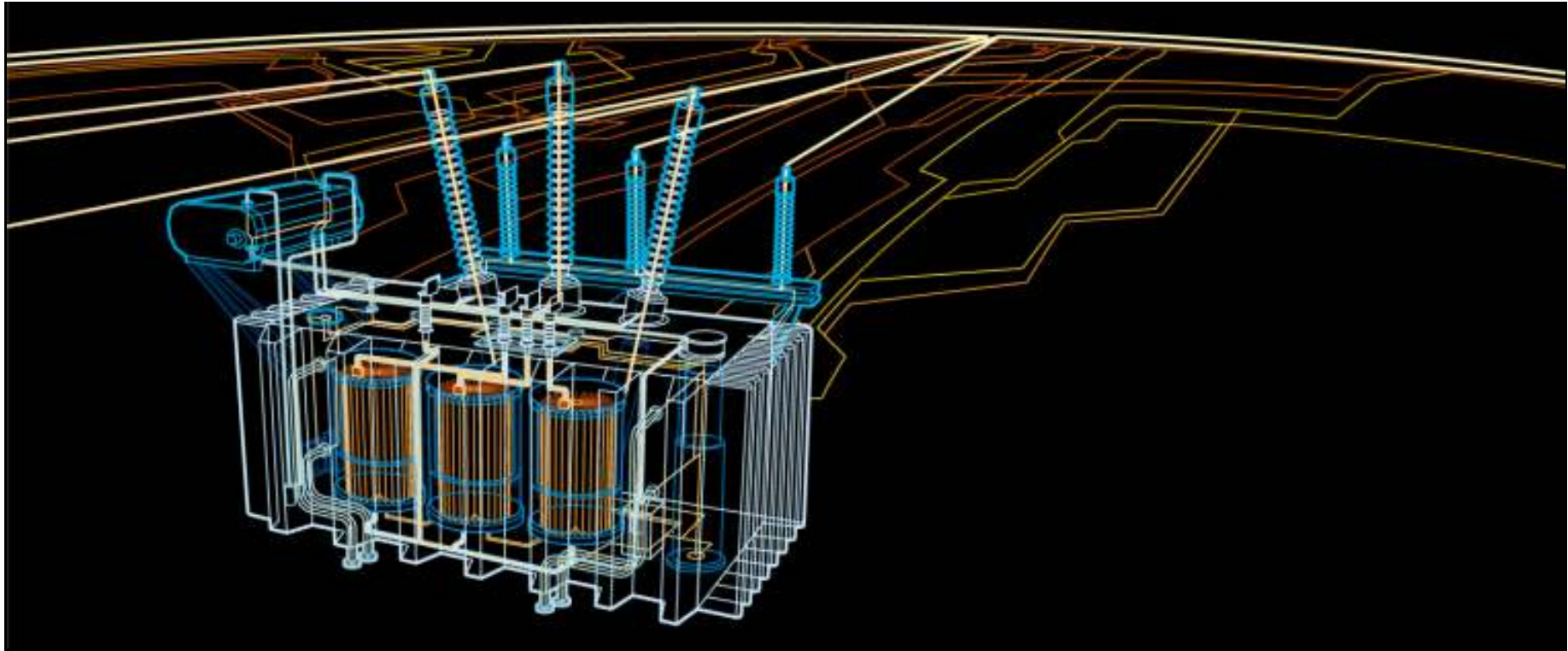




Antonio González, 28.04.2015

Supply Chain Management The Logistic Chain of the Production Flow

Theory of Restrictions (T.O.C.).DRUM-BUFFER-ROPE (DBR)

- THEORY OF RESTRICTIONS (T.O.C., E. Goldratt) The output of a system is determined by the capacity of the slowest process. This process is denominated *BOTTLENECK*.
- DRUM-BUFFER-ROPE (D.B.R.) Is the tool to apply TOC for scheduling a production flow.



