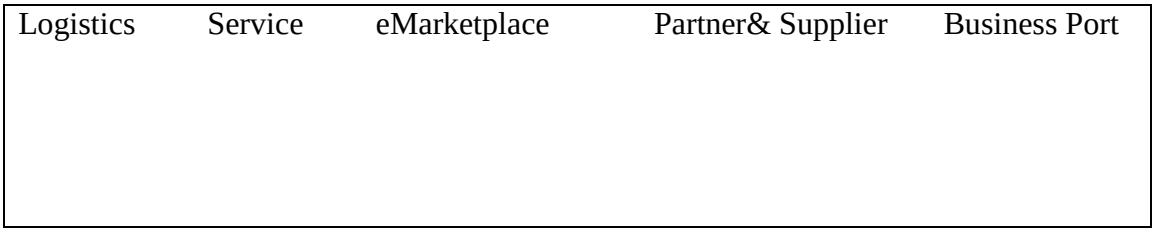

Figure 2.2: Towards a Strategic BN Architecture

To depict that in a *result view* on strategic application architecture, we have identified three important layers for Business Networking in projects with partners:

- Firstly, the presentation layer which provides customized views on possible transactions for different employee roles. It also includes profiles for customers and business partners.
- Secondly, the application layer which provides a structural and process view on its components, including object or data flow between components.
- This third layer defines the ports to interface with other applications or with customers and business partners and provides matching, messaging.

2.3 DATA PROFILING: THE FOUNDATION FOR DATA MANAGEMENT [3]

To realize significant savings from expenses, companies throughout the world are implementing two primary enterprise applications: enterprise resource planning (ERP) and customer relationship management (CRM). Each of these applications focus on driving increased efficiencies from core business processes, with ERP systems focused on holding expenses "in check," and CRM systems working to build more profitable relationships with customers.

Successfully implemented, ERP systems help companies optimize their operational processes and help reduce processing costs. On the opportunistic, customer-facing side of profit-seeking, companies realize that customers are expensive to acquire and maintain, leading to the deployment of CRM systems. At the same time, organizations have developed data warehouses in an effort to make more strategic decisions across the enterprise spending less and saving more whenever possible.

But a new age in enterprise management is here. The very foundation of ERP and CRM systems is the data that drives these implementations. Without valid corporate information, enterprise-wide applications can only function at a "garbage in, garbage out" level. To be successful, companies need high-quality data on inventory, supplies, customers, vendors and other vital enterprise information. Or their ERP or CRM implementations are doomed to fail. The successful organizations of tomorrow are the ones that recognize that data (or, more accurately, the successful management of corporate data assets) will determine the market leaders in the future. If your data is going to make you a market leader, it must be consistent, accurate and reliable. Achieving this level of prosperity requires solid data management practices including data profiling, data quality, data integration and data augmentation.

Any data management initiative begins with profiling, where you analyze the current state of your data—and begin to build a plan to improve your information. This paper discusses data profiling in detail, what it is and how it can be deployed at your organization. The paper ill also look at how data profiling fits into the broader data management process of your organization.

2.3.1 What is Data Profiling

Data profiling is a fundamental, yet often overlooked, step that should begin every data-driven initiative. Every ERP implementation, every CRM deployment, every data warehouse development and every application rewrite should start with data profiling. Industry estimates for ERP and data warehouse implementations show these projects fail or go over-budget 65-75% of the time due to wrong data architecture.

To address information challenges at the outset, data profiling provides a proactive approach to understanding your data. Data profiling, also called data discovery or data auditing, is specifically about discovering the data available in your organization and the characteristics of that data. Data profiling is a critical diagnostic phase that arms you with information about the quality of your data. This information is essential in helping you determine not only what data is available in your organization, but how valid and usable that data is.

2.3.2 The problems with data

Data problems abound in most organizations. These problems are data inconsistencies, anomalies, missing data, duplicated data, data that does not meet business rules, orphaned data and many more problems. Before you begin any project initiative, you need to know basic information in support of that initiative:

- Do you trust the quality of the data you are using in this initiative?
- Will the existing data support the needed functionality?
- Is the data you are using complete enough to populate the needed data repository?

- Does the data for this initiative conform to the expected business rules and structure
- Rules?
- Can you access the needed data sources for your initiative?

2.3.3 Techniques for Data Profiling

Now, let's look in more detail at the types of discovery techniques you should consider during the data profiling process:

2.3.3.1 Structure discovery: Understanding data patterns and metadata

By examining complete columns or tables of data, structure analysis helps you determine whether the data in that column or table is consistent and meets the expectations that you have for the data. Many techniques can validate the adherence of data to expected formats. Any one of these techniques provides insight about the validity of the data.

2.3.3.2 Data discovery: Business rule validation and data completeness discovery

After you analyze entire tables or columns of data with the structure discovery steps, you need to look more closely at each of the individual elements. Structure discovery provides a broad sweep across your data and often points to problem areas that need further investigation. Data discovery digs deeper and helps you determine which data values are inaccurate, incomplete or ambiguous.

Data discovery techniques use matching technology to uncover non-standard data, frequency counts and outlier detection to find data elements that don't make sense.

2.3.3.3 Relationship discovery: Data redundancy and similarity discovery

The third and final major phase of data profiling is relationship discovery. This aspect of profiling discovers what data is in use and links data in disparate applications based on their relationships to each other or to a new application being developed. Different pieces of relevant data located across many separate data stores make it difficult to develop a complete understanding of the data.

Organizations today maintain an enormous amount of data, such as customer data, supplier data, product data, operational and business intelligence data, financial and compliance data and so on. In addition, organizations get data from partners, purchase data from list providers and acquire industry-specific data from other sources. Companies typically don't fully understand all of their data—and cannot effectively manage their data—until they understand all of these sources and the relationships of data across different applications.

Relationship discovery helps you understand how data sources interact with other data sources. Consider some of these problems that can occur when data sources are not properly aligned:

- A product ID exists in your invoice register, but no corresponding product is available in your product database. According to your systems, you have sold a product that does not exist.
- A customer ID exists on a sales order, but no corresponding customer is in your customer database. In effect, you have sold something to a customer with no possibility of delivering the product or billing the customer.

- You run out of a product in your warehouse with a particular UPC number. Your purchasing database has no corresponding UPC number. You have no way of restocking the product.
- Your customer database has multiple customer records with the same ID.

  Relationship discovery provides you with information about the ways that data records relate.

These records can be multiple records in the same data file, records across data files or records across databases. With relationship discovery, you can profile your data to answer the following questions:

- Are there potential key relationships across tables?
- If there is a primary/foreign key relationship, is it enforced?
- If there is an explicit or inferred key relationship, is there any orphaned data (data that does not have a primary key associated with it)?
- Are there duplicate records?

2.4 THE BUILDING BLOCKS OF DATA MANAGEMENT

Data profiling is the beginning of an effective data management strategy. Although profiling techniques provide an essential first step, there is much more to a complete data management strategy. The foundation of data management consists of five technology building blocks: data profiling, data quality, data integration and data monitoring.

2.4.1 Data profiling: Understand your data

As this paper has discussed, data profiling encompasses such activities as frequency and basic statistic reports, table relationships, phrase and element analysis and business rule discovery. It is primarily done before any data-oriented initiative and often can be used to pinpoint where further efforts need to be focused.

2.4.2 Data quality: Standardize, validate and verify your data

Data is often invalid, out of range or incompatible with current business rules. Data can be misspelled. And data becomes outdated. By checking domain, range and missing values, you can create correction algorithms to identify and correct data problems. Information on customers, suppliers and products, all have unique validation rules.

2.4.3 Data integration: Combine data from multiple sources

Whether identifying similar data within and across data sources or removing and consolidating duplicate data records, data integration is necessary to obtain a true understanding of your organization. Data integration can occur at the individual level, at the household level (for example, all customers at the same address), at the business or corporate level, at the product level, at the supplier level or some other combination of attributes.

2.4.4 Data monitoring: Audit and control data

After you have inspected, corrected, merged and enhanced your data, you need to make sure that it stays consistent, accurate and reliable over time. Data monitoring is

the building block that addresses ongoing control of data integrity. By checking and re-checking data quality on a continuous basis, you can identify and eliminate data problems before they can adversely impact your databases or enterprise applications.

2.5 WHY .NET TECHNOLOGY IS IMPORTANT FOR ERP

In late 1990's ERP companies caught the wave of web browser wave, so they had to convert their whole architecture that must be web friendly. At that time .Net gave a stand to many companies.

2.5.1 Problems faced by Customers and Developers

First, web browser-based user interfaces would not provide the rich features and raw speed of native code. Native code (code running locally on the PC) leverages the local CPU to perform much of the computing work, giving the user interface a snappy performance, and a rich set of reactions to a user's mouse clicks and keystrokes. In the lite-client model, most of the work is performed on the server. A web browser interface is analogous to a slide show, where the projector (the server) does the work and the screen (the browser) just hangs there.

And if companies need lite-client architecture they require high budgets. They have to use large server architectures.

2.5.2 Why .Net is better for ERP Systems

This new .NET platform is a better platform for building and running applications software than the Windows OS that we know today.

.NET insulates software developers and computer users from the deficiencies and incompatibilities of operating systems. And .NET provides a new set of tools and components of unprecedented power that can be used to write a new type of software called "managed code."

Managed code is more robust. The .NET platform not only runs this new type of code but oversees its execution allowing software errors to be caught and halted before serious problems can occur. "Memory leaks," "memory corruption," and "blue screen of death" problems that freeze our old Windows systems in their tracks are prevented by .NET or curtailed before damage is done.

2.5.2.1 Better security

We all know our systems are susceptible to hackers. Under the old Windows approach to security, software is granted permission to do things on your computer based on the permissions granted to the user who runs the software. Hackers continue to find devious ways to sneak destructive software onto our systems and trick our computers into running that software under a privileged user account. In contrast, managed code follows a security model that is inherently different; the software is granted permissions on its own merits – not those of the user. Attributes of the software itself such as who wrote the software, where it came from, and where it is located are used to dictate and police what the software is allowed to do. The .NET platform enforces

the new regime. Managed code can only run on the .NET platform so must submit to this new system of strict supervision and restriction.

2.5.2.2 Better connectivity

The new .NET software development tools and the standards based nature of managed code make it easier to develop systems that employ state-of-the-art connectivity techniques such as XML Web Services. And the future will clearly be filled with collaborating systems, large and small, networked together, exchanging information and performing services for each other and for mankind. Building this high level of connectivity and requisite robustness demands new components, tools, and a standards-oriented approach.

2.5.2.3 Faster software, faster development, easier deployment

.Net Managed code is lean, speedy, and lightweight. These traits enable new innovation in application development and deployment. And, .NET includes a huge box of prefabricated industrial-strength components ready to use by software developers, allowing developers to save time while creating more robust and powerful applications. Aspects of managed code coupled with industry standards invite new deployment models including “no-touch” deployment and software that updates itself.

So, after having look on all these advantages we can say that .Net is better software for ERP Systems, as they require efficiency, security, reliability and robustness.

The Literature Review was also done of the following books exclusively acquired from GSK under NDA.

The books are:

- Excelling in Selling

- Role Play Book

Further workflow Performa's were acquired which would be made available on demand.

Chapter 3

METHODOLOGY

3.1 INTRODUCTION

3.1.1 Purpose of this section

The purpose of this section is to formalize the understanding of the problems regarding the pharmaceutical distribution companies and our approach to the solution taking into account the study of the system of Novartis and GSK.

3.1.2 Scope of this section

This section will limit itself to the understanding of the Pharmaceutical distribution system and different roles that interact with this system and different requirements to achieve a successful completion of the system.

3.1.3 Methodology Overview

The system for pharmaceutical company that will capitalize from the automation of its order taking, marketing and distribution processes and will provide the executives with the facility of dynamic reporting, that is analyzing facts and figures on the fly.

3.1.4 Scope of the Solution

The scope of the system is limited to Pharmaceutical distribution system and communication between different roles that interact with this system and different requirements to achieve a successful completion of the system.

3.1.5 Purpose of the Solution

The purpose is to provide Pharmaceutical Industries a system which could make efficient the various procedures and activities involved in the distribution department and hence provide the company timely information needed in order to carry out its activities efficiently while analyzing the system continuously and improving upon it.

3.1.6 Problem Statement

Pharmaceuticals companies are finding it increasingly challenging and difficult to keep track of activities involved in the distribution of products. As a result of largely manual systems and inordinate analysis of facts, millions of rupees are lost each year. The companies also need a state of the art communication system so that the employees can communicate and synchronize activities and move towards the goal of incremental success.

3.1.7 Motivation

The present ERP, CRM solutions cost a fortune e.g. solutions by SAP range from $2 to $22 million and it is virtually impossible to buy considering a mid-size company. The motivation behind the system is to make it feasible for the pharmaceutical companies to incorporate a system which would give a greater return on investment and contributes to the growth of the company.

3.1.8 Business Context

The processes of the following companies were studied and our solution evolved as a result of implementing the mature processes undertaken by these leading companies on the pharmaceutical forefront.

3.1.8.1 GSK (Glaxo-Smithkline-Beecham)

It is a renowned multinational pharmaceutical company ranked 1st largest in Pakistan and is the provider of the leading medical products. This company was formed as the result of the merger of Glaxo-Welcome which were merged earlier, Smith-Kline and Beecham. So the merger resulted in a pharmaceutical giant emerging in the world and now GSK is the biggest company among pharmaceuticals in terms of infrastructure, market share and profitability.

3.1.8.2 Novartis

It is a renowned multinational pharmaceutical company ranked 3rd largest in Pakistan and is the provider of leading products in the market ranging from medicines to agricultural products. The company has a local manufacturing plant at Karachi and distribution centers in every major city.

3.1.9 Present Solutions

The existing solutions along with cost are.

1. SAP ERP $7-$22 million
2. SAP CRM $2-$22 million

3. MICROSOFT Great Plains $18K

3.1.10 Justification of the Solution

The world is moving towards an era of specialized system and generalized system although greatly popular today will not be able to keep pace with the times to come when specialized solutions will be essential for survival. Our solution specifically designed for distribution activities of pharmaceutical companies will be a component based solution and will not suffer from protocol level integration required in SAP. Besides being customized our system will also be optimized for specific use. The market solutions are generalized and suffer greatly because of optimizations required for a specific business solution. Our solution will also be cost effective as the cheapest SAP solution amounts to $2 million.

