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Intelligent CRM on the Cloud

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Abstract- This paper presents a new conceptual framework and practical solution for Customer Relationship Management (CRM) and E-Loyalty programs for cutting edge M-Commerce. CRM has come to the world of technology to help companies maximise technology usage. CRM means disciplined business strategy to create and sustain long-term, profitable customer relationships. To this aim, it must concentrate on customer. This paper introduces the notion of Intelligence CRM (i-CRM), and will define and develop i-CRM, E-Loyalty for the M-Commerce environment including Cloud services. The conceptual framework will include solutions for customer complaints and evaluation of the solution through perceived value, interactivity, and acceptance of i-CRM, perceived ease of use, perceived usefulness, loyalty and E-Loyalty. This paper shows how i-CRM can foresee the threshold of customer feedback creating an innovative solution to minimize negative customer feedback and increase the loyalty and E-Loyalty of an organization.

Keywords-Customer relationship management, Complaint, Interactivity, perceived value, E-Loyalty

I. INTRODUCTION

Companies today are confronted with thousands of immeasurable complaints, yet they do not have the ability to measure or assess them [1]. It has been suggested that up to 80% of CRM projects fail as well as 60% of web-based CRM implementations also failure [2]. One reason for this is a lack of CRM understanding [3]. It has also been suggested that implementations fail as companies fail to adopt a clear strategy or to make proper changes to its business processes. Companies install a CRM application in the belief it will deliver the capability they need. The most common fault: focusing on the CRM's implementation technology and excluding the people, process and organizational changes required for it to be useful [4]. CRM was created to address these dilemmas. However, CRM has not yet been broadly arranged, implemented or utilised in most small-medium enterprises [4]. Moreover, some organizations have inadequate CRM systems or due to a lack of experts or qualified employees do not intensify the benefits of a CRM. A shortage of training for CRM has also been noted as another reason for CRM failure [5]. Only 17 per cent of companies included customer acquisition, retention and enhancement cost program in their marketing strategies (based on Qci "quality control information" Consultancy's

"<http://www.qci-intl.com>" audit of 50 companies). In spite of the talk of customer focus, there is little evidence to show that chief executives have an attention on it. Three quarters of chief management do not have consistent, direct contact with customers [3]. Loyalty and E-Loyalty is not understood by firms nor do they attempt to attain it [6, 7]. Companies fail to recognise or identify the potential benefits of CRM [8]. Though CRM has appeared as a significant business strategy for electronic commerce, little research has been conducted in evaluating its effectiveness. In addition, companies have not recognised the relationship between CRM and loyalty [3, 9]. Most companies around the world underestimate CRM and regard it so clear, as they have a strong system to assess all kinds of issues [10]. Companies with CRM, often are unsuccessful to utilize it in generating customer relationships, enhancing productivity or maximising efficiency. Organizations remain and continue to live because of customers, and without customers, there is no business. Customers are a company's main asset [11]. The relationship between customer and company is crucial to any business. Value has always been the fundamental basis for all business activities and customers' satisfaction and loyalty creates this value [12]. CRM performs as an intermediary between company and customer arranging communication, leading business forward. However, existing CRM does not provide comprehensive intelligent support to deal with customer concerns, complaints or feedback [10, 13]. This is the motivation for this research.

II. EXISTING CRM SYSTEMS AND TECHNOLOGIES

- SAP CRM [Business-Software.com, 2010]: SAP proposes on-demand, subscription based CRM resolutions that are easy-to-use and based on web. SAP CRM was improved to address the exclusive, end-to-end requirements of major industries including: Auto, Chemicals, Client Products, Retail, Telecommunications, Professional Services, Public Sector, High Tech, Industrial Machinery & Components, Media, Utilities, Oil & Gas, and Wholesale Dissemination [14].

- Adverse marks of SAP CRM: SAP asserts to have 3,000 CRM clients. We admit just about a third of those have been completely arranged. Several clients grasp mySAP CRM licenses but some progressed to full implementations. Various SAP customers required mySAP CRM quickly but there were

no facility ready to cover its applications. Whilst SAP may not avoid new customers, many SME's may not acquire SAP's on demand CRM software impressive. SAP's framework prevents customers from progressing to the SME's. Still SAP has not revealed what is the estimated capacity and space each customer may achieve with individual usage time framework which is considered as tenancy.

