



Successful Application of the TOC Thinking Processes to a pull system environment

Luhann Holtzhausen



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Luhann is an Industrial Engineer that has been involved in the mining and minerals industry for over 5 years.

He was first introduced to the Theory of Constraints attending a guest lecture of Dr Pieter Pretorius in 2006. Since then he has grown an avid passion for understanding the application of TOC in the business arena.

The past three years he has been extensively involved in supply chain management and improvement at Weir Minerals Africa.

2007 – Graduated from the University of Pretoria (BEng - Industrial)

2012 – Obtained Masters Degree from the University of Pretoria (MEng- Management, cum laude)



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Excellent
Minerals
Solutions



Weir Minerals Africa



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WEIR MINERALS
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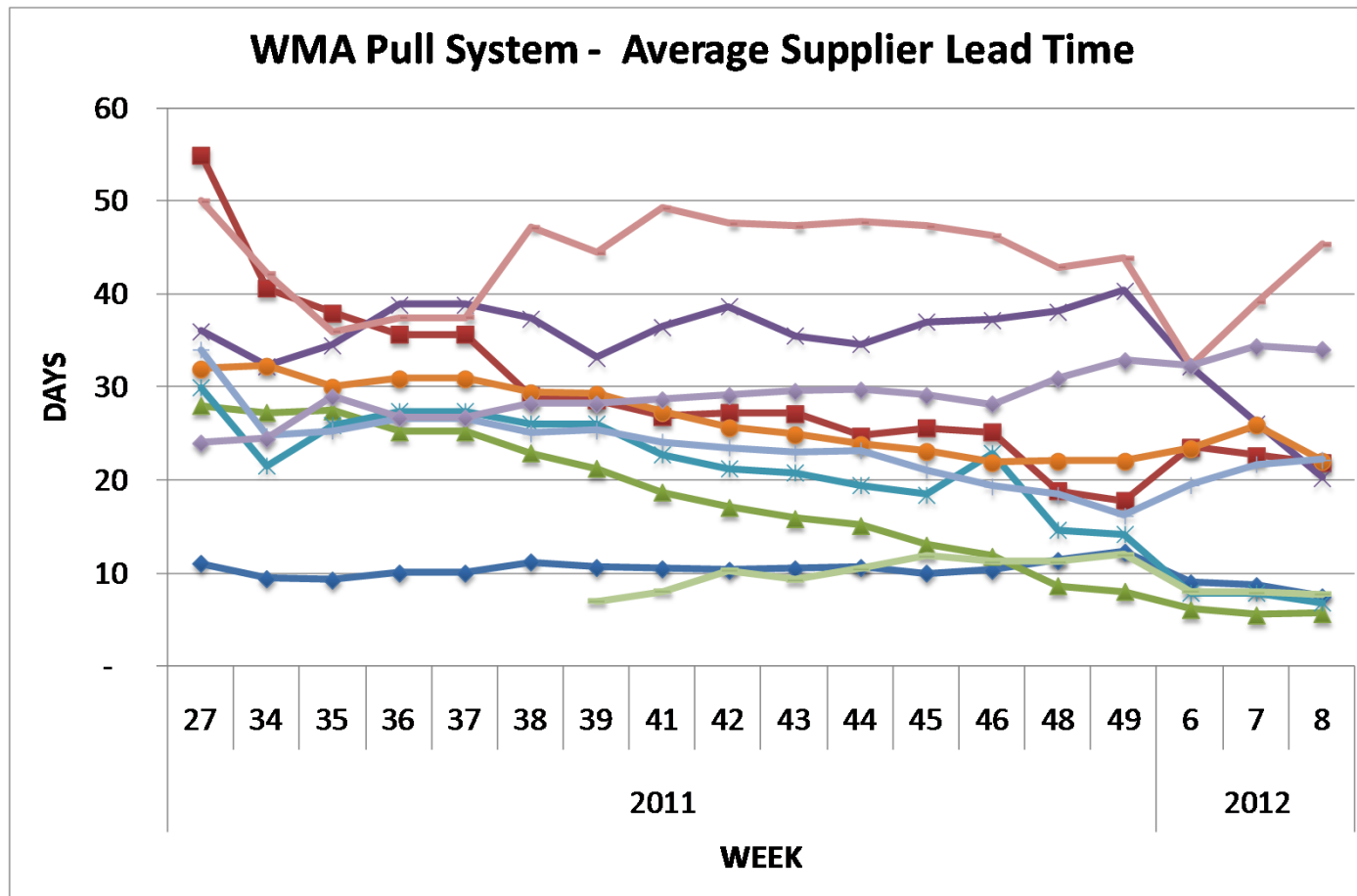


- 7000-8000 Spares per day
- 80% vol – Pull System
- Supply mining industry mainly in Africa & Middle East





