

# Inventory theory: New perspectives for corporate management

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## Abstract

The significance of inventory theory for **corporate** management is questioned. A new perspective on how to look on inventory issues is needed: Inventories are very often the effect of mismanagement of those processes which lead to inventories. Therefore we need to fully control these processes to optimize inventories. The main business processes are briefly described and the role of IT assessed. Modern information technology enables us to design the concept of a virtual enterprise which in fact is a concept for global management of business processes. A concrete example is given. © 1999 Elsevier Science B.V. All rights reserved.

*Keywords:* Inventory management; Process management; Total quality management; Virtual enterprise concept

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## 1. Introduction

Perhaps because I worked myself at a university 30 years ago in the field of operations research, I have always wondered why researchers and institutes like ISIR are so attracted by the topic of inventories. Why did I wonder? Because the significance of inventory theory to corporate management and I underline *corporate management* is by my experience nil.

The *issue* addressed is indeed of high interest for corporate management, but the *approach* is not. This is an obvious contradiction, which I will try to explain and solve in this paper.

## 2. Inventory issues

If we look into the structure of a problem like the optimal lot size or the newsboy problem which have to be resolved by any student in his/her first operations research class, the issues raised are really important:

- How to optimize costs?
- How to harmonize production and sales planning to achieve a certain delivery objective by minimizing cost?
- How to avoid waste, e.g. by avoiding obsolete inventories?
- How to avoid loss of demand and, as a consequence, loss of profit?, etc.

All these issues are indeed important because they immediately impact the bottom line of the profit and loss statement of an enterprise.

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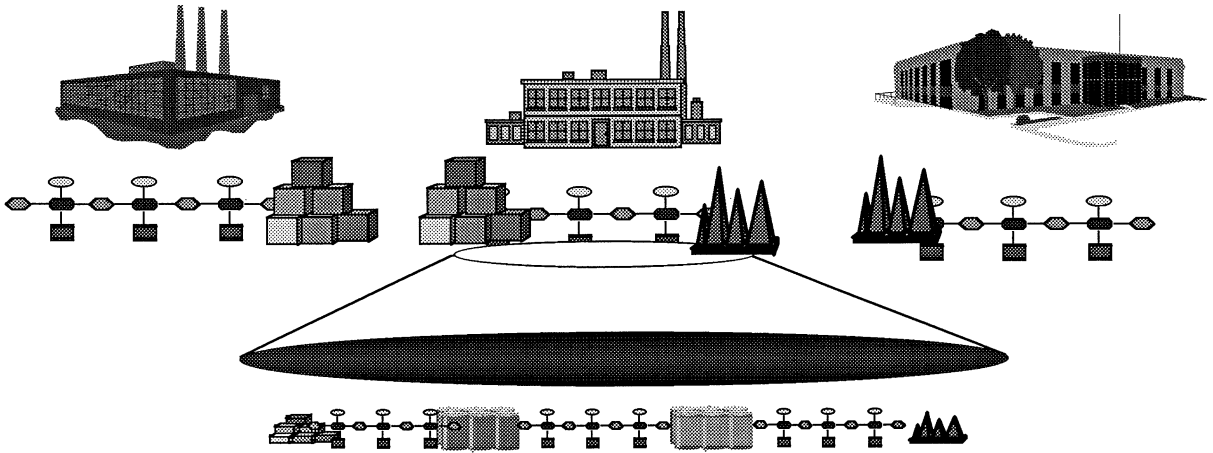


Fig. 1. A new perspective of inventory management. Inventories are the consequence of non-seamless processes within different companies or mismanaged processes within one company.

### 3. Corporate reality

If you look into corporate reality, I assert that you will not find mathematical models which really address these issues from a management and bottom line point of view. Of course, I am quite sure that there is use of mathematical models for production and sales planning and inventory management, but the use of these models is restricted to the execution level.

These models do not or cannot address the real complexities of the strategic issues.

At the strategic level we need a *new perspective* on how we look on inventory issues.

Inventories are very often the effect of mis-management of those processes which lead to their piling up. Inventories are the result of processes we have not fully under control, as illustrated in Fig. 1.

### 4. A new perspective on inventories

The new perspective should be: based on the idea that if one succeeds in managing sales, production and distribution in the right way, one might not even need inventories. Therefore, if we want to deal with the issues mentioned properly we need to look at the whole process of sales, production and distri-

bution instead of just looking at inventories. The new perspective is illustrated in Fig. 2.

