A CRM Technology Model for the Telecommunication Industry

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CERTIFICATE OF AUTHORSHIP / ORIGINALITY

III

I certify that this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Abstract

Planning and implementing a Customer Relationship Management (CRM) System affecting the attention of senior management within the majority of organizations. A CRM is no longer a fancy word but a necessity enforced by the impact of e-Business and the increased competition. Current interest in CRM is not limited to a specific industry or to a certain company size.

This study is a comprehensive analysis of the CRM process. It starts by exploring the components of the CRM process with a special focus on the role of Knowledge within such process. Then the study highlights how CRM is currently implemented, how it is related to the customer life cycle and to all possible customer interaction points. Moreover, methodologies used in designing CRM systems were investigated and CRM services were identified. Finally, the study concludes by determining how we can measure the performance of implementing a CRM system, and then identify the challenges facing existing CRM systems.

I backed up my study with a CRM model for a hypothetical telecommunication company. The model presented was used to highlight how capturing and managing information about customers across all contact channels will affect the CRM process of the company. The model was used as a basis for presenting technology tools used in implementing a CRM system. Models presented for the system were based on the rich picture technique.

My study goes beyond highlighting the importance of knowledge, to the discussion of how the customer explicit knowledge could be captured, and what Knowledge Management tools can be embedded within the day to day business process. Such tools will work on tacit as well as explicit knowledge.

CRM is not a common process among all industries. The Banking and Finance, Telecommunications, Health Care and Airline industries have new operational challenges issues that are discussed thoroughly. Additionally different design methodologies for CRM process do exist and were presented within the body of the study. The ideal CRM design methodology relies on the size and the nature of the business and should always consider the knowledge element.

CRM is not an isolated process that could be implemented separately from other processes within the business. As a matter of fact, there are two essential elements that come into play here; total integration within all areas, and firm support from senior management.

Further research areas required are highlighted. Such areas are required to resolve obstacles and limitations, not only with the design I proposed through this study, but also within the existing commercially available CRM systems. Research areas proposed are not limited to personalization, trust and the measurement of the CRM process.

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Chapter 1

INTRODUCTION TO CRM

The new trading trends

Why did online retail sales in the US surpass USD45 billion in 2002.[1]? Why is it that between August and October, 2002, Europeans spent online on average EURO430 per head, whereas an American spent on average EUR543 per head [2]? And why is Cisco Systems Inc., the world's largest Internet commerce site is selling more than $32 million in products everyday (Cisco Systems, Inc.). It is the new trading trends, trends that are more than just an online sale. It is an industrial revolution that is having a clear impact on almost every aspect of our life.

It is impacting employment figures as more than a million new jobs have been created by the U.S. high-tech industry since 1993 [3]. It is impacting how businesses are operating and delivering their products and services as according to new figures from the UK Department of Trade and Industry, half of UK firms now order goods and services online. And as per the eMarketer, over 50 million Americans are currently online at work. From the other end, according to a new report from news.com.au, Australian business earned AUS43 billion (USD24 billion) as online revenues, from December 2000 to mid 2002. Finally, it is impacting customer's interactions and expectations and the eMarketer predicts that 42 million households will be shopping online by 2003.

Despite exciting new trends in today's trading, to be able to properly analyze, review and utilize such trends we are required to understand the e-business drivers, as well as the implementations of the right business strategy which will control the delivery of better products and services via the new electronic medium. An interesting classification system that breaks down revenues generated the different layers of the Internet Economy can be found in [3]

The Internet is shifting the way companies interact with their customers. It not only creates new electronic channels like the Internet and the WEB portals; but it did revolutionize the traditional customer interaction channels. That is why we can now recognize the emergence of a multimedia contact centre as opposed to the traditional call centres. Via contact centre, companies can interact with their clients using normal telephone calls, voice mail, faxes, e-mail text based chat as well as pushing contents directly to the clients via the Internet.

With today's trading over the net, companies have realized the importance of quickly understanding their customers, and accordingly, promptly responding to the customers's wants and needs via the new channels. This response by itself is a challenge that is facing the business today. The challenge is forcing companies to acquire new electronic knowledge based systems that will engage all parties involved in the customer life cycle.

Commonly known as Client Relationship Management (CRM) Systems, these new systems involve customers into the organizations' electronic systems in an effort to retain existing clients and to acquire new ones.

This study will cover drivers behind these systems and will discuss the characteristics of such new systems. Besides, it will explain what kinds of services are offered with such systems as well as the different types of relationship with each business. Based on the services offered and the relationship associated with each business, I will introduce my proposed case study along with a proper design methodology. Knowledge will always be a major element in such systems.

There will be a case study based on a hypothetical telecommunication company that will illustrate my system. The case study will be utilizing Live Net as an implementation tool. Finally, I will conclude by exploring further studies in CRM systems.

On one hand the electronic channels form a major driving force for such systems; the other knowledge seems to be a more efficient factor behind the success of such systems. In fact, the emergence of such a powerful electronic network has contributed to the evolution of systems that will capture a large amount of customer information from all business units within an organization. Such knowledge forms the motive behind effective CRM systems that are in use in the different businesses across the world today.

This knowledge includes customer background, customer purchasing history, products and services information versus the client contacts history, maintenance and warranty records, in addition to existing and future customer requirements. Such knowledge is either stored within the organization filing cabinets, data base legacy systems or even in the minds of key individuals in the organization. Capturing the above knowledge in the right context and at the right time will help in creating proficient systems that will enhance the overall relationship with clients.

CRM in simple terms

Customers are the heart of any business. They form the life support system to any organization; in fact, with no customers, you have no business. If business maintains and enhances the relationship with customers, the business will survive and grow. If that relation is ignored, the business will soon disappear.

Why today's business needs to adopt CRM?

New trends in today's business world have forced companies to adopt new business strategies in order to survive and compete in the market place. The following are some of these trends :[4]

Internet Technology The Internet facilitates access to a whole range of knowledge and information to Customers. In addition, customers are offered the ability to complete their transactions as well as get frequent updates on the products or service they use.

Increased competition A common problem within the telecommunication industry is the number of customers switching back and forth between competitors. It is known as the churn rate, and as an example, about 30% of customers change their providers yearly in the mobile phone industry [5]. A high rate will force the providers to not only stop them from moving to another providers, but to have the right knowledge on why customers are churning and using such knowledge to maintain the customer loyalty.

The growing cost of acquiring new customers It costs five times more to sell to a new customer than to sell to an existing one. The cost of acquiring a customer to do business online is 1.5 to 2.5 times the value of an average sale; online retailers are spending 76% of their revenues on acquiring customers, and 3% on retaining them [6].For example, an online retailer might spend around $120 to acquire a new customer, who will then spend about $80 on purchase. The real retention value of this would be obvious and that if the customer does this more than a time.

Increased customer expectations E-commerce has changed customer expectations. Customers do not care what area of the business they call or where information is stored. All they want is an excellent and prompt service. Customers expect you to have detailed knowledge about their transactions with your company without the need to be transferred from one agent to another. From the customers' perspectives, businesses are operating around the hour on the net and they need prompt responses.

Client Relationship management is one of the major strategies that is becoming critical for the survival of business today; not only in industries like professional services (Financial services, accounting. etc.) but even in the retail business. Any business small, medium or corporate that doesn't consider a CRM strategy will soon see customers move away to businesses that do CRM.

Customers everywhere, demand better services. Customers do not expect their requests to be delayed or ignored. While this will pressure companies, it does seem to be a great opportunity for businesses to acquire the right CRM strategy.

What is CRM?

Applying a CRM strategy will shift the company from being product centered to customer focused. The previous target of "Get the order at any cost" will be "How I can better service my customers ". Being customer focused requires having consistent, dependable and convenient interaction with the customer in every encounter.

Ravi Kalakuta defined CRM in his book e-business Road Map for Success as "An integrated sales, marketing and service strategy that produces lone showmanship and depends on coordinated actions"[4]

Implementing the right CRM strategy coupled with the right CRM product increases the financial performance of the business. A study by Andersen Consulting showed that CRM performance accounts for 50 percent of the variance in companies Return on Sales (ROS).

A division of Wal-Mart stores in the US increased their sales to about $16 billion by implementing one of the CRM services [5] . They implemented cross selling by dedicating 200 agents to join key small- and medium sized business into their discount club stores. Cross and up selling are two main CRM services that will be explored further within this research

Such figures indicate that the focus on enhancing the CRM capabilities will be a major factor that will differentiate business from each other, and will continue to be a competing factor.

Is CRM a system as well as a management strategy?

CRM is an integration framework. Therefore, implementing CRM strategy into practice requires integrating all applications within the business into one main application. The CRM business process should have a link to every single process within the organization

The objectives of a CRM strategy within any business can be summarized in achieving higher returns on investment over time. CRM strategy will not only help in acquiring the right customer but in retaining a profitable relationship. The following points illustrate such objectives across different elements:

- Utilize existing relationships with clients to retain them and increase revenues. Techniques such as cross selling and up selling are used to generate more revenues from a committed client with future needs.[4]

- Enhance the level of customer service and support. This is done by integrating data about customers from different units of the business into knowledge. The main aim behind this objective is profitability.[4]

- Collaborative marketing CRM strategy will enable the different departments of the business to work together towards getting the right knowledge to acquire the right customer at the right time.[4]

- On the other end, this knowledge will also help the businesses to offer pro active solutions to the customer needs. Businesses will be able to identify the customer problems and offer solutions before the problem even strike the customer.

- Gain the customer loyalty by presenting the differentiated image for the business in the market place. As discussed above, this means improving the ability to target customers" needs and requests in a professional manner.

CRM Application & e-CRM

Technology impact on CRM is revolutionary. Companies contact their clients using the traditional contact channels like the face-to-face, mail by post, telephone calls and fax or using the new electronic mediums, such as the web, email, interactive voice response. Customers want a variety of ways to deal with companies.

While this sounds like an opportunity to contact customers via different channels, it is becoming very challenging to keep track of contact details. One of the strategic challenges that is facing the call centre industry is how should they respond to the rise of the Internet-based technologies. Businesses need to plan and implement a contact media integration strategy, while at the same time embrace multiple media channels.[7]

These types of customer contact increase customer control and sales channels for revenue generation. Such strategies have high-impact on customer retention.

What difference does the letter e makes in front of the CRM application. Apparently the e refers to CRM online. It is the application which allows customers to take care of them across the internet. Other legacy based CRM applications would refer to client server based architecture.[6]. It is important here to emphasize the impact of involving the customer with the CRM process through the web. It does add a lot to the overall customer experience and satisfaction.

Implementing a CRM strategy requires developing a group of integrated applications that will computerize all business processes which involve a customer interaction. Some of these processes are:

- Sales (includes all types of sales cross-sell, up-sell & telesales).

- Marketing and fulfillment.

- Customer service and field services.

- Retention and loyalty programs.

- Partner relationship management

In chapter two of this study I will be exploring the different types of relationship automated within a CRM system and in different industries. Then I will present my design methodology which will classify services and relationships in CRM.

Companies are looking for software vendors that have the right knowledge of integrating the different systems into one core CRM module. Therefore a successful CRM system needs to integrate applications the businesses have in place.

As CRM seems a natural habit for small businesses due to the nature of the size and the type of relation with their customers, it is worth mentioning here that through the design

methodology that I will be explaining through my study, I will place special emphasis on the usage of CRM systems to small and medium size businesses. Application Service Providers offer robust CRM solutions designed for small business. A good example of an ASP who is offering such a solution for companies with about 500 employees is Salesforce.com. [8].Major software manufacturer like IBM and Artisoft have announced new strategies developing CRM application for small businesses

CRM applications will be the driving force for investment in information technology over the next few years. The growth in the worldwide CRM spending is expected to reach US$76.3 billion in 2005, up from US$23 billion in 2002. A good part of this research will concentrate on the impact of knowledge on the integration between the different parts of the CRM applications.

Customer Life Cycle

It is important before we can progress further on CRM system, to have a closer look at the nature of the relationship with customers. Such a relationship, as in any other type of relationships, passes through different stages.

On one hand, the relationship will be stronger if both parties involved in it are committed to grow the relation further. On the other hand, increased competition makes it very difficult for customers to be more committed to such a relationship. The lifecycle of the customer can be viewed as the process the customer has been undergoing to be with a company for the overall period of the relationship [6]. In general the relationship with customers passes through the following three main phases:

Figure 1-1 Customer Life Cycle [4]
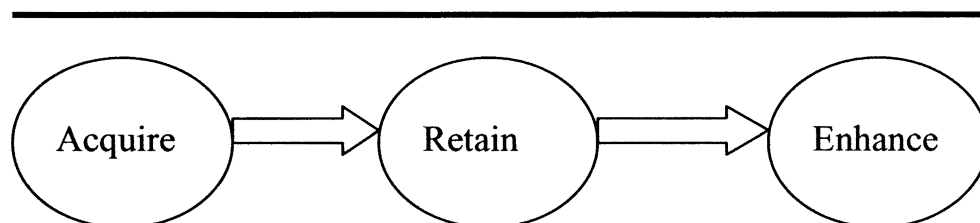
Acquisition A great deal of planning is required in this phase. It does require an understanding of the customer needs and wants. This normally followed by promoting the right product backed up by excellent service for the right customer and through the right channel. The following case provides more illustration of this phase:

"A customer is looking to install a new cable modem service into his premises. The customer started to surf the net for service provider in his/her area. He/she landed on the web site of the service provider, filled up the request form that includes name, address of premises, contact details, as well as the type of service required."

What the customer would expect?

Within a few minutes, the customer should receive a call from a representative within the service provider; the agent needs to acknowledge the request, confirm the possibilities of installing the services, discuss the installation requirements, and when it can be done."

Such a prompt response is not impossible any more. It is possible due to the following:

- The internet is a powerful tool for companies to promote their products and services and is also a major source of knowledge for the customer who can search for the right solution, and request the required details.

- Integrated CRM applications that allow the representative to review the customer details and find all the necessary information for installing the service. In fact, the representative might need to have an access to customer information which is available from more than one department within the company. Such a process used to take a lot of time and effort in the past, but nowadays it is fast and effective.

- Knowledge enabled systems that are capable of capturing the required knowledge, and facilitate it through the different systems. Knowledge on the possibility of installing the service to the customer would come from a previous interaction with the client to install a phone service, for example.

Enhancement: Offering customers convenient solutions to what they might require will greatly help in enhancing the relationship with them. *Cross selling* and *up-selling* are some of the techniques that are currently used in the contact centre for maintaining a longer-term strong relationship.

A Company contact centre receives thousands of calls a day inquiring about products and requesting extra information. Such calls are utilized to suggest products or services that might be of interest to the customer.

For example, a personal computer owner with certain type of software might be offered hard ware upgrade, peripherals or even other types software.

Retention: Retaining profitable customers proves to be more profitable than attracting new clients. Such a retention strategy requires delivering what the customer wants not what the market needs.

Not all customers are the same and they cannot be treated equally. Clients need to be categorized according to the revenue they do generate. Such customers need to be identified and offered solutions that will keep them loyal to the business. I will be elaborating more on the issues of measuring the customer's value.

It is difficult to isolate the different phases of the customer's life cycle. All the phases are interrelated to each other. It is also difficult for companies to focus their efforts on the three phases at the same time.

Companies have to choose a certain phase and work on mastering it. The choice of the phase is important, as it will dictate the type of technology to be adapted.

CRM Systems Architecture

It would not be a surprise to notice that the new CRM applications focus on the customer, not around the different functions of the business (i-e marketing, sales, accounts. etc.). Response and feed-back from customers should improve and enhance the overall CRM process.

Companies are not only required to integrate the different business processes that build up the CRM system, they also need to also integrate the software applications that automate such processes. The figure below shows the core software systems for a typical organization and how they need to be integrated

Figure 1-2 Core Software systems within the organization for CRM integration.[9]
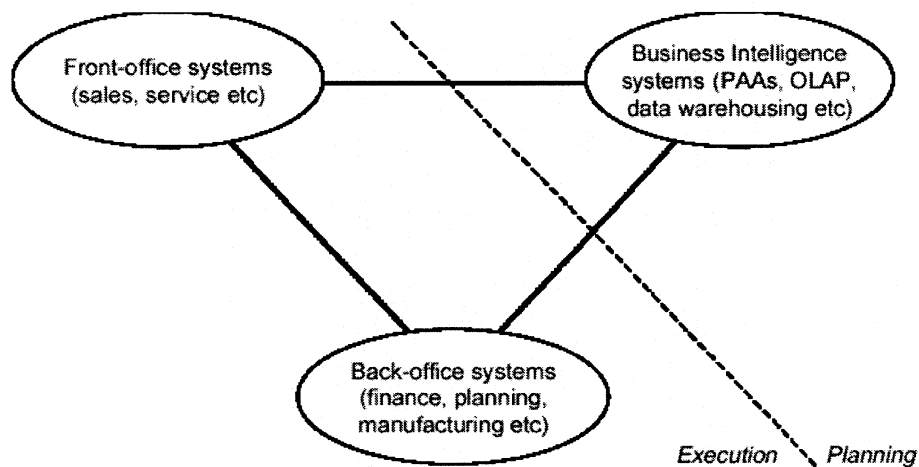
OLAP: Online analytical processing. The interactive, multidimensional analysis of business information on an enterprise scale.
PAA: Packaged analytical application. An analytical application capable of producing useful analysis 'out-of-the-box'.[9]

There is a growing trend towards managing all the activities of the customer's life cycle as one process, even if that process will span across different functions of the business. With the above idea in mind, managers need to restructure the different functions of the business into a structure that can integrate very well with what the CRM system requires.

Customer interaction Points

Relationships with customers are highly dependent on the type of channel used to communicate with the customers (the customer interaction point). Companies need to identify and review these interaction points. Also they need to make sure that they are using the right software and tools that will help turning such an interaction into an effective and rich relationship with the customer. This is accomplished by capturing the right knowledge during the interaction, then analyzing it for future transactions.

As discussed earlier, selecting which channel to use is an overall strategy that the company needs to address. Each channel has characteristics that need to be analyzed and reviewed against the company's objectives. Companies can encourage their customers to go through certain channels over others. Personalization and privacy is an important element that needs to be considered with the contact management strategy of an organization. Personalization impact on CRM is a subject that will be explored further within this study. An interesting comparison graph is shown in figure 1-3

Figure 1-3 Different customers contact channels with different costs –.[9]
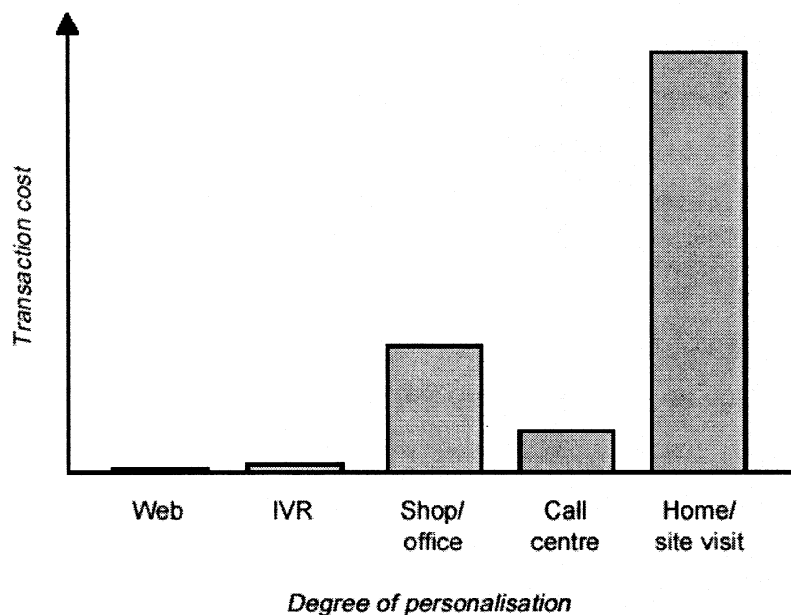
Over the next few pages I will elaborate more about the most effective interaction points between businesses and their customers:

- Call (Contact) Centre

- WEB Portals

Multimedia Contact Centre

Organizations are now realizing the critical importance of every customer contact and are starting to understand the potential of the contact centre for becoming the first and the main point for implementing the right customer relationship strategy. The Contact centre is becoming an important point of conducting everyday business. On the other hand contact centre software is the business tool that manages the interactions with the customer.

Ovum defines contact centre as "a communication interface between business and its customers which enables high volumes of contacts in multiple media to be managed in a holistic way". The definition refers to a unified routing and handling of calls at the agent desktop. From now on I will be using the term contact centre rather than call centre, as the term contact is closer to what is being used nowadays.

The emergence of the contact centre

On one hand, it appears to be that most of the business transactions are executed over the telephone. On the other hand, organizations are quickly responding to the emergence of new communication channels like e-mail, web chats, fax, and voice over the Net, voice mail, and Web call back. Such a response which requires support for all these types of new medium communication is behind the evolution of the contract centre as opposite to the call centre.

According to a study, by Forrester Research, 56 percent of all customer interactions will be going through the WEB over the next 4 years. This will reduce telephone contact to as little as 5 percent. Companies are realizing this fact and working on upgrading their call centre into a new multimedia contact centre. Webs enabling the call centers as well as the implementation of unified messaging are the two essential technologies behind this upgrade.

According to a study done by electronic CRM-solution provider KANA in June 2002, about 61% of customer service communication with high-tech companies is conducted either online or via e-mail. Another 27% is conducted through other communication channels including the

internet (self-service or online chat), e-mail and the telephone. The survey covered 100 high-tech industry customers.[10]

Figure 1-4 Survey results on the preferred communication channels for customers.–[10]

Preferred Form of Customer Service Communication among Customers of the High-Tech Industry Worldwide, June 2002 (as a % of respondents)

E-Mail 21%

Online chat 2%

Telephone 4%

Web self-service 17%

Combination 56%
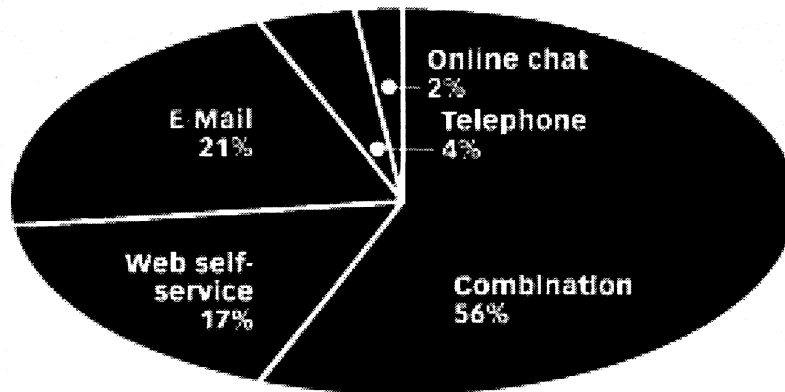
Note: n=100
Source: KANA, August 2002

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The emergence of the Networked based call centre

An important development within the call centre market is the rise of the network based contact centre. A business that will utilize the network based call centre service is not required to house special call centre equipment or applications. They will be located at the location of the provider. Telecom companies are the major providers of this type of call centre services.[11]

The call centre service provided by Telecom companies is growing rapidly. By 2005 call centre services will generate more than $3.5 billion in annual revenues for telecoms service providers. About 1 quarter of the call centre agents worldwide will start using some type of network-based call centre service, and about half of these agents will use network-based services as their major call distribution mechanism.[11].

Networked based call centre added a lot of flexibility for companies as they introduced the concept of virtual agent. An agent that can work from any where can work from the comfort of their home. Figure 1-5 illustrates the difference between a traditional call centre facility and a networked based one provided by telecom provider. It also shows how it is possible to have a virtual agent.

Figure 1-5 Traditional Call centre versus network based one [11]
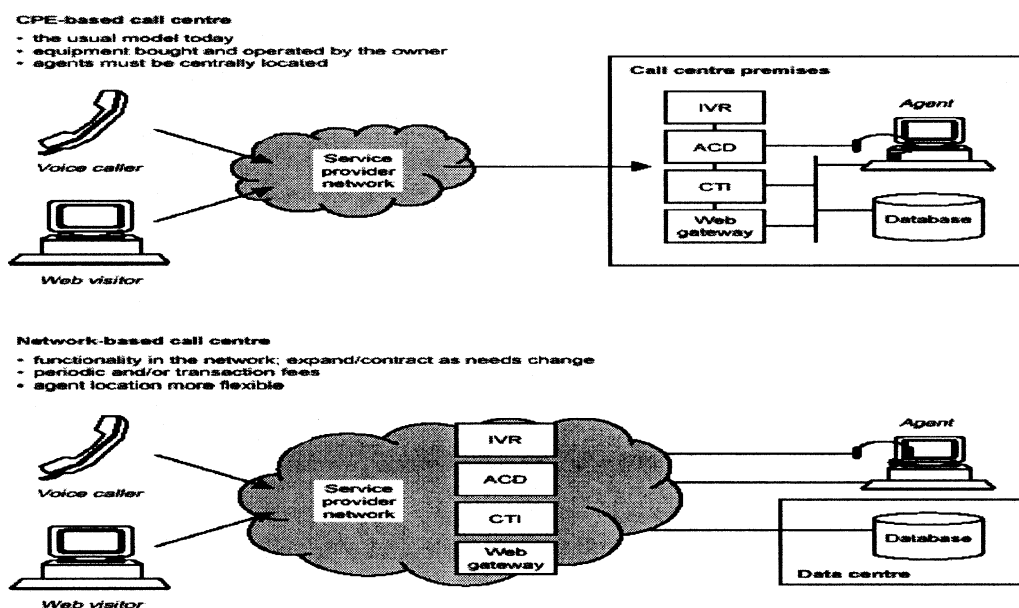
Contact Centre Systems

A contact centre system is a combination of software as well as hardware technology. The software part is a set of applications that integrate with a dedicated telephony network system as well as the company databases and other applications. The main idea of such a system is to handle customer interaction in the most efficient and effective manner and in multiple media format.[12]

Figure 1-6 Functional Diagram of a contact centre [12]
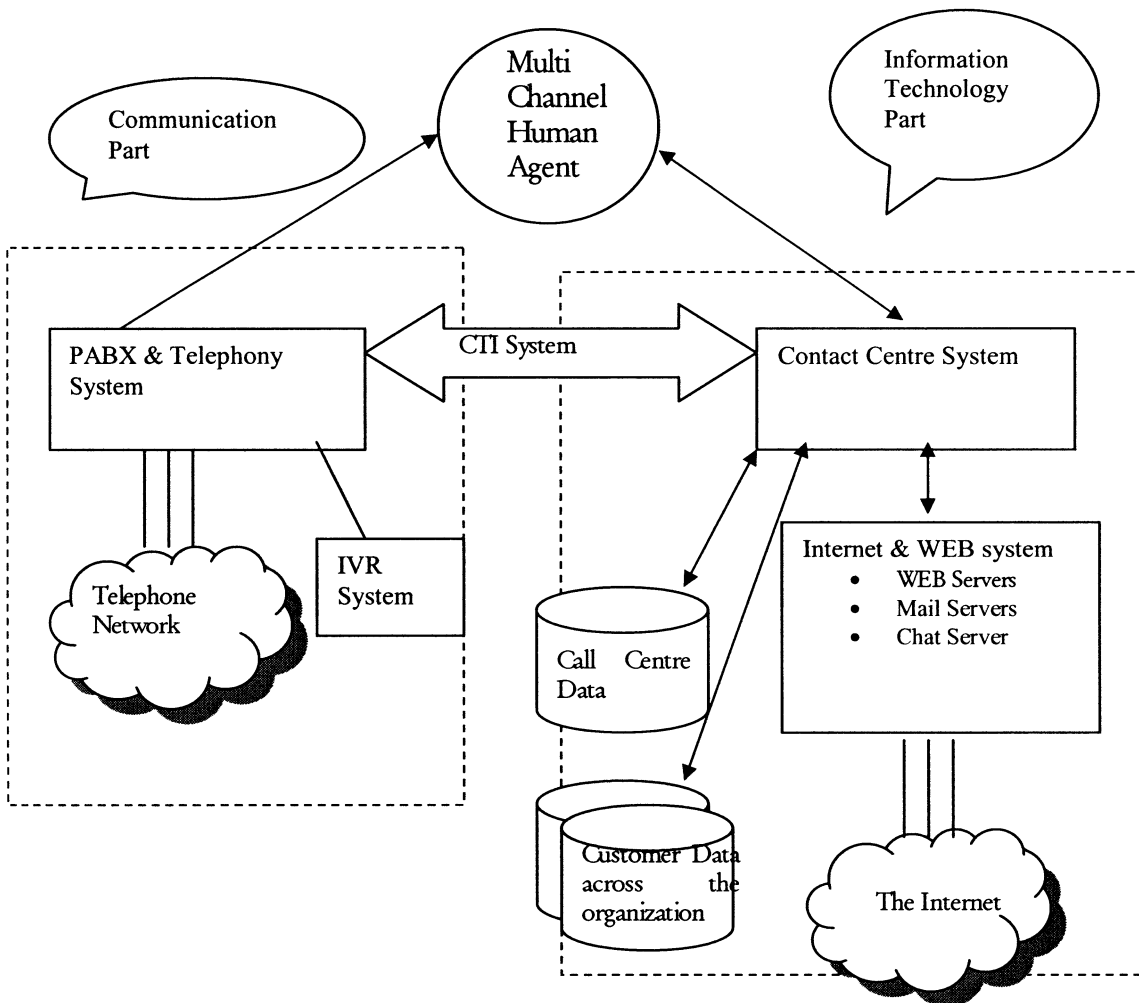
Figure 1-6 shows the main elements of a contact centre. The Information Technology (IT) part is equally important to the communication (telephony part). Both parts need to operate together along with the Internet to facilitate the job of the human agent.[12]

The term "Agent " refers to the dedicated trained personnel who utilize the agent workstation in order to process customers interaction. Most of the technology in the call centre is dedicated towards enhancing the overall facilities available for the agent. Such an enhancement would be available by providing the agent with a complete view of the customer data.

The view will be generated from the different applications used around the company. Ideally, the agent would be able to handle multiple channel contacts from a centralized workstation. The agent will be able to answer telephone calls, emails, faxes as well as Web chats. The agent should have an access to detailed knowledge about the customer.

It would be useful to recommend at this point that such a powerful agent is the secret behind a successful client relationship strategy. Building the most efficient contact centre that will facilitate this agent is a challenging process. I will be exploring, at a later stage, the technology behind contact centres.

Contact Centre and the customer's life cycle:

Services offered within a contact centre usually cover the different stages of the customer's life cycle.

1. Telemarketing campaigns as well as email and web based campaigns help in searching and finding the right client.

2. Telesales and Internet based transactions help in performing the sales transaction.

3. A wide range of customer services which offers help on how to use the product or service as well as accounts inquiry and warrant related services. Such services help in retaining the customer.

4. Cross selling and up-selling are two powerful services offered by the Customer Service towards enhancing the overall relationship with customers. Using existing customer data in finding about new customer requirement then offering the right product for the right customer at the right time and through the right channel will absolutely enhance the relationship with the customer.

The Multi Channel Agent Requirements

In order for the agent to properly process customer interactions, the following items must be available as part of the contact agent's software:[12]

- Add the details of a new customer.