3.1.11 Domain

1. ERP(Enterprise Resource Planning)
2. CRM(Customer Relationship Management)
3. Ecommerce
4. MIS(Management Information System)
5. Data-Warehousing
6. Rich Internet Applications

3.2 GENERAL DESCRIPTION

3.2.1 Product Features

3.2.1.1 ERP solution for pharmaceuticals

- Employee Management
- Customer Relationship Management
- Communication Management
- Real-time dashboards
- Data-Transformation Workflows
- Data Analysis by cubes

3.2.1.2 Employee management

- Territory tracking and assignment
- Evaluation and Dynamic Reporting Combo (RIA)
- Performance Indicator Monitoring (RIA)
- Employee Profile Management
- Employee Access Management
- Team Management
- Category Management
- Designation Management

3.2.1.3 Customer relationship management

- Doctor Registration
- Doctor Meeting Manager
- Doctor Viewer

- Pharmacist Manager
- Pharmacist Viewer

3.2.1.4 Communication management

- Online Survey Feedback (RIA)
- Online Survey Administration (RIA)
- Online Survey Facts Reporting (RIA)
- e-Chat (RIA)

3.2.1.5 Real-time dashboards

- Executive dashboards based on 3-D Graphical Reporting
- Key performance indicators of employees
- Graphical reporting of facts comparisons
- Latest Charting techniques
- All Reporting is on the fly and dynamic
- Have facility to save reports in word file format.

3.2.1.6 Data transformation workflows

- Full Designing and automation of task using "DTS" (Data-Transformation Services) feature of SQLServer2000
- Transformation of Employee Evaluation data to be viewed through Multidimensional OLAP cubes.

3.2.1.7 Data analysis by cubes

- Dynamic Facts Reporting through drag and drop interface using multiple dimensions of Employee.
- Cube can be refreshed from time to time to load the most current data.

3.2.2 Similar System Information

The HRM module of the Oracle 11i E-business suite has the same concept of Human Resource Evaluation but it doesn't go into depth of evaluation procedures as it is a generic solution. Microsoft Great Plains has also implemented HRM but to a lesser extent then the Oracle 11i HRM so it also suffers in weak visual reporting abilities. SAP CRM has also a HRM module which goes into too many details diverging its focus from the evaluation system of the employees to becoming an employee data bank with very strong data storing abilities from every aspect but relatively weak visual reporting and integration of data-manipulation on the fly. Net-suite provides very detailed solution for medium sized companies and very strong visual reporting for HRM but does not support on the fly reporting and data-manipulation integration.

3.2.3 User Characteristics

3.2.2.1 Executive (group)

These are the people in the managerial context, which are responsible for major decisions in the organization. These people are only submitted quarterly and annual

reports and these people are traveling most of the times so they require on the fly report access from the web. Three sub-roles involved in Executives include.

- National Sales Manager
- Managing Director
- Regional Sales Managers

1.2.2.2 Medical information officers

These people belong to the Marketing department and their responsibilities include dissemination of information about medicines to the doctors and hence convince them to prescribe medicines of their respectable companies.

1.2.2.3 Sales representatives

These people are responsible for selling medicines to the retailers and stores. They are concerned with ordering and sales procedures.

1.2.2.4 Regional sales manager

These are the people who are supervisors and evaluator of the MIO's and their decisions and monitoring directly affects the marketing of products and hence consequently sales.

1.2.2.5 Administrator

These are the people responsible for making appropriate changes to the database and these people facilitate the automation process by providing support to the organizational users. Their role including managing the whole online system and trouble shooting in case some trouble arises. Some Regional Sales Managers desire the access rights of Administrator as they want to keep an eye on every bit of data involved in the evaluation process.

3.2.3 User Problem Statement

3.2.3.1 Executive

The Executives find it extremely difficult to keep an eye on the activities of employees from a broad spectrum. The web enabled system will allow them to keep an eye on activities any time they want which will provide them real time insights into the system and hence help improve the decision making process. The Executives also find it hard to communicate with employees as email system is used and it is not possible to keep a track of such a large number of employees so helping them to communicate through customized interface with respect to their employees will greatly help the cause of the organization to succeed.

3.2.3.2 Medical information officers

The MIO's find it very hard to communicate with the company and to work cohesively as they have to travel far and wide for the marketing campaigns and hence with the web based system they can easily coordinate their schedules and communicate with each other and with the upper management and hence this will facilitate better performance in the organization. Currently the communication is only done through emails and mobile phones. The web-based system will also cut out costs associated with the mobile phone bills and hence will greatly help in reducing overall cost and resulting in greater revenue.

3.2.3.3 Sales representatives

The sales representatives have problem checking the order status and ordering procedure as it is currently done by entering data into a legacy pda and at the end the memory chip is submitted to the data entry operators. This involves cost in terms of time i-e they submit information at the end of the day so, it can only be processed the next day and also it has resource cost as company has to obtain and maintain pda's and also many data-entry operators. This problem can be easily solved by the web-based system as the sales representatives can easily enter ordering information and check order status pertaining to different customers by just accessing the corporate web-site and hence greatly reducing the total turn around time of the order increasing delivery service efficiency and reducing costs related to resources such as pda's.

3.2.3.4 Regional sales managers

The Regional Sales Managers find it very hard to evaluate employees. Evaluating employees and knowing in which area they lag is very important to success as in pharmaceutical business employees specially MIO's are the ones who convince doctors/pharmacists to buy the products and hence increase the profitability of the organization so monitoring them is monumental to the success of the organization.

3.2.4 User Objectives

3.2.4.1 Executive

- Dynamic Reporting
- Employee Management
- Better control on activities
- Greater revenue generation
- Better communication
- Employee performance review
- Better Order Management
- 360 degree view of customers
- Enhancing customer base

3.2.4.1 MIO

- Better communication with executives and fellow MIO's
- Better performance through self performance evaluation

- Platform to achieve better relationship with doctors
- Facilitation of better information dissemination techniques
- Better scheduling
- Better complaint feedback management with doctors

3.2.4.2 SR

- Better order entry and management
- Better relationship with customers
- Better performance review
- Territory assignment problem solver
- Inventory tracking
- Customer sales record information

3.2.4.3 Customer

- Ordering placement facility
- Order tracking facility
- Profile maintenance facility
- Payable information checking facility
- Expiry claim registering facility
- Expiry claim status facility
- Online communication with Pharmaceutical company representatives

3.2.5 General Constraints

Table 3.1: General Constraints Specifications Table

Operating System	Windows XP
Developing Environment	Dot-Net Framework , Visual Studio .NET, Macromedia FlashMX
Language	ASP.NET / C# / JavaScript / Action Script
Database	SQLServer2000
Third party Component	Dev-Express Xtra-Grid
Rich Internet Applications	Flash Communication Server
Reporting	Crystal Reports 10
OLAP	SQL Server Analysis Services 2000

3.3 PERFORMANCE REQUIREMENTS

- Every page should download within 16 sec of time on a 56k internet connection.
- The site should be viewed on 1024*768 resolution for optimal display.
- The site should be viewed on Internet explorer 5.0 or Netscape for optimal display.

- The site should be viewed in 32-bit color mode for optimal display.

3.4 NON-FUNCTIONAL ATTRIBUTES

3.4.1 Security

The system should be secure from unauthorized access. The security should be role based.

3.4.2 Reliability

The system should be made reliable by eliminating risks posed to its working.

3.4.3 Maintainability

The system should be highly maintainable and should support adding and deleting of modules as required without affecting other modules as much as possible. This is obviously not possible in case of dependent modules.

3.4.4 Portability

The system should be portable so that it can be ported to higher specifications with respect to time.

3.4.5 Extensibility

The system should be made extensible by architecting the system as such to allow various modules to be added as desired.

3.4.6 Reusability

The system should be coded using the object oriented paradigm hence maximizing the reusability.

3.5 GENERAL DELIVERABLES

Modules involving responsibilities assigned to me are as under:

3.5.1 Marketing Module

This involves the system for MIO's (Medical Information Officers). The scope will be largely limited to the intra-organizational activities performed by the MIO's bridging the communication gap and capitalizing on better coordination of activities and schedules. The system will strongly emphasize on communication of information on day to day basis instead of weekly synchronization and hence will make it easier to take timely decisions. The system will also involve sub-modules to make it easier for the MIO's to communicate and analyze their meetings with doctors and hence documenting facts about those meetings electronically and consequently being able to analyze the responses.

3.5.2 CRM Module

This involves the CRM (Customer Relationship Management) system for achieving 360 degree view of the customers and to be able to analyze the needs of the customers. This system will also provide various services to the customers on the web and hence will help in achieving a better relationship with the customers and consequently

building the customer base of the organization by retaining the customers and at the same time through customer extension.

3.5.2.1 OLTP module

The OLTP (Online Transaction Processing) module will include the main database used for the daily transactions and this will prove to be the backbone of the system. My responsibilities will include the database design for the Marketing and CRM modules and the modules which are directly dependent upon system for the executives.

3.5.2.2 OLAP module

The OLAP (Online Transaction Analytical Processing) module will include the dimensional database sub-modules for the Marketing and CRM modules. This module is aimed at providing the executives the ability to achieve dynamic reporting and hence analyze the different facts and figures dynamically through the dimensional models by forming cubes on data which will facilitate ad-hoc querying.