If we want to find the common denominator between up-to-date management concepts (Materials Management, Process Management, Re-engineering, Total Quality Management, Work Flow, etc.) and inventory theory we have to have this integrated view. If we, for example look into the notion of materials management, that is exactly what it addresses, in a broad scope:

Materials management looks at the whole flow of materials, starting with the purchase order of raw materials for production, the production process itself and distribution. Process management has an even broader scope because it looks at all processes in a company and it requests that we do not look into hierarchies and departments but that we rather organize our company along the main business processes Fig. 3:

Total Quality Management adds the key objective of any company: “to satisfy our customers” and therefore TQM requests that all processes are streamlined and organized towards the customer Fig. 4:

Satisfying the needs of the customer is the name of the game and I personally believe very much in this concept of TQM. If we look, e.g. at a Japanese company especially in their production area you

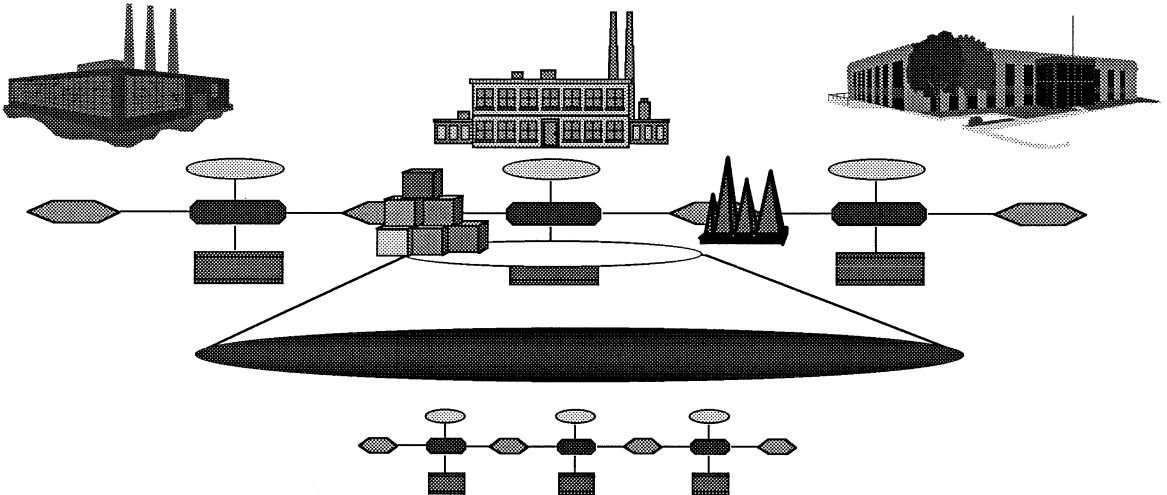


Fig. 2. A new perspective of inventory management. Manage the materials processes right and you might not even need inventories

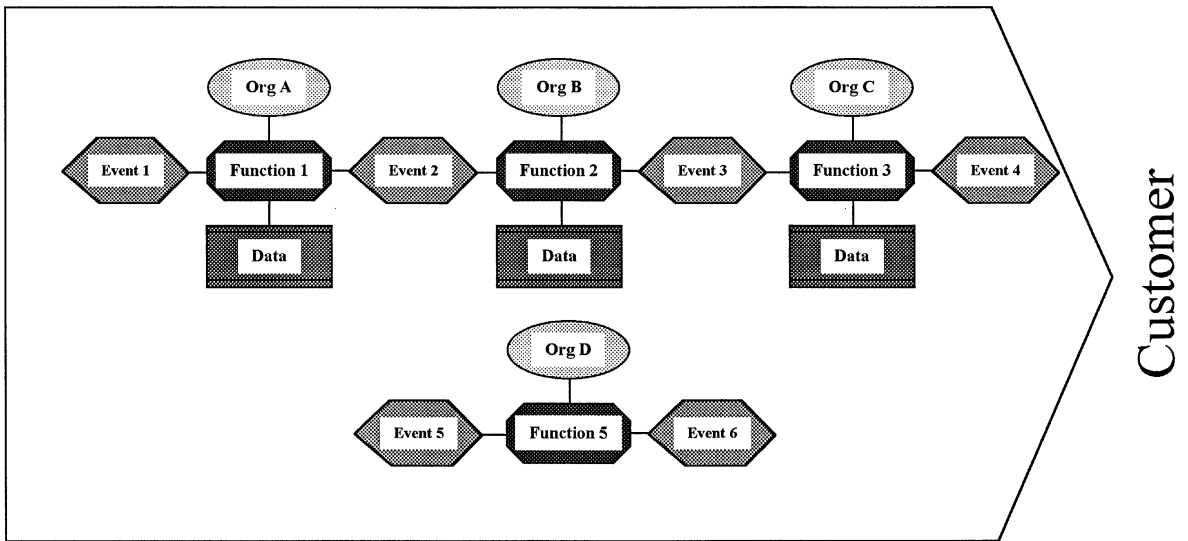


Fig. 3. A broader scope of materials management is ... Process management ...

will really understand that if we reorganize our production but also all the other departments under customer satisfaction aspects we will change the organization.

