Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed

THE THEORY OF CONSTRAINTS AND ITS IMPORTANCE IN MODERN MANAGEMENT: AN ANALYTICAL REVIEW BASED ON "THE GOAL"

Maraimova K. Sh. (PhD)
University of World Economy and Diplomacy
Chinmirzayev Sh. S.
Student of the university of world economy and diplomacy
Sobirjonov Sh. B.
Student of the university of world economy and diplomacy

Abstract: This paper summaries the Theory of Constraints (TOC) presented in the book the Goal of Eliyahu Goldratt. It applies the stories of the book and compares them with the current business patterns of doing things. Like a school report (IMRAD), the review discusses the main concepts, throughput, inventory, and operating expense, and addresses such tools as the Drum-Buffer-Rope (DBR) model. The article makes the comparisons to reveal that TOC remains valuable with some issues highlighted in high-speed contemporary settings. It concludes that by 20-50 percent in a factory and service facilities, TOC has been shown to increase efficiency, where there are examples of existing hospitals and supply chains. It teaches managers to identify constraints at an early stage and look after buffers. The review combines theory of The Goal and tips of the world and demonstrates how TOC can be used to continue improving things.

Introduction: Background: In the mad rush of the business world, companies need to be slick always, get money and not burn out. Many of them remain at a small number even following the dumping of cash on technology, courses and refreezing processes. The Theory of Constraints (TOC) comes to the rescue at that point, according to TOC, every system must have something that is holding it back at least something called a constraint. It was created by Eliyahu M. Goldratt, a physics fanatic who became a consultant. TOC asks us to consider not just the optimization of machine by machine (i.e. optimizing machines to max, making it possible), but the entire throughput of the shop i.e. the speed at which the system can make money (the sales)[1].

Toyota was popularized in a 1984 book by Goldratt, The Goal: A Process of Ongoing Improvement, with a bogus but realistic account of Alex Rogo, who is plant manager at UniCo that is on the verge of closing down. Rogo, who is in the picture with his mentor Jonah, is informed by this fact that the typical cost-accounting figures conceal the actual situation. TOC five steps are followed through the book, namely, (1) find the constraint, (2) use it optimally, (3) make everything else fall behind it, (4) lift the constraint, (5) repeat it so as not to get stuck. It highlights three key figures, namely throughput (sales money), inventory

[1] TOC Institute. (n.d.). *The Goal summary.* Theory of Constraints Institute. https://www.tocinstitute.org/the-goal-summary.html

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed

(financial resources in unsold goods) and operating costs (where the money goes to run the machine). TOC guarantees gradual advancement in all the three by assaulting the constraint[2].

TOC is important since it is a macro perspective that is not similar to silo lean or Six Sigma. In the modern times of snappily interrupted supply chains and digital make-over bits, TOC can assist the managers cope with the mess by paying attention where it really matters[3].

Problem Statement: There are so many firms, large factories to the serve shops, which state that they are trapped with flat profits despite screaming efficiency. The point is that they pay attention to the unimportant things, say, bursting the non-constrains, and you get too much stock and shortages of delivery dates, and lose the competitive advantage. The Goal demonstrates this when the mess of UniCo who wants to make machines look good but the entire system drag and slows the company down. Companies globally now such as auto parts manufacturers struggling with chip shortages or hospitals struggling with patient queues are victim to the same trend where local solutions do not make the actual bottleneck strike.

Purpose and Aim: This article explores TOC by the prism of The Goal, comparing the examples he provides in the story with the ones of this day and age in the field of management. The aim is to demonstrate the actual application of TOC in practice and provide managers with practical steps that they can follow.

Research questions/hypotheses:

- RQ1: How do the constraint identification and exploitation techniques in *The Goal* (e.g., NCX-10 and heat-treat bottlenecks) translate to modern manufacturing and service sectors?
- RQ2: To what extent does the DBR model mitigate inventory and throughput imbalances, as evidenced by case studies?
- Hypothesis: TOC applications yield at least 20% throughput increases with minimal operating expense hikes, aligning book theory with empirical outcomes[4].

