

# TLS ed Industria 4.0

## La gestione efficace con l'aumento della complessità

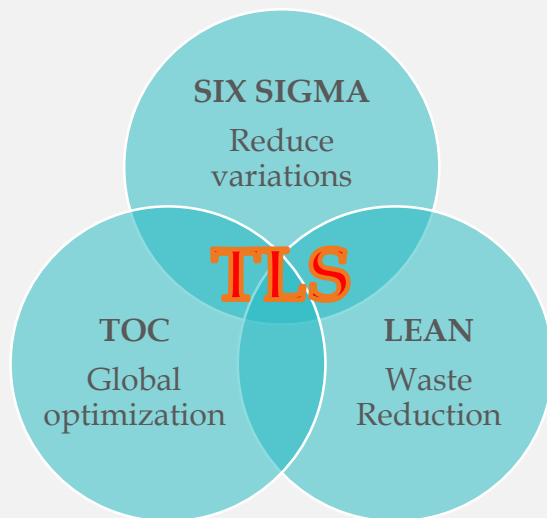
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# TLS ed Industria 4.0. La gestione efficace con l'aumento della complessità



Partita sempre più impegnativa

Complessità

Mass customization

Variabilità

Velocità

Concorrenza



# Industry 4.0: Che bisogno c'era?



One piece flow?  
Flessibilità?  
Velocità?  
Qualità?

## KANBAN VERSUS MRP II – WHICH IS BEST FOR YOU?

Walt Goddard, a leading spokesman in the field of inventory management, visited Japan for a first-hand look at how the Kanban System works. His findings shatter a few myths and point out how we can gain the best of both worlds.

Walter E. Goddard, *President Oliver Wight Educational Associates, Inc.*

There's more than distance separating Japan and America. In the field of production planning and inventory management, the two countries are going in different directions. To the east, it's Kanban; to the west, it's Manufacturing Resource Planning (MRP II).

The goals of each are identical – to aid manufacturing companies in improving customer service, inventory turnover, and productivity. Spectacular results can be cited by companies employing each. However, the tools used by Kanban are dramatically different from the tools used by MRP II.

After visiting Japan to compare the pros and cons of Kanban with those of MRP II, I came to two conclusions:

- Kanban can succeed only where the user produces highly repetitive products. MRP II, however, works equally well for highly engineered one-of-a-kind environments, make-to-stock products, and finished-to-order products.

- MRP II has better tools than Kanban, but these tools are more costly. It is very important for a company to properly evaluate not only the costs, but what the paybacks will be.

How Toyota's Kanban philosophy differs from a typical U.S. company		
Factors	Toyota's Kanban	American philosophy
Inventory	A liability. Every effort must be extended to do away with it.	An asset. It protects against forecast errors, machine problems, late vendor deliveries. More inventory is safer.
Lot sizes	Immediate needs only. A minimum replenishment quantity is desired for both manufactured and purchased parts.	Formula. We're always seeking the optimum lot size with some formula based on the trade-off between the cost of inventories and the cost of set up.
Set ups	Make them insignificant. This requires either extremely rapid changeover to minimize the impact on production, or the availability of extra machines already set up. Fast changeover permits small lot sizes to be practical, and allows a wide variety of parts to be made frequently.	Low priority. Maximum output is the usual goal. Rarely does extra thought and effort go into achieving quick changeover.
Queues	Eliminate them. When problems occur, identify the causes and correct them. The correction process is aided when queues are small. If the queues are small, it surfaces the need to identify and fix the cause.	Necessary investment. Queues permit scheduling operations to continue in the event of a problem with the leading operation. Also, by providing a reservoir of jobs, the factory management has a greater opportunity to match up varying operator skills and machine capabilities, combine set-up and thus contribute to the efficiency of the operation.
Vendors	Co-workers. They're part of the team. Multiple deliveries for all active items are expected daily. The vendor takes care of the needs of the customer, and the customer treats the vendor as an extension of his factory.	Adversaries. Multiple sources are the rule, and it's typical to play them off against each other.
Quality	Zero defects. If quality is not 100%, production is in jeopardy.	Tolerate some scrap. We usually track what the actual scrap has been and develop formulas for predicting it.
Equipment maintenance	Constant and effective. Machine breakdowns must be minimal.	As required, but not critical because we have queues available.
Lead times	Keep them short. This simplifies the job of marketing, purchasing, and manufacturing as it reduces the need for expediting.	The longer the better. Most foremen and purchasing agents want more lead time, not less.
Workers	Management by consensus. Changes are not made until consensus is reached, whether or not a lot of arm twisting is involved. The vital ingredient of "ownership" is achieved.	Management by edict. New systems are installed in spite of the workers, not thanks to the workers. Then we concentrate on measurements to determine whether or not they're doing it.