Very often we might need a re-engineering of the main processes of a company to really achieve the level of customer satisfaction we want.

So only by shifting the perspective we end up with a totally new concept on how to look at the issues of inventory management.

Having heard all the above one may ask: These buzz words have been around since minimum ten years why and how should we re-approach these issues now?

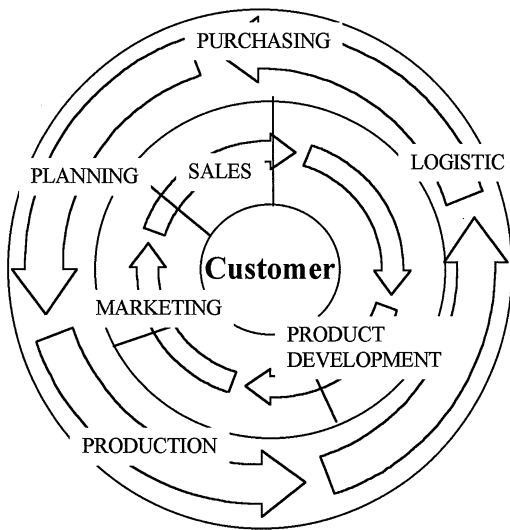


Fig. 4. Total Quality Management is even more focused ... it re-directs all processes towards the customer.

According to my view, with network computing, group-ware and the work-flow concept we are now in a situation that enables us to start thinking on what is called the Virtual Enterprise Concept. We will be more and more in a position to design processes which are executed at different physical locations by interactions between people who work at these or other additional locations. We are able to measure process input and process output and we will be more and more able to measure customer satisfaction, both at strategic and at operational level. The basic idea of this is shown in Fig. 5.

And if we succeed in doing that: there might be no inventory management issue left to be resolved!

Therefore, I re-state: Let us address the real issues of inventory management from a corporate point of view, let us look into the business processes, describe them completely, simplify where you can, define quality metrics for your processes and measure their achievement and implement the



Fig. 5. The virtual enterprise concept is possible ... by using network computing, groupware, workflow concepts ...

whole thing by using modern tools of information technology because they will enable you to speed up response time to the market, and they will allow efficiency in process execution.

**5. The case of Henkel**

Let me illustrate the ideas I am proposing using an example from the field I am responsible for at the Henkel Group called the Surface Technologies business:

Our main processes (Fig. 6) within our organization – and this is actually true for most companies – are

- order to delivery process (sales planning – order processing – production planning – purchasing – logistics)
- customer satisfaction (customer visit – customer acquisition – customer complaint – technical service)
- time to market (product development – product adaptation – market justification – market introduction)

All these processes have an impact on our inventories. The order to delivery process includes the process of inventory management. Just until re-

cently we had different production sites producing for the same market. At each production site we had a production planning function and within the sales administration we had a planning group responsible for the inventory of finished goods and delivery service. The production planning groups at the production sites were responsible for inventory of raw materials and the production plan.

We had a classical functional oriented organization. The result of our process analysis was to change the functional organization to a more process oriented organization. We brought the whole planning process to the main production plant into one “Operation planning group” where one can find all the functions (purchasing, production planning, sales planning, logistics) within one group. Also the group has all the responsibilities for inventories of raw materials and finished goods, and delivery service, which were previously distributed over the different locations. This process organization works only by using network computing and groupware tools. By using these tools we concentrated also the other administrative processes at one location without changing the legal structure of the different companies. Today we still have different legal entities but we are acting in one “virtual” organization Fig. 7.

**Main business processes**

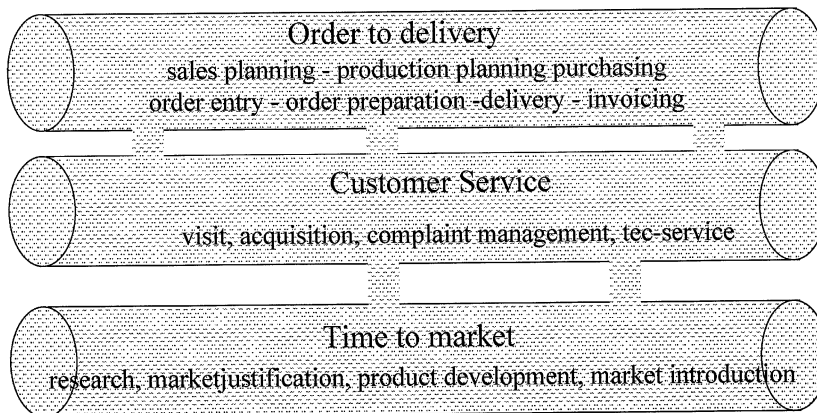


Fig. 6. Main business processes.

