DEMAND CAPTURING MECHANISM IN SAP

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ABSTRACT

MRP planning process usually starts with the inputs from the sales and marketing department. Input is a demand for saleable finished materials for each quarter in excel sheet through email inbox on a monthly basis. Planning department consolidates all those requirements and arrives a plant wise agreeable daily delivery plan by considering various manufacturing capacity constraints through manual mode. The entire process from order capturing to Production plan, involves lot of manual intervention like a discussion with all stake holders. Difficult to track the changes made in the finished materials planning and the process took more executive hours to freeze the manufacturing plan against domestic and international requirements. To get them into the SAP (Systems Applications and Products) system, each market requires its preparation and transfer process. The one thing they have in common is obscurity, and there is no chance to get a right idea of total order quantity, modifications in order, to particularize, or order fulfillment, to avoid excess production. Furthermore, manual entry of order data into SAP consumes too much time and may lead to errors. This project attempts to address the issues of MRP nervousness due to demand capturing in SAP software which handles the above scenario in two different ways - make to stock and make to order with limitations. The objective of this project is to address the manufacturing problems faced due to current demand capturing issues of SAP system by developing a customized demand capturing mechanism with built-in capacity constraints table in SAP. In SAP, marketing will capture their demand into the customized demand capturing basket with in the planning horizon fixed by the management. Marketing demands are then transferred into planning module for MRP run. In principle, proposed new mechanism under development in SAP drive the marketing people in a user-friendly way to capture customer orders and forecast orders. It will eliminate the non-value added activities of all stake holders. It reduces the demand fluctuation and improves the stability of vendor schedules for the dependent demand.

Keywords: SAP, MRP, Schedule stability, Demand Management, MPS, Capacity-constraint, PPC, Planning time hurdle, Bill of Material, RDBMS.

1. INTRODUCTION

The requirements of the integrated planning cell of a tractor manufacturing company who supply their tractors to domestic and international farming community to manage their demand fulfillment process which is operated by the Systems Applications and Products in data processing (SAP) platform is the origin of this paper. In today's volatile marketplace, it turns out to be extra significant for manufacturing companies to face their client's requirement at the exact time. Above and beyond the fact that it develops into more significant, it is also more difficult for manufacturing organizations to adjust their demand forecasting, inventory levels and capacity levels on today's markets. In the case of increasing demand, an organization could decide to expand their capacity and production, but in a volatile market, the situation could be changed quickly.

Demand administration and completion have extensively been treated as the major capability of supply chain and business achievement. Nowadays, upholding a major capability in demand administration and completion is very significant than before. Meanwhile, it has grown up to be more difficult than ever. The causes are well-known to any company working in the worldwide stadium. Some are shown below:

- A blast of demand and delivery conduits
- The difficulty of worldwide supply chains
- The prospects of clients and patrons

How effectively we manage our order management and fulfillment processes has a direct and immediate bearing on the success and even survival of our business.

Jianhua Lin et al. [1] studied and developed a model for integrated production planning approach by using production data which are available daily from an iron and steel manufacturing company. Melina C et al. [2] further tried to facilitate the integration by defining and characterising of Advance Planning System by using software concepts. Purnendu Mandal et al. [3] described the evaluation of system requirements at various possible locations and configurations of SAP implementation and realized the benefits.

P.T. Helo et al. [4] developed a configuration approach by mainly focusing combination of selective and generative rules and incorporating with already available ERP systems. Stephen C. Shih et al. [5] studied the governing issues in the company's downstream supply chain operations and developed a knowledge management practice. Jayanth Jayaram et al. [6] studied and analysed the capabilities of various supply chain in small and medium sized companies in India.

The objective of this paper is to bring out a methodology in SAP to capture the customer demand in a common platform. It is worth mentioning that, demands get captured in customized SAP platform where the capacity constraints of a plant are in built. On one hand, capacity requirements planning is considered as a subset of demand management. On other hand, capacity requirements planning can be used as a tool to control the demand fluctuations within the demand time hurdle.

2. METHODOLGY

In make to stock scenario, creation of planned independent requirement is one of the procedures in demand management function for capturing the customer order in SAP system. For this activity, the transaction code used is MD61 for creation and MD62 for subsequent modification. In this, requirement has to be split according to daily requirement and fed into the system manually. This will consume more man hours.

Practically the said process is a cumbersome process and has the following disadvantages.

- Customer requirement has to be captured one by one via table or through schedule lines.

- Time taken to capture the orders is too high.

- Tracking error is difficult due to manual process.

- No control over plant capacity and technological capability.

- Separate working is required to convert the marketing requirement into daily plan as per plant capacity and model wise capability. This will require additional man power to prepare the daily plan.

- Difficult to integrate the marketing priority with capacity requirements and it require several iterations and discussions to freeze.

