Holistic Approach to the
Theory of Constraints

Guests were Jame s F. Cox III and John G. Schleier, Jr.,
Co-Editors of the Theory of Constraints Handbook

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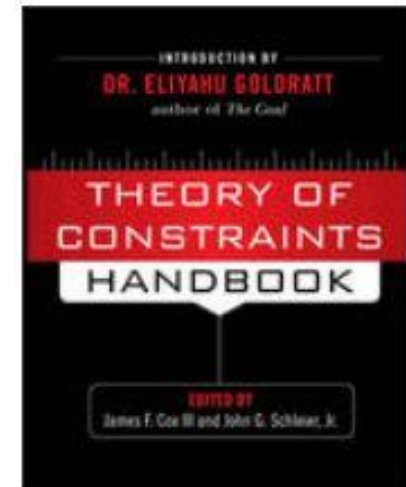
Holistic Approach Theory of Constraints

Business901 *Podcast Transcription*

Implementing Lean Marketing Systems

The Business901 Podcast featured John G. Schleier, Jr. and James F. Cox III authors of the upcoming book, [Theory of Constraints Handbook](). In this authoritative volume, the world's top Theory of Constraints (TOC) experts reveal how to implement the ground-breaking management and improvement methodology developed by Dr. Eliyahu M. Goldratt. *Theory of Constraints Handbook* offers an in-depth examination of this revolutionary concept of bringing about global organization performance improvement by focusing on a few leverage points of the system.

Theory of Constraints concepts and tools are aimed at one overriding objective: bringing about a process of ongoing improvement in enterprises. That said, the purpose of this book is to provide "hands on" guidance from the world's top experts on how to implement these TOC capabilities. This guidance is buttressed by clear definition on how they work, why they work, what issues are resolved and what benefits accrue. Leading practitioners provide guidance based on their hands-on implementation experience. Academic authors give a review of the wealth of literature on why to move from the traditional discipline to each TOC discipline and a review of the TOC literature in that discipline. Indeed these ideas are of such a scope that this Handbook required 44 authors to explain them.

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Jame s F. Cox III, Ph.D., CFPIM, CIRM, holds TOCICO certifications in Production and Supply Chain, Performance Measurement, Critical Chain, Strategy and Tactics, and Thinking Processes. He is a Jonah's Jonah, Professor Emeritus, and was the Robert O. Arnold Professor of Business in the Terry College of Business at the University of Georgia. Prior to his tenure at UGA, Dr. Cox held the E. L. Lowder Professorship in the School of Business at Auburn University.

John G. Schleier, Jr., holds TOCICO certifications in all disciplines. He was President and Chief Operating Officer of the Mortgage Services Division of Alltel, Inc., Executive Vice President of Computer Power, Inc., and Director of Office Systems and Data Delivery for IBM, where he directed major software development projects, sales administration, and financial functions. Mr. Schleier served on the faculty of The University of Georgia Terry College of Business Administration as IBM Executive in Residence and as Executive Professor of Management.

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Joe Dager: Thanks, everyone for joining us. This is Joe Dager the host of the Business 901 podcast.

Participating in the program today is Dr. James Cox, and John Schleier, co-authors of the upcoming book The Theory of Constraints handbook.

I looked at the book, and it's probably the most comprehensive collection I've seen on the Theory of Constraints. It reminded me of a collection of short stories from the best authors, both academic and practitioners, on a subject that I've seen in quite a while.

Few of us really understand how much work is involved to put a collection like this together. I have to ask you, why undertake such a project?

Jim Cox: Well Joe, this is Jim Cox. That's an interesting question. It goes back a ways. TOC is a holistic philosophy that originally started in manufacturing scheduling and expanded to other functions as the need arose. Goldratt describes this path himself in chapter one.

John and I have been involved in TOC for over 25 years and have watched the body of knowledge grow in both breadth and depth. We are fortunate to know a number of the top TOC experts in different areas. And we felt it was time to ask them to document the body of knowledge.

First, the extent of the body of knowledge across a number of functions exists now. Manufacturing cost accounting, measurement, distribution, supply chain, project management, marketing and sales, strategy and tactics, human behaviors. And across

organizational types: for profit, non for profit, government. A number of services: such as professional services, hospitals, medical practices, even prisons and education. In education, TOC looks at behavioral problems of children and how to teach in a Socratic manner. In education administration, it also covers individual improvement today, also.

TOC has had remarkable results in each of these areas. Yet most people have not heard of its use. They still think of TOC as a scheduling method in production; the Drum-Buffer-Rope situation depicted in the goal.

The second point is we wanted to document the depth of knowledge in each function in organization type. We wanted a one-stop reference to this holistic philosophy that provided enough how to knowledge for one to apply the tools in one area, determine the system results, identify the next constraint, apply the correct tools, and determine the organizational results, and so on.

John Schleier: Joe, this is John Schleier. Just to add to that, one thing that Jim and I both wanted to accomplish was to have absolutely no spare time whatsoever over the past year, and we were entirely successful with that.

But on a serious note we wanted to also, in extending the body of knowledge, and bringing activity in the field up to date, we really wanted to get the attention of the academic community. We are really hopeful that more and more theory constraints content will be taught in our business schools across the country. We've seen over the last 25 years, both of us, how powerful the Theory of Constraints tools are. So that carries with it a certain enthusiasm that we have for wanting to see The Theory of Constraints applied and to be helpful in a business community that we think really needs improvement in so many areas.

We were motivated much more by those things than we were with the thoughts of making any money on the book or anything like that. We really wanted to get the knowledge out there.