3.6 TIME-LINE

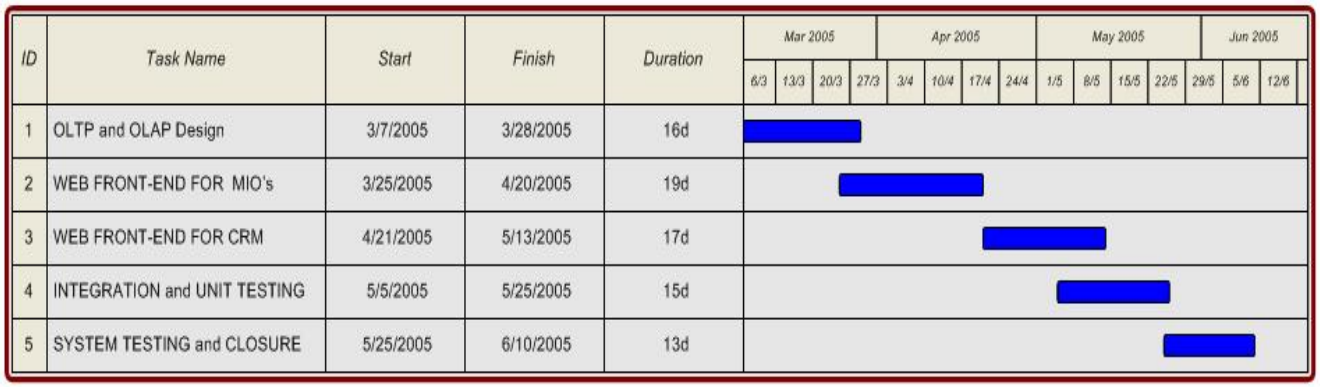

Figure 3.1: Initial Time-Line

3.5 SYSTEM DESIGN

3.6.1 Data Flow Diagrams

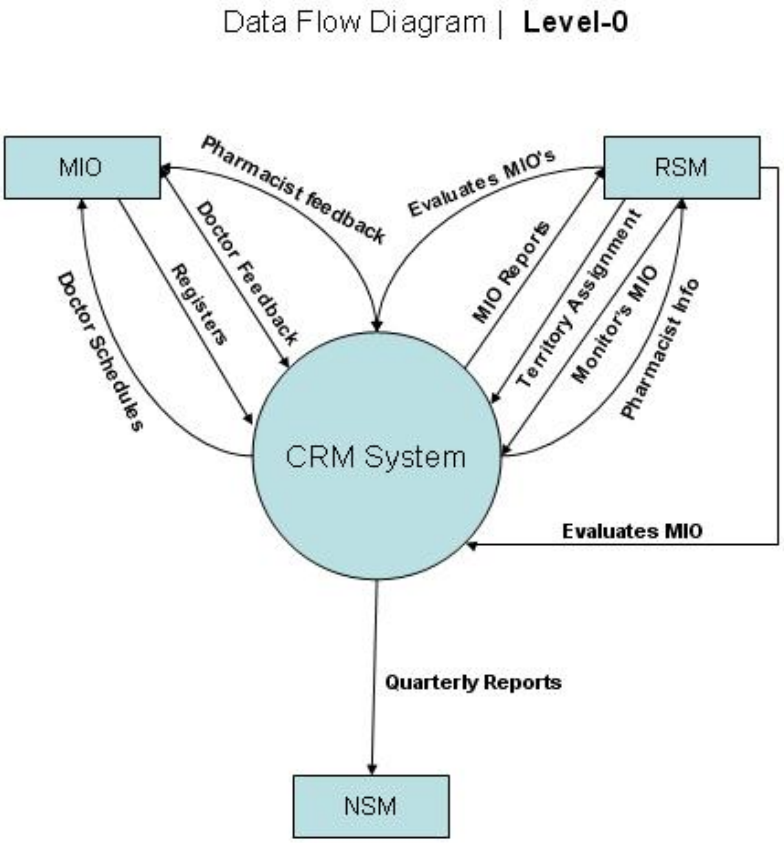

Figure 3.2: DFD Level-0

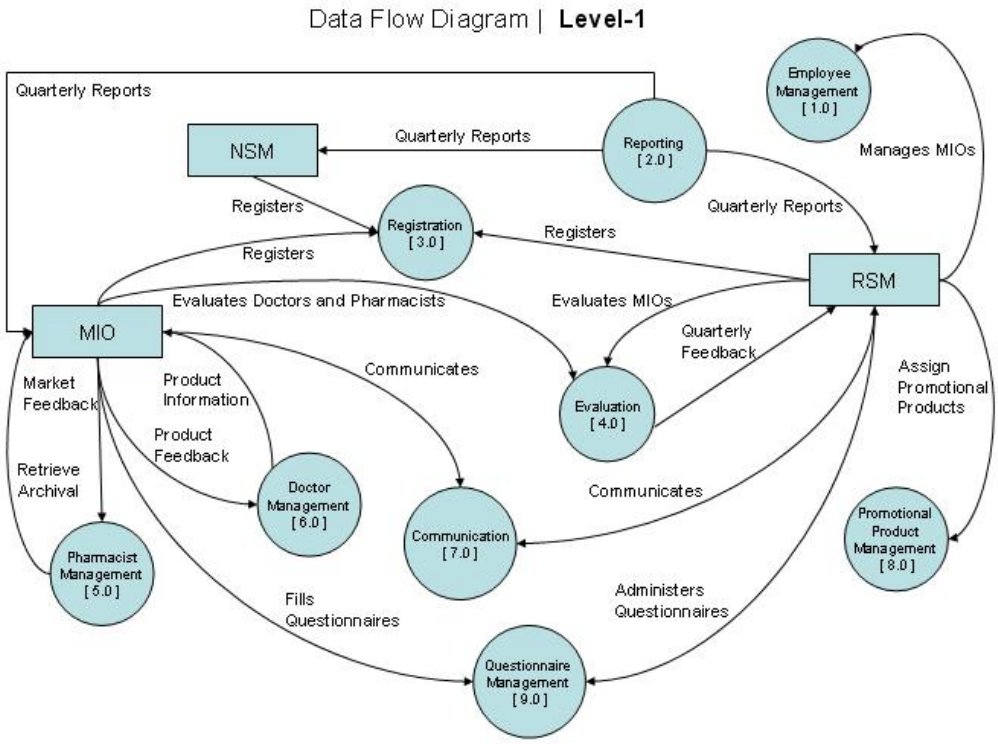

Figure 3.3: DFD Level-1

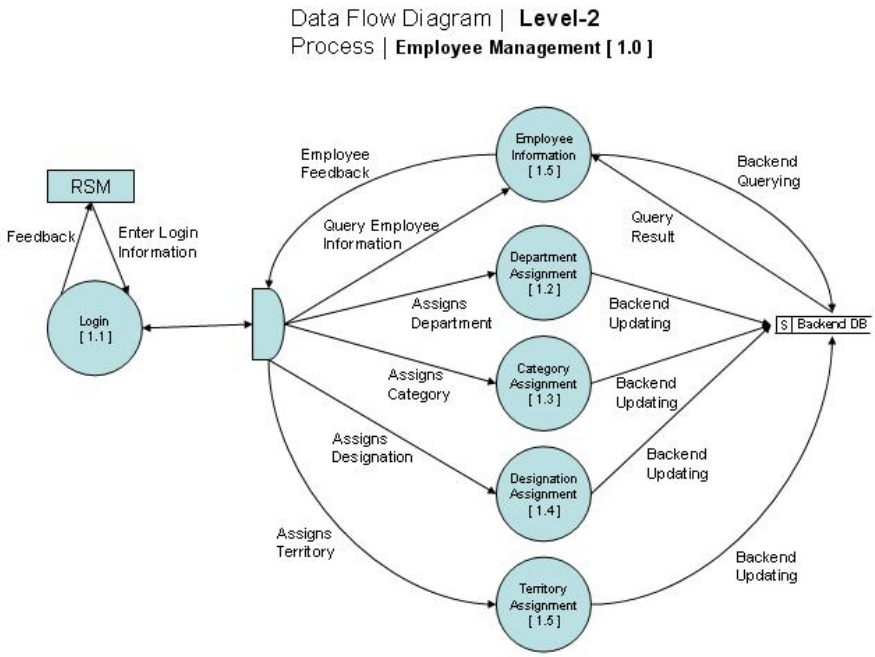

Figure 3.4: DFD Level-2 Employee Management

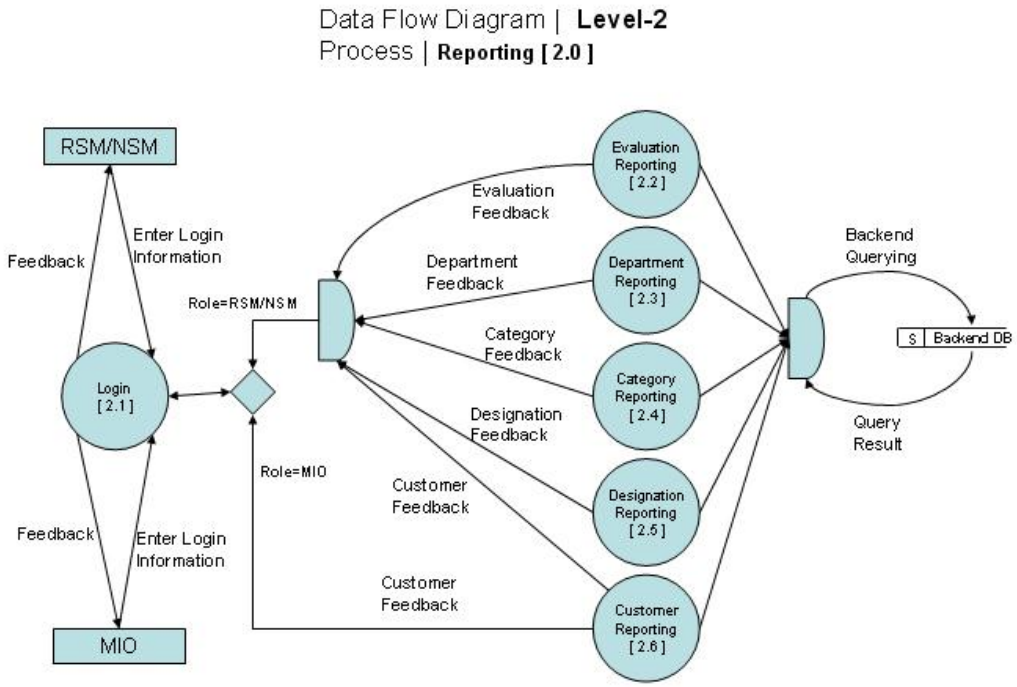

Figure 3.5: DFD Level-2 Reporting

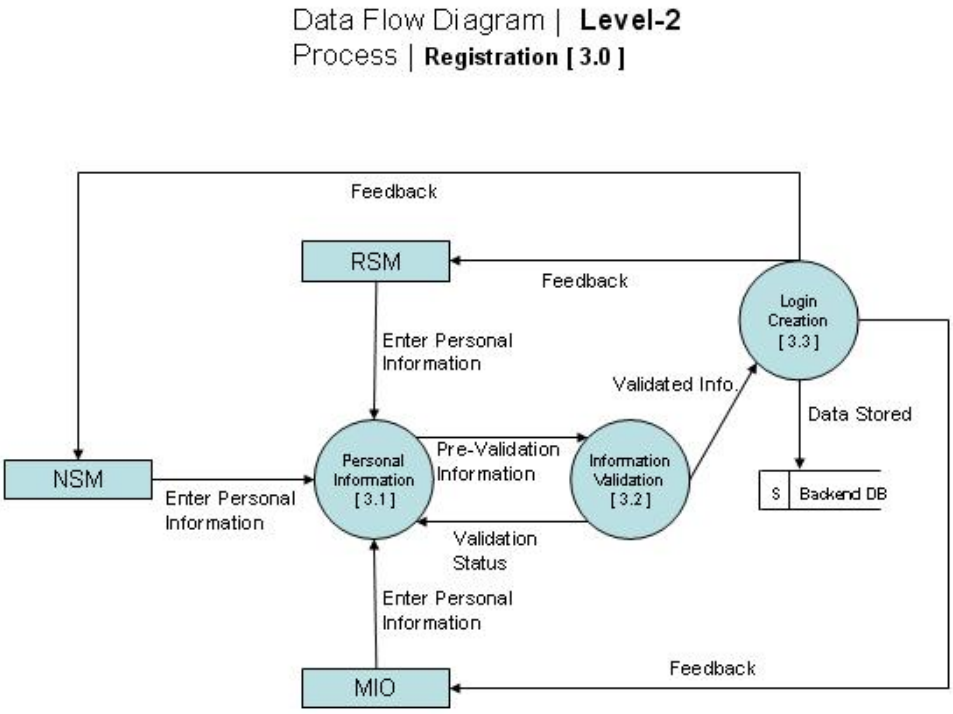

Figure 3.6: DFD Level-2 Registration

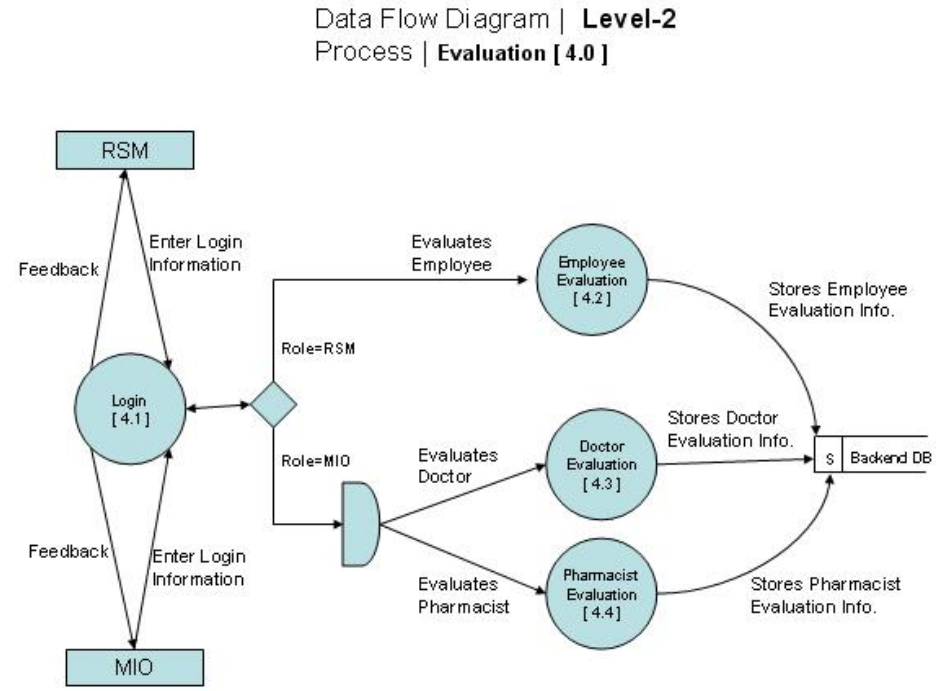

Figure 3.7: DFD Level-3 Evaluation

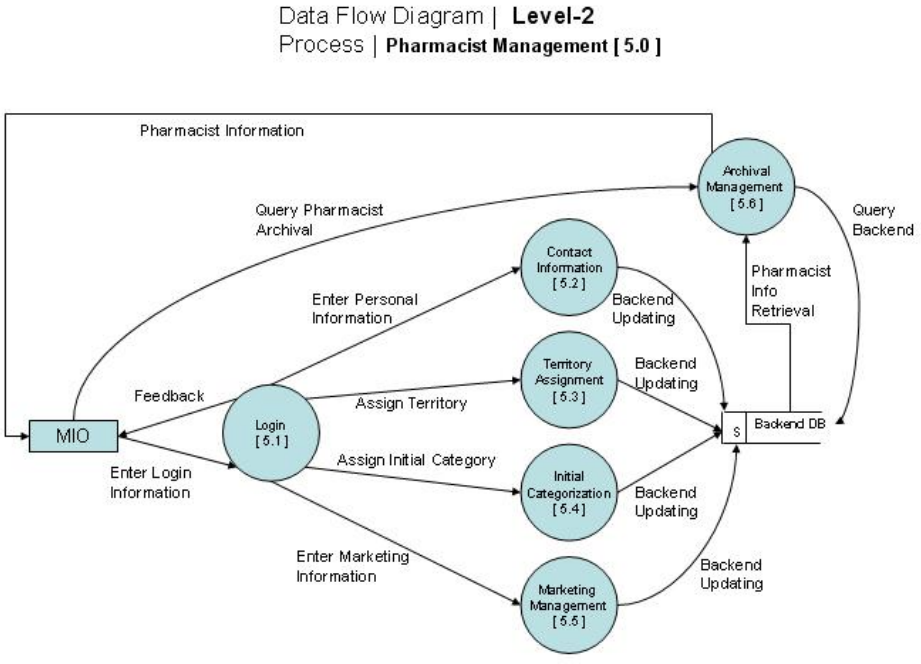

Figure 3.8: DFD Level-2 Pharmacist Management

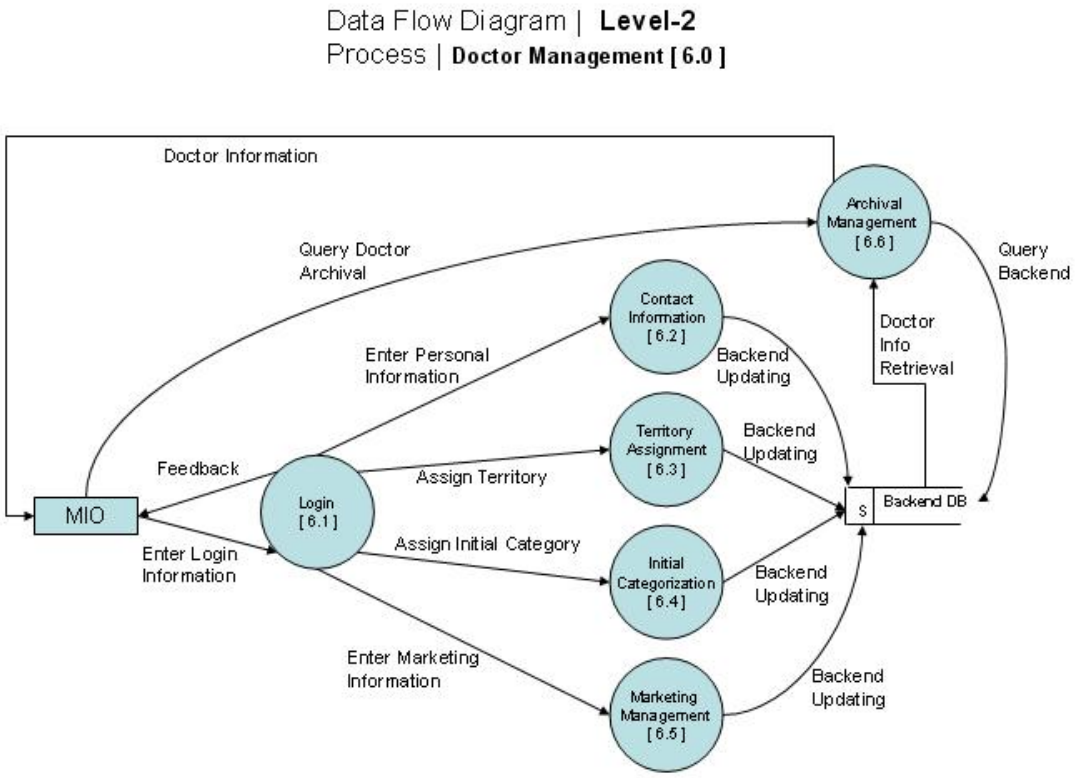

Figure 3.9: DFD Level-2 Doctor Management

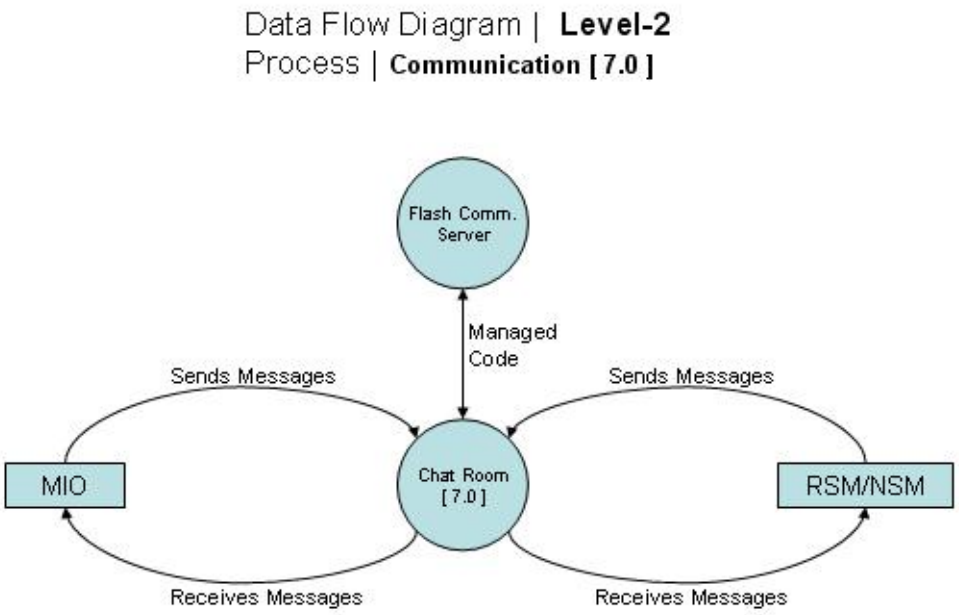

Figure 3.10: DFD Level-2 Communication

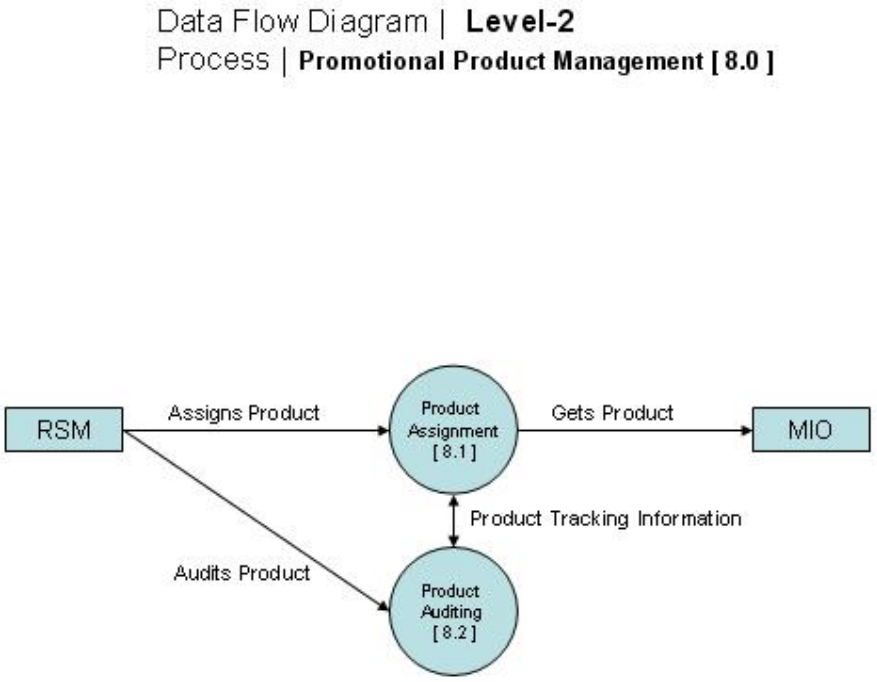

Figure 3.11: DFD Level-2 Promotional Product Management