In make to order scenario, in SAP, we have two different modes to capture the customer demand. One is through sale order creation and another one is customer scheduling agreement. In both the cases, schedule lines to be captured manually according to the split requirement.

Both make to order and make to stock scenario will not consider the capacity of a manufacturing facility. For that, in SAP system we have a separate module called capacity requirements planning.
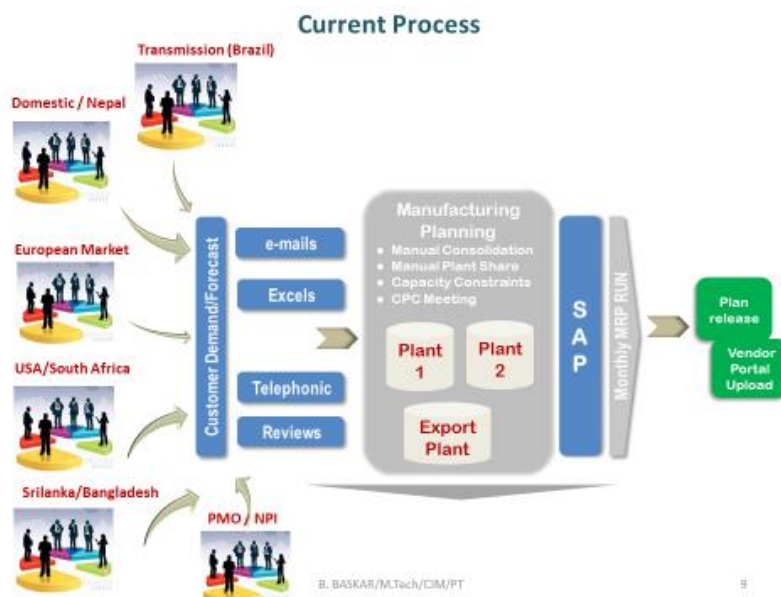
Figure 1 Current scenario to capture customer demand

In order to overcome the practical issues of present method shown in Figure 1 of order capturing, two strategies adopted. First one is to develop a new method for order capturing mechanism in SAP platform, so that all stake holders capture their demand in one common platform. This will enable us to capture the demand of marketing upfront inside the SAP system as and when the demand arrives. Second is to simplify the demand uploading method for Make to order and Make to stock scenario.

To capture the customer demand and demand forecast, a new platform is developed in SAP by using the Advanced Business Application and Programming/4 (ABAP/4) shown in Figure 2. ABAP/4 is a tool which is available exclusively for developments in SAP as per business requirements. ABAP/4 is a fourth generation language, and it is the backbone of the R/3 system. ABAP/4 is a technical side of SAP. Since the scope of this paper is related to marketing and manufacturing, more focus given to functional side of SAP.
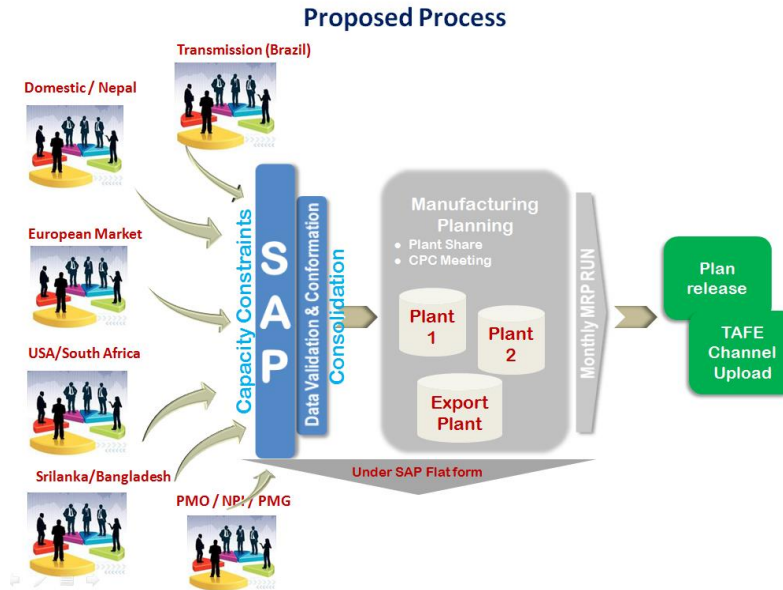
Figure 2 Proposed scenario to capture customer demand