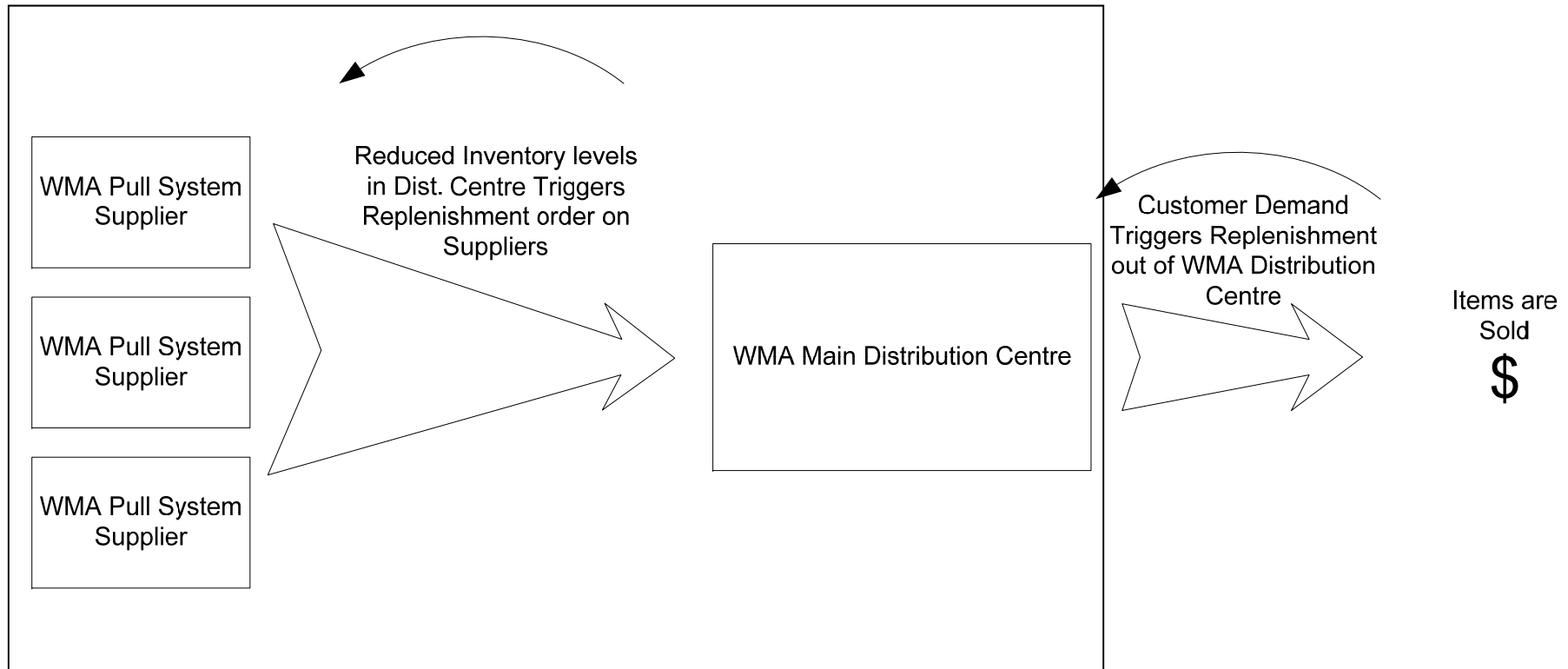
Background



- Excessive Lead Times
- Poor OTD
- High levels of Stockholding Required
- Pirate Activity
- Bottom line Impact