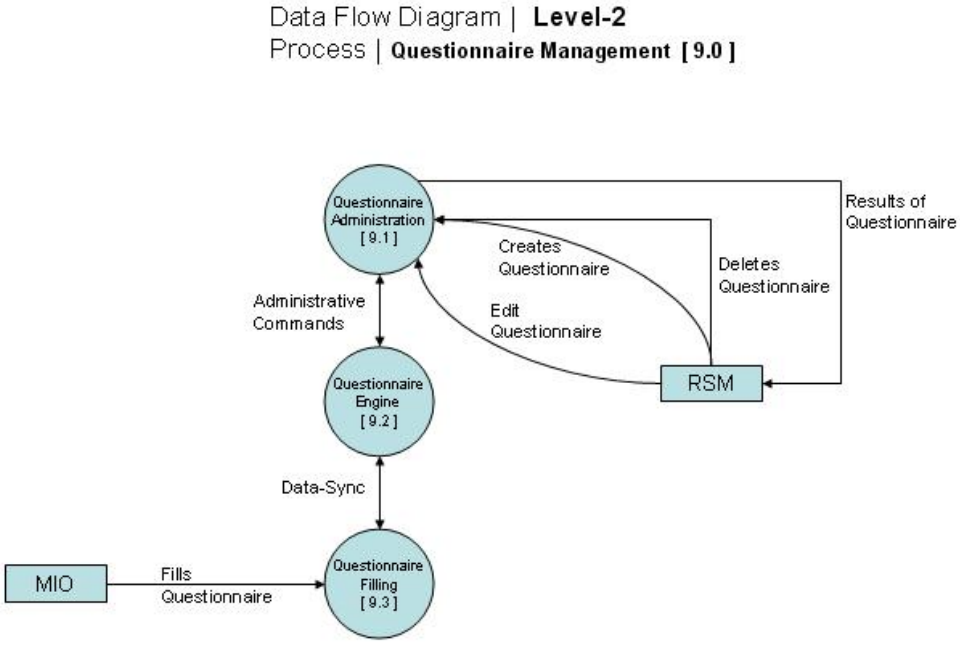

Figure 3.12: DFD Level-2 Questionnaire Management

3.6.2 Entity Relationship Diagram

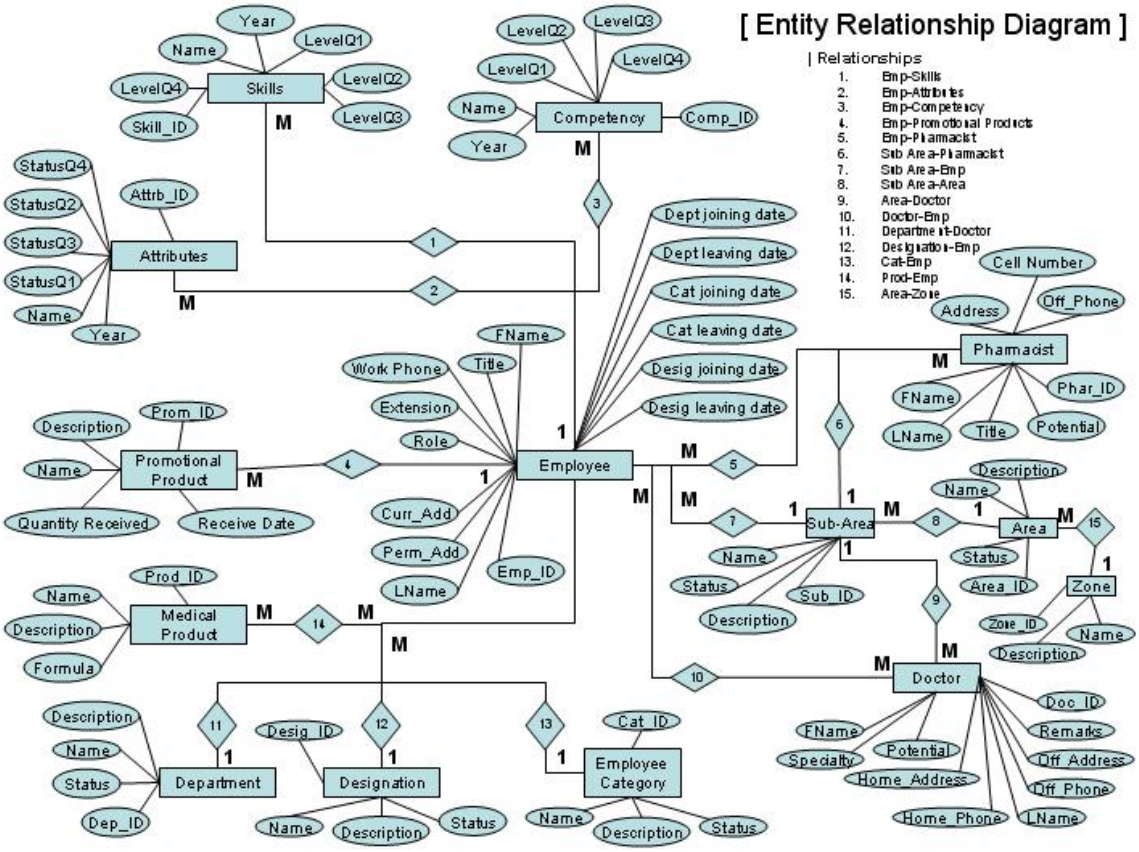

Figure 3.13: Entity Relationship Diagram

3.6.3 Relational Model

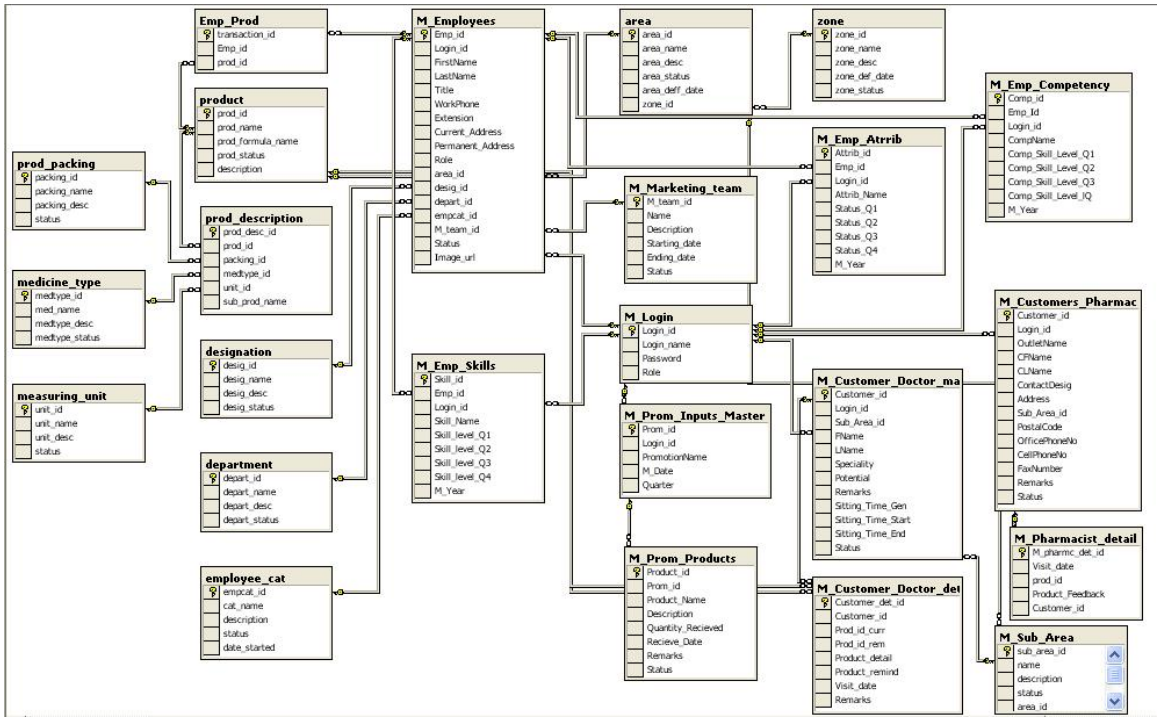

Figure 3.14: Relational Model Diagram

3.6.4 OLAP Model

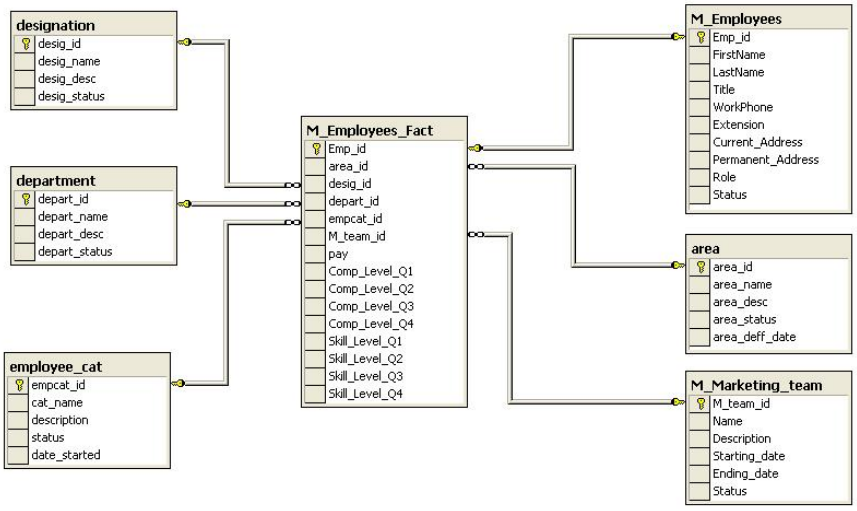

Figure 3.15: OLAP Model Diagram

Chapter 4

RESULTS

4.1 WEB PORTAL DESIGN

My responsibilities included complete front-end template designing of the Web-Portal which I designed using Macromedia DreamWeaverMX and Adobe Photoshop CS.

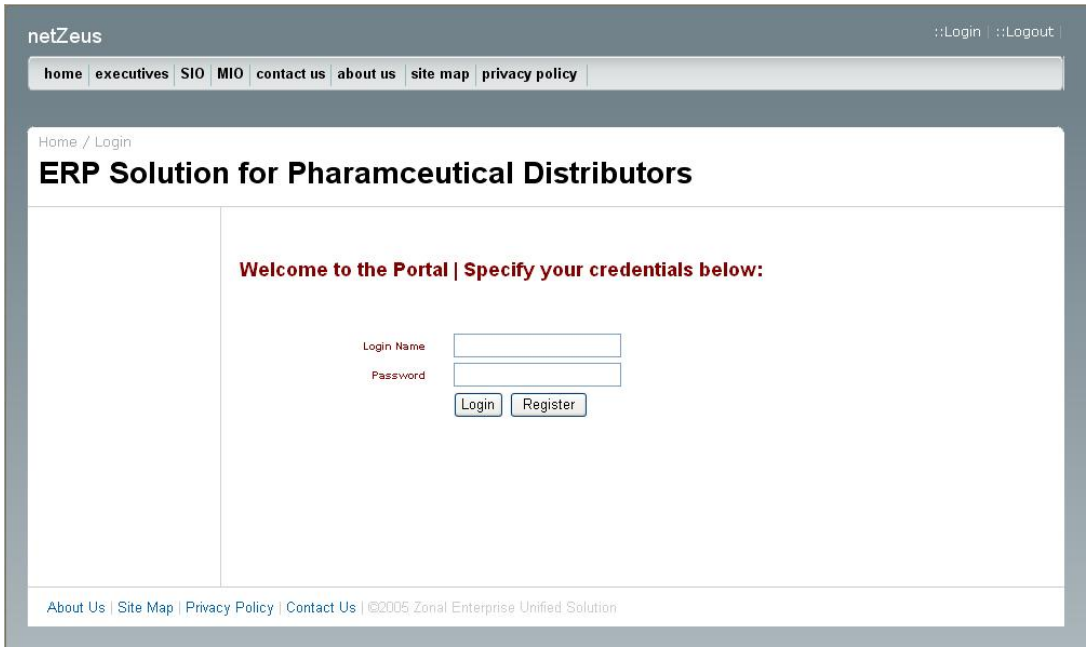

Figure 4.1: Login Screen

4.2 REGISTRATION

If a new MIO comes in the organization then he has to get himself registered with the organization. So Registration just does that. Every employee has to register no matter what the post he/she joins the company in.