### Eight manufacturing functions: how they're controlled by Kanban and MRP II

Functions	Categories	Kanban System	MRP II
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Digitalizzazione spinta?

TLS: Tutto da rifare??



Gino  
Bartali

“l’è tutto  
da rifare.”

Ponte a Ema,  
18 luglio 1914

# Inoltre...



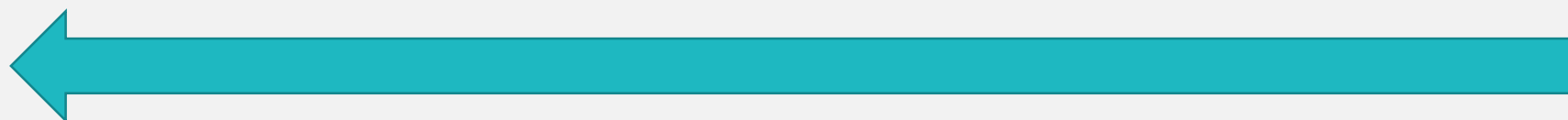
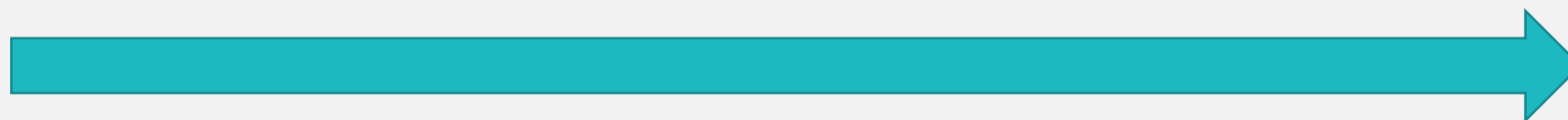
INGOMBRANTI - COSTOSI - NON  
RIPETITIVI



VISUAL - KANBAN - FIFO - SYNCHRO  
Raccolta dati  
Perdita di controllo?

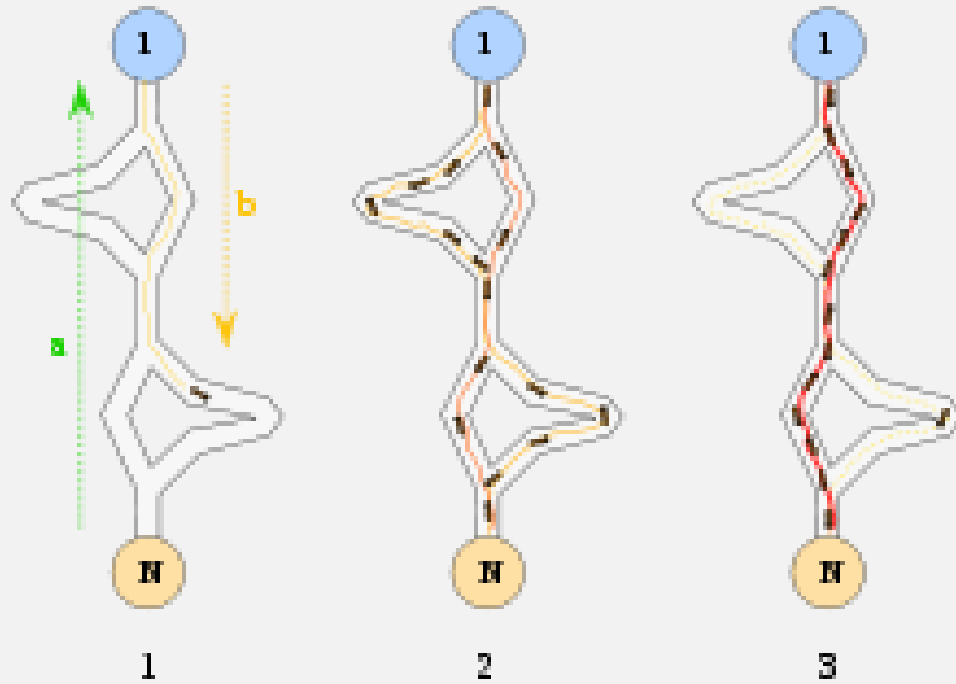
Inoltre...