Joe: I think you did. This was a great concept. Do you really think that you can treat some of the subjects in depth with the collection that you put together?

Jim: We have divided the book up into a number of sections and have chosen the top TOC experts in those various areas, and tried to focus them on a how-to approach. Each one of those chapters is probably 20 to 40, some are 50 to 60, pages long. We focus them on the how-to approach. And in each section we have an academic lead off that section, and discuss that topic area from first a traditional management viewpoint, then from a TOC viewpoint, and critique the TOC body of knowledge in that area.

That ties academia into using the handbook, and use this as a foundation for doing further research in the area. The practitioner authors, many are consultants, have been in the field 20 years. And we've gone back and forth on a number of reviews with each one, trying to succinctly put the message down and focus on how to implement these tools.

Joe, TOC is a holistic philosophy. Maybe that's one of the problems in getting it implemented. A person has to take a systems perspective to whether they're looking at their own personal life. An organization, whether it's profit, not for profit, government agency, whatever, but they need to take a systems perspective. So, it's an overwhelming challenge to do that.

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Joe: I see that throughout the chapters you've done a great job. You've got some real noted experts in there, Dettmer, Goldratt, Newbold. Names that just pop out at me that I recognize. How tough was it to get all them to contribute? How long did it take you to put all this together?

Jim: Joe, I've known most of these people and John's known most of these people for the 25 years we've been in there. At one point, I taught Jonah courses, as John did. Some of these are past students. Some are actually students from the University of Georgia, Ph.D. students, and they did dissertations in this area.

There were probably 50 authors that I wanted to go after to get this. We knew that some would be unavailable, but it seemed like everybody wanted to be a part of this book. So it wasn't difficult at all to get them to make a commitment and to be enthusiastic about it. I think each person wanted to contribute and put a stake in the ground as far as the body of knowledge and what we know today. Hopefully, we can move forward from this stake in the ground.

John: Joe. I would add to that that all but maybe two. I'd say all but about two accepted and they accepted enthusiastically. They were coming back and thanking us for selecting them to be a part of this handbook. I was really kind of amazing. Their participation as we've gone through the last year or so of putting this together has been very responsive.

As Jim said, with several of them we've went through three or four editing iterations, where we felt certain points were not as clear as they could be. They were very accepting of our suggestions and very responsive in coming back with improvements that in many cases went well beyond what we suggested to them. It was a great group of people.

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I wanted to add one other thing. Jim was talking a minute ago about the holistic nature of "Theory of Constraints", and we talked about the problems that emerge at trying to get holistic solutions accepted. I just wanted to refer to something that Russell Ackoff, from University of Pennsylvania, at the Wharton School said. He said the specific reason that blocks organizations from adopting systems thinking is simply that there is a knowledge and experience gap on the how to."

And that's exactly what we're trying to address in this book. And if you were to go, for example back to your question you know can you cover in enough depth in each of these chapters the how to aspects of how to get up and running with some of these concepts, if you were to go for example into the supply chain chapter that was written by Eli Schragenheim, he's done extensive consulting in bringing up supply chain going from manufacturer to retail around the world. If you read that chapter, he will tell you exactly what to do, what works. He will bring up the obstacles. He will bring up the pitfalls along with the concrete how to steps to make it happen.

Joe: What I thought was unique about the book was that I could sit there, and I could go and read in depth about a certain subject but you touch so many different parts that you can learn a little bit about everything. And then there's a way if you really want to dig deeper into the subject you have an expert available. It's like an interview with an expert to see if you really like their material to see if you want to go deeper with that person.

John: Yeah, that's very true. And one, along those lines, one other thing that you'll notice is that for example when we talk about the thinking processes in Theory of Constraints that their use is pervasive across the whole application set and so when you read a particular

chapter and see how an author arrives at his explanation, his or her explanation of solutions, very often the thinking processes are brought into play in that discussion and you can see how Theory of Constraints itself is a system of solutions. But that's made clear in each chapter, in the linkage from one facet of Theory of Constraints to another and how each facet plays into solutions is brought out.

Joe: We are talking about Theory of Constraints, being holistic, system thinking and the big umbrella of everything, but don't a lot of disciplines claim that? I mean doesn't lean kind of claim that? I wouldn't say so much Six Sigma but system thinkers; everybody wants to be kind of like a big shot. Why is Theory of Constraints that way do you think? Or why do you believe that?

Jim: I think, it's interesting you bring up Lean and Six Sigma, there's a couple of chapters in the text that talk about the merging of Lean and Six Sigma with TOC and how to use TOC to focus improvement using the tools of Lean and Six Sigma. So I think in the longer term we'll see these three philosophies merge, each offer, brings a different set of tools to the table for a manager. And it's time that we bring them together and take advantage of the thinking processes in TOC, buffer management in TOC, the measures in TOC to focus lean improvement at various work centers or various functions and to focus Six Sigma tools where they impact the bottom line significantly.

And you're not talking about raw material savings; you're talking about increased route to the market. I think TOC brings to the table that focus that external focus onto the customer and ways to improve the bottom line significantly by using Lean tools or Six Sigma tools.

So I think that's where the merging is. There are a few rough points in merging these philosophies. Lean likes to trim resources; TOC likes to look at that quote, "idle capacity" and recognize that some is protective capacity, and some are excess capacity. And with the excess capacity, TOC's first focus is on how we sell this excess capacity to make money. So I think a correct focus in the long run for the organization and to keep loyal employees is to put the threat of a layoff as the last resort. Those areas there, I think over time will be worked out, and Lean advocates will recognize that Murphy's going to strike and that you need protective capacity to eliminate the impact of Murphy, or to take advantage of market opportunities.

