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# Colibri: Towards a New Generation of Advanced Planning Systems

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## ABSTRACT

This paper presents Colibri, an advanced planning system that is adaptive according to the user's role, highlights the underlying process of the planning task, and supports real collaboration.

## Keywords

Advanced Planning Systems; Sales forecasting; Users; Collaboration; Workflow.

## ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous.

## INTRODUCTION

Nowadays, Advanced Planning Systems (APS) are part of the applications suite of several companies. As mentioned in many related works (e.g. [1]), according to Amstel and colleagues, such a system "suits like an umbrella over the entire chain, thus enabling it to extract real-time information from that chain, with which to calculate a feasible schedule, resulting in a fast, reliable response to the customer."

Planning concerns several domains: sales, inventory, manufacturing, transportation, etc. This paper focuses on sales forecasting.

Despite continuous developments in the domain, APS suffer from limitations. In [2], the authors point out some of these limitations. However, their focus remains on the gaps between APS modules and all the elements required for the implementation of supply chain management. Here, we tackle other limitations that have not received much attention from the community: User Interface (UI) and interaction-related issues.

From a user-centric analysis of existing planning systems, we have noticed that APS are (generally) difficult to use. In the specific case of sales forecasting, we have noticed that existing systems do not really support users in terms of business rules and collaboration.

Planning system vendors have been making effort to integrate features in order to overcome these limitations.

However, as such evolutions had not been natively considered, they result in complex and inconsistent UI.

The above-mentioned observations motivated the development of Colibri, a supportive and adaptive advanced planning system.

## SALES FORECASTING

Sales forecasting consists in forecasting future sales based on past sales. In a company, one or several forecasters work jointly with several collaborators in order to achieve the planning task.

Sales forecasting is an iterative process which is achieved on a weekly or, more generally, on a monthly basis. Theoretically, the process follows a well defined workflow which is split in five successive phases.

1. **Past sales review** consists in investigating past sales in order to adjust irregular sales, so that the data reflects the reality. As sales forecasting concerns a large number of products, irregular sales are first highlighted by the system. In addition, in most cases, the forecaster solicits his collaborators for investigating sales regarding products of their scope.
2. **Product life cycle management** consists in adding information about new products as well as planning the substitution and deletion of other ones. Generally, only the forecaster is allowed to perform such operations.
3. **Forecast computation** consists in automatically computing future sales based on the reviewed past sales data. This operation is launched by the forecaster and is performed using statistical algorithms.  
Note, forecasts are computed for a period of time that may vary from a company to another. However, in general, this period concerns the twelve future months.
4. **Future sales review** is all similar to reviewing past sales. However, the focus here is on future sales automatically computed by the system.
5. **Forecast reliability analysis** consists in comparing different forecasts, so that important gaps can be identified early.

It is important to note that back-and-forth switching between phases is possible. However, going back-and-forth to another phase should be limited and, preferably, controlled in order to avoid introducing inconsistency in the data.

It is also important to note that, prior to sales review, data

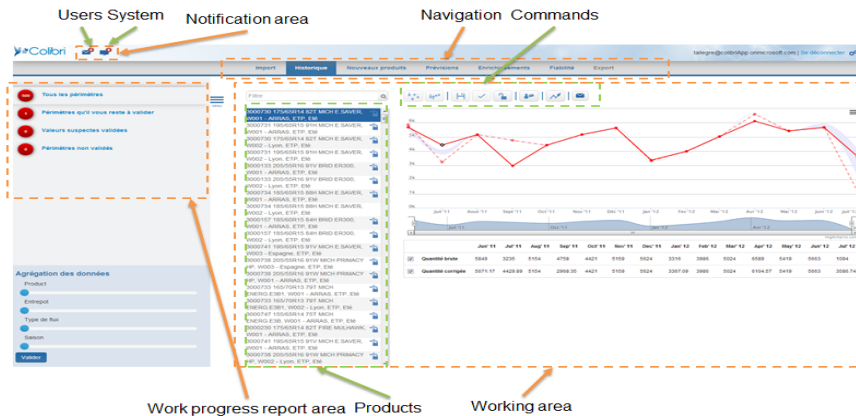


Figure 1. Colibri: Past sales review

is imported from the information system. Data is also exported to the information system after the analysis of forecast reliability in order to make it available to all decision makers.

### UI AND INTERACTION-RELATED ISSUES IN APS

Sales forecasting is supposed to go through a well defined workflow. However, our analysis shows that existing APS do not make this workflow obvious to the user. Indeed, advanced planning systems UI look like Microsoft Office software UI. Commands are organized using common concepts (e.g. "File", "Edit") instead of using concepts specific to sales forecasting. Due to this organization of commands existing APS UI do not support the user in realizing his tasks according to business rules.

Studying the roles involved in sales forecasting revealed that users fall into two classes: frequent users (forecasters) and occasional (collaborators). A significant number of commands are not meaningful for the occasional user. Yet, we do not denote any form of adaptation in existing APS: occasional users also have to face all the UI complexity.

In addition, APS comprise a large number of commands and propose interacting through multiple and separated windows that the user has to manage simultaneously. As a result, interaction is highly mentally demanding and this demand is higher for new or occasional users.

### COLIBRI: SOME KEY FEATURES

Colibri proposes a user-friendly UI. Unlike most of the existing APS, all interactions take place in one single window. Navigation within the system is organized according to the phases of sales forecasting: the UI highlights the process workflow and thus supports the user in terms of business rules. In order to maintain consistency throughout the UI (that augments the learnability of the system), most of the screens are similarly organized.

Figure 1 corresponds to the past sales review phase. The working area gives access to commands that are specifically related to products sales values, located right above the corresponding data (represented both graphically and numerically). These commands include features meant for controlling the data consistency and for collaborating. For instance, it is possible to lock the data related to a product sales. Once the data is locked, only a "super" user (such as

the forecaster) can allow its modification again. The forecaster also has the possibility to solicit his collaborators in order to investigate sales of one or several products. Some other commands may be specific to phases. Those commands appear on the left part, at the bottom, of the UI. Note that available commands depend on the type of user interacting with the system: Colibri is adaptive.

In Colibri, users can exchange insights regarding a given product or a set of products. Users are notified of messages availability in the notification area. Messages are of two types: those authored by users and those authored by the system itself.

Sales forecasting concerns thousands of products. It is then important to report work progress to the user at the different steps of the process. The work progress area of the UI provides the user with relevant indicators (according to the current phase) such as the percentage of remaining sales to be investigated or the percentage of sales that have been reviewed and validated (thus locked) for the sales review phase.

### CONCLUSION AND FUTURE WORK

This paper points out some UI and interaction-related issues in APS. It describes the sales forecasting module of Colibri which highlights the forecasting workflow and supports real collaboration.

In the short term, we plan to conduct user studies, first in the laboratory then in real-world situations, in order to assess the usability of the system and to validate whether the expected user experience (identified during the analysis phase with experts) has been met. Our long term goal is to develop a complete APS solution which places the user at the center of endeavors.

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