- Salesforce.com [Business-Software.com, 2010]: This firm prepares a considerable group of CRM and business application services [14]. It assists businesses monitor customer accounts, follow sales leads, assess marketing campaigns, and prepare after sales services. Moreover, it concentrates on sales force automation, marketing automation, and customer service and support automation. In addition, it creates one of the best security systems for a company.

- Issues with Salesforce.com: Offline client customization is not endorsed within Salesforce.com. There is a shortage of efficient marketing automation. The sales procedure ability is restricted. There is no supplying for users to efficiently work with groups. Data is often incorrect and beside the point. The mail merge aptitude is decrepit. Salesforce.com proposes no simple passage to convey your data. It suffers significant tools to guarantee data quality. In addition, it has restricted mobile and offline abilities. It is expensive to customize and personalize and rely on the Sandbox atmosphere. There is restricted enterprise intelligence resolutions and needs capable IT experts to generate important changes to the solution [15]. Inefficiency in customer gratification: (1) High customer churn (2) At-risk customer base (3) Customers site accountability of approach, as well as heavy limitations and as a cause for discontent. There is a lack of capability to strengthen best practices [15].

- Oracle-Siebel [Business-Software.com, 2010]: Oracle is one of the biggest application software firms in the world proposing virtually all the aspects of a company's requirements to control its business. Oracle has achieved PeopleSoft and Siebel in the last two years. Clients can easily prepare CRM software from either Oracle, Siebel, or PeopleSoft's Siebel CRM on Demand clients [14].

- Problems of Oracle-Siebel CRM: It is unsuccessful to take benefit training capabilities [16]

- Maximizer[Business-Software.com, 2010]: Designed for larger companies, Maximizer CRM prepares a full-highlighted CRM encompassing marketing computerization and customer service and support. Maximizer CRM provides different connection options such as desktop, Web and PDA.

By facilitating mobile tools with full-featured CRM, Maximizer develops cooperation and customer engagement. Maximizer Software Inc. generates a affirm, manageable CRM and contact management resolution that may assist SME's intensify sales, simplify marketing, and improve customer service and support [14].

- Dilemmas with Maximizer: Having advanced to Maximizer 10, Crystal Reports sponsor no longer roles. This clarifies to

be a problem with linking to information source area. Moreover, if a person tries to connect to MAS_OurDatabase, they receive a slew of SQL errors [17].

- SUGARCRM [Business-Software.com, 2010]: Is an open source CRM application creating a enriched set of business procedure that improve marketing productivity and effectiveness, enhance sales accomplishment, amend and increase customer satisfaction and prepare administrative awareness into business performance. It is a likable choice for all kinds of customers across a large scope of industries due to its coordination and administration abilities, adjusting to the performance of every firm [18]. Sugar Suite is the best choice because of its improved features. It is helpful for all sizes of companies and industries [14]. Moreover, this software has an easy installation and is trouble-free, with an administration place which proposes variety of selection and tools. SugarCRM is made on open source and as it has flexible delivery model, there are no arrangement limitations. Also, it gives personalized service and workflow guarantee adjustment to the user.

- Problems with SugarCRM: normally, it loads slower than V-Tiger CRM and is troublesome to the user. Issues arise while user does not lock the installation upon finishing it. On the opposite to V-Tiger CRM, many add-ons are not free to install and should prepare supplementary.

- Sage [Business-Software.com, 2010]: Sage is an easy-to-use, quick-to-adjust, on-premise or on-demand CRM software resolution with out-of-the-box constructible business procedure automation.

It is a CRM solution that influences the convenience of the web to create a company's marketing, sales, and customer care teams with the required devices to market more efficiently [14]. Customer service and support encompasses the following aspects: centralized client information, consolidated service and support, strong prediction system and reporting, improved opportunity management. complete featured mobile CRM, access to data promptly, solve client problems effectively [19].

- Problems with Sage CRM: It creates no customer feedback facility. Moreover, customers are often dissatisfied with the product because they did not understand what they required it for at all [20].