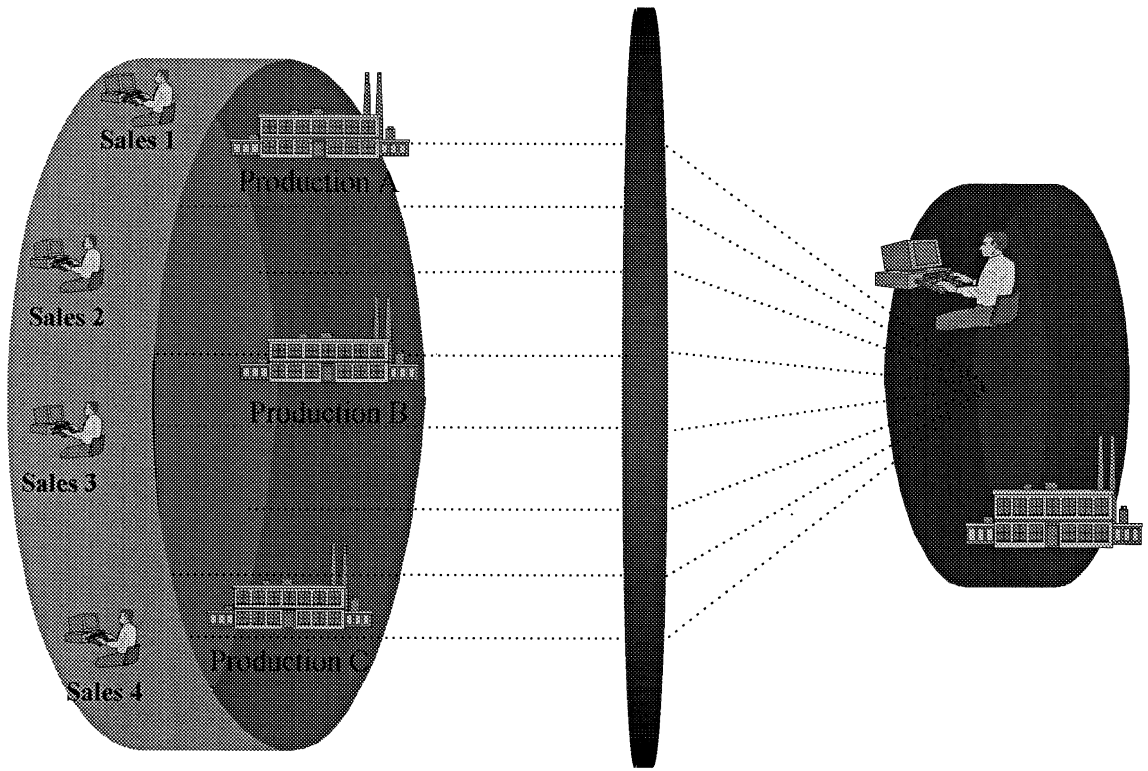


Fig. 7. The concept of the virtual organization... Same processes at different locations/enterprises are focused in one virtual organization.

## 6. Conclusion

What does this mean for the inventory management in our examples. It can be summarized in three points:

- We do not look at sub-processes, (as usually done in mathematical models for reason of simplicity), instead we are trying to optimize/manage the whole process in one step
- By the concept of the “virtual enterprise” we are enabled to practice “on-line process control”: we monitor so closely and interactively that our results will be always better than with applying “one-shot” models.
- It sounds very philosophical, perhaps a little vague, but with this approach we fully utilize expertise and motivation of our people involved: they decide, based on all new incoming informa-

tion, at which location which articles should be produced in what amount; a multi-functional team negotiates a “good” solution based on real-time available information!.

I am well aware that these thoughts need more elaborate explanation and that they might not be as precise as mathematical models, but they address practical day-to-day business problems with corporate impact.

I am personally convinced that with the new information systems technology the concept of the virtual enterprise can become reality ... and this will give us entirely new options to organize and run companies and eventually to address in a totally new way business problems such as inventories, which still are in most companies – also at Henkel – too high ... but we have now the concept and the tools to change this situation!