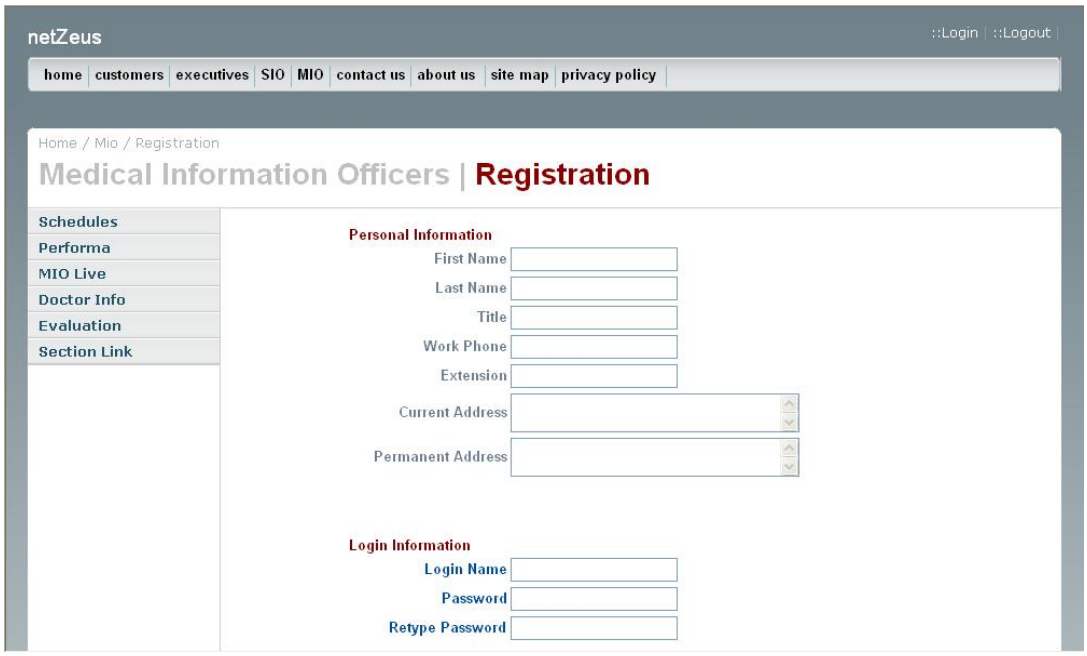

Figure 4.2: Registration Screen

4.3 EMPLOYEE MANAGEMENT

The Employee Management includes:

- Employee Information Management
- Employee Evaluation Management

4.3.1 Employee Information Management

This includes the following sub-modules:

- General Info Management
- Access Management
- Department Management
- Designation Management
- Team Management

- Category Management
- Territory Assignment
- Image Upload Panel

4.3.1.1 General information management

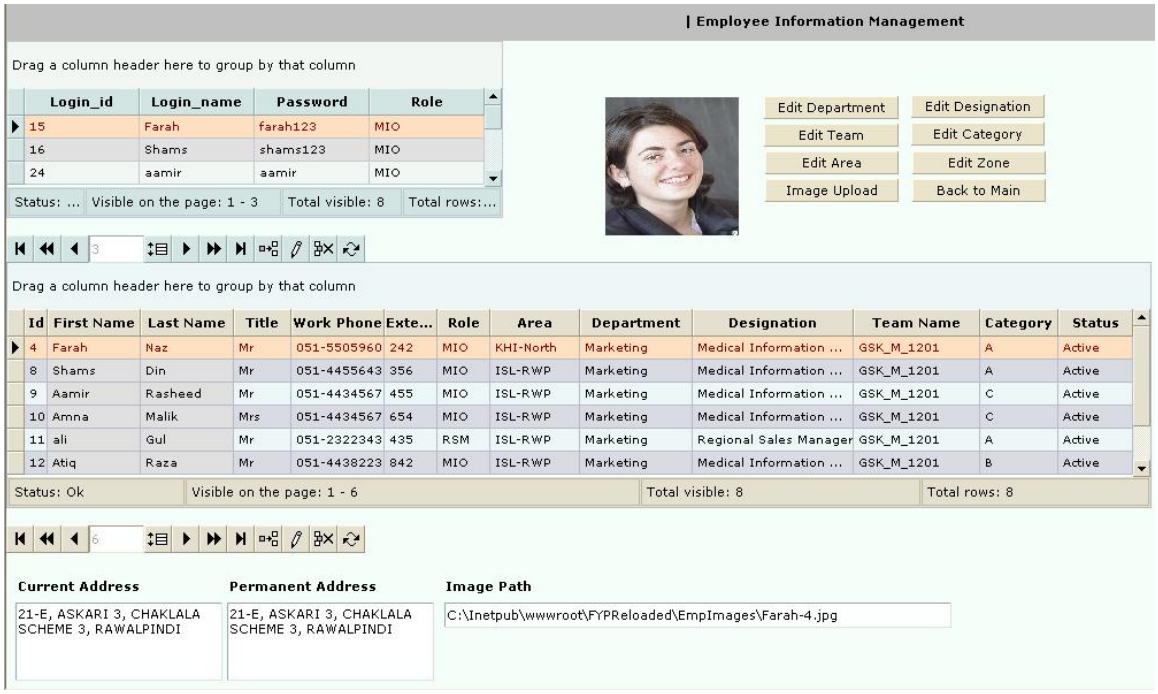

Figure 4.3: General Info. And Access Management

4.3.1.2 Department management

Figure 4-4 Department Management

4.3.1.3 Designation management

Figure 4.5: Designation Management

4.3.1.4 Team management

Figure 4.6: Team Management

4.3.1.5 Category management

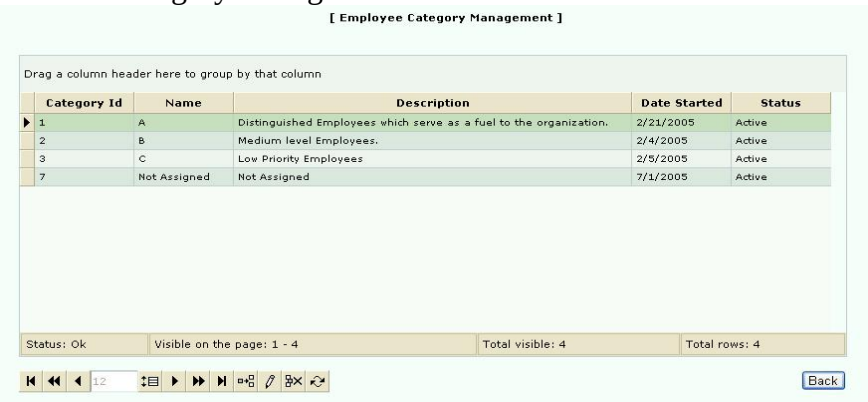

Figure 4.7: Category Management

4.3.1.3 Territory Management

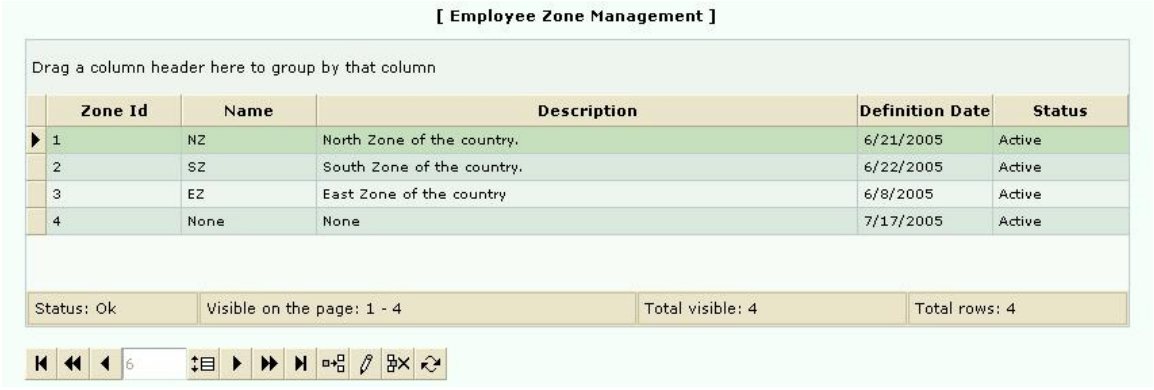

Figure 4.8: Zone Management

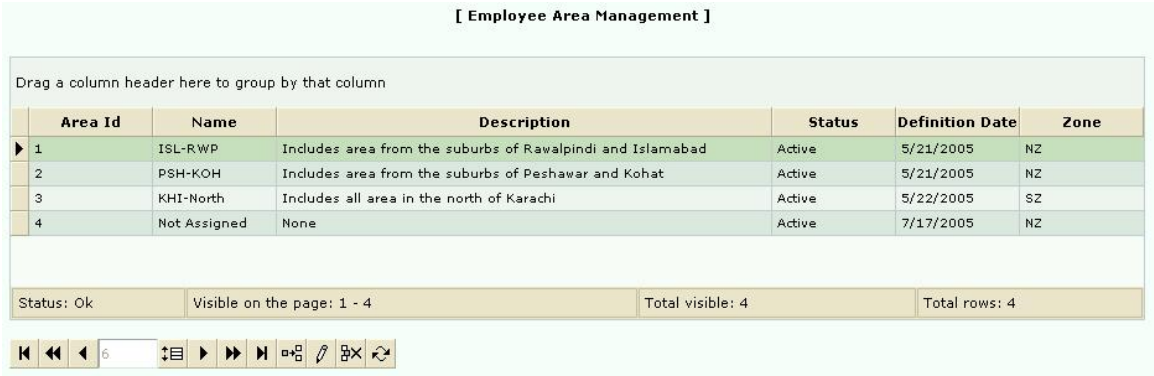

Figure 4.9: Area Management

4.3.2 Employee Evaluation Management

This includes the following sub-modules

- Competency Entry
- Competency Management
- Attribute Entry
- Attribute Management
- Skill Entry
- Skill Management

4.3.2.1 Competency Entry

Competencies are evaluated by RSM's as they enter information into the system regarding any MIO. The form for competency entry is shown below. The RSM can also view that information entered and of employees in the same team with the view data button. RSM can further view this information through the Intelligent Grid if given access which is described in the section "Competency Management".

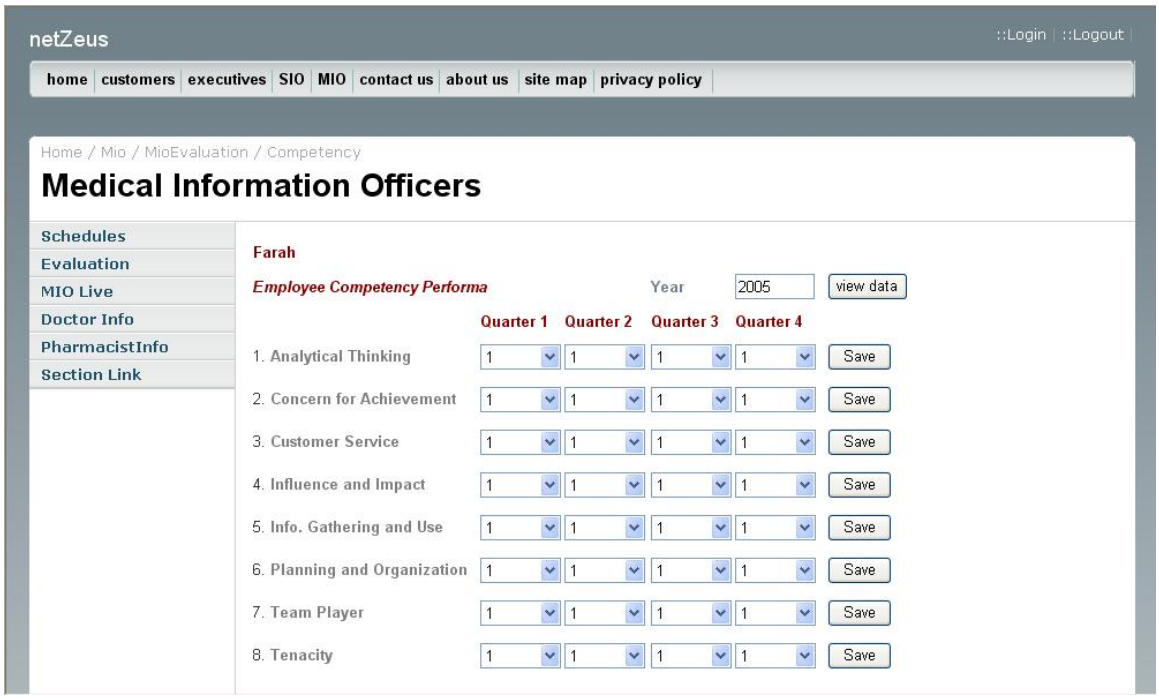

Figure 4.10: Competency Entry

4.3.2.2 Competency Management

The most distinguishing feature of this module is that there is a new concept of dynamic reporting evolved and we can extract information about the employees as we manipulate the grid. This is a highly user-friendly and decision acceleration feature and could prove to be monumental in decision making process.

4.3.2.2 Usage

Just drag and drop the required column e-g in the case below the Employee column is dragged and dropped on the area above the column area so the grid will intelligently sort it self and will group itself according to the “Master Column” as specified. This technique is highly useful as now we can see the data grouped by individual employees and also we can compare the data with the total as shown in the row at the end of the grid.