- Be able to retrieve the customer full record using different references such as the name and account. Integrated customer databases should hold customers' data even if customers have transactions from different systems.

- Locate the right product or service and retrieve the details of such a service. This requires an access to all databases across the organization, which contains customer's as well as product's data. The same data will also be integrated across the organization and the contact centre.

- Enter the customer's requirements clearly and precisely into a properly designed form.

- Be able to set automatic notification for different events. For example the agents could use the software to setup an alarm if the customer failed to call back.

Web Portals

Throughout my study for CRM systems and as the technology has developed to achieve better customer contacts, I realized that portals form an effective tool that links all parties involved within the business. An exciting government initiative with the portal industry can be found in [13]

An internet portal is a well planned web site that provides a common point of entry into an array of structured web contents.[13]. Knowledge and information within portals are classified by the portal designer and content administrators. The classified contents are then offered for the different customer segments as needed.

Process portals are portals that support the overall customer process. Pharma, Inc. a leader in the pharmaceutical industry integrated very well the different function of the CRM process into a well designed and structured health care portal [14]. The portal manages to integrate the following business interactions within all parties of the healthcare industry:

- Exchange of medical transactions by doctors with pharmacies, laboratories, other doctors and insurance companies.

- Exchange of administrative information among doctors, hospitals and manufacturers. This will mainly process orders and invoices

- Exchange of financial information between doctors' hospitals and insurance companies.

It is obvious that such a portal manages to aggregate all relevant customer information within a single meeting place. Although it manages different parties, it personalizes the entry and the knowledge available as per the customer requirements. All in all such a portal becomes a huge knowledge base that is designed to serve all members of the health care industry

Figure 1-7 The interaction between CRM and portals – reproduced from [14]
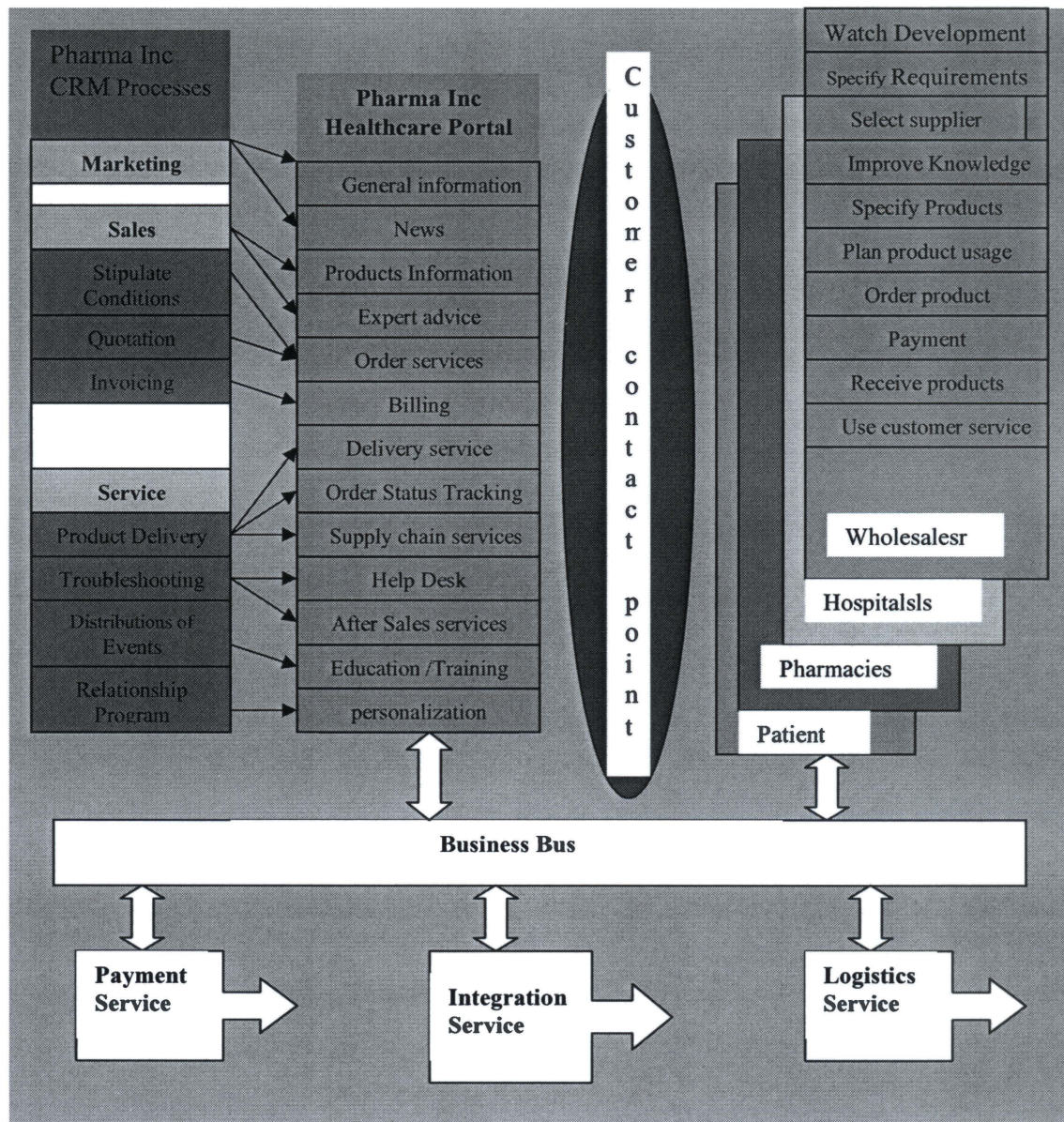
Web Enabled Call/Contact centres versus Web Portals

It is important at this stage to observe the similarities and differences between the two CRM contact methodologies. A basic Web portal offers a personalized access to a suitable range of information for a specific purpose [15]. Other types of portals include Intranet portals, public web portals and knowledge portals. A more specific type of portals has been also introduced by Ovum "Workspace Portals". Such portals typically address the following:

1. Proper integration between the necessary functionality areas.

2. Flexibility in the form of personalized information for the end user

3. More structured and organized graphical user interface

The following functionalities are usually supported by web portals to serve their purposes:[15]

- Access to static as well as dynamic contents

- Access to applications

- Search and navigation

- Information and application integration.

- Personalization

- Task management and workflow

- Collaboration and groupware

- Information distribution and "push" technology

- Portal infrastructure functionality.(Security, Manageability, Availability and scalability)

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On the other hand, a Web Enabled Call Centre is a new trend driven by the internet. Businesses extend the value of their call centres by integrating them with the web. This is done using a gateway that allows the web site visitors to interact with the call centre human agents. [11] Voice over IP is the heart of such interaction within the multimedia contact centre.

Through web enabled contact centres, human agents can provide the following services:

- E-mail response

- Real time web chat

- Web Call Back request (Voice and video over IP)

- Co-Browsing

Human agents still play a major role within web enabled contact centres. The technology has been developed to enhance the work of human agent and to facilitate a lot of information about the customer before he/she is connected to the agent.

Statistics show that a large number of online shoppers abandon their shopping cart before completing their online purchase transactions because they have additional questions and the web site lacks real time customer service (The ability to speak to a human agent for clarification).

The following findings of a US survey conducted during January 2001 by Critical Research on E-Business [16], reveal a clear indication of the importance of the human agent:

- 93% of e-business buyers commonly run into problems while trying to conduct a business transaction online.

- 95% of e-business buyers abandoned websites during transactions.

- 85% of e-business buyers had problems basically signing up for a service online

- Only 36% of e-business buyers had their problems solved online in a reasonable manner.

- And the most important fact was that online assistance (e-mail, telephone or chat/instant messaging) was helpful for less than 35% of businesses.

Technology within the Web enabled call centres will never eliminate the role of the human agent. Instead, the human agent will be getting the right knowledge about the customer surfing experience across the site. Using such technology will allow the agent to get the last page the customer has visited and may be push any specific pages to the customer. This should help in quickly answering the customer inquiry and may lead to possible cross or up-sell opportunity for an extended warranty on the item.

An online shopper who is confused about warranty issues will not complete the online order process unless he/she has a chance request to speak to a customer services operator while he is surfing the site. (Interpath voice buttons).

Voice over IP and Interactive Voice Response are the two main technologies that could help in reducing the percentage of human agent involvement with customer transactions. Natural speech recognition techniques are also taking place to maximize the number of possible transactions that can be completed without the intervention of a human agent. Transferring money between your bank accounts is one form of transactions that can be completed in this way. Not to forget that Interactive Voice Response allows transactions to be completed with minimal cost compared to the human agent cost.

Figure 1-8 Integrated Web Enabled Multimedia Contact System [11]
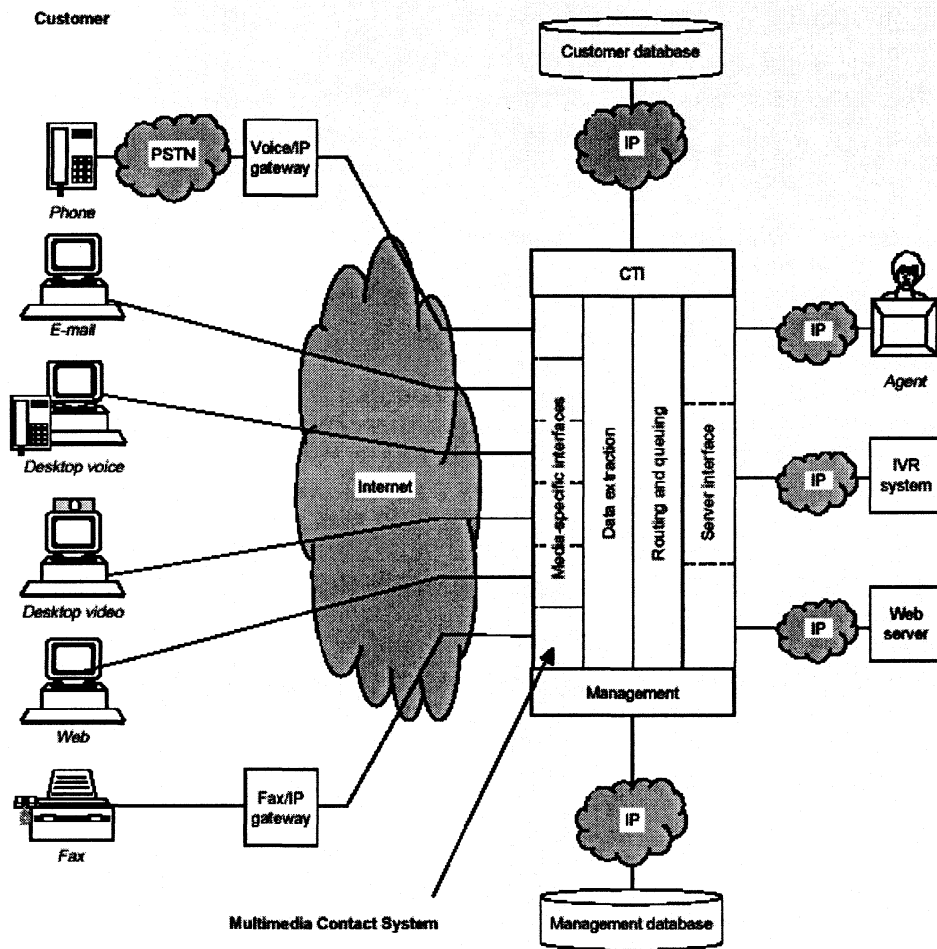
Table 1- 1 Web portals versus Web enabled call centres

	Web Enabled Contact Centres	Web Portals
Evolution & Definition	• Direct impact of the internet. Emerged to empower the human agent and not to replace them. . • Uses a gateway to allow website visitors to interact with call centre agents through voice calls, text chat, e-mail, 'show and tell' (data collaboration) or video.	• From search engine & as demands are increasing on web sites to retrieve information web portals emerge. A basic Web portal offers common entry point with a personalized access to a structured range of information that serves a specific purpose [15]. • Other types of portals include Intranet portals, public web portals and knowledge portals.
Functionality & Services Provided	The normal human agent day to day services, in addition to the following : • E-mail response • Real time web chat • Web Call Back request (Voice and video over IP) • Co-Browsing	Access to static as well as dynamic contents Access to applications Search and navigation Information and application integration. Personalization Task management and workflow Collaboration and groupware Information distribution and "push" technology Portal infrastructure Functionality.(Security, Manageability, Availability and scalability)

	Web Enabled Contact Centres	Web Portals
Technology Impact	• Voice over IP and networks are the main technology driver behind this type of Web centres. For a more detailed descriptions of the technologies within the contact centre, please refer to the previous sections in the chapter • Computer Telephony Integration (CTI) including Automatic Call Distribution (ACD) and Interactive Voice Response - IVR • Middleware and database connectivity tools • Natural Speech Recognition • Scripting tools for the automated processing	• Metadata structure design, selection & integration • Middleware management and integration tools. • XML • Ecommerce software tools

THE DIFFERENT TYPES OF CRM RELATIONSHIPS

The eBusiness Stakeholder Model

Different business strategies and procedures enforce different type of relationships within the CRM system. Professional services firms, for example, have to maintain different set of customer relations not similar to businesses in the communication industry. Even government nowadays is operating with a customer focused approach and they do maintain certain type of relations within their customer contacts.

Before progressing well into the different type of relationships , I would like to discuss an exciting e-Business model presented by [17]. The model is well illustrated in figure 2-1.

Figure 2-1 Jutla's e-Business Stakeholder model [18]
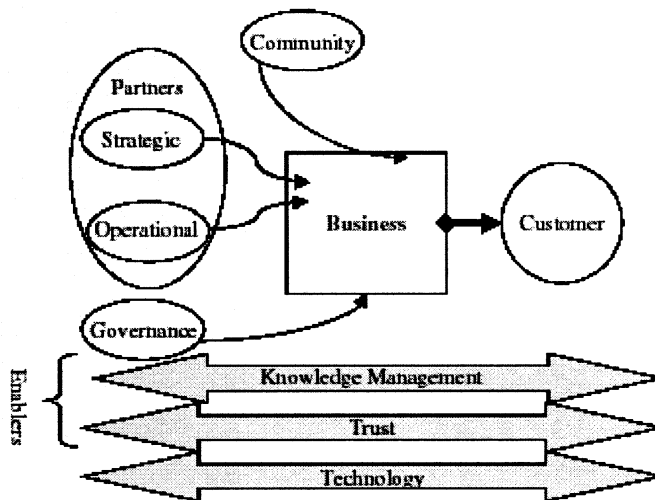
We can notice from the model it is designed with the customer in mind. The two main elements of interest to me within this research are:

1. Identification of the internal/external stockholder's categories. Stakeholders are the partners involved in the relationship. Each category added an extra value to the

customer. Community, governance, customer and partners are considered the external stake holders. Additionally, the model identifies the company's employees as internal stakeholders. I think the presented categories are generic and should accommodate any type of process that involves the customer.

2. The other important factor is identifying the enablers for the process. Knowledge, trust and technology are the main enablers of any CRM process. It is amazing how Korner identifies in [19] the technology impact on the financial service industry, and how technology is enabling new efficient methods for managing the relationship with customers.

Figure 2-2 Relationship between technology and CRM [19]
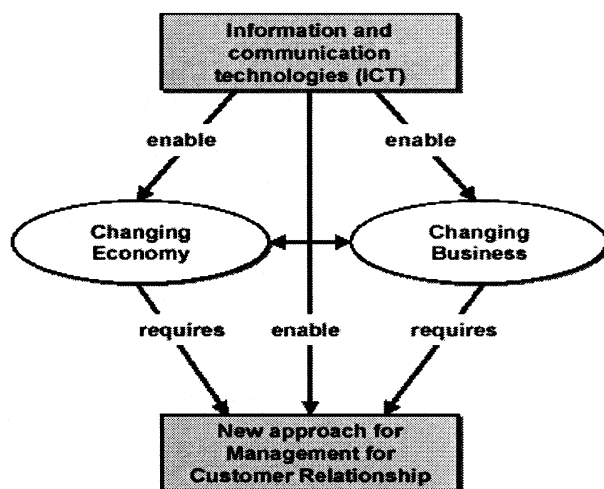
In fact the overall CRM process is about capturing the right knowledge about the customer, analyzing it in the right context then using it to add value to the overall relationship with the customer.

Knowledge transfer is a key feature particularly within the professional services industry. Customers demand knowledge to be part of the end product or service. Businesses are required to think of innovative methods to share the right knowledge with the customer, and to keep the customer better informed and educated about what they receive.

It is important to stress here that sharing knowledge with clients aims to achieve a better educated customer, which will lead at the end for a new business opportunity? This is considered as an important strategic goal for the whole CRM process.

In the coming few sections, I will shed the light on the different types of relationship within different industries. I will cover the professional services, communication, the financial services, the government role, retail and the business to business interaction

The Financial Services Industry

A good example about the importance of CRM within the financial services sector is the story of an 80 years old woman.[5] Although she had had a 50 year relationship with her bank in Florida, USA, She received a warning letter from that bank. The letter warned her to maintain a minimum balance in her account or she would be charged with the minimum monthly charges of $25.

The letter might be part of a mass mailing campaign to inform the bank's customers of their new minimum account policy. However, the bank mailed the letter without any considerations of the following pieces of information about the customer's son:

- He had two accounts with the same bank valued at more than $100,000

- He pays most of his mother bills each month.

- He was a good credit card holder with the same financial institutions.

- The last interesting piece of information was that he intentionally kept his mother's account to a minimum to prevent her from writing cash checque.

We could see clearly from this story the impact of missing every single piece of information about the customer! It simply could ruin the entire relationship with the customer.

Maintaining the right knowledge about customer does not only apply to the financial services industry. A special emphasis would be put on maintaining every possible piece of information about the customer in order to maintain a longer profitable relation.

Figure 2-3 Maintain the right knowledge will guarantee a better relation with the customer
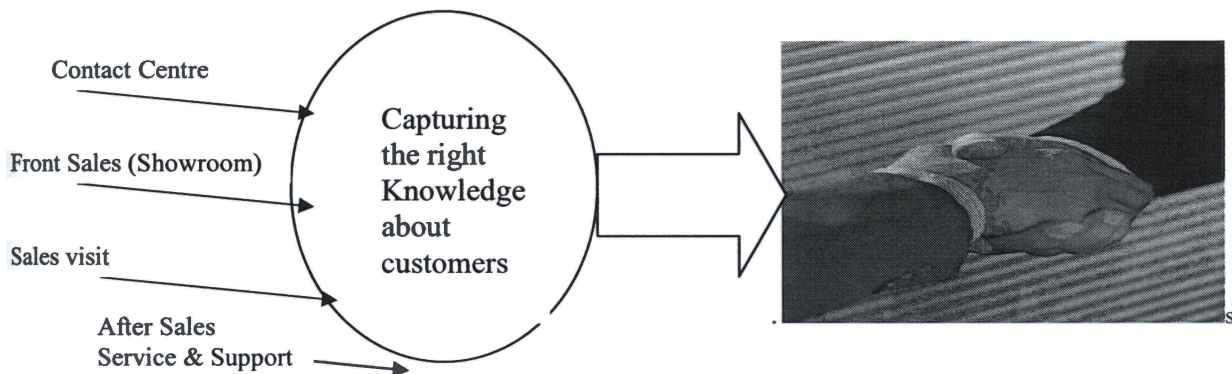
Nevertheless, the question that remains to be answered is how to capture and maintain the right knowledge. In the previous scenario the bank had to capture knowledge related not only to the customer, but to her son as well. The bank knowledge needed to be captured not only from one branch, but from several branches, also from several business units within the bank such as the credit card units.

The key to the process of capturing knowledge and the efficient client relationship management system is to model the business process then identify major CRM enablers within the proposed model. A specific model for CRM in financial industry are presented by Koerner in [19]

The model presented by Koerner (*named as the MCR-Mode, Management of Customer Relationship*) is designed for the management of customer relationship in the generic business media. As I do realize the importance of such model within the financial services industry, I will go deeper into details of the model within the coming few pages.

The below categories or building blocks, as they are named within the model, are presented.

1. **Customer Interaction:** I would like to stress the importance of not only capturing knowledge but sharing such knowledge with the customer. This would ensure that the customer is educated about his financial needs? As an example of this is the process of collecting all possible transactions performed by the client, then presenting and sharing

such information as knowledge. The client would then access this useful knowledge and be able to identify his financial needs.[19]

The above example illustrates a customer interaction which adds real value to the customer experience with the banks. We can also tell that the contents of the interaction should be personalized to meet his/her requirements.

2. **Added value for the customer:** The above interaction with the customer should not only present a list of transaction that the customer performed with the client. However, it should indicate possible added value solutions that are built around the customer's history. So the challenge here is not only to capture the transactions and transfer them into a presentable knowledge? It is also to analyze the customer behavior and link this to a potential product or service that the bank could offer.

What is usually involved in this proposed product or service is the bank knowledge of what particular product benefit the customer? It doesn't only present a solution, it indeed represents the bank financial knowledge mixed with the banks knowledge about that particular for that particular which is shared.[19]

3. **Customer Profiling:** To target the right customer at the right time with the right message, the business needs to be aware of every possible piece of information about the customer. This requires the banks to maintain all possible transactions about the clients and from the different business units across the bank. Banks need what is called as Data Warehouse in order to be able to maintain these huge transactions into one location. And then need data mining techniques and procedure capable of profiling the customers according to certain criteria.[19]

4. **Trust:** is an important element that must be addressed specially in the financial services industry. Customers use new Medias for transactions like the internet and they need to feel secure within. Clear privacy and communication policy need to be identified. From the other end, the appropriate secured networking protocol should be used on the bank web site so that it does secure the data.

In the case of using a data ware house to collect the data within the financial institute, the bank is required to create the proper procedures to control the privacy of such transactions. If the data goes missing it will negatively impact the customer trust within the institute.[19]

5. **Virtual Communities**: The arrangement of virtual communities with common interest is considered very effective in the financial services industry. Knowledge about the community members and what interest them can not only improve the level of interaction between the community members, it can also create a better relation with the customer, especially when there is a clear incorporation of the contents provided, and the communication tools used within such communities.[19]

6. **Processes**: Financial institutes need to work on the integration of all their business processes taking into account the customer as the core. Integration should happen between the customer facing processes and the internal ones. I will not be discussing this point any further as I will be building my coming few chapters on how to design CRM processes[19]

7. **Controlling**: refers to the process of evaluating the customer's value. Financial institutes need to be able to identify the profitable customers form the overall pool customers. Today CRM processes are complex and expensive and need to guarantee a return on investment for the business. In fact, control could refer to the value measure of all the above six points listed in the model. Clear measuring criteria need to be set so that a business could judge how well they are performing within each block of the model. [19]

The above model seems to be a comprehensive model to implement a better CRM process within the financial services industry. However, I think the financial institute customer strategy has to influence such a model. What does the bank want to achieve through CRM? What objectives they want to accomplish by embedding these blocks? The answer to such questions would influence applying some of the blocks or criteria above the others. Therefore the controlling block would help in reviewing where the

bank stands in their CRM strategy. Within the next chapter I will be exploring this further and I will present my design methodology.

An attractive implementation for one of the proposed building blocks is presented in [20]. Within this model Kundisch is discussing how banks and financial institutions can deliver personalized products and solutions to their customer. This should involve modeling not only the customer (Customer model) but also modeling the products and services (Content model) that the bank has. Delivering then the right product for the right customer at the right time would involve a match between the customer and content model. Figure 2-4 illustrates the framework of such a model

Figure 2-4 modeling the customer and content in order to deliver the right product on the right time and via the right channel [20]
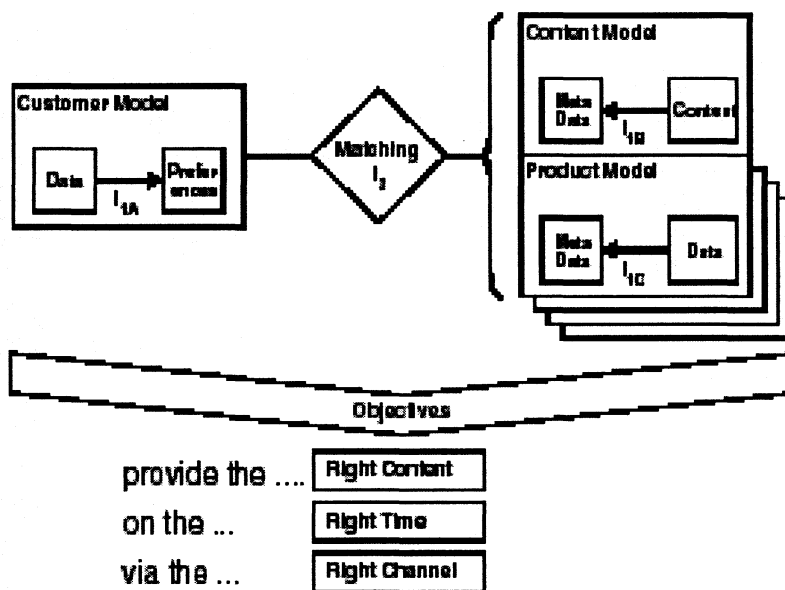
Banks and financial services firms are now challenged with the task of delivering a one to one products and services to their customers with minimum costs[21]. Personal services similar to the one the customer used to get through his one to one relationship with the bank or branch manager.

The concern of driving the cost down is about offering the right product to the right profitable customer. This will bring the knowledge based process of measuring the customer value to the front. The next factor to be considered for reducing cost is the delivery channel. Banks encourage their customers to use channels with less cost. The table below in Figure 2-5 from [21] illustrates the different bank transaction costs.

Figure 2-5 Cost per transaction (In US$) via the most common channels used by banks and financial institutes nowadays [21]

Financial industry channel	Cost per transaction
Branch platform*	$5.30
Email reply	$4.78
Call center	$2.12
Branch teller	$1.56
Voice-response unit	$0.32
ATM	$0.26
Internet	$0.09
*With a full-service representative behind desk Source: IBM Consulting Group	

Professional Services Industry:

Business processes within this industry are people based, complex and are made on an ad hoc basis.[22]. Businesses within this industry usually offer consulting solutions to their customers. They could deliver such solutions to their clients without any involvements in the customer education.

The new customer trends though indicate that customers are hungry for knowing how and what solution will be implemented at their sites. Firms within this area are mainly involved in making their clients more knowledgeable.

Knowledge based solutions are not an option within this industry as it is an integrated part of what they will offer. Professional services firms such as Anderson Consulting, Ernst & Young and Deoitte & Touch Consulting group are very well known because of their usage of

professional knowledge management software. Such software will have storage area to store lessons learned from the implementation of projects as well as the project standard[23]

One of Ernst & Young four value principles is "Knowledge rich" quoted from within their 1998 annual report. The following extract from the second page of the report confirms what has been discussed at the beginning of this chapter about the importance of capturing knowledge.[22]

"Ideas, insight and best practice are key elements in helping our clients gain competitive advantage. Our aim is to fully capture all the expertise and experiences of our people and combine these qualities with extensive external data together with our own significant global research. We then share the resulting knowledge throughout our organization in order to make a real difference to our clients' success."

Dawson in his book "Developing Knowledge Based CRM" views knowledge and relationship as two processes that lead to each others. A professional services firms' ability to generate knowledge internally via the solutions provided will add value to their clients and it will naturally create and enhance the firms' relationship with their clients [24].

Tacit, Explicit Knowledge Conversion

Tacit Knowledge is the knowledge that individuals do gain through their long work experience within an organization and is usually difficult to convey to others[25]. Explicit knowledge on the other hand, is the knowledge that can be easily documented, shared and communicated with others.

Most of the knowledge developed within an organization is of the first type. However, lots of work has been done towards the formation and development of knowledge. Nonaka and Takeuchi developed a model of knowledge conversion through shared interaction between tacit and explicit knowledge.[26] The model suggests that the outcome of the interaction between *tacit* and *explicit* knowledge is four different models of knowledge conversion as per figure 2-5. Socialization refers to the process of transferring the tacit knowledge of individuals to another individual perhaps through different levels of communication.

Externalization refers to the ability to convey the tacit knowledge which is ambiguous to a readable and documented format. A format that is easy to access and read. On the other hand, Internalization refers to the process of converting the explicit clear readable knowledge into a tacit personal knowledge. Combination refers to the process of converting explicit knowledge into other forms

Figure 2-6 The 4 models of knowledge conversion [26]

	Tacit Knowledge	Explicit Knowledge
Tacit Knowledge	*Socialization*	*Externalization*
Explicit Knowledge	*Internalization*	*Combination*

Dawson presents a modified version of the above model in which he redefines the tacit and explicit knowledge.[24]. As tacit knowledge is central to individuals, it grants them the ability to act efficiently; it is renamed in the model as Knowledge only.

Individuals on the other hand who will have access to explicit knowledge only will have limited ability to act efficiently. Therefore, explicit knowledge has been renamed as information.

Within the Dawson proposed model externalization is the process of converting individual's knowledge into information (document or structured business processes). However, this information will not be converted into knowledge until other individual's experienced such information (Internalization) become part of their centre knowledge. Socialization is when a person becomes skilled with the knowledge of another person through direct interaction and without capturing this knowledge into any format. It is the most efficient and effective form of knowledge transfer, however, it is not usually easy to implement within an organization.

Figure 2-7 Dawson Knowledge management cycle [24]
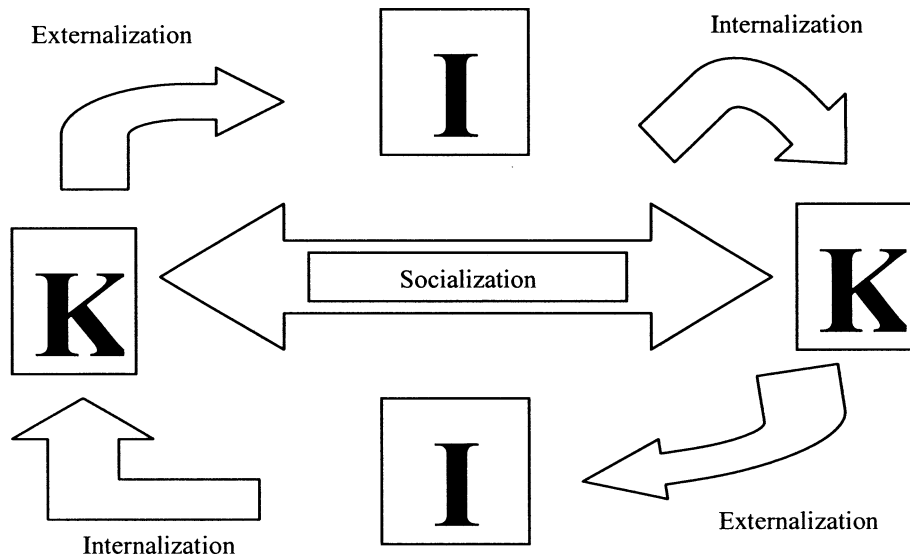
The main business of professional services firms is to transfer or to help in transferring information into knowledge. They do also add value to information which makes it of use to their clients. What differentiates this type of business is the process of transferring and sharing knowledge with their customers. This process requires maintaining a close and special relation with the customer. Modeling the client relationship within this knowledge sharing business is an important element of this study. I will be analyzing over the next few pages some of the models presented by Dawson.