Tracciabilità

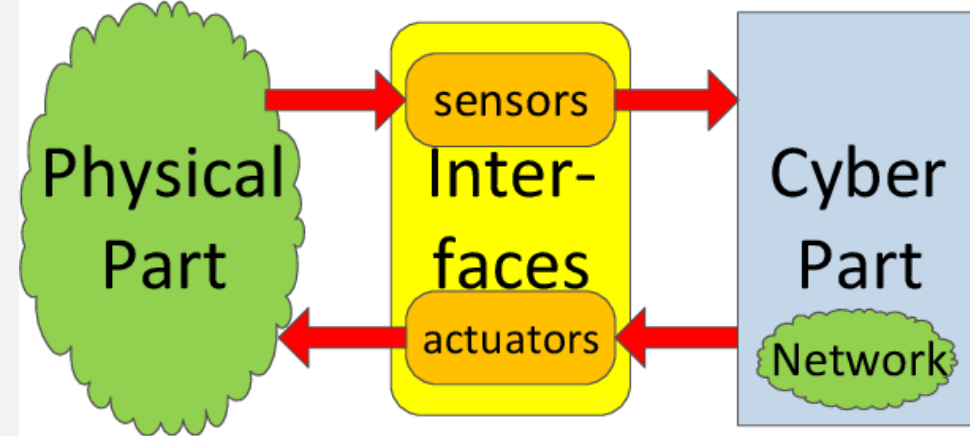


Rintracciabilità

# Un'occhiata ai fondamenti Industry 4.0

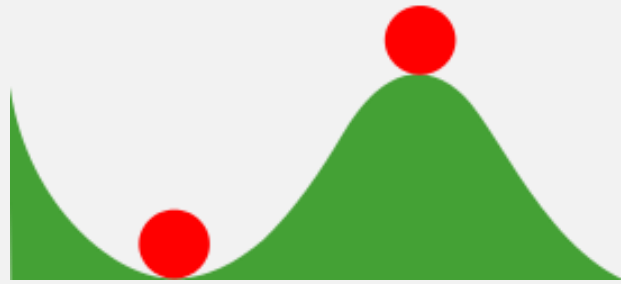


CAS – COMPLEX ADAPTIVE SYSTEMS  
Algoritmi autoregolanti basati su  
informazioni locali



CPS – CYBER PHYSICAL SYSTEMS  
Calcolo – Comunicazione – Controllo  
Autonomia

# Industry 4.0 vs .....



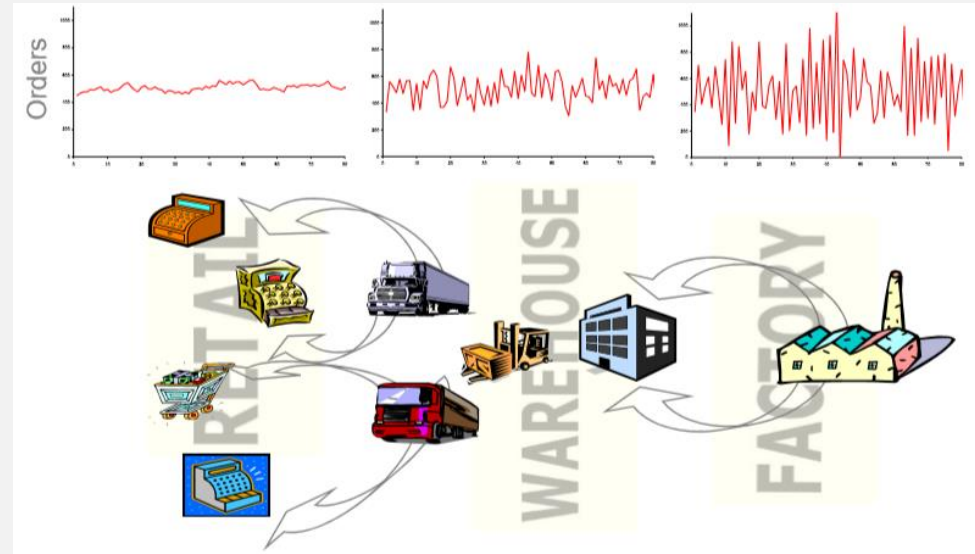
Push



Pull



MIGLIORA STABILITA' DEI SISTEMI  
Auto-regolazione  
Gestione decentrata  
Push - pull  
Gestione complessità



