Super Business Intelligence Management Tool

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Abstract: Efficiency of the business process is the most important thing in a business for its success. Most of the large and medium organizations use many business planning and process management tools to manage their business process and operations. Many of them are only providing the status of the process. Those systems don’t have the facility to identify the bottlenecks in the current process and provide possible suggestions to avoid that kind of situations. Therefore the research was based on a new business process management tool for process mining, and provide solutions to enhance the best practices in the operations and business process. Super Business Management Tool (SBIM) is useful for planning and monitoring business operations in companies and the supervisors in operations will get the facilities to identify difficult situation in the ongoing production and the possible solutions for them using the system and calculate raw item wastages in one system. It was developed using Java 7 and MS SQL Server 2012 for database management purposes. The system provides the facility to retrieve data about the achieved business key performance indicators (KPI) levels against targets for each process. Therefore, this tool can be used as a reporting tool for making important business decisions as well.

Keywords: process mining, predictions, performance measuring, production monitoring, business KPI reporting, Raw Item wastage calculation

I. INTRODUCTION

Business management system is an IT tool to analyse all the parts of the business top to bottom. At the real world industry these kind of systems mainly focused on daily business process to track every transaction of the business and store the data in a secure database. Today these kinds of systems in the real world industry face a growing challenge when it comes to cleaning and processing the large volumes of data that features rich and well balanced applications. Senior Management requires a powerful and comprehensive Business Intelligence process to transform application data into an environment which enables relevant questions to be answered and important trends to be identified, ultimately facilitating for better business decisions.

This research can provide integrated, end-to-end solutions for stores, production, sales. The solution includes integrated inventory, production management and employee registration and designed to optimize and streamline workflows, prepare well control environment among the staff, improve customer service, and increase the bottom line. Main objective of this research was to design a system to help users to identify bottlenecks of the production workflow process and give suggestions or solutions to solve those points through the system by process mining using past data of productions.

This Research paper consists of background for the research including existing researches in same area and the methodology that used to develop the system.

2. BACKGROUND

The major difficulty of the current researches and tools is no facility to identify the problems in the ongoing production process. They can be used only to plan the production and store inventory and employee details. Therefore, when there is a problem in the process the system cannot identify those situations and send alerts to the relevant users. Delays in the production can lead to major business problems like rejecting the orders, losing the projects by the client. Therefore the efficiency of the production is one of the most important things in the production management. If the system can provide available solutions to overcome that kind of situations will be helpful for production managers.

Most of the systems don’t have the facility to monitor the performance of the employees in the production. Therefore for upcoming orders and special projects production managers have to manually search for the best people for them. If there is a proper process for that selecting the best people for relevant projects that will be a key success point for both project and the for the company.
2.1 Related Literature

A. Employee Management Tools

Service business management system is the invention provides a microprocessor, an input device for entering job costing data and job parameter information, an output device such as a printer to generate contract proposals and management reports. A display device is preferably also provided to display the minimum labour rate calculated by a program executed on the microprocessor from the job costing data. Memory is preferably also provided to store at least the minimum labour rate for use in generating management reports. Disadvantage of this is use an input device for entering job costing data and job parameter information and it’s no facility to identify the real time productions delay s and suggestions for those kind of situations. [1]

Management tool and method is a management tool for monitoring over time a performance feature, in relation to an identified goal, said tool including performance rating means for enabling said performance feature to be rated by reference to pre-determined minimum and optimum performance criteria, and a visible display for displaying the performance rating means and the rated performance feature. Disadvantage of this is no facility to monitor the status of ongoing productions. [2]

B. Production Management

That application’s method is Production schedules are executed for production machines and lots having high importance or priority from among lots being objects of production process by the production machines, and progress of production process is managed by a scheduler based on the production schedules. For those lots whose progresses are delayed, the production schedules are automatically adjusted by the scheduler so that the delays can be eliminated. Disadvantage of this is System was developed only to plan the production but not for monitoring the real time status of the production and it doesn’t have a facility to suggest best practices for the upcoming productions. [3]

System and tool for business driven management is a system for a business driven management is described. A strategic alignment is determined for a plurality of services. Demand planning is driven in accordance with the strategic alignment. Program execution and value measurement is outputted in accordance with the demand planning and applied to the strategic alignment determination. Disadvantage of this is not identify the bottlenecks in sub parts of the workflow [4].