Figure 3 shows the overall concept of demand capturing mechanism. In this newly developed process, the person who is in need of a product has to capture their product requirement into the daily baskets B1, B2, B3….Bn. The capacity of basket is determined by the plant capacity and the model mix capacity through constraints master. Planning time hurdle fixed (for this project, PTF set as 30 days) will allow the demand from 31st day onwards. First 30 days is frozen period. Demand become stable for 30 days at any point of time. This will increase the stability of vendor schedules for the dependent components defined in the Manufacturing Bill of Material (MBOM).
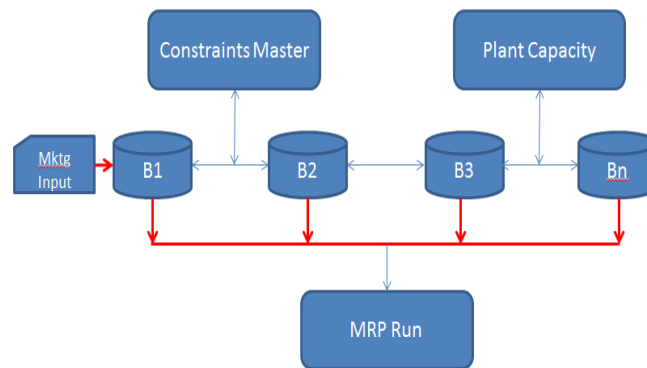
Figure 3 Overall concept of demand capturing mechanism

3. ORDER CAPTURING MECHANISM

While analyzing the make to stock and make to order scenario, it is identified that certain basic fields are common to capture the client requirement into the SAP organism. They are material number which is a saleable number, demand quantity for the material and expected delivery date for the material. Also planner should know from which market the demand is originating. So with the help of above four fields, a database table has to be created in involving the creation of fields, data elements and domains to develop a new platform for order capturing.