+ CONDIVISIONE INFO - BULLWHIP  
Wifi  
Rfid



# La buona notizia!!

**TOC, LEAN e SIX SIGMA trovano un potente alleato in INDUSTRY 4.0 nella gestione snella della complessità.**

**VALORE - LOTTA AGLI SPRECHI**

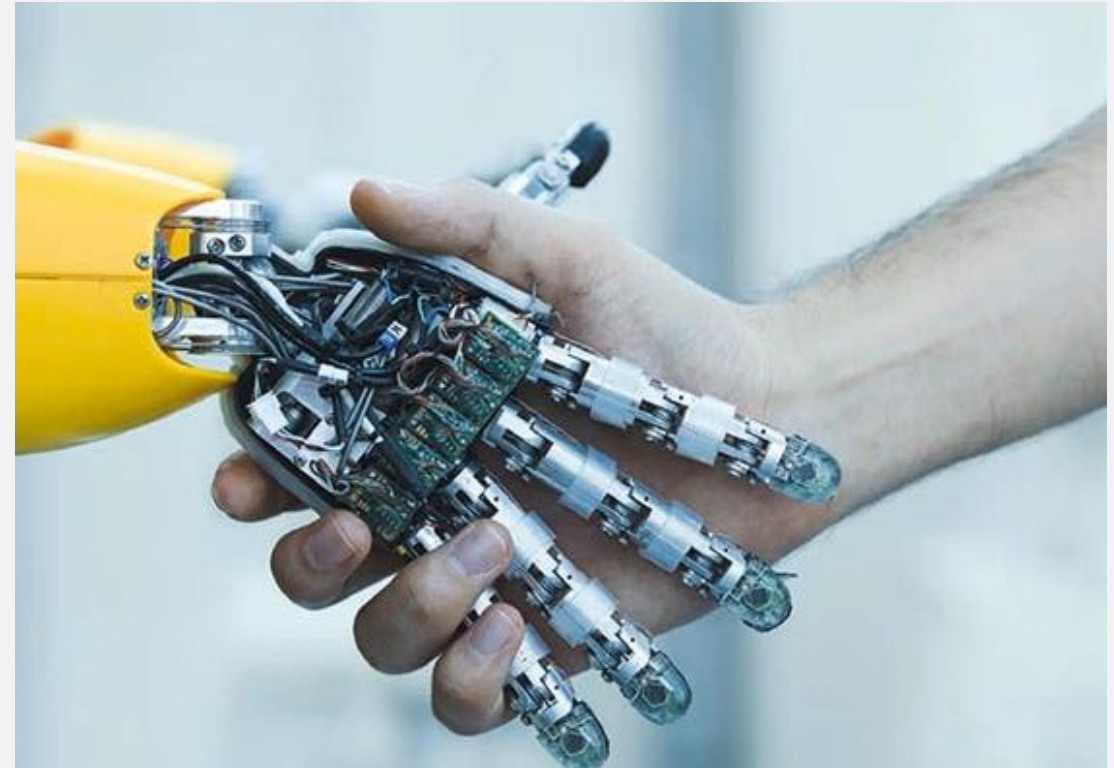
**GESTIONE DEI COLLI DI BOTTIGLIA**

**FAVORISCE RACCOLTA ED ANALISI DATI (BIG DATA).**

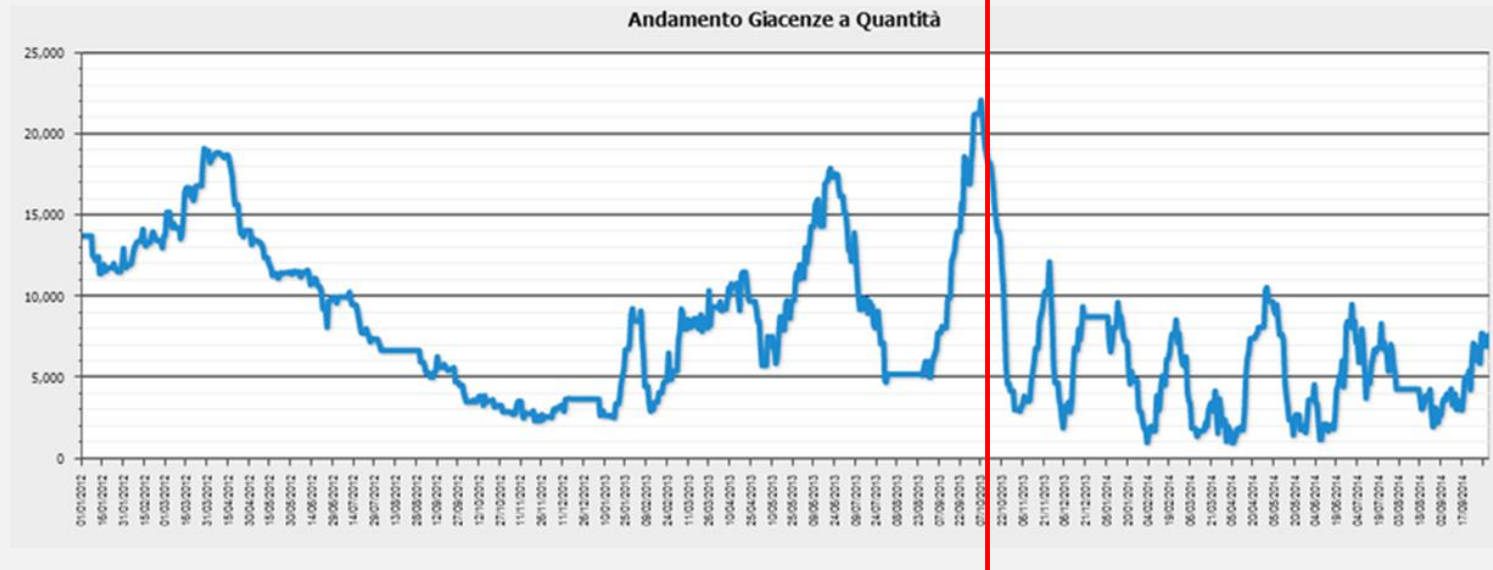
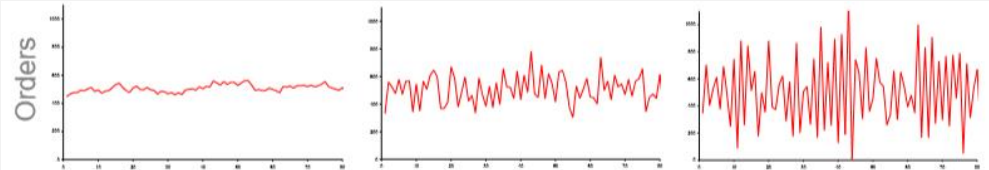
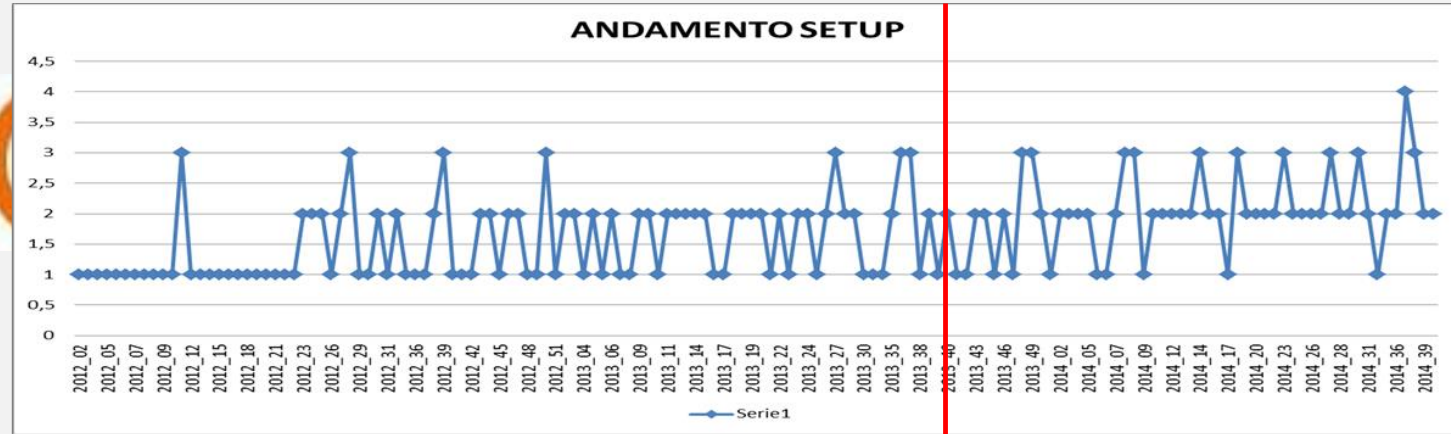