John: You'll see across the handbook, a strong acknowledgment of the power of Lean and Six Sigma tools and discussion of how they're synchronized with Theory of Constraints application. You see this in hospitals and medical practice. You see it in other facets. And one of the things that I find frankly, encouraging, is that people within these disciplines seem to be acknowledging the good points of the other set of disciplines.

For example, in the Six Sigma handbook, on page 127, it says, "While careful planning and management of projects is undeniably important, they matter little if projects being pursued have no impact on the bottom line, or throughput. If you choose the wrong projects, it's possible to make big improvements in quality and productivity that have no impact whatever on the organization's net profit." The Six Sigma handbook goes on to say on page 128, "It can be shown that the TOC approach is superior to traditional TQM approaches to project selection."

That's a pretty powerful statement; I think. I give them great credit for recognizing the focusing power of TOC, which when combined with Six Sigma, can really bring you dramatic results. And again, in the handbook, TOC application people are pointing to Lean and Six Sigma for their qualities that they can bring, that really aren't covered in Theory of Constraints.

Joe: I think that one of the things about Theory of Constraints that people really don't realize, I mean the goal was made so famous, and everybody knows who Herbie is, and they kind of understand Drum-Buffer-Rope. Herbie is synonymous with manufacturing anymore, and it's kind of funny in that nobody can ever name who the main character was, they all know Herbie though. Maybe Herbie was the main character. By the way, I think I can name him, I think it was Alex Rogan or something, if I remember right,

John: Alex Rogo, you got it pretty close.

Joe: What I think that's really interesting is where Theory of Constraints has evolved since that time. The control point and controlling throughput, controlling work in process and having that hand on that bottleneck of what constrains you is probably the most important part of your business. I sometimes don't understand why, why people don't give Theory of Constraints maybe the credit that it deserves in recognizing that it's more than just finding the bottleneck, it's about controlling your business with it. Am I way off the wall? Or I mean, you're the experts, you tell me.

John: Well the importance of the constraint and the importance of the ability to buffer workflow and to understand the relationship between dependent events and statistical fluctuation. How those, and Murphy striking, how that tends to get things screwed up in an

operational environment. All of those issues are pretty much the same whether you're looking at a manufacturing plant or a bank or insurance company or hospital. That, I think, becomes more apparent as one goes through the chapters in the handbook.

Joe: I wonder with the Theory of Constraints, or why isn't it more popular, let's say? I don't see it being written about in health care. I don't see it being, you know you see it in your normal bottleneck situations and it's always part of Lean, always part of Six Sigma that you deal with Theory of Constraints, but I don't see it in other disciplines being written by itself a lot. Am I just not reading the right things, or...?

Jim: Joe, I've got a listing of over 125 books that have been written on TOC. Some of those are books in different languages, but I'll be glad to send you a copy of that. I just updated it earlier today, and sent it out to some people that are interested in TOC. But, I think you have a point there, TOC originally was developed as a production, planning and control technique. And maybe the goal was too successful, in implanting that idea, and people have not kept track of it, and that's one of the primary reasons of the handbook.

A lot of times when you talk to a person, and you say, "Oh I'm very interested in theory and constraints." And their response will be, "Oh yeah, I read the goal back many years ago." And they're totally unaware that the tool of buffer management has been used in hospitals in England, in their medical facilities, to move hospitals that ranked 490, 494, in due date performance and lead time, poor lead time, to number one or two in a period of six months.

So various pieces of the Theory of Constraints that aren't too publicized, such as buffer management, are very appropriate to the service sector and improvements there, in

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identifying the cause, or eliminate the causes of the lateness. So, those are written, there's a couple of articles written, there's a book by Julie Wright written that I think it's called We All Fall Down, her experience in the UK hospital system. Probably, there's maybe a half dozen references to the hospital environment.

Probably the best place to keep track of the body of knowledge in TOC is TOCICO, the Theory of Constraints International Certification Organization. They have an annual conference. Last year it was in Tokyo, hosted by a large number of well-known Japanese manufacturers. So that's one place. A couple other places are Realization, ProChain web site, AGI's website. They each have annual conferences, as does Constraints Management Group, where their top performers have VPs or Presidents of the firm discussing their results in detail and discussing the newer advances in the body of knowledge. This is where I think academia has really failed. They've not gone on and documented these results. Hence, you see little written in the academic research, and little written in the practitioner magazines about these successes.

John: In the area of hospitals, in our book we have one example for the Oxfordshire Horton Hospital in the Emergency Room facility. Patients processed in under four hours were at about 50 percent, 50-60. In a six-month horizon that went from that level to 80, then to 91, then to 95. That's a huge improvement. Which brings me to another point, one of the tenets of the Theory of Constraints is that we go after ambitious targets. We're not interested in a five percent increase. We're interested in 30, 40, and 50 percent.

The results that we're seeing, whether it's in project management, manufacturing, supply chains or whatever, tend to be up in that range. They tend to happen fairly quickly. Then

go on upward from there. Julie Wright, Jim mentioned her work, in They All Fall Down, her book, and her chapter in our handbook. She cites an experience where they were able, in a particular hospital, to triple the patient throughput with only five percent increase. Triple it, now, with only a five percent increase in resources.

Joe: One of the things I always like about Theory of Constraints is that someone didn't go in and talk about efficiencies or going from two sigma to three sigma. People from Theory of Constraints always came in and said, "We're going to reduce this by 50 percent. We're going to reduce this by 40 percent."

To me, that's a language that a typical, let's say, from a manufacturing standpoint, a typical manufacturer wants to hear. You're giving numbers that are realistic to him, and four sigma into five sigma isn't realistic to him.