Knowledge Relationship Roles

Before introducing Dawson's models it is worth discussing the specific knowledge relationship roles that it will be used within his models. An individual can play a single or multiple roles, depends on the size of the organization. The following will summarize the proposed roles.

The existence of these roles is not only limited to the provider at the professional services firm. Similar roles must exist at the customer site, in particular the role of the senior representative.

The roles detailed below are performed by both the senior and junior staff at the professional services firm. Senior staff needs to attend some critical roles; however, this shouldn't restrict

the overall roles of relationship with the clients to senior staff. Junior staff needs to be given the opportunity as part of the overall knowledge transfer process within the firm.

The table below (Table 2-1) details the different knowledge roles that could exist in a knowledge based relationship model:

Table 2-1 The different knowledge roles that could exist in a knowledge based client relationship model.

Role	Description	Function & Responsibilities
Senior Representative (SR)	Face the top-level contacts at the customer site. This role is important in shaping the relationship with the client (especially when it is required to reach the senior management at the client site) not in the knowledge transfer stage.	Establish trustworthy relation with the customer at the customer acquisition phase. As well as at any crucial stages of the project.
Relationship Coordinator (RC)	The person plays a critical role within the relationship model with the client. The person who plays this role needs to be familiar with all the available resources at the professional services firm and have the influence to access them when required. He also needs to have the right knowledge and background about the customer, people and business process.	• Coordinate the different knowledge resources of the professional service firms to carry out the particular outcomes of the client and the project. • Provide the customer with efficient, effective and on time access to the required resources within the firm.

Table 2-1 The different knowledge roles that could exist in a knowledge based client relationship model.

Role	Description	Function & Responsibilities
Knowledge Specialist (KS)	Knowledge Specialist forms the foundation of knowledge and skills within the professional service firms. They don't usually have the right skills to communicate and coordinate knowledge with the customer.	• Design professional solutions based on their knowledge and skills. • Work and communicate with their peers to deliver the end solution to the customer
Knowledge Customizer (KC)	Usually taken by a senior member at the professional service firm, who acts as a filter for the huge amount of information and knowledge produced? He will then present the categorized and relevant information to the customer	• Customize information and knowledge in a way that suits the customer requirements. • Communicate that customized knowledge effectively with the relevant people at the client site.

Dawson's Relationship Models

Based on the above defined roles and how they relate to each other, the following more precise models of relationship could be defined.

- *The Diamond or Mirror Model:* The model assumes a similar organization structure between the service provider and their clients. And the same roles do exist at both sides, Figure 2-7. The model suggests that similar structure and knowledge base will speed up the knowledge transfer process. The frequent and consistent contacts illustrated in the model will help in building a far better stronger relationship with clients.

Figure 2-8 The diamond or mirror model of relationship [24]

SR – Senior Representative
RC – Relationship
Coordinator
KS – Knowledge Specialist
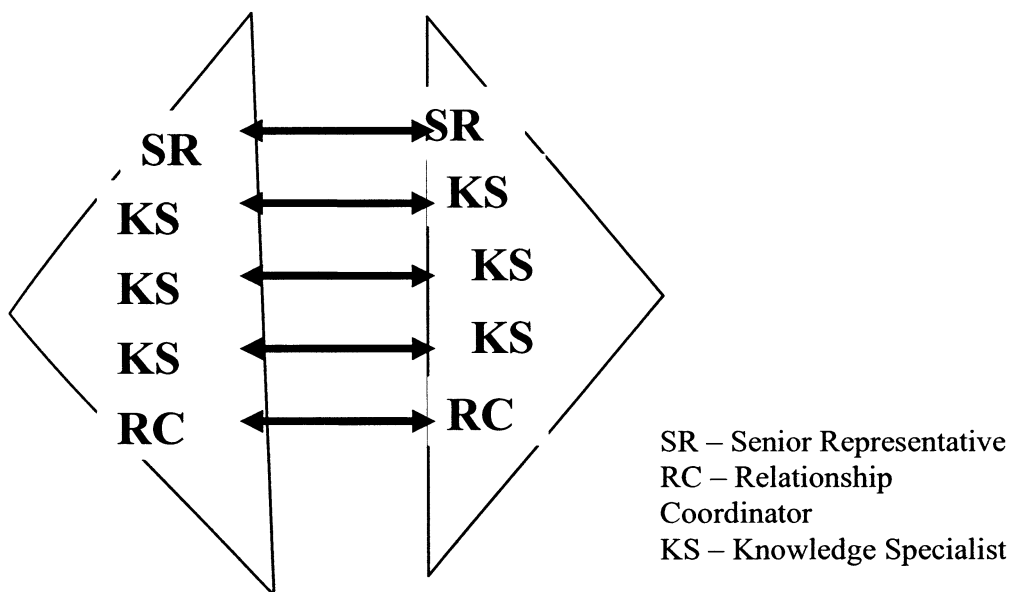
- *The Guru Model:* In this model, one person "The Guru" will play all the critical client contacts roles. Usually a s senior staff member will be able to handle this role where he/she will get proper support from junior staff within the company, figure 2-8

Figure 2-9 The guru model of relationship management [24]
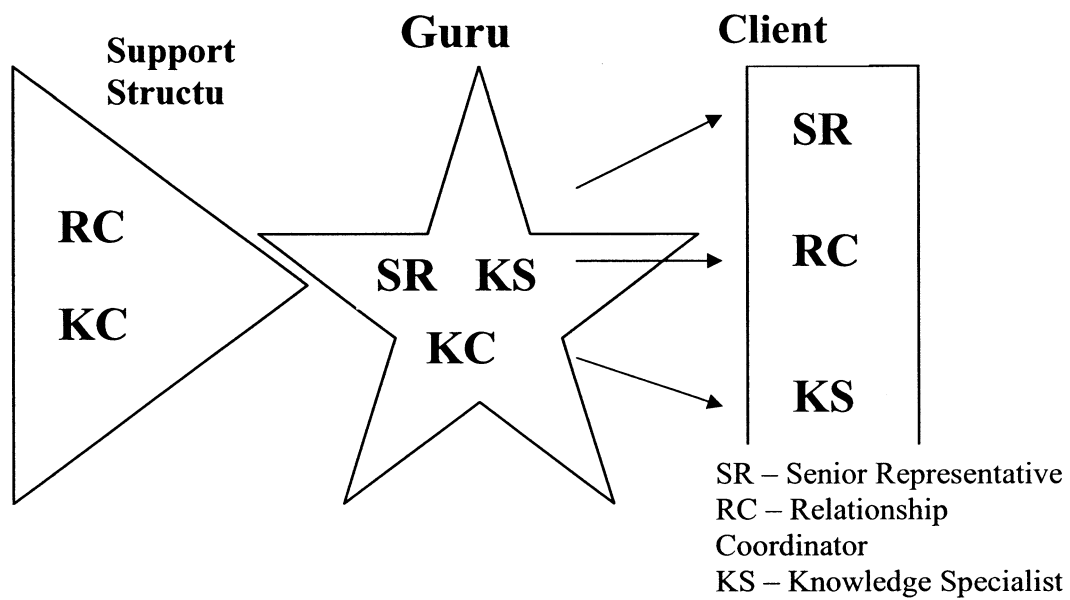
- *The Portfolio Sales Model:* As the name implies, this model is mostly used by portfolio managers within investment banks. Figure 2-9. The relationship coordinator role is so important especially with the new trends of coordinating the move of a large range of experts who are responsible for a specific task within the client organization.

Notice also the role and function of the sales person within the model. Sales people do customize the generic knowledge generated by the analyst to make sure that such knowledge, when applied, it will add real value to their customers.

Figure 2- 10 The portfolio sales model of relationship management [24]

Professional Service Firm   Client (Portfolio Manager)
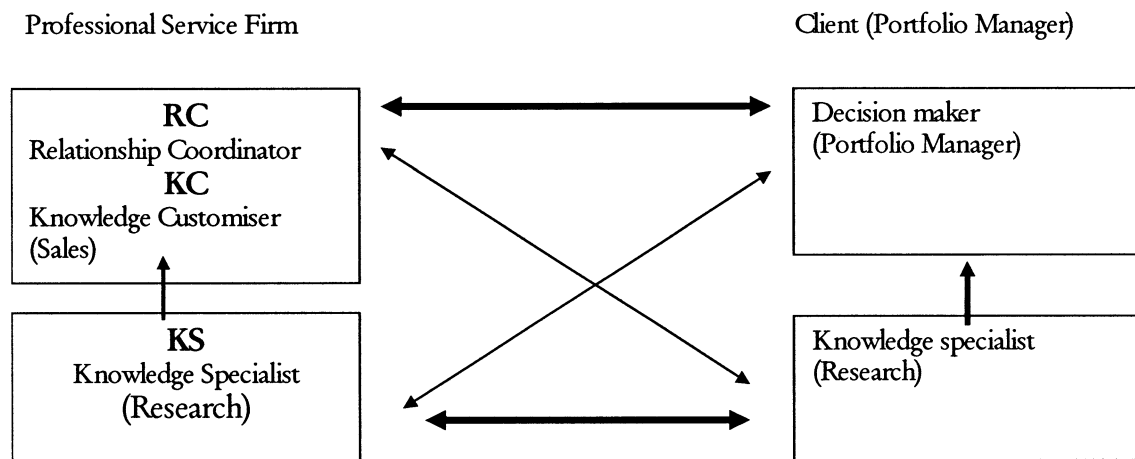
The above models are not the only available models available within this industry. As stated earlier within this dynamic industry, proper models can be designed as the need arises. The main concern that needs to be addressed during the design and creation of new model is the knowledge roles of both parties. The client side and the service provider side as shown in the table below. Clear responsibilities of each role and definition of interactivity is also important for the relation and the development and sharing of knowledge.

Table 2-2 Summary of Dawson's proposed models for the professional service firms

Diamond (Mirror Model)	Mirroring similar roles at both the client side as well as the service provider. One to one relation ship between the different roles.
Guru model	One person (The guru) will play the different roles required at the client side. Support structure mechanism will be available to help the guru in his role.
Portfolio Sales Model	Where the sales person is playing and matching different roles with the client, the knowledge specialist is acting as a researcher.

The Telecom industry

For better illustrations, I start my discussion about this industry with a story of a customer of US Telecom giant AT&T[27]. The customer was targeted to sign in for what is called AT&T Personal Network – "One rate, one bill and one number for customer care". The following is an extract from the story:

> "I signed up for six relationships with AT&T—long distance, wireless, calling card, credit card, cable TV and cable modem. Things seemed to go well until I had a billing problem with my wireless service. The "one number" that I called put me in a queue. Then I was transferred to another queue—for wireless customers. It would have been faster to call the wireless customer-care number directly. I got my billing problem resolved, resulting in a large credit balance in my wireless account that was reflected in my next bill. But a month later, a collection agency called, claiming that my long-distance account was delinquent. "But AT&T owes me money," I protested. "We don't know about that, sir. Your long-distance account is overdue," I was told curtly. So much for "one number, one bill." Now I use four different vendors—SBC Communications for local calls, MCI for long distance, AT&T for cable TV and modem, and Verizon Wireless for wireless calls. Meanwhile, A&T has quietly dropped the Personal Network service"

The above story is an inside indication of what is happening within this industry. Telecom industry is mainly operating in a saturated market with tough competition and high churn rate. Such challenges within the operating environment involve a proper integration of CRM processes and strategies.

Telecom Industry Market Drivers:

The World wide Telecom market is driven by the following market drivers: [16]

- Increased customer expectations.

- Deregulations laws are pushing for distinguished range of products and services that will fill up the gap in the market. Consolidation of the companies in the carrier market is a result of deregulation.

- Convergence of both the area of telecommunications and computing is also driving companies for market expansions to be able to offer competitive bundled services. 3G or the third generation mobile computing is a good example of this convergence, as mobile operators offer additional transaction based service like mobile banking.

- Technology advance represents another challenge which drives Telecom companies into upgrading their infrastructure and offer the latest services (like digital cable services)

- The continuous demand for bandwidth represents another challenge to meet the growth of both internal and external internet traffic. Bandwidth is also being treated as a commodity now between the carrier and service providers.

CRM will be a critical application for telecom companies not only because of the above drivers. Moreover, the telecom industry will be in control of the growth of the wireless and wired internet infrastructure. Such an infrastructure will drive a powerful efficient and proactive CRM strategy that can reach the customer in various channels.[28]

Telecom industry operational challenges:

The following business and operational challenges are common within the telecom industry and they usually need to be addressed by any operational CRM strategy [16]

Companies within the telecom industry are usually characterized by large volumes. Not only they do have a huge customer base, but they do also have a huge number of transactions. This

results in numerous customer databases that will only be treated and stored in data warehouses. The challenges are as follows:

- Complex, old and large legacy front-end, as well as back-end systems that are not adapting to the new business challenges and resulting in an inefficient business operation. A good example of this topic would be the WilTel story [29]. WilTel Communications is based in Tulsa, Oklahoma which offers a selection of network and broadband media services to businesses with powerful bandwidth requirements. The company customer base includes local telephone companies, international telephone carrier, wireless companies and major internet service providers. Recently they have implemented a CRM solution based on Siebel. One of the exciting comments of the Project Manager on this project was *"We were in a situation where we had to keep tweaking our systems just to get them to work. And with customers requesting faster and faster service dates, we could no longer tolerate the fact that it sometimes took 8 to 12 hours just to enter an order. We had to improve our processes to get things done in minutes, rather than days"*

- The business model within most of the telecom companies is product centric instead of being customer centric. As per the head of business intelligence for Sybase – Sean Kelly [28] he commented "Telecom companies have to radically transform their business culture in order to fully exploit the CRM technology. What this means is the transformation of a product-centered culture to a customer-centered culture". This stresses out the importance of the business model in CRM systems

- Ineffective customer interactions are leading to a loss of lots of cross-sell/up-sell opportunities at all the levels of the customer interaction points. This ineffective interaction is a result of offering various products and services across different business units, departments and may be companies within the main company. The final outcome is they will not be able to know how much business the customer does with the company.

47

- The inability to measure the value of their customers. This results in unplanned spending of resources on unvalued customers and the inability of the company to keep track of their different channels and outlets.

- Inefficient and expensive customer acquisition process coupled with the more serious problems of customer churn. It costs US$250 to acquire a customer in mass markets where the churn percentage varies from six per cent right up to 30 percent.[16]

Some Important lessons for CRM within the Telecom industry

The following lessons are listed in [30] and they are of good value for any CRM implementation within the Telecom industry:

1. Use all possible data, integrate it and create a single view about the customer. At this stage it is important for the company to understand that the customer might have different relationships with the company. This should be supported by systems that they could link multiple accounts into one and provide all possible information about the customer. This will result in better methods of measuring the customer's value.

2. Identify profitable from non profitable customers and, accordingly, differentiate the service and support for this group of profitable customers. This might be achieved by a special call centre number. Other customers shouldn't be ignored, by any chance.

3. As the cost of call centres are increasing you need to make sure that you have an effective Web presence. The web site needs to act as a virtual branch office that allows the customer performs all possible transactions and activities that can be done in a normal branch. Make sure also that the web site is user friendly and have the options to get help when required either via email, chat or by talking to an agent.

4. Target the existing complex large legacy systems into a step by step manner. There is no need to have huge budget to replace all systems at once. Try to use an incremental approach that will grow as you grow with the CRM system.

5. CRM is a strategy, not a piece of software. It needs to be enforced from the top senior people downward to every single employee within the company. No matter how stylish your CRM system is, it will not create the customer culture within the organization until the people who use the system have a strong faith in customer service.

The CRM Transformation models

The telecom industry is one of the committed industries to CRM within their business strategy. However due to the difficult market drivers and the operational challenges discussed in previous sections, the CRM experience might fail to generate the expected return on investment.

Applying a customer centric model over the existing product centric model will guarantee an efficient CRM approach within the company. A good model, which is presented in [16] is called "CRM Transformation". The model was originated by IBM Global Services

Figure 2-11 The CRM Transformation Model, [16]

1. Become Functional	2. Gain Operational Excellence	3. Mass Customization	4. Achieve customer intimacy

Within the becoming functional stage, the CRM software is implemented integrated with the existing legacy systems within the company. Middleware products will be most probably used for this integration. New processes will also be created for the different units involved with the customers like the contact centre. Finally training and assistance should be offered for the new system as well as the new process.

As the new CRM system is implemented within the company, within this stage the newly accepted processes is getting modified and updated to lift up the transformation to the stage of the operational excellence stage.

As the customer knowledge and culture is spreading within the company, and the new powerful effective CRM processes are implemented by well trained employees, that will be able to provide products and services that will meet the customer expectations. This will lead to the stage of Mass Customization

Based on the above stages businesses will be in a better position to offer and promote special bundled products and services targeting segmented customers. This can be described as effective marketing, as the customer is more educated and more familiar with what the company can offer. The CRM process at this stage is in the customer's intimacy stage

The knowledge element in the customer relation

A good practical analysis that demonstrates the importance and power of capturing knowledge within an organization, will be the following case study about Pele-Phone Communications [5].

Pele-Phone Communication is the major cellular network services supplier in Israel with a customer base close to one million business and consumer cellular subscribers. The company work force is around 1,000, and the company is planning to introduce new service in response to the deregulation.

Of special interest to this study is the company initiative towards understanding their customer base. The company recognizes that using a traditional data base will not enable them to serve their needs of capturing and storing every single piece of knowledge about the customer, in order to come up with more powerful strategies and decisions that will reflect on the business.

Data warehouse is the solution used by the company. I will be discussing data warehouse in a later chapter. Nonetheless for the sake of this section of my study, I decided it present the knowledge capture case in a concise manner in the following table.

Table 2-3 illustrates the impact of captured knowledge on companies.

Knowledge captured	Business impact
Analyze customer profile information. Stored in the data warehouse	Identify customer's specific needs and target them with customized offering.
Track customer requirements. Monitor mobile phone usage and the profitability of certain customers. For example, focus on lower rates for calls made within a specific geographic region.	Develop new products and services. Develop profitable pricing strategies. Evaluate the potential of new marketing initiatives.
Analyze call records. Compare the number of dropped calls on car phones to the average number of dropped calls for the handset population.	Come up with special and new promotion. Promoting car phones over the handset ones
Analyze customer data on a daily basis. Analyze historical usage patterns along with changing market factors.	Reducing and cutting churn by identifying with accuracy customers who may be considering switching to a competitor. Such customers will then be targeted with special promotion or may be special services designed to maintain their specific interest and loyalty.
Analyze call behavior data	Come up with a better customer retention application and strategy
Detect changes in call patterns and perform other sophisticated analysis. Identify potential areas of fraudulent use	Better control of lost or dead accounts. Enhanced strategies for fraud management.
Support engineering applications. Monitor the usage and capacity load of its network infrastructure.	Significant efficiency gains on the cellular network which will reflect and increase the overall profitability. It should also drive lower costs and lower prices to customers

After implementing such powerful captured knowledge techniques within companies, they have become customer-focused companies. They were able to segment the market and then provide each segment with the kind of service and attention that is in line with its needs, and also with its profitability to the business. [5]

The Healthcare industry

The healthcare industry has also been challenged to change its strategy from a product centric into a customer centric model. What makes health industry different from the others is that such an industry is the most important topic for every one. Almost every person is a potential customer. Therefore, channels like the internet and trends like electronic commerce drives the need for a new business model built around what the customer want and how to enhance the overall relation with the customer.

The U.S government, for example, is looking seriously at the internet as a powerful tool to enhance the customer service within the healthcare area. A new legislative has been introduced which requires all medical claims in the United States to be submitted, captured, adjusted and paid within 15 days using secured application across the internet[31]

What makes this more challenging is that payers claims are requested to notify and justify the patient and the provider of the reasons in case this due date can't be met. This should not be a surprise for us if we realize the fact that more than 30 percent of the US healthcare cost is wasted because of inefficient paper- based processes, hand written reports with redundant non integrated data which results in unnecessary treatment. This is according to a study by DeNelsky

Challenges within the industry

The healthcare industry is undergoing transformation. In the past, giant companies used to control and dominate the healthcare market. However with the presence of the internet, new players are coming into the picture through the usage of Web Portals. The following is a summary of the common challenges that are facing the industry[14]

1. The rising costs challenges, this only the cost of hospital equipment and qualified personnel. Pharmaceutical companies are pressured by government to reduce their prices for medicine and drugs. As a consequence of the overall increased cost, there is pressure in the healthcare environment. Health insurance providers are also badly hit by this factor. In response to this challenge, health insurance companies are changing their business model from a pure insurance provider where customers submit claims

and get reimbursed into managing the overall healthcare service customers are receiving. Such a model requires continuous and closer interactions with all players of the model. The role of knowledge based processes and systems are very critical for the success of this model.

2. Regulations: Strict laws and regulations control the release and publication of any newly developed prescription medicine until the time frame had passed for clinical trails.

3. Profitability: The development of a new medicine is becoming more time and overall resource intensive. Only one or two out of 10,000 basic substances ever reach the market, less than %30 of these substances are profitable

4. Patent protection: Due to worldwide competition the existing medicine patent regulations are not enough to protect the medicine from other generic products that will appear in the market.[14]

5. Isolated customer contact point: As access to the customer information (The patient) within the area of healthcare is restricted due to some government rules and the complex nature of the network. This in return will prevent the pharmaceutical company from contacting the customer directly to promote their products and services. And will lead to an isolated customer interaction contact points which is difficult to capture and integrate knowledge within. A more important result will be that pharmaceuticals companies will end up not knowing their customers very well

Towards the above difficult challenges the healthcare and the pharmaceutical industry can't afford to be product centric. For every product there will always be a competitive product that will match its quality and probably offer a lower price. Companies need to be customer focused in order to maintain the competitive advantage. As we can notice from figure 2-11 several channels are responsible for different type of customers. On one hand the key account manager is responsible for hospital, wholesales and pharmacies roles, and from the other hand separate marketing departments will be responsible for the patients.

Figure 2-12 an example of the isolated customer interaction within the healthcare industry (Pharma, Inc)
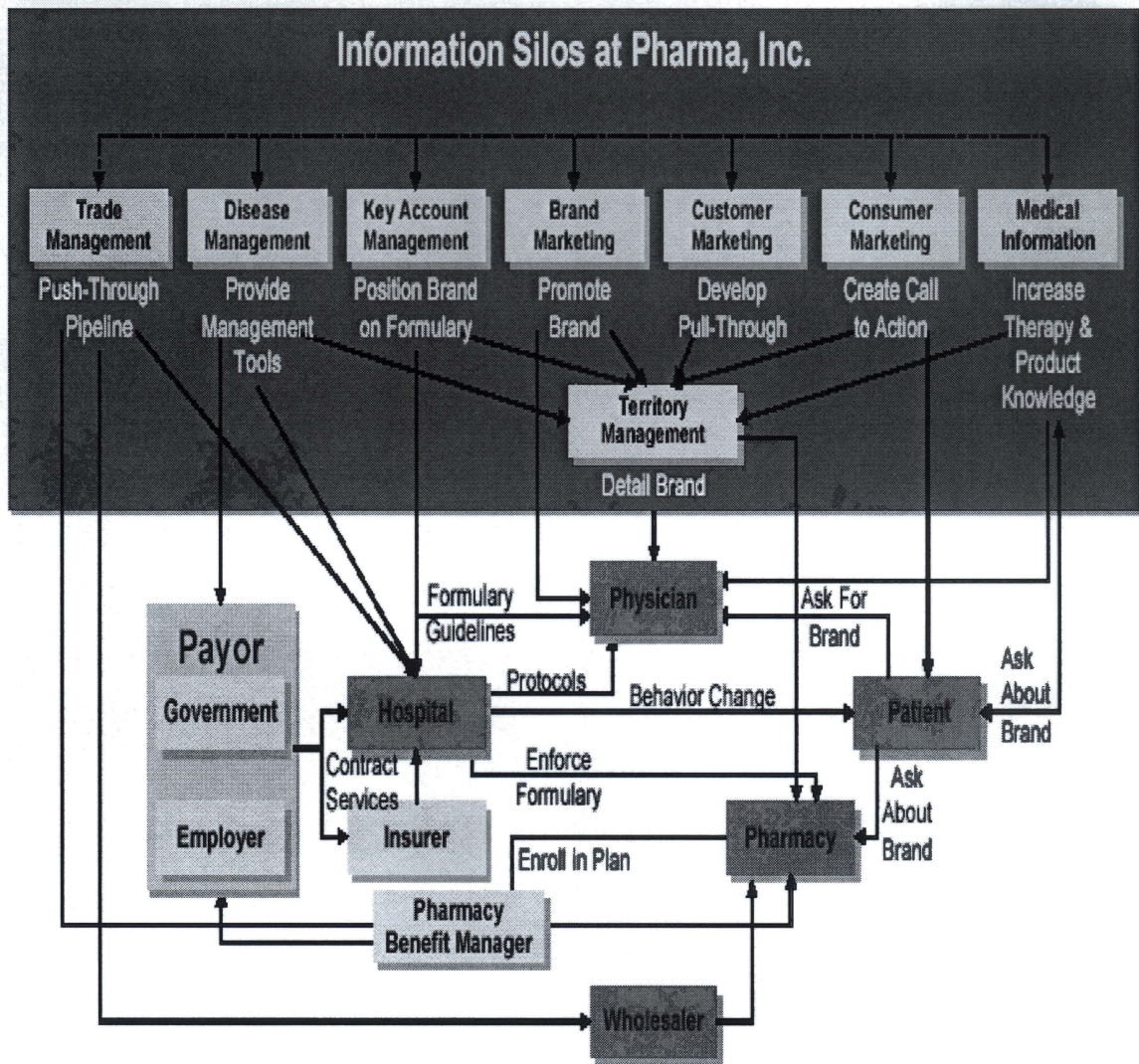
The healthcare industry major players

As the network that connects all the players within the healthcare industry is a little bit complex, therefore it is important to be able to identify the major player within this model:

- Pharmaceutical companies.

- Medical device companies.

- Insurance providers.

- Government

- Independent information resources.

- Wholesaler

- Patients

- Doctors

- Laboratories and Radiologist

- Hospitals

- Pharmacies

The complexity of any healthcare CRM model comes from the fact that a player might play the role of the customer in a transaction and as the provider on another. Patients are very important and the objectives of any CRM process would be built around it. On the other hand doctors are considered providers from one end and at the same time they are customers for Pharmaceutical companies. Figure 2-12 displays how a major pharmaceutical company views their market and how they do propose to segment their customer. As we can notice from the

model the market has been segmented into the following three segments, which are based on the different contact channels that will be used to reach every segment.

1. Hospitals, Wholesalers and pharmacies

2. Doctors

3. Patients

Figure 2-13 Pharma Customer Segments [14]

Pharma Customer Segments
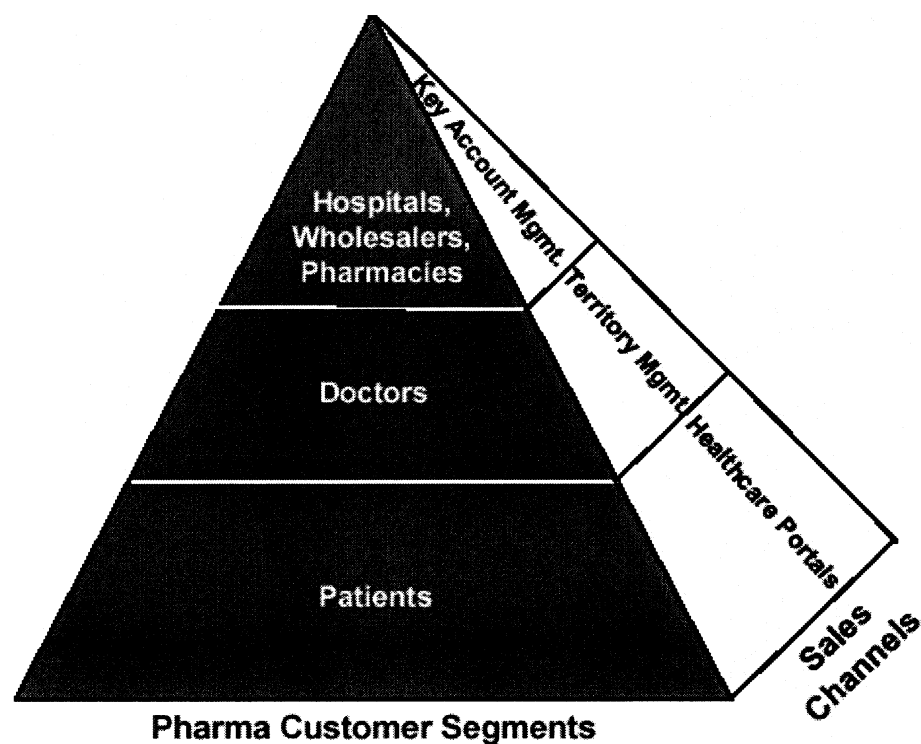
The role of web portals within the healthcare industry

Web portals have been mentioned earlier in chapter 1 of my study. Web portals do play a major customer contact channel within the healthcare industry. This is due to the inability of the companies to profile and know their customer via other channels. Therefore parties

involved within this industry and in particular pharmaceutical companies are utilizing the role of the internet as an effective tool that will cross all boundaries and reach the customer.

Three different types of web portals can be identified within this industry. Each type represents a business model and will have its own customer process and the defined roles within the process. Obviously it will also serve a specific purpose and target a pre defined segment of customer.

Diverse elements of knowledge will be captured within each type. However all these elements must be integrated in order to achieve a generic customer strategy? As this study is mainly centreed on the knowledge element, I did prepare the following tables (2-3, 2-4 and 2-5). The tables will summarize the different portals and what knowledge might be captured within each type.

Web portals within this industry play a major role in integrating the stages of the customer life cycle. Which will be the base for knowledge based CRM process as figure 1-7 displays the interaction between web portals and CRM.

Table 2-4 Knowledge captured through information portals

Portal Type	Description	Example	The Knowledge element
Information Portal	• Forms a community for both the professional users (doctors, practitioners) and patients concerned about a common disease. Messaging services to establish a lively community • Offers information about the diseases symptoms, medicines. Ask the expert • Allow users to exchange information about their experience. Personal stories, • Very efficient in controlling and driving the patient visits nature and frequency to doctors • Played a major role in introducing the portal operators as other main players within the healthcare industry. Previously doctors and hospitals were the only players in such a market.	www.intelihealth.com (An award winner portal in the US, built on advertisings & other distribution channels. Educate the users about 200 syndrome) www.actionathma.co.uk An asthma awareness community web site within the UK and supported by GlaxoSmithKline (GSK)	• Capture customers profiles both patients and doctors. Profiles include name, age, address and contact details. • Online questionnaire, diaries and surveys will help in both capturing the necessary information for marketing decision. And in delivering contents that is relevant to that specific customer segment. • Such contents will help in marinating an educated end user. An important element of any CRM strategy. • Relies heavily on the quality, reliability of the knowledge presented. Such elements are critical for continuity.