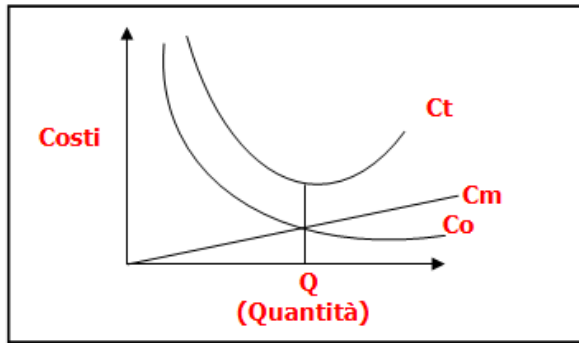
**RISOLVE ALCUNE CRITICITA' DELLA GESTIONE DI AMBIENTI LEAN/TOC**

**OPPORTUNITA' DI MIGLIORAMENTO**

- Flessibilità
- Velocità
- Qualità



# One Piece Flow: fine del lotto economico



# Lean acc



TAGLIO                      MIN  
 CUCITURA                MIN  
 OE                            €/V

	DONNA	U
DOMANDA/WK	120	
PREZZO VENDITA	€ 105	€
COSTI MATERIALE	€ 45	€
TEMPO LAV TOTALE	17	
TEMPO DI TAGLIO	2	
TEMPO DI CUCITURA	15	

MIX ??