- **Drum**: the bottleneck set the rhythm for the whole chain.
- **Buffer**: there is a centralized protection for the system against variability as temporary stock before the bottleneck.
- **Rope**: the bottleneck “pull” or tie the rest of processes in the system, new order is introduced only at the right time.

The Complex World: CHAOS

Optimum use of resources



Balance of capacity in between processes



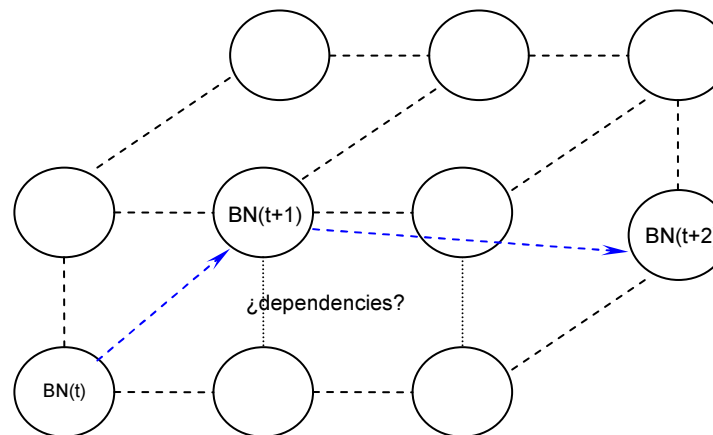
Reduce Protection Capacity



Variability (Market mix)



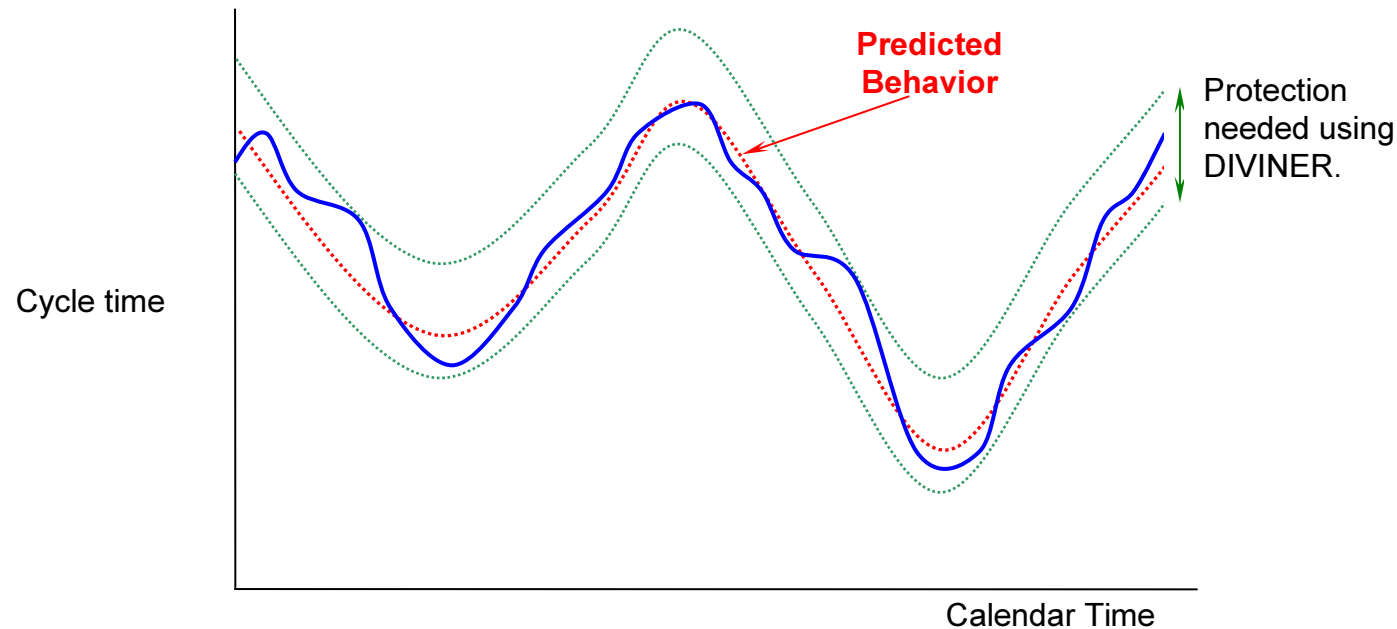
Movement of the bottleneck is a function of the Backlog Orders



