The Science behind TGO

- Lean redesigned for the printing and packaging industry
- Presented by Udi Arieli, EFI
The Science Behind TGO

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About this Presentation

This presentation summarizes the culmination of over thirty years of my research, development, and education into the Theory of Global Optimization and its application in a printing and packaging industry. Each major topic in this presentation – Workflow is taught in lectures.

As the creator of both the theory and its unique tool, PrintFlow Dynamic Scheduling, I continue in my mission in advancing intelligent automation and TGO to guide the print industry to greater profitability.
Why the world needs a theory
Changing World = Big Challenges

- Tough economic time – changing world economy
- Changing customer demand - more competition for marketing spend
- Shorter lead times
- More setups/make-readies
- Shorter runs – must manage many more jobs for the same revenue
- Lower prices, higher costs
- Increased variety and complexity of products being produced
- Continuous improvement cost
- Processes changing - analog decreasing, digital increasing
- New management challenges

*Bottom line*: We are challenged to maintain profitability
New Technology

• Automated equipment alone does not ensure profit growth.
• Digital processes are faster but harder to manage.
• CIM and JDF provide a strong foundation for process improvement but also introduce new (often hidden) constraints.
The Theory of Global Optimization

Why I decided to develop TGO:

- To help the printing industry become more efficient and profitable
- Because most previous automation projects had failed
- We needed a guiding principle for software development
- The industry was ready for something new and exciting
- Other theories and practices lacked printing industry focus
- To be successful in our goal to provide the ultimate tool set for our clients, we needed to identify and attack any industry practices and myths that erode performance and profitability
Evolution of Business Strategies
The Theory of Global Optimization

Evolution of a Theory

Lean manufacturing theories have been around for over 200 years. Each major leap forward was the result of an innovative thinker:

- Eli Whitney: Mechanization, Farming
- Henry Ford: Assembly Line, Automotive
- Edward Deming: Process Control, Industry
- Eliyahu Goldratt: Constraints, Manufacturing
- Udi Arieli: Global Optimization, Printing

Albuquerque, NM 2015
Comparing Theories

Lean focuses on eliminating waste and reduced cycle time. TOC focuses on system constraints.

• Neither has a printing industry (job shop) focus...
• Neither focuses on the global view.
• Neither focuses on Global Optimization.
• Neither has embedded their theories in a practical, successful software product.
The Theory of Global Optimization

The Theory of Global Optimization is the science of managing a printing or packaging operation with a global view.

TGO is not a production strategy; it is an end-to-end workflow improvement strategy that yields benefits in acquisition, administration, planning, production and delivery. When TGO is implemented with big-picture training and motivation, the culture of the company is transformed; everyone performs with the global view in mind, and everyone performs smarter.
Lean vs TGO

**Lean Manufacturing**
Focused on manufacturing
- Process Flow
- Process control
- Organization
- Metrics
- Logistics
- Waste Reduction

**Global Optimization**
Focused on total system
- Problem solving
- Optimization
- Global View
- Constraint Management
- Automation

Based on the Theory of Global Optimization (TGO)

EFI Automated, Intelligent Workflows
Profit Battle: Lean –vs- TGO

While many attempted to wedge Lean into the printing industry, one team recognized its limitations and shortcomings and looked for a better mousetrap.
# Comparison - Lean - TOC - TGO

<table>
<thead>
<tr>
<th>Lean</th>
<th>TOC</th>
<th>TGO</th>
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</thead>
<tbody>
<tr>
<td>Focuses on individual processes within a linear workflow.</td>
<td>TOC focuses on constrained cost centers.</td>
<td>TGO recognizes that all cost centers must be managed and optimizes.</td>
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<tr>
<td>Lean recognizes a process delay as waste in the system.</td>
<td>TOC recognizes one primary constraint that is fixed, or made permanent for a period, allowing you to place large buffers in front of it.</td>
<td>TGO recognizes that the workflow has more than one constraint and that the constraint can be constantly changing. The strategy must include a process for monitoring, identifying and addressing constraints in a fluid system.</td>
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<tr>
<td>Lean does not recognize the impact of a constraint.</td>
<td>TOC does not know the difference between a bottleneck and a constraint.</td>
<td>TGO distinguishes between a bottleneck (potentially beneficial) and a constrained cost center (causing jobs to be late).</td>
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<tr>
<td>Lean manufacturing looks at individual processes.</td>
<td>TOC utilizes Drum-Buffer-Rope (DBR) to balance the flow of the system.</td>
<td>TGO utilizes smart software with scoring algorithms to balance the flow of the system and to maximize bottom-line impact.</td>
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<tr>
<td>Lean focuses on systematic elimination of waste as its primary goal.</td>
<td>TOC only understands the primary constraints, ignoring all other goals.</td>
<td>TGO recognizes that we must find a compromise between all conflicting constraints and goals.</td>
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A manufacturing operation is a chain of interdependent links...
The Theory of Global Optimization

Only a few constraints control the throughput, on-time delivery, and cost of the entire printing operation.
The Theory of Global Optimization

Identify and remove the constraints, and you increase throughput and profits.
The Theory of Global Optimization

You must have a global view in order to synchronize, optimize, identify and manage the true constraints.