John: Well, if you look at the work that Mabin and Balderstone did, looking at manufacturing results with Theory of Constraints, they summarized across... Jim, do you remember how many companies? I don't remember that in particular, but there were a number of implementations that they looked at.

The mean on-time delivery improvement went up 44 percent. The revenue throughput mean increase was 63 percent. The combined financial mean increase, including ROI, was 73 percent. Lead times were cut 70 percent. Cycle times mean reduction, 65 percent. And inventory level mean reductions, 49 percent.

And if you look in our book, there will be some case study examples that show similar numbers for particular companies that are often named. If you go to the world of project

management, I looked across the literature I found there, looking at the Realization. Looking at a couple of the major software providers for critical chain software, Realization.com, ProChain Solutions, and then at some other individual examples that I was able to look up.

The cycle time improvement in 19 cases, the minimum was 20 percent. That went up to 62 percent, with about a third of the cycle time improvement cases in a range of 50 to 60 percent. On-time delivery improvement increased from 90 to 100 percent for 11 of 16 cases, and 80 to 89 percent for five of 16 cases. Without continuing to recite all those, but I noticed one thing that I found kind of interesting. One of the clients for one of the companies, I think it was for ProChain Solutions, said that his experience told him that traditional project management is a pop gun, and we now have a bazooka.

Joe: That's a good line.

John: That's a pretty good line, I thought. And one other thing, just in that area of results: Jim and I have a little first-hand experience with critical chain. We were asked to do and got involved in... What I could call some action research with a major software development company whose name you would recognize if I were going to mention it, which I'm not, but a big, big company.

They had a major project, 13,000 personnel project, on their single biggest application that they're doing. They told us they were hopelessly behind schedule. They had six months left to go until their due date.

So we're entering the scene late, late in the cycle. We went in there and said, "Look; you've got to... From what we're seeing..." We did a little survey of their 30-some employees who were working on this particular project got them to identify the undesirable effects they were experiencing. It became clear, as we kind of knew before we even asked that they were drowning in multi-tasking effort.

They were flooding the organization with more projects than they could handle which increased the work in process and added to the chaos and confusion and so on. They were also being flooded with service requests for their developers to support that should have been handled by the service request organization that they had.

Anyway, to get to the bottom line quickly, we choked off the releases. We told them, "Look; you've got to lay out a critical chain that considers resources. We want you to tell your employees that we're no longer going to measure them on task completions, which they were being measured on in their performance evaluations. That we want 50 percent estimates, that is, estimates where you have a 50-50 shot at making it, instead of padding your estimates with another 40 or 50 percent to make sure your measurements are covered.

We're going to take the difference between your 50 percent estimate and your previous 90 to 100 percent estimate and we're going to put that in a project. We're going to take half of that and put it in a project buffer, we're going to implement a relay runner approach where we ask people on the critical chain when they're finished."

"When are you going to be finished with your work? OK, you're going to be finished day after tomorrow." We go to the next person tell that person "Day after tomorrow you're

going to get this work, when it hits make sure that you've got full kitting, make sure that, and tell me if you're missing anything and when you get that work you don't do anything else until you have it finished." The bottom line was we brought that project in on time with a morale improvement which we tested later with a little survey that went right up through the roof that people were ecstatic and we cut the error rate, the number of defects by seventy-four percent compared to what their previous experience had been. I mean it just bowled them over; they couldn't believe they had made it, but they did.

Joe: What takes place when you have these paradigm shifts? You're saying we've got these management methods and to make these huge shifts you have to have a pretty significant shift in the way you do business to get improvements of 40, 50, 60 percent, don't you?

John: You surely do.

Jim: Yes, on this project here that John was talking about, we actually constructed a current reality tree with the undesirable effects, clouds, future reality tree to determine the objections. We used the prerequisite tree and developed a full-scope solution using the TOC thinking process tool set. The environment could have been almost any environment, and a tool set would have worked equally well in those environments.

But using that tool set, we have developed a pretty comprehensive solution with the manager over that area and looked at the negative impact of some of the actions and their problems. But you're exactly right; it is a paradigm shift in the way you think about the organization and the way you manage an organization. Many people look at that and probably walk away because their school education, their local background is a local

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optimum approach where they're looking for those six line problems in industry and how do I solve this six line problem and they don't realize their solution causes problems in marketing, or sales, and human resources or employee morale so they never realize that their own actions can be causing problems in other areas.

John: If you take the shift that you make in saying, "We're not going to measure people to on-time task performance." That sounds like a form of heresy to a lot of people. I mean it's when one does that, one overlooks the fact of human, normal human behavior. People are part of the system, and when you look at the world that way, you can see that, "OK, if I tell people that I'm going to measure them to on-time task performance, and then they're going to pad their estimates."

Already this is starting to give me trouble, and when I tell them that I'm not going to measure them to on-time task performance then they're willing to give me a 50 percent estimate, and then I can take the contingency that was previously scattered through all these individual estimates, and put it in a project buffer that I can use to help me track and protect the project. And we also recognize that if someone knows that they're being tracked, and they happen to finish a task early, in a lot of cases they won't report it as completed because... Well, then the next time around my manager will say, "Well last time you beat your estimate by 30 percent. So why can't you take that much more out of this new estimate?'"

We try to get away from the tendency people have to sandbag and not report their work, so the project gets the advantage of early completions which we help by using the relay runner approach to moving work through the system. But it's too bad, as Jim alluded to a

minute ago, that we aren't picking up on some of these things and incorporating them into our university curricula.

