TOCICO CONFERENCE 2004

Using the 5 Focusing Steps to Define Local Measurements

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The measurements problem

REMINDER
T, I and OE are not local measurements

- **Managers need local measurements**
  - Evaluate local contribution to system performance
  - Provide alerts for proactive course corrections
  - Pinpoint improvement needs and focus improvement efforts
- **Local measurements can be counterproductive**
  - The moment we introduce local measurements, we risk local optimization at the expense of global goals
- **Examples of bad local optimization**
  - Projects: hidden safeties
  - Supply Chain: excess inventory
  - Sales: inflated forecasts, heavy discounts

Nothing new to report

- All the necessary concepts have been defined
- Further development will happen when the solutions is implemented in more companies

Consideration: variability and uncertainties

- If we had a perfect, non-variable world ...
  - Customer demand was known years in advance
  - Manufacturing technology did not change
  - Machines did not break down
  - Work-processes had zero variability
  - New technologies could be developed without trial and error
- … the measurements problem could be solved by optimization software.

1. Create optimized plans with detailed instructions

2. Communicate instructions

3. Ensure that instructions are followed

Key to local measurements

1. Identify the constraint
2. Exploit the constraint
3. Subordinate everything to Step 2
4. Elevate the constraint
5. Go back to Step 1 if the constraint has changed

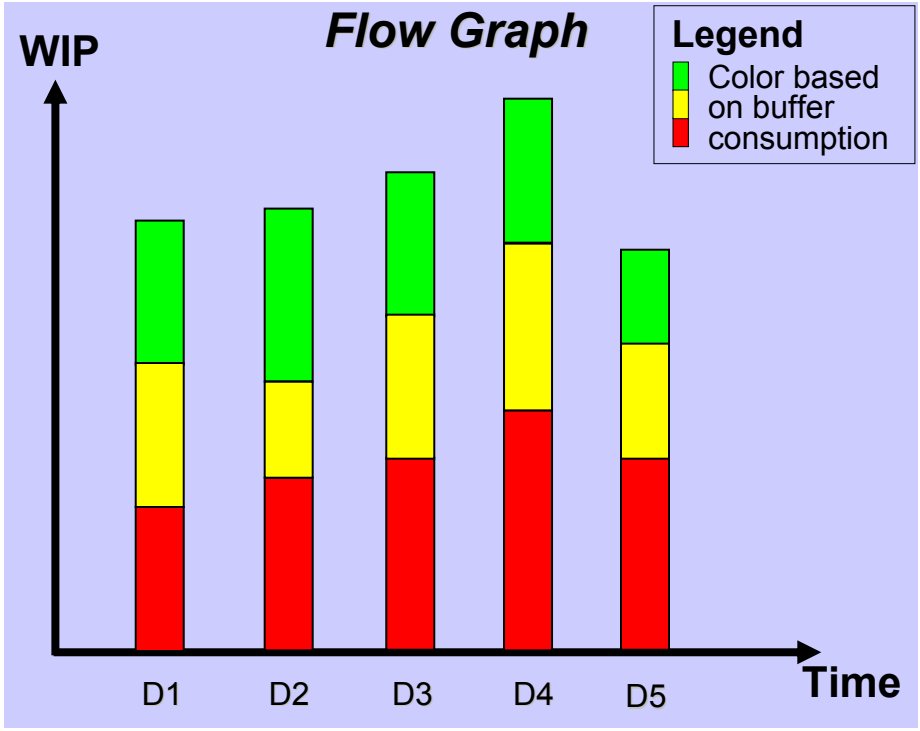
Subordination Logic
Convert exploitation decisions into instructions for front-line managers.

Buffer Management
Make instructions reflect the effects of uncertainties and insubordination.

Buffer Diagnostics
Record obstacles to subordination and prioritize based on buffer impact.