Project Scope – the 40,000ft view*



* Lisa Scheinkopf



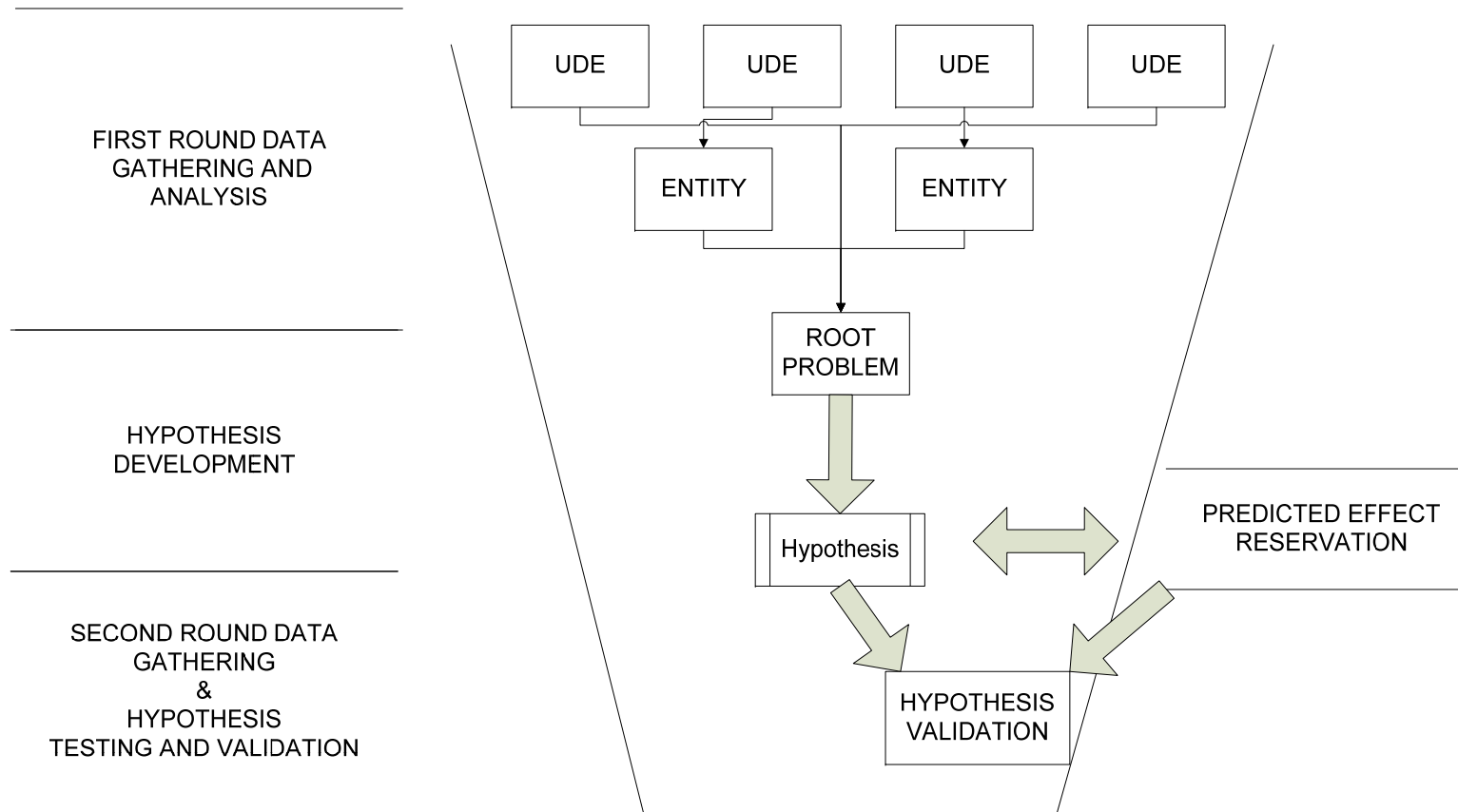
Research Objectives

- What are the undesirable effects (UDE's) experienced by the stakeholders in the current pull system?
- What is the root cause(s) for these UDE's? Or what is the root problem?
- Can the hypothesis that will be developed from the root cause be validated?



Research Design & Strategy

- TOC Thinking Process – Current Reality Tree Method





Identification of UDE's

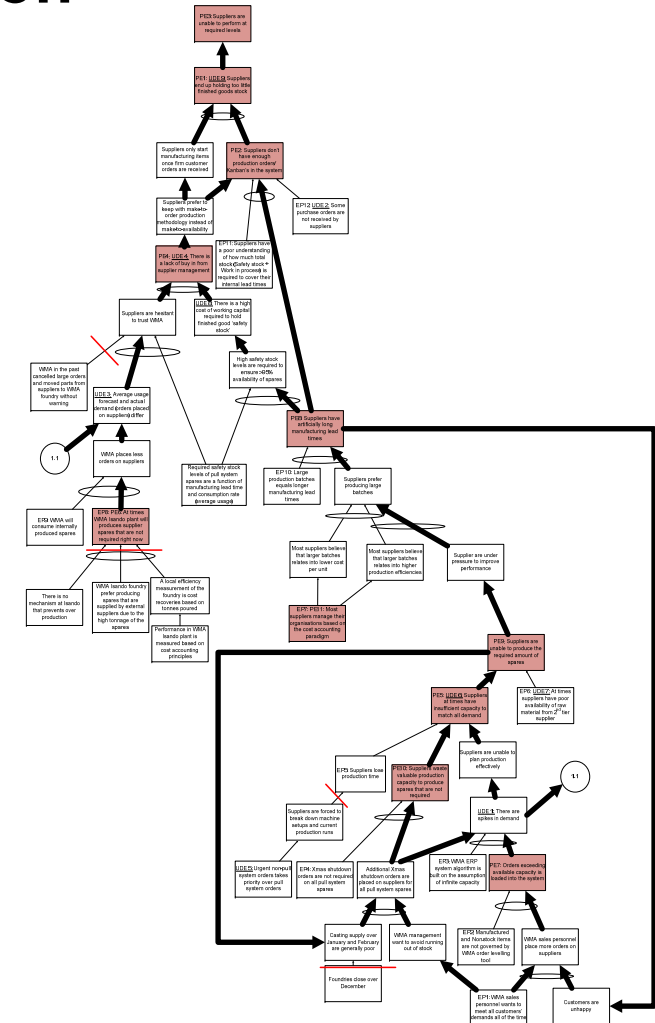
- Survey of complete supply base population of case study scope