By optimizing production, you produce greater throughput and profits.
What is TGO?

The Theory of Global Optimization (TGO):

The science of leveraging “smart” software to optimize workflows from acquisition through management, prep, production, delivery and analysis. TGO promotes:

- Acting according to the **global view** of the company.
- Change companies culture in every area
- **Optimizing and synchronizing** all areas of your business.
- Identifying and **resolving weak links and constraints**.
- Improving “**real-time**” communication and data sharing/analysis to address real-world challenges before they negatively impact your bottom line.

*Integration, Automation and Smart Software*
The TGO process improvement strategy identifies the constraints in a system and focuses resources on the elimination or control of the constraints to improve efficiency and throughput.

This process control is critical to the success of the end-to-end management and production workflow, allowing for the delivery of integrated, automated systems that leverage smart software for constraint management in all phases of acquisition, management and production.

By identifying the constraints up front, the impact of those constraints are minimalized, resulting in better processes, better capacity utilization, higher throughput and improved profitability.
Building Blocks of TGO
The Theory of Global Optimization

TGO Building Blocks

- Being Intentionally Proactive, Not Reactive
- Global View • Global Thinking
- Identifying and Focusing on Constraints
- Synchronization & Optimization
- Throughput • Bottleneck Management
- End-to-end Continuous Improvement
- Leveraging Objective Indicators
- Managing/maximizing Capacity /Smart Scheduling
- Teamwork
- Applying all of these Company-wide

Making TGO Part of Your Business Culture

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The Theory of Global Optimization

TGO is unique in that it is the only business development strategy supported by a foundation of smart software.
TGO Myths
The Theory of Global Optimization

Myths
Myth or Fact

The customer comes first.

There must be a realization that adjustments to accommodate one customer will almost always impact many customers and overall profit performance.

The wider perspective of the plant should prevail over the narrower focus of a single job, cost center, or customer.
Myth or Fact

Greater productivity and efficiency in a cost center equals more throughput and higher profits.

Higher efficiency or productivity in individual cost centers does not necessarily lead to higher profits.

Equipment speed only translates to profitability when the impact of its performance can be carried throughout the production process.
Myth or Fact

Bottlenecks hinder profitability, they create waste and slow down throughput.

Bottlenecks are good for your company, as long as they do not become constraints... we call them queues.

There are over 40 myths addressed by TGO. The TAGA TGO whitepaper details a number of them.
TGO in Life
Real World Success with TGO

James Pilcher  
VP of Manufacturing /  
GM Freeport Press Inc.

David Baldree  
Director of Operations  
Valtim Marketing Solutions

Judi Hansen  
Director of IT  
J.S. McCarthy Printers
Real World Success with TGO

- I have known Udi Arieli since 2007. He has long been a proponent for both this industry and manufacturing optimization.
- We have implemented TGO throughout our operation through the use of PrintFlow.
- Our experience here at Freeport has been phenomenal. Our business continues to grow, our margins continue to increase, our productivity in our entire operation continues to improve - all this in what many consider to be some of the most challenging times in history for the printing industry.
- Thank you, Udi
Real World Success with TGO

- I preach TGO all the time
- TGO is no longer a theory but with PrintFlow has become a true scientific method.
- If you can understand TGO and deploy it, you can change any company.
- TGO has challenged me to think beyond the norm.
- Udi and TGO were probably some of the most important influences in my life
- It has allowed me to help my company grow almost forty percent in two years.
Real World Success with TGO

- J.S. McCarthy Printers: New England commercial printer focused on service, technical innovations, and superior quality of product

- “Having known Udi for more than 30 years, it still amazes me how he is always open and thinking about anything that will improve production process and has never stopped thinking outside the box!

- “While the rest of us get drawn into the day-to day-details, he is an invaluable constant presence in the printing industry, drawing us back to thinking of the global view and TGO."
Workflow & Automation Ecosystem

Marketing | Acquisition | Management | Pre-Production | Production | Post Production

- Campaign Management
- eCommerce Web-to-Print
- CRM
- Remote Desksops
- Cross Media Marketing
- Variable Data Printing

- Estimating
- Intelligent Quoting
- Order Management
- Purchasing
- Inventory
- Costing
- Invoicing and Receivables
- GL and Financials

- Planning
- Scheduling
- Fiery® Workflow
- Pre-Press Workflows

- Warehousing & Fulfillment
- Shipping

Automation • Smart Software • End-to-End Optimization • TGO • Business Intelligence
Certified Workflows • Synchronized Version Releases
Revenue Generation • Differentiation

Albuquerque, NM 2015

67th Annual Technical Conference
tagaatc.printing.org
Q&A

TGO
Thank you

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