Table 2-5 Knowledge captured through Sales portals

Portal Type	Description	Example	The Knowledge element
Sales Portal	• Healthcare portals dedicated for the online sales of their medicines. They are also referred to as online pharmacies • Mainly target end customers B2C as opposed to other businesses customers like doctors B2B Customers need to register online and provide their health insurance scheme. Doctors need to write a paper based prescription which will then be forwarded manually to the online drug store which will validate and deliver the prescription. A time consuming process specially with the billing part • Other companies are proving a more advanced solution in which they allow doctors to write electronic prescription directly from their PDA or through the internet. Which will also automate the billing process (Touchworks by allscripts) illustrated in Figure 2-14	www.drugstore.com www.cvs.com (B2C) www.Neoforma.com targets business customers (B2B) www.allscripts.com	• Capturing the basic customer profile which includes basic contact details. • Transaction and history details will also be captured to be used into a knowledgeable customer decisions. • Cross and Up sell offers could also be offered as a result of the above knowledge. • Transaction history also about what doctors and professionals are prescribing. An important knowledge which is of interest to pharmaceutical companies.

Table 2-6 Knowledge captured through integration portals

Portal Type	Description	Example	The Knowledge element
Integration Portal	• Integrates all the parties involved within the process. Customers, doctors, laboratories, insurance companies, hospital and pharmaceutical companies. • Each patient will have what is called a personal medical record, which will be accessed by any doctor treating that specific patient. • The record will also be accessed when necessary by any other party involved in the process. Laboratories or X ray results..etc. No room for redundancies. • Professionals can request and order any specific information they need • Administration work is also integrated and managed within this network	www.webmd.com	• Knowledge and feedback from doctors and professional about the impact of medicines on their patients. This will be fed back to the R&D side of the company. • Knowledgeable and educated doctors that would offer an educated solution. • Huge amount of detailed transactions for the patient with any involved party. This knowledge could be very useful in any future marketing decisions. • Insurance companies are able to capture knowledge that will be used in managing better plans and offers for their clients. • Patients are also able to be knowledgeable about their updated record and be able to get any future decisions

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Figure 2-14 outlines the power capabilities of the stat of art Touchworks system which automates the clinical operations (Prescription, Ordering and Charges, and the Documentation across the internet and using wireless devices PDA (source www.allscripts.com)
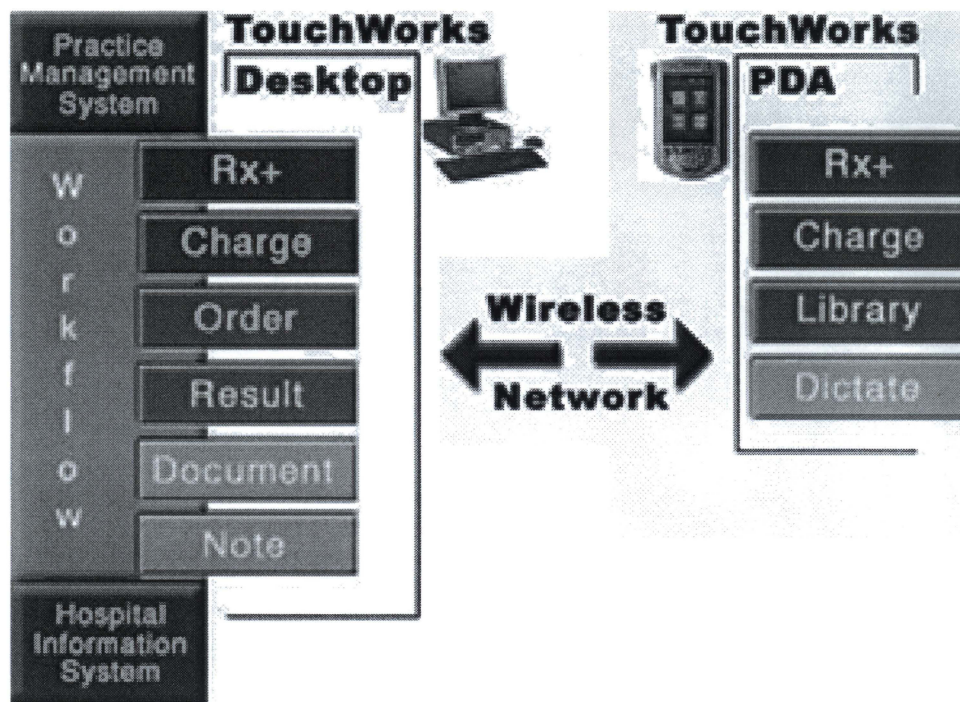
The Airline industry

The frequent flyer or the air mileage programs are one of the first and important initiatives within this industry to better understand their customer behaviors. However as any other industry the airline industry is also challenged not only by the new market trends (mentioned in chapter 1) which impact other industries. The recent September the 11th attacks also put a lot of pressure onto this industry. As per the IATA World Air Transport statistics the operating revenues for the airline industry went form US$328.6 billion in 2000 down to US$305.3 in 2001

Major airline companies responded to the challenges introduced by the 11th of September attack by introducing a new customer initiative. Alaska Airlines for example rushed in Jan 2002 to introduce as part of a CRM strategy a customer notification system that will notify travelers about flight changes. The same system is also used by major British airline British Airways [32].

CRM Services in the Airline industry

Although frequent flyer programs are an important part of any airline carrier CRM strategy. However it is not the only CRM service that cab offered for customers within the airline industry. Among other CRM services are the flight notification systems as explained above. Kiosk check in which has been adopted by several airline carrier. Virtual check in services and the personalized web based interface which offers wide range of customer services across the net. in addition to the online baggage tracing.[33]

Airline carriers need to have reasonable operations efficiency before they can offer such CRM services. The above services are expensive and will not guarantee a high return on investment once offered to customers.

Figure 2-15 illustrates the ROI for some CRM services within the Airline industry[33]

Example: Return on investment from select CRM initiatives
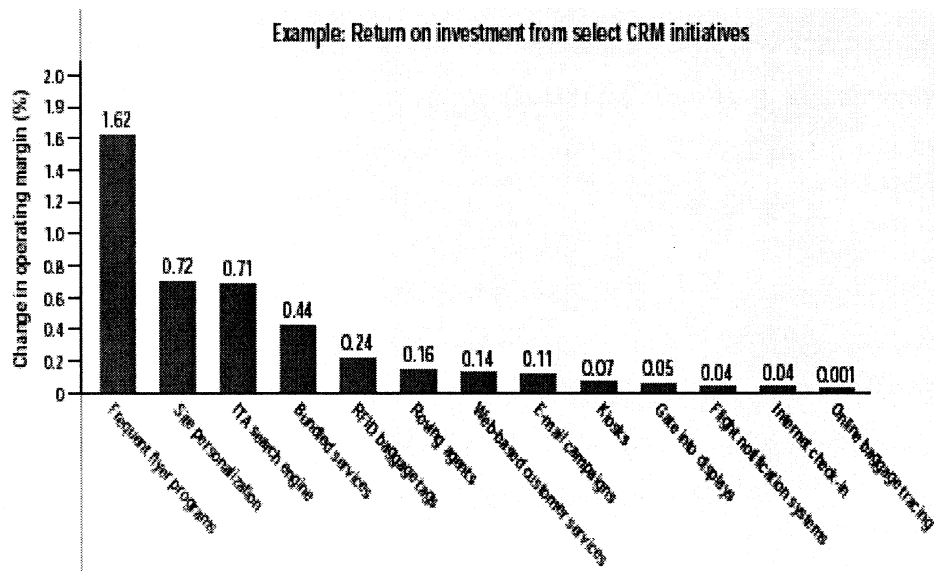
Limitations within the existing CRM implementation

On one hand according to the CRM software and system suppliers web portals and magazine all players within the airline industry are aware of the importance and do appreciate the investment in such an expensive technology. On the other hand the airlines carriers are not sharing the same view on how they do implement CRM and how can it benefit them.

I was able to conclude that within the existing industry implementation of CRM there is a mixed view of how to implement CRM and how efficient it is for the business. The different opinions can be found in [34].

Within the existing industry implementation for CRM the following limitations can be noticed which needs to be addressed to achieve better CRM strategy[33]

Driven by competition:

Within the existing CRM implementations Airline carries are not responding to what they can offer to their customers and what their customers are really want and expect from them .Instead they are duplicating what their competitors are offering. This is a reflection of the unawareness of how much value such service worth for the customer.

No clear vision

One other common mistake that airline companies are falling into is the no clear vision or direction for their CRM strategy. Separate scattered processes and initiatives from competing departments. Such initiatives might end up in contradictory goals as they are lacking a more generic view for the customer.

Employee are not ready yet

Before companies offer their CRM solution they need to make sure that their employees do have the right tools to offer consistent service across all contact channels. Such tools should guarantee proper access for all captured knowledge about the customer when required. From the other hand employees need to have the right training on how to interact with the customer in the most appropriate manner that serve the company CRM policy.

Customer Segmentation

Segmentation is very critical within this industry. It allows companies to know and identify their profitable customers. Knowledge captured about the profitable customers should help them to classify what type of CRM services they do prefer. Accordingly companies will plan operating their businesses with operations efficiencies.

Knowledge captured from the frequent flyer programs are not necessary a true indicator of the customer value. For a classic airline, only 52% of its high-value customers are also top-tier members of the frequent flyer program.[34] On the other hand one major airline in the U.S discovered that its top 1000 customers (by revenue) accounted for 60 percent more revenue than its top 1000 customers by mileage[33] Also a study by the IBM institute for Business value found that just over 15 percent of the airline customers accounted for over 40 percent of its revenue.

Figure 2-16 Airline customer value segmentation (by revenue) – Source: IBM Analysis
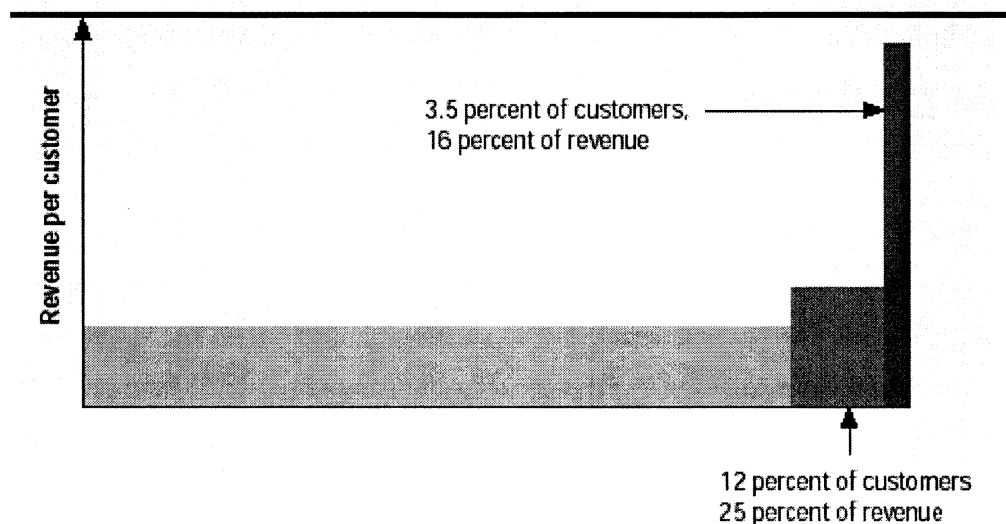
Programs similar to the mileage or the frequent flyer do capture huge amount of knowledge but only about members of such program. One of the main challenges that the airline industry are facing is the manipulation or may be more important the integration of such knowledge and data.

A carrier like American Airline with about 45 million members in their program is a typical example of such a position [34]. As indicated above data generated from such programs doesn't generate the right knowledge that helps in profitable customer segmentation. More over the above generic data will not give an indication of what exactly the customer preference is.

Personalization, integration and delivering such knowledge across all customer interaction points are the main challenges before it can be used in an effective CRM strategy. Data mining techniques can be very helpful in the process of personalization and integration of data. A good approach in using such tools specifically within the airline industry can be found in [35] in which data mining tools are used to first identify high value customers then to classify what CRM services of specific interest to such customers.

The knowledge element in a value based customer segmentation

A more dedicated knowledge based customer segmentation technique is an integrated part of a powerful CRM strategy. Such technique would allow a better comprehensive understanding of the customer value and priorities. Producing such segmentation is not something easy and it does require a lot of tools that will be discussed into more details in a later part of this study.

A powerful value based customer segmentation that was developed by IBM is demonstrated in figure 2-17. Two values are used within this segmentation a monetary value that might be captured based on the overall spending of the customer in dollar format. This is an important value as it could be used to analyze how much travel investment has been done and to predict any future possible spending. The second value used is the travel frequency which indicates the number of trips completed by the client.

Capturing such detailed knowledge about customers needs to be followed by a more in-depth understanding of the individual drivers for each segment. Drivers refer to what type of CRM service do customers within the segment prefer or value over other services offered by the competitors.

Figure 2-17 Value Based Customer Segmentation – Source: IBM Analysis

Corporate masses US$3.5K/4 trips per year Miles — 5%	**High-tier road warriors** US$6.5K/7 trips per year Flexibility — 13%	**Global stars** US$8.2K/12 trips per year Recognition — 14%
Snowbirds US$2.1K/2 trips per year Excess baggage — 9%	**Captains of industry** US$3.8K/6 trips per year Status and prestige — 10%	**Low-tier road warriors** US$6.3K/12 trips per year Legroom — 7%
Latin transfers US$1.8K/2 trips per year Native language — 3%	**Atlantic hoppers** US$2.4K/6 trips per year Seamless transfers — 11%	**Domestic young bloods** US$5.3K/10 trips per year Perks — 8%
Dormant US$0.9K/2 trips per year Non-air earning — 2%	**Short-term project** US$1.6K/5 trips per year Convenience — 6%	**Regional flyers** US$4.9K/8 trips per year Nonstop services — 12%

Monetary value: High → Low
Frequency of travel: Low → High

Capturing the required knowledge that could conclude the customer's drivers is not an easy and direct process. It should use all possible direct as well as indirect channels to collect feed back from customers. The captured data along with any other available knowledge about the customer should offer a detailed view of the customer habits and needs for the specific segments.[33] Figure 2-18 models the different approaches of identifying the customer needs.

Figure 2-18 Identifying customer needs – Source: IBM Analysis

The above knowledge represents a valuable tool with the hands of the airline carrier once completed. A specific tailor made offers can be developed to target each cycle of the overall customer life cycle for that specific segment. Certain acquisition, development and retention targets can be set for each segment. This makes the CRM services available across the whole customer life cycle.

They can also be used to direct low profile customers to other automatic response systems instead of an operator assisted channels. It can also help in offering important customers the specific services that of concern to them.

For example knowledge about specific high profitable customer segment that is mainly interested in CRM services that will make it easier for them to increase work and business

activities onboard of the air craft. Such knowledge can be utilized proactively by promoting to the segments free email and internet access onboard of their next trip.[33]

Offering internet and email access onboard of the aircraft is an expensive service. However with the above customer value model, the investment cost can be highly reduced by limiting the offer to interested high value profitable customers. Major distinction can be noticed in such an offer compared to generic offering of service that might or might not return profit on investment. Return on investment (ROI) is a significant element that will help businesses in evaluating the profitability of a specific CRM service in offer. Figure 2-19 illustrate the ROI on different types of CRM initiatives.

Figure 2-19 – Illustrates the return on investment (ROI) from select CRM initiatives – Source IBM institute for business values
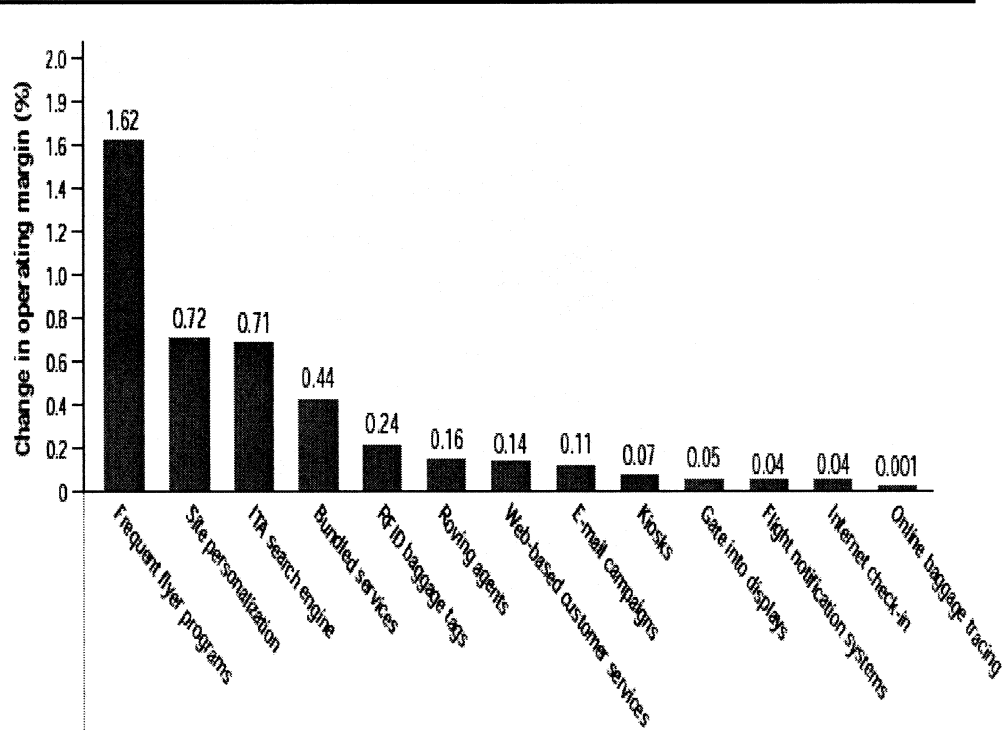
The frequent flyer program is an important service for customers, as it shows a high return. While the web enabled customer services is in the middle of the list, the online baggage tracing service doesn't seem to be of much value for customers. The other critical and important measure within the CRM implementation is the actual operation cost for introducing the different CRM services. It would be very helpful in planning whether to introduce the service

or not. It would also indicate how much efforts is required and whether the business is ready to make such an investment or not. Figure 2-20 displays the financial assessment of some selected CRM services. This should drive better operating decisions which should impact the whole image of the company.

Figure 2-20 Financial assessment of selected CRM initiatives – Source IBM institute for business values (Dec. 2002)
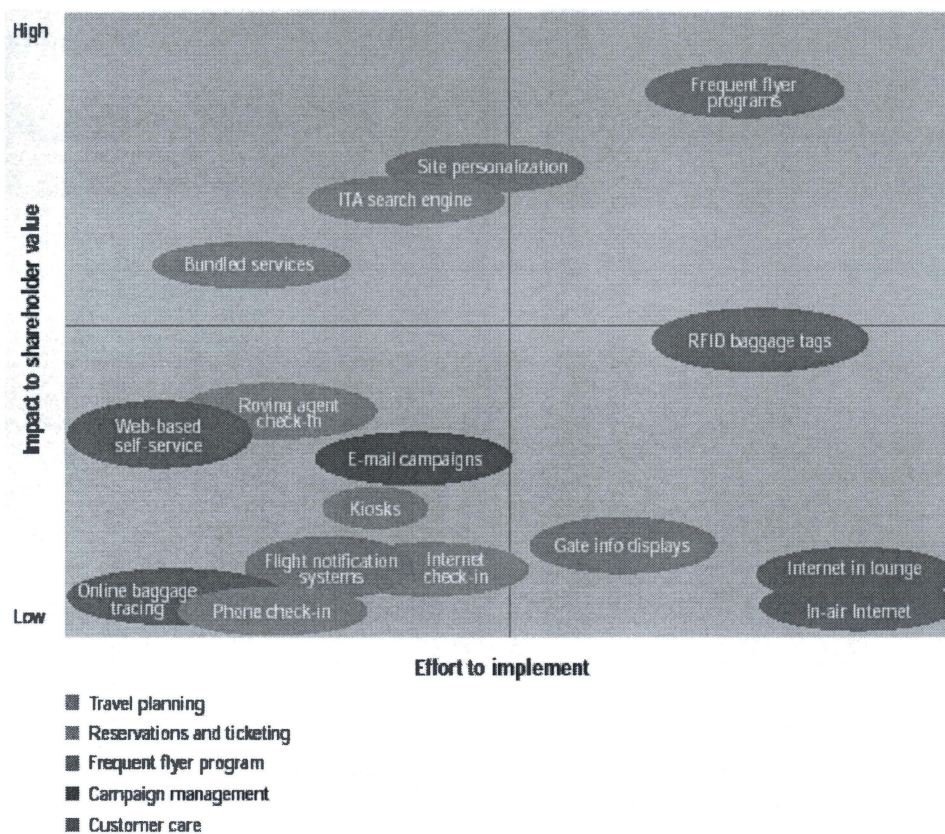
APPROACHES & METHODOLOGIES IN DESIGNING AN EFFICENT CRM SYSTEM

CRM Services

CRM services are what companies want to offer their customer. I find it a little bit hard to list all types of CRM services. The reason behind this is the nature of the CRM processes. It is growing to a stage that it is spanning every single service that the business offers.

Nevetheless, customer expectations are one the main driving process of such services. Businesses need to look at the business processes from the customer point of view rather than from the company's point of view. A typical e-customer nowadays does expect almost all of the following services:

- Access to online product and service catalogue, probably a comparison facility that will compare the process from different vendors' prospective.

- Personalized and special offer.

- Configuring, placing and confirming the order.

- Facility to make and follow up business related inquiry. Product & services inquiries as well as one related to logistics and delivery.

- Checking the account transactions and activity

- Updating the customer profile.

A common customer requirement that I could notice is the customers self management for what they do and what they want, which enables the customers to administer their priority processes for themselves. Cisco Systems; for example; was able to save $120,000 by only allowing customers to download copies of their invoices online [36]

A quick look through the above list will emphasize the knowledge value within the CRM process. Knowledge about what the customer wants can only enable the company to offer such services. Through the next few lines I will try to list the most viable services that I was able to conclude through my study.

Common contact point

Contact point integration or strategy is all about offering customers a common access point or channel that will allow them to follow a standard channels to get hold of the product, service or inquiry they are after. The common contact point means integration of all the business processes around the enterprise with the proposed common contact point. It also means that all the necessary customer knowledge must be captured through this point and should be available by the agent who is in touch with the company.

Cross Sell & Up sell

Cross-Sell and Up-Sell are two types of sales and marketing opportunities. They arise as a result of the knowledge gained from analyzing the customer information. Since the cost of acquiring a new customer is almost five times the cost of retaining an existing one, maintaining all possible information about the customer will bring further sales lead.[4]

Measuring customer value

It is always worth marinating knowledge about the value of the customer. Some customers are profitable and some are not. Specific measurement criteria need to be defined against the transactions of customers with the business. Accordingly, businesses will be in a better position on what to offer their customers and what channel needs to be facilitated for such customer. Measuring the customer's value is an important service with CRM that will lead to customers' segmentation. Customer segmentation is critical to achieve an efficient and more enhanced relation with customers.

Personalized offers

Another sale lead that is also dependant upon maintaining detailed transaction history about the customer. Personalization is an important element of today's CRM systems. Customers will appreciate the knowledge known by the company about his/her needs and wants and how they are likely to change.

Offer customers full access to their records and transactions

Facilitating access to customer's records and transactions will warranty sharing knowledge with the customer. An important service that will educate clients more about the product or service they are likely to get. Along with the new trends in customer expectations this service is becoming major in CRM systems.

Client relationship within every process in the enterprise

Although the concept of client relationship sounds only related to customer interactions, it is becoming important to think about client relationship among every process within the company. Whether it is a financial process, or logistics and delivery relationship with the clients, all need to be considered and acted upon. This particular service should guarantee an ultimatum CRM system.

CRM System based on the Customer life Cycle

The customer life cycle discussed briefly in chapter one, formulates a perfect base for an efficient CRM system. The customer's life cycle model that I will be using here to demonstrate the CRM system was referred to as the components of the customer stakeholder by Julta in [23].

An ideal efficient CRM system should cover every stage or components within the cycle. Alternatively businesses might choose to adopt their CRM strategy on some components and leave others. The whole CRM system will be based on the different components of the cycle.

Jutla model consists of four stages which starts with the engage process and ends up with the support. The order and the fulfillment stages fall in between the abovementioned phases. In the next parts I will be exploring some of the CRM services that are associated with each cycle.

Engage

This is a very important stage of the cycle where all efforts are made to get the customer engaged with the company. CRM systems can play a major role at this stage and it can help businesses know and target their customers so that they are continuously and fully aware of their products and services.

Order

A successful engage stage will be naturally followed by an order. Knowledge based CRM systems can transfer the order stage into a powerful tool that will not only add to the customer's experience with the enterprise and their products and services, it will also add more power to the overall view of the enterprise to their customers. Things like product catalogues, prices, comparison and order delivery should always have the customer in the middle.

Fulfill

With the existence of the new CRM systems, order fulfillment is not all about delivering the customer's request; in fact it goes beyond this stage to a level where the customers are more knowledgeable about the order and where it stands. This process will also assist in capturing the knowledge about customer experience with the product and service.

Support

Supporting the customer's experience is now an integrated part of modern CRM systems. Throughout this stage, the experts offer their customers a deeper commitment to what they originally offer. Such commitment will naturally drive the cycle back to where it had started of engaging the customer again.

Table 3-1 gives guidelines to the design process of a CRM system based on the cycles explained above. The methodology here indicates some flexibility to the enterprise as they can decide on what stage of the cycle they like to embed their CRM system in. The information on the table list presents some possible objectives of CRM systems within that particular stage of the customer's cycle.

Table 3-2, on the other hand, lists CRM enablers and metrics for the different stages of the customer's cycle. The table is based on Craig's view of e-Business readiness [23].

The methodology used here is simply based on what cycle the enterprise is ready to embed CRM system within. It is always difficult to separate cycles from each other as it is an overall customer process. However, as listed within the table, there are common knowledge and characteristics that can be captured and shared for each cycle.

Table: 3-1: CRM Systems Design and the customer life cycle [23]

Engage	Order	Fulfill	Support
• Access to common customer data base which will lead to more up sell and cross sell opportunities. • Full access to complete customer information and knowledge by all responsible staff. (Any staff that has a role to act on with the customer) • Personalization and one to one marketing. • Granting customers full online access to their own data, transactions and history.	• Offering customers an integrated views of their orders (The view includes prices, availability, shipping information) • Allow access to real time data of the supply chain management. Such data will offer customers an optimum knowledge of where there orders stands • Dynamic pricing which responds to the market changes and the customer segmentation	• Managing information on product or service movement. • Tracking information about product and services not only shipped to the customer but also installed configured as per the customer needs • Facilitate access to detailed product & services information by the whole enterprise. The knowledge should include the different stages of the product cycle (Design, support and upgrade)	• Turn the support process into a successful engagement experience. • Provision of complete customer history • Trust where the customer belongs to the company and trust their services. • Order tracking • Offer support based on the customer segmentation. Requires dynamic measure of the customer value to the company.

Engage	Order	Fulfill	Support
• Online catalogue that offers updated price list detailed product and services details, latest offers and marketing material. • Comparison of shopping experience where customers have the chance to compare product features & prices • Customer profiling & segmentation. Customers are categorized into separate segments and profiles.	• Capture detailed knowledge about the order process and about the customer. • Offer customer access to product and service configuration • Global sales • Order management	• Sell products through different channels with common fulfillment process. • Global sales fulfillment challenges • Access to information about product availability and lead time	• Offer customer support via different channels (visits, contact centre, web portals, emails, faxes..etc) • Contact point integration. Where the different channels are integrated by systems that facilitate knowledge management.

Table 3-2 summarizes the enablers and metrics for each stage of the customer life cycle – Mainly from an e-Business Perspectives [23]

	Engage	Order	Fulfill	Support
Enablers	Browsing, Searching, Comparing, Configuring, Interacting, questioning, listening, interactive marketing, real-time information availability, broad coverage of prospects, cross-channel coordination for marketing, sales and services. And reduced cost of product and services.	Selection mechanisms available for the customer (Pricing, product availability, shipping, export and tax rules). Payment mechanism, contracts, order transaction management	Integrating and interconnecting back-end process. Delivery capability. Global sales governance	Knowledge management (By providing complete customer history in real time, as well as maintenance and access to corporate knowledge base, Customer contact point integration
Metrics	Level of integration for the above enablers. Customer acquisition ratio, Customer profitability ratio. Number of new and effective marketing campaigns over a certain period. The number of interaction methods	Order accuracy rate, revenue per channel ratio, number of products per sales order, integrated pricing, inventory control availability and accuracy, number of payment mechanism available, percentage of cross sell	Back-end integration index, delivery capabilities index and governance rules knowledge index	Customer retention ratio, Customer satisfaction level, Knowledge access index, e-mails response system availability. Average response time to service a call.

CRM Systems based on the contact channel

One approach of designing CRM systems is based on the contact channels strategy that the company is using. That is assuming that the business has a strategy. However most businesses do not have one and their contact channels just respond to what the market and customers want.

A lower end CRM system is built around different scattered inconsistent contact points; each point has an interface that will capture knowledge about the transactions going through this particular point. Such systems will have little or no integration with any other system.

On the other hand, a higher end CRM system will have total integration across all customers' interaction points with one common consistent interface. This can be seen as a main system that links all the sub systems together. Although knowledge is captured at each point it is shared among all the different channels.

Figure 3-1 CRM Systems based on the contact channel strategy
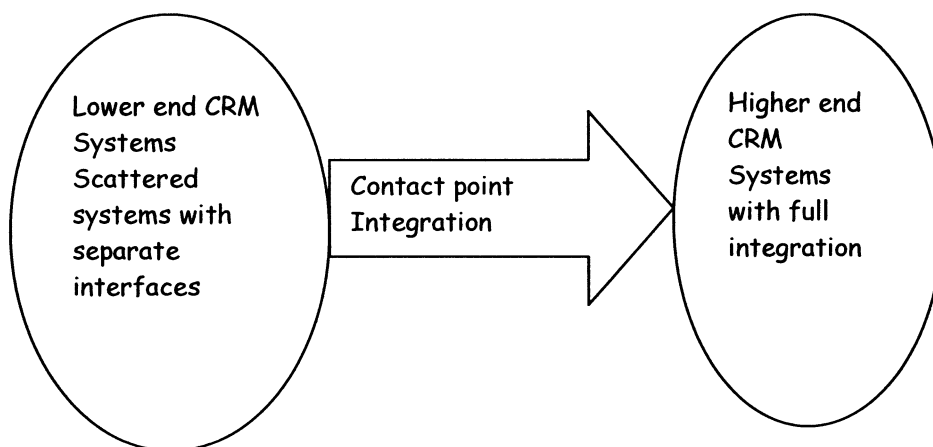
The contact channels strategy

A variety of contact channels are in use by businesses which vary in costs and characteristics. A powerful CRM system should work on channels that are preferred by customers and at the same time offer a good opportunity to capture knowledge through.

Companies are able to decide on the most appropriate channels or what is called as contact media strategy relying on the following parameters:

- Contact channels available and are in use by the company, and how accessible these channels are for customers

- Customer's expectations

- Degree of personalization affected by the channels.

- Cost of transaction as opposed to the customer's overall value to the business (customer segmentation)

- Ability to capture knowledge through the channels and integrate this knowledge within the overall CRM system.