Initial list	After Entity Existence and Clarity Reservations
Spike Demand	UDE 1: There are spikes in demand
Miscommunication	UDE 2: Some purchase orders are not received by suppliers
Lack of forecast / uncertainty of forecast	UDE 3: Average usage forecast and actual demand (orders placed on suppliers) differ
Lack of buy in from management	UDE 4: Lack of buy in from supplier management
Urgent non-pull system orders	UDE 5: Urgent non-pull system orders takes priority over pull system orders
Capacity constraints	UDE 6: Suppliers at times have insufficient capacity to match all demand
Raw material short	UDE 7: At times suppliers have poor availability of raw material from 2 nd tier supplier
Cost to carry stock	UDE 8: There is a high cost of working capital required to hold finished good 'safety stock'
Stock levels not high enough	UDE 9: Suppliers end up holding too little finished goods stock



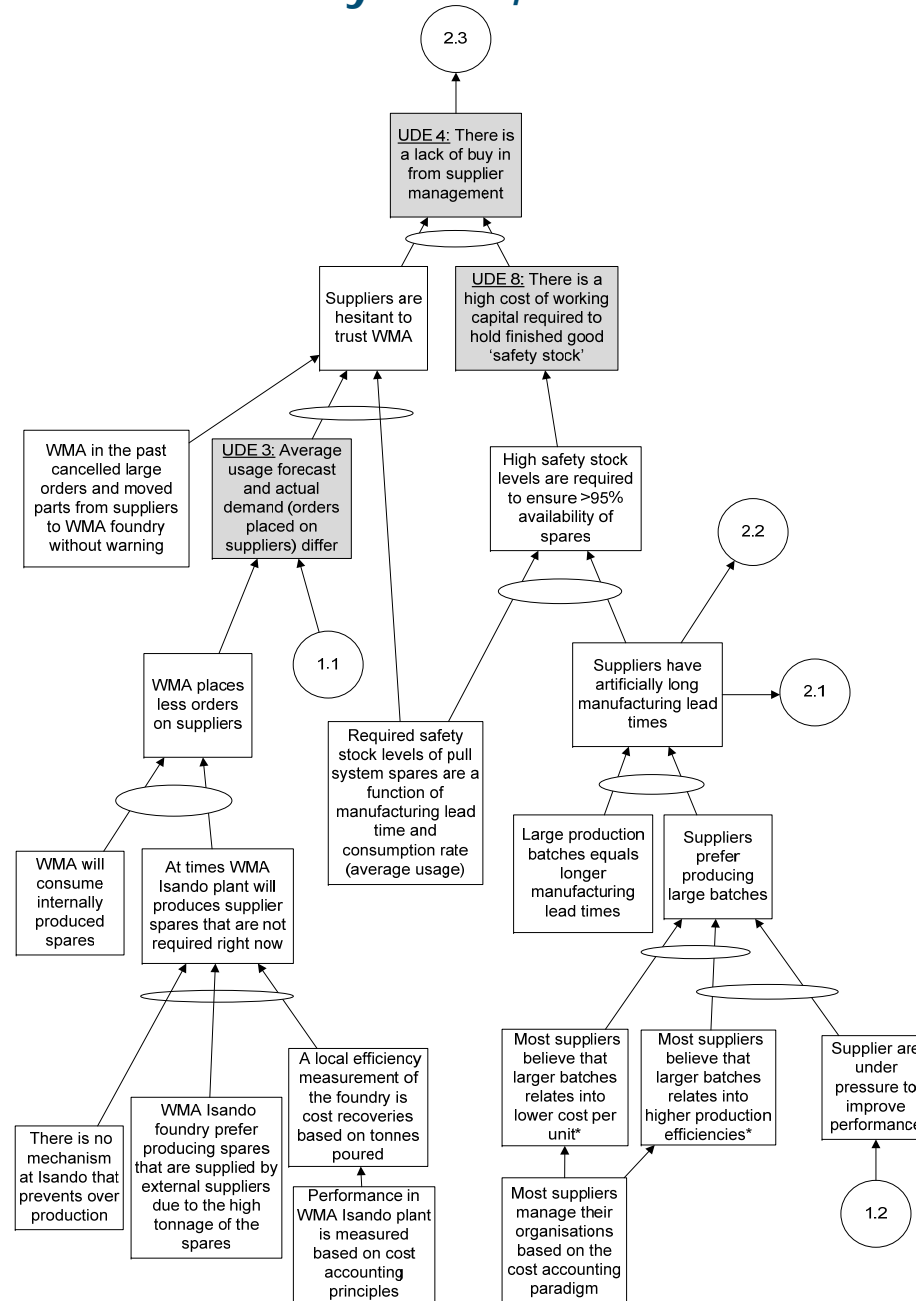
CRT & Root Cause Identification

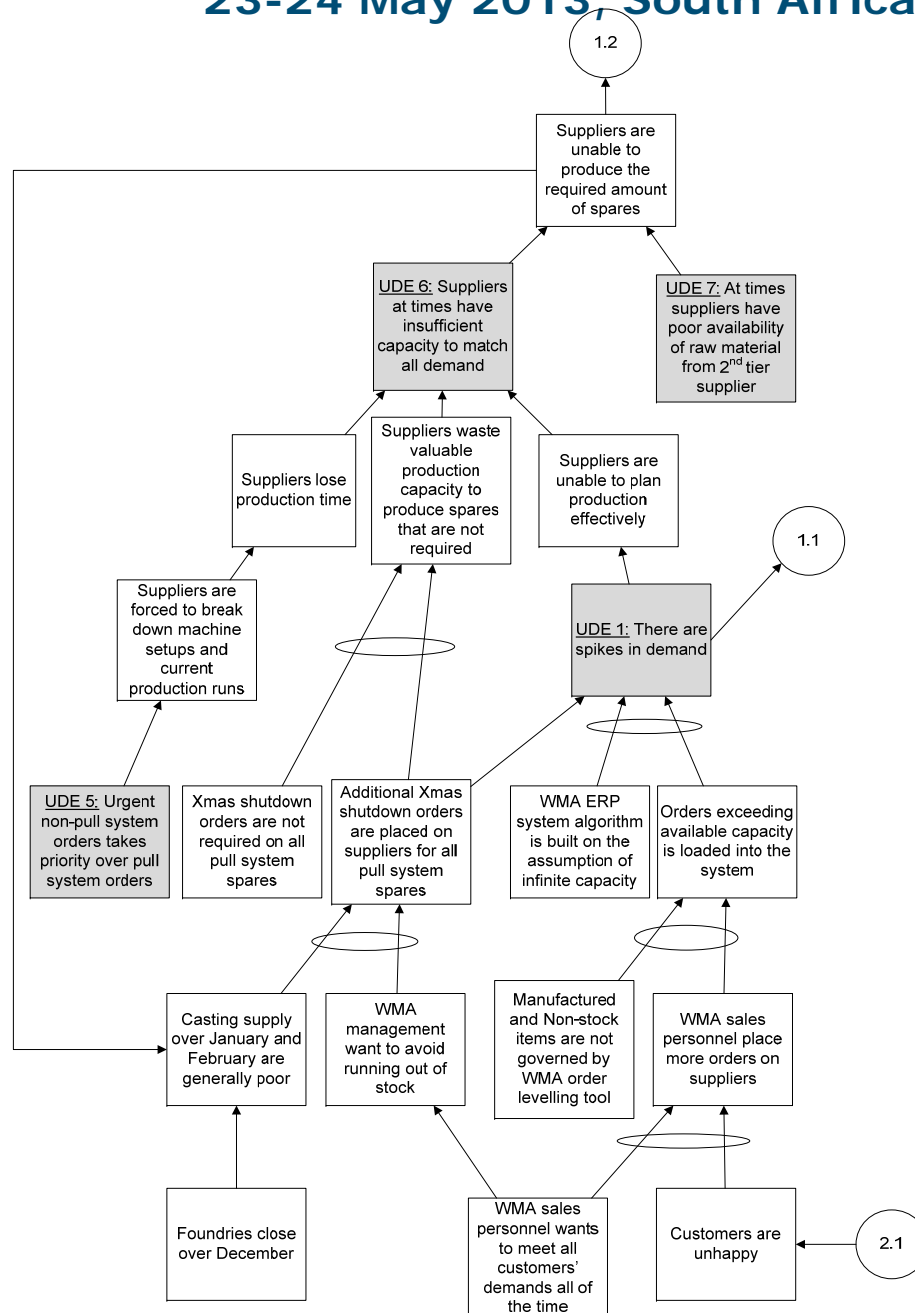
	PE 1	PE 2	PE 3	PE 4	PE 5	PE 6	PE 7	PE 8	PE 9	PE 10	PE 11	Total	% of 11
Entry Point 1: WMA sales personnel wants to meet all customers' demands all of the time	X	X	X	X	X		X	X	X	X		9	82%