# esempio

Q	Q	Q	TOTALE
60			180
6.000	€		18.600
3.000	€		8.400
3.000	€		10.200
1.200			3.240
600			840
600			2.400
	€		10.500
	-€		300



??

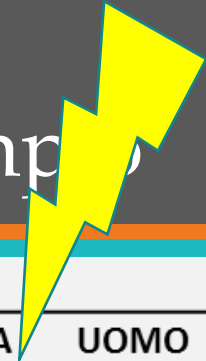
Q	Q	Q	TOTALE
120			200
2.000	€		20.400
6.000	€		9.600
6.000	€		10.800
2.400			3.760
1.200			1.360
1.200			2.400
	€		10.500
	€		300



!!

# Lean acc

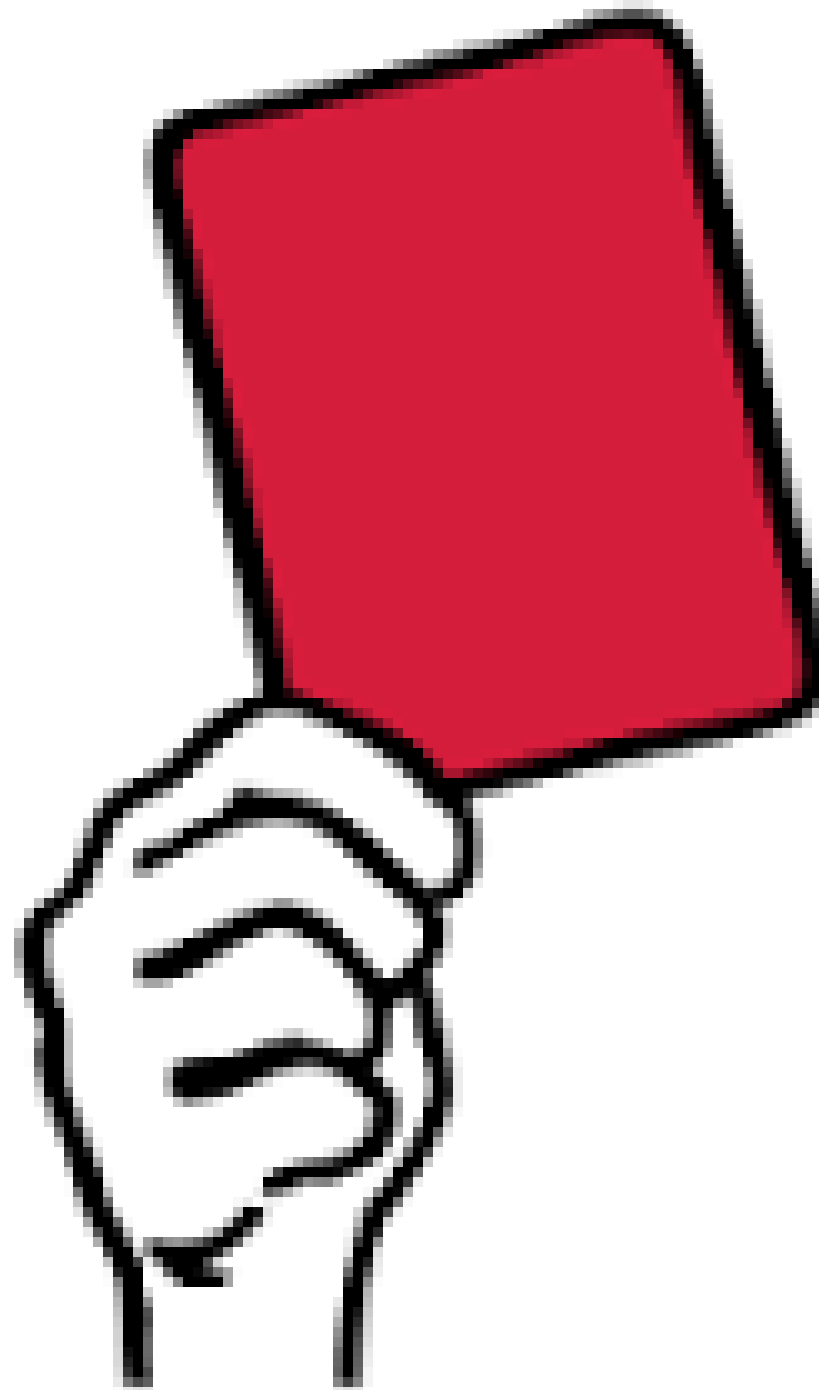
mp



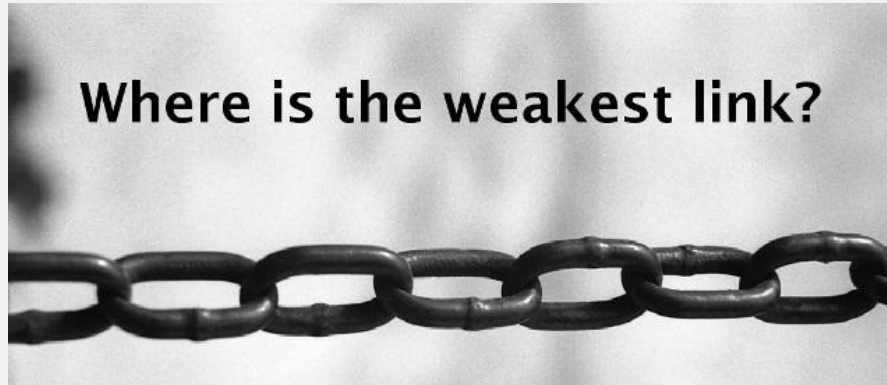
	DONNA	UOMO
DOMANDA/WK	120	1
PREZZO VENDITA	€ 105	€ 1
COSTI MATERIALE	€ 45	€
TEMPO LAV TOTALE	17	
TEMPO DI TAGLIO	2	
TEMPO DI CUCITURA	15	

	DONNA	UOMO	TOTALE
	19	18	
	5	8	
	14	10	