Joe: I believe there's not a good segment on just even problem-solving and quality initiatives. The engineering field gets a little bit of that but is there in the management structure of universities? You're more acclimated to academia than I am but is management theory being taught, these type of things into?

Jim: Not to the extent that it needs to be. There are a few pockets or a few schools that teach TOC in depth, but not many. TOC challenges a lot of paradigms. The traditional management paradigm is to manage everything, to get the most of all resources versus the TOC paradigm of focus. It's as important to determine what not to do as it is to determine what to do. Traditional project management versus critical change, John went through some of the differences there.

If we looked at manufacturing scheduling and control we see large MRP and ERP systems versus in TOC we see simple drum buffer row or simplified drum buffer row and now one chapter is even on pull MRP systems which simplifies and reduces lead time and inventory at the same time in planning and control systems. There's a clash between traditional push distribution systems with real point ELQ type formulas and then max formulas at each location versus the TOC rapid replenishment pull distribution system. There are clashes between traditional cost accounting with this internal cost focus and measures versus throughput accounting with this external or market focus.

Services are looked at as being very different for manufacturing versus in TOC we've got a robust system, tool set, that's applicable to all systems, to manufacturing, service,

government, not for profit, for profit, education, prisons, hospitals, individuals. The same tool set can be used to identify what to change, to what to change and how to cost the change for any one of these systems. We've got traditional problem-solving versus, and decision making versus this holistic tool set. So there are many paradigm shifts that have to be made to bring TOC into the academic arena.

I think in academia a Ph.D. is very knowledgeable in a niche or in their own field and what we're asking them to do is to become very knowledgeable or knowledgeable across a large number of functions and to understand the interactions and interrelationships. How to identify the constraint whether it be the sales function, marketing function, engineering, manufacturing, distribution, policies and procedures.

Then if you're not the constraint, how do you subordinate your function to support the constraint which again directly violates do the most you can, work as hard as you can in each individual function? I think in academia we need to erase the whole blackboard and then start all over with diagramming how the various functions work as a system in the short and the long term.

Joe: It seems sometimes too simple. It's too easy to do when you're just looking at a constraint. When I talk to Theory of Constraints people, they go to a whole different level where the typical understanding of the Theory of Constraints is kind of down and on the first floor and you guys are on the third, fourth floor when you're talking about it a little bit. You know one of the things I'll go to, when we talk about problem-solving and Lean problem-solving, you talk about the five why's, but the thinking process that the Theory of

Constraints uses is a whole different level of thinking is it not? I mean it goes much, much further than you can with let's say the five Why's concept.

Jim: Yes, I agree with you, but if you took the five why concept, the early use of the thinking tools and the current reality tree in particular, both would ask why but in TOC you would validate that that cause really existed before you asked the second "why". Then when you ask the second Why, you would validate that that cause existed. So I look at the five "why's" and what we call the Snowflake Effect, or Diving Down to identify a core problem as being very similar, except TOC is like a person that wears a belt and suspenders. TOC wants to ensure that that cause really exists and validate that cause exists before they ask a second or the third or the fourth why.

John: We go through categories of what we call legitimate reservation, which are also documented in the book, in reviewing the logic so that we can assure that it's solid.

So the picture we see of the current reality expressed in logical cause and effect construct is really right on the money. It accounts for causes of all of the undesirable effects that we've been able to identify in the environment.

When we go to the next stage, which is to determine not only what to change but what to change to, and we lay out a cause and effect picture of a future reality that we want to have, we can make sure that we see in cause and effect terms what's going to have to happen to get us from the current set of undesirable effects to desirable effects and to what's really the goal or objective of the organization.

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The tools of Theory of Constraints all link together to take us to that logical objective of where, what we want to get to and what steps are needed and then to a Prerequisite tree and Transition tree that lays out the plan for actually how to execute that and get you there.

It's really a complete system and part of the objective of it is not only to get the logical picture of the environment and make sure we don't get confused between symptoms and real problems, core problems, but to then also make sure that we have a picture laid out that will facilitate communication and discussion of the environment.

When we talk about how to get to the future that we want, that we can go through a process of what we call Negative Branch Reservations where we look for... We listen to the "yes, buts" that people have to say about what might happen in a particular step and identify potential problems that might sink the effort toward improvement. So that we've anticipated those in advance and that the plan for improvement doesn't get defeated because of unanticipated consequences. Those things are all considered in the TOC thinking processes.

Jim: There's a newer tool in the TOC toolkit, the thinking processes, and that's the Strategy and Tactics tree. Back in, I guess, the '90s, maybe before that, Goldratt talked about the Strategy and Tactics tree.

But more around 2000, 2002, he got into how to construct these trees and now there's a body of knowledge where what we do is we look at where we're at and we look at how we implement the TOC tools, the Lean, or whatever the set of tools are we're implementing. How do we sustain that, and then how do we grow to the next stage?

So from the top of the tree to the bottom, when we get to the bottom, we're looking at the detailed actions taken by each person or each function of the organization for implementation, for sustaining, for growth. These trees are very comprehensive and really combined the Future Reality tree, Pre-Requisite tree, and Transition tree into one diagram that leads as a road map to where you want to go. There are some generic trees for implementing critical chain, retail, S&T tree, make-to-availability, make-to-order. I think the pay-per-click tree...

John: Right. Five of them.

Jim: Five of them, now, that are in the public domain. One can use those as sort of a guideline, but they've got to be knowledgeable of the other thinking tools so they're able to modify a specific tree for their own environment and their own situation.

I think there are a number of contributions in the handbook that are new and extend the body of knowledge. I think the S&T is talked about four or five chapters...from different perspectives: How to use the S&T, and how to develop a Mafia offer, how to construct an S&T tree. So there's a lot of new material in there that is not in other publications yet.