Entry Point 2: Manufactured and Non-stock items are not governed by WMA order levelling tool	X	X	X	X	X		X	X	X	X		9	82%
Entry Point 3: WMA ERP system algorithm is built on the assumption of infinite capacity	X	X	X	X	X		X	X	X	X		9	82%
Entry Point 4: Xmas orders are not required on all pull system spares	X	X	X	X	X		X	X	X	X		9	82%
Entry Point 5: Suppliers lose production time	X	X	X	X	X		X	X	X	X		9	82%
Entry Point 6: At times suppliers have poor availability of raw material from 2nd tier supplier	X	X	X	X	X		X	X	X	X		9	82%
Entry Point 7: Most suppliers manage their organisations based on the cost accounting paradigm	X	X	X	X	X		X	X	X	X	X	10	91%
Entry Point 8: At times WMA Isando plant will produces supplier spares that are not required right now	X	X	X	X		X						5	45%
Entry Point 9: WMA will consume internally produced spares	X	X	X	X								4	36%
Entry Point 10: Large production batches equals longer manufacturing lead times	X	X	X	X	X		X	X	X	X		9	82%
Entry Point 11: Suppliers have a poor understanding of how much total stock (Safety stock + Work in process) is required	X	X	X									3	27%
Entry Point 12: Some purchase orders are not received by suppliers	X	X	X									3	27%





