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Evaporating Cash Constraint

Presented By: *Ravi Gilani*

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Agenda

- Constraint identification
- Cash Constraint-definition
- Issues with cash constraint
- Managing cash constraint
 - Exploitation and subordination
 - Right measurements
 - Increasing cash to cash velocity
 - Selling obsolete material
 - Elevating cash
- Case Studies-Indoasian Fusegear Limited



Constraints: Identification

- Every system will always has one weakest link- **Constraint**
- Constraint is in market if market share $> 50\%$ of world market
- Constraint is orders if On Time in Full (OTIF) $> 95\%$



Constraints: Identification

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- Supply is constraint if material availability $< 95\%$ despite payments being on time
 - Suppliers if consumption is $> 50\%$ of world consumption
 - Supplier policies if consumption $< 50\%$ of world consumption



Constraints: Identification

- Constraint is operations when OTIF $< 95\%$, and material availability $> 95\%$
 - Equipment if Overall Equipment Effectiveness for at least one equipment (OEE) $> 95\%$
 - Operational policies if OEE $< 95\%$



Cash Constraint

- There is *Cash Constraint* only and only if there are
 - sufficient orders i.e. OTIF < 95%
 - manufacturing capacity i.e. OEE < 95% for all equipments
 - right suppliers, and supplies are suffering as suppliers are refusing to supply unless paid upfront
 - Cash shortage does not necessarily imply ***cash constraint***



Cash Constraint: definitions

- Cash to cash cycle time is the total time it takes from taking cash out to cash in (**n**) periods
- Throughput (**T**) is defined as the rate of contribution over a period of time
- When constraint is cash, it is defined as the contribution in \$ per unit of time per \$ of cash available
- $T = ((s/tvc)^{(1/n)} - 1)$ per unit of cash for one period of time where **s** is the unit selling price and **tvc** is the unit totally variable cost



Cash Constraint: Throughput calculation example

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Data elements	P	Q
Selling price per unit (s) in \$	100	80
Totally Variable Cost per unit (tvc) in \$	50	50
Manufacturing lead time in weeks	2	2
Credit period in weeks	4	1
Total cash to cash time (n)	6	3
$T = \{(s/tvc)^{(1/n)}\} - 1$	0.12	0.17



Cash Constraint: definitions contd..

- Throughput ratio (t) = s/tvc
- Survival Time: This is the time the organization can run with current cash.
Survival time = $Cash/OE$
- Minimal cash required for survival = $n*OE$
- Adequate survival cash = $n*OE*\{t/(t-1)\}$
- Sufficient survival cash = $n*(OE + \text{Cash required for full capacity utilization for one period})$



Cash Constraint calculations

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	P	Q
Throughput ratio (t) ~ s/tvc	2	1.6
Total cash to cash time (n)	6	3
OE /week in \$	500	500
Cash available in \$	2000	2000
Survival time in weeks	4	4
Survival cash requirement: $n \cdot O.E.$	3000	1500
Adequate cash requirement: $n \cdot OE \cdot \{t/(t-1)\}$	6000	4000



Cash Constraint: Issues

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- **Cash constraint** is the worst constraint
- Cash shortage does not necessarily imply cash constraint
- Exploiting and subordinating cash constraint also elevates cash constraint
- Cash constraint impacts throughput non-linearly
- Cash Constraint is the fastest constraint to shift!



Cash Constraint: Some Common nonsense

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- Purchase more than immediate requirement to take advantage of quantity discount
- Combine supplies to get freight advantage
- Produce more than immediate requirement for better capacity utilization
- Batch dispatches to reduce freight cost
- Not selling obsolete material below purchase price / book value



Managing cash constraint: Measurements

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- Monitoring right measurements
 - Survival time, cash available, adequate cash requirement
- Remove wrong measurements
 - Sales, profit, market share, gross margin, net margin
 - ROI, productivity, capacity utilization



Managing Cash Constraint: Cash to cash velocity

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- Cash to cash cycle time (n) reduction has huge non-linear impact on throughput, cash availability, survival time, adequate cash requirement etc.
- For product P, reducing cash to cash cycle time from 6 weeks to 3 weeks, throughput / week increases by more than 100%
- Reduce cash to cash cycle time by shrinking
 - Customer payment time
 - Manufacturing lead time
 - Supplier lead time



Managing Cash Constraint Selling obsolete material

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- Often organizations do not sell obsolete material at below purchase price/ book value
- In most cases selling unwanted stock even at a discount of 80-90% of purchase price is the right decision
- For product P, selling obsolete material even at 85% discount will generate cash > purchase price in 18 weeks!
- Any addition in cash increases survival time immediately



Managing Cash Constraint

Cash elevation

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- Cash constraint organizations do have difficulty in organizing loans even at high interest rates of 18-24% per year
- However even these organizations, cash could be available at 1-2% per week!
- For a cash constrained organization selling product P, borrowing even at 2% per week makes sense as P generates T @ 12% + per week (Q even better @ 17% per week)
- Interest cost control is not the Goal of the organization!



Cash Constraint-case study

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- A mass manufacturing organization in electrical industry, had a constraint in cash
- Material cost ~ 40% of sales
- Manufacturing lead time ~ 3 days
- Collection time ~ 60 days
- Capacity utilization ~ 30%
- OTIF < 10%
- Suppliers were willing to provide material off the shelf provided they could get payment upfront
- The constraint shifted from cash to orders within 13 weeks!



Cash Constraint-case study

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Data elements	Existing	New
Selling price per unit (s) in \$	100	50
Totally Variable Cost per unit (tvc) in \$	40	40
Throughput ratio (t=s/tvc)	2.5	1.25
Manufacturing lead time in days	3	3
Credit period in days	60	4
Total cash to cash time (n) in days	63	7
$T / \text{week} = \{(s/tvc)^{(1/n)}\} - 1$	10.7%	25%



Summary

- There is **Cash Constraint** only and only if there are sufficient orders i.e. OTIF < 95%, sufficient manufacturing capacity i.e. OEE < 95% for all equipments, right suppliers, and **supplies** are suffering as suppliers **have not been paid** on time due to cash crunch



Summary

- Exploiting and subordinating cash constraint also elevates cash constraint
- Cash constraint impacts throughput non-linearly
- Cash Constraint is the fastest constraint to shift!
- Eliminate wrong measures and implement right measures



Summary

- Shrinking cash to cash cycle time has the most immediate impact on cash
- Elevating cash by selling obsolete material even at very low price impacts cash significantly
- Borrowing cash at very high interest could also be an option during the duration of cash constraint situation



THANK YOU!



Ravi Gilani

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Ravi Gilani, founder and managing consultant of Goldratt India, introduced TOC in India in 1998. He helps manufacturing organizations increase their profits by simplifying measurements. He enjoys striving for the impossible by challenging sacred assumptions and simplifying complexity.

Ravi also serves on the board of TOCICO

Ravi can be contacted at ravigilani@goldrattindia.com

