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Extracting CRM Requirements - Waterfall or Agile: A Comparative Study

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Abstract— *Customer relationship management (CRM) is a system that helps to manage the business interactions between customers and enterprises by combining business processes and technologies. It has many functions that can store, track and share customer data. Consideration of CRM requirements will lead to successful implementation of CRM. Several software companies offer CRM application using different software development approaches. The objective of this paper is to provide a brief review of the CRM system, how to extract the CRM requirements and finally a comparison between two software development approaches which are used to build the CRM system with a mention to many software companies that have the CRM software applied these approaches. These approaches are an agile approach and a waterfall approach.*

Keywords— *Customer relationship management; CRM requirements; Agile CRM software.*

I. INTRODUCTION

Customer relationship management (CRM) is one of the information systems which based on Relationship Marketing (RM) concept. The RM concept arose in 1983, as an attempt to minimize the gap between companies and their customers. RM doesn't refer to simple transactions, but is directed to retain customers and facilitate more complex, long term relationships with customers [1].

CRM is a combination of people, processes and technology that seeks to understand a company's customers. It is aimed to build strong business relations with customers [2] [3]. Other words, the companies that have customer relationship management (CRM) applications can easily get new customer and retain old customers.

CRM systems implementation depends on the company size as these information systems are often used in large enterprises and are not suitable for small businesses [4]. CRM systems are difficult to be used in day-to-day business, especially businesses with less than 50 employees, which haven't implemented information systems to support their customer-centric processes.

Reasons for not implementing a CRM system are including the lack of resources, no demand in the company , too complex requirements, high costs and negative experiences.

CRM software has a set of requirements that must be carefully studied to meet the organization's objectives [5] [6]. These requirements serve business processes which include sales, services and marketing.

CRM software can be implemented using a software engineering methods which are waterfall method and agile methods [7] [8] [9]. There are many software companies have a CRM software applied these methods [10] [11] [12].

It is important to note that there are a few researches in this field and so we will present in this paper an overview about the needs to apply CRM using different software methods.

Section (2) presents a background on customer relationship management. Section (3) presents different aspects for CRM System requirements. Section (4) presents two models in software engineering that leads to implementing a CRM system successfully. Also, mentioned the software companies that serve the CRM applications.

II. CRM BACKGROUND

In this section, we will clarify briefly all the information concerning with CRM, its description, the importance of using CRM and the main functions of CRM for serving the organizations' departments.

A. What does the CRM concept mean?

CRM has different definitions to different people based on two approaches which are management and information technology [13]. The first approach refers to the management companies that defined the CRM term as the managerial efforts exerted to manage the business interactions with customers by combining business processes and integration of technologies such as: data warehouse, website, intranet/extranet, help desk, sales, accounting, ERP and data mining not only seek understanding the company customers but also increasing customer loyalty and profitability [14]. The second approach refers to the information technology companies that defined the CRM term as using it to describe software applications that automate the marketing, selling and service functions of businesses [15]. Another definition CRM technology or CRM systems are described as a link between front office and back office functions with the company's customer touch points [2].

CRM has become the main mean for enterprises to gain competitive advantage and an important option for enterprises to make strategic planning [3]. It helps the company to get long term relations and work with quality goods strive for good customer service.

A relationship can be defined [15] as "composed of a series of episodes between dyadic parties over time".

B. What does the importance for using a CRM?

There are so many benefits of CRM which has been presented by different researchers [14] as follows:

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- Improvement of Customer Satisfaction: by using smart IT CRM which provides service responses depending on customer inputs and requirements.
- Retaining current customer: by collecting all the available relevant information about the customers as names, habits, preferences and expectations; customers can be kept returning back continuously.
- Providing information on future sales: by automatic analyses of the previous historical trends, and the customer purchases so that, the estimations of future buying behaviour can be predicted.
- Increasing customer loyalty: collecting all information about the customer and having all relevant data about a customer's history to develop loyalty programs.
- Higher customers' profitability: Companies have the ability to know which customers are profitable, which are going to be profitable in the future and which ones will never be profitable by the analysis of customers' data.

C. What does the importance for using a CRM?

For successful actions through the CRM, it requires consistent data about customers which will be accessible to the responsible employees through the key CRM functions that can store, track and share customer data. These functions also called the parts of CRM application architecture [15] [2] [16].

a) Operational CRM

It supports the actual contact with customer provided by front-office employees and general automation of business processes including sales, services and marketing. In addition to; it is the component that helps to improve the efficiency of day-to-day customer's operations.

