How and why return products back to manufacturer?

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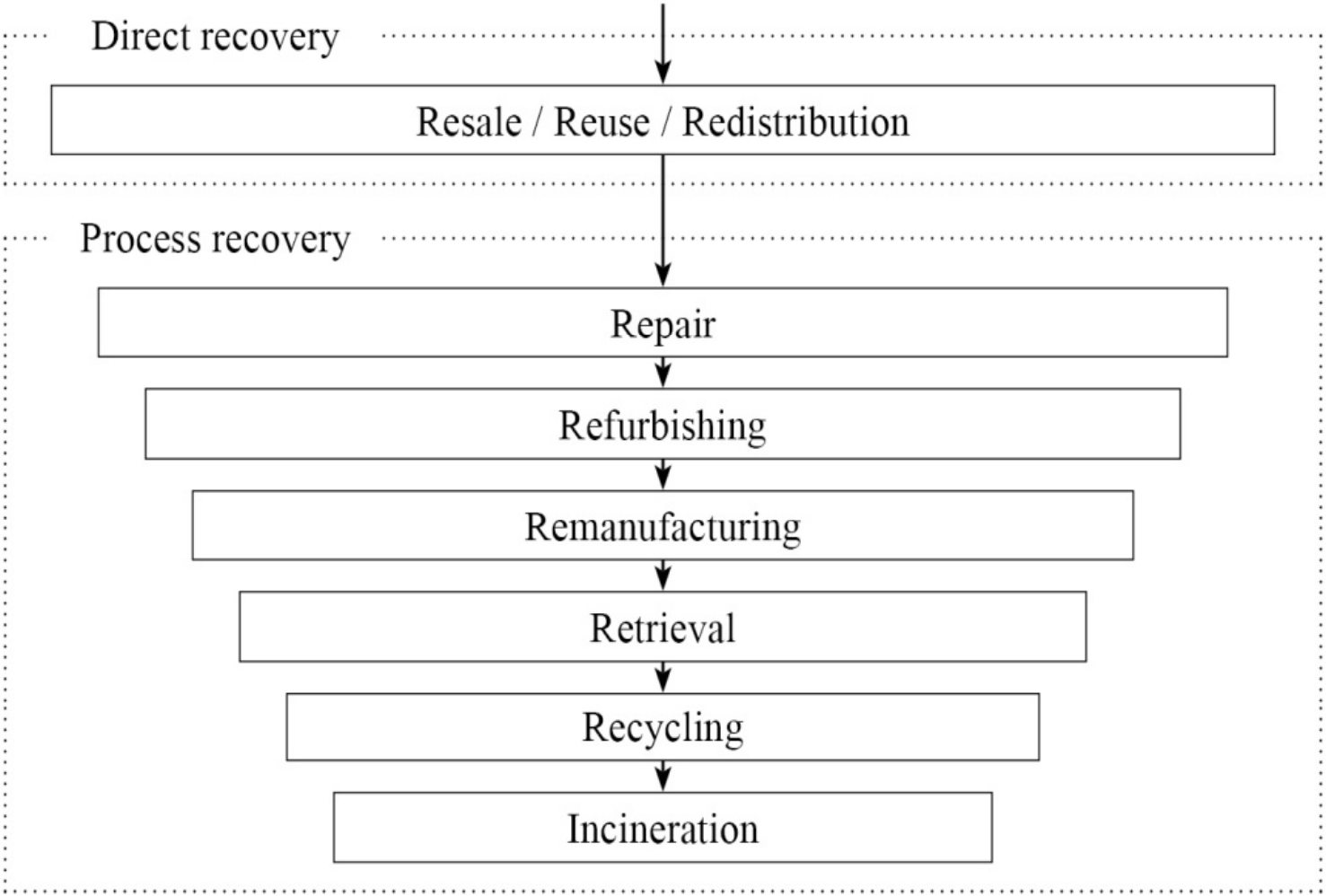
Introduction

This paper is giving complex view of reverse logistics in a field of inventory management. It describes the return of End-of-Live products, the reasons of this return and ways of return.

Next part of paper deals with material requirements planning (MRP) and rate of return EOL product for remanufacturing or recycling.

Last part of paper focuses on inventory in process of remanufacturing considering about two kinds of stock are supplemented by opportunity stock which is typical for remanufacturing.