Communication business management method, tool and device is the management method includes steps: first receiving service request including operation types and object IDs, second obtaining IDs from the service request, and obtaining current state types corresponding to object IDs, next if current state type and operation type matched to coincidence relation configured in advance, then executing operation corresponding to operation type in the service request, finally the said coincidence relation includes coincidence relation between state types and operation types allowed to operate. The invention also discloses communication service management equipment and communication service management tool. Disadvantage of this is invention manages services are depend coincidence relation [5].

Business network with ERP, CRM and other business management tools is making business networking which will supply all connected marketing and managing tools for members of this network, those for businesses, companies, clients, customers and workers. Making a software solution, which can be one solution or a set of different solutions co-operates into one business network. Disadvantage of this is no facility to monitor the status of ongoing productions [6].

C. Inventory & Supply Chain Management

Supply chain management tool to promote a uniform business ecosystem is systems and methods are provided for understanding a business ecosystem. Arising from this understanding, intelligent recommendations can be provided to, regarding the use and implementation of new or additional technology assets in order to facilitate a uniform business ecosystem. Disadvantage of this is no method to identify the delays and failures of supplies and adjust the productions plan according to them [7].

Business management system and method for a deregulated electric power market with sharing of supply chain data, is a business management method for trading in load estimations with interaction between an electrical energy supplier and a plurality of customer energy consumers, comprises the steps of first grouping the plurality of customers into respective customer circles such that each circle comprises a number of customers engaged in similar activities next developing respective load profiles for each of the customer circles for a predetermined period past then inputting the respective load profiles to an aggregate load profile estimator for providing an aggregate load estimate finally trading in the load estimate. Disadvantage of this is sharing of supply chain data not a better solution [8].
GeoCue Production Management System is an optimized geospatial workflow platform that improves the efficiency and profitability. Accurate project planning and optimizing the workflow have always been challenging. Not working toward continuous improvement in workflow best practices, improving efficiency and implementing reliable project tracking metrics can be costly. GeoCue helps to address these challenges by automatically implementing and monitoring the customized workflow while capturing real production metrics that help in both day-to-day production management and in planning future projects. The GeoCue comprises an integrated set of tools for managing and monitoring geospatial production workflows. GeoCue is a customizable, extendable platform technology, enabling end-users to use with any of their geospatial workflows [9].

PLEX - Manufacturing Intelligence Software is a system that gives real-time data for Real-Time Decision Making. A manufacturing intelligence software is extremely data-driven: comprehensive and detailed visibility is indispensable to maintaining high performance and quality in a world of razor-thin profit margins. Unfortunately, most business intelligence tools are generic, and lack the unique views and analyses manufacturers need to gain critical business insights for control and continuous improvement [10].

### 3. METHODOLOGY

Initially the research team did background research about the selected topic and it was described in previous chapter – Literature Review. After selecting the topic team planned what are the goals that are going to be achieved by completing the research and project. And also the team decided to use incremental model to develop the system.

#### 3.1 Requirements Gathering

At this phase team identified the requirements for suggested system in this phase. In this phase team collected information from live business firms especially by interviews and meetings. Also the project team decided to search details about business intelligence tools by going through researches and existing products which have various kinds of functions, algorithms and standard business formulas. As a major point the team specially searched for important functions which are currently not available in other business management tools and decided the functions that should be included in the researched system. Business firms which the team had discussion about production work-flows.

- **Functions of the system,**
  - Maintaining User Accounts and job hierarchy.
  - Inventory Management System.
  - Employee Management system.
  - Production management system
  - Generate stock reports, production flow reports and employee performance reports for Head of department.
  - Send or alert notifications to supervisor or department head about bottle necks, employee failures and row item wastage of the relevant production.

#### 3.2 Designing

A working version of software is produced during the first module. Therefore the team had a working software early on during the software life cycle. Each subsequent release of the module added functions to the previous release. The process continued till the complete system was achieved. Easy to divide the system into separate modules is the major advantage that the team had from deciding to implement the system using incremental model.

As showed in Figure 1 the system is dived into to three sub systems as Inventory Management, Employee Management and Production Management which are connected to each other.

![Figure 1: Diagram for project plan using incremental model](image)

![Figure 2: Software high level architecture Diagram](image)
3.3 Implementation

In this phase, project team planned to implement all the functions of the proposed system. “SBIM Tool” is a desktop application. Therefore project team decided to implement the system using following languages and tools.

Figure 3 Flow Chart for Give suggestions to plan the production process

Flow chart in the figure 3 describes how to get the estimated time for a particular process using the historical data in the system. When the user enters a new task in the system suggests the estimate time for the task according to the item count.