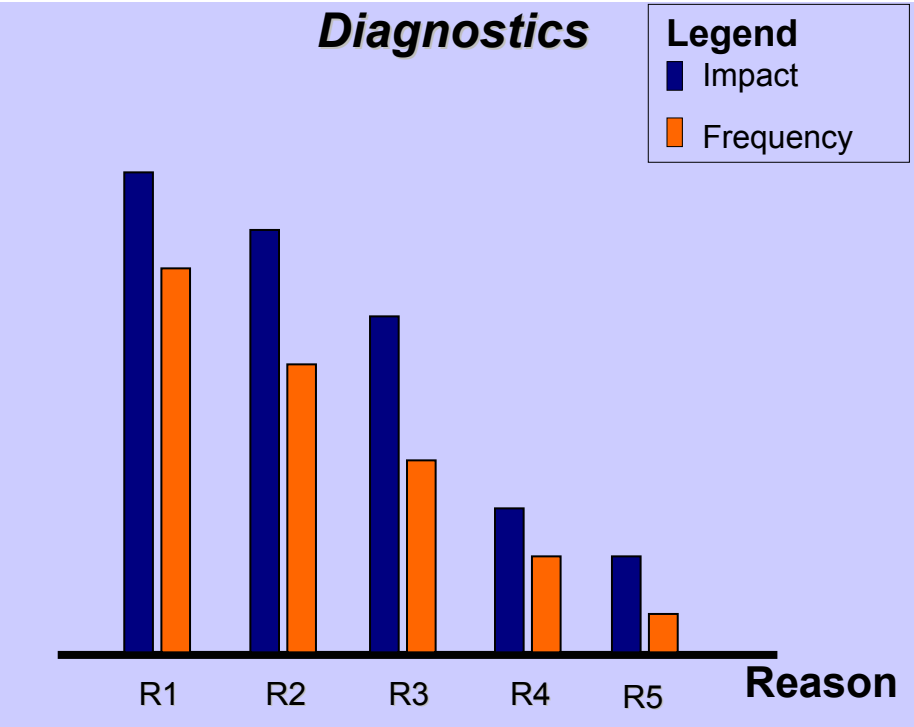
Measuring subordination: production

- DBR is assumed for Master Scheduling and Material Release
- Buffer Consumption measures subordination in aggregate
  - What percent of orders are in the red zone? Is that number growing?
- Track work-in-process (WIP) inventory for local contribution
  - WIP can be quantified as Throughput $'s or Number of Work Orders/ Parts
  - Can have an advanced metric (WIP x days of buffer consumed), or simply classify as RED/ YELLOW/ GREEN
  - If you use T$'s and days of buffer consumed, it is the same as T$-Days
- Measurement: prevent WIP from accumulating (maintain flow)
  - As long as materials are released per DBR, flow is aligned with T & I goals
  - There might be conflicts between flow and OE. Use T and OE calculations to resolve such conflicts



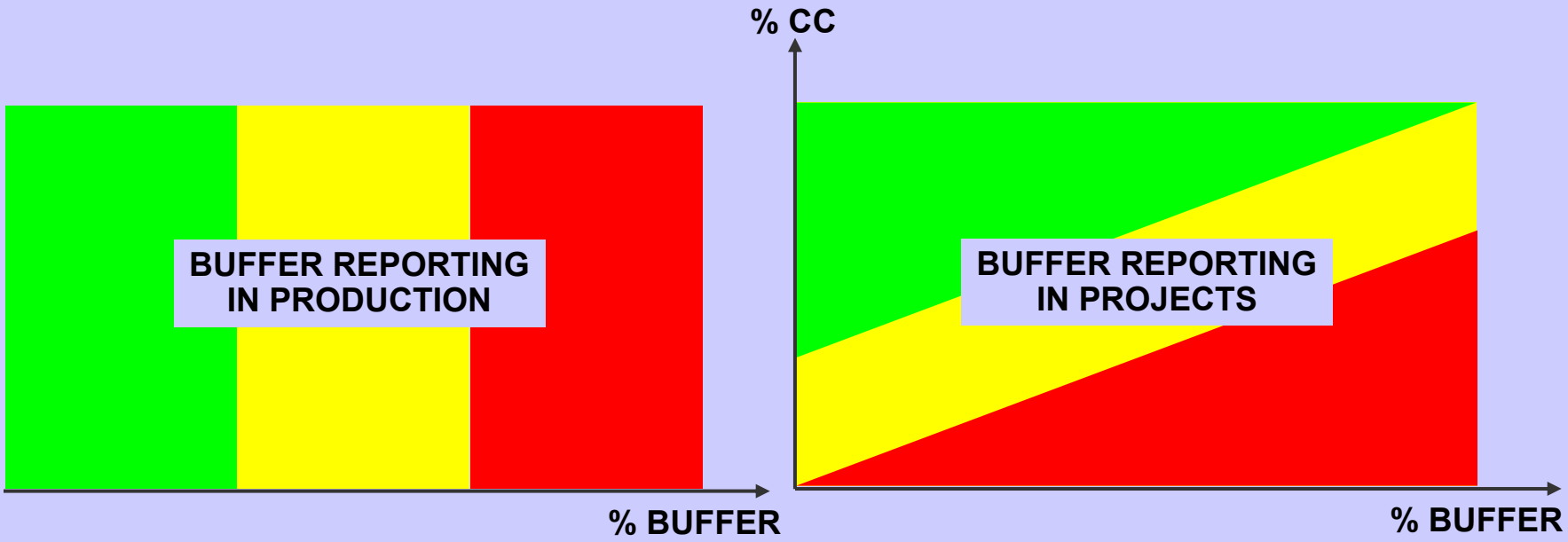
Identifying/ prioritizing improvement needs