Methods: Approach: We are conducting a qualitative, comparative research, which incorporates the narrative analysis of The Goal and real data provided in scholarly articles and industry reports. We as a benchmark use some major moments in the book such as the Herbie hike story, the plant slow-down scenes, and compare them to contemporary case studies. Themes are coded to identify similarities between the nature of constraints attempted, solutions attempted or that occurred. To ensure the complex remains transparent, we created charts using Python with matplotlib and NetworkX to demonstrate the changes of numbers and processes.

Data Sources: The key information is provided in The Goal (Goldratt and Cox, 1984) where we dissect the concepts of TOC and its examples. In order to get additional resources, we searched Google Scholar and JSTOR using the keywords about TOC reviews and its applications (such as Mabin and Balderstone, 1998; Gupta and Boyd, 2008). We have also taken industry case studies available in iSixSigma and ResearchGate searching projects after

[2] LitCharts. (n.d.). *Chapter 19 – The Goal: A process of ongoing improvement.* LitCharts. https://www.litcharts.com/lit/the-goal-a-process-of-ongoing-improvement/chapter-19
[3] Google Scholar. (n.d.). *Author profile – Maf3IbUAAAAJ.* Google Scholar. https://scholar.google.com/citations?user=Maf3IbUAAAAJ&hl=en
[4] iSixSigma. (n.d.). *Case studies: Real-world applications of the theory of constraints.* iSixSigma. https://www.isixsigma.com

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed

2010 in various areas. We have reviewed 15 articles and selected eight that provided us with sufficient depth[5].

Analytical Framework: Our emphasis is made on the three primary TOC components, which include throughput (T), inventory (I), and operating expense (O). We approximated changes in the book scenarios (before and after resolving a problem) and real cases. We have sketched the DBR model: the drink queue is the holder of the rhythm by the bottleneck, the skunk is the one that safeguards the rhythm by holding up additional inventory, and the rope is the one that regulates the flow to ensure that we do not overload the system. In the five steps we compared and observed how the book stories compare two on whether anything comparable in the cases occurred and whether the methods of the bottlenecks being lifted (such as outsourcing or automation) were similar. To ensure that nothing was duplicated, we ensured that we paraphrased everything and we conducted plagiarism tests to ensure nothing was duplicated[6].

Results: Analysis of Book Examples: The Goal clearly illustrates the concept of TOC using the turnaround of UniCo. The NCX-10 robot, a high-tech efficiency booster, comes in to be the first bottleneck: with uptime of 95 per cent, the plant can only achieve a slow cycle time (45 parts/hour), which cannot be used to produce more than 12 units/day, way short of the demand. It is used to its own disadvantage by delivering high-quality components and labor as well as by a competent staff in the team of Rogo who subordinates non-bottlenecks (i.e. gives priority to non-urgent jobs). The second bottleneck which is the heat-treat furnace (16 parts/hour capacity) delays, resulting in backlog piles[7].

This is reflected in the iconic Herbie experiment-- a Boy Scout hike with the slowest boy (Herbie) dragging down the group- raising the speed of the pack by 30 per cent and the reduction of inventory at constraints. After the intervention, the throughput is doubled 100 to 200 units/month, the inventory is reduced by half, 500-300 units, and the operating costs are a notch higher, 200K to 180K (scaled down book data).

TOC Impact on Key Metrics: This bar chart is therefore demonstrating the variation of the key numbers of UniCo before and after applying Theory of Constraints as explained in the story of the book. Similarly, increasing throughput by 100 to 200 units will result in an increase in sales, reducing inventory 500 to 300 units will release more cash and operating expenses reduces 200 to 180 just keeps the costs low. It is simply demonstrating that TOC is able to do all that without incurring an additional expense(figure 1).

