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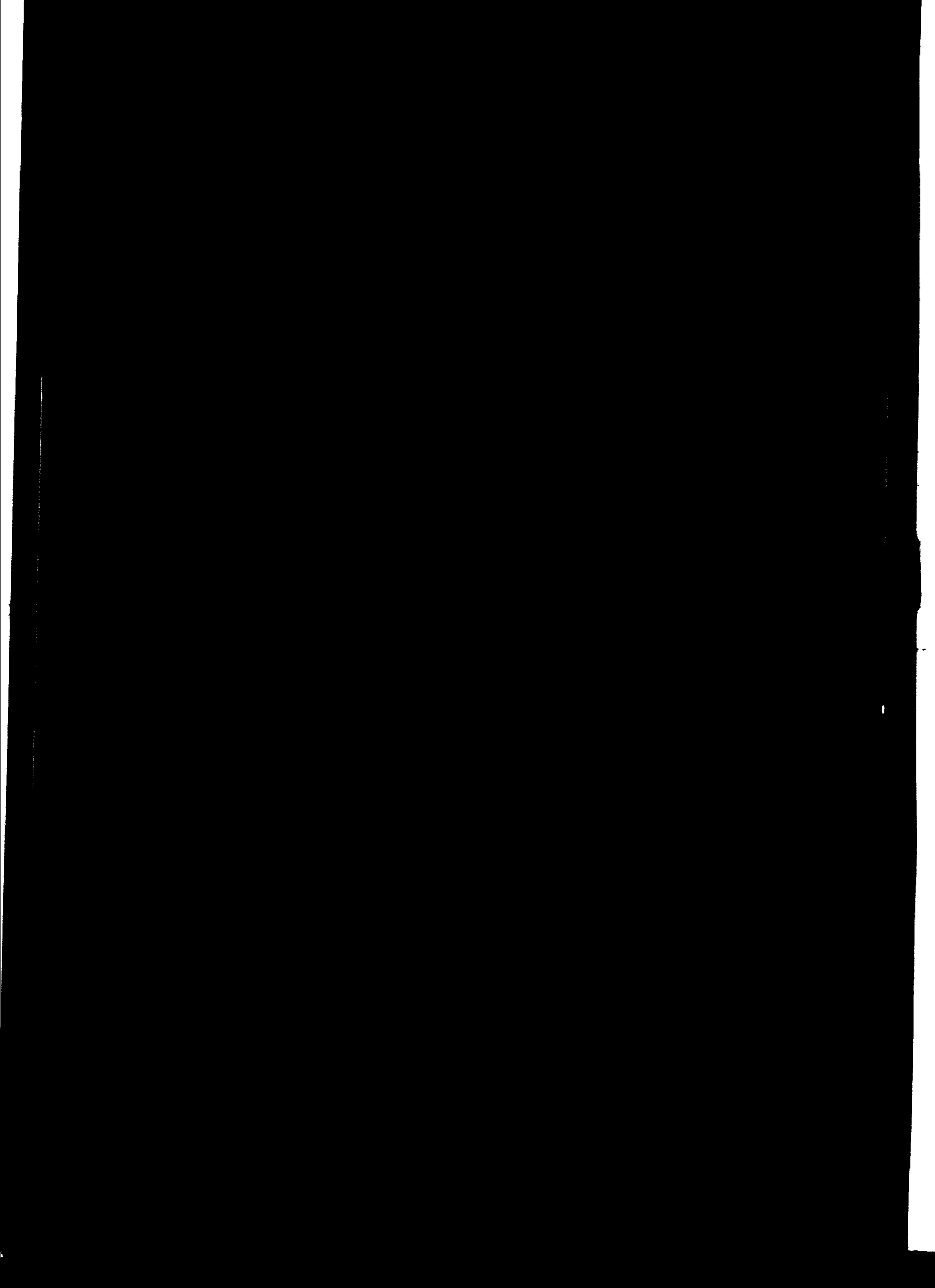
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THE ROLE OF COMPUTERS IN PRODUCTION PLANNING 1/