3.1. Data maintenance

Once the table structure and screen designing is developed, next step is to maintain relevant master data in the table. For the order capturing purpose two customized tables developed. They are master data table in SAP with name ZMASTER as shown in Figure 4 and capacity and technological capability master with name ZCAPACITY as shown in Figure 5.

Figure 4 Master data table in SAP

Figure 5 Master for capacity and technological capability in SAP

In master data table as shown in Figure 4, fields market, material and technology has to be maintained.

In the capacity table in Figure 5, plant specific capacity constraints for the different technologies maintained.

3.2. Order capturing process flow

In SAP, in order to capture the customer demand, the respective marketer has to enter the Transaction Code: ZDEMAND in the command field which is shown on the standard tool bar and we can either hide the command field or display it by choosing the arrow to the left of the "SAVE" icon. The Figure 6 in which order capturing mechanism initial screen in shown below
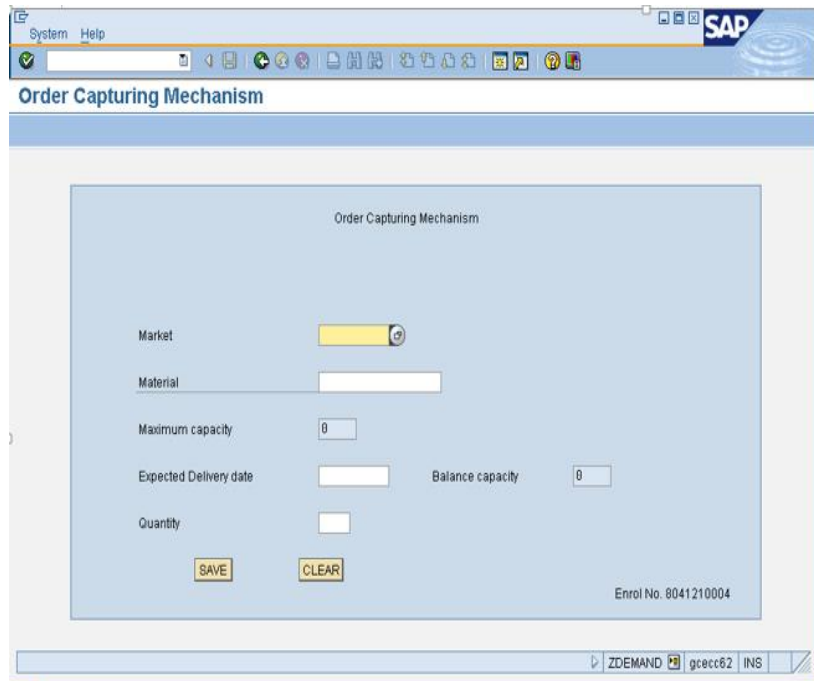
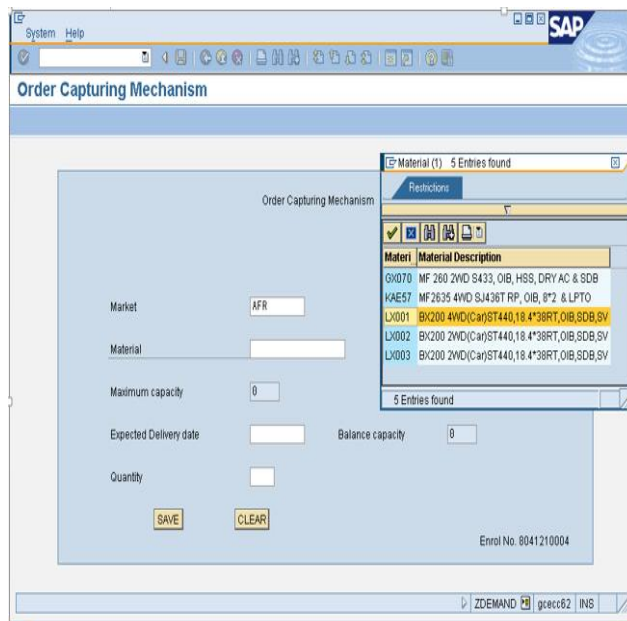**Figure 6** Order capturing mechanism – Initial screen
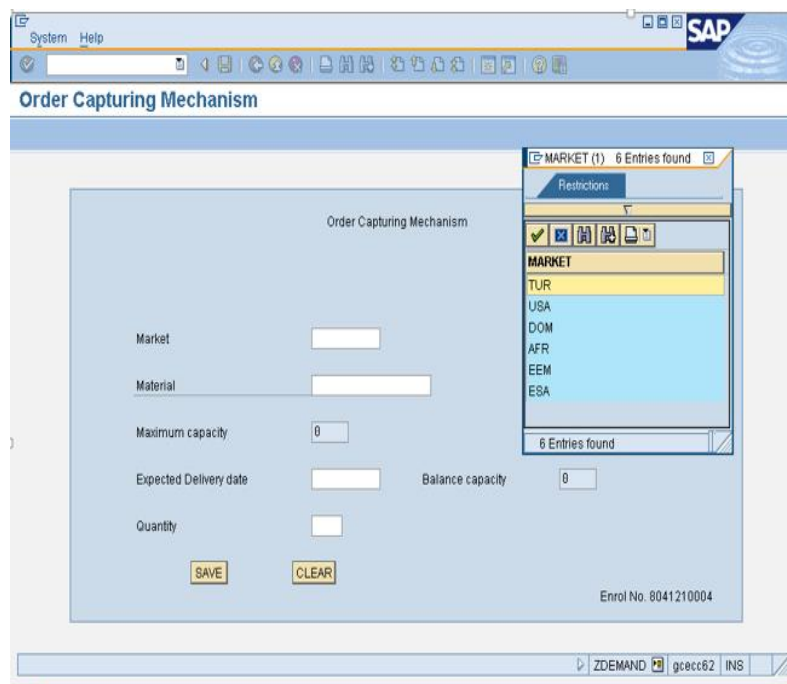
Figure 7 Order capturing mechanism – Market Selection