The following is a list of the most commonly used channels by business's around the world [9]

- Face to face communication or personal visits at home or office for either sales or services

- Faxes

- Mail by post

- Retail shops

- Contact center receiving phone calls.

- Interactive voice response (IVR) that processes automated voice calls arriving through the contact centre

- Indirect channels through distributors and resellers.

- The world wide web either through web enabled contact centre or through web portals

Figure 3-2 is a summary of the characteristics of the different types of the contact channels used by businesses today. The knowledge element is missing from the table. Designing a CRM system is based on the contact channels methodology which involves answering two questions. The first question is: how easy is it to capture knowledge through the channels? Second how much knowledge can be captured and documented.

Length of the interaction and how complex it is outline two characteristics that of interest in the table below. First channels with longer interactions like home visits mail and web interactions offers an opportunity to capture more knowledge compared to channels with short interactions.

Nevertheless, as the channel gets more complex, the mechanism of capturing knowledge will be more difficult. Consequently the challenge will always be how to enhance the captured mechanism, especially through complex channels. Table 3-3 illustrates this fact.

Figure 3-2 Contact channels characteristics compared [9]

Interaction medium	Length of interaction	Complexity	Information content	Location	Type of content	Type of customer
Home/office visit	Long	Very high	High	Customer's home/office	Any	High-value customer
Shop	Short-medium	Moderate	Simple-moderate	Shop, in opening hours	Goods	Any type of customer with transport and time
Mail	Long	Moderate	High	Customer's home or office	Any	Any
Call Centre	Medium-long	Moderate	Moderate	'Anywhere, any time' service	Service	Any with a phone
Interactive voice response	Short	Low	Simple	'Anywhere, any time' service	Service	Any with a push-button phone
Natural language IVR	Short	Low-moderate	Simple	'Anywhere, any time' service – hands-free	Service	Push-button hostile customers
E-mail	Long	High	High	Customer's home or office	Any	Any
The web	Long	High	Complex	Access requires a computer	Information	'webphiles' customers only
Web-enabled call centre	Medium to long	Moderate-high	High	Access requires a computer	Any	webphiles' customers only

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Table 3-3 The knowledge element in the analysis of the contact media channels

	Face to face – personal visits	Email	Mail by post	Phone calls (via contact centre)	IVR	WWW	Web Enabled Contact Centre	Shop (Retail)
Complexity	Very high	High	Moderate	Moderate	Low	High	Moderate-High	Moderate
Length of interaction	Long	Long	Long	Medium - Long	Short	Long	Medium to long	Short-Medium
How easy to capture knowledge?	Very Difficult	Difficult	Medium	Medium	Easy	Difficult	Medium / High	Medium
Knowledge content	High	High	High	Medium/ High	Low	High	Medium/ High	Low/High

CRM Systems based on Knowledge Management

Knowledge management is a process that is getting more recognition within the enterprises. CRM, on the other hand, is another new business process that is also receiving adequate attention. However, at this stage, implementation of CRM systems has no integration with the knowledge management model within the company.

Implementing CRM systems that are only based on transactional contacts to manage customer's relations outline the traditional CRM systems. True CRM systems is only available by integrating the knowledge management process to create a knowledge enabled CRM processes[37]. A knowledge enabled CRM system enables companies to use knowledge to estimate key business actions such as customer's satisfaction and customer's profitability.

Figure 3-3 Departure from traditional to true CRM systems

KM
Systems to
Create,
Structure,
and apply
knowledge
to enhance

Traditional
CRM focused
on transactional
exchange

True CRM which integrates very well with KM process to evaluate key business values
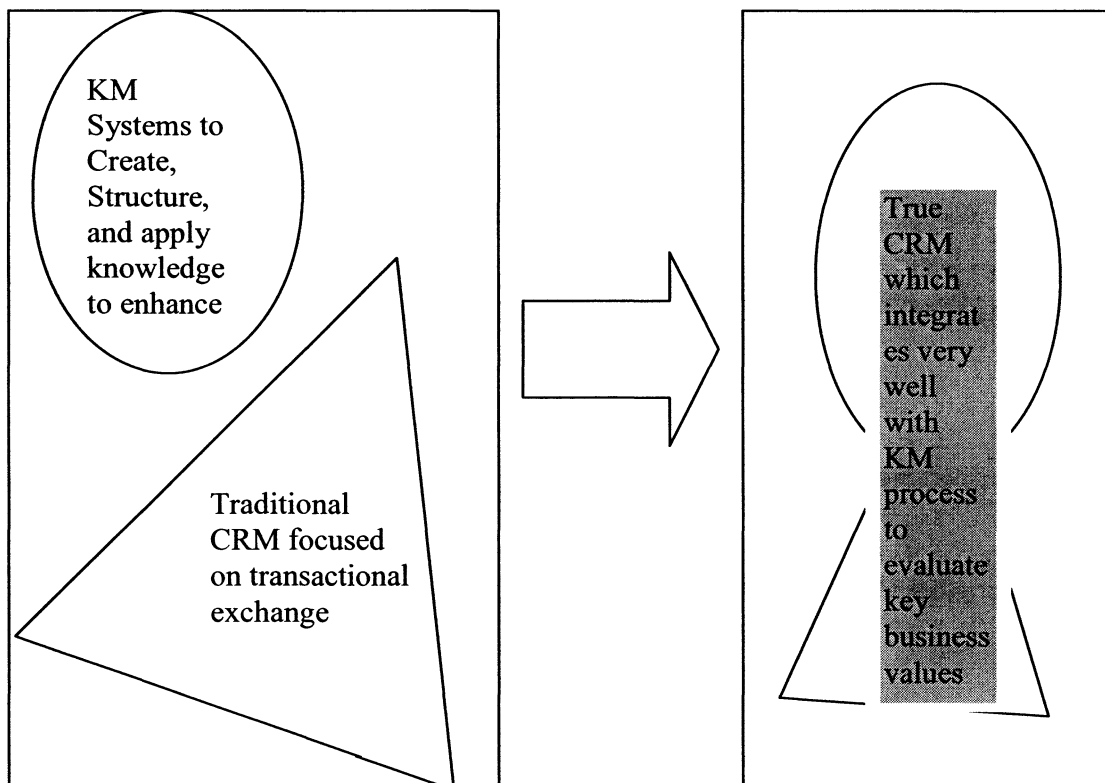
Bose and Sugumaran proposed in [37] a model that integrates the conventional CRM services and functionalities with the management and application of knowledge. The model proposed should help businesses to take more informed and more knowledgeable, customer centric business decisions.

The Knowledge Management Model

The frame work proposed by Ranjit is based on a knowledge management model that consists of four main processes as displayed in figure 3-4

Figure 3-4 Knowledge management models [37]
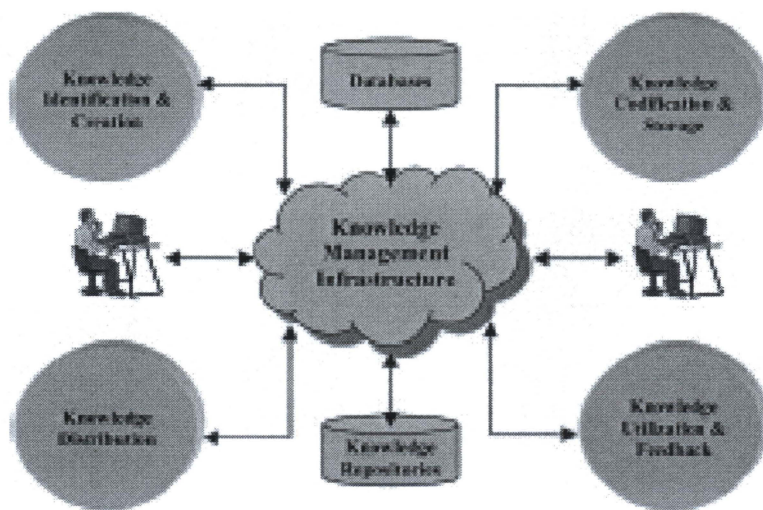
As per the figure above, the model consists of four major processes presented in the following sequence below:

1. Knowledge identification and creation where any relevant knowledge to the CRM process is identified and captured.

2. Knowledge classification and storage where the captured knowledge is mapped into an internal digital representation digital format which can be stored in a knowledge repository.

3. Knowledge distribution where knowledge is distributed across the whole organization to serve in solving any customer's problems. Knowledge is distributed using either push or pull technology.

4. Knowledge utilization and feedback where knowledge is used and utilized from the repository by the stakeholders to act on customer's issues. Moreover, feed back is also given to enrich the knowledge experience. This exchange of knowledge should also help to identify future knowledge that also needs to be added to the repository.

Offering intranet and extranet capabilities presented in an enterprise portal format is an essential part of the model. The portal is designed to offer the following:

- A common interface to knowledge from all knowledge sources within the company.

- Accelerate the spread and distribution of knowledge through the portal architecture which is similar to knowledge internet portals and search engines like yahoo.

The spread of knowledge occures through leveraging existing knowledge and enabling the creation of new ones through a continuous process that is called the knowledge learning loop. (Figure 3-5)

Figure 3-5 The knowledge learning loop [37]

| Presentation |
| Enterprise knowledge portal, FAQs, Online chat |

| Personalization |
| Collaborative filtering, Rule-based personalization, Intelligent agents |

| Collaboration |
| Work flow, Groupware, Discussion Forums |

| Process |
| Decision support, Supply chain, Rule-driven triggers, Work Flow |

| Publishing & Distribution |
| Authoring, Push technology, Webcasting, Notification |

| Integrated Search |
| Search engines, Search agents, Spiders, Data mining, Filtering |

| Categorization |
| Ontology, Common semantic definitions, Visualization |

| Integration |
| Indexing, Knowledge repository, Abstraction, Learning, Document management |

Knowledge Learning Loop

Documents	Data Warehouses/Marts	Applications	Best Practices	Discussions
• Orders & Contracts • Billing & Payments • Sales & Revenue reports • Markets & Competition • Promotion & Discount history	• Sales Force Automation • Marketing • Contact Center • Supply Chain	• Customer, Supplier & Partner Profiles • Customer Value Analysis • Behavior Prediction	• Campaign Management • Advertising • Targeting • Problems & Solutions	• Survey Responses • Call Center Contacts • Campaign Responses • Problems & Complaints

Knowledge Sources

Knowledge Management capabilities

Knowledge management capabilities are the enablers for the knowledge learning loop illustrated in the model. The capabilities consist of processes and technology features that support such a process. Here is a brief description of each capability:

Table 3-4 Knowledge management capabilities

Presentation	Ability to present different sources of knowledge from a single browser-based point.
Personalization	Creation of profiles for users and groups that will be used to provide personalized knowledge screens and contents.
Collaboration	Using communities of practice to connect people with people that share a common practice.
Process	Use play their role within the relevant business process, by providing access to knowledge management applications
Publishing and distribution	Providing users with user friendly tools that will allow them to capture and distribute knowledge.
Integrated search	Powerful search tools that will facilitate accurate relevant results and reduce the information overload. And to provide indexes to the knowledge sources.
Categorization	Classification system that will allow users to author, publish, create and access knowledge in a more structured manner for easy access and retrieval
Integration	As the above capabilities are offered, consistency needs to be maintained among all sources of knowledge and each user as the user's role is integrated.

The main technology enablers behind the above mentioned knowledge capabilities are XML and intelligent agents. XML and agents are powerful tools that will be elaborated more on within the next chapter of my research.

The model is designed so that it offers captured customer's information at the right time and to the right group of people. Moreover the knowledge management features will offer the necessary tools to analyze and share such knowledge. Knowledge collaboration tools should enhance the process of taking critical customer's related decisions, which is the main objective of any CRM system.

Components of the KM based CRM model

The next stage within the model is a KM based CRM system that integrates the CRM services and functionalities with knowledge management capabilities, see figure 3-6. The model consists of the following four components:

- *Data Sources*: An open architecture to interact with internal as well as external sources of information, including customer transaction. Technology development has impacted the range of customer contact channels and created a diverse range of customer data sources. Phone calls, faxes, emails contact centre and web portals are all part of the data sources that feed into the model

- *Knowledge acquisition component*: involves the identification and acquisition of customer and product knowledge using smart agents.

- *Knowledge repositories*: Where collected and automatically generated knowledge is gathered into a central knowledge repository. Repositories are created so that all possible knowledge about the customer is captured, which ends up in the following four different repositories:

  o *Customer transaction repository*. Where a customer service representative should be able to find all the necessary information to solve a customer's problem, including products and services purchase transactions, time and date of transaction and discounts given.

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- o *Customer Profile repository:* Includes complete customer's profile, preferences, and the value of the customer from the company point of view.

- o *Policies and procedures repository:* which includes standards and procedures associated with handling customer's related situation

- o *Domain knowledge repository* where industry related information are kept and stored

- *Knowledge utilization component:* Where knowledge search and indexing capabilities are implemented for efficient utilization of the knowledge. Periodic content delivery of knowledge to specific users is also accomplished within this component.

The above model has employed one of the best methodologies in designing a CRM system. The discussion of the components of the model detailed above is evidence of a tight integration between all possible sources of the customer knowledge in and out of the organization and the CRM processes. The development of agents within the components of the model is certainly an achievement within the area of knowledge management and CRM. More details about the agents can be found in [37]

Figure 3-6 KM-based CRM analytic system architecture [37]
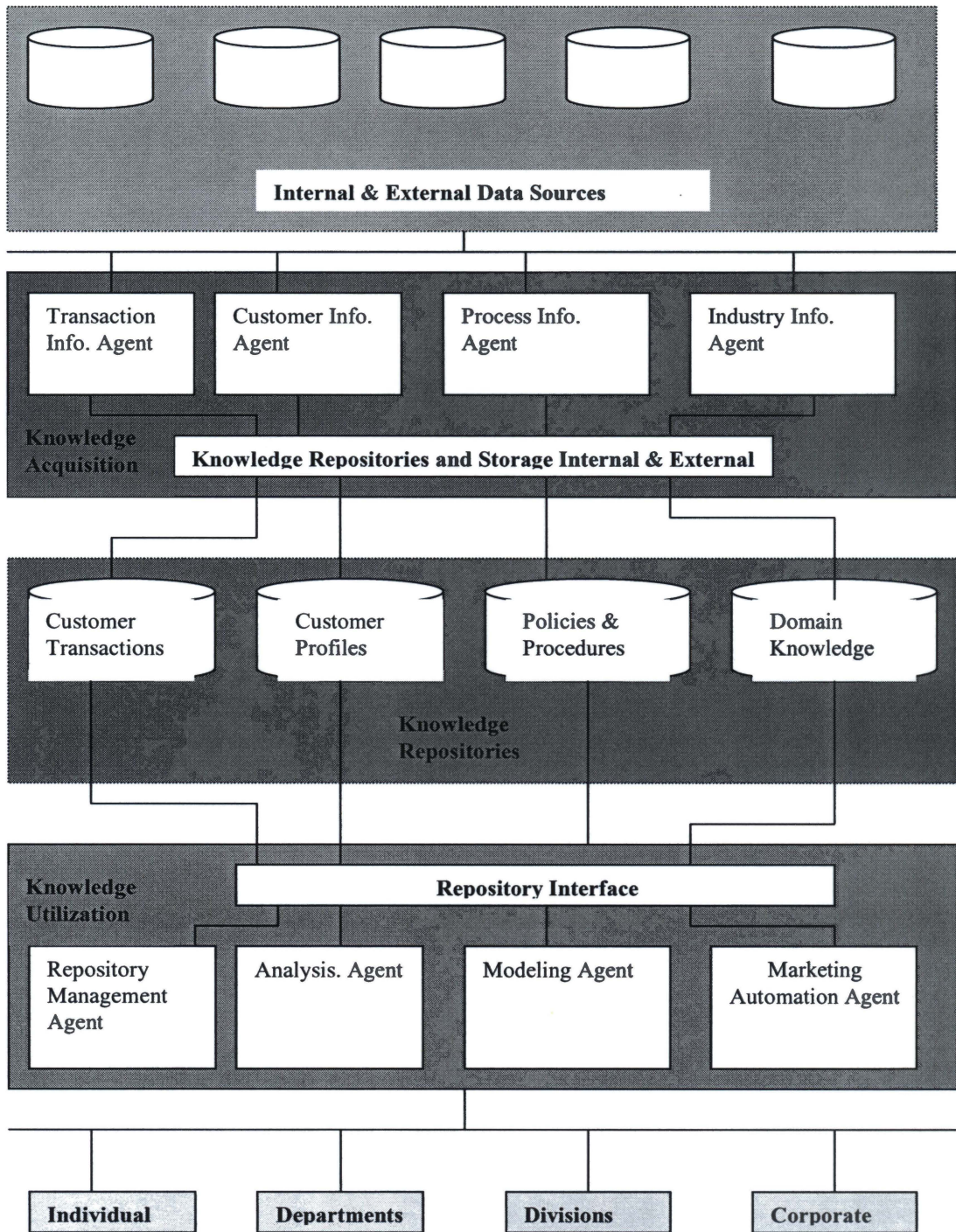
CRM SYSTEM CASE STUDY – NEW HORIZON COMMUNICATION SERVICES

Over the last three chapters, I have discussed and analysed the characteristics of an efficient e-CRM system, in chapter 3 in particular I presented various current design methodologies for CRM systems. However in this chapter, I will propose my framework using a hypothetical case study for a Tele communications business.

My design methodology

The design methodology used within the case study is a mixture of approaches presented in chapter 3. With regard to the customer's life cycle, the system can be used across all stages of the cycle. The system is also embedding the following: important CRM conceptual elements within its design:

- **Contact channels**: The system is designed to work in a multi media contact centre format, where customers are able to use more than one channel to reach the business. Channels that could be used were discussed in details in chapter one under the contact channels sections of this study. To support the continuous process of knowledge creation, transfer and management, customer's contacts and inquiries are categorized into three types of categories. The classification was done according to the level of complexity for the contact. The categories will be presented later on through the chapter.

- **Knowledge repositories**: Knowledge repositories support the system as a knowledge collection and collaboration point. All repositories are powered with a powerful search capability adaptable to the nature of customer relation process. Search engines and facilities should accept human like inquiries. Some of the knowledge repositories are:

o *Products and service repository.* Where detailed information about existing and coming products and services are kept within. Such a repository presents not only an efficient source of information about what the business is offering, but also an educational tool for users of the system about what business they belong to.

o *Contact repository.* Whether it is a customer inquiry, an initial contact, an order or an after sales complaint it will be logged within the repository. Thus, customer's contacts via all channels are recorded.

o *Transaction repositories:* Should log sales, purchase order warranty and after sale customer's transactions. Any other customer related transaction will also be recorded.

o *Customer profile repository.* This repository stores customer's name, address and contact details, as well as a detailed profile of the customer's existing and future requirements. Customer's organization structure and the roles involved at each level of the culture are also recorded within the repository.

o *Company repository.* Contains a list of who does what within the company along with their roles, phone numbers and emails.

o *Industry repository.* Where employees could access government's legislation about the communication industry. The repository should also have links to any industry related organization.

- **Knowledge Management:** The system is designed with a tight integration between customer process and knowledge management. Knowledge is captured through any customer contact. Customers are categorized into three levels according to their value model as discussed later in this chapter, in addition to the categorization within the types of customer transactions.

In the coming section, I will talk about the tools involved in composing such an integrated system. Then, I will be demonstrating the implementation of the case study using Livenet.

About LiveNet and Rich picture modeling technique

The model is based on the rich picture method, which is a Meta model of collaboration. It is mainly used to define collaboration processes for any type of application. Additionally, it is also used to implement any processes as an electronic workspace.[38]

The strength of the rich model comes from the fact that it can model community, coordination and social models at the same time. The model has emphasis on people and not only on business functions which cater for better collaboration. The technique is characterized by the following:{Hawryszkiewycz, 2005 # 83}

1. It offers a strong background for managing knowledge.

2. There is no separation between theory and implementation. The techniques provide concept that map directly to an achievement.

3. The technique produces systems that are designed as an agent based which will actively support users.

The case study – New Horizon Communication Services

The case study presented here is for a communication company that offers various products and services for a different range of customers. A model based on the rich picture method is presented for a knowledge-based electronic client relationship management system. Such a model should offer a complete integration between the different business units. Special emphasis in this model is placed on the contact centre section of the CRM module. The various activities in the contact centre into a transition diagram. These models and transition diagrams are then implemented using LiveNet Workspace based structure.

Services offered by the company

The business case company offers the following services:

- Fixed Telephone Lines

- Mobile Telephone Links

- Data link services.

- International Calls Services

- Internet Connection Services (ISP)

Rich Picture models for the company

Figure 4-2 displays the three main activities that build up the system in the case study. The generic CRM activity, the contact centres activity and the WEB portals activity. For the sake of this study, the contact centre activity will only be expanded into more detailed rich pictures as well as a transition diagram.

Figure 4-1 CRM Based Call Centre – Workspace Structure

CRM Based Call Centre - Workspace Structure

Figure (4-2) Rich Picture for a KB CRM System
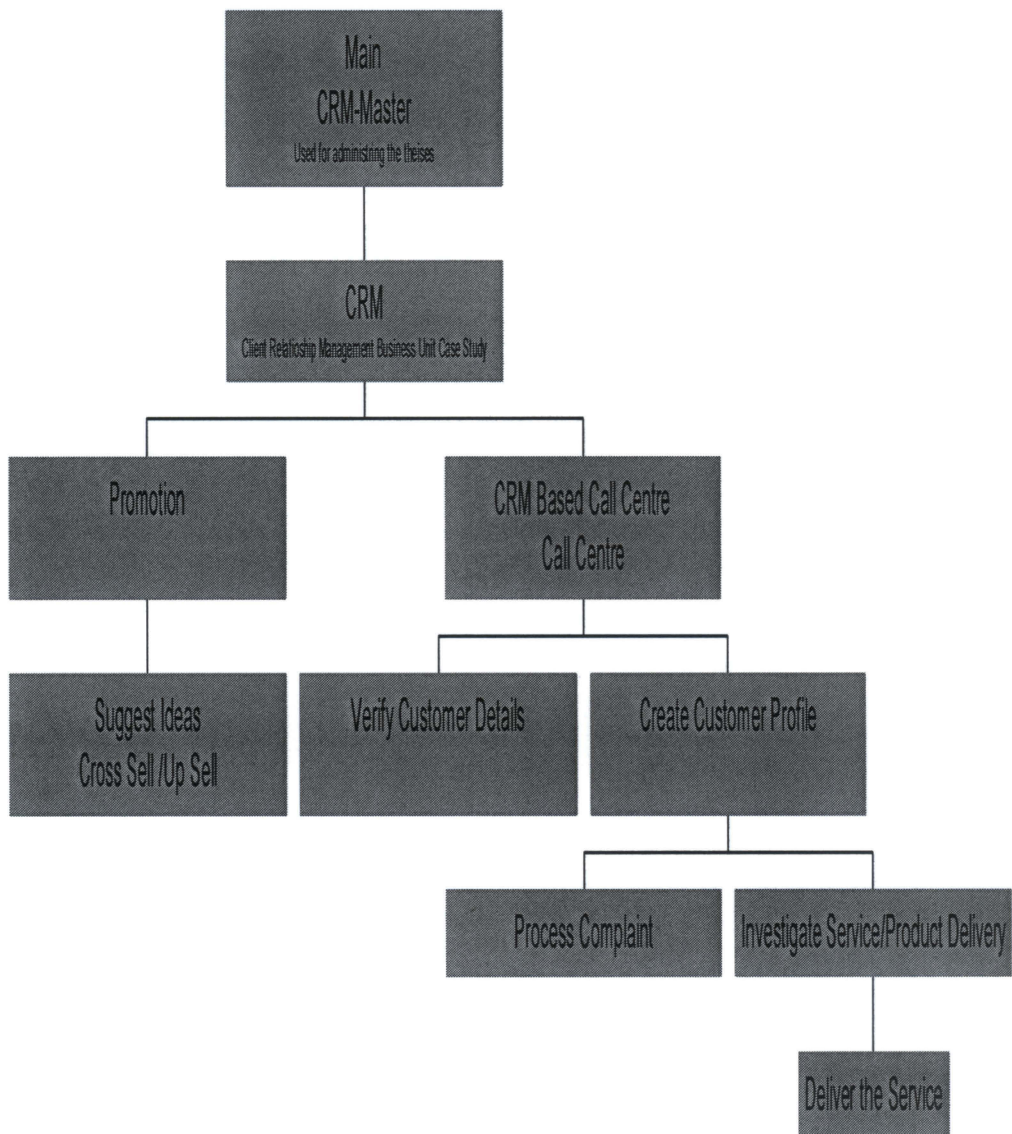
Figure (4-2) Rich Picture for a KB CRM System
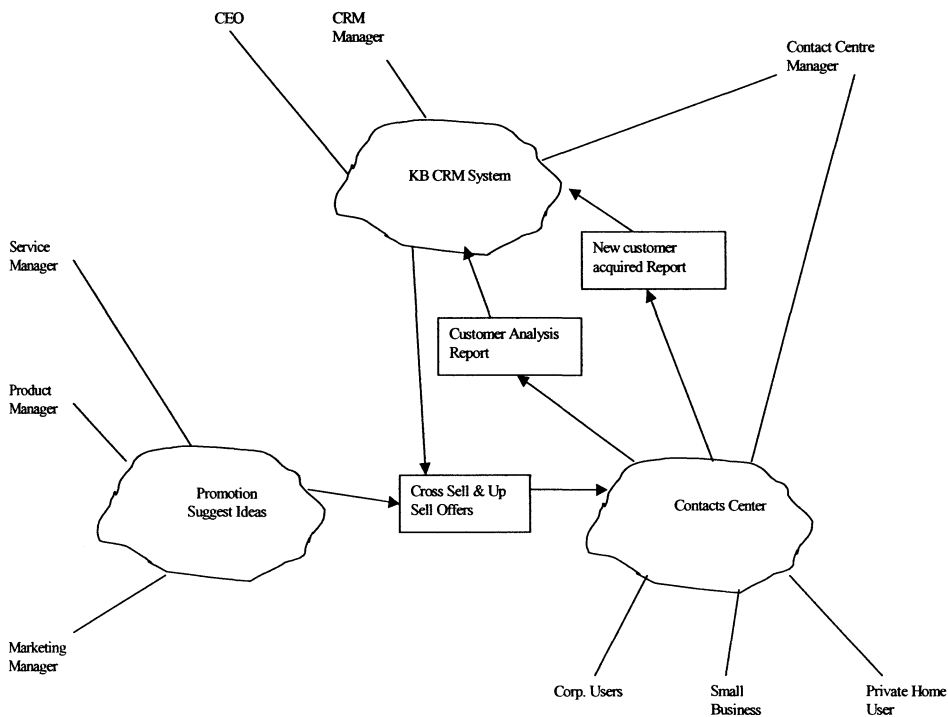
Customer Categories

As the company offers its service for a wide range of customers, the following customer categories could be defined:

Category A - Private home users. (1-2 fixed line, mobile line, Intl. calls and Internet services)

Category B - Small Business users. (Between 2 and 10 fixed line, mobile line, Intl calls and data link)

Category C - Medium to large Business users. (More than 10 fixed line, mobile, Intl calls and data link)

Figure (4-3) Rich Picture for a contact centre – Level1

Customer

Product Info

Complaint Manager

Customer service Representative

Contact Centre Management

Complaint

Process Complain

Recommended Problem Resolution

Recommended Actions

Customer Request

Customer

Customer

Expert

Product Specialist

Process Customer Request

Coordinator

Supply the Service

Customer
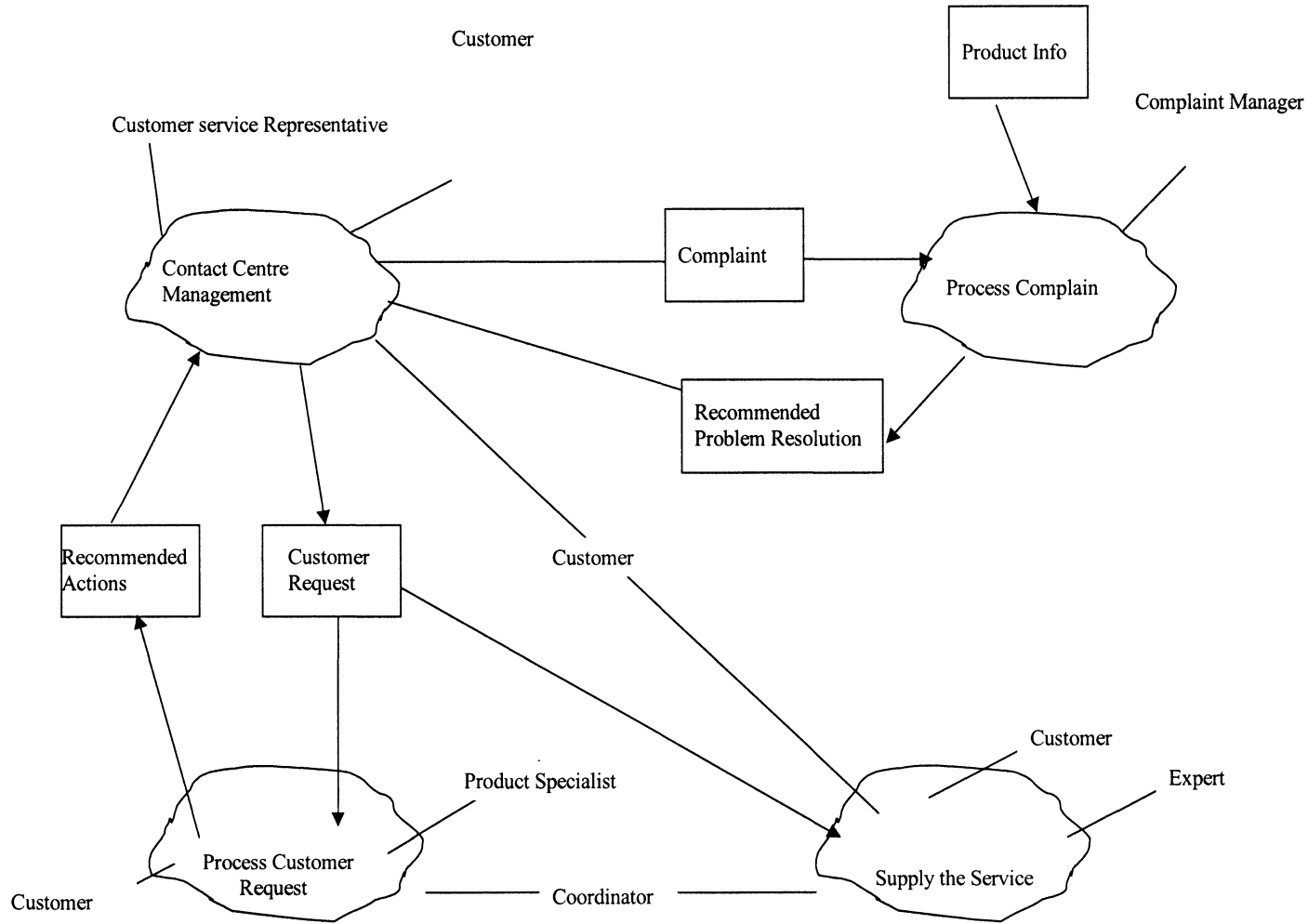
Figure (4-4) Expanded Rich Picture for a contact centre

Contact
Center
Representative

Customer

Front Office

Check Database

Accounts /Finance
Processing

Customer
Account Report

Customer

Customer Request

Coordinator

Complaint Manager

Accounts
Dept.