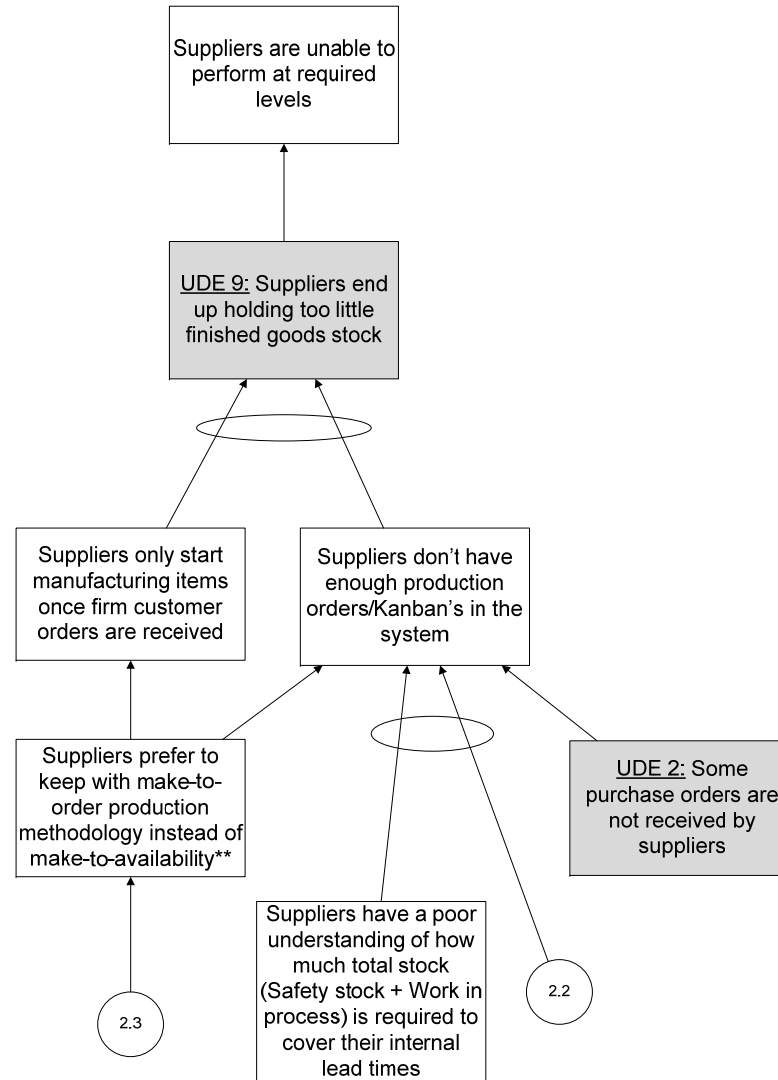
7th International TOCPA Conference 23-24 May 2013, South Africa







CRT & Root Cause Identification





Hypothesis, Testing and Validation

According to Goldratt (2008) the fundamental concepts of supply chain are:

- Improving flow (lead time) primary objective of operations
- This primary objective should be translated into a practical mechanism that prevents over production
- Local efficiencies must be abolished
- A focussing process to balance flow must be in place.

These concepts are in conflict with the fundamental concepts of cost accounting (Goldratt, 2008)

Research Hypothesis: WMA pull system suppliers are managing organisations based on the cost accounting paradigm



Hypothesis, Testing and Validation

Hypothesis validation by attempting to invalidate hypothesis

- What, if it existed, would force one not to believe that the WMA pull system suppliers are managing their organisation based on the cost accounting paradigm?
 - The primary focus of suppliers are improving flow
 - Suppliers have practical mechanisms in place that prevents over production
 - Local efficiencies are abolished
 - Suppliers have a focussing process in place to balance flow
- Do these entities exist?



Hypothesis, Testing and Validation

From empirical audit findings it was evident that none of the four entities existed at supplier operations





Hypothesis, Testing and Validation

- Attempts to invalidate hypothesis failed.
- Observed facts seemed to rather support hypothesis
- Hypothesis passed a test of validation



Results

- All research objectives achieved
- Root cause for poor supplier performance identified
- Successful application of TOC Thinking Process to a South African

Manufacturing Case Study



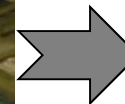
A Call To Action!