Return


Direct recovery
Resale / Reuse / Redistribution
Process recovery
Repair
Refurbishing
Remanufacturing
Retrieval
Recycling
Incineration

Reason of return

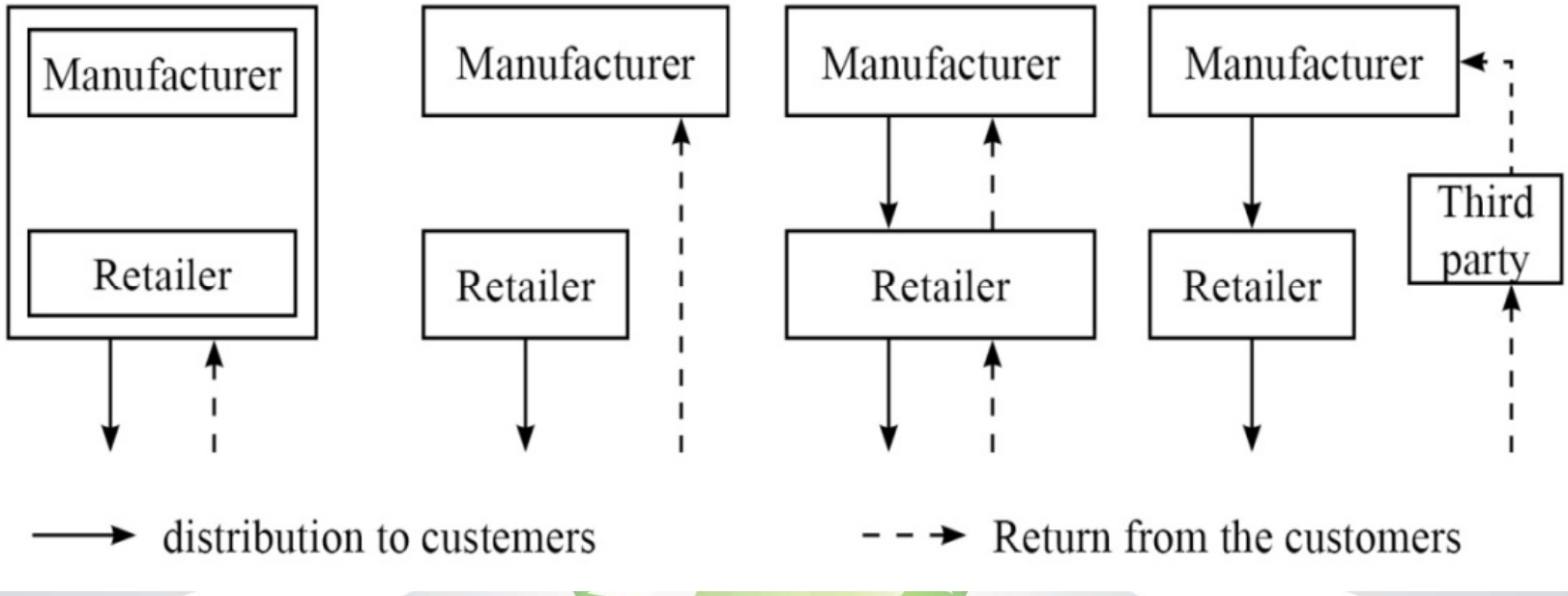
Factory Repair, Service, Maintenance, Agent Order Error, Customer Order Error, Entry Error, Shipping Error, Incomplete Shipment, Wrong Quantity, Duplicate Shipment, Duplicate Customer Order, Not Ordered, Missing Part.

Damaged, Dead on Arrival, Defective, Stock Excess, Stock Adjustment, Obsolete. Freight Claim, Miscellaneous.

Disposal of the product, Scrap, Destroy, Secure Disposal, Donate to Charity, Third Party Disposal, Salvage, Third Party Sale.

Rework, Remanufacture, Refurbish, Modify, Repair, Return to Vendor. Use as Is, Resale, Exchange and Miscel-laneous.

Ways of return



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Material Requirements Planning

Seven characteristics of the recoverable manufacturing systems:

- The uncertain timing and quantity of returns
- The need to balance demands with returns
- The need to disassemble the returned products
- The uncertainty in materials recovered from returned items
- The requirement for a reverse logistics network
- The complication of material matching restrictions

