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Agile Development to Implement Cloud ERP

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Abstract –Agile development methodologies are very promising in the software industry. Agile development techniques are very realistic n understanding the fact that requirement in a business environment changes constantly. Agile development processes optimize the opportunity provided by cloud computing by doing software release iteratively and getting user feedback more frequently. The research work, a study on Agile Methods and cloud computing. This paper analyzes the Agile Management and development methods and its benefits with cloud computing. Combining agile development methodology with cloud computing brings the best of both worlds. A business strategy, the outcomes of which optimize profitability revenue and customer satisfaction by organizing around customer segments, fostering customer-satisfying behaviors, and implementing customer-centric processes

Index Terms— Agile Development, Cloud computing, Software Development, CRM.

1 INTRODUCTION

Agile methodology is an approach to project management, generally used in software development. It helps teams respond to the unpredictability of building software through incremental, iterative work cadences, known as sprints. Agile methods are a response to the inability of traditional methods to embrace change in a turbulent business environment that demands software to meet its need quickly [2].

1.1 Agile Development

Agile development methodologies and cloud computing complement each other very well. Cloud services take pride in meeting user requirements rapidly, delivering applications whenever and to whatever extend they are needed. The agile system of software development aims to break down project requirements into little, achievable segments. Segments can be planned developed and tested individually to maintain high quality standards and approximately no bottlenecks. Moreover, lean agile software methods place huge emphasis on developing a collaborative relationship between application developers with end users [11]. The whole development process is transparent to the end user.

Using lean agile development in conjunction with cloud computing provides a highly interactive as well as collaborative environment. The moment developers finalize a feature, they can push it as a cloud service; users can analysis it instantly and offer valuable feedback. The development methodology chosen is based upon the correctness to the project and the client. This can differ from traditional "Waterfall" approaches (definition phase, build phase, testing phase, and then deliver), to more agile strategies involving frequent releases, continual integration, continuing client involvement, iterative functional deliveries, and usual necessities reviews.

1.2 Customer Relationship Management (CRM)

The need to manage customer relationship is not a new concept. Around 1998 a phrase emerged, which attempted to encapsulate everything relating to this. It was called "CRM". One significant feature of CRM was that it focused attention upon revenue generating activities. It emergence appears to be the outcome of several developments in the sales and marketing domains. It was increasingly recognized that ERP systems, which focused on manufacturing and related activities had failed to meet the growing needs of the sales and marketing functions. Later additions to this have included campaign management, call centre services and market intelligence management. One of the key technological issues has been the integration of the different technologies: databases, laptops, mobile phones, client/server and computer-telephony integration. The internet has spawned new channels such e-mail and portals. With the removal of technological barriers it becomes possible for information to be immediately available at any location globally. However, one of the main concerns is SECURITY. Unsecured channels present a threat of interception and intrusion. One of the solution being developed is encryption[13].

1.3 Cloud Computing in IT

Cloud Computing is a fresh wave of IT infrastructure that permits businesses to run their applications on a shared data center space. Unlike traditional licensed software, cloud technology brings in efficiency by removing the cumbersome processes related to software development, testing installation and failovers [7]. Capitalization on these advantages, cloud computing has gradually become a rage among companies around the globe. The below Fig. 1.1 shows the architecture cloud computing.

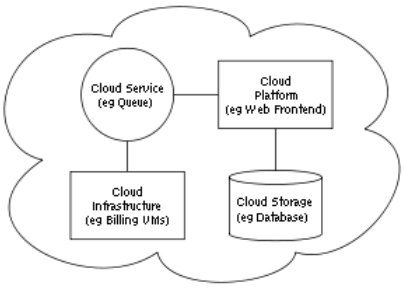

Fig. 1.1 Cloud Computing Architecture

2. LITERATURE REVIEW FRAMEWORK

Combining lean agile development methodology with cloud computing brings the best of both worlds. Cloud Computing is how software applications are delivered today. It is the result of advances in technology, ranging from increased processing, increased sophistication of storage region networks, ubiquitous high-bandwidth network access, and the increased security and reliability of the internet [15].