Supplier Development Program

2012

WMA Supplier Development Program

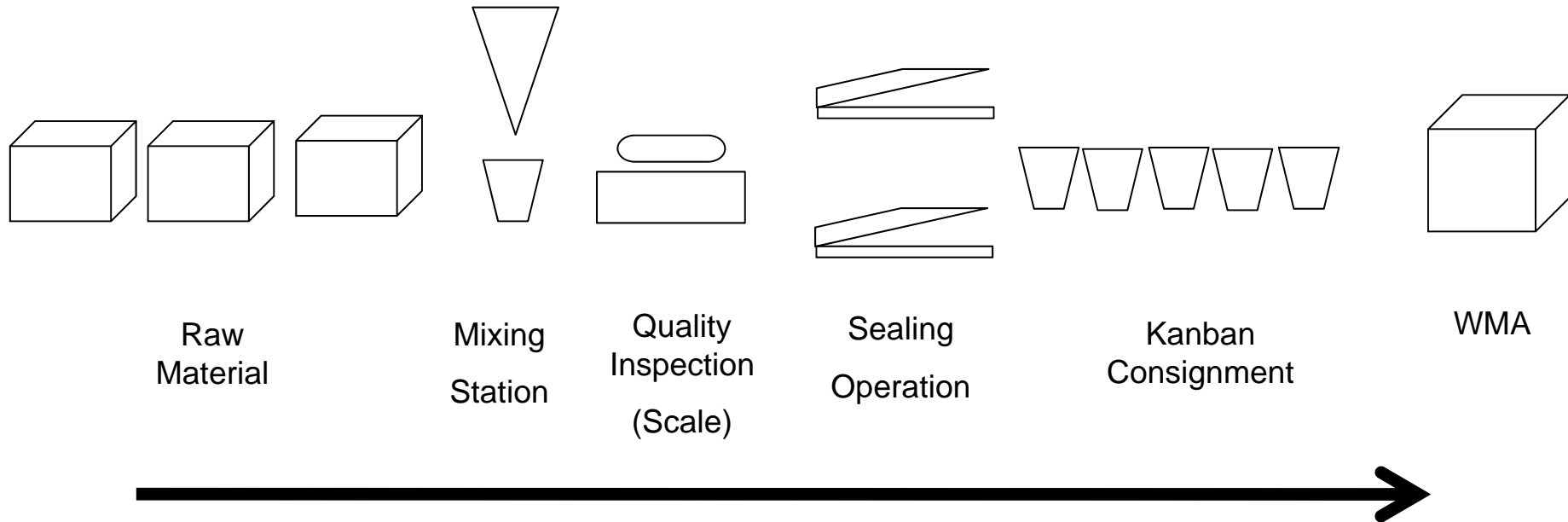
A guide to implementing world class Lean Manufacturing





A Call To Action!

Supplier Training



Very Basic – Single product Simulation

Goal is to promote benefits associated with managing according to the four
fundament concepts of supply chain



A Call To Action!

Supplier Training





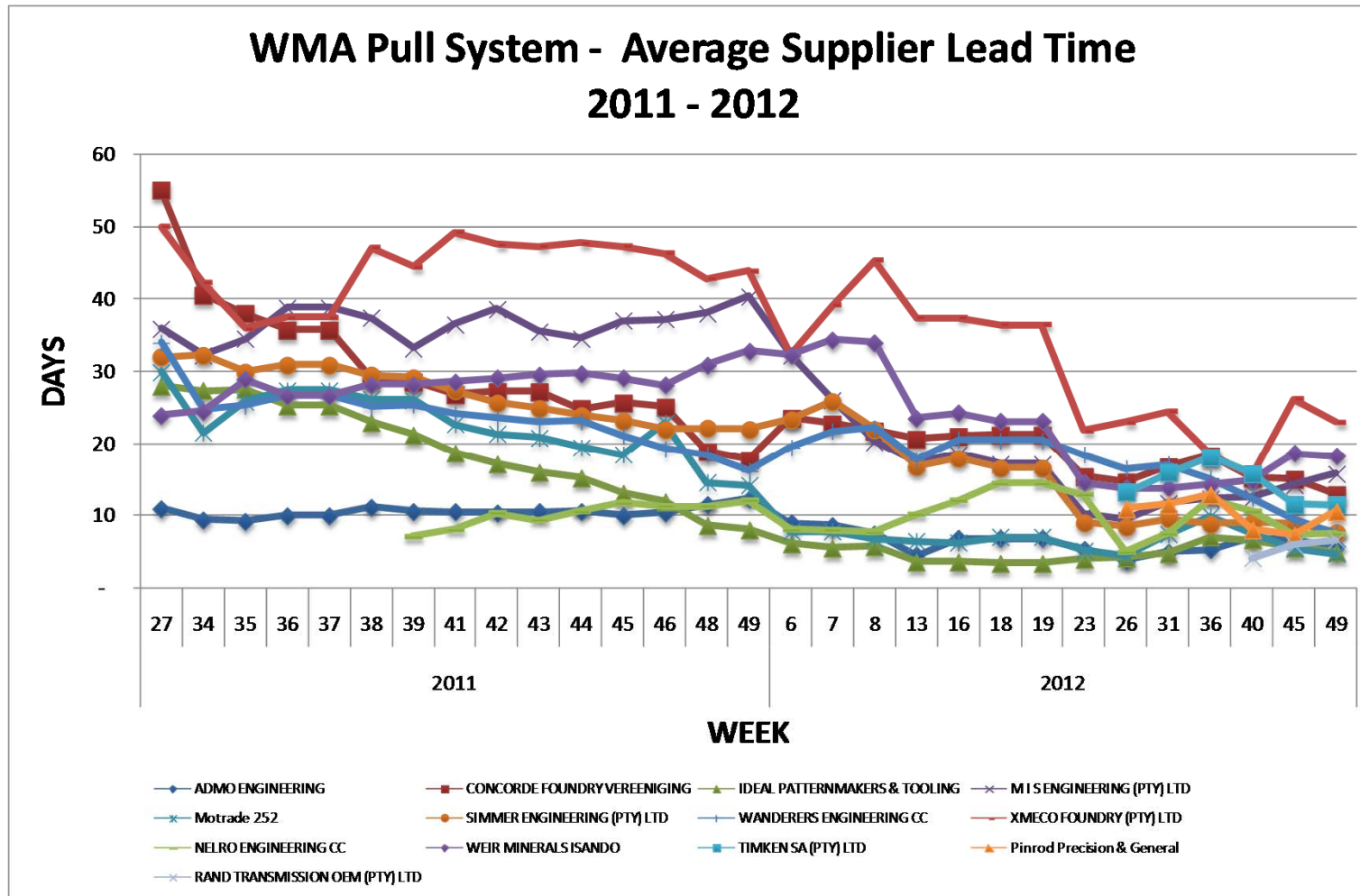
A Call To Action!

