Automatically Business Decision Making System for Software Development by using CMMI

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Abstract

The automatic business goals are effectively to provide in the software development system. In this research, the senior level management will define goals based on previous data. We focus to generate all of the business goals based on Capability Maturity Model Integration (CMMI) applied by Goal Question Metric (GQM) approach. According to the GQM approach, the system will check estimated data for future and come out possible goals automatically alignment on defined future goals by senior level management.

Keywords: CMMI, GQM approach, Project Monitoring and Control, MySQL database, Java

1. Introduction

In the current software development, business decision-making system is important process to support the automatic business goals. In this research, we proposed to make a decision model that is Capability Maturity Model Integration (CMMI)†.

We cannot suggest automatic goals only used to CMMI model. Therefore, we applied the GQM approach, which is a good measurement process to provide business goals better and timelier decision. Thus, this approach will support to define goals by senior management based on CMMI model‡.‡.

The system will check the defined goals of metric data plan by senior level management. If defined goals by senior management will match with the resources data, the system will be operated automatically. If the resources will not match with the required goals, the system will realign production goals, which will be match with the actual goals of processing.

Additionally, the metric program framework used to generate a complete metric plan, which includes GQM analysis, to monitor and control measurements of defined goals. The GQM approach has three levels of measurement of defined goals system, such as (1) conceptual level, (2) operation level, and (3) quantitative level. In the GQM analysis, the metric plan will define specific goals according to the project monitoring and control measurements in the software development.

Therefore, the research paper focused measurement approach of GQM analysis to define all of the business goals and measurable index to perform business operation functionality‡. For application concerned, the model developed in this paper is used for dairy farms milk production procedure. By constructing milk production database, the proposed is able to monitor targets of each unit to achieve goals schedule (daily, weekly, monthly and quarterly). Then the senior level management will be confirmed and the system will assign automatically decision goals alignment and control all of the future resources of performance.

For technical construction, we collect data by using excel data collection tool to import data in MySQL database first. Moreover, the system will report business goals to senior management showed by graphical interface as a result for the future target. The test result will perform the automatic business goals for future target that are reporting in step by step to the senior management.
2. Framework of the CMMI model applied with GQM approach

In this research, CMMI model applied the GQM approach, which is an approach of metric data analysis used to monitor business decision goals in the software development.

It is related the metric plan with the key process area of Project Monitoring and Control measurements.

2.1. Applying GQM approach based on CMMI

Figure 1 shows how to perform business goals decision-making system of the CMMI model.

This paper is concerned with a generating of business goals by CMMI model. In doing so, this model applied or adapted the Goal Question Metric (GQM) approach. It is used to evaluate the defined goals by senior level management that can monitor and control measurements for the progressive measurements systematically.

This research identifies the general measures for the specific goals and its specific practices related to the process area of CMMI. Monitoring and control measurements provide business goals with progressive measurable index to align directly with the GQM approach. This approach is defined to align all of the business goals at the levels of the organization. Moreover, it will make to control success or failure through progressive measurement and key performance indication of metric definition for improvement decisions. Therefore, the GQM approach is an excellent metric approach to be uses everywhere better than similar approaches that do not take into all business operation levels.

2.2. Metric data decision of GQM approach

Metric framework that is used to generate the metric plan is described, followed by a complete metric plan.

The process metric plan is established by the business decision based on the actual progress in terms of GQM approach according to the business goals. The metric plan contains goals and scope of implementation metrics. The metric plan includes data collection, data analysis, data reporting and metric decision making. This section defines the metric plan based on monitoring and control measurements for developing metric steps are:

1. Define the measurement goals by senior management and obtain the objectives/goals for the future target.
2. Utilize the GQM approach and determine the business goals progressive measurements to monitor.
3. Review measurement practices and the target of business processes in specified areas.
4. Establish reporting and monitor key performance indicator of metric units.
5. Align with the business operation for monitoring results per all units (daily, weekly, monthly, quarterly, and yearly).

Therefore, this paper presents the key process area of CMMI model that is necessarily to support on business effective process improvement, needs design implementation, needs decision tools for achieving goals for future target systematically. According to the illustration propose, we need to define the actual business goals by senior level management aligned with the resources of business data.