In order to ensure success of operational CRM, the companies should focus on the requirements of customer and the employees should have the right skills to satisfy customer. The output from operational CRM solutions typically is on summary level only, showing what activities occurred, but it doesn't explain their causes or impact.

b) Analytical CRM

The target of analytical CRM is customer data analysis, its evaluation, modeling and prediction of customer behavior. When a company implements the analytical CRM, the company is evaluating customer value through the analysis of profitability.

Analytical CRM has four dimensions that each one has a set of Elements. These dimensions are Customer identification, Customer attraction, Customer retention and Customer development.

- Customer identification: it means customer acquisition. It refers to the target population who can become customer and prefer them to be more profitable for companies.
- Customer attraction: directing the organizations efforts and resources into attracting the target segmented customer.
- Customer retention: represents the essential condition to retain the customer through the comparison between customer's expectations with the extent to which the customer is satisfied.
- Customer development: extending transaction intensity, transaction value, and customer profitability individually.

c) Collaborative CRM

Collaborative CRM can be seen as a communication center that provides the connection between companies and their customers, suppliers, and business partners through collaborative services as (Personalized publishing, e-mail, communities, conferences and web-enabled relationship interaction centers, e-CRM/Internet ……, etc.).

III. CRM REQUIREMENTS

Some researchers have considered the CRM System requirements through two aspects; the first aspect is looking at the requirements specification for the parts of CRM. The second aspect is looking at the requirements specification of CRM system implementation; as a result, the real difference will be observed into your enterprise by facilitating communication with customer.

It is possible to measure the requirements that achieved for each element in CRM system. One of the researchers in this regard presented the requirements engineering processes for customer satisfaction management systems (which are one of the elements in CRM system) that adopt on quality management system with international standards ISO 9001: 2008 [17].

CRM in any business enterprises needed to be preceded by a sequence of stages. The Business enterprise should consider a list of factors at every stage of a CRM implementation program, for increasing the effectiveness of system implementation. Through identification of three information systems (IS) and information technology (IT) requirements (front-end systems, back-end systems, and data-handling technologies) which are considered the main parts of CRM [5], is presented in Fig. 1.

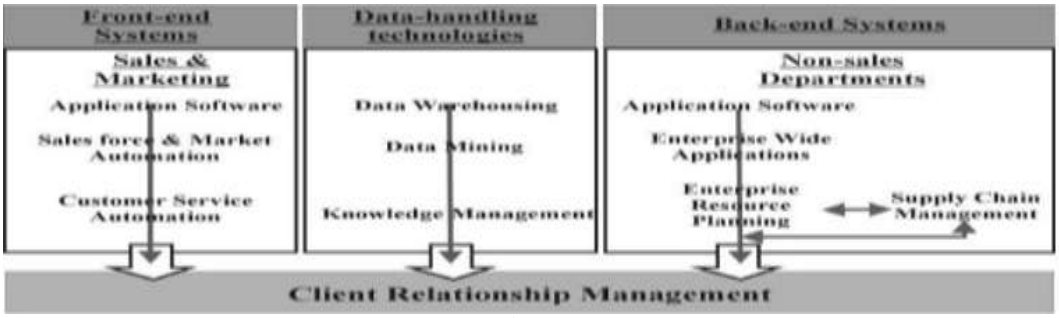

Fig. 1. Three requirements for implementing a CRM system

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The Front-end Requirements include the sales force automation requirements, market automation requirements and customer service automation requirements. Data Gathering Requirement is based on gathering data. Because building a CRM system is based on data, information and knowledge available about a customer. Back-end Requirements is a high level of operational CRM which must be achieved before implementation of CRM system as data integrity about a client at the level of organization's departments.

The CRM requirements specification is the base of a successful CRM project. It is an element which has the main effect on the ultimate success or failure and must be documented [6].

The CRM requirements document serves a set of objectives which are, Identify suitable technologies, allow prospective vendors to quote accurately, facilitate internal agreement, secure appropriate funding and resources and smooth out the implementation process.

The content of the CRM requirements document includes some headings as follow:

- Approach: Identify how the requirements were gathered and who was involved in the process.
- Overview: Identify who will use the system and why it will be used.
- Phasing: Identify how the system functionalities will be broken down and how the system functionalities will be prioritized.
- Business objectives: Identifying and detailed the business goals because it is one of the factors which lead to success the CRM system as a management project.
- Supporting processes: Identify how the system will support the business processes necessary to achieve the agreed business objectives.
- Entities: describe the data records managed by the system; and also identify the new entities that needed to be added to support the organization's processes.
- Functional requirements: Identify all the supporting functional requirements such as administration, security or access related functionality.
- Data Migration and integration requirements: Data migration term defines what the data that will move between systems, integration requirement term defines if the requirement is for real time integration or more periodic integration.
- Reporting: Detailing the reporting requirements, where it helps to speed up the system implementation and also it is a validation way by which the processes have been modeled correctly.
- Systems replaced: identify the existing systems and data source that will be decommissioned as part of the roll out of the system.