Complaint
Report

Process
Complaint

Product Info

Verify Customer
Request

Detailed
Customer
Record

Create Customer Profile

Recommended
Action Report

Product or Service
Specialist

Customer

Deliver the Service

Investigate /Service
Request Delivery

Service
Delivery
Report

Expert /Specialist

Figure 4-3 and 4-4 presents two levels of a rich picture for a CRM based contact centre. The following activities are defined in figure 4-3:

- Contact Centre Management. Refers to all the centre management tasks, including agent managers, as well as centre managers; tasks within the activity guarantee a smooth operation for the centre

- Process Customer Request. This activity will be illustrated through detailed rich pictures and transition diagrams over the coming few pages. It must be mentioned that a great number of roles are involved in this activity, including the customer, product specialist and a coordinator with other business units.

- Supply the service. Describe the mechanism of supplying the service to the client.

- Process Complaint: A very important activity for any CRM model. The efficiency of resolving complaints will depend on the tasks within this activity. Indeed, this activity could turn into a new sales opportunity if it has been dealt with properly. The right knowledge is required to enable the agent to resolve the problem.

Figure 4-4 on the other hand, is an expansion of figure 4-3. The front office activity which has been introduced is responsible for interacting with all types of customer interactions. Additionally the customer's verification request is added to the rich picture before the customer 's request process activity takes place. The verification process will be illustrated in another rich picture diagram.

Categorizing Customer's Contacts

Customer's contacts are categorized by the characteristics of the request. Customers would usually make contacts for one of the following reasons:

- To get more information about a product or service

- To order a product or service

- To check order status

- To pay accounts

- To get instructions on how to use the product or service.

- To report problems or difficulties in using the service

- To comment on the product or service.

To make it easier to process a customer's requests or inquiries, the following categories could be defined:

Category 1: **Simple** – Inquiries directly answered by the customer service representative officer. Knowledge Data Bases could be used to retrieve relevant and similar answers.

Category 2: **Easy** – Inquiries that involves collaboration with other business units.

Category 3: **Difficult** – More difficult inquiries that involve 3rd party supplier and other parties.

Figure 4-5 illustrates the transition diagram of the rich picture presented in the previous two figures. Categories defined earlier will be used in this transition diagram

Figure (4-5) Transition Diagram for a Contact Center
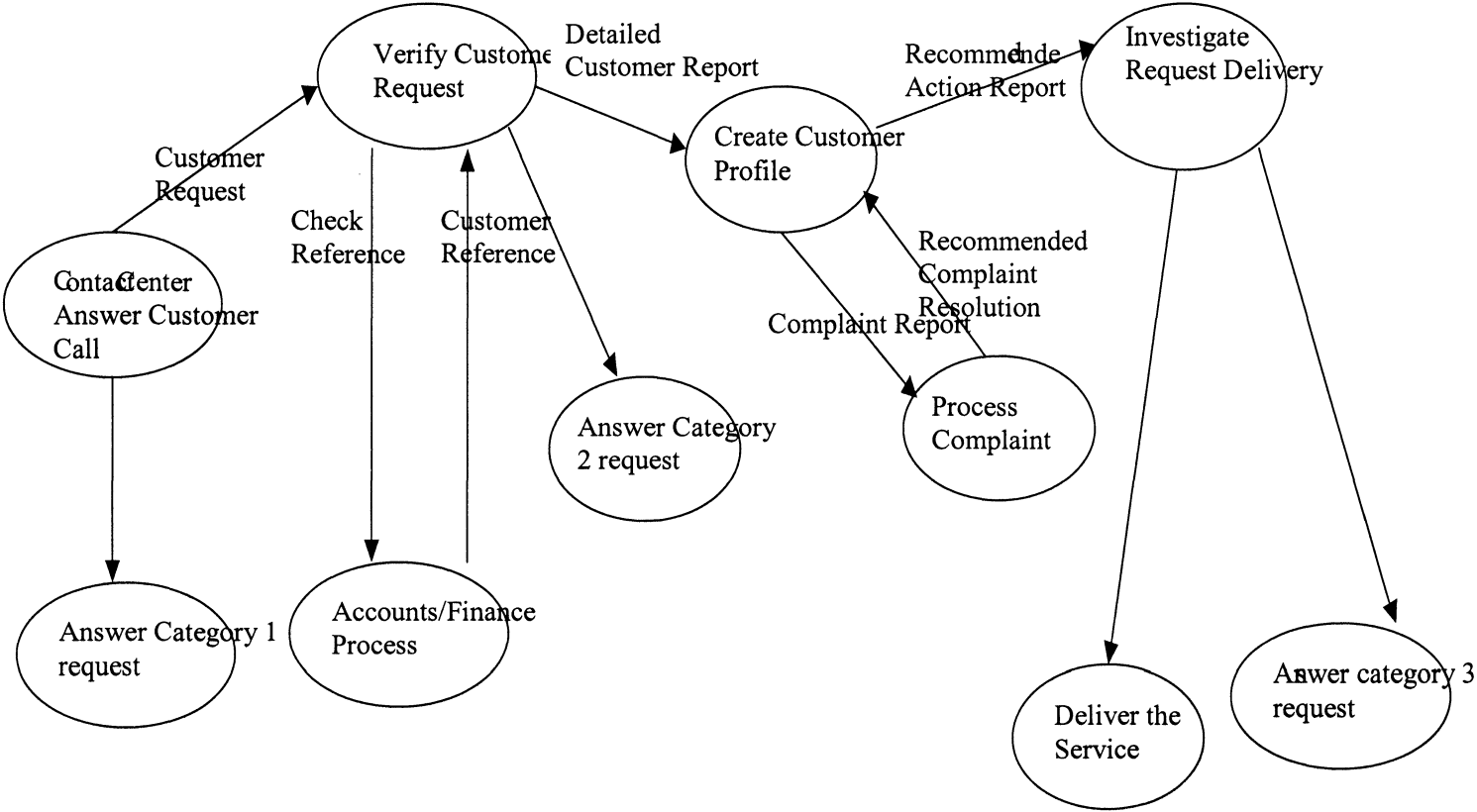
In the next section, I will be reviewing and presenting the following activities into detailed rich picture as well as the transition diagram:

- Verify Customer Request

- Investigate Request Delivery

- Deliver the service

Process Complaint

- Cross Sell / Up Sell

Figure 4-6 **Rich Picture Verify Customer request**

Customer
Request

Call Logger

Verify
Call
Type

Coordinat
or

Customer

Verify
Call
Details

Detailed Call
Report

Verify
Customer
Details

Detailed
Customer Report

Customer
Relation
Specialist

Recommended
Action Report

Investigate
Product/Service
Delivery

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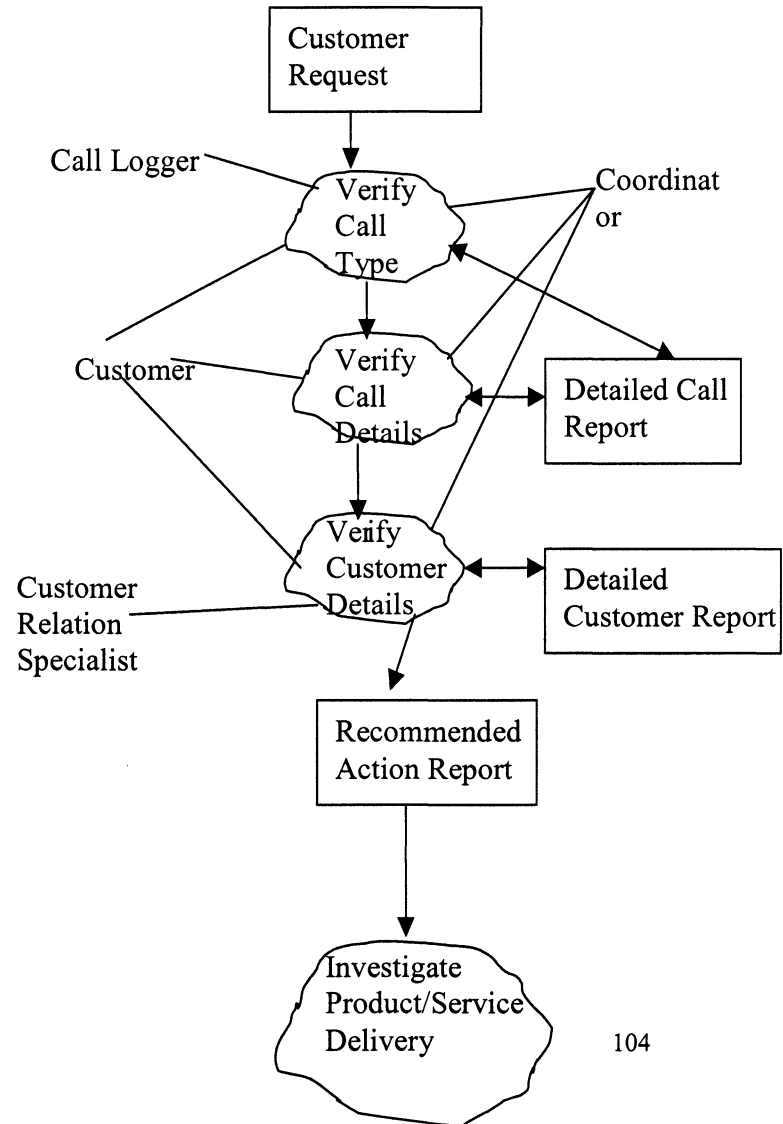
Figure 4-7 – Transition Diagram Verify Customer Request

105
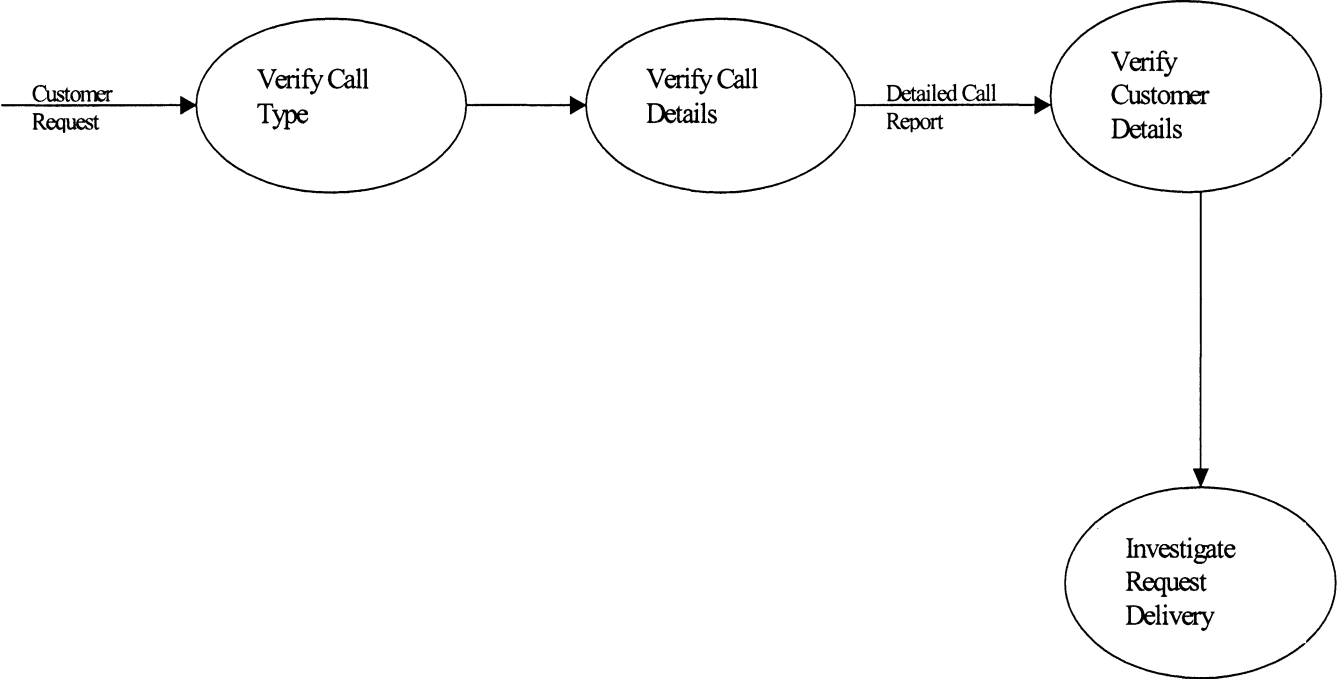
Figure 4-8   Rich Picture Investigate request Delivery

Recommended Action Report → Check PABX Requirement → PABX Requirement Report → PABX Expansion

3rd party PABX Supplier

PABX Operation Team

Check Cabling Requirement → Cabling Requirement Report → Cable Expansion

Cabling Contractor

Service Delivery Repor

Deliver the Service

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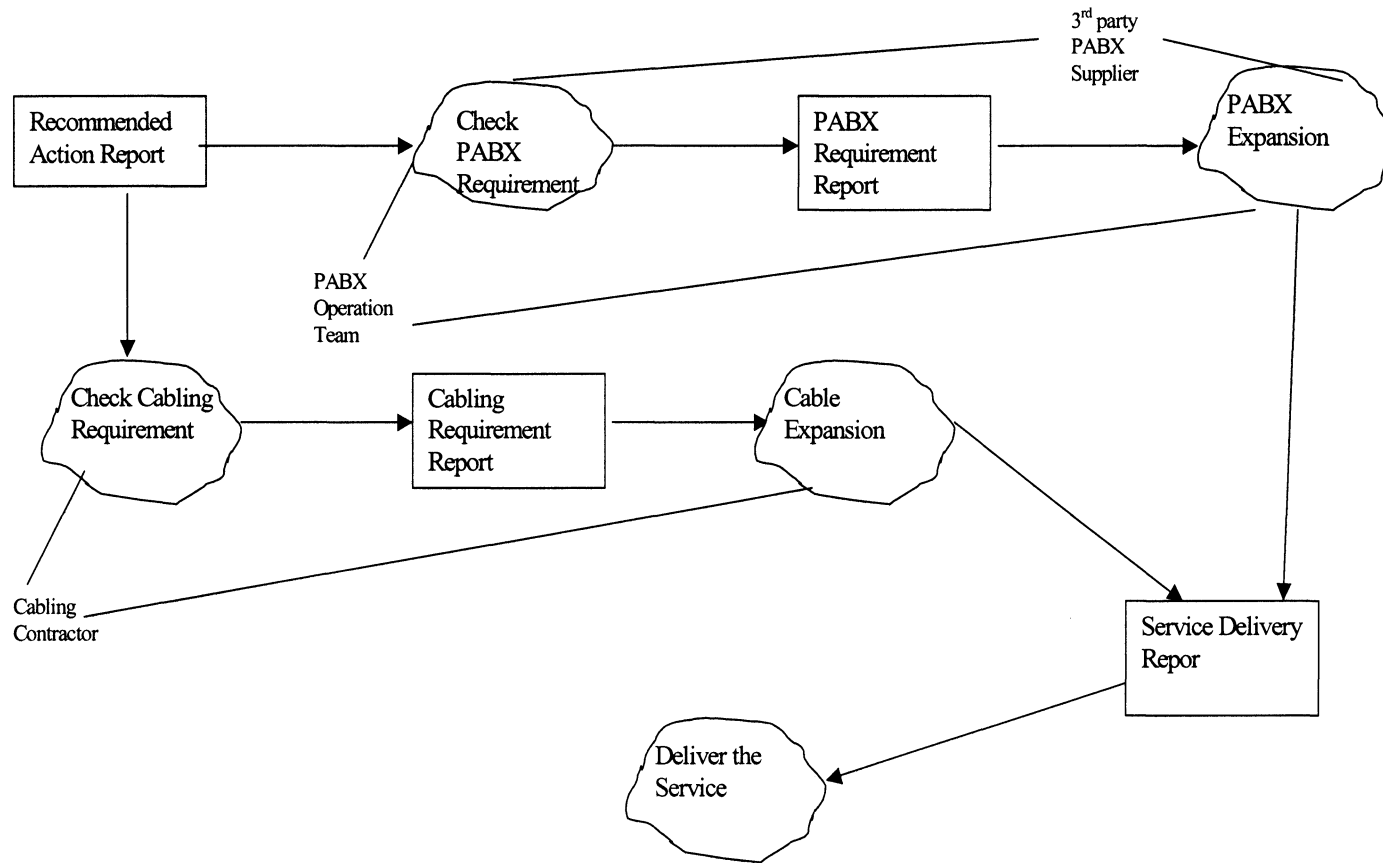
Figure 4-9 Transition Diagram Request Delivery
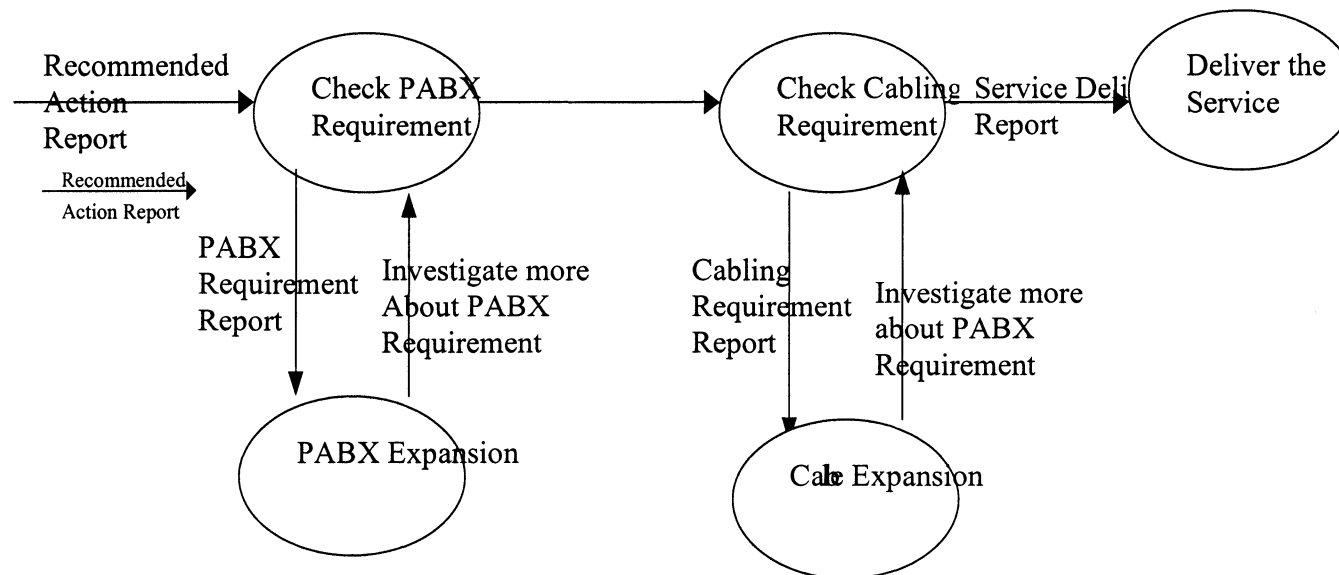
The role of the customer Service Representative

All contacts directed to the contact centre will be answered and handled by a Customer Service Representative - CSR. Trying to define a standard interface for the CSR, the following outline presents a CSR view when customers log on to the system:

- Directory of Products & Services. (Products and services detailed information)

- Knowledge Base. (Data base of all the received calls and answers – with powerful search facility)

- Customer profile (Detailed customer record and profile)

- Calls data base (searchable date base with all calls to the centre)

- Company Directory (List of all people working for the company with who is doing what feature , e-mail and voice enabled)

- Links to other suppliers and 3rd party vendors.

- Calendar with access to book other business unit services to complete the job.

This is what would customers from the different category view when they log to the system:

Table 4-1 Customers' inquiry categories

Category A	Category B	Category C
Related products and services information	Related products and services information	Related products and services information
Support Knowledge Base.	Support Knowledge Base.	Support Knowledge Base.
Lodge a request with our on line facility	Lodge a request with our on line facility	Lodge a request with our on line facility
Shop around	Account status	Account status
		On Line chat with our expert consultants

Figure 4-10 - Rich Picture Process Complaint
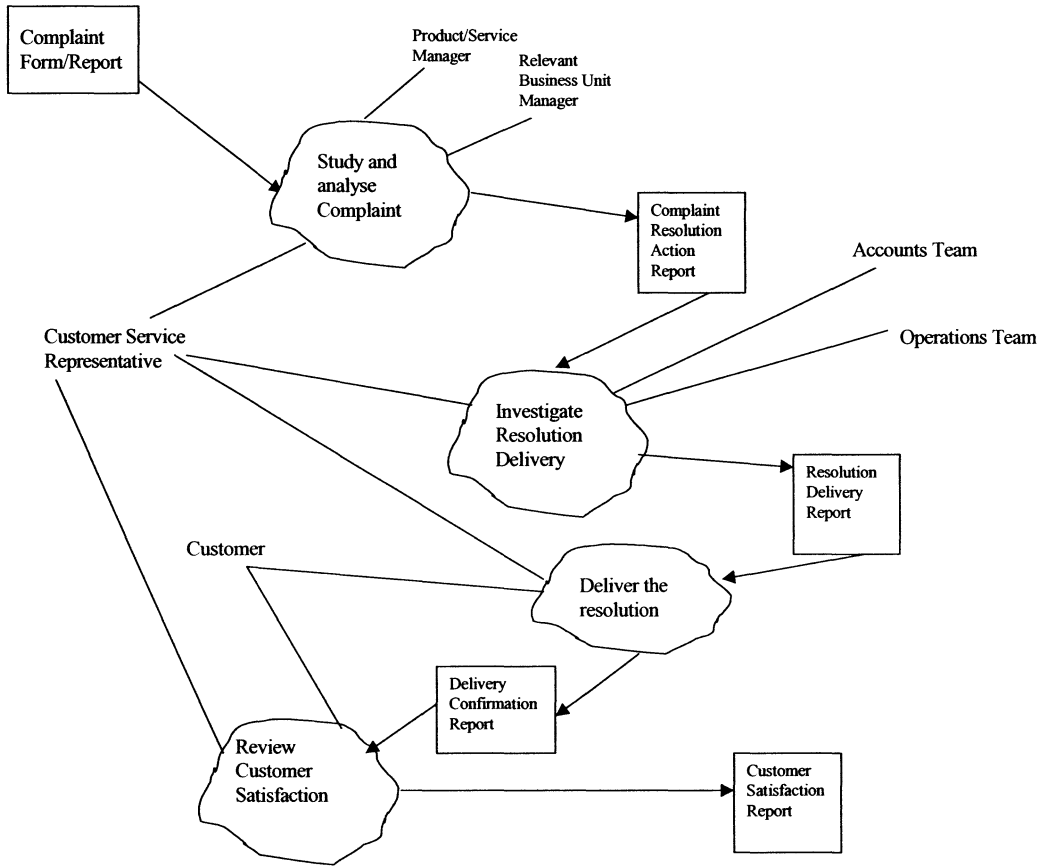
Figure (4-11) Transition Diagram – Process Complaint
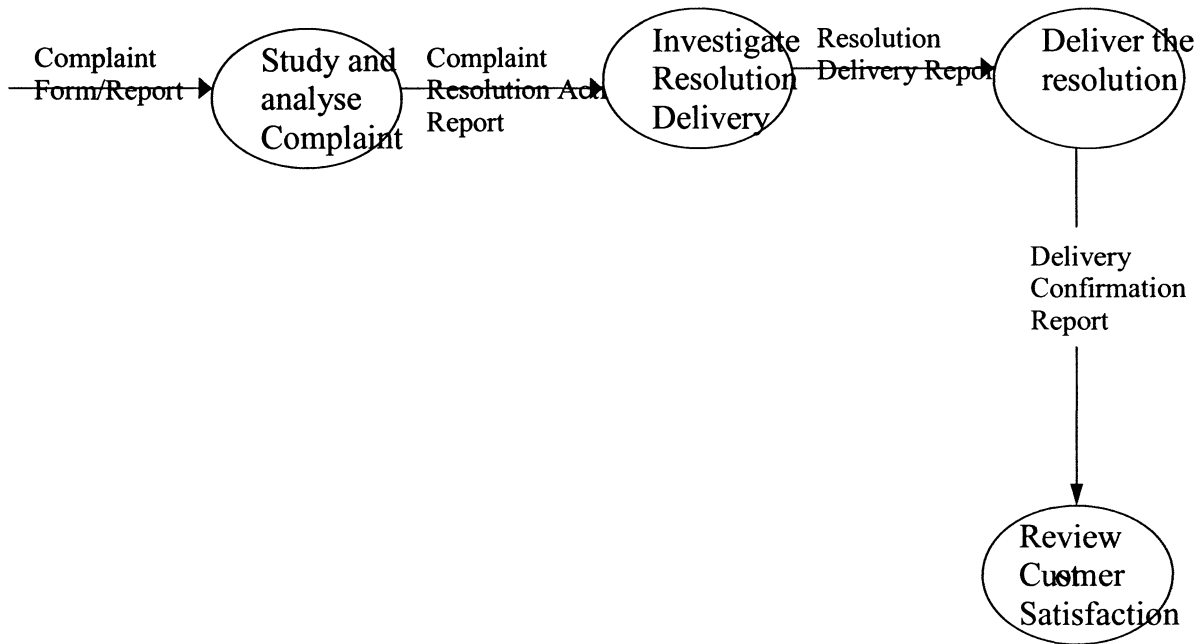
Figure 4-12 - Rich Picture Suggest Ideas
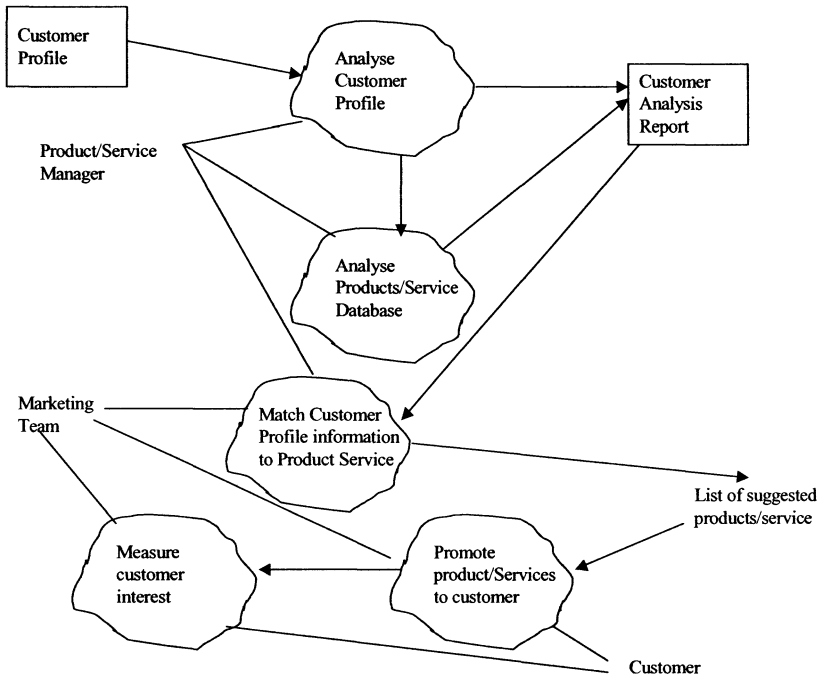
CRM TECHNOLOGY ENABLERS

My study CRM Technology Model

This extensive study has enabled me to create my own model of the technology enablers for the CRM process. The model presented in figure 5-1 consists of three layers. The first layer of the model symbolizes the customer interaction points, which was discussed in details in chapter 1. As the number of mobile phone users is increasing every day, the usage of the WAP protocol is also increasing in the interaction process with customers. See [Kevin H.W. Shen, 2000 14] for more detailed information about the usage of WAP and SMS in CRM systems.

A new area of customer interaction will be launched in June 2005 where about 46% of mobile users will be connected to GPRS. The GPRS will allow users of both 2G and 3G phones to receive multimedia media messages (MMS) as well as WAP messages. [39]

Mobile business is another area that has emerged in which the company's knowledge about their customers is integrated with the knowledge about the customers' locations. The accumulated knowledge is utilized to deliver applicable as well as well-timed offers and information that is of interest to the customers. This generates a variety of location based services which form the knowledge building blocks about the customer location; including Cell Identifier (Cell Id), Global Positioning Systems (GPS), Assisted Global Positioning System (aGPS) and Broadband Satellite Network [40]

The next layer represents the collaboration tools infrastructure that needs to be available within the system to make the existence of such powerful customer interaction points accessible. This layer actually automates the customer related business process as well as integrates the different business processes in an organization towards servicing the customer. With this in mind, it has the middleware tools that link any old legacy systems to the customer front-end system.

The third layer corresponds to the existing systems inside the organization. It also corresponds to the data warehouses that hold customer knowledge.

Figure 5-1 outlines the various technology techniques used in a e-CRM system.

GPRS WAP SMS	WEB Portals	Contact Centre • CTI • IVR • ACD
• Middleware • Workflow • E-Mail Infrastructure		
• Mainframe Legacy Applications • Data Warehouse		

In the coming sections, I will be discussing in some details some of the technology enablers mentioned in the model.

Data Ware House & Data mining techniques

Data Ware house is a special type of a data base system. Typically, such systems pull their data from all available production systems within an organization. Data ware houses are organized in a way that allows answering complex queries. Gardner defines data ware house in [41] as " a process, not a product, for assembling and managing data from various sources for the purpose of gaining a single, detailed view of part or all of a business".

Data Ware houses are always related in a way or another to the size and nature of the business. Designers of such systems need to consider that businesses are always changing and, therefore, they have to come up with a dynamic and scalable solution.

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As a matter of fact factors such as the nature of inquiries, number of users, and the size of the data contribute to the type of the designed solution. In my proposed system data warehouses, I present the storage in which all types of customer knowledge are captured, organized, and stored. I believe data ware houses are considered a necessity for any type of knowledge based systems.

Data types and information

Businesses need to take any opportunity to capture any customer data. Such detailed data will help in answering business inquiries. In addition, it should help in justifying such found answers. The process of capturing data at all levels of customer interaction is vital to CRM and data ware houses. It is worth mentioning here that captured data will not be of value for the business until it is converted into valuable information. Such information is defined by each individual business.

Inmon defined in [41] the different types of data that will build typical data warehouses:

Integrated Data: It is important for an effective design of a warehouse to decide on who wants access to what data. Businesses are usually consist of various departments. In some situations users from within a specific department requires, access to that specific department data. By contrast, in other situations, cross departmental access is required. Managers and team leaders usually require such an access. As data is extracted from different resources, alteration of data may occur from time to time as part of the data extract and preparation cycles. Thus refinement and clean-ups of such data before it is integrated is crucial while would help in establishing a data common structure as well.