In the initial screen, there are 6 fields. They are market, material, maximum capacity, expected delivery data, balance quantity and quantity. Apart from the above there are two radio buttons. One is SAVE and another one is CLEAR.

In the next step marketer has to press the F4 key. Now the available markets are displayed on the screen as shown in Figure 7. Select relevant market from the list.

After market selection, click the material field and press F4. Now we can able to see the list of materials. In this both material and market both are mapped. So the F4 option displays materials which are relevant to the market. For example, if we select Africa market from the list, then system will display only the materials which are relevant to the market as shown in Figure 8

Figure 8 Order capturing mechanism – Material selection
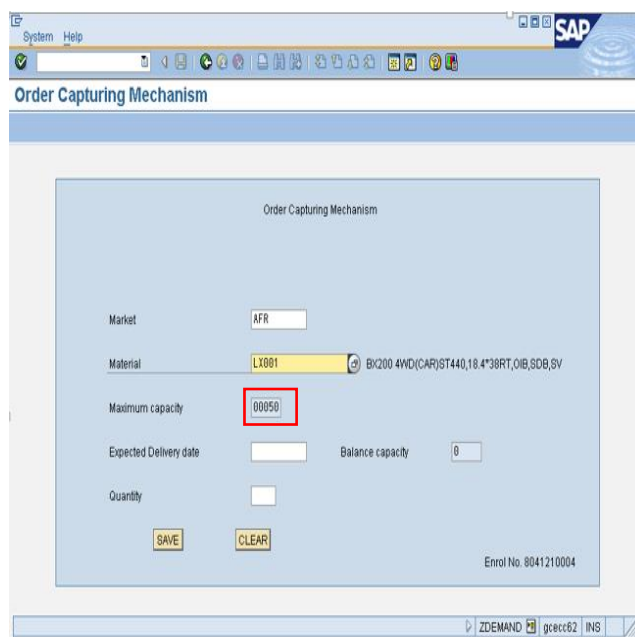
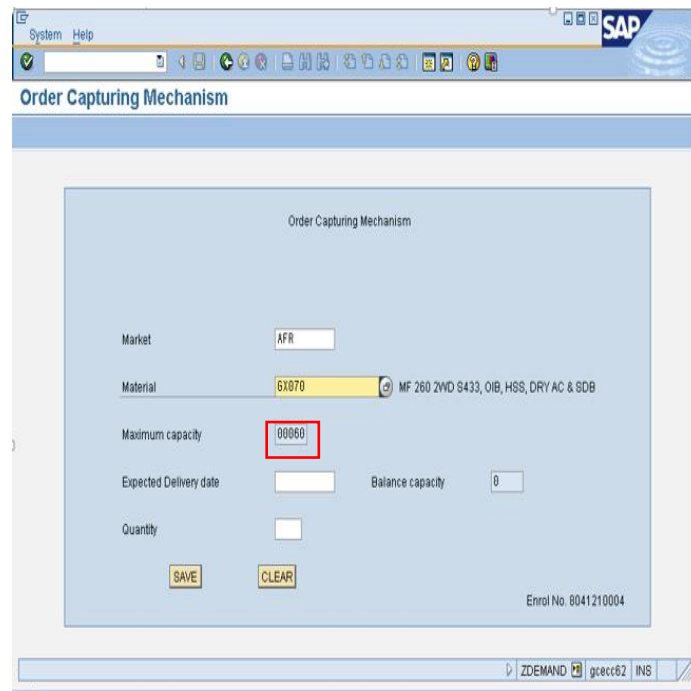**Figure 9** Maximum capacity display for material 1

This validation yields the following advantages

- Reduce the effort put by marketer for searching the material from the list.
- Avoid booking the wrong material into the selected market.

Once the material is selected, the system will display the maximum capacity of the material. If we see the Figure 9, material LX001 selected. Now the system displays the maximum capacity as 50.

Same way if we select the material GX070, the system displays the maximum capacity as 70 as shown in Figure 10.

This functionality validation helps the marketer to know the maximum capacity of plant upfront in the order capturing screen whenever he/she select the material. Here the field's material and maximum capacity both are mapped.

Figure 10 Maximum capacity display for material 2

Figure 11 showed the relationship between material, plant and technology which gives a clear idea about the logic of maximum capacity which is used in the order capturing mechanism. Here the plant capacity and technological capability mapping done with respect to finished product.
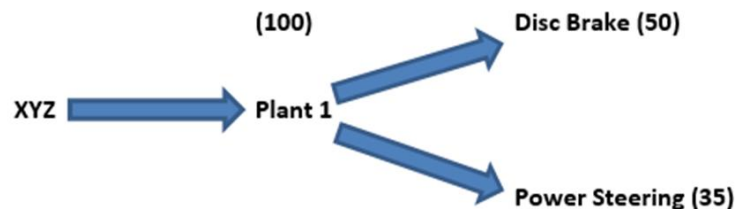
Figure 11 Relationship between material, plant and technology

In the above example case, finished product XYZ is produced with technologies

1. Disc brake and

2. Power Steering.

Total Plant capacity for the day is 100. Whereas material XYZ with disc brake technology can be produced only 50 units and material XYZ with power steering technology can be produced only 35 units.

Here the capacity constraint is power steering. i.e. Maximum, we can able to produce material XYZ is 35 units. Because the bottle neck is the technological capability of power steering for the material XYZ.

Next step is to capture the expected delivery date. Here once the delivery date is given, system displayed the balance available capacity on the screen as shown in Figure 12.

It means that, some quantity already booked on the specified date for the given material. Once the balance capacity known, marketer may book the required quantity in the quantity field as per the requirement and press the save button. Now the system shows successfully saved.

**Figure 12** Screen for balance capacity

Suppose if the marketer tries to enter the demand quantity more than the balance quantity available, then the system populates an error message in a separate window as shown in Figure 13
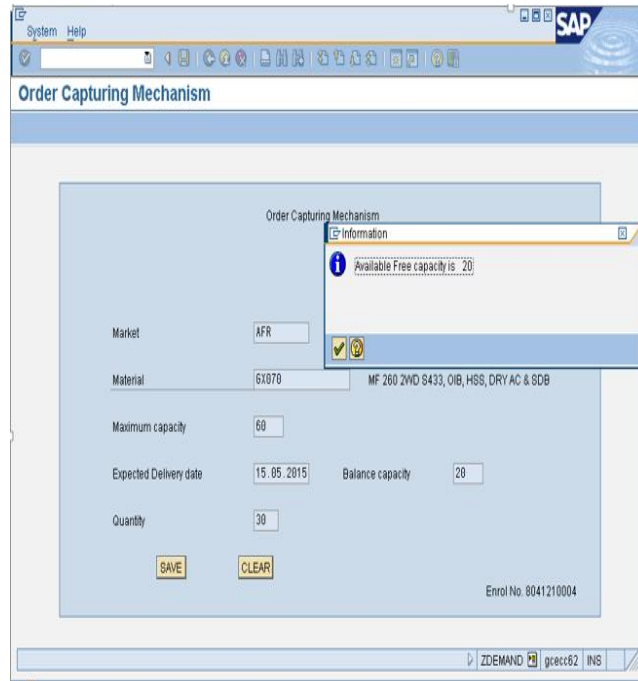
Figure 13 Popup screen for free capacity

System will allow us to save the data as shown in Figure 14 if quantity given is equal or less than the balance available quantity.