- *Reason Code* is captured when work is put on hold, e.g.:
  - 01, Quality Problems
  - 02, Drawings Not Available
  - 03, Problems with Set-up
  - …
- Pareto analysis is based on buffer impact/ frequency, e.g.:
  - Yes, we have problems with set up. But was that one of the top three causes of buffer consumption?
- Use standard *Reason Codes*
  - Makes analysis easy
  - List of standard *Reason Codes* should be continually updated as old systemic problems are fixed and new ones arise



Same general solution works in projects

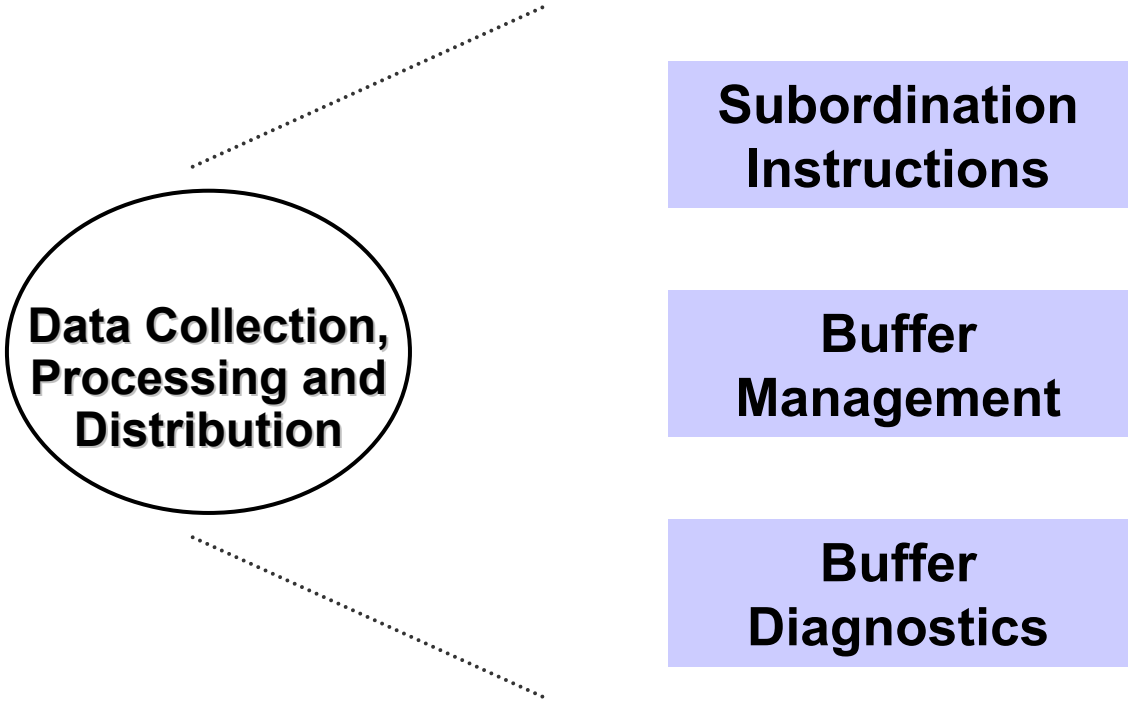
1. BUFFER CALCULATIONS ARE DIFFERENT



2. MEASURING WIP IS TRICKY

- *Throughput $'s are difficult to quantify*
- *Effort (hours of work) can be gamed most easily*
- *"Number of Tasks" might be the most practical*

Information Technology can help ...