by

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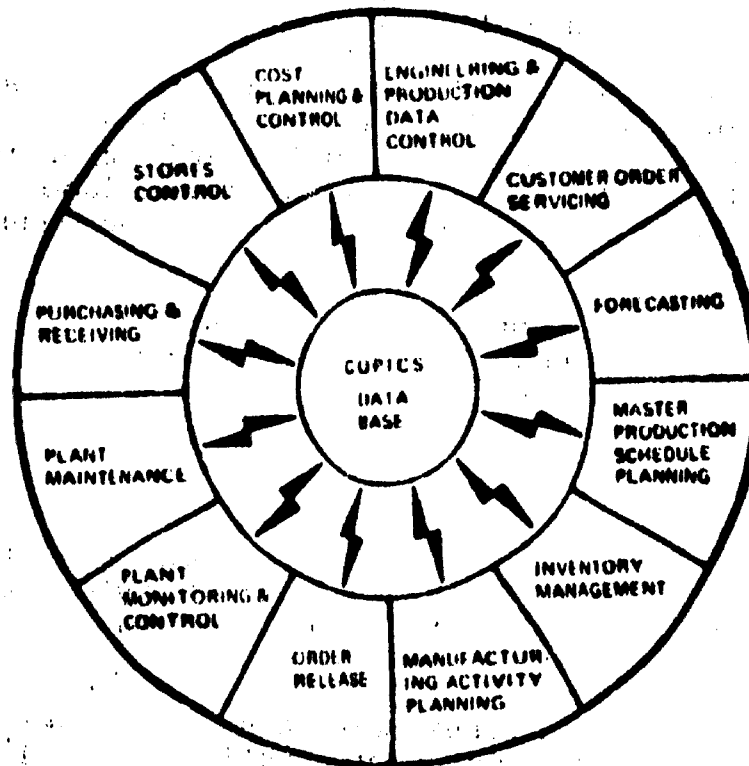
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THE ROLE OF COMPUTERS IN PRODUCTION PLANNING

Today a manufacturing company is successful in proportion to its ability to rapidly gather, transmit and interpret all information dealing with its activities. The complexity and amount of data needed for the conduct of the business have increased considerably. In spite of this fact, many managers are trying to control more complex business activities with information that becomes increasingly incomplete and out of date.

The IBM developed COPICS (Communication Oriented Production Information and Control System) brings a new approach to this problem by employing the communication capabilities of the computer to help management operate more effectively.

At present, the manufacturing terminology does not seem to be unified throughout the countries, let's shortly summarize the manufacturing application areas:



Manufacturing Planning and Execution Areas

- . **ENGINEERING AND PRODUCTION DATA CONTROL** creates and maintains basic engineering records.
- . **CUSTOMER ORDER SERVICING** links the sales information system to manufacturing. Customer order entry and control of the order through to shipment are addressed.
- . **FORECASTING** provides techniques to project finished product demand and establish management standards to control manufacturing activity.
- . **MASTER PRODUCTION SCHEDULE PLANNING** allows quick assessment of the impact of alternate production plans on plant capacity. The result is a realistic master production schedule, which is used for further detailed planning.
- . **INVENTORY MANAGEMENT** determines the quantities and timing of each item to be ordered - both manufactured and purchased - in order to meet the requirements of the master production schedule.
- . **MANUFACTURING ACTIVITY PLANNING** is used to plan detailed capacity requirements and to adjust the date of planned order release to be consistent with plant capacity. Its objective is to achieve a reasonable level load as well as to minimize work-in-process inventory and manufacturing lead time.
- . **ORDER RELEASE** is the connection between manufacturing planning and execution. On the planned order release date, this function creates the documents authorizing production or purchase of the required material.
- . **PLANT MONITORING AND CONTROL** traces the progress of each shop order as it moves through the shop. It coordinates many of the supporting activities such as inspection, materials handling, and tools. Direct computer control of many phases of the manufacturing process also falls here.
- . **PLANT MAINTENANCE** addresses maintenance manpower planning, work order dispatching and costing, as well as preventive maintenance scheduling.
- . **PURCHASING AND RECEIVING** maintains current purchase quotations, creates purchase orders, and follows the progress of the order from the time of requisition, through acknowledgment, follow-up, receipt, quality control, and deposit in stores.