Figure 5-2 The data preparation cycle and process, source [42]
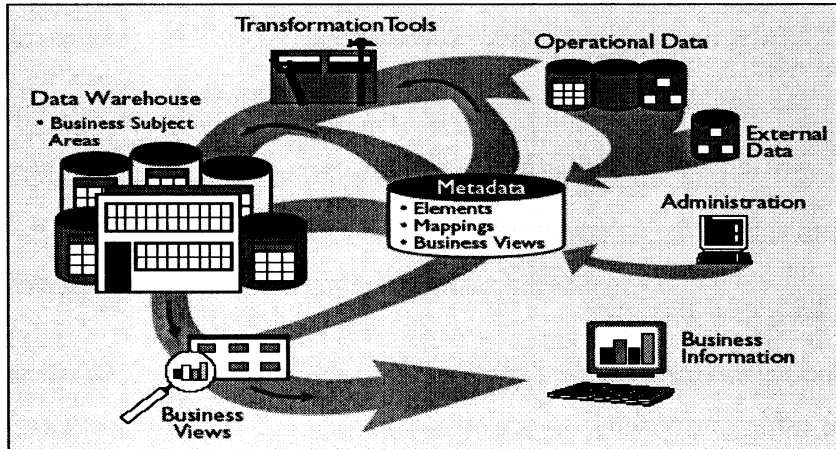
Detailed and summarized data: Detailed data is useful and sometimes could hide smaller tiny information that would help the business in reaching critical business decisions. On the other hand, summarized data would ensure that work performed by others is not repeated. Manipulating unprocessed data into a common and easy to process format is called summarizing data process. Figure 5-3 illustrates how detailed data for a sales promotion can show sales lead in particular days rather than the misleading summarized version [43]

Figure 5-3 Detailed versus summarized data, [43]
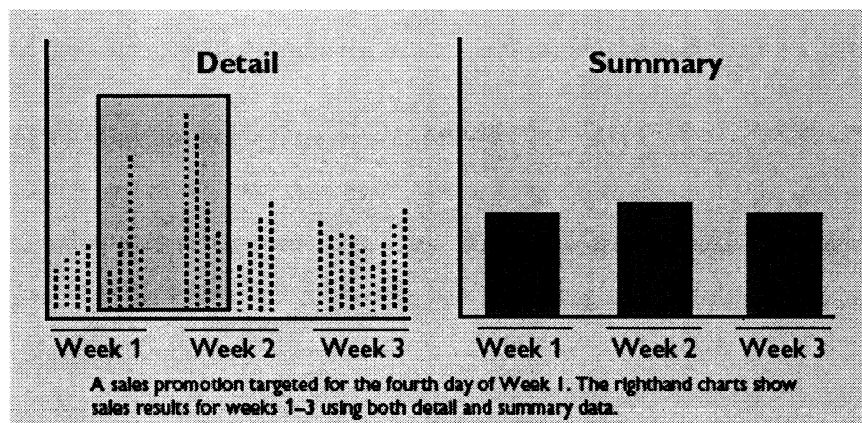
Historical Data: Old historical data is also important for business analysis, whether it is data coming from a legacy system or any other format and should be included in the data warehouse. Such data would be of help to analyse trends changes and movement within the

business environment, besides, it helps in predicting future leads. One good example of historical data is historical customer data, which is defined as previous customer details and transactions that can't be ignored in designing any customer related process.

Metadata: Metadata is well known as data about data, which is a representation of the objects defined in the warehouse data base. It typically includes tables, definitions, queries, reports and any business rules. Metadata acts as a library catalogue that helps users to locate the exact data that they would like to retrieve from the warehouse.[43].

Metadata, in the case of Web portals is the information stored about an item so that an agent can search and use. The agent could be a human being, a machine or even a software module [15]. On the other hand items are information items, for example, a product promotion document, or may be a technical manual document. Metadata for such a document could be that author's name, creation and modification dates, may be the templates or/and a brief description of the document itself.

The concept of metadata applies very well to all knowledge based systems and to my case study. For example, the metadata about the customer categories proposed in the system could have the form of a category template in which different fields within the templates will reflect the nature of the customer. The template might contain fields of information about the nature of services the customer is using (i. e. fixed or mobile line), the geographical area of the address of the customer, or may be the nature of business the customer is currently involved in.

Data Warehouse design methodology

Designing an efficient data ware house solution that could lead to a successful CRM strategy requires a structured methodology along a clearly defined structure. Ideally the framework needs to be customer centered. The following methodology was proposed by Gardner in [43]Figure 5-4

Planning:

Enterprises at this stage are required to clearly define the objectives of building a data warehouse. Business challenges should be confronted with a well prepared process to tackle such challenges. This step should be of much help in shaping up what type of data warehouse

is required and what structure to use. Consequently a well planned solution might involve a redesign or enhancement of the existing business process.

Design and Implementation:

This stage is about the readiness of the planned solution and technology. Is the planned data ready for such a setup?, how integrated is it? Will the proposed technology fit within the existing business IT infrastructure? How will the proposed design impact the different departments within the business? Is there an adjustment that needs to be made for the planned design? Giving the correct time and effort for such a stage should guarantee an efficient implementation of the solution, and accordingly, would ensure the proper use of data towards critical business decisions.

Figure 5-4 The Data Warehouse Methodology proposed by Gardner
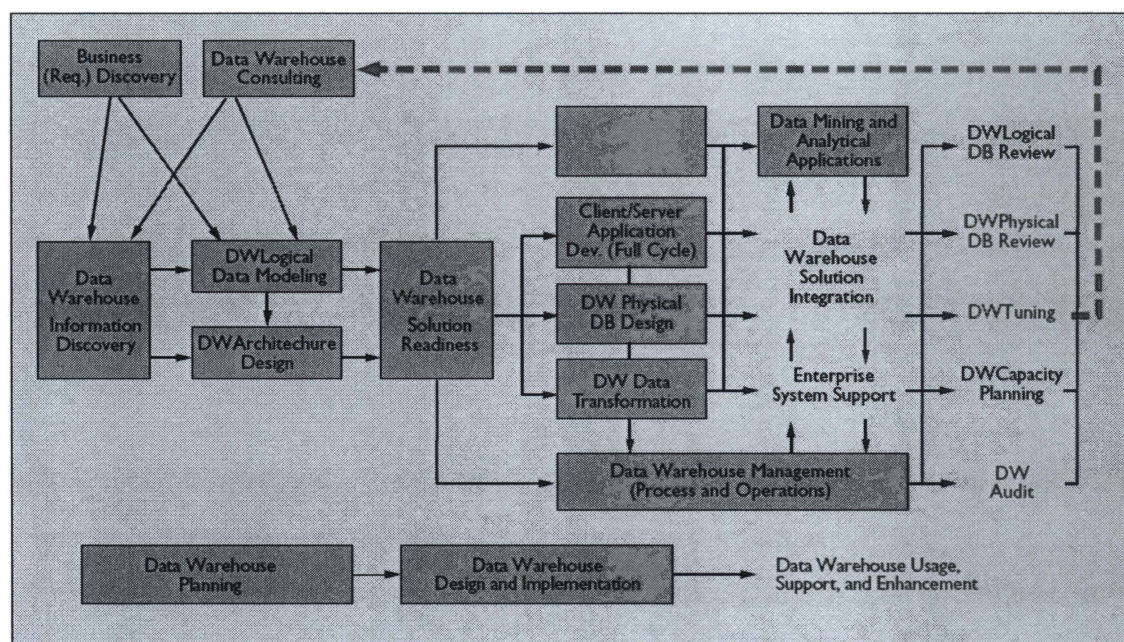
Support and enhancement:

The support and enhancement stage forms a kind of a post implementation stage where follow up and maintenance is carried on the currently operating solution. This stage should ensure the continuous availability of the solution. In addition, it would cater for any required changes, updates or even expansion of data, and finally users or applications.

Data Warehouse Architecture and Framework

Implementing the above methodology is vital and should lead to a well designed framework that would organize the operation of data warehouse. The framework is a blue print of the solution. It is a graphical presentation of the various objects and components and how they relate to each other.

Ideally the data warehouse consists of the following three components as illustrated in figure 5-5, [44]:

1. The data bases which contains the data of the warehouse

2. Middle ware which is a special software that extracts data from other systems, whether it is legacy systems or external applications. I will be having a special section later in the chapter.

3. Client software which allows access and interaction between users and applications. Web browsers such as internet explorer and Netscape are the most popular clients nowadays.

Figure 5-5 Basic Ware house Architecture and Component Source[44]

Data Acquisition Software	Data Warehouse	Data Acquisition Software
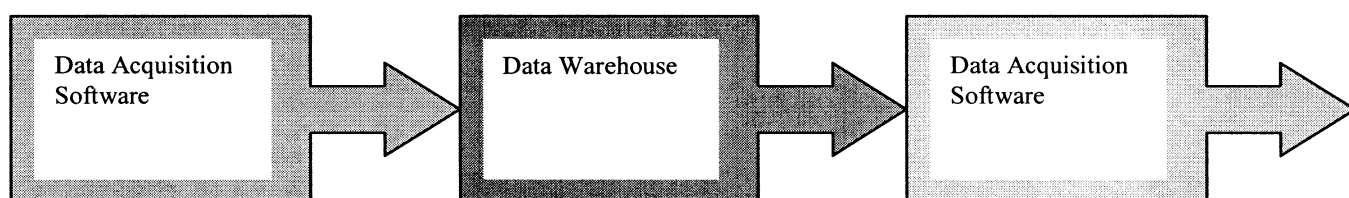
Back End:
External data from legacy systems and external sources. Consolidate and summarize data. Load data into warehouse.

Target Database:
Data are maintained in a relational and/or multidimensional database

Front End
User access in warehouse data analysis

More detailed warehouse frameworks are shown in both Figures 5-6 and 5-7 designed by IBM and Gardner

Figure 5-6 A Date Warehouse Structure by IBM [42]
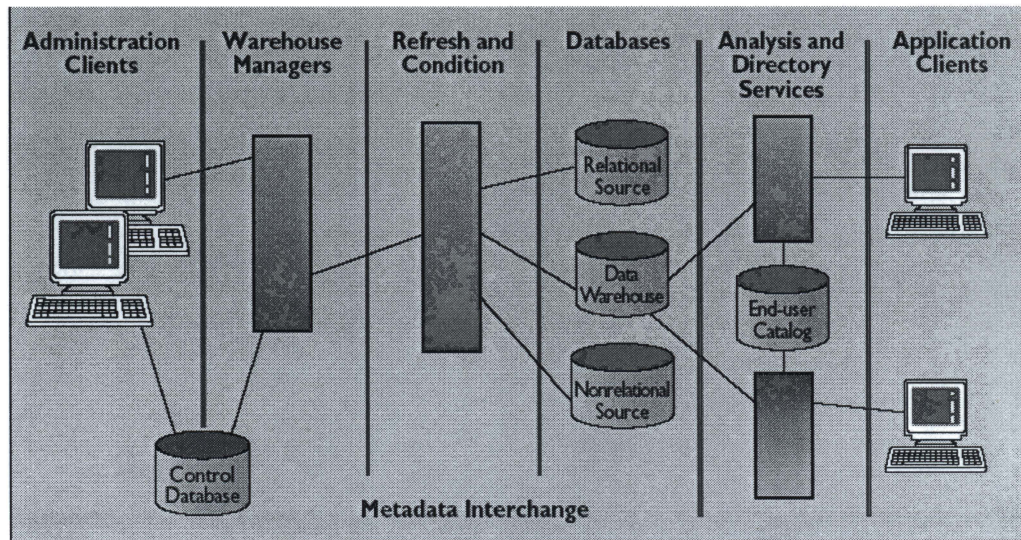
Figure 5-7 Data Warehouse structure by Gardner [43]
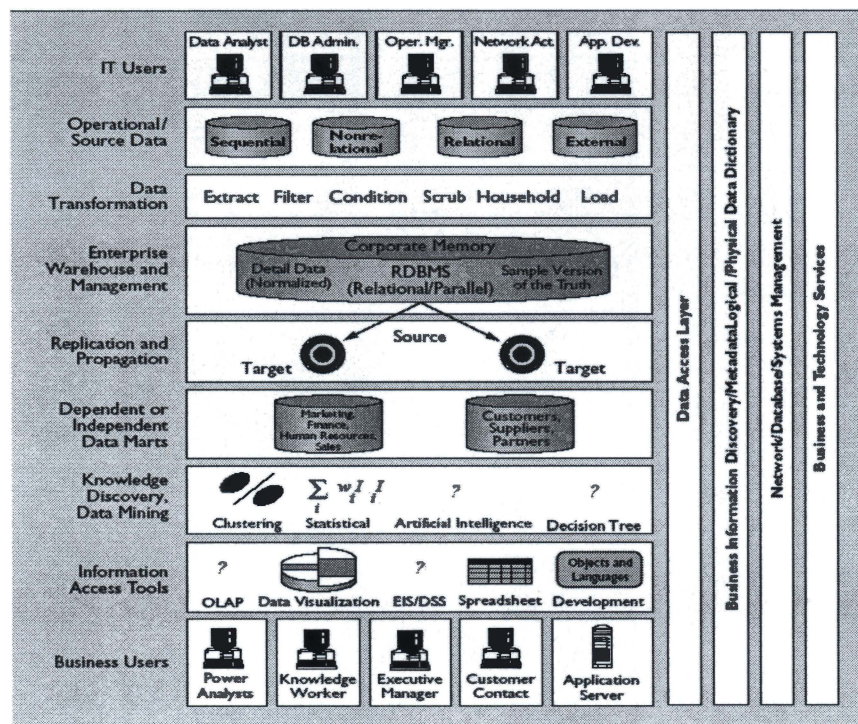
Call and contact centre technology enablers

In the first chapter of my research, I explored the importance of the call centres to any CRM system. I also explained how technology enablers introduce new customer interaction points and come up with contact centres instead. Figures 5-8 and 5-9 illustrate the different functionalities involved in today's customer interactions and the different media format that is enabled by state of art technologies.

Figure 5-8 Examples of the customer interaction functionality [45]
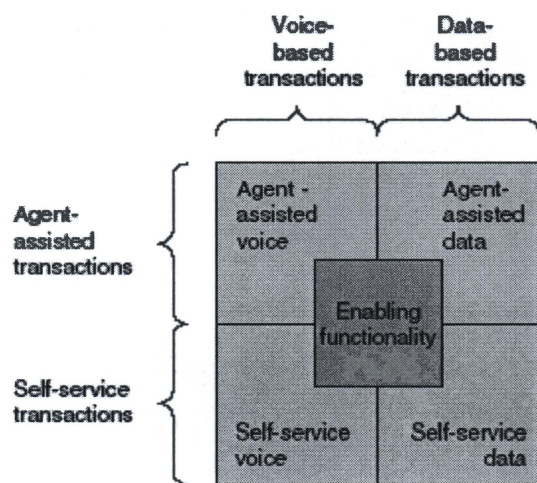
Figure 5-9 The different media format in use with customer interactions [45]
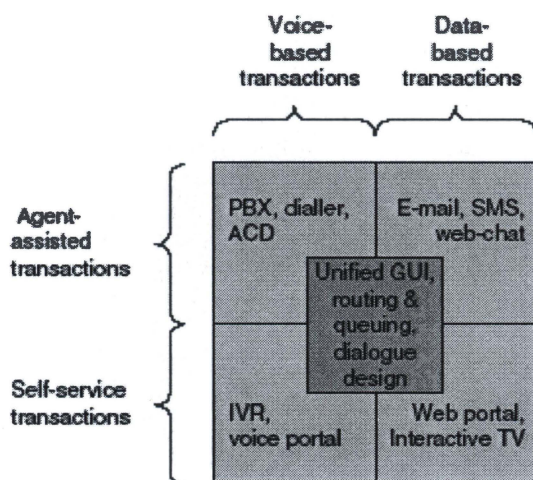
It can be noted from the above figures how the same agent can handle different contacts using different media according to the incoming request. The agent most probably will be able to pull data from the date warehouse in order to answer the customer request. Additionally self service interactions also use multiple channels (voice and data) and are also capable of pulling the custom tailored information in response to what the customer wants.

The role of IP Telephony within the contact centre

IP telephony or what is called as voice over IP is a breakthrough technology within the world of contact centres. IP telephony promises to deliver voice superiority similar to what a conventional telephone system will offer.

The technology is inhibited with some obstacles, for example, latency cannot be controlled across the internet and the availability of pc's ready for voice messages is limited. Hoever such problems are being resolved.

Voice over IP VoIP is critical to the development of the new contact centres due to the following reasons [11]:

- The fact is such a technology will make it possible for voice and data to share a common channel or media to go through. Such a fact can be applied in offering a customer currently surfing the internet to press a button and have voice interaction with an agent, and to distribute incoming calls among agents

- Technically VoIP will make more efficient usage of the telecommunication infrastructure than the traditional phone systems.

Important applications can be offered using the VoIP technology which should enhance the overall communication system. The following categories of applications are a clear indication of how the reform has happened in the industry [11]:

- Offering clients' voice access across the internet using computers bundled with multimedia capabilities. From the comfort of their house and while surfing the

internet, with the click of the button they will be voice linked to agents on the contact centre.

- Enhancing the call distribution mechanism to the various agents of the centre. Since the voice and data are sharing a common channel, switching and distributing calls becomes not only automated but with much less cost. The facility would also support remote agents which would eliminate any geographical boundaries.

- VoIP will significantly change the way telephone operator work and charge. On one hand, there will be clear indicators for reduction in cost for both local and long distance calls. On the other hand, establishing international call centres will be feasible where the contact centre will move to the country that offers the most reliable infrastructure with attractive prices. Geographical boundaries no longer exist.

Interactive Voice Response

Interactive Voice Response IVR works as a layer in between the caller and the computer system. It Is the first layer the customer will deal with and it captures some important data that can be used in the system to retrieve the full customer information. IVR is the first and main component of what is referred to as Computer Telephony Integration CTI discussed next.[11]

Computer Telephony Integration (CTI)

As the name implies, CTI provides an association between telephony system and the computer system to enhance the overall handling of calls within a call centre environment. It is a fast growing industry and a lot of stakeholders are competing for setting standards for this technology. Standards are important in this area as integration is also required between different telephony systems within the same organization. The two main standards are the (TSAPI) Novell AT&T's Telephony Services API which is a server based standard, and (TAPI) the Microsoft Intel's Telephony API which is a desktop base standard.[46].

When the association is happening at the level of the agent desktop it is referred to as "first-party CTI". And when the association is performed on the server level it is labeled as "third-party CTI",

Figure 5-10 [11] display the two models

First-party CTI

Third-party CTI

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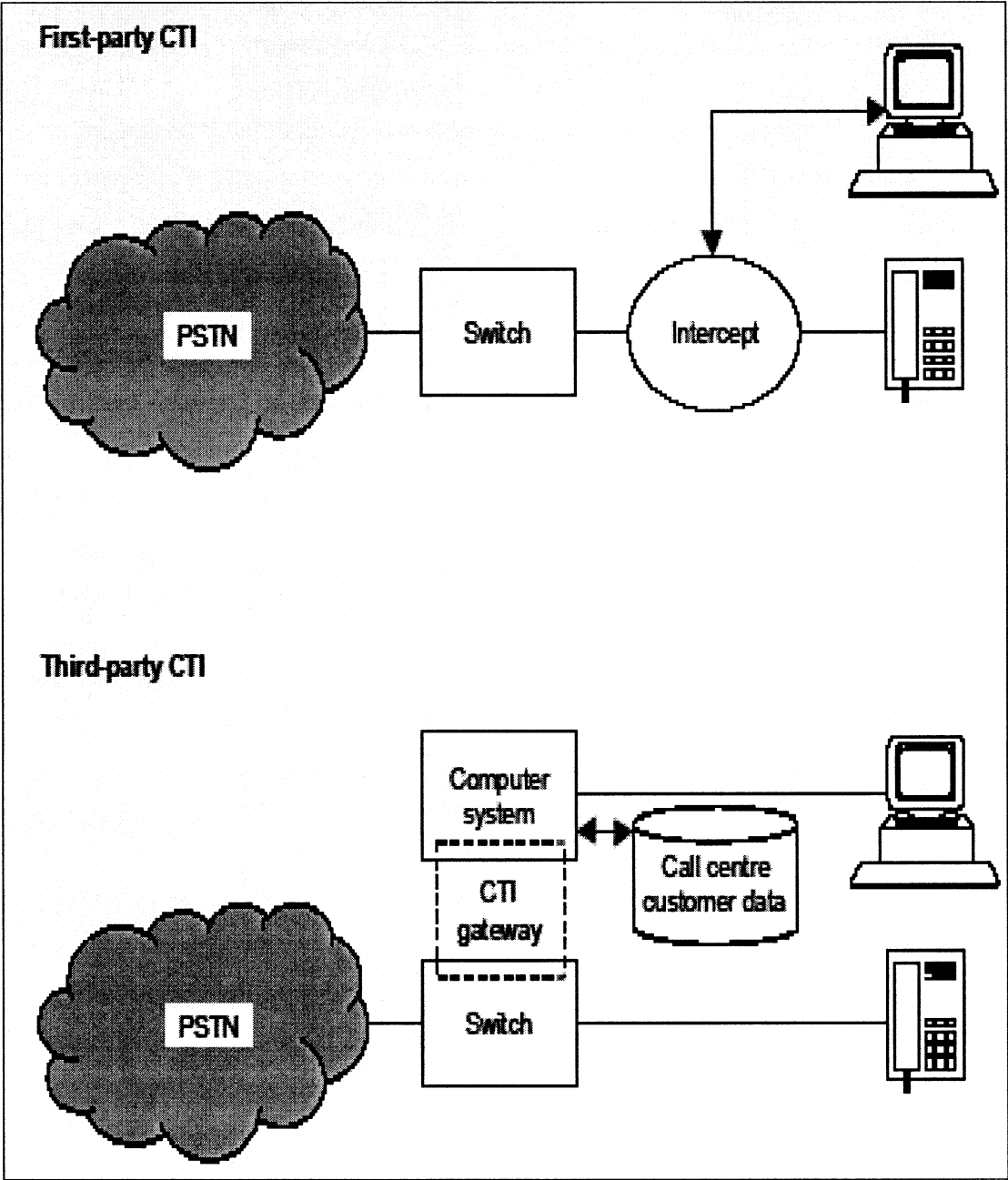
Web Portals

Web portals were discussed in chapter one of this research as an efficient customer interaction channel. The demand on this channel is increasing specifically for CRM applications. Portals strength comes from the fact that they are able to capture and share knowledge across the internet, which can link not only customers to the business but also the different businesses.

There are powerful development tools that are behind the fact of designing a solution to fit your enterprise. If you want to grow further you just need to expand your existing solution, and your original design is still valid. The following is a list of the tools that makes such a jigsaw design concept possible. [15]

Web Content Management:

Information displayed or delivered across a portal must be properly created and managed to perform the role required out of such delivery. In CRM systems and with customers we want to make sure that the right knowledge is delivered. Content management is not only about selecting the right contents but also about maintaining the latest and updated content. Moreover, it is about selecting a delivery channel suitable for the customer.

Ovum defines content management in [15] as "a set of tasks and processes for managing content explicitly targeted for publication on the Web through its life, from creation to archive". This definition indicates a sequence of manual tasks that are performed by people and could be supported by software tools.

Application Servers:

Application servers contain the infrastructure to run the portals. Defined by Ovum in [15] as "Provides runtime infrastructure and development services necessary to deploy application or components in a multi-tiered architecture supporting web and other client interfaces" .The model displayed below provides support for each level of functionality of the running portal including both the development tools , client connectivity and the run time management.

Figure 5-11 Ovum model of application servers [15]
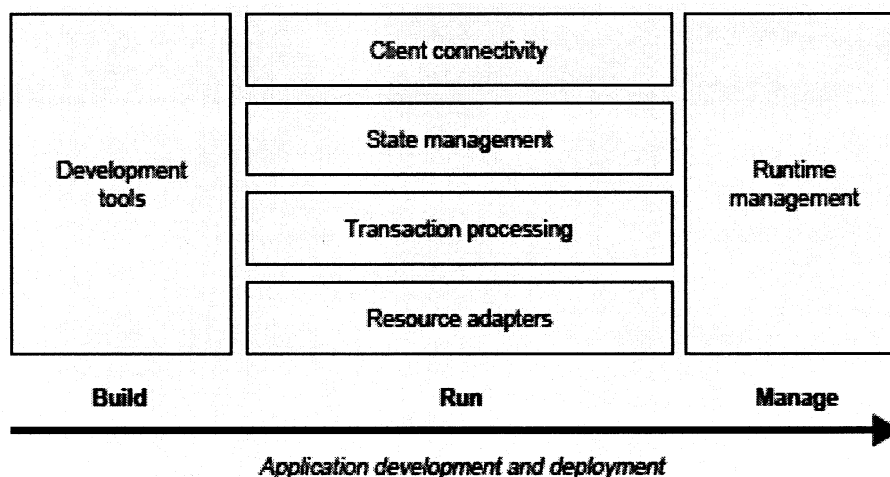
Enterprise Application Integration (EAI)

EAI is a set of tools that offers the capabilities of middle ware, workflow and data information. Ovum defined EAI in[15] as "combines the technologies and processes that enable custom-built and/or packaged business applications to exchange business-level information in formats and contexts that each understands". The components of the EAI model as per figure 5-12 include the following tools:

- Connectivity tools to link between the different applications.

- Transformation tools that will accept data and information from a certain source to another.

- Process Management Services that coordinate and manage the transformation between different applications.

- Resource-interface Services which provide an interface to any external source (applications, databases, files...etc)

- Development Services: Basic tools suitable for the development of EAI solutions.

- Runtime management Services which link the different modules are available within the EAI model

Figure 5-12 Ovum Enterprise Application Integration model [15]

Process management Transformation co-ordination and management	Development Process modelling, transformation specification and interface development	Management Reliability, availability, scalability and monitoring
Transformation Identification, validation, synchronisation, transaction support, transformation and routing		
Connectivity Communication, addressing, delivery and security Resource interfacing Interface translation and metadata discovery		

Extensible Mark (XML)

XML was developed by a working group of the World Wide Web Consortium (W3C) formed in 1996. It is a simple very flexible text format developed from XGML to meet the challenges of a large scale electronic publishing. XML is increasingly playing a main role in the exchange of data across the Web [47]. While Electronic Data Exchange (EDI) is an important enabler for data exchange, XML proves to extend the power of EDI in several methods. Businesses are modifying their EDI documents and applications into an XML format[48]

While HTML tags define how a web browser should read the document for display onscreen, XML tags describe what data to be displayed on the screen and how such data is structured hierarchically.

The W3C advises that XML is a meta language with basic standards to create new languages with more enhanced standards. Accordingly, extended languages and standards have been developed and created to meet specific requirements, such as SOAP for information exchange, MathMl for mathematical notations specifications, SMIL for multimedia authoring, XSL/XSLT for data formatting, XQuery for document querying and XML Schema for document databases and Web portals[47]. An interesting extension for XML standards can be found in [49]

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A large amount of critical enterprise data is currently stored in XML data format which is ready for exchange through the Web. As a result, XML data is becoming an integral part of today's enterprise data warehouse. The challenges of integrating XML data within the data warehouse design comes from the fact that XML data is semi structured (lacks a clear schema) and the different approaches for representing relationship in XML. How multidimensional design for data warehouse can start from an XML source can be found in [50]. The solution presented for such a problem comes from a redesign of data warehouse structure.

Integrating an organization different data warehouses into a common data warehouse requires a standardized format for describing multidimensional data., details of XCube which is a modular solution that consists of group of XML based document templates to exchange data warehouse data that can be found in [51]

Component-based CRM Development & Middleware
Components are program sections that can be separately developed and distributed. Such components can be developed or can just be collected from existing services such as legacy systems. Components protect developers from implementation details and get developers to pay attention to interface standards instead [48]

The goal of developing CRM components is to allow various tools and off-the-shelf CRM components to be easily gathered into a complete dynamic CRM system which can be easily customized for any new implementation.

Component-based development needs to follow a structured software design approach, where the method of decomposing a problem into its element parts until the parts is small and easy to implement.[52]. Component based development requires the integration and interaction of scattered applications and components. The integration and the interaction of the different components are powered by components middleware.

Knowledge based CRM processes have accelerated the importance and growth of middleware. Such dedicated processes require the flow of knowledge through the Internet and across multiple systems and components. Retrieving all possible data and knowledge about customers from all systems can't be possible without the use of tools like middleware.

Middleware are important enablers that simplify the development of complete efficient systems by allowing components interactions. Components interaction can occur horizontally between applications, directories and databases or vertically in between applications and the lower level services available in the distributed network.

"Component middleware is an infrastructure that supports the creation, deployment and interaction between components" [48]. In reference to the case study presented in chapter 4, figure 5-13 illustrates the idea of components that link communication companies to the third party contractor for the sake of out sourcing some cabling work to an outside contractor. Each component is mapped to a particular business process within a company.

Figure 5-13 Component Based Development and Interaction
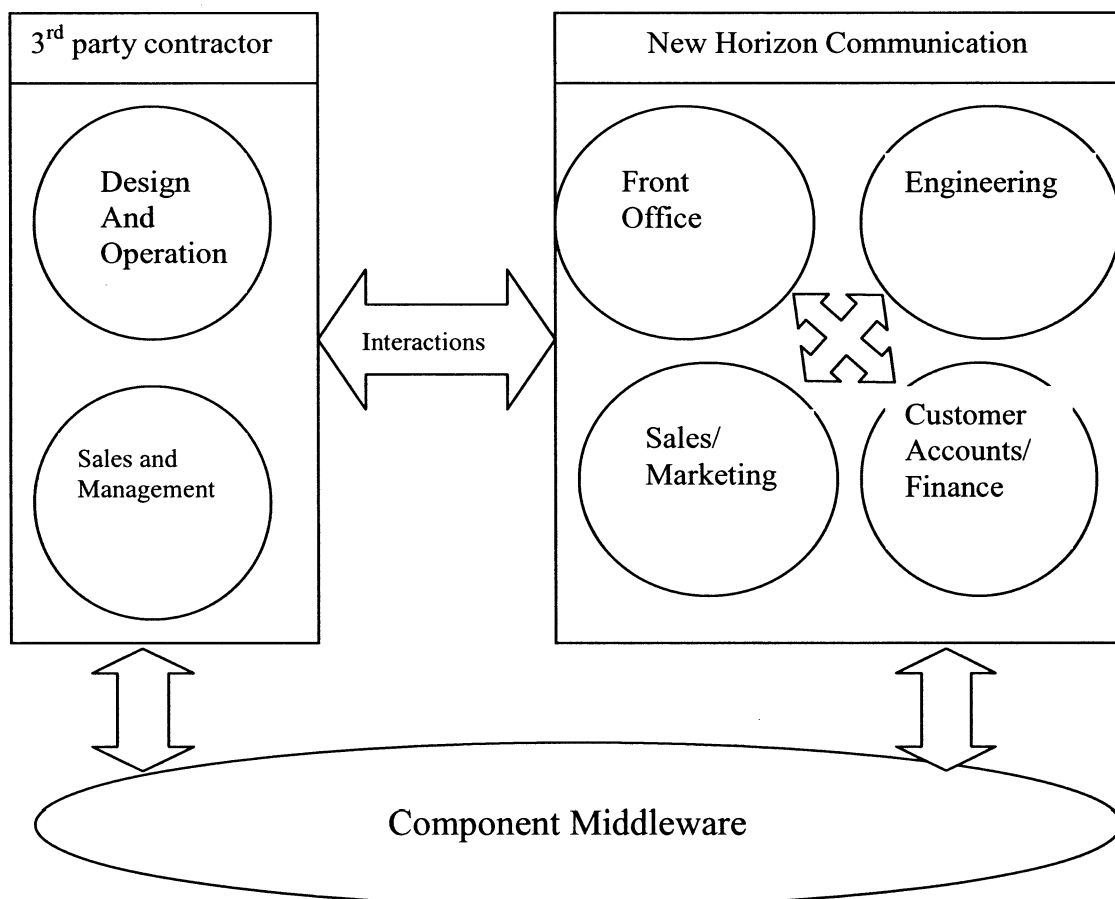
Component Middleware Framework

Three different approaches in relation to component frame work have been developed by companies as standards towards linking and integrating components applications [48]

CORBA

Common Object Request Broker Architecture - CORBA has been promoted by the OMG (Object Management Group) to provide a trader web services that will enable firmly joined and long period business relationship between components. It does this by assigning a set of properties defined as (name, value) pairs to each component.[48]

The CORBA standards have been developed to be independent of programming languages, and operating systems. Any programming language such as JAVA or C++ can be used to develop components.