Agile development process optimizes the opportunity provided by cloud computing by doing software releases iteratively and getting user feedback more frequently. It is essential for software development organizations to consider lean agile development methodologies while coming up with their cloud computing strategy [12][14]. To gauge industry trends related to the adoption of agile methods with cloud computing deployment model technology, Cap Gemini, in associated with HP, conducted a study in 2010.

The study surveyed around 30,000 cloud experts, IT managers, and engineers along with quality assurance managers working in leading firms across Asia, Europe and North America [4]. The study concluded that with an increase in cloud services, organizations are focusing on deploying lean agile methods to streamline operations. About 60% of the organizations that took part in the survey are expected to integrate lean agile methods as part of their operations for forthcoming cloud projects and services [14]. This approach will also help to generate user feedback and enable the organizations to monitor quality standards at each segment of the development[10][11][12].

The multinational companies (MNCs) are using information and communication technology for connecting their partners in a supply chain and in Customer Relationship Management (CRM). The digitization of supply chains by these companies is forcing the SMEs to adopt IT tools for integrating their supply chains to survive in the global supply chain [13]. SMEs are using these IT tools on functional basis but not for integrating the functions of a supply chain. Until the IT tools are deployed by SMEs for, integrating their supply chains the seamless and boundary less supply chains the seamless and boundary less supply chain will continue to be out of their reach [13]. The deployment of IT tools for integrating the supply chain is not free from barriers.

These barriers are not only effect the process of IT in supply chain integration but also influence one another affecting each other and leading to poor SCI [15]. It is impossible to achieve an effective supply chain of large industries without considering the issues and problems of the supply chain of SMEs in specific. Therefore the future research should focus on examining the level of SCI and in identifying the challenges or barriers faced by Indian manufacturing SMEs for integrating their supply chains. These principles are referred to as "Agile Manifesto" [6]. Some examples of agile methodology are: Extreme Programming (XP), Feature Driven Development (FDD Crystal Methods); SCRUM; Dynamic Systems Development Method (DSDM); and Adaptive Software Development (ASD) [6][13][14].

3. DESIGN AND IMPLEMENTATION

The product structure database offers engineering much greater control over product and process design, especially in terms of engineering change control. Planned changes can be phased in and emergency changes can be communicated immediately.

ERP systems offer numerous analytical tools for the engineering function. When diagnosing the impact of changes to materials and resources, for example, engineers can check where used information to identify the affected products. Bill Comparisons can be used to highlight differences between products or between revisions of the same product (e.g., to identify and upgrade kit requirements).

3.1 Production and Planning

3.1.1 Production Management:

Production system is a system whose function is to convert a set of inputs into a set of desired outputs. Production system is depicted under with help of chart. The below Fig. 3.1.1 shows the system production.

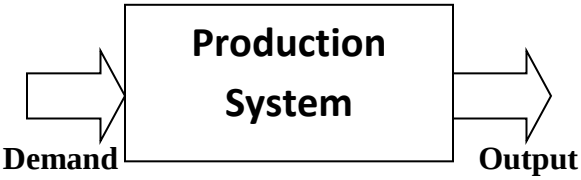

Fig. 3.1.1: Production System

Production management involves the managerial decisions regarding design of the product and design of the production system i.e. determination of production processes and production planning and control.ERP systems support custom product configurations.

3.1.2 Product Design:

The form designing includes decisions regarding its shape, size, color and appearance of the product. The functional design involves the working conditions of the product. The factors are: Standardization, Reliability, Maintainability, Servicing, Reproducibility, Sustainability, Product Simplification, Quality Commensuration with cost. The below Fig. 3.1.2 shows about the process of production.