STORES CONTROL keeps track of material location and determines where to store new material. Its objectives are to increase utilization of storage space and to reduce both picking time and picking errors. Automated warehousing techniques are also addressed.

COST PLANNING AND CONTROL is addressed particularly to the financial executive and provides techniques whereby the information created and maintained for production purposes can be used for budgeting and accounting applications.

I will mainly address the Production Planning application areas (i.e. Forecasting, Master Production Schedule Planning, Inventory Management, Manufacturing Activity Planning and Order Release), but one should not neglect the execution phase as it is responsible to monitor the actual conditions, which are measured against standards to make sure everything is going according to plan. When deviations from the plan occur, the system automatically notifies the responsible manager.

In the planning area - with its high volume of data to be handled, as well as its complexity of applications with its strong interrelations - fast decisions are required from the management. This complexity is even increased by the fact that PLANNING is choosing from a range of alternatives. Analysis and evaluations of this vast amount of data as well as performing of simulations exceeds the capabilities of the human brain and cannot be solved even in small to middle size manufacturing companies without long time delay. But time is nowadays a very important factor to which high management attention should be paid, as decisions taken with long delay do not reflect any more, e.g. the economical situation which was taken as basis for it. Result: inactual and, therefore, incorrect decisions, causing profit loss for the company.

In the present technologically highly developed world many tools are offered to management, which enables them to concentrate on the real decision finding process, whereas the clerically complex analysis of the high volume data and simulation can be performed by the computer and serves as basis for it.

Here two approaches that significantly reduce delay in determining the impact on the production plan of day-to-day changes and interruptions:

Real-time data processing, in which most data required by the system is entered into it at the point where the data is created and at the time it is created, so that the affected records may be immediately updated. It is immediately accessible for the concerning function.

Net change processing, in which any effect that data entered into the system may have on the production plan can be quickly determined. Replanning no longer has to take place just once a week or once a month. Instead, it can be done once a day or, in some instances, continuously.

Of course, not all data need be processed immediately. In some cases delays can be tolerated. In these instances the application approach is batch processing (e.g. when data must be measured by comparing the current period's activity with that of the previous period or the same period last year. In this case, there is little need to update the current period's activity on a real-time basis).

Advantages of a computer based Communication Oriented Production Planning System to Management:

It enables management to determine the effect of alternative plans, such as different master production schedules, before one of them is implemented. The simulation techniques are addressed in each of the application areas.

It enables all areas of the business to be informed much sooner of the effect of a given event. Thus, everyone "changes direction" at the same time, and much effort can be saved.

Reductions in inventories of finished goods, components, raw materials, tools, etc.

An improvement in customer service. Fewer late orders, more realistic confirmation of delivery dates, faster delivery, shorter lead times, faster response to customer inquiry, etc., all should contribute to a better competitive position.

Better utilization of production facilities. A slight increase in manpower and machine utilization can generate very large savings.

A reduction in work-in-process inventory. This will result in shorter manufacturing lead times and less shop congestion.

Less handling of data. The need for paperwork creation and control is dramatically reduced.

More realistic planning of manpower capacity levels, which will reduce overtime costs as well as idle time.

Reductions in material shortages and in most of the resultant expediting.

Better utilization of a manager's time.