DCOM

Distributed Component Object Model (DCOM) is a standard developed by Microsoft and it is an extension from Microsoft previous standard Component Object Module (COM). While DCOM implementation is based on the Windows platform, some experiments are taking place to bring other platforms. Security in DCOM is built on the Windows NT security model, which leaves a gap in developing secure applications for platforms other than MS-Windows.[48]

EJB

Enterprise Java Beans (EJB) provides a component model for the Java programming language. Business process can be written in Java and then encapsulated as components (Java Beans). Each bean has an interface that performs the business logic of the bean. The container is the core of the EJB and where the Java beans run in secure platform .Direct interoperability with non-Java platforms is not possible with the current implementation of the EJB.[48]

Chapter 6

EXISTING CHALLENGES AND FUTURE STUDIES IN CRM SYSTEM

This chapter will conclude my study in the area of CRM systems. I will discuss major challenges in the area of CRM and highlight other areas that require further study and research. Most of the existing challenges in the field of CRM require further research as the existing solutions and models don't represent the optimum model for the challenge.

Measuring CRM Performance

The most challenging questions within businesses and enterprises today are about the validity of investing in the world of electronic business and CRM. Senior management are keen to find out a reliable model that suits their business and will allow them to measure the performance of their investments in the field.

The model defined by Julta in [17]which was discussed extensively in chapter 3 of this study, contains a realistic scale to measure the performance of applying CRM within the enterprise. The scales that are part of the dynamic measures for the model involve both the components of the eCRM model (Engage, order, fulfill and support) as well as the enablers of the model (knowledge, trust and technology).

The reliability of this type of scale comes from the fact that it does rate and weight how critical each component to the enterprise. The component is given a high rate if it is relevant to the business and at the same time, all the enablers are properly implemented and integrated within the applied system. Chapter 3 of this study illustrates a more detailed metric for each component of the model.

The rate defined should give the enterprise the flexibility of applying a CRM model that suits the business by selecting the desired component then applying and integrating the enablers to support the desired components. The scales illustrated in figure 6-1 and 6-2 rate both the

component and the enablers. Businesses have the choice of not only selecting the components but also of the level of enabling such a component.

Figure 6-1 Rating scale for component [17]

Rating	Description
0	This is not a part of this system.
1	This has rudimentary features of the component available but does not have the 'common' features.
2	All available enablers are present but are separate in how they are administered.
3	All enablers are present and interoperate with each other. This is the benchmark to aim for when evaluating systems.
4	Flexibility for additional enablers and interoperability are available (future growth. This is the target for companies that are pushing the envelope!

Figure 6-2 Weighting scale for components [17]

Weighting	Description
0	Not required.
1	Could be in the system.
2	Should be in the system
3	Necessary
4	Necessary and Essential

The overall score is a multiplication of both the weight and rate values. Such score should be a clear indication of the performance and the readiness of the CRM systems implemented within the company.

For example, a company might decide that the engage and order components are very critical for the business, while on the other hand, the fulfill components are of no value, besides the

support of lower value compared to the engage and order. Accordingly such business would work on a CRM system with a high overall score for the engage and order components, medium score for the support and 0 score for the fulfill components.

Figure 6-3 illustrates a plot of an example with a score for each component of the CRM model. The four components are equally weighted at a value of 4. On the other hand the engage component is assigned a rating of 1, the order component is assigned 2, the fulfill component a value of 3 and finally the support component a value of 1.

Figure 6-3 an example of a plot of a CRM system [17]
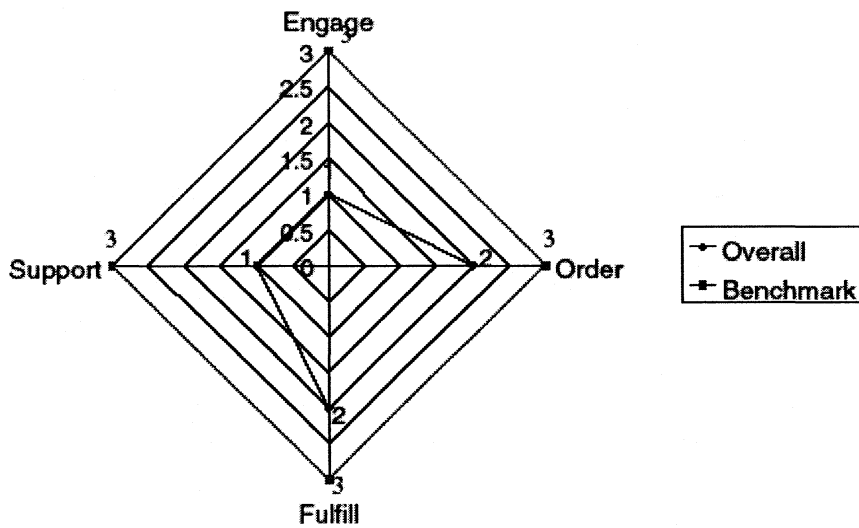
Knowledge is the main element of this study and at the same time it is one of the enablers of the above discussed model. Therefore, measuring the performance of the knowledge element is also included within the proposed scales.

Another model for planning the cost and performance measure of web service investment is presented in [53]. Although the model design and elements are primarily about investing in web services, it includes similar measures to CRM models and in particular the knowledge based ones.

In the following few lines I will summarize the tools used in Kia model and explain how I view knowledge as enablers in such tools. Three levels of web services assessments are used within

the model. The first level is the modest level and represents a minimum investment in web services. The second level is the Moderate level and the major investment is presented in the third level which is the elaborate level. The following tools are used in the model:

1. **System features and functionality work sheet.** This categorizes the business goals that require web services, and then clarifies the delivery mechanism for each service? This tool which is presented in table 6-1 is very similar to the four components in the Julta's CRM model, where each component addresses a certain business process. As illustrated in the table, each row presents a part of the business process. And at the same time each row presents some elements of knowledge about customers, companies and the services required.

2. **Performance worksheet** that defines the goals and objectives of the service proposed in the first tool and identifies some performance measures that could be used to evaluate whether the web service has achieved the desired goals or not.

3. **Cost work sheet** is as the name implies, it helps in calculating and estimating the system's cost. It also helps in categorizing cost areas.

Table 6-1 Worksheet for System Features and Functionality [53]

System Feature	Modest	Moderate	Elaborate
Who are your customers?			
What information-based services will you provide?			
How will customers get access to these services?			
What will customers be able to do?			
What system features will be included?			
What information sources (internal & external must be coordinated?)			
What security and confidentiality measures must be implemented?			
What activities will be outsourced?			

E-Business drivers, operational excellence measures and the financial indicators

A study done by the Centre for Research in Electronic Commerce established a strong link between E-Business drivers, operational excellence and the financial indicators. Figure 6-4 illustrates the links as per my understanding for the study found in [54]. Financial performance is measured by using a variety of variables that would give a clear indicators of the profitability of the business.

Figure 6-4 Links between investing in e-business drivers, operational excellence and financial indicators
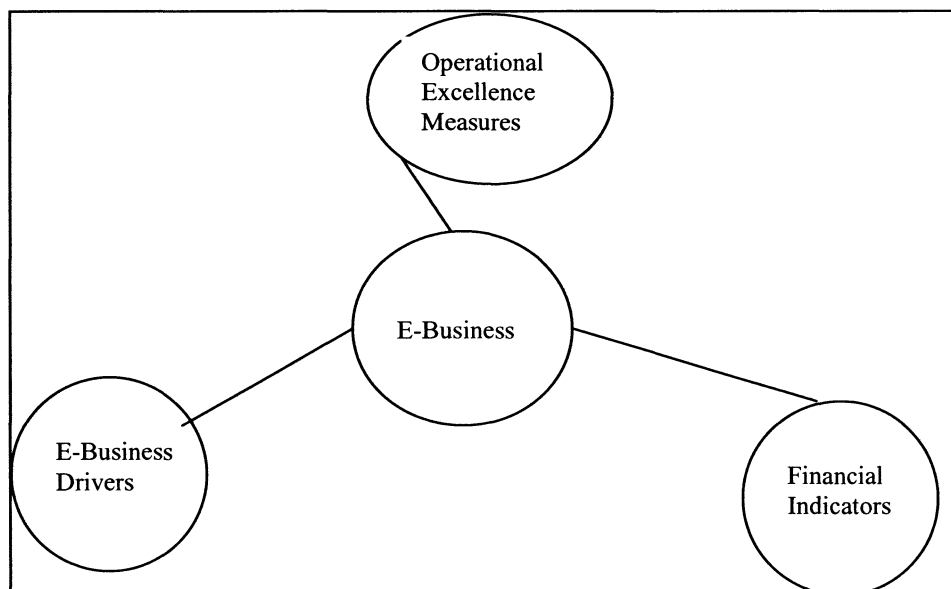
Four financial variables were used within the survey [55]. The ratios of revenues to the number of employees, gross margin, return on assets (ROA) indicate how profitable the business is? And finally the return on investment (ROI) measures the income generated for a specific fiscal year.

The study highlights the following e-business drivers:

- Systems integration refers to tight integration between Web applications and the internal back-office systems in the organization. The survey confirms that the more the integration allows customers and suppliers to perform online transactions that are directly posted to internal systems, the more increase in financial revenues.[55]

- Customer orientation of IT. Two types of orientations are necessary here; the first one is the informational orientation which is another name for knowledge management and sharing, the survey has proved that providing customers with knowledge about products, customer support and service will lead to an increase in revenues. Providing personalized knowledge is certainly the perfect required knowledge, an issue that I will be exploring further within this chapter. The second type of customer orientation is

the transactional orientation which refers to facilitating online transaction. The study suggests that allowing the customer to submit, modify, pay through a secure connection will lead to an increase in revenues.[55]

- Supplier orientation of IT is another area for knowledge management and sharing but with the supplier and vendor side. This driver is about updating and marinating a quality level of knowledge and information with vendors that should keep them updated with products information, stock level, and delivery schedule. This should maintain long term knowledge based on relationship which will lead to revenues and profits increase.[55]

- Internal orientation of IT is also about utilizing technology and applications to enhance the level of knowledge management and sharing within the internal departments of the company. Empowering companies internal processes with applications via the intranet will give clear indicators of revenue and profit generation. However, the study suggests that the number of businesses that are utilizing technology to this level is still relatively small.[55]

- Customer-related processes or customer-centred processes will certainly help customers to contact the company through a single point of contact regardless of the subject of the contact. Tight integration between the company's internal departments is required for this type of processes. An obvious increase in revenue can be noticed as per the survey.[55]

- Supplier-related processes or supplier centered processes will lead to a smooth business to business exchange of knowledge and transactions. However, as per the survey such processes are not yet popular among companies. About 72 percent of businesses have no conventional processes that will manage knowledge sharing with suppliers..[55]

- E-Business Customers' readiness refers to how comfortable customers are with the security and privacy of online transaction. About 69 percent of the companies believe that their customers are happy and comfortable and, therefore, a marked increase in profit has been noticed.[55]

- Supplier e-Business readiness, on the other hand, is not as high as the customer e-Business readiness. Only 49 percent of the vendors are relaxed with the security and privacy of business to business transactions over the internet.[55]

The above drivers directly apply to the Telecom CRM model presented earlier in this paper. To start with, the systems integration refers to a common knowledge repository which allows easy storage and fast retrieval of customer's knowledge. Accordingly, the sales support and any other customer's oriented processes within the Telecom providers are integrated. Information and knowledge generated from systems are managed and presented in a way that all systems are utilizing and enhancing this knowledge.

Customer and supplier orientation refers to the process of finding, sharing and managing the right knowledge about customers and suppliers. The processes presented in my model were all customer centric processes. Customer knowledge capturing is happening across all channels and systems and they are all integrated into one.

The telecom company model presented could also cover business to business related process. In this particular case, businesses will become the customers themselves. In addition, supplier related processes will apply the knowledge capturing elements which will assure the flow of knowledge among the systems for the efficiency of the concerned systems.

This is to confirm that implementing e-business and CRM requires a suitable IT preparation for both the customer as well as the supplier, in addition to a well designed knowledge based customer and supplier processes. Not to ignore that both the customer and the supplier readiness for such a process, as an indispensable fact.

Table 6-2 lists a summary of how e-business drivers affect each of the four financial variables.

e-Business Driver	Revenue/ Employee	Gross Margin	ROA	ROI
System integration	×			
Customer orientation of IT	×	×	×	×
Supplier orientation of IT (Relationship)	×	×	×	×
Internal orientation of IT				×
Customer-related processes	×	×	×	×
Supplier-related processes		×	×	
Customer e-business readiness	×	×	×	×
Supplier e-business readiness	×	×		

Operational measures were another element of the survey. Operations within the business are another indicator of how successful the business is? Eight operations measures were defined in the survey conducted by the Center for Research in Electronic Commerce (CREC) at the McCombs School of Business, the University Of Texas at Austin

1. How much online generated revenues online compared to the total revenue generated all over the company?

2. Ratio of online MRO supply procurement to the total MRO procurement. MRO refers to maintenance, repair and operations.

3. Ratio of online production-goods procurement, similar to the previous item but for direct procurement goods.

4. Order delivery cycle time or the time between receiving an order from the customer and delivering the product to the customer. Obviously, reducing the order fulfillment time should enhance financial performance, which requires avoiding all possible type of errors.

5. Number of incorrect orders delivered each month.

6. Percentage of customer support incidents that has been resolved online compared to the total number of incidents resolved by the company.

7. Ratio of the number of new customers acquired online compared to the total number of customers acquired.

8. Number of existing customers performing business online compared to others who are not performing business online.

The above operational measures were also mainly related to knowledge. Each element presents a piece of essential knowledge required within the process. A good example that applies the above measures to the telecom model is the customers' categories. The proposed customers' categories were based on knowledge captured about customers through various channels. This knowledge presents the actual measured knowledge about customers, which accordingly, can be grouped into different categories.

The survey presented that supplier related processes are still lacking behind in the area of knowledge, integration and readiness. Businesses need to exploit their usage of technology in order to not only capture knowledge but to manage it and share it customers' and suppliers (Business-to business) and to improve internal and external processes. Chapter three of my study suggests CRM models for enhancing customers' and suppliers' related processes, for example, the CRM model which is based on the customers' life cycle. CRM is based on the contact channel, and on the CRM knowledge management process. I suggest that the knowledge management CRM process is the most suitable for both the customers' and the suppliers' based processes.

Technology & Trust

Along the rapid development of such CRM systems, trusting technology is an issue that is still needs to be explored further in order to fully enable the capabilities of such systems. On one hand, e-business marked a revolution in collecting instant and extensive knowledge about customers, their transactions and their behavior. On the other hand, security risks involved with e-commerce discouraged customers from participating efficiently and frequently in online

transactions. Studies in [56] reveal that there is still a lack of customers trust in the electronic systems.

In another research done by the U.S Department of Commerce, Federal Reserve, the OCED and a survey about German companies listed in [57] both studies confirmed that the key obstacles to the success of electronic commerce are related to trust, security and regulations that control trust and security.

Capturing knowledge and exchanging customers' related information through web sites are all dependent on trust. Consumers are no longer motivated by financial rewards to exchange their personal information through web sites and electronic systems. About 63% of customers refuse to offer personal information to web sites collecting such information because they do not trust such sites. Furthermore 65% believe that because of the risk of releasing such information, the whole thing is not worthy of their attention. Interestingly 69% of web customers will not provide data because there is no information of how the data will be used [56].

Lack of customers' trust is coming from the following facts as per the study in [56] :

- Customers believe that they do not have any control over how their personal information will be used by companies while they are visiting web sites. Customers are worried that their data be commercialized to other 3rd parties companies and web providers. About 87% of web customers believe that they should have complete control over the information that they do provide. Over 71% feel the need for new rules and legislations for protecting information.

- The fear of keying in credit card information as hackers might have illegal access to such critical data.

Trust by itself is a special type of customer relationship. Trust relationship engage different units, companies, people and the software components. All units within such a relationship do trust each other and assume certain properties per each unit [58]. Assumptions built into any trust relationship play a critical role and can mislead the whole relationship whether it is customer to business or business to business. How misleading these assumptions could be is

beyond the scope of my study. However, more exciting details about this matter could be found in [58]

Trust is defined by political scientist Eric Uslaner of the University of Maryland as the "chicken soup of the social sciences". Eric adds that trust is behind all positive indicators such as economic growth and involvement within community. On one hand, trust enhances cooperative behaviour and, on the other hand, it is a complex term that drives a lot of research studies not only in areas like sociology and political science but also in information technology.[59]

Trust in the electronic world involves not only people but processes, objects and transactions. Shneiderman suggests using the words "rely on" to refer to trust of objects, processes and transactions as opposed to trust of people. Shneiderman defines trust in [59] as "*The positive expectation a person has for another person or an organization based on past performance and truthful guarantees. Trust is about positive experience between parties through a relationship, trust will never happen to a computer or to a network, people will trust the company that supplied the computer or network instead*"

Knowledge can play an important role in building and maintaining a trust relationship. Knowledge based systems should have a detailed history and transaction among parties involved in the business. Capturing transactions and information should always help in building either a trust or break the relationship with the customer.

The following is a summary of principles and guidelines presented in [59] which could be of help to companies in building and marinating a trust based relationship across their online communities:

Table 6-3 Summary of principles and guidelines for building trust relationship across online communication [59]

Principle	Guidelines
Use trust assurance and guarantee as a tool to attract and invite new customers.	• Reveal historical data about the business performance. • Present reference from existing and old customers. • Seek 3rd party certification and accreditation for the business. • Security and privacy policies

Principle	Guidelines
Define clearly who does, what and when, within the buy and sell process.	• Clarify the responsibility of each participant. • Define the compensation terms in clear order and as an integrated part of the guarantee process. • Maintain a proper disagreement resolution process that will warranty the customer right.

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Personalization

Personalization is a matter that is continuously challenging the growth of the eBusiness world. The internet and the various electronic medium offer unlimited channels of launching businesses today but on the price of the one to one relationship with the customer. Marinating such a relationship is of a high priority for attracting new customers and keeping the existing ones. The internet world is facilitating the one to many relationship models with customers.

My simple definition of personalization is the challenge of maintaining a one to one business relationship with your customers across the electronic medium of the internet. On the one hand, customers are happy to have the stores open around the clock for business, but on the other hand, customers are frustrated from not getting the right advice and the personal and closer look that will perfectly suit their requirements.

Financial organizations are challenged with highly demanding clients that are not limited to the traditional branch channel. Such customers do also have the opportunity to get their service online through other competitors. Competition is also challenging such organizations to reduce the cost of their products and services in order to maintain the proper client base. Low-cost delivery channels are what banks are relying on in order to maintain reasonable prices for their products and services, table 6-4 compare the cost per transaction for the different channels used by the bank. However the price that banks pay for such delivery channels is this personal relationship the customer is after.[21]

The bank or branch manager is usually aware of his/her client's requirements. They do have the right knowledge about that customer applying for the loan, such knowledge is critical for both the banks and the customer and vital to complete the loan process with proper satisfaction that would maintain the loyalty of the customer and help the bank to maintain a proper customer base. The same applies not only to customers applying for loans but also to customers' investment requirement and insurance. Knowledge kept with the right person within the financial institute is very helpful in understanding the clients' investment trends. Is it a short term or long term one? Accordingly, an investment plan could be developed that assures both parties satisfactions.

Table 6-4 – The cost per transaction table for the various channels used by the financial industry.[21]

Financial Industry Service Delivery Channel	Cost per transaction
Branch Platform	$5.30
Email reply	$4.78
Call Centre	$2.12
Branch teller	$1.56
Voice-response unit	$0.32
ATM	$0.26
Internet	$0.09

I believe that personalization is an important aspect of my study, and for that it is the topic that I will conclude with my research, particularly about "Knowledge Based CRM Systems". I do consider personalization is the most valuable feature of utilizing knowledge in CRM system. Based on my findings, I have been able to conclude that knowledge and personalization are inversely proportional to each other. If an organization is able to take the right initiative of planning and building a Knowledge Based CRM system, effective and proper personalization is a feature that will be naturally embedded and integrated within such a system. Riecken went to the level of using the word personalization to refer to CRM in [60] .It is worth reminding here that the body of this research contains an extensive guidelines of setting such a system.

In the CRM system for the Telecom Company I am presenting within this study personalization plays a major role. From one side personalization facilitate customer and fault categorization. It also helps in reducing the rate of customers changing their mobile and internet providers especially with the high level of competition.

However, the question is: what do we mean by effective and proper personalization?. Does personalization refer to a special web site that will show the customer name on top? Or does it refer to the process of displaying only relevant product details and information for the customer? Through the different phases of my research about the subject I was able to conclude that true personalization does not only refer to the process of capturing knowledge about the customer; however, it also involves applying reasoning and intelligence to the system. So that the end system will be able to simulate the role of the manager in duty, a manager who has the right knowledge and history about the customer and the proper understanding of the organization products and services that suit the customer.

Personalization Technologies

Personalization is initially a form of asking portals users to tick boxes that will reflect the type of information they are interested in. Such selection will, accordingly, direct users to their personal pages. Personalization is now moving into more adaptive and smart methods that will involve different areas of technologies:

- Powerful user interfaces which empower the users with a usable view which access all possible data of interest. Usability is the most challenging issues for large scale personalization [61]. Remarkable progress in the field of human-computer-interaction facilitates the design of user interfaces that is perceived by the customer as personal rather than controlling. Such a perception will certainly add value to the product and will maintain loyalty to the business. [62]

- Content management where the content of the site is categorized and classified to ease information access and retrieval.

- Specially designed data bases that will handle high transaction rate, with an optimized cached redundant communication with the user interface. Data replication and distribution features will also guarantee that data is replicated over secured links. The My Yahoo experience with the design of special User Database is an excellent example of this [61]

- Artificial intelligence (AI) in where particular software is trained to recognize models, behavior and preference. Observational personalization relies on recognizing the behavior

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of the customer from a recorded data of the navigation process.. AI is regenerating the internet in accordance with the area of CRM and personalization. [63]

- Web mining tools are required to analyze the huge amount of data recorded through the customers' navigation process. Besides, XML tools are required to present such data.[63]

- Customer centered software and systems design methodologies: Some personalization attempts to use systems design methodologies that will have little or no value for the customer. Designers try to customize customers to suit the available tools, rather then customize the tools to benefit the customers. A good article about a user centered design methodology can be found in [64] where technology is rightly positioned to service the customer. The article outlines a six step model that demonstrates the role of personalization in the design of object oriented user interface.

Another methodology is presented in [21] is shown in figure 6-5. The methodology presents a customer-centered model that will capture knowledge about the customer through all possible channels within a financial organization. As illustrated in the figure, the model includes usual customer details, in addition to the financial and transactions history, not to exclude knowledge about the customer behavior.

Figure 6-5 Information Model
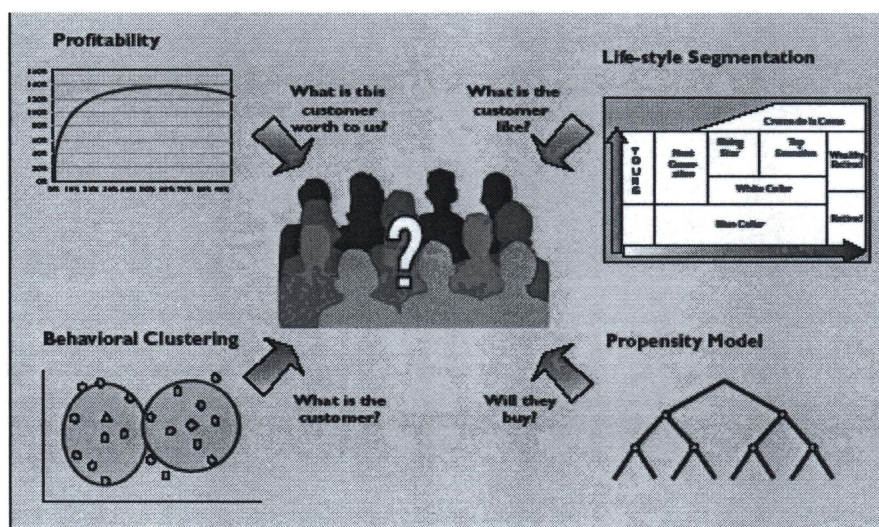
A five modules Web personalization process were presented in [65] and illustrated in figure 6-6. The five modules and the modules brief explanations are listed below in table 6-2

Table 6-5 of Web Personalization System [65]

Module	Explanation
User Profiling	The process of collecting information relevant to each visitor, either in an open or a hidden way.
Log Analysis and Web usage mining	The process of extracting statistical information, conclude usage prototype, divide the users into groups accordingly and then discover a possible correlations between groups and the pages that they are visiting.
Content Management	The process of classifying the content of a web site in various categories.
Web site publishing	To present locally stored data in a Web format.
Information acquisition and searching	is related to collecting information that will be displayed on the web site but is not stored locally on the server

Figure 6-6 Modules of Web Personalization System [65]
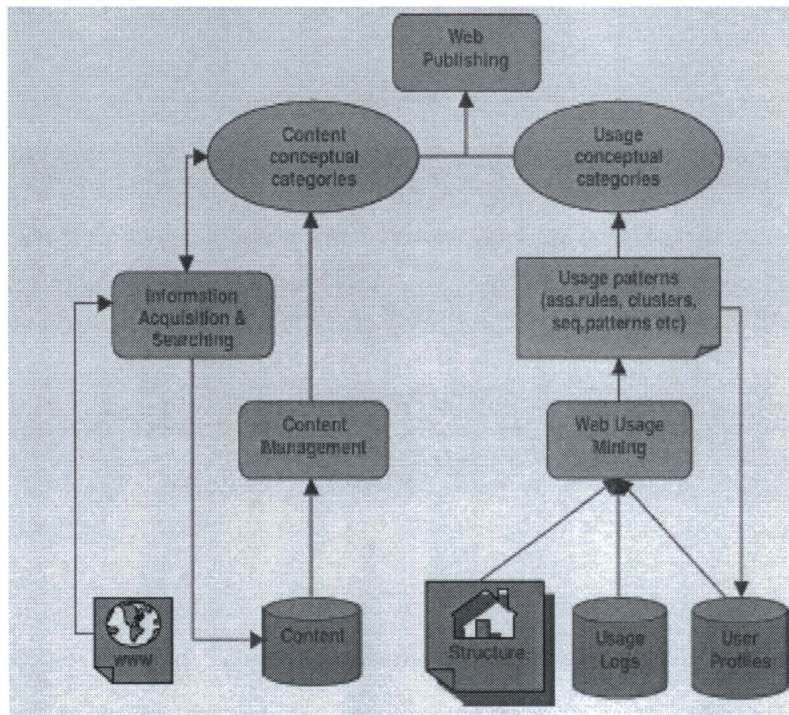
Personalization is neither an area that is not limited to the channel of the internet, nor is limited to a particular industry. While I was discussing the topic within financial organization, I noticed that a lot of implementations within other areas are also worthy of studying. Refer to [66]for a more extensive study about personalizing news services. The study elaborates on the role of structured content in personalization.

The Telecomm industry is another example of utilizing personalization. I would like to refer here to an interview with the vice president of AT&T internet service in [67]. Kathleen Early views personalization and the services offered within her company as a kit of Lego blocks. Backbone services will act as the baseline Lego blocks. In addition to other blocks of services like broadband access infrastructure, firewalls, certificate and web hosting.

Customers will be able to pick and construct their own personal network. Moreover, by introducing Quality Of Service and Virtual Private Network facility to the above services, customers will be able to have a personal view of their own network which is running on the

AT&T network. Customers will be able to realize what services they want to expand on and what Lego block they would like to include in their expansion.

Riecken defines personalization in [60] as a way of maintaining a significant close one-to-one relationship with the purpose of understanding the requirements of each customer. This ensures using the right knowledge about the customer to guarantee that such a requirement is properly fulfilled. The definition attempts to map a customer with a particular background goal to one of the business' products and services which fits that particular background.

Issues with Personalization

Whether personalization implementations refers to allowing users to select their own interfaces which include the items of their own interests or it refers to marketing of products and services based on previous knowledge about customers, both implementations do share the following common issues and concerns:

Privacy

Privacy concerns are the negative side of personalization. As businesses are capturing knowledge about the customer's behaviour, a serious fear about the privacy of the customer is raised. The process of capturing knowledge and collecting information during navigation can take two different forms. The first is an open way that requests the user to input his/her own preferences through a series of questions. And the hidden form which refers to the hidden collection of data through cookies or recording the navigation process. The following is a summary of the privacy risks that customers have expressed their concerns about:[68]

- Unwanted marketing presents a blockage for customers to get engaged in any ecommerce activity. Customers do have major concerns about receiving such materials.

- Users are not comfortable with the concept of the computer learning something about their habits and shopping patterns.

- Online customers are also concerned that companies are categorizing them for the sake of price intolerance. Such customers are worried that they are charged higher prices because they have been placed in the wrong category.

- With the usage of cookies online, users are afraid of disclosing unwanted personal information to other users on the same computer.

- Online users are also anxious about others that could find out their own way of detecting online passwords and user's id's.

- Governments are now considering using information and knowledge collected from web sites in the process of fighting terrorism, which raises a higher possibility of revealing private user information?[68]

Addressing users and personalization

Unpredictable results and findings were detected with the My Yahoo experience detailed in [61], here is a quick summary of them:

- High percentages of the online users are happy with what is given to them as their default page and they never worry to personalize them. This fact could be related to the users' preference of not dealing with complex tool for customization. Accordingly, the default page is a critical page that should be carefully designed.

- On the other hand, power users will use the service of customization to its maximum capability and, therefore, special care should be taken to accommodate such a requirement.

- The online customer profile must roam with the user regardless of where he/she would logon from. The customer expects to view the same results no matter where he/she is located.

- Personalization should address all users, from beginners to advanced, local and international users. The process also offers a great opportunity to learn from users and enhance again in the process. Businesses need always to assume that a lot of online

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customers will not understand what is meant by personalization. What might sound like a clear and straightforward concept would be complex and ambiguous to others. Therefore, such personalization tools need to be presented in a smart and intelligent method.

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