Rate of return

d - demand

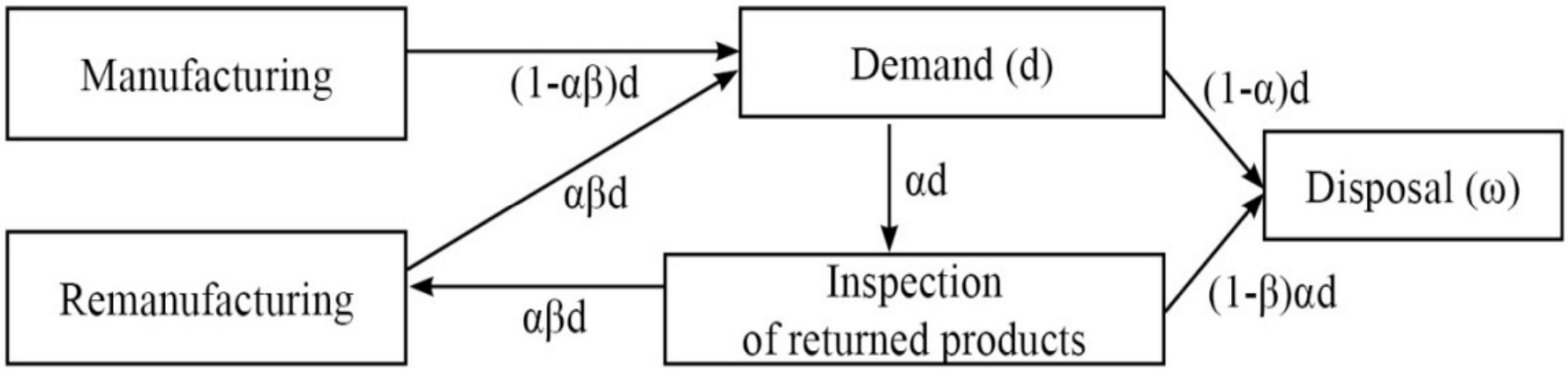
α – rate at which products are returned to manufacturer ,

β – rate at which returned products are used,

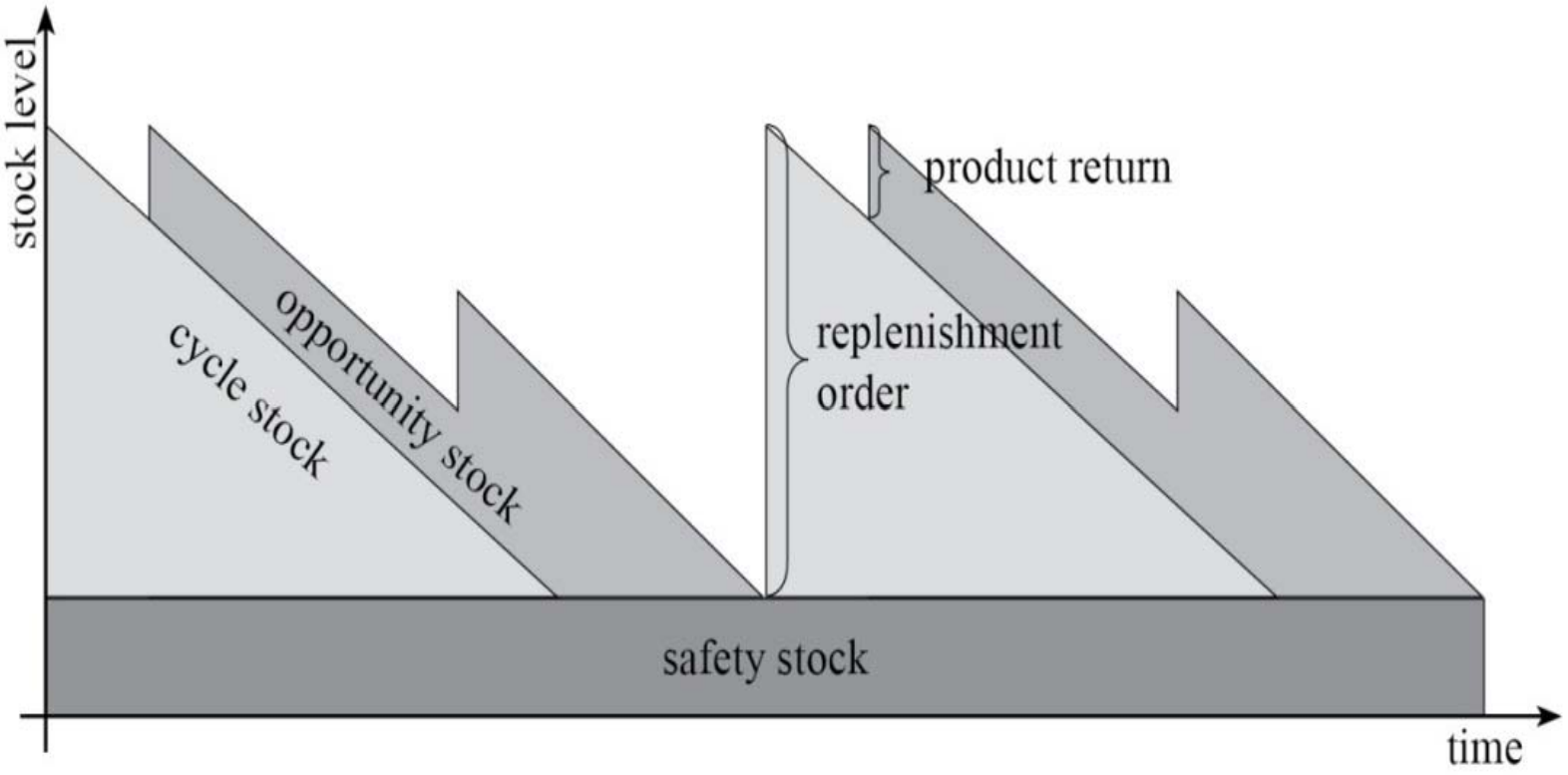
r_{tr} – quantity of returned products, $r_{tr} = \alpha d$