- Microsoft Dynamics: Microsoft Dynamics for customer relationship management strengthens employees to intensify sales, satisfaction, and service with automated CRM that's easy to use, customize, and maintain. Microsoft Dynamics business software offers a wide range of enriched, easy to get CRM resolutions to assist firms fulfill their needs. Using Microsoft Dynamics CRM customer service solutions, users can convert customer service into a strategic advantage. With a 360-degree view of the client, representatives can resolve problems promptly and decline adjustment times with improved client service software. Moreover, by computerized procedures, customers can decrease expenses and assist to make sure that customer service is carried on across all touch points. The client service solution endorses the following

roles: accounts, contracts, knowledge base, programming, workflows in a setting, and analytics [14]. Business solutions from Microsoft Dynamics CRM are: (1) Flexible, with selections for arrangements, purchase, and approach. (2) Familiar and easy to use because it works like other Microsoft products. (3) Designed to suite your business throughout broad customization and partner proposing [21].

III. Existing CRM Adoptions

While CRM vendors provide significant concepts and methods in the management of Business and Customers, there are many problems in existing CRM approaches in areas such as the way they are adopted, and utilised in an organization. The list below describes these in more details:

Most companies that performed and implemented Customer relationship management address inadequate level of enhancement and they do not obtain the desired outcomes [22, 23].

- CRM does not lead to profitability: Today, it is difficult to manage relationships with the customers efficiently and profitable. Moreover, it is hard to prepare explicit explanations for the varieties of CRM processes. In addition, existing state of the art mechanisms in organizations are not lucrative without the assistance of CRM [5, 24].

Attaining and retaining customers re the biggest dilemmas and obstacle companies have to deal with in order to provide value for the company [25]. Most companies have a clear recognition of their actions in customer relationship, but they do not know how to succeed in these actions when dealing with their customers [26].

- Obscured CRM: In some companies CRM is an ill-defined, misconceived and ambiguous subject [27]. Current theories and hypotheses do not describe the reality sufficiently [28].

- CRM does not create a difference: Although some companies have a CRM system, it does not illustrate any heterogeneity (Contradiction) in the behaviour of customers [29].

- Failure turns out: Despite, having powerful CRM system with great experts, many failures occur in CRM implementations [10]. There are cases of failure and weaknesses in customer data transmission, stiff consolidation with demand [30].

- CRM is not fortunate for increasing sales: Admitting that CRM can bring about more touch-points to the company but it does not always intensify sales within the company [31].

- CRM is not economical: CRM is not always a cost-effective method for companies and it should be stressed on the methods in order to be differentiated [32].

- No motivation to implement CRM system: More than half the Hotels in London embodied some factor of e-CRM, however, they have no motivation to be led by CRM notions [33]. In some companies the concepts and CRM strategies have not achieved adequate attention and companies do not wish to apply customer relationship models as a framework in their companies [34, 35].

- Policy failure: Capturing false customer information, unclear goals, inappropriate selection and utilization of technology, inability to integrate customers and processes and use of misleading metrics or improper measurement approaches are major policy failures [36]. Also, disparity between customer speculation and CRM strategies shows hurdles in CRM accomplishments [37].

- Lack of training: Understanding how to manage relationships with customers effectively has become an important topic for academics, requiring a clear and comprehensive set of training programs. Anecdotal evidence and reactions to CRM training generally suggest that CRM training can prevent accidents [5].

- Managerial problems: In spite of substantial investments in CRM, there are many difficulties and blurring in management of the companies and even in getting the outcomes and customers are discontent with little ROI from implemented CRM [38,39].

- It cannot create a good bond: CRM does not lead to long-term relationships with the customers and a good amount of customer loyalty due to some weaknesses in managerial methods [40].