Movable bottleneck. Movement to the Chaos.

ADVANCED SCHEDULING. DIVINER 3.0

- Is possible to **predict** the behavior of the system due to the variability caused by the backlog. Thanks to the **simulation** performed by Diviner, is possible to analyze the future evolution of the supply chain and take measures in advance in order to adjust capacity to face only natural random variability



Natural Variability + Variability of the backlog. Tailor-made production

ABB Zaragoza Solution.

ABB

From IT based solution to People Involvement

Exercise Summary

- Empower / coach your people to solve the problems alone



- Give a time target.
Implementation has to be fast



- Enable your people to perform by provide right means

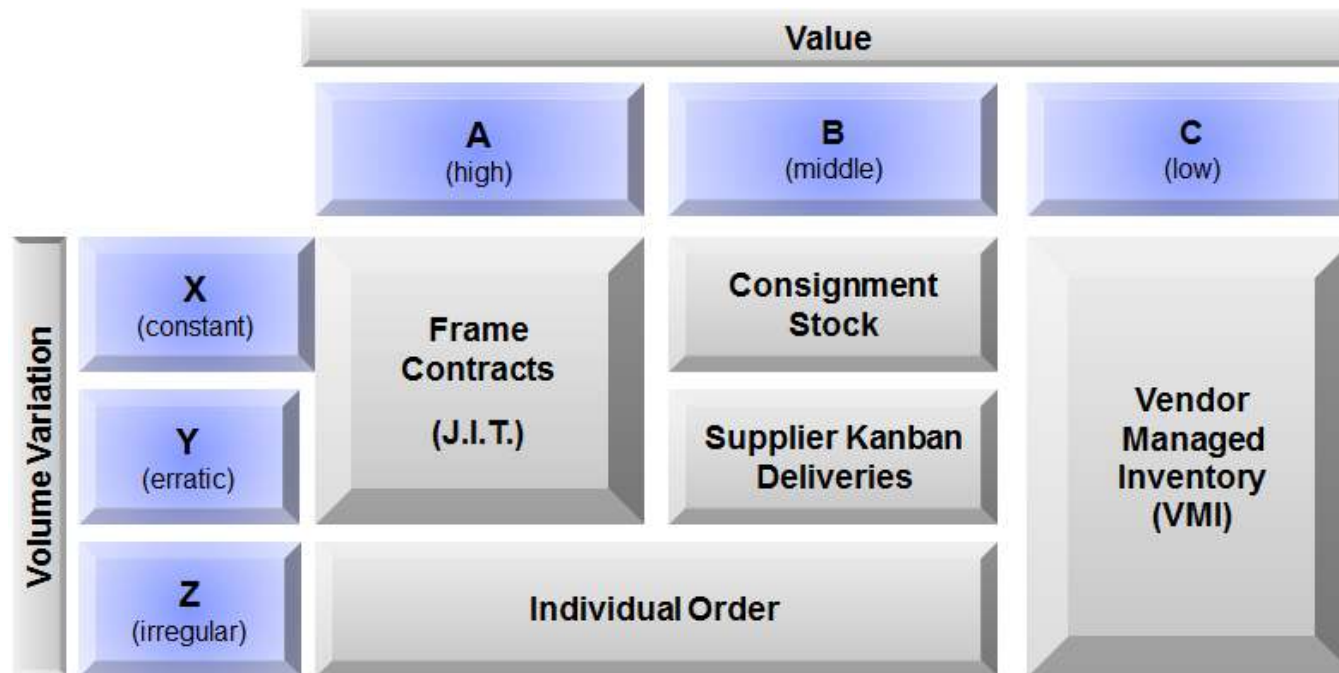


- Give management attention to the shop floor people / Celebrate success



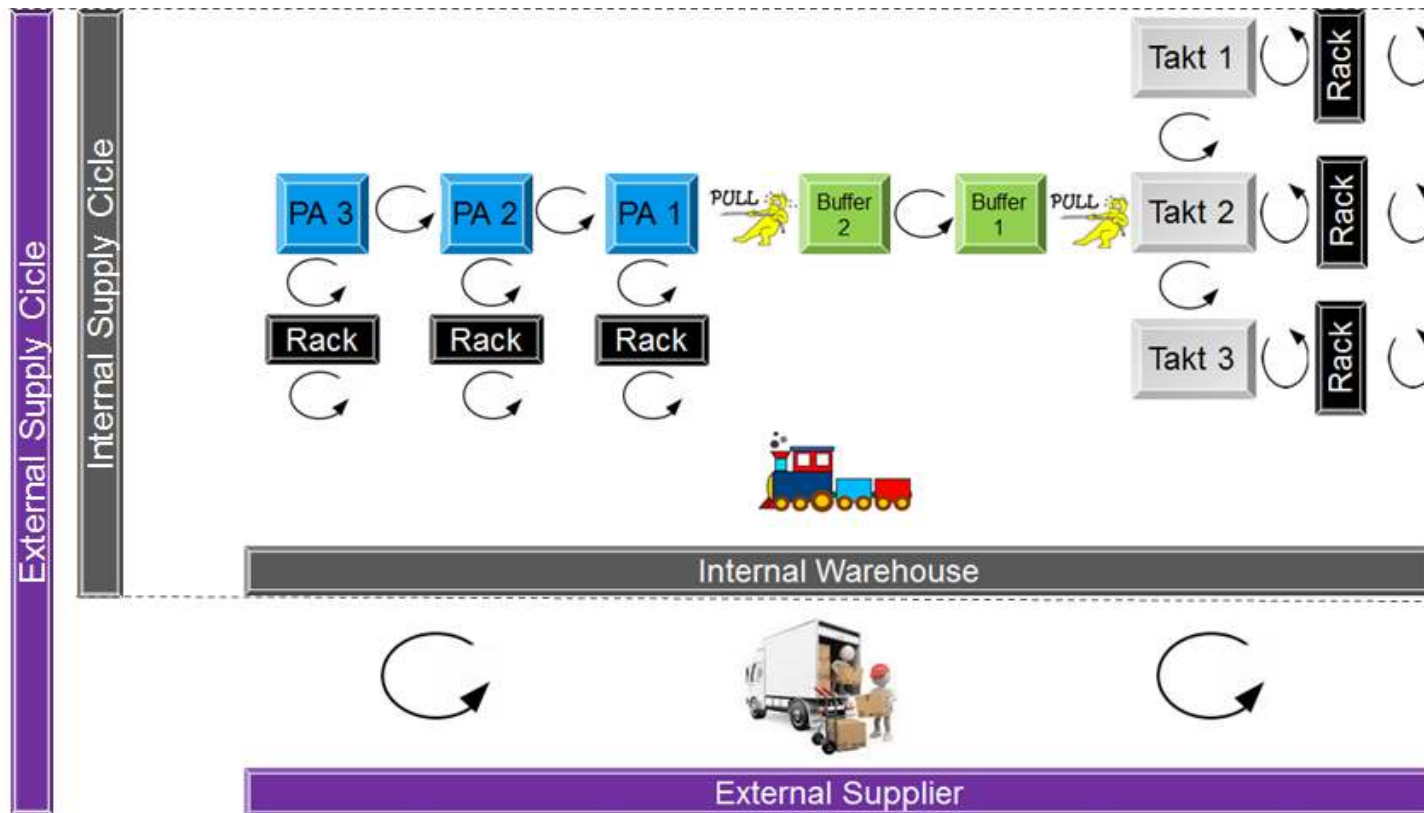
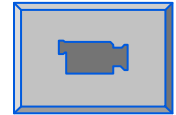
Logistics & Material Supply