r_r – quantity of used returned products $r_r = \alpha\beta d$

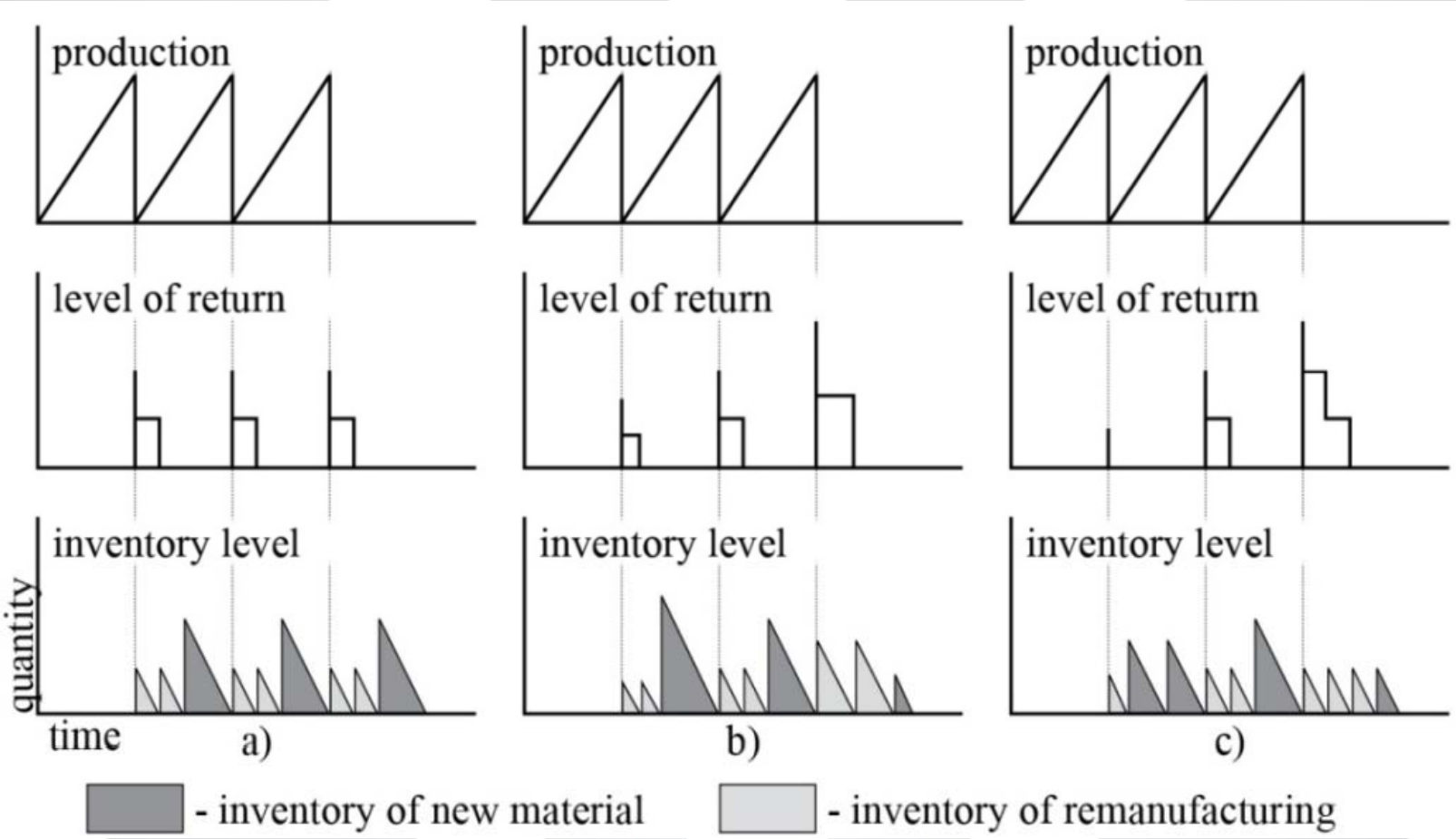
ω – disposal (it means the quantity of products which are not returned or reused), $\omega = d - (r_{tr} - r_r)$



Inventory in process of remanufacturing



Inventory level



Conclusion

As we can see the return of products back to the manufacturer is effective not only in economic sense but environmentally as well. Based on these two facts the companies are focusing more on the planning of processes related to the return of the end-of-life products for their remanufacturing.

However the quantity and quality of returned products is uncertain which makes material requirements planning difficult. This uncertainty led to the development of models dealing with return, quantity and rate of return and also inventory management connected with inventory return.

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