1. Conceptual framework of Intelligent CRM (i-CRM)

In this section, we present the research stages based on the three levels of the science and engineering research approach [41]. The proposed conceptual framework is shown in Figure 1 below:

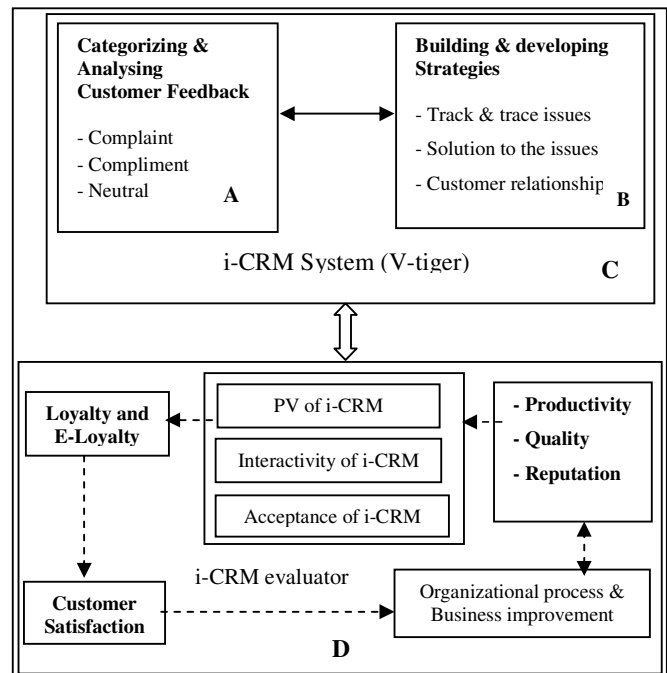


Figure 1. The Proposed Conceptual Framework of i-CRM on the cloud.

IV. THE IMPLEMENTATION OF INTELLIGENT CRM

In this section, we describe the implementation in four parts:

1. Categorize and analyze customer feedback (Conceptual framework-Part A). See figure 1.

In this stage, we will carry out 3 steps. Moreover, we aim to clarify two types of customers of the system and organization. Complaints will be analyzed using multiple channels e.g. online, offline, e-mail, document and data base.

- Feedback data extraction from the database

We will employ an ontology based tool. Extraction will be accomplished by extracting and clarifying this from the data we have from our ARC partner [42].

- Carry out qualitative analysis on customer feedback

In qualitative research, purposeful sampling is often used in a deliberate way with some intent or focus in mind [43]. Qualitative is concerned about the description and understanding of the situation behind the factors [44].

- Customize related service features and data collection mode: An observation checklist will be utilized. The purpose of an observation checklist is to record observations as data, making them quantifiable [45]. Moreover, the types of data that will be collected will be determined by the research questions. Delphi Technique, Questionnaire, Q-sorts, and Individual or Group Interviews will be used [46]. Customer feedback is the procedure or particular example of preparing information to businesses about goods, services and customer service. Management, marketing and sales departments can all use customer feedback to simplify processes and improve profitability [47]. A company's dissatisfied clients can well illustrate the switching between different companies to receive better services [48]. Customer feedback prepares invaluable information. Therefore, customer feedback is among the critical "social information" that potential customers can trust to decrease uncertainty and help in decision making [49]. Currently there is no systematic approach to customer feedback in most CRM applications. We aim to challenge these issues. We shall clarify, categorize and analyze the customer feedback.

2. Identify, address the issues with strategies (Conceptual framework-PartB). See figure 1

There will be 2 steps involved in this stage, namely:

- Develop a classification scheme for these feedbacks

In this section, we review the classification schemes from our partners to demonstrate the variance, differences and potential incompatibility of customer feedback classifications and definitions. Such a scheme may use text mining techniques and business process analysis for each type of customer feedback. A search of similarities and commonalities between feedback, based on selected characteristics, will create an objective foundation for classification [50].

- Address issues through DEBII Data mining technologies and solutions: We aim to address the issues by proposing i-

CRM strategies and the technologies underpinning the new i-CRM including:

Data mining: Data mining technology allows marketing organizations to better understand their customers and respond to their needs. After the data-base has been created based using historical data, unseen behaviors will be predicted. Data Mining can often help segment these prospective customers and increase the response rates that an acquisition marketing campaign can achieve [51].

- Develop Ontology based conceptual framework to support intelligence CRM: Ontology: are formal specifications of shared conceptualizations of a domain. The quality of a formal ontology requires both a good conceptualization of the domain and a good specification of the conceptualization [52]. Moreover, we need ontology for the CRM and for our problems, and as, it has been not clear yet, we will not use that for complaint.