Decide on Your Supply Cicles



Production Supply Strategies

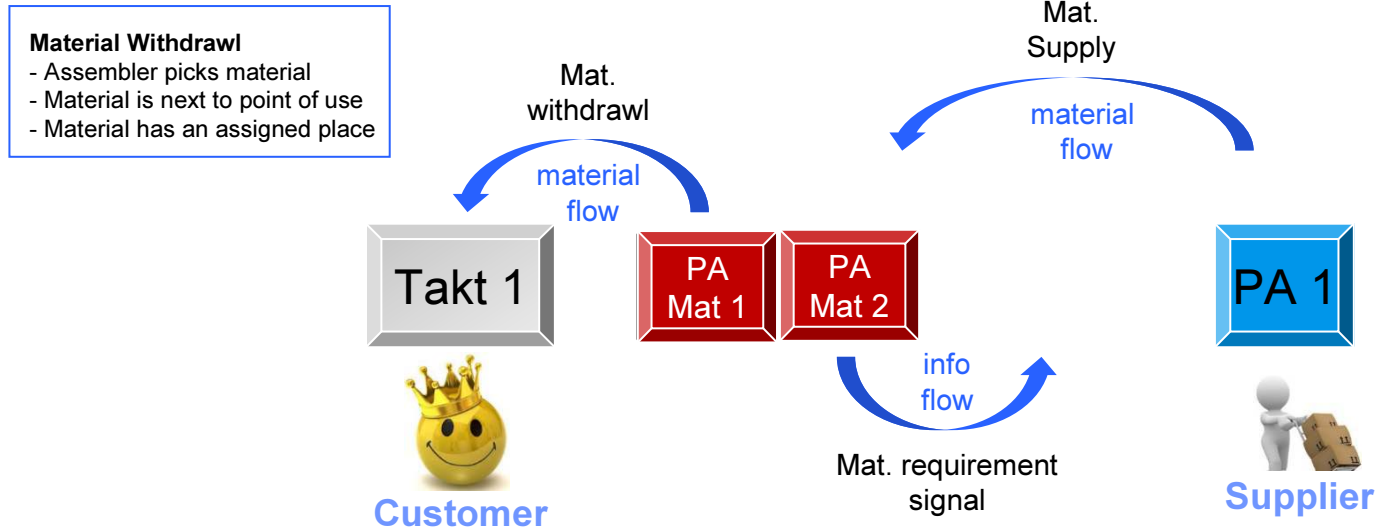
Pull Material Supply



- The internal supply cycle describes the supply of material from the internal warehouse to the point of use.
- The external supply cycle describes the supply of material from the supplier to either the internal warehouse or directly to the point of use

Pull Production (III)

Information & Material Flow in Detail



Pull applies in any **Customer – Supplier** relationship

- ABB Warehouse
- Production line
- Production line
- Production line
- Takt 2
- Takt
- Production Planning

.....



- External supplier
- ABB Warehouse
- Paint shop
- Production Planning
- Takt 1
- Pre-Assembly
- Purchasing

Information Flow

- Material requirement signal needs to be sent to supplier (inter. or exter.)
- Signal can be anything from empty place, Kanban card, empty bin, flag etc.
- Issue of signal has to be early enough to allow refill before no more material available
- Refill signal is always issued by 'customer' not an ERP system



= pull signal

Power and productivity
for a better world™