Suppose if the marketer wrongly entered the past date, there is a possibility that the demand gets captured in the past date. To avoid this validation given for the date field.
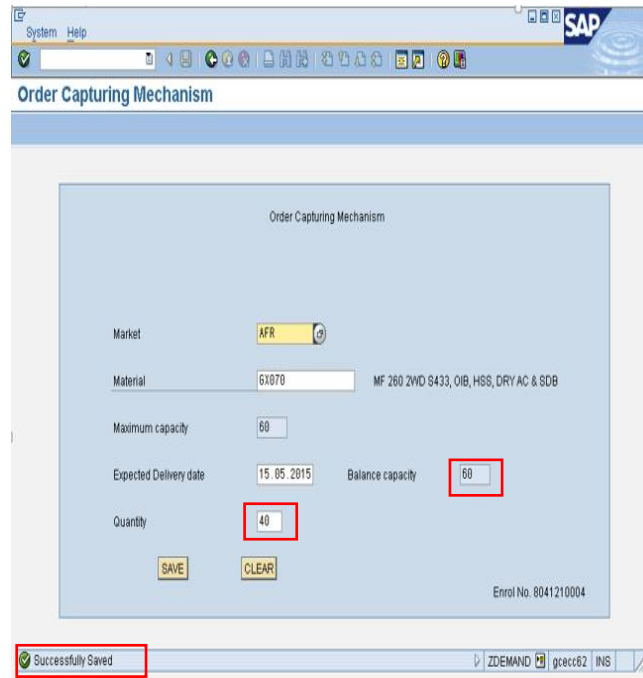
Figure 14 Less than balance quantity screen

Whenever the past date entered, system gives an error message stating that the date lies in the precedent as revealed in Figure 15
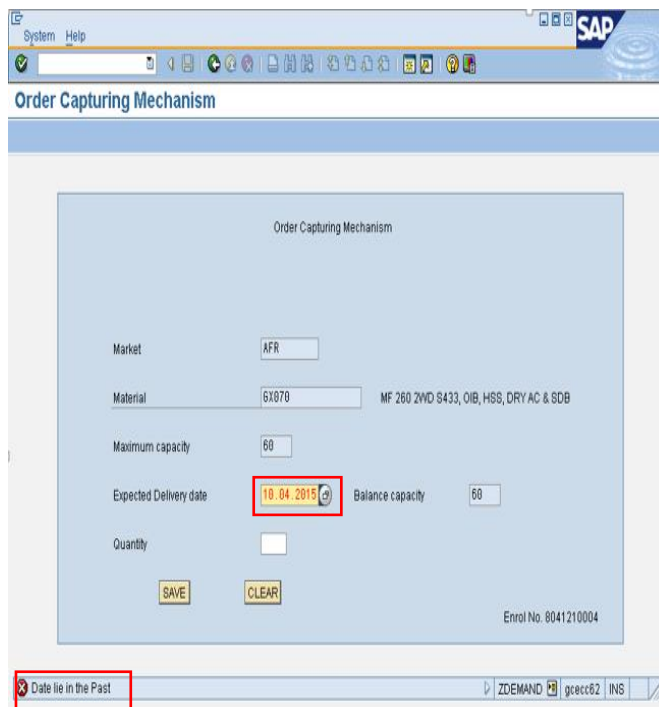
Figure 15 Screen for precedent date justification

3.3. ORDER CAPTURING WITH SCHEDULING TIME HURDLE

3.3.1. Insist Time Hurdle.

The insist time hurdle is a spot in the MPS and is sandwiched between the present date and the scheduling time hurdle as revealed in Figure 16. The area between the present data and the insist time hurdle is known as the 'frozen zone'. The insist time hurdle contains real customer orders. Since the wealth is devoted to these orders, changes would result in extreme cost, condensed manufacturing efficiency and deprived customer service and hence any changes can only be made with the sanction of senior management.
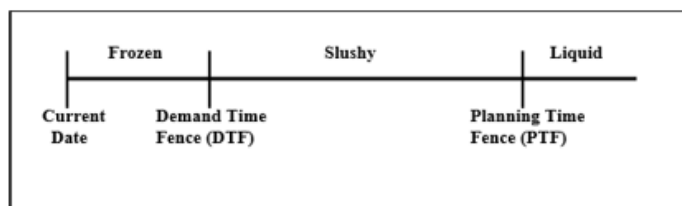