John: So if you were a retailer, or if you owned... Say you were a company that owned its own supply chain, including retail outlets, let's say, and you said to yourself, "Well, it's time to do a strategic plan. We're not really growing the way we should. We're seeing too many stock outs in our stores. We've got this problem and that problem."

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You can go to the S& tree, and unless you are a highly unusual organization, you will find a level-by-level set of generic steps for a strategy that will probably fit you pretty well. You will have as Jim said, you will have to modify it, maybe tweak it here and there.

But you'll not only have those steps, but you'll have a definition at each of those steps of the necessary and sufficient assumptions that justify why that step is a step that should be taken. And, my goodness, it would just simplify your approach toward getting a strategy put together enormously.

Joe: Yes, I always argue that someone should never start with a blank piece of paper.

John: There you go. We're together on that one.

Joe: It's tough to do that. Even business plan or marketing plan software, most of the reasons software is sold is for a sample marketing plans.

John: I want to jump for a minute, if I could, to just another little discussion. In the book, in chapter 27, we have a chapter on "Theory of Constraints in Prisons" as written by Christina Cheng, and working with the prison system in Singapore.

That emphasizes a couple of really neat things about Theory of Constraints. One thing Eliyahu Goldratt has always done is to emphasize the importance of the Socratic Method, leading people toward finding their own solutions and then owning those solutions.

What Christina did is, she went into the prison, just to net it quickly. They asked her to teach the conflict cloud, the evaporating cloud, to a set of prisoners who were shortly going to be released on parole. Those people would be able to identify or structure the conflicts

that they're facing in their own personal lives and come up with solutions for those conflicts that would help them to remain employed and to remain clean and out of prison.

Now the success rate of people exiting the prison and going out on parole had been about 20 percent. About 20 percent would get a job, keep it, and so on. Christina taught them the evaporating cloud took them through the construction of these clouds for themselves. And, by the way, she had people who spoke Malay-Chinese and generally poor English. So she's got to work with this diversity of languages. She had 18 hours of class time that she could spend doing this.

It's a heck of a story. It's one of the really entertaining stories in the handbook. What she was able to do was to raise that success rate from 20 percent to 60 percent, right out of the box.

They got so interested in this in the prison system, they said, "Oh good grief, we've got to back deeper into the prison and teach more of this kind of thing to people who are longer-term prisoners, so that they can begin to understand."

So instead of having a counselor say, "Well, George, you've got this problem and that problem, you should think about this and look after that," and so forth... You let the prisoner really drill in by giving them the tools to do it with and understand what their real problems are.

The story is really just incredible because she goes through several individual cases to show you the work that they did, the homework that the prisoners did, and how it helped them.

Jim: Also, there's a chapter prior to that that's on the Theory of Constraints in Education. Kathy Suerken has had significant successes around the world in numerous countries of teaching teachers how to use the cloud, the Future Reality Tree, or Pre-Requisite Tree and the Negative Branch, in changing child behavior.

These are some very significant stories and some examples of where these tools were used to teach History, or teach other concepts. As you know, the thinking tools are based on causality. So it's very easy to show the causes of war or the causes of the situation. Then putting it in that graphic format really helps students remember and understand facts much better.

They're used to handle behavioral problems there. They're used to teach. They're used to as you might expect, to handle administrative problems also. So there's just one chapter after another...

John Ricketts has an excellent chapter on the use of the TOC tools in professional a service which is consulting. John is a Ph.D. eminent scholar for IBM and has used many of these tools, critical chain tools and other tools. He has a book out where he discusses the use of TOC and professional services. This chapter advances that even more in the differences that might exist between services and manufacturing and how he was able... IBM was able to use these tools quite effectively in their consulting practice, and in helping address problems of clients.

John: He does a really good job of contrasting the application of constraint management and buffering and the like...of contrasting professional scientific and technical services with manufacturing. So he draws or connects the bridges for you so that you can see how he

moved from the sort of understanding he would get in say, reading the goal to what you really have to do in that kind of a services environment.

Joe: There's also a couple of guys, I think, named Cox and Schleier that wrote a chapter on Theory of Constraints for personal productivity, didn't they?

Jim: Yes, Joe, that's interesting. John and I... I taught at the University of Georgia for 20 years and introduced the thinking tools, right after I learned them from Ellie and Bob Fox. I came back and taught an advanced Operations course to seniors. I usually use case studies, and I just said, "I really think these thinking tools are good so I am going to try them out in this class."

With about a weeks' preparation, I started the class and I just said, "Students we are going to study your personal productivity problems." That's what we did. I taught them how to build a current reality tree the old way, how to solve things with clouds, and develop a prerequisite tree.

Well, one young lady in there, Sheila Taormina, came to me after the first class and told me she didn't want to do that exercise. I had Sheila in other classes and Sheila was about a 3.8 grade point student. She was a member of about 10 organizations and an officer of about five to 10 of them. She was an all American swimmer, and so on and so forth. Sheila told me, "I don't have personal productivity problems. I'm pretty good, thank you, at managing my time. I swim five hours a day, I maintain this and this."

I had to agree with her, she didn't have a personal productivity. But I told her, "Sheila you are going to have to do this exercise. I want you to learn the tools." She said, "Well I want

to do it but let me do it on my swimming." So I told her I didn't swim well. And she would have to have someone who knew swimming to check that part of it, but I could check her logic. The story went on, Sheila graduated, so on and so forth, and the story is in that chapter...

John: Tell them why she wanted to use it for her swimming.