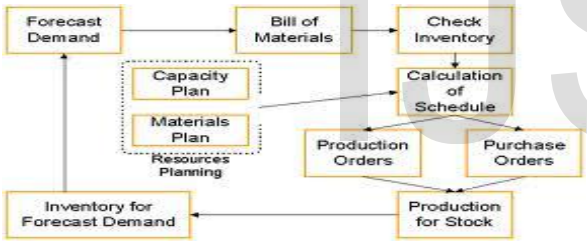

Fig. 3.1.2: Production Process

Production system is the framework within which the production activities of an enterprise take place. An appropriate designing of production system ensures the coordination of various production operations. There is no single pattern of production system which is universally applicable to all types of production system varies from enterprise to another.

3.2 Manufacturing Process

The nature of the process of production required by these three different types of production system are distinct and required different conditions for their working. Selection of manufacturing process is also a strategic decision as changes in the same are costly. Therefore the manufacturing process is selected at the stage of planning a business venture. It should meet the basic two objectives i.e. to meet the specification of the final product and to be cost effective.

Factors of Manufacturing Process

Effect of volume/variety is one of the major considerations in selection of manufacturing process. When the volume is low and variety is high, intermittent process is most suitable and with increase in volume and reduction in variety continuous process become suitable. The Fig. 3.2 shows the process of manufacturing.

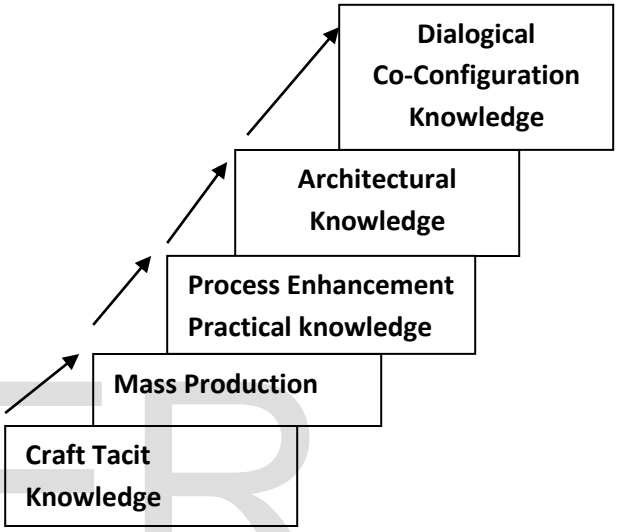

Fig. 3.2: Manufacturing Process

Capacity of the plant project sales volume as the key factor to make choice between batch and line process. In case of line process, fixed costs are substantially higher than variable costs.

Hence, it is very important for entrepreneur to consider all above mentioned factors before taking a decision regarding the type of manufacturing process to be adopted as for as SSI are concerned they usually adopt batch processes due to low investment.

3.3 Algorithm for Agile with Cloud Computing

The Sampling analysis tool creates a sample from a population by treating the input range as a population. For example, if the input range contains quarterly sales figures, sampling with a periodic rate of four places values from the same quarter in the output range.

t-Test: The Two-Sample t-Test analysis tools test for equality of the population means underlying each sample. For all three tools below, a t-Statistic value, t, is computed and shown as "t Stat" in the output tables. Depending on the data, this value, t, can be negative or non-negative. Under the assumption of equal underlying population means, if t < 0, "P(T <= t) one-tail" gives the probability that a value of the t-Statistic would be observed that is more negative than t. If t >=0, "P(T <= t) one-tail" gives the probability that a value of the t-Statistic would be observed that is more positive than t. "t Critical one-tail" gives the cutoff value so that the probability of observing a value of the t-Statistic greater than or equal to "t Critical one-tail" is Alpha.