	85	120	205
	8.925 €	12.000 €	20.925
	3.825 €	6.000 €	9.825
	5.100 €	6.000 €	11.100
	1.615	2.160	3.775
	425	960	1.385
	1.190	1.200	2.390
			€ 10.500
			€ 600

TEM  
TEM  
TEM  
PROI  
RICA  
COST  
MAR  
TEM  
TEM  
TEM  
OE  
PROI



# Lean accounting per decisioni efficaci: un esempio



TOC



TAGLIO	MIN/WK	2400
CUCITURA	MIN/WK	2400
OE	€/WK	€ 10.500

	DONNA	UOMO	MIN/WK
DOMANDA/WK	120	120	
PREZZO VENDITA	€ 105	€ 100	
COSTI MATERIALE	€ 45	€ 50	
TEMPO LAV TOTALE	17	20	
TEMPO DI TAGLIO	2	10	1440
TEMPO DI CUCITURA	15	10	3000

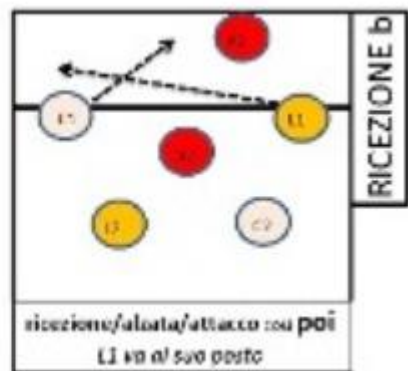
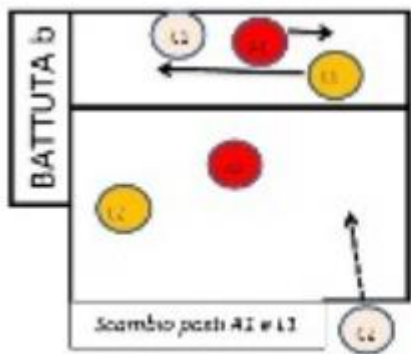