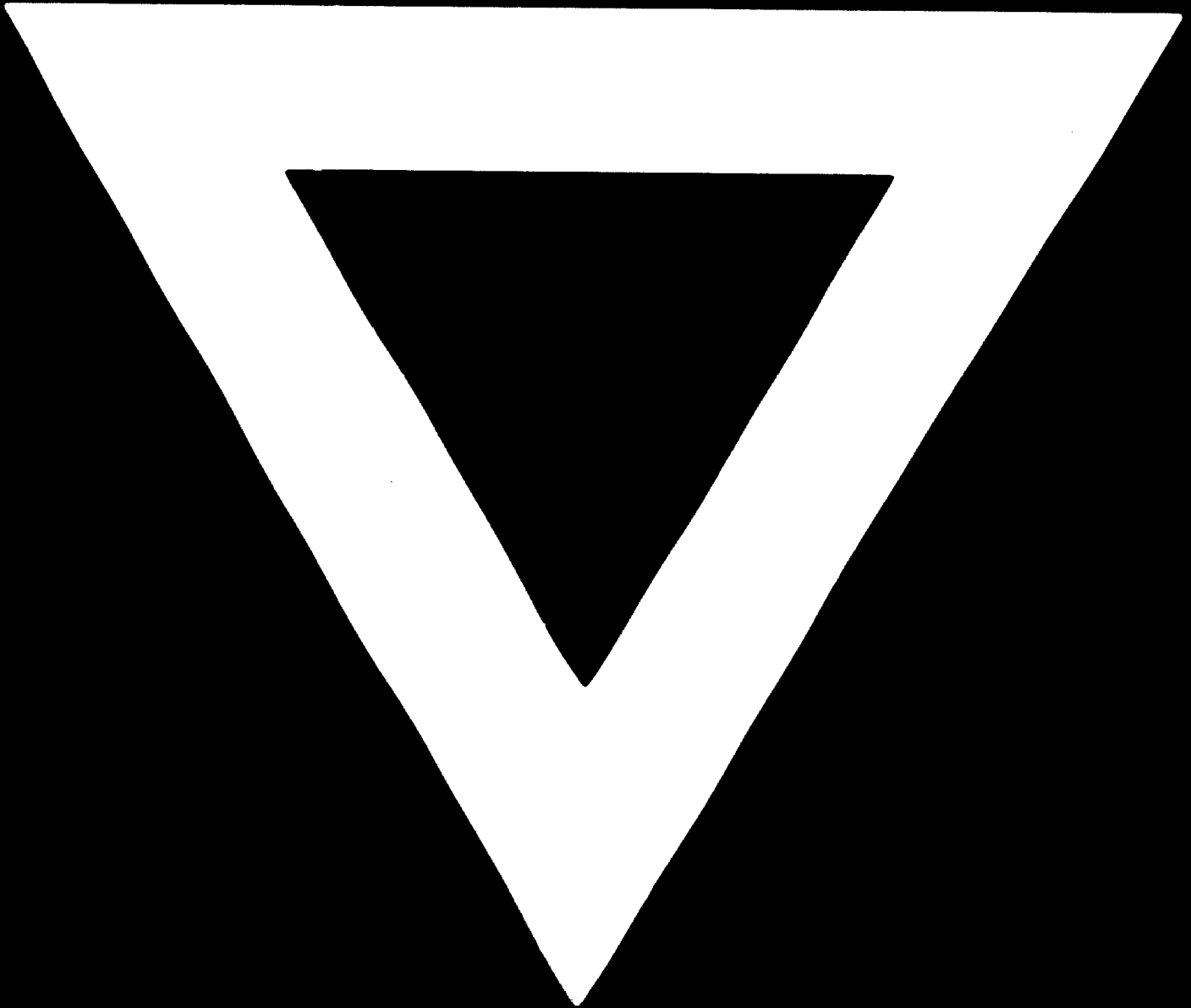
A reduction in purchased material costs because buyers have more time to spend in negotiating lower prices or seeking more reliable sources of supply.

The elimination of redundant data. Everyone is basing decisions on the same set of data.

More awareness of planning risks, more accurate forecasts, and more current information, resulting in better decisions.



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