3. Build intelligent i-CRM system using V-Tiger to provide open and shared services (Conceptual framework-PartC). See figure1

We will carry out 3 activities in this stage:

Step one - Design i-CRM for V-Tiger (Open Source CRM). V-Tiger is known as an open and shared service.

Step two - Develop semi-automatic methods to categorize feedback based on the proposed classification scheme.

Step three - Implement v-Tiger systems on the DEBII open Cloud for evaluation and data collection.

Cloud or on demand computing: Cloud is a key differentiating element of successful IT with its ability to become a true, valuable, and economical contributor to cyber-infrastructure. "Cloud computing" is the next natural stage in the evolution of on-demand IT goods and services. To a large extent, Cloud computing will be based on virtualized resources [53].

The above underlying technologies are proven for enabling intelligence and automation. It will build up and strengthen strategies for the intelligence CRM solution to strengthen the customer relationships and retain the customers.

- V-Tiger CRM: V-tiger CRM (Business-Software.com, 2010) is Open Source CRM software, used mainly by SME's. V-tiger CRM can be used to manage company wide CRM and Inventory Management activities, such as sales force automation, customer support and service, marketing automation, procurement and fulfillment effectively. [18]. V-tiger CRM is an Open Source CRM application that was forked from SugarCRM with the intention of being a fully Open Source CRM application with comparable functionality to SugarCRM and Salesforce.com. [54], [55]. It is a 24/7/365 CRM with technical and email support, managed backup, recovery of customer data, fast and secure MYSQL and Web servers giving maximum reliability and performance with fast and dedicated customer service [56]. Our challenge with V-Tiger is due to the fact that V-Tiger's installation is somewhat tricky, e.g. because-tiger cannot populate its database during installation, and needs additional file changes in order for the installation to be completed successfully. Another challenge

of V-Tiger version 4.x is that, similar to SugarCRM's upgrade issues. The upgrade process of V-Tiger also times out causing the upgrade to fail. In the new 5.x (one of the last SugarCRM versions) releases this problem has been fixed [57]. However, we aim to study V-Tiger and develop methods to overcome the above mentioned challenges.

- Negative aspects of V-tiger [Business-Software.com, 2010]

(1) V-Tiger's installation is somewhat tricky. Because v-tiger cannot populate its database during installation, and need additional file changes in order to be completed successfully. (2)V-Tiger versions 4.x is that, similar to SugarCRM's upgrade issues, the upgrade process of V-Tiger also times out causing the upgrade to fail. But still some weaknesses are exist in the application (SiteGround, 2009a).

In addition, after implementation, we will conduct opinion mining to determine the attitude of the customers.

4. Proof of concept and evaluate our solution and the conceptual framework and the proposed i-CRM. (Conceptual framework-Part D). See figure 1

In this stage, we have two types of customers which are categorized as operators and end-users. There are 3 aspects of proof of concepts and evaluation, namely:

- Set up evaluation criteria, PV, Interactive and acceptance, PU and PEOU

- Evaluation and obtain Loyalty and E-Loyalty

- Evaluate i-CRM and iterative evaluation and improvement through Pilot Test with DOT

We will confront the challenges with the following strategies:

- E-Loyalty: Customer loyalty is one of the most vivid and clear topics in the field of marketing and CRM that is extensively applied and utilized by researchers. In addition, it is mostly about frequently buying the same brand in order to fulfill and satisfy the consumer's needs [58, 59]

- Perceived Value in the Current CRM systems: Based on our literature review, it is clear that there is not sufficient research in ascertaining the positive relationship between perceived value and E-Loyalty. In previous studies [60], the researchers considered PV to describe satisfaction and did not measure and investigate Loyalty or E-Loyalty. Although [61] proved that PV has an impact on loyalty, they failed to establish the relationship between PV and E-Loyalty. This is our focus.