Figure 4 Flow Chart for Identify bottle necks and send notification emails

Flow chart in the Figure 4 illustrates about the process of identifying a difficult situation in a process and sends a notification to respective supervisor. System will show a pop up in the system a bottle neck in a process using the estimated time for the particular task. If it is exceeding the limit it will send automatic notification e-mail to respective supervisor and then system will check if it is a raw item wastage or not. If it is a raw wastage it will send a notification mail with the calculated wastage of raw items.

Therefore project team decided to implement the system using following languages and tools.

Java - Since Java is highly compatible for applications which have multi users in different places, the team decided to use Java as the language.

Netbeans 8.0 - It is used to design the front-end of the system.

Microsoft SQL 2012 - Microsoft SQL server management studio 2012 was used to design the database (back-end) of the system.

Jasper reports 5.0 - Jasper reports is using to design the reports.

Java library tools - To develop some functions and algorithms.

3.4 Testing

The team decided to start testing once a function is implemented. Testing was done in several ways. The project team planned to do following testing when each and every function is fully implemented.

Furthermore in both white box and black box testing, team had planned and executed following testing methodologies.

3.4.1 Functional testing

omedical - To verify the whole unit a set of functions are working fine.

Integration Testing - To verify that after integrated all the modules of the system, the system is working fine

System Testing - To evaluate the system's compliance with its specified requirements

3.4.2 Non-functional testing

Performance Testing - To determine the speed or effectiveness of the system. This process includes, measuring the response time or the number of MIPS (millions of instructions per second) at which a system functions.

Compatibility Testing - Compatibility testing was conducted on the system to evaluate its compatibility within different environments. This includes of two types - forward compatibility testing and backward compatibility testing. Operating system Compatibility Testing – basically with Windows and Linux.
4.0 RESULTS

The system was tested with various testing methods as mentioned in the methodology. All the functions were tested in the time developing.

Figure 5: Main index page of Employee Management System

The above figure is the main interface of the employee management module. In the data files tab menu, the HR Manager is able to view all the departments, sub-departments, designations and employees available in the company by providing the relevant department code or department name and by providing designation code or name and by employee code or employee name. Also will be able to add, delete and update department details, designation details and employee details. In the transaction tab menu HR Manager will be able to rank the designation according the hierarchy and assign the relevant employees to the correct hierarchy.

Figure 6: Main index page of Production Management System

The above figure is the main interface of the production management module. In the data files tab menu, the department head is able to add, update and delete workflows, processes, and other cost and process exceptions. And also add product level 1 and product level 2 details. All the windows will respond in less than 1 second.

5.0 DISCUSSION

Through this research team has developed which will be useful for maintaining business and production processes of their companies. Identifying upcoming difficult situations and providing solutions to solve them will be a great option for production management teams. That will be caused to save many resources like man power, raw materials, time without wasting and efficiently use them. The system, developed by the research can store the performance details of the employees and using them, the system will be able to provide solutions to sudden shortages of man power in the productions. And it gives the facility for supervisors to study the performances of their respective employees. This system can be recommended for users who are in below areas.

- For manufacturing companies, hotel and restaurants.
- For HR department in the company manage the performance details of the employees
- For Stores departments to manage their stock details.
- For production supervisor to monitor the production.
- For production planning teams for planning the future production

6.0 CONCLUSION

SBIM Tool is a desktop application for business and production management. It has the facilities to monitor the ongoing production, identify upcoming difficult situations of the production, inventory management and employee management. To work the system correctly without errors there are some conditions that should be satisfied. Followings are the conditions that should be satisfied to get the maximum performance of the system.

- Operating System – Windows 7.1 or greater version
- SQL Server – MS SQL Server 2012
- Running Platform – JDM 1.8
- To server PC 4 GB of RAM and 100 GB of HD space is minimum.
- To client PC 2 GB of RAM and 10 GB of HD space is minimum.
- Maximum up to 15 users per LAN

In future versions of this research, the research team is planning to add following features and functions to the system.

- Send alerts to supervisor’s mobile. In this version, system sends only an e mail to supervisor.
- Combine all the branches of a company. In this version the system can only work with in the branch and cannot connect with other branches of the company.
Create a web based reporting system to get reports from the system. Anyone from anywhere can access the reporting system (but they need to have the URL) and download reports. But they don’t have the access to any changes in the system data like change employees in the production, change MRN or GRN.

REFERENCES