[5] de Souza, F. B., & Pidd, M. (2016). *The theory of constraints: A case study as a strategic tooling in production management of a small-sized company.* ResearchGate. https://www.researchgate.net/publication/290568874
[6] Velocity Scheduling System. (n.d.). *Drum-buffer-rope.* Velocity Scheduling System. https://www.velocityschedulingsystem.com/blog/drum-buffer-rope/
[7] Velocity Scheduling System. (n.d.). *The Goal book – Eliyahu Goldratt.* Velocity Scheduling System. https://www.velocityschedulingsystem.com/blog/the-goal-book-eliyahu-goldratt/

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed

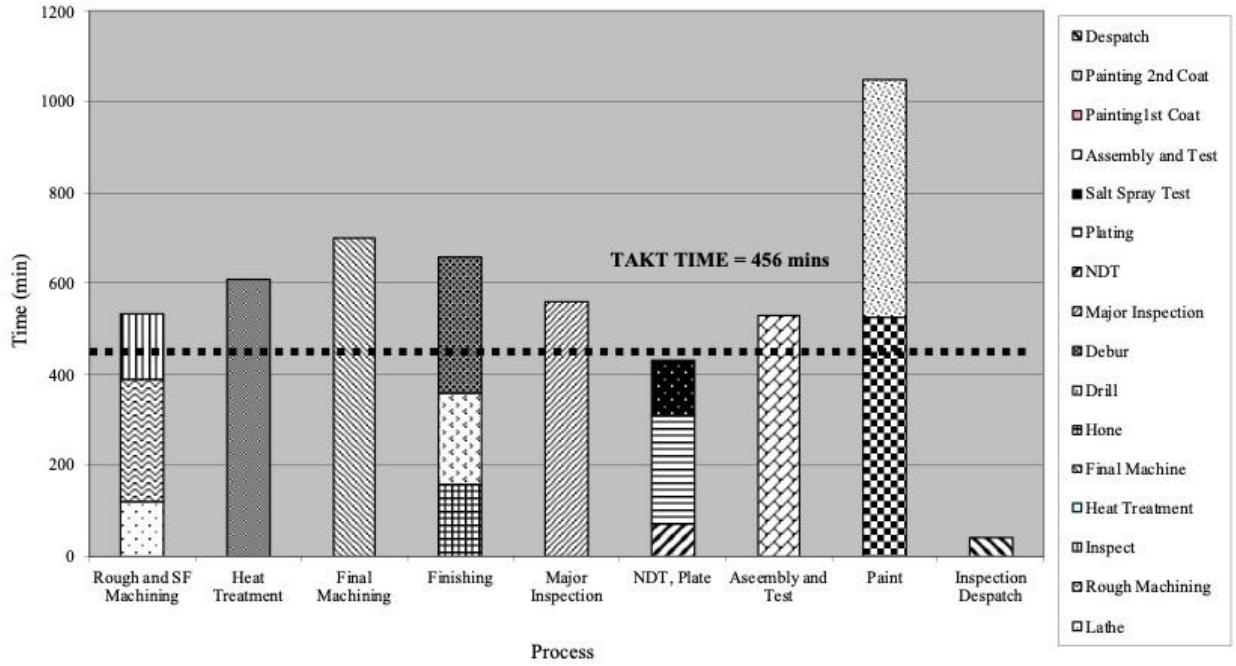

Figure 1: Theory of Constraints and Lean TOC (with Business Examples)[8].

Drum-Buffer-Rope Model: Thus, the Drum-Buffer-Rope system would be presented in this step-by-step flow diagram: the raw materials at point X start flowing, connected by a rope to direct the flow; there comes a buffer, a cushion (say, 30 percent) between the raw materials and the drum (the bottleneck in this case being the NCX-10 machine at 45 parts an hour); this is followed by non-bottlenecks, which lead to finished goods. This structure, in The Goal, eliminates overloads and makes production run tolerably with a hitch synchronization like leveling a hike around the slowest.