The following formula is used to determine the statistic value t.

$$t' = \frac{\bar{x} - \bar{y} - \Delta_0}{\sqrt{\frac{S_1^2}{m} + \frac{S_2^2}{n}}} \quad (1)$$

The following formula is used to calculate the degrees of freedom, df. Because the result of the calculation is usually not an integer, the value of df is rounded to the nearest integer to obtain a critical value from the t table. Because of these different approaches to determining degrees of freedom, results of TTEST and this t-Test tool will differ in the Unequal Variances case.

$$df = \frac{\left(\frac{S_1^2}{m} + \frac{S_2^2}{n}\right)^2}{\frac{(S_1^2/m)^2}{m-1} + \frac{(S_2^2/n)^2}{n-1}} \quad (2)$$

t-Test: Paired Two Sample For Means

You can use a paired test when there is a natural pairing of observations in the samples, such as when a sample group is tested twice — before and after an experiment. This analysis tool and its formula perform a paired two-sample student's t-test to determine whether observations taken before a treatment and observations taken after a treatment are likely to have come from distributions with equal population means. This t-test form does not assume that the variances of both populations are equal.

$$S^2 = \frac{n_1 S_1^2 + n_2 S_2^2}{n_1 + n_2 - 2} \quad (3)$$

4. Experimental Results

4.1 Production and Planning Result:

Product design is a strategic decision as the image and profit earning capacity of a small firm depends largely on product design. Product design consists of form and function. The below Fig. 4.1 shows the result of production.

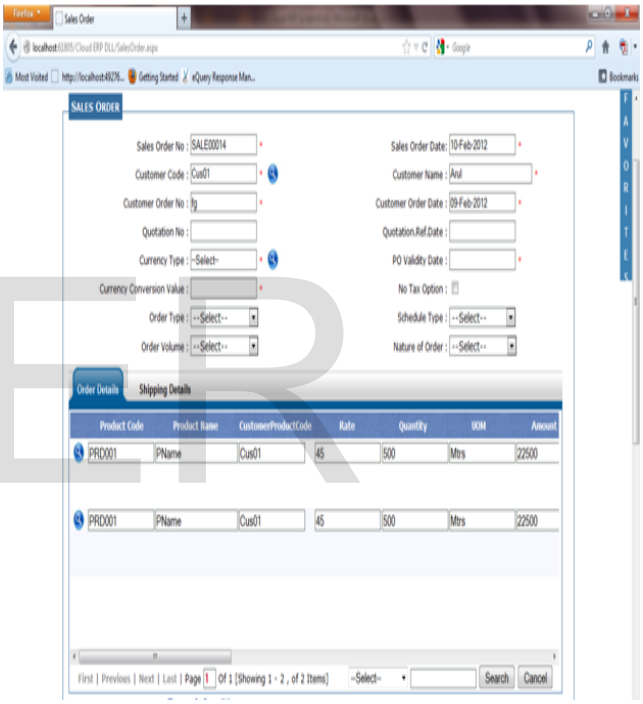

Fig. 4.1 Production and Planning

4.2 Manufacturing Result

Manufacturing process is the conversion process through which inputs are converted into outputs. The below Fig. 4.2 shows the result of manufacturing process.

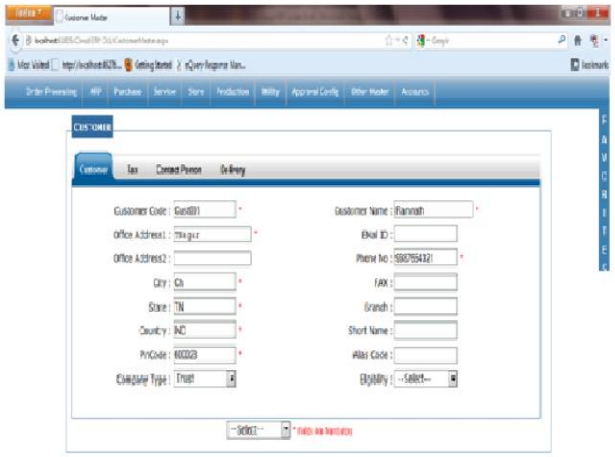

Fig. 4.2 Manufacturing Process

5. CONCLUSION

Agile methods are light weight software methods. Agile development methods are very pragmatic in understanding the fact that requirement in a business environment changes constantly. Highly creative people who have understood the shortcomings of normal software management processes are using agile development methods in organizations. Many organizations all around the world are trying out the various available agile development methods. Agile development processes optimize the opportunity provided by cloud computing by doing software release iteratively and getting user feedback more frequently.

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