Figure 16 Screen with demand time hurdle

3.3.2. Planning Time Hurdle

The planning time hurdle is a spot in the MPS and is set between the insist time hurdle and the end of the scheduling prospect as shown in Figure 16. The area between the insist time hurdle and the scheduling time hurdle is known as the 'slushy zone'. The scheduling time hurdle contains real client orders and predicts orders. Resources are devoted but to a smaller extent and it are possible to change the priorities. The region away from the planning time hurdle contains only predict orders and the region is classified as 'liquid zone' and changes to the schedule can be made as resources are still not dedicated.

In the order capturing mechanism, both demand time hurdle and planning time hurdle has taken as 30 days and set. If the marker enters the date which falls within the time duration of

set 30 days, then system will throw an error message as "Date lies in the planning time hurdle of 30 days. Select date outside hurdle" at the bottom of order capturing screen as shown in Figure 17.
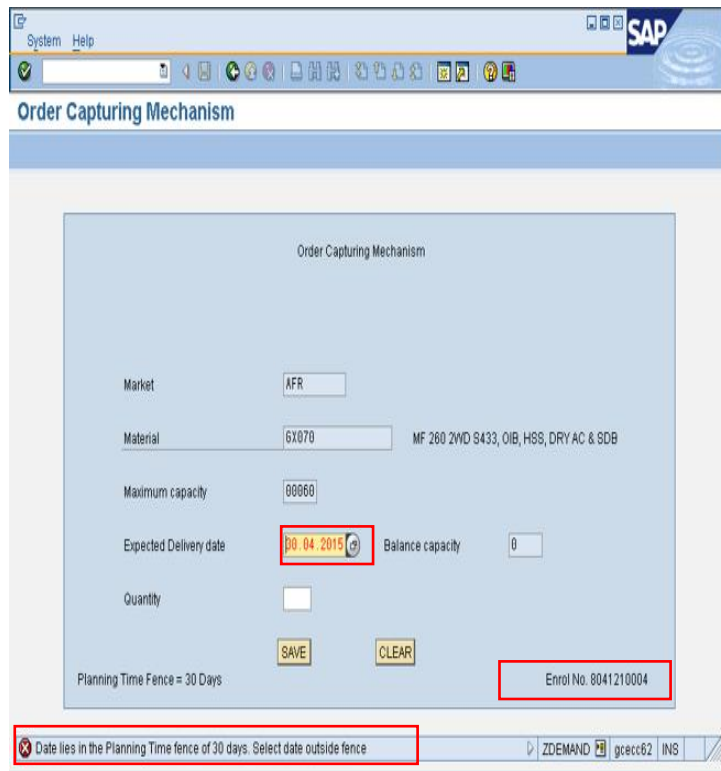
Figure 17 Order capturing mechanism with planning time hurdle

3.4. ORDER CAPTURING MECHANISM – REPORTS

Fetching required data from the database and redirecting to the output devices or displaying the data in screen as per client's requirements is the concept behind report generation.
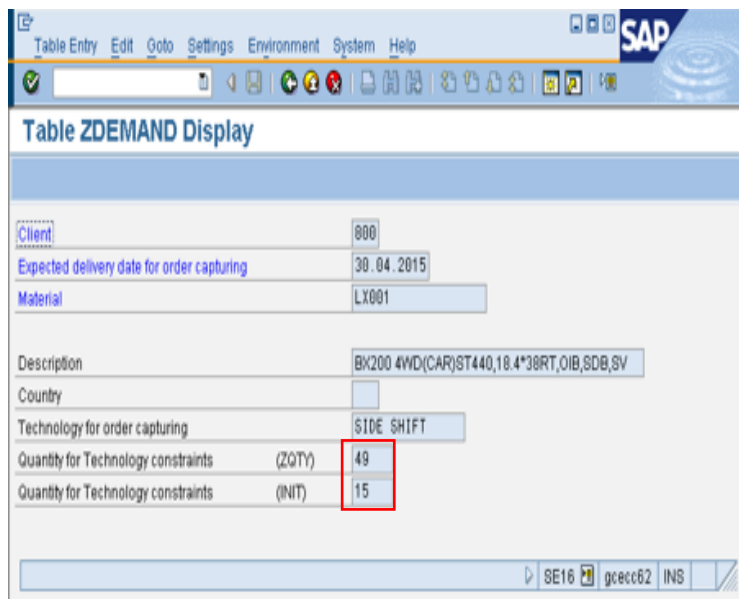
There are diverse kinds of reports available in SAP. They are

1. Pictorial Data Reports
2. List Viewing Reports
3. Cluster Reports
4. Relative Reports
5. Traditional Reports

3.4.1. Demand Variation Report

Figure 18 showed the initial and final quantity captured for the given material on the specified date.