Giving back to the community



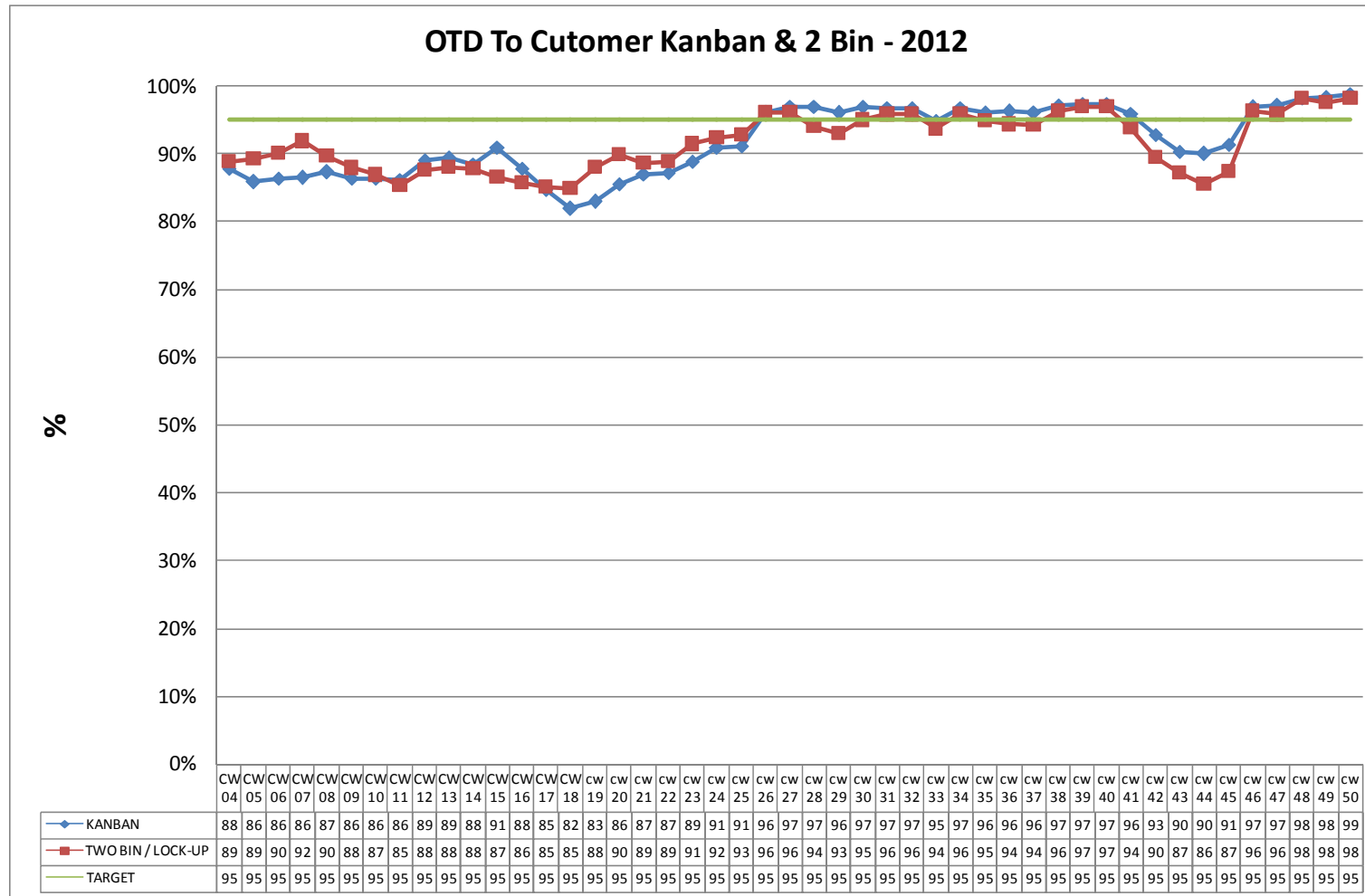


A Call To Action!





A Call To Action!





Closing and Questions