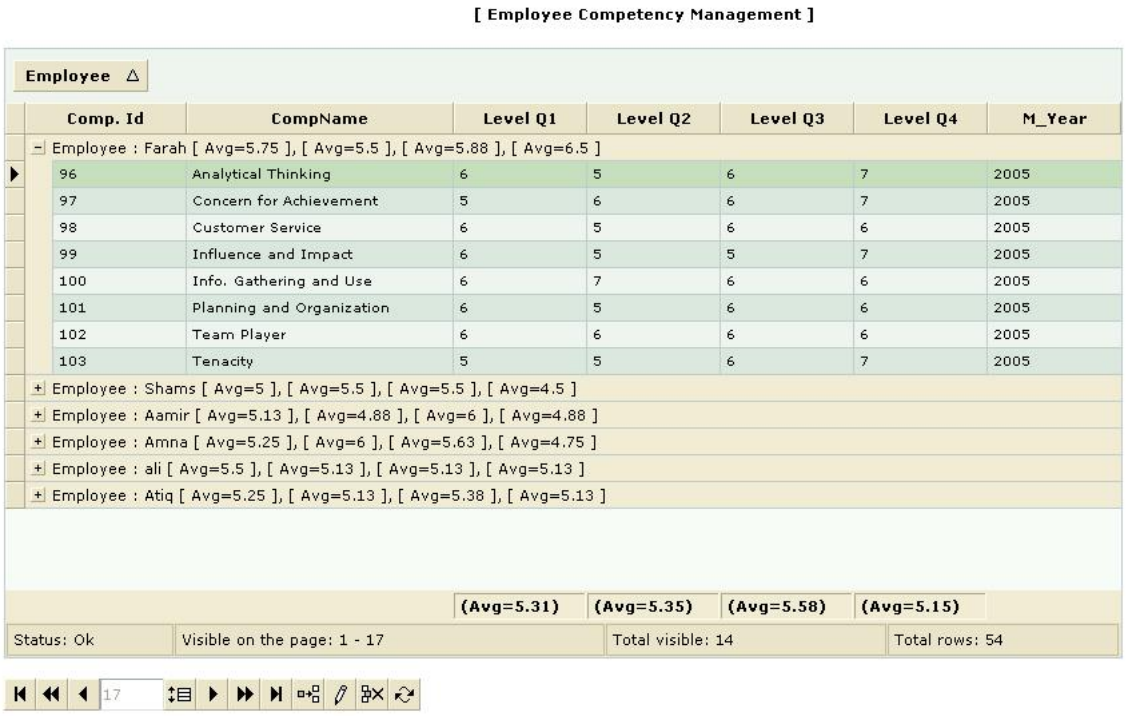

Figure 4.11: Competency Management

4.3.2.3 Attribute Entry

Attributes are entered using the following screen by the respective RSM. The information is saved intelligently into the database i-e if already present in the database it is updated otherwise it is inserted into the database hence keeping the values consistent in the database.

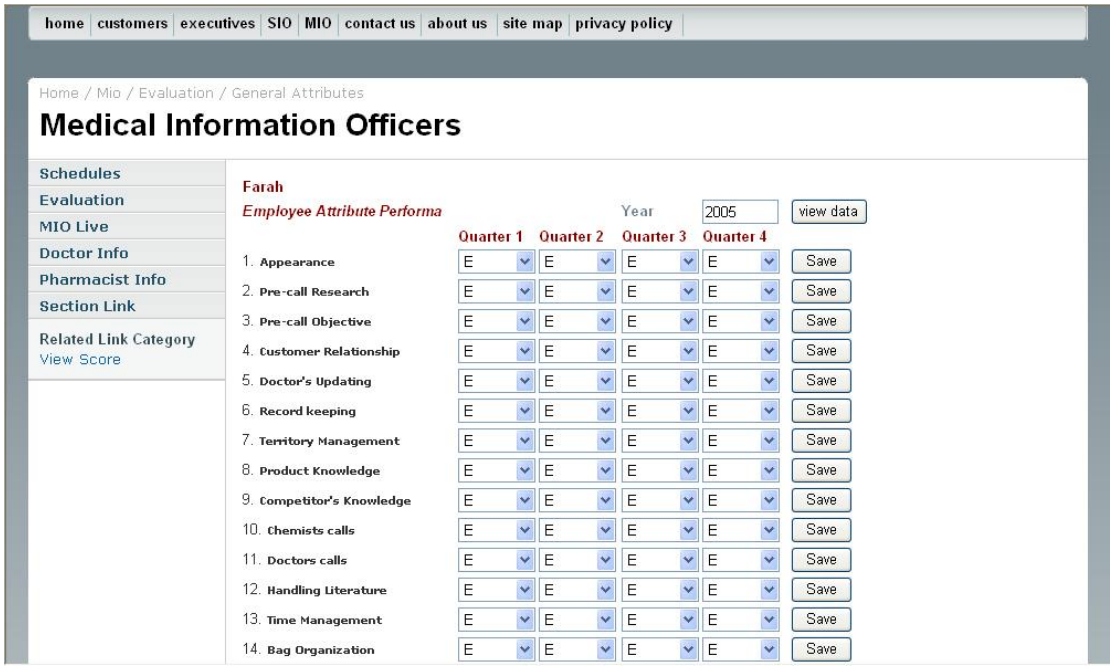

Figure 4.12: Attribute Entry

4.3.2.4 Attribute Management

Same technique is used with Attribute Management. See in the screen shot below how the data came up as we wanted to know which employee attributes were rated as "Excellent" in Quarter 1. The results are amazing and we can well imagine how big difference this can make in the decision support process. The features of reporting are not only supported themselves but they are complemented by the live updating of data in the grid with a simple click.

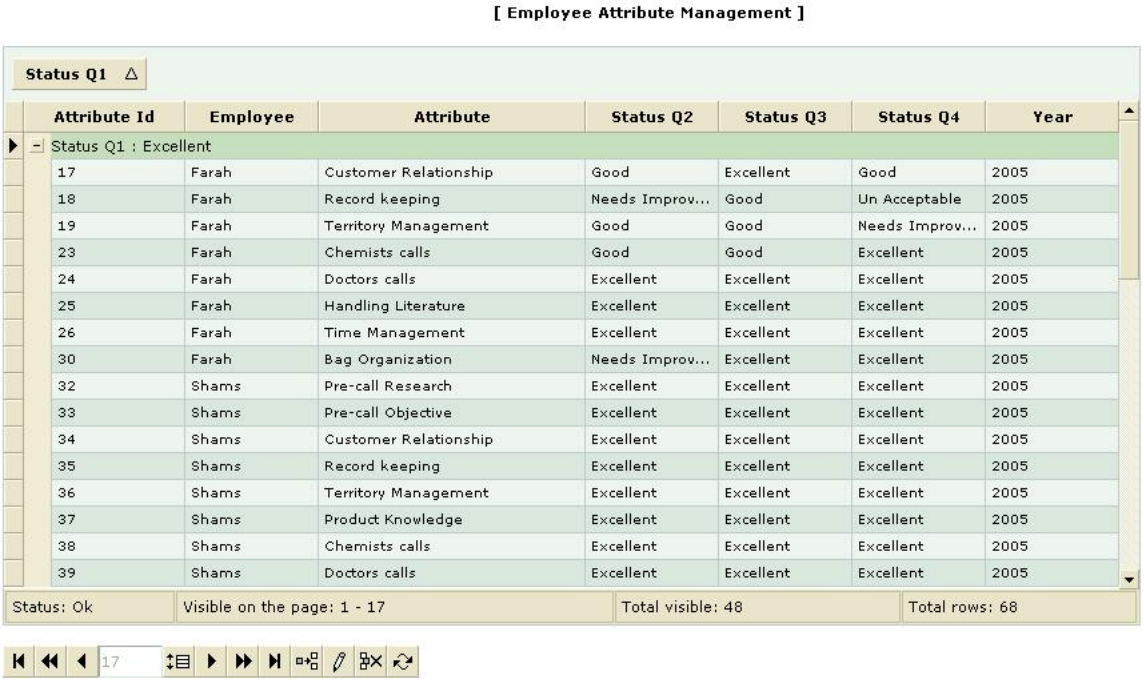

Figure 4.13: Attribute Management

4.3.2.5 Skill Entry

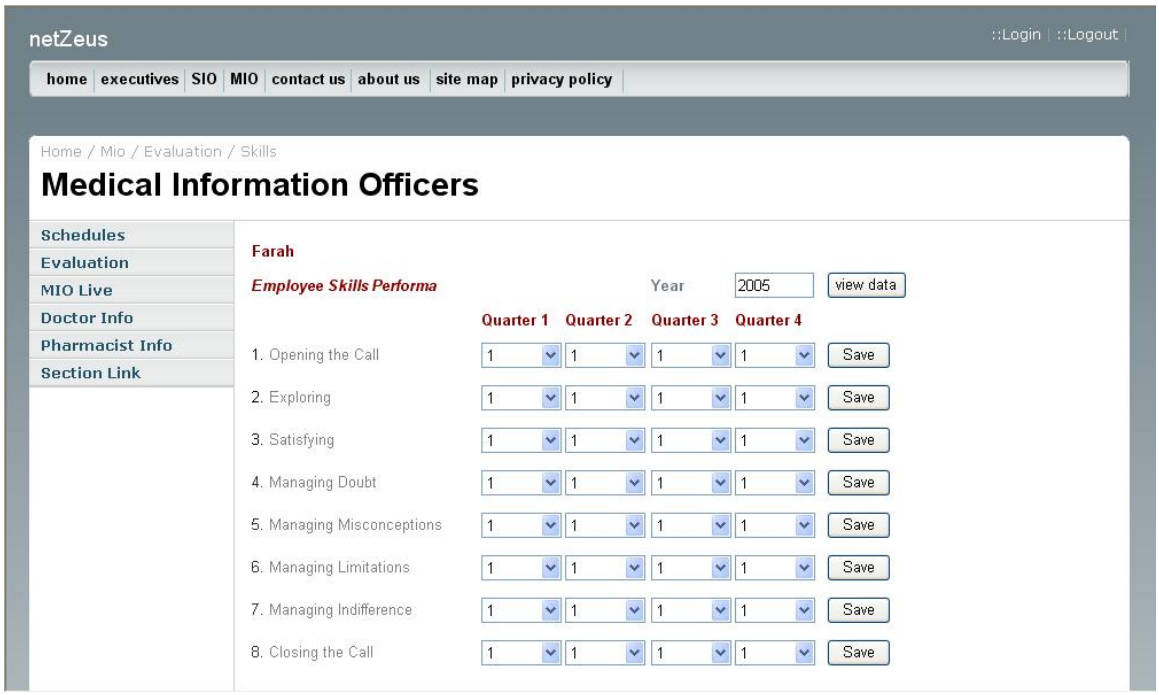

Figure 4.14: Skill Entry

4.3.2.6 Skill Management

Observe the feature of search in the grid below. We just enter a specific value to find in the column and the focus goes to that row. In this way we can go to item of our choice. Using this search makes it very easy to locate data specific to a RSM needs.

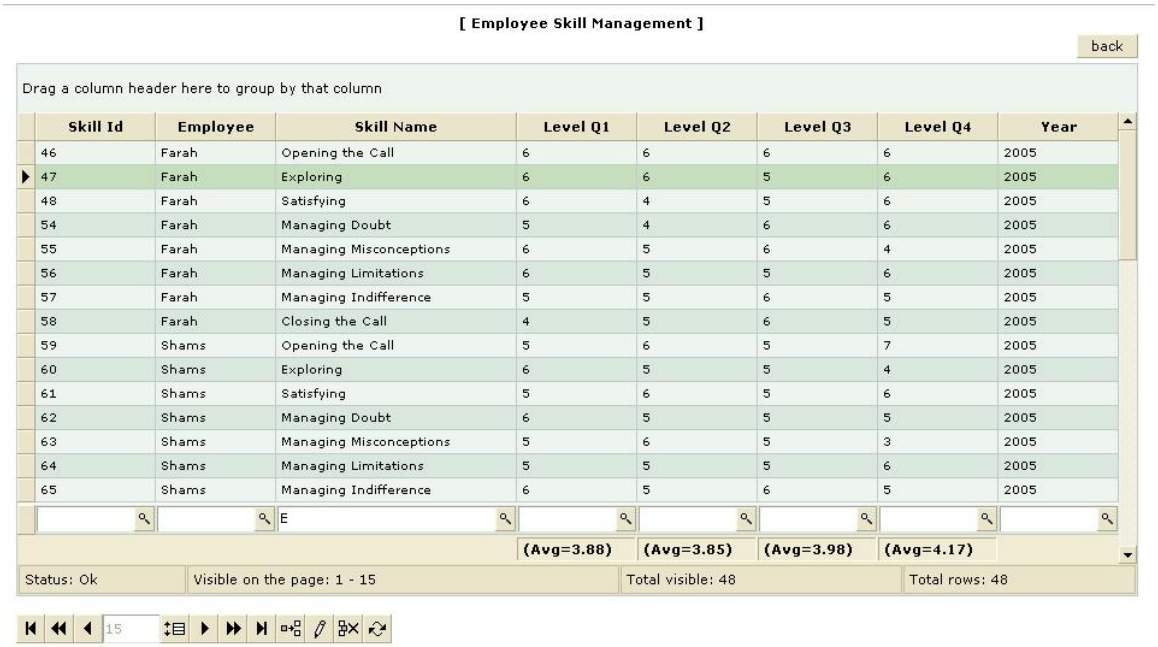

Figure 4.15: Skill Management

4.4 COMMUNICATION MANAGEMENT

4.4.1 E-Chat

This includes the use of RIA technology facilitated by Flash Communication Server. This is a chat application designed so that the MIO's can interact with each other and the Management. The distinguishing feature of this module is that there is no page refresh but the data is live and updated as it is sent and received. The user just has to enter a login name and has to just press the login button to start using this feature. As

most of the companies have the problem of employees chatting most of the time with other irrelevant persons this chat interface would limit this activity and make the staff more productive with continuous monitoring from the designated person as it is a room like environment.

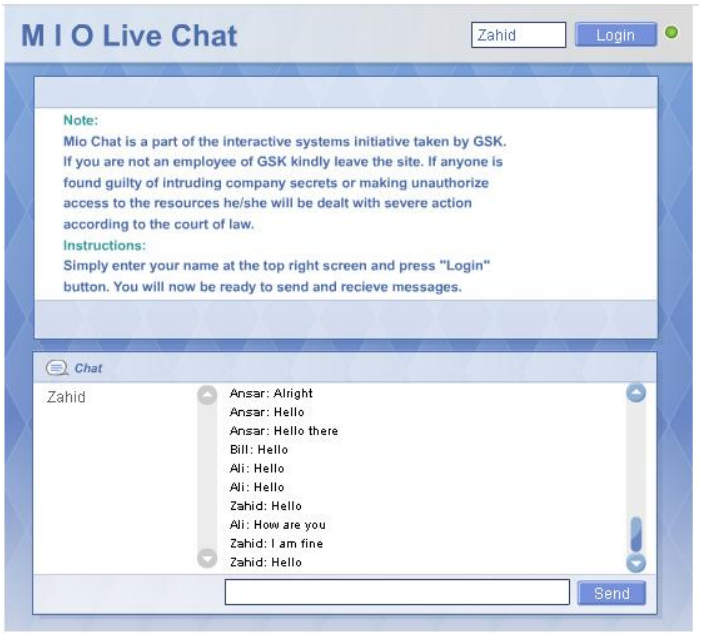

Figure 4.16: MIO Live Chat

4.4.2 E-Survey

This module has two sub-modules

4.4.2.1 Survey client

This sub-module includes the front-end for the survey filling. This client takes data from the survey and updates the data in the RIA repository. The overall resultant data in the end is shown as a percentage to the person filling the survey form.