Figure 18 Changes in demand quantity

It shows that, the requirement has fluctuation for the given date. It is the responsibility of the planner to highlight the said changes to the senior management groups, so that variations can be controlled with proper action.

3.4.2. Marketwise Demand Report

Market wise demand report created using Quick Viewer. For that transaction code SQVI is used in SAP. Figure 19 shows the initial screen of Quick Viewer variant.
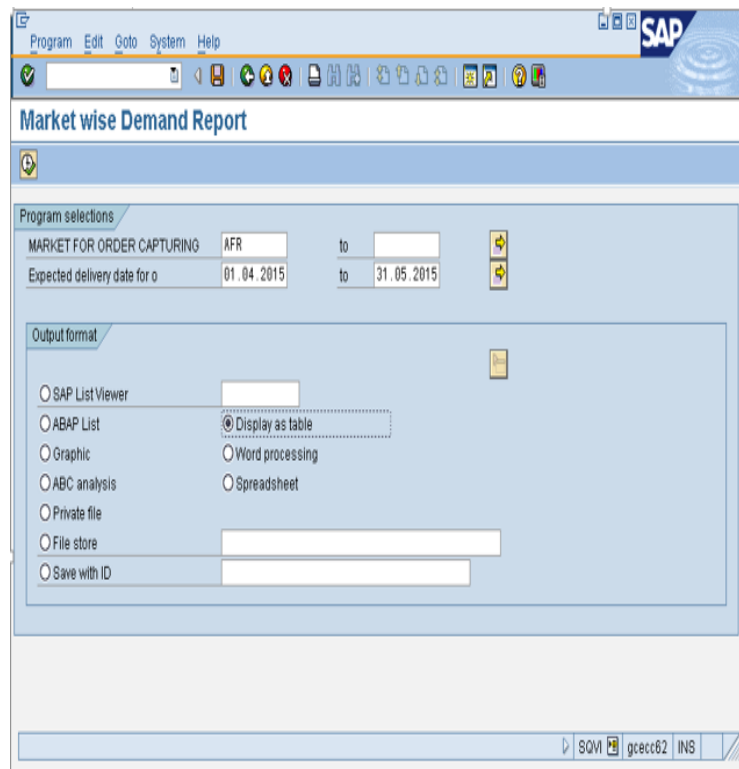
Figure 19 Market wise demand initial screen

In the initial screen, required market and period of study to be given as input. Then the output format can be selected from the list of options available. Then enter the execute button or Press F8 to get the output in the desired format.

The below Figure 20 shows the output of market wise demand report in table format.

Figure 20 Market wise demand report in table format

The same market wise demand report in ALV format is shown in Fig. 21. If required, the report displayed can be downloaded and saved in excel format for further analysis.

Figure 21 Market wise demand report in ALV format

3.4.3. Delivery Date Wise Demand Report

Figure 22 Day wise demand report

Output of day wise demand report for the given period displayed in Figure 22. This paper enables the manufacturing to down load in excel format for production purpose.

4. ADVANTAGES OF DEVELOPED MECHANISM

- Sales demand / plan entry in SAP system through common platform. It creates a single point of entry for all markets.
- Gain more control over demand entry.
- Easy to use solution.
- Automatic display of model capacity.
- Automatic display of free capacity of a model on the specified date.
- It improves the visibility of the entire demand capturing mechanism.
- It reduces manpower cost.
- It reduces the lead time.
- Authentic information flow between Sales and Planning.
- No communication delay on the information flow.
- Sales can fix the delivery priority.
- Sales demand modification can be tracked.
- Production plan information to all the concern will be as per time line.
- The ICS target can be achieved.
- Deliver the product within agreed due date. Thereby create happier customers.
- Transparent information to Top management.
- Daily production plan can be generated.

5. CONCLUSION

In this work, we analysed the current issues faced by the manufacturing organization in the demand capturing process in SAP software. Identified a new process and developed a new platform which acts as a single point of contact for all type of demands.

The developed demand capturing mechanism gives enormous saving in terms of man power cost and increases the productivity. If we workout the Cost Benefit Analysis (CBA) of this project, it gives a saving of 88% of total cost.

In this project, three developments made:

- New platform for demand capturing developed in SAP with in-built capacity constraints. This will be implemented after user acceptance testing (UAT).

- Simplified process developed to capture demand for make-to-stock scenario in SAP was tested and implemented in SAP.

- Simplified process developed to capture schedule lines for make-to-order scenario in SAP was tested and implemented in SAP.

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