- Interactivity of CRM: Interactivity is one of the items that can affect E-Loyalty. According to literature review, the lack of interactivity is a major problem in companies. No research has been conducted on interactivity and its relationship with loyalty, hence little interactivity is understood. In addition, conflicting and unclear outcomes have been created. Finally, this shortage of interactivity can easily hinder the productive use of the internet as a marketing communication channel (Liu, 2003; Srinivasan, 2002). This work will focus on the knowledge and ability of an individual or a company who can provide dynamic communication and interaction with customers [62]. Moreover, in interactivity the information must be personal and responsive [63].

- Acceptance of i-CRM with PU and PEOU: Through the literature review, we could not find related application of the TAM model [2] in the area of our CRM adoption research. In particular, PU and PEOU as two important measurements of the acceptance of CRM system have not been thoroughly investigated to facilitate CRM adoption in previous studies. In addition, although the adoption of CRM has been explored from the customer satisfaction perspective [64], no research has been conducted using the E-Loyalty as the indicative of the CRM adoption.

- Technology Acceptance Model (TAM): In one study, the researchers experimented with TAM to prove and achieve maximum satisfaction, according to a five-point Likert scale and have done the result with Factor analysis. PU (perceived usefulness): is defined as how well consumers believe a service may assist them to accomplish their daily works [65]. PEOU (perceived ease of use): is defined the extent to which a user believes that using a service will be free of effort [65]

V. SIGNIFICANCE

Scientific Significance: There is little that has been done in E-Loyalty programs in relation to interactivity, perceived value and i-CRM. Above all, not enough research has been done, regarding intelligent CRM. To the best of our knowledge, this is the first research that integrates loyalty, i-CRM, interactivity and PV into a holistic framework. This study will create proper contribution to the previous studies and to science as it corresponds to our research issues that have been identified in the literature review. We aim to solve the problem in this thesis.

VI. MANAGERIAL IMPLICATIONS AND SOLUTION SIGNIFICANCE:

Managers' reputations would be built up, if they concentrate on the improvement of PV, interactivity and implementing i-CRM in their companies. As PV can amplify interactivity level, and interactivity alone has an impact on the acceptance of i-CRM, from the managerial perspective, this illustrates the significance of the defined model as a strategic objective to be considered by managers. Moreover, this system, will increase loyalty as well as E-Loyalty and reduce the complaints to a minimum level. What is more, i-CRM provides a sustainable competitive advantage, reasonable price for companies and customers, superior services compared to previous CRM systems. The outstanding point that managers must bear in mind is that the loyalty will ultimately bring about royalty to the company which will create a better image for the company.

VII. CONCLUSION

In this paper, we presented literature of existing research work on CRM, the issues in the existing approaches and motivation of the study. We proposed conceptual framework of the Intelligent CRM on the cloud and detailed ontological

approach. This work is concluded with significance of science and social science contribution.



Figure B: DEBII Open Cloud to be adopted in this research (sample from Aلسys Project 2009)

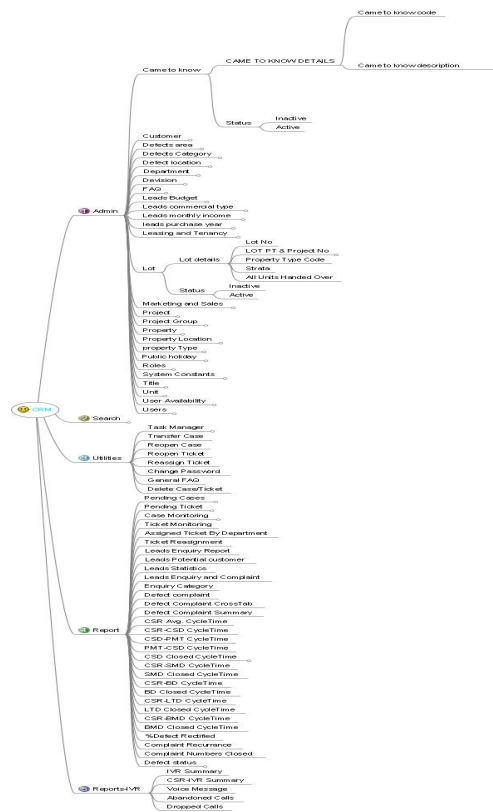


Figure B: Ontology to be developed in this research (sample from Aلسys Project 2009)

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