Figure 4.17: MIO Survey Filler

4.4.2.2 Survey Admin

This Admin gives the facility of Making and Editing Surveys to be filled by the desired candidates. This includes the provision of Adding questions and choices to the survey to be filled with the help of the survey client.

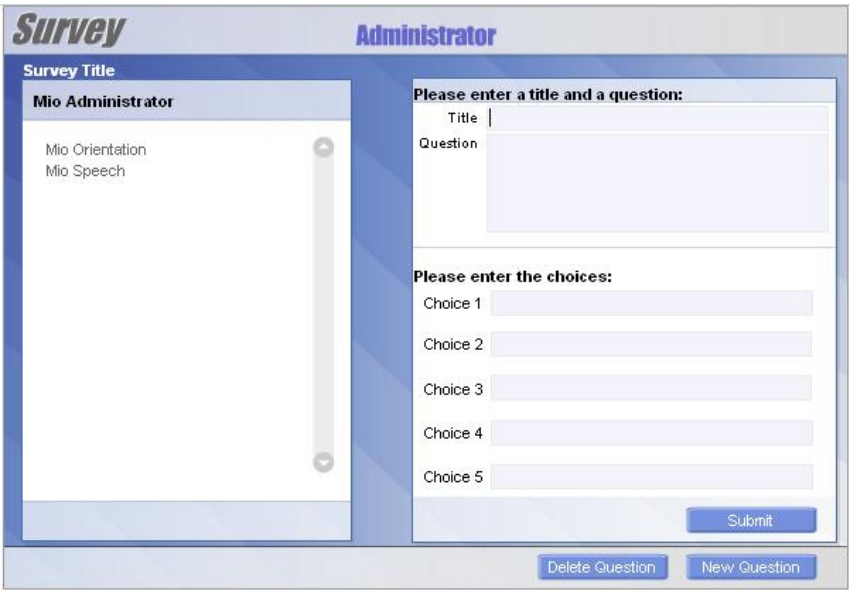

Figure 4.18: MIO Survey Admin

4.5 REPORTING MANAGEMENT

4.5.1 Visual Competency

- Competency Score Report for Quarter-1 is shown below. See how the buildings represent each employee's competency in Quarter-1 so this is a visual comparison of employees. Similarly we have the competency views for all the quarters. So a complete visualization of the ongoing process is achieved through the technology of crystal reports 10.

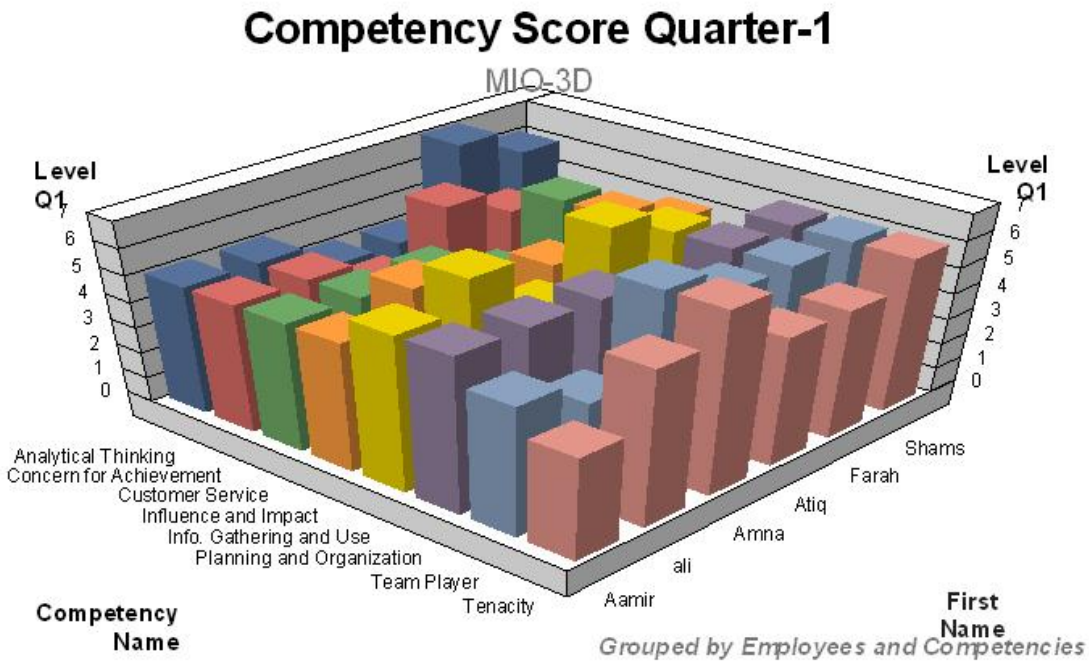

Figure 4.19: Competency Score 3D for Quarter 1

- Similarly information is shown in another view in the form of bars represented by different colors representing the different competencies.

Hence the person would have a 2 dimensional and 3 dimensional view of the employee performance regarding competencies.

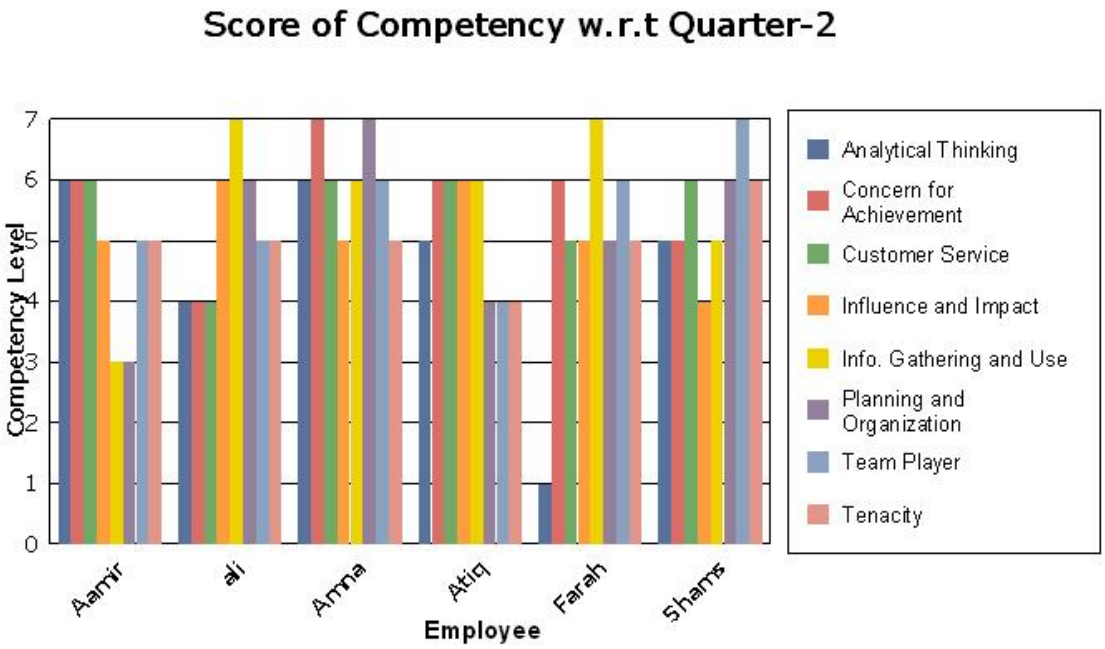

Figure 4.20: Competency Score 3D for Quarter 1

- Competencies for the quarters are shown in different state of the art visualizations which include the following as shown below and many more.

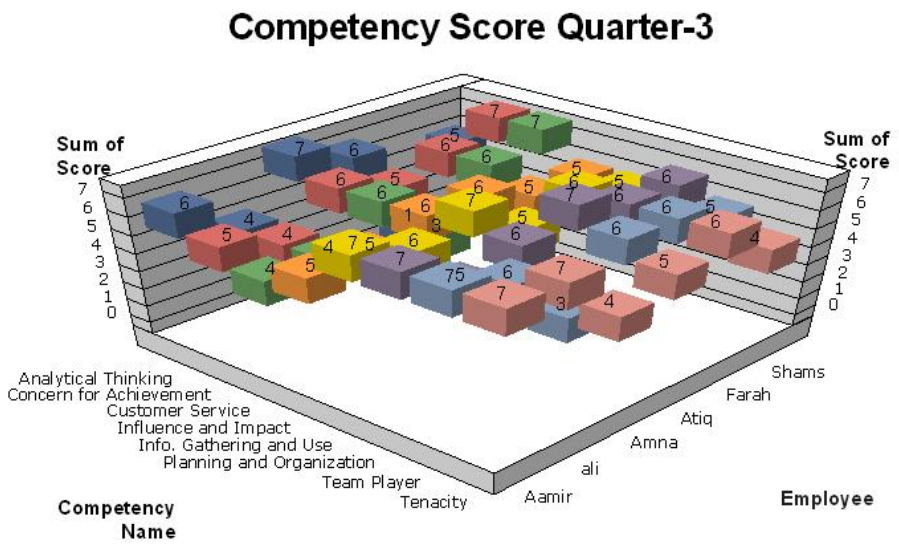

Figure 4.21: Competency Score 3D for Quarter 3

Notice that the values for each quarter are also displayed on the cubicle.

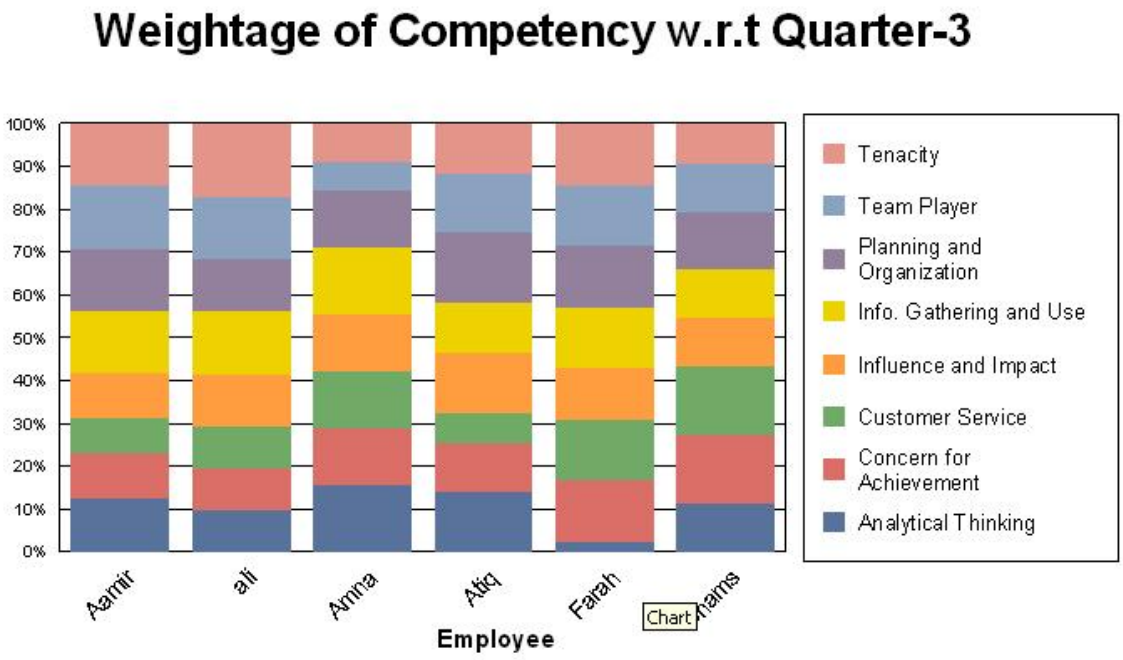

Figure 4.22: Competency Score 3D for Quarter 3

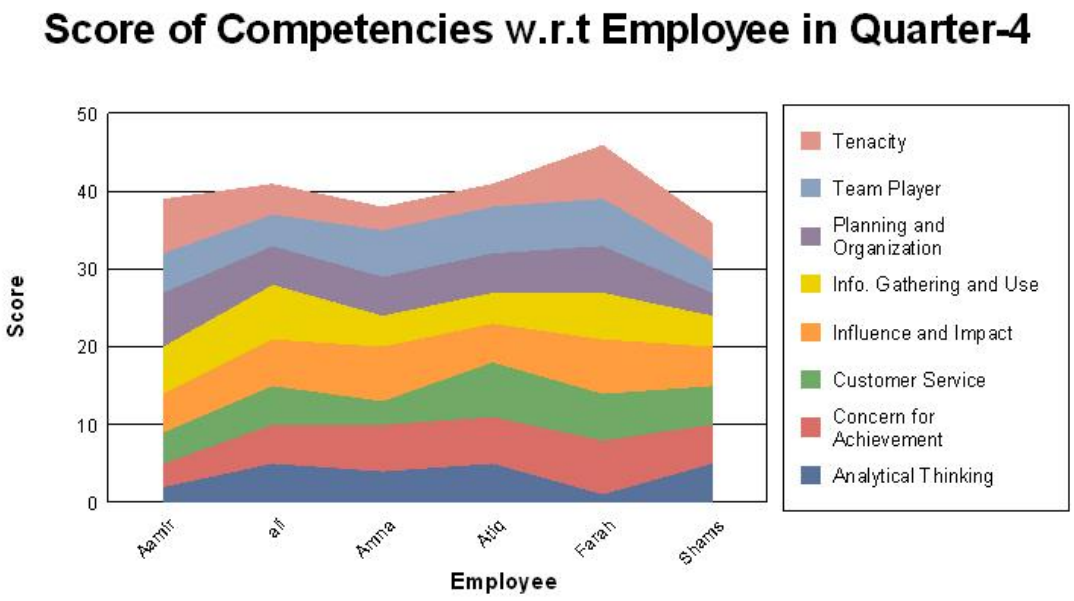

Figure 4.23: Competency Score 3D for Quarter 3

Note: The printing is in grey scale so the reader would not be able to distinguish between the colors so this difference can be seen from the project demo.