3. Implementation of metric analysis approach

In this section, we consider to implement the metric data that is used to define the actual milk production diary.

According to the defined phase, the milk production diary consists of four collection records such as production collection records, milk storage units collection, own farmer collection records and other farmer contract units. In this collection procedure, own farm and other farmer contract collection will provide as
an input to the storage tank collection. Among them, the systematic collection form involve product code, product item, packing type, production amount of metric units, usage amount of collection, usage amount of production and the remaining amount of milk data to support operation target (business goals) smoothly. This section has to discuss two divisions such

3.1. Metric data collection procedure

Based on the GQM approach, we need to store the specific goals of metric data as a previous data collection.

The collection data refer to the milk diary production such as milk production units, milk storage units’ collection. The storage collection is provided by the own farm collection records and other farmer contract units as an input to become the milk resources.

Figure 2 shows the implementation of the approach of metric data flow. In this operation, we describe how to implement the milk production diary.

3.1.1. Create the production collection records

We define the business goals of production units in the milk production system.

This system apply the production code, product item, packing type of each product item, amount of production per milk bottle, required milk liter per each of product item and usage of milk liters which are able to support operation target (defined goals by senior management) smoothly. All of the productions units are stored in the metric database of the milk production system.

3.1.2. Create the storage units collection

In storage collection, we store the received data from own farm and other farmer collection, amount of production usage data, amount of remaining balance production units.

They are related to each other to align the defined goals of production by senior management level based on previous data.

3.1.3. Define goals by senior level management

Based on previous data results, senior level management defines goals for future target of production.

Moreover, the system will check estimated milk production collection for future and come out possible goals automatically alignment on defined future goals by senior level management.

3.2. Monitoring progress of auto suggestive goals

The senior level management specifies business goals of the future target to compare the previous data.

As a metric data flow, all databases are used to make suggestion goals for future target. The system will assume that senior management last input results which must be approximately they want to product for appropriate products. As per previous data result, the system will auto align with the senior management last input results. If the resources of milk production are not matched with the suggestive goals by senior management, the system will realign the production goals per each product items, which will be matched with the actual milk collection data in storage.

Based on daily actual results, weekly, monthly, quarterly, yearly data will realign the goals systematically and report in systematically to senior level management.

3.3. System Implementation of milk production

This system presents evaluation of the automatic goals for window application that is developed in Java.

Database in window application is MySQL database that are connect to the graphical interface by using JFreeChart tool. In the evaluation process, it is performed the metric parameters of the milk production system by graphically. Milk production system shows the automatic
decision goals of that are implemented in window application.

4. Performing results of business goals

In the research application, the performing results are classified into three phases to suggest the automatic business goals as follow as. Phase 1: Collection of the business goals is supported to define the business for future target by senior level management. The amount of collection units displays the milestone review of the production resources that are calculated by using packing type as required milk bottles as shown in Figure 3. Phase 2: According to the phase 1, the production of business goals are stored in the milk production database. The production data is used for future target of business goals defined by senior level management. Based on the previous data results, the senior management defines the production of goals described as a decision-making goal for future target. Phase 3: The system will accept auto suggestive goals for production units matched with the storage data resources if the storage tank units are greater than requirement of milk calculation. Then, the system will be realigned by suggestive goals based on the storage unit resources. In addition, the system will monitor targets of business goals to achieve business goals timely (daily, monthly, and yearly). During the system implementation, the auto suggestive goals will come out to specific indicators of milk products by using graphical interface tool. Figure 4 shows the evaluation of the auto suggestive goals for the future target.

5. Conclusion

In this system, GQM approach is modeled as a metric plan for measuring the performance of milk production units. GQM approach can easily tested to calculate and align the metric of milk production units. Therefore, the system can perform the auto suggestive goals by systematically for the defined goals by senior level management. In the future issue, the research is used to refine the proposed method that can evaluate the quality of metrics applying more kinds of metrics to link to the GQM approach. The system will implement GQM plugin and monitoring tools flexible approach to improve the quality.

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