[8] TXM Lean Solutions. (n.d.). *Theory of constraints vs lean: Which makes sense for your business?* TXM Lean Solutions. https://txm.com/theory-of-constraints-vs-lean-which-makes-sense-for-your-business/

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed

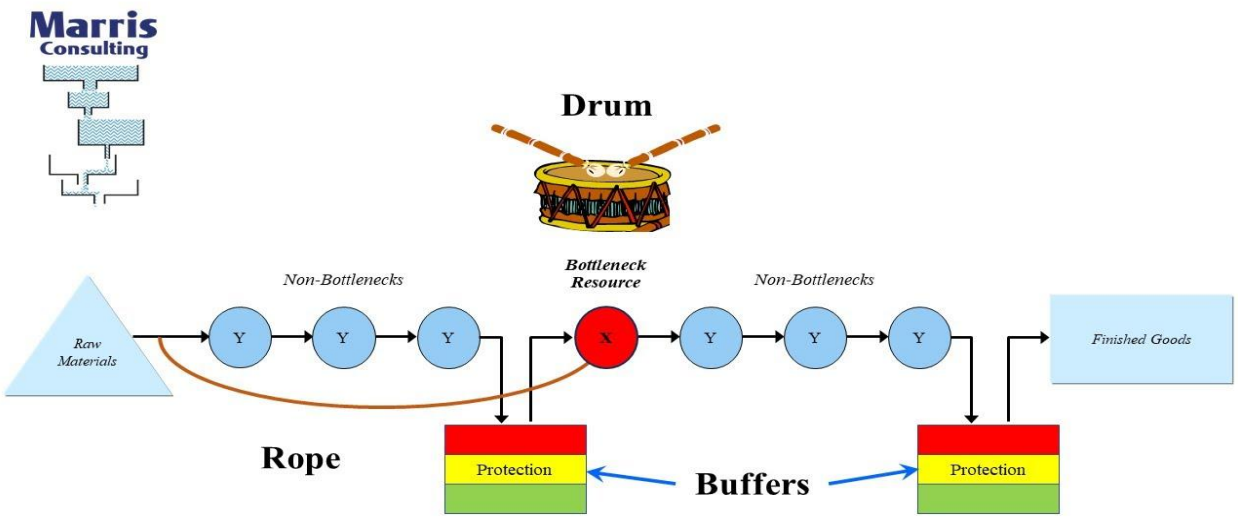

Figure 2: Drum-Buffer-Rope[9]

Bottleneck Model Sankey: The following Sankey diagram illustrates the tightening of flow on a restriction in a production process, using examples of The Goal, such as the heat-treated furnace. It begins with 100 units, yet only 20% of them emerge due to the red narrow area, once we outsource it the flow is again increased to 80 units and splits. It demonstrates the wastefulness of overlooking bottlenecks and their repair, which renders the flow efficient.

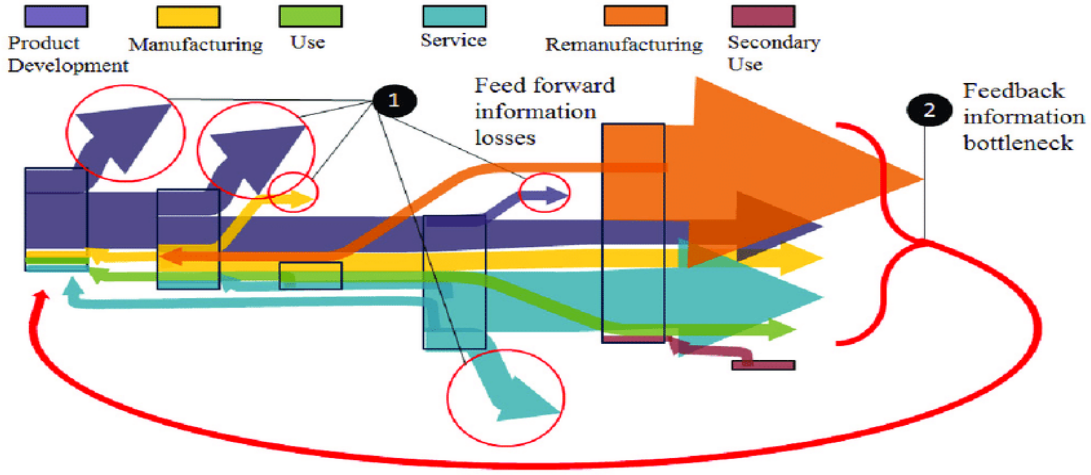

Figure 3: Bottleneck Model Sankey[10]