ANALISI MARGINI/min	DONNA	UOMO
TAGLIO	€ 30,00	€ 5,00
<b>CUCITURA</b>	<b>€ 4,00</b>	<b>€ 5,00</b>

# Conclusioni

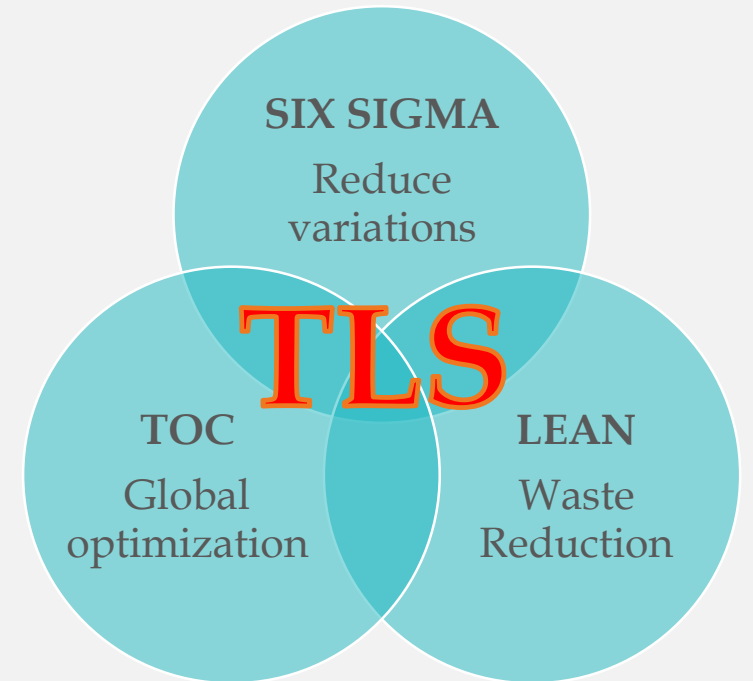
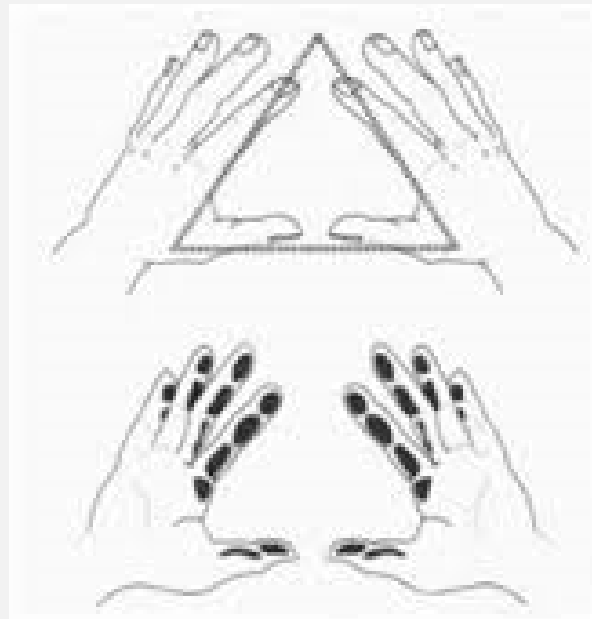
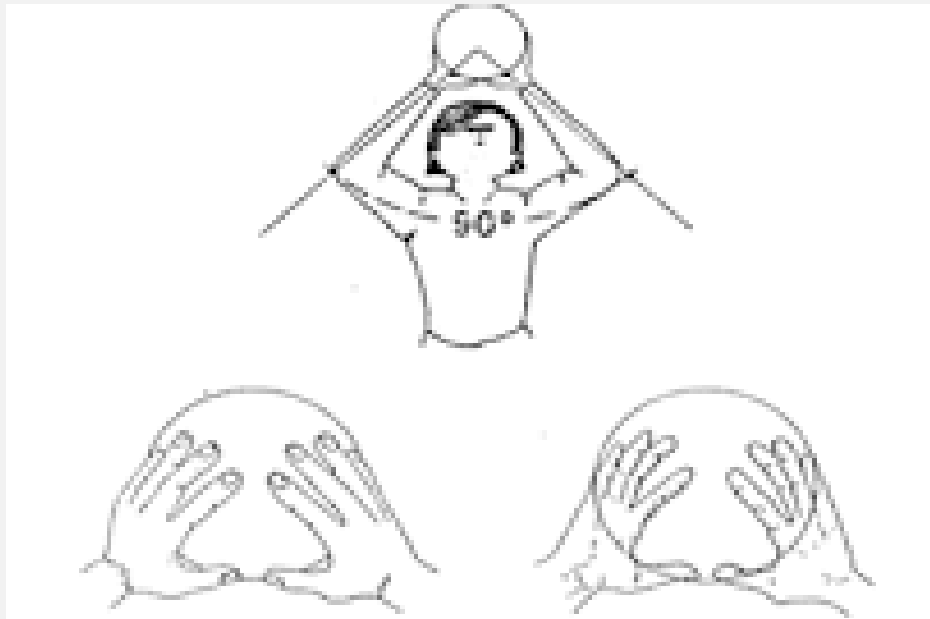
INDUSTRY 4.0 sarà un supporto straordinario allo sviluppo.

Metterà a disposizione nuove tecnologie



# Conclusioni

Ma non dimentichiamo ...  
i fondamentali!!



Arrivederci!!

"Le cose non  
succedono.  
Le cose  
vengono fatte  
succedere."

JOHN FITZGERALD KENNEDY