Jim: Well she said she kept working harder and harder and getting worse and worse. She was spending more time trying to improve and make the Olympic team and she was actually not improving at all. At this point in time, she was a senior at the University of Georgia. So she is getting rather old for being good at swimming, a world class swimmer. I think she was ranked 25th in the nation or something.

So anyway, she analyzed her swimming. She swam in the Alamo meet and came in second with the best time, right after she done the trees and clouds six weeks later or so, came in second to Janet Evans. You might know that name there, a world class swimmer of that era.

But anyway, Sheila graduated and went on and got a Masters. Then in 1996, March or so, I got a card from her. She was telling me that she had achieved her life dream and made the Olympic team as an alternate. So she had taken the next two years after she graduated and worked, and made the Olympic Team. Bottom line was she won the gold medal on the relays in the Atlanta Olympics and was on the front page of USA today with her teammates and Bill Clinton and Chelsea.

The story went on, she got the gold medal there. She has been in the 2000 Olympics. She switched events and went into the triathlon, which is a couple mile swim, bicycling and running. So she switched events. Then in the most recent Olympics in Beijing she was in the Pentathlon.

John: Pentathlon.

Jim: Thank you. Which is five events, including horseback riding, I think shooting, fencing and I am not sure what else. Anyway, it's a fantastic story, and it started there in that exercise of using the tools for personal productivity.

John: She wrote the story herself, for us, and it is well told. You can see clearly how she applied the thinking tools to help her get where she wanted to go.

Jim: That is only one of... I use that exercise in every class, Advanced Operations Management class, at the MBA level and the undergraduate level from that point on until I retired. And I had students lose a significant amount to weight, by using the thinking tools to address their problems.

I've had them whether they were marginal students; they turned their day upside down. Instead of partying they went to bed early and got up at four or five in the morning, studied in the morning. So they identified their problems and their own solutions. Many of them had significant success in addressing these problems.

So hence I think instead of reading organization books. Or how to remember names or faces, or so on or so forth. The first step is to identify your own problems. What's blocking

you from achieving the goals you want in your life then solving those to identify win-win actions to solve that problem. And then develop and detailed implementation plan with measures that let you know that you can achieve that goal in your life or goals in your life.

By laying out a detailed plan and executing it. So hopefully over time we will teach these tools and catch a lot of young people early on where they recognize they need to change their ways, and they can achieve goals in their lives.

Joe: That seems like the passion that you have for Theory of Constraints is personal development. Is it not?

Jim: I think so. I think Goldratt's major contribution to all this is, the thinking tools. And it's just the practical application from logical to common sense. But it's so uncommon with most people today. They take actions, and they don't understand the full ramifications of these actions. And then they have to live through the consequences of these actions. And I think his tools offer tremendous opportunity to change people's lives where they can achieve their goals.

John: If we go back to the chapter we were talking about earlier of Kathy Suerken on TOC and education, one thing kind of connected to this that impressed me, was that her observation was that the thinking tools can really be learned. At least some of them can be learned by grade school children. And in her chapter there's a picture of a conflict cloud.

That's drawn in chalk, I think it's in chalk, on the sidewalk in grade school in the UK. And these grade school kids come out and resolve conflicts that they have, by walking through that sidewalk diagram of a conflict cloud, because they have been taught how to do it. And

it's just kind of interesting. I think that these tools can be understood and used by very, very young people.

Joe: When you talk about the thinking process, and to me I kind of relate it to value stream mapping and the current state and future state of what we are doing there. But it seems that I look at value stream mapping, more the operational level when I see you describe the thinking process; it seems to be a higher level above that. More of a management, or a management theory, can you comment on that correlation?

Jim: Well I think of value stream mapping as laying out the details of the operation, and I think if you went in there, you could take a value stream map, and ask why. And dive a little bit lower, even into a value stream map and ask why do we use this process, or "why do we have this step?" And then try and validate those steps in the value stream map.

As I discussed earlier with the validation approach, I look at the TOC tools as strictly causality, linkages in each diagram. If I do this, then this will happen. If I do this, then this and this will happen. Or in order to do this, I must take this step here. So I'd look at those as being, like a set of dominoes. Where I have one domino, that first domino and it hits then next, the next, the next.

And then as we go up, maybe it splits into three different paths with that action and another action. I look at that as being an intelligence diagram. A causal intelligence diagram whereas I look at value stream mapping as just portraying what it is. The process as it is right now, how can I improve the process? What should it look like in the future?

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It is more an operations tool in itself and I look at the thinking process of being a much more robust set of tools. Usually the policies, the procedures and the measures in an organization cause bad actions. So I think that's where the power of TOC comes in and the thinking tools in particular.

You can have a nice value stream map. A future value stream map if you have bad policies and procedures. Or measures in that value stream map, it's not necessarily going to show up in the value stream map. You need to understand the logic of the environment around it. Does that address your question there Joe?

Joe: Yeah, I think so. I think it gets to that because I am looking at the fact that the thinking process and the decision trees is a management function. It's more of systems type thinking, function.

John: Exactly. Another thing that is important about those tools, Joe, is that they are also aimed at sharpening one's intuition about the problems that you are looking at. For example, in laying out a conflict diagram, an evaporating cloud. People are taught an effective use of language for surfacing the assumptions that underlie the elements of the cloud.

Once one sees those assumptions on each side of the conflict, it's much easier to think of solutions because you see what the assumptions are, that may be somewhat misguided in some cases, or at least changeable. So all the way through the application of these thinking tools, one will find what I like to call triggers of creativity; just because you are making the causes and effects visible. You are making the assumptions of underlying

conflicts visible or making the shape of the conflict itself visible. Doing all those things gives you ideas on how to make changes that are important.