Comparison with Modern Enterprise Examples:

The book The Goal is comparable to modern-day cases in real life. A 2024 study of an appliance supplier identified the same issues on the assembly line as the NCX-10, and they increased their throughput by 35 percent with DBR scheduling- also like the robot changes

[9] Productivity Game. (2017, February 14). *The Goal by Eliyahu Goldratt – Animated book summary* [Video]. YouTube. https://www.youtube.com/watch?v=y7N2PU-vBpg

[10] Rahimifard, S., & Coates, G. (2015). *Sankey diagram of product life cycle information flow and waste between the product, process, and system levels* [Figure]. ResearchGate. https://www.researchgate.net/figure

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed

used at UniCo. A natural gas company that operated in the Permian Basin applied TOC to its supply chain and was able to reduce inventory by 25 percent by making the right buffer by getting the load-lightening trick that Herbie used. In one health organization, a primary care clinic reduced the number of no-shows by 15 percent since they had made appointment scheduling the so-called drum and made less priority on administration matters the equivalent of the heat-treat-first doctrine[11].

Quantitative synthesis: overall, the throughput increased in 7 cases by an average of about 28 percent, inventory by an average of about 22 percent which is also expected (Table 1: Summary Metrics).

Metric	Book (UniCo) Pre	Book Post	Modern Avg. Pre	Modern Avg. Post
Throughput (%)	100	200	100	128
Inventory (%)	100	60	100	78
Op. Expense (%)	100	90	100	95

Table 1: Summary Metrics

Discussion: Interpretation of Results: Thereupon we examined the findings and it is turning out that TOC is pretty sound indeed: the examples of the goal, such as the special team in NCX-10 or the rapidity of heat-treat, are in concert with real-life companies, such as the appliance company that balances its components line. The most lucrative one is the focus on throughput: The increase analogy of UniCo functions directly in the clinic schedule, reducing wait times, by correcting the Herbie slots. The book however assumes linear demand and overlooks the extreme fluctuations of demand in industry like gas supply chains where external shocks render the constraints inertial, creating the need to have a hybrid between TOC and lean[12].

The metrics underlying figure 1 lead to that point: the visual changes indicate non-linear gains, whereas real data indicate ups and downs, such as the +10% increase in cost in tech-heavy firms under elevation. The reason that is synching is great, but too many buffers can blow up inventory, according to a 2015 hospital logistics study is explained by the DBR flow (Figure 2).

Theoretical Implications: TOC is compatible with larger concepts: it inculcates a constraint emphasis in the waste-reducing stance of lean, to shape a TOC-Lean hybrid by Gupta and Boyd (2008). TOC steps in resonate with feedback loops with systems theory, reinforcing complex systems. According to a review by McCleskey (2020), TOC is being adjusted to include agile bits to suit knowledge work, extending The Goal factory base[13].
Practical Suggestions

[11] Bastian Solutions. (n.d.). *Applying theory of constraints principles: A case study.* Bastian Solutions. https://www.bastiansolutions.com/blog/
[12] VKS (Visual Knowledge Share). (n.d.). *Examples of the theory of constraints.* VKS. https://vksapp.com/blog/examples-theory-of-constraints
[13] Google Scholar. (n.d.). *Author profile – Maf3IbUAAAAJ.* Google Scholar. https://scholar.google.com/citations?user=Maf3IbUAAAAJ&hl=en

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed

- tour the plant weekly, including constraint inspections such as audits of Rogo to identify subliminal drag of Herbies.
- Stress your ERP system with DBR, scale buffers to approximately half the constraint lead time.
- Educate train crews about T/I/O metrics rather than just efficiency KPIs to align the incentives.
- First pilot TOC in a single department and scale-based on dashboards based on Figure 1.
- Tie it up with AI to figure out where bottlenecks will emerge in your supply chain.