IV. CRM Implementation Success: Agile Or Waterfall

The CRM implementation system needs to plan and choose the method that helps for making it successful. There are two different models to CRM implementation that we will briefly discuss; waterfall model and agile model.

A. Waterfall model

The waterfall method was the first software process model [18]. This model goes through helping the implementation of the project through a linear-sequential life cycle [19] represented in Fig. 2.

It is easy to understand and use because each stage must be completed before the next one can start. To make sure compliance with requirements; the project must be reviewed at the end of each stage. The result of each phase is one or more documents.

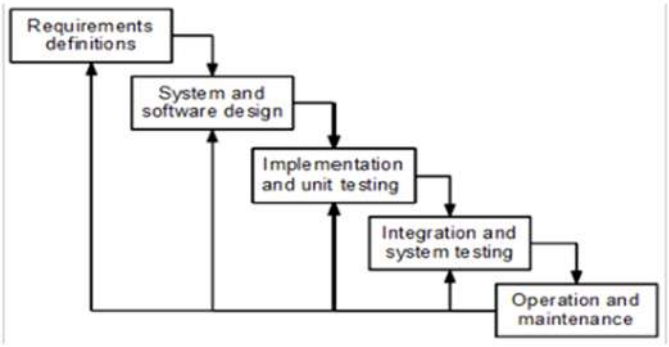

Fig. 2. Waterfall model life cycle

B. Agile model

Agile methods rely on an iterative approach to software specification, development and delivery, and were designed primarily to support business application development where the system requirements usually changed rapidly during the development process. Agile team is intended to deliver working software quickly to customers, who can then propose new and changed requirements to be included in later iterations of the system [18] [20] [21] represented in Fig. 3.

There are several agile software development methods available [21] and the most famous are Extreme programming (XP), Scrum.

The goal of agile methods is to allow an organization to be agile. It means being able to "Deliver quickly, Change quickly and Change often" [22].

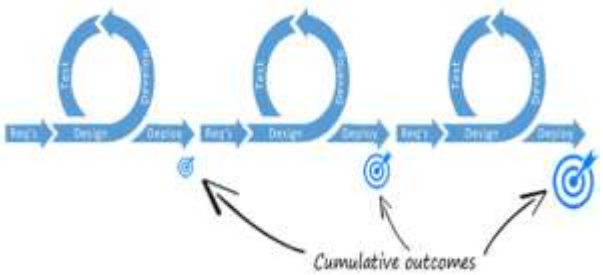

Fig. 3. Agile model

C. CRM implementation using agile approach

Many researchers have referred to the CRM system as one of the most important applications that can be implemented using the agile approach [6] [8] [9].

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Waterfall model can work well with the CRM implementation system if the business needs are clear and no changing requirements. But when implementing a CRM in large or complex projects that have ambiguous, incomplete or changing requirements, it needs agile methodologies through dividing the CRM implementation into smaller tasks. It facilitates the developers to deal with these requirements. [23] [24] [25].

Agile has a different perspective when implementing management systems. This perspective is tending towards achieving a different goal (delighting the customer), a different role for managers (enabling self-organizing teams), a different way of coordinating work (dynamic linking), different values (continuous improvement and radical transparency) and different communications (horizontal conversations) [9].

CRM as a project has visibility, risk and value attributes. Researchers pointed in this field the importance of applying the agile methods rather than applying the waterfall method through these attributes shown in TABLE 1.

TABLE 1. Effect of using agile or waterfall methods on CRM project attributes

Attribute	Agile method	Waterfall method
Value	Gaining a value of the project throughout the time period of the project.	Gaining a value of the project at the end stage of the project.
Visibility	Visibility of the progress and outcomes of the implementation is determined and delivered continuously.	Visibility of the outcome of the implementation is determined and delivered at the end of the project.
Risk	If there is a problem, there is space and time to deal with it and find a solution.	If there is a problem, it is too late to deal with it.

Several software companies offer CRM applications and the most popular vendors are Microsoft company that developed (Microsoft Dynamics CRM), Sugar company that developed (SugarCRM), Oracle company that developed (Oracle CRM and Oracle Siebel CRM), SAP Business Suite that developed (SAP CRM) and Salesforce company that developed (Salesforce) [26].

Some of these companies developed their CRM software using agile methodology in particular using the scrum method [10] [11] [12].

V. CONCLUSION

After the study of the CRM description, its functions, importance of using CRM, it leads us to mention the importance of getting its requirements specification documented through two aspects. Also, we studied two models of software development to implement a CRM system which are waterfall model and agile model and specifying the importance of using agile methods for implementing a CRM system for most popular companies in this field.

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