- Below is a 3D Report combo of various graphical representations. This adds versatility to the 3D graphs hence helping to analyze how the information could be represented in the most helpful way

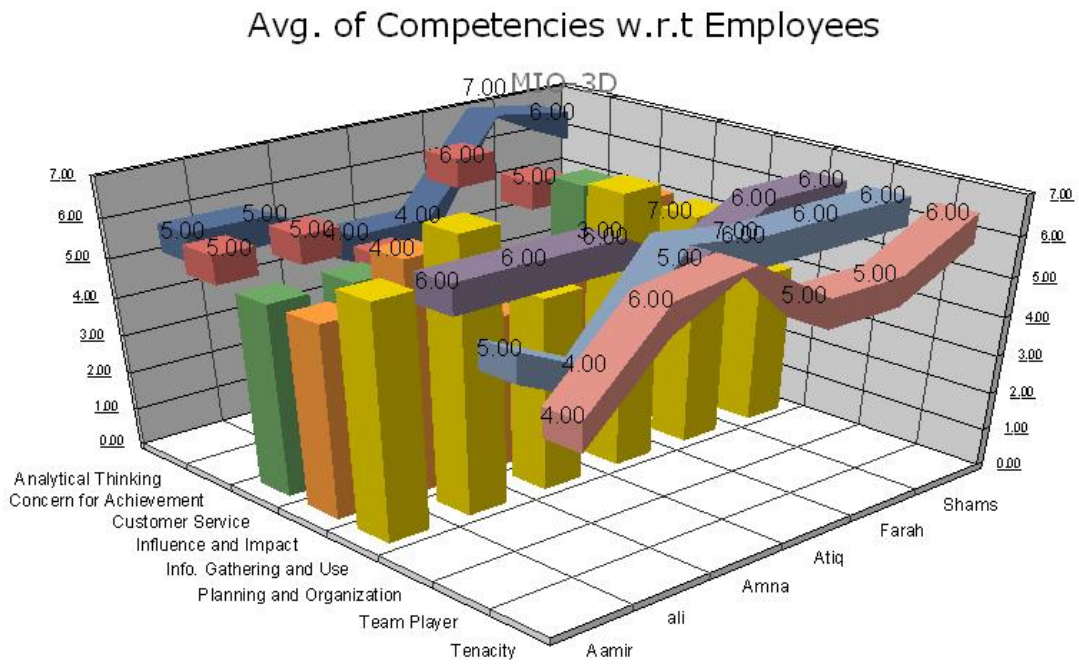

Figure 4.24: Competency Score Average for All Quarters

4.5.2 Visual Skills

Similarly as shown above skill data has also been represented in the form of 2D and 3D graphical representations. A few examples are shown below.

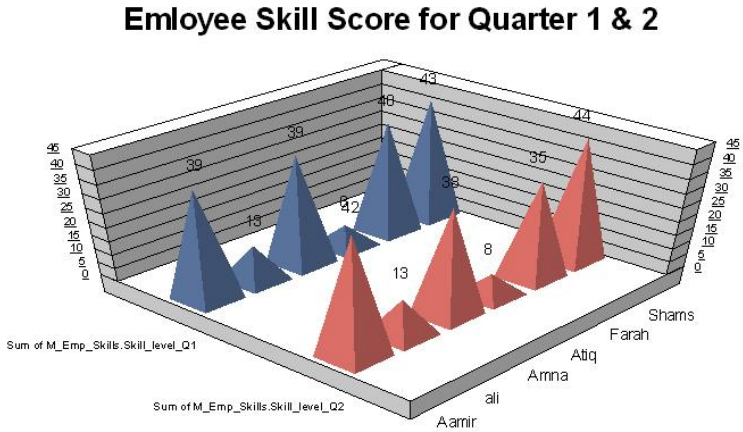

Figure 4.25: Skill Score Comparison for Quarters 1 & 2

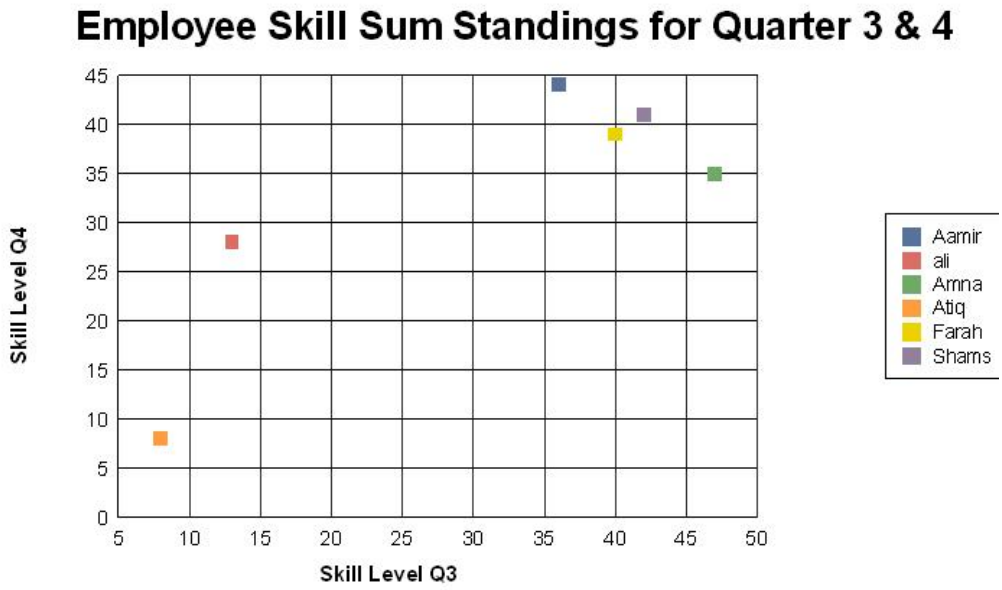

Figure 4.26: Skill Score Comparison for Quarters 3 & 4

4.6 DATA TRANSFORMATION WORKFLOWS

Workflows were designed using the "Data Transformation Services" in conjunction with SQL Server 2000 stored procedure calls to successfully transform data from OLTP database to Dimensional OLAP database and then to the Multi-dimensional OLAP by the SQL Server 2000 Analysis Services. The data regarding the evaluation management was transferred so that the higher management can slice and dice through the cubes and access data on the fly to effectively evaluate the employees. The pay parameter has been kept as part of a future extension programme so that the OLAP transformations are compatible with a payroll system which could be developed in the future. The workflows can be either triggered manually or can be configured to trigger automatically by setting a time. The facility to automatically triggering the workflow is

provided by the SQL Server 2000. Below are screen shots of the workflows defined. The transformations can be seen by right clicking on the workflow arrow and selecting properties->transformations.

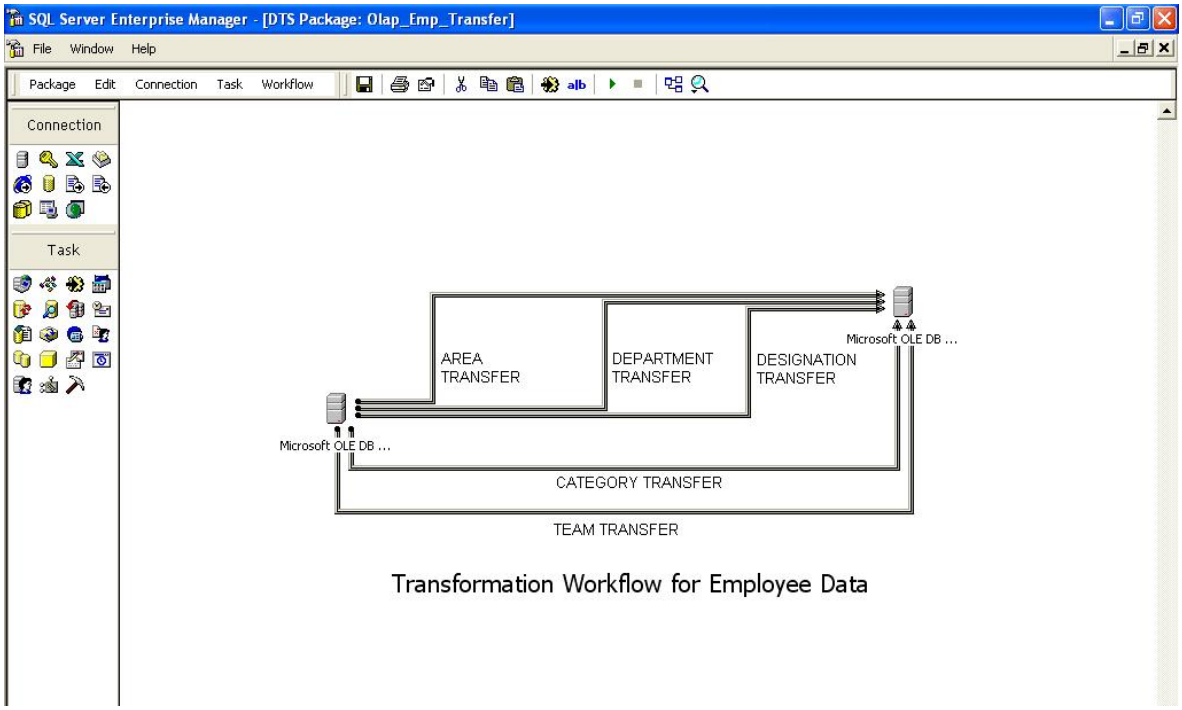

Figure 4.27: Employee data transfer workflow

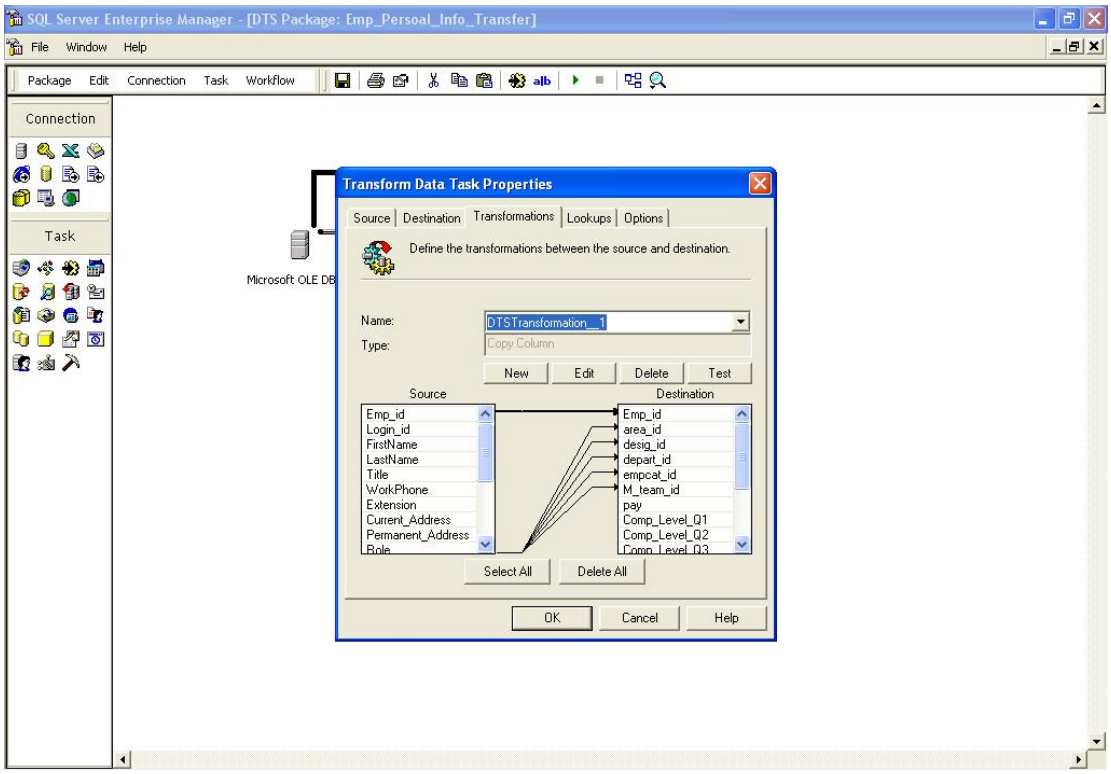

Figure 4.28: Employee data Transformation Mapping

4.7 OLAP CUBES

After the data has been transformed from the OLTP to OLAP a cube is generated which forms after a third transformation from Dimensional OLAP database to Multidimensional OLAP structures. Now the data is ready to be sliced and diced. As the data has now been stored in the MOLAP so when we slice and dice through the cube no data from the previous database is affected by the dynamic queries hence this works to be very efficient in area of decision making as the OLTP backend is free for regular OLTP tasks.

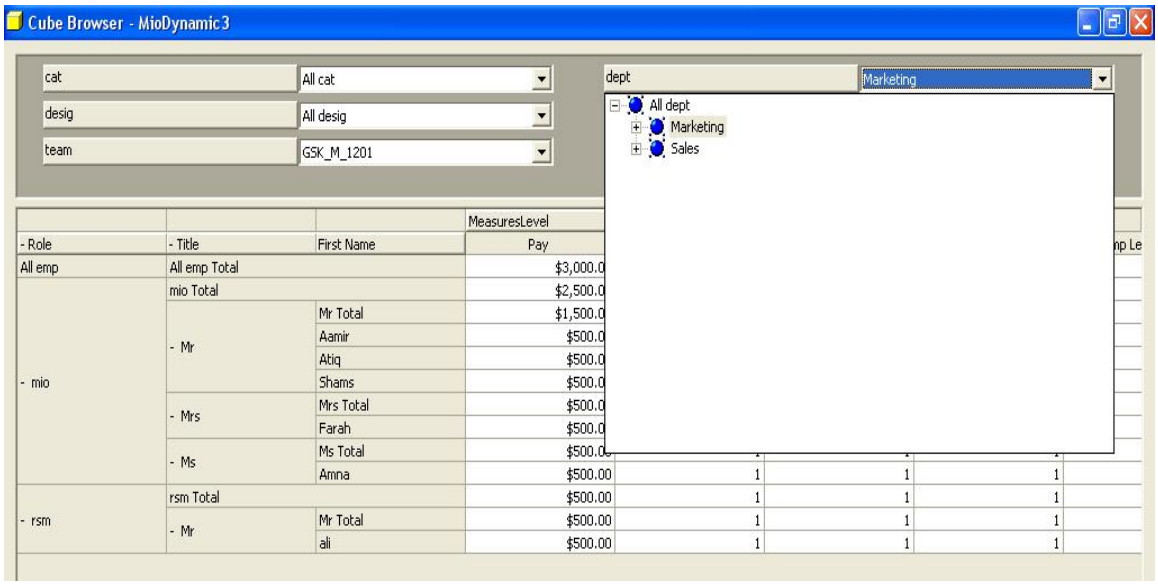

Figure 4.29: OLAP Employee Evaluation Cube

Chapter 5

CONCLUSION AND FUTURE DIRECTIONS

One of the major challenges facing organizations today is the need to create a single, accurate, consistent, and timely view of their customers, vendors and employees – a view that cuts across all of their applications, systems, business units, and customer touch points. While many organizations have some sense of the value of such a view, far too many organizations fail to grasp the ramifications of not having an accurate, complete view of their customers. It's a hard job to maintain such huge information and then dig into the data to extract different parameters from the data for the decision making. Our system achieves timely and accurate decision making capabilities with the 360 degree view of employees and customers making it easy for the management to make critical decisions. The use of cutting edge technology in our system allows the management to view, edit and manipulate employee data in real-time.

In future this system might be integrated very easily with the payroll, Customer Service Portal etc moreover this system might be integrated with a BPM solution to increase productivity by managing various tasks.

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