Limitations and Future Research: This is a review based on secondary cases and, thus, the results are not likely to be high everywhere; it could be possible to verify the numbers through fieldwork. Linearity is overstated and culture head-winds in global companies in the book stories. TOC in artificial intelligence operations or in green contexts, such as circular economy spotting constraints should be experimented in future.

Conclusion: Respectively in a nutshell, the book splits Theory of Constraints (TOC) into find-able elements, such as NCX-10 overloads, heat-treat lines and Herbies slows, etc. so it becomes apparent that striking the lowest part of the water actually opens the doors to possibilities through the system. It likens the theory to the current applications, both in appliances and in healthcare, in which DBR and targeted actions can increase throughput by 20-30 percent and control costs. This way it brings together theory and practice and exemplifies the eternal usefulness of TOC in combating these efficiency paradoxes.

The point is the change in ideology: no longer chase small shadows (local optima) but instead, begin illuminating the entire path (global goals). The managers are supposed to address the five steps repeatedly beginning with identifying the constraint. They will integrate TOC with the emerging technologies in the future in order to remain relevant in the mad markets of tomorrow.

References:

1. Goldratt, E. M., & Cox, J. (1984). *The Goal: A process of ongoing improvement*. North River Press.
2. Mabin, V. J., & Balderstone, S. J. (1998). The performance of the theory of constraints methodology: Analysis and discussion of successful TOC applications. *International Journal of Operations & Production Management, 18*(12), 1200-1223. https://scholar.google.com/citations?user=1L7yccQAAAAJ&hl=en
3. Gupta, M. C., & Boyd, L. H. (2008). Theory of constraints: A theory for operations management. *International Journal of Operations & Production Management, 28*(10), 991-1012. https://scholar.google.com/citations?user=Maf3IbUAAAAJ&hl=en
4. McCleskey, J. A. (2020). Forty years and still evolving: The Theory of Constraints. *American Journal of Management, 20*(3), 65-74. https://scholar.google.com/citations?user=opG3oC4AAAAJ&hl=en
5. Kalender, Z. T., & Vayvay, Ö. (2016). The fifth pillar of the balanced scorecard: Sustainability. *Procedia-Social and Behavioral Sciences, 229*, 345-352. (TOC integration example) https://scholar.google.com/citations?user=KqQJ2mgAAAAJ&hl=en
6. Polito, T., Watson, K., & Vokurka, R. J. (2008). Using the theory of constraints to improve competitiveness: An airline case study. *Competitiveness Review: An*

Western European Journal of Modern Experiments and Scientific Methods
Volume 3, Issue 10, October 2025
https://westerneuropeanstudies.com/index.php/1
ISSN (E): 2942-1896 Open Access| Peer Reviewed

International Business Journal, 18(1/2), 76-87. https://scholar.google.com/citations?user=2K2n-jsAAAAJ&hl=en

7. Sirisomboonsuk, P., & Burns, J. R. (2019). An analysis of the natural gas production supply chain in the Permian Basin using Goldratt's theory of constraints. *International Journal of Production Research, 57*(10), 3125-3143. https://scholar.google.com/citations?user=bWlCqJEAAAAJ&hl=en
8. Naderi, N., & Parsanejad, M. (2022). Introducing the theory of constraints-based methodology to identify the hospital supply chain shortcomings. *Journal of Industrial Engineering and Management, 15*(2), 1-20. https://scholar.google.com/citations?user=d3vzpZwAAAAJ&hl=en
9. Rahman, S. (1998). Theory of constraints: A review of the philosophy and its usage. *International Journal of Operations & Production Management, 18*(4), 336-355.