Jim: I would like to add to that... You mentioned it as a management tool; I would like to think that the lowest level worker in an organization can learn these tools. And use them effectively to show what's blocking then from doing the job that's needed. We have a chapter on day to day conflicts by Odette Cohan, where he presents the use of it at the lowest levels in an organization.

We have another chapter where we look at studying your customers and identifying the problems that your industry creates for your customer. What are the assumptions built around those problems and the how can we address the customer's problems that our industry creates so that the customer wants business with us.

So the tools are really robust enough to be used in engineering. To identify new solutions to problems, and sales in marketing and identifying new markets, distribution. It's just very robust and detailed, in the fact that you are able to identify hidden assumptions about the way you think about the problem. So, I think they can be used anywhere, and it's just a better way of thinking than what we used today. And most of our decision making that either at the individual level or at the organization level or say a supply chain level where you have several organizations working together.

It is taking that system thinking that we've always talked about, and nobody knew how to do it. We've got tools and techniques there and how to steps that make that system thinking a reality.

John: I think Odette Cohan's chapter is a really good example. He gives good examples of how one can take the evaporating cloud, the conflict cloud for example and apply it to conflicts that an individual has within himself or herself. How it can apply to conflicts between two people. How it can apply to conflicts that exist across abroad organization or policy maybe driving you in the wrong direction. So there is that kind of versatility in the tools.

Joe: I think they are so important today because products have been commoditized so much that the only thing that you are left in selling is really yourself and the knowledge within the company. Being able to distinguish and apply the proper things for your customers and understanding their problems are so important.

I think this is a... Theory of Constraints has a great opportunity here to maybe come to a little more forefront than it has in the past.

Joe: Well Lisa Lang's chapter really hits a home run on that one.

Jim: I think Lisa Lang has been a speaker on your podcast before.

Joe: She has. It was very similar to this podcast. It ran really long.

Jim: Yeah, she is phenomenal and we have a chapter by E. Fred Goad, who holds a Ph.D. in organization psychology, own resistance to change and the layers of resistance to change and how to overcome those layers. So it's interesting that if you are looking at marketing and sales, you can lay out a plan to discuss with your customer and to show them the causal linkages of the problems they're facing.

How the industry creates it and how your solution addresses those elements. And you can listen to their responses as you go and tell what layer and the resistance to change levels you're at. Then how do I respond to that to move them to that layer? So, there's a very exciting material in there from a sales and marketing standpoint.

There's exciting material there in the measurements area with some really outstanding new concepts and measurements.

John: Deborah Smith and Jeff Foreman's chapter is nothing less than exciting in this discussion of measurement which is not always the most exciting thing to talk about, but its really superb work.

Joe: I think measurement is so important, but everybody struggles with them. I mean nobody wants to do them. I can't wait to get my hands on the complete copy of the book.

Joe: Is there anything you would like to add in this conversation that maybe is important that I left out or didn't ask?

John: Well, I think just a couple of things quickly. I think Dr. Gary Bartlett's chapter on Theory of Constraint in Medical Practice. He is an oral surgeon who has just done a remarkable thing with his practice and has... I think done an unusual amount to integrate lean and six sigma concepts in Theory of Constraint and what he has done. He took that practice in not being profitable after he had paid the salaries of his staff, other surgeons, himself and his staff to a point where it is now three and a half million dollars a year profit.

But emphasizing the customer and how to provide service levels that go beyond what other competitive practices could provide. Lynn Boyd and James Holt chapter dealing with the Theory of Constraints and complex environments is just a very, very powerful piece of work. It hits a lot of the flow of ideas that have to take place in a big company as an aircraft manufacturer and so on were all ideas on say that have to do with a new product where what needs to happen in manufacturing and distribution and sales and engineering.

All have to come together and ideas on how to tie this flow of ideas together in a project network to make it work better. John Covington's chapter where he talks about application of the Theory of Constraints and a church denomination that is losing a thousand members a week and how to identify what the constraint is and how to bring solutions to that situation is a heck of an interesting story.

Jim: And if I look at it, I think the core elements of TOC are what make it different. TOC is all about focus, Goad talks about, defines in the TOC chapter and one word, focus. TOC looks at constraints determining the system performance no matter what the system is. The sum of the local optima is not equal to the global optima. There's always a win-win solution, always.

John: And if you haven't found it, you haven't looked hard enough. There is a point made that this is true.

Jim: Inherent simplicity exists in reality, the world is not complex. One must look for this simplicity. People are good. Many policies, procedures and measures call him to act madly. Look for significant global improvement. This is what TOC is all about not marginal improvement and then the much overlook area, TOC has two necessary conditions.

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Sure it is focused on making money now or in the future or achieving if it is a nonprofit. The goal now and in the future but there are two necessary conditions that must be addressed and that is take care of your people and take care of your customers. So you can't achieve, in the long term, more money now than in the future unless you satisfy your customer's needs better than your competition and you treat your worker with significant respect. So I think those points there made TOC, or really the foundation of TOC and how it operates.

Joe: When is your book coming out then?

Jim: It is supposed to be available at the TOC-ICO, Theory of Constraints-International Certification Organization, the annual conference in Las Vegas, June 19th.

Joe: As much material as we covered, I hope everyone realizes it is not a 122-page book.

John: No, about 1,200 pages gets pretty close to it.

Joe: I want to finish it up here by saying thank you to the both of you. I had a delightful time. This podcast is available on the Business901 podcast site and on our iTunes store.

John: Well, it's been a great pleasure for us too.

Jim: Joe, we've enjoyed it.

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