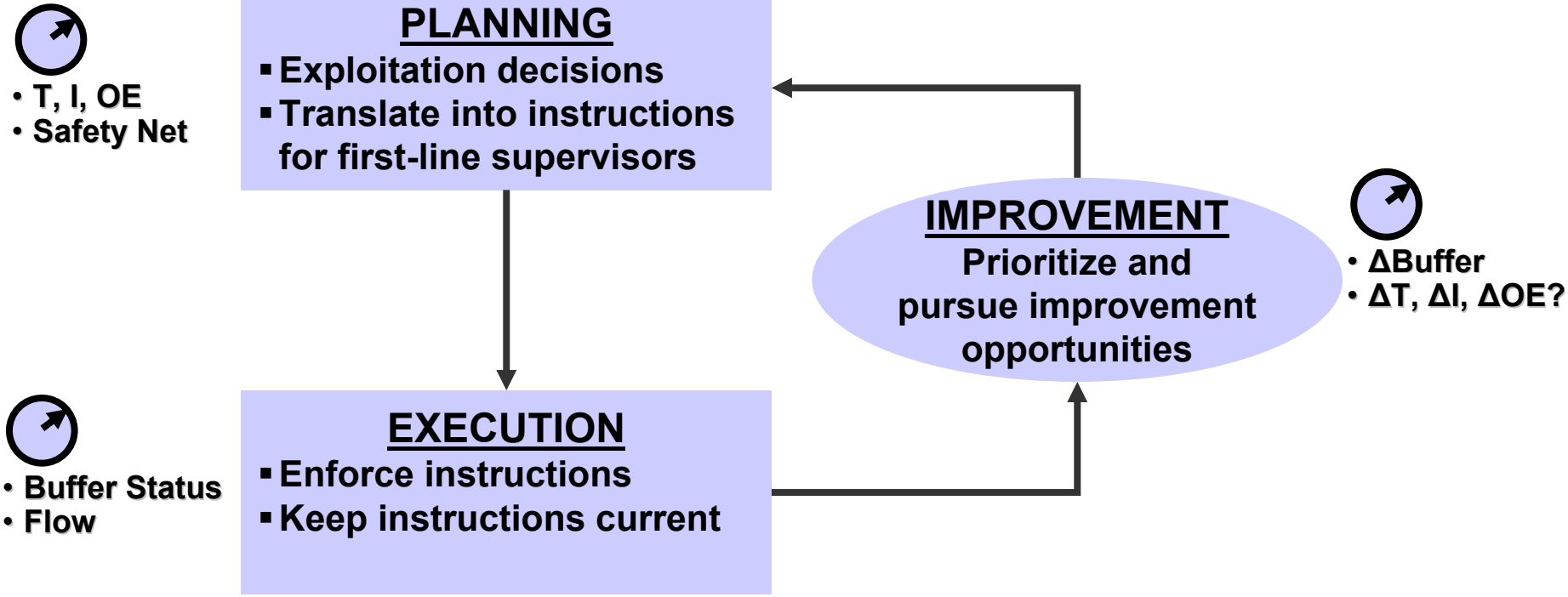
… but you cannot rely on numbers alone

- We have to distinguish non-performance from effects of uncertainties and variability.
- Not all human intuition and judgment can be converted into bits and bytes.

Key points about local measurements

1. Subordination + BM, not optimization.
2. Flow, not efficiency.
3. Computer-aided, not computerized.

Overall management process and measurements (for production and projects)



About Sanjeev Gupta

- CEO of Realization Technologies, the leading provider of TOC Multi Project Management solutions.
- Prior to Realization, CEO of Thru-Put Technologies, a TOC Production Management solutions provider.
- Founded Thru-Put after working at Xerox for 5 years in various management roles, the last of which resulted in dramatic improvements in one of their plants using DBR.
- Education
  - M.S. in Public Management & Policy from Carnegie Mellon.
  - M.S. in Mech. Engineering from Virginia Tech.
  - B.S. in Mech. Engineering from Indian Institute of Technology, Delhi.
- Married, with two children.

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