



THEORY OF CONSTRAINTS
INTERNATIONAL CERTIFICATION ORGANIZATION

TOCICO WEBINAR

Innovation for Impact

A Step-by-Step Innovation Process that
Creates Value for all Stakeholders

Presented by

Dr. Curtis R. Carlson & Dr. Alan Barnard

*Professor of Practice, Northeastern University
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CEO, SRI International 1998-2014*

*CEO
Goldratt Research Labs
Lifetime Achievement Award, TOCICO*

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Webinar Outline

1. The **NABC** approach to Innovation (Curt)
2. The **ProConCloud** approach to Innovation (Alan)
3. Training **ChatGPT** to use the **ProConCloud** (Alan)
4. Q&A



THEORY OF CONSTRAINTS
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Part 1

The **NABC** approach
to Innovation
that creates value for all stakeholders

Dr. Curt Carlson



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From Failure to Systematic Success





Questions

Are you a value creator?

Must all professionals be value creators?

Performance Today?



< 25% of initiatives have value



A Critical Test

"Every CEO will at least give lip service to the idea that the world is moving faster and that we need to do a better job at innovating.

But if you go into an organization and ask people to describe their innovation system, you get blank looks.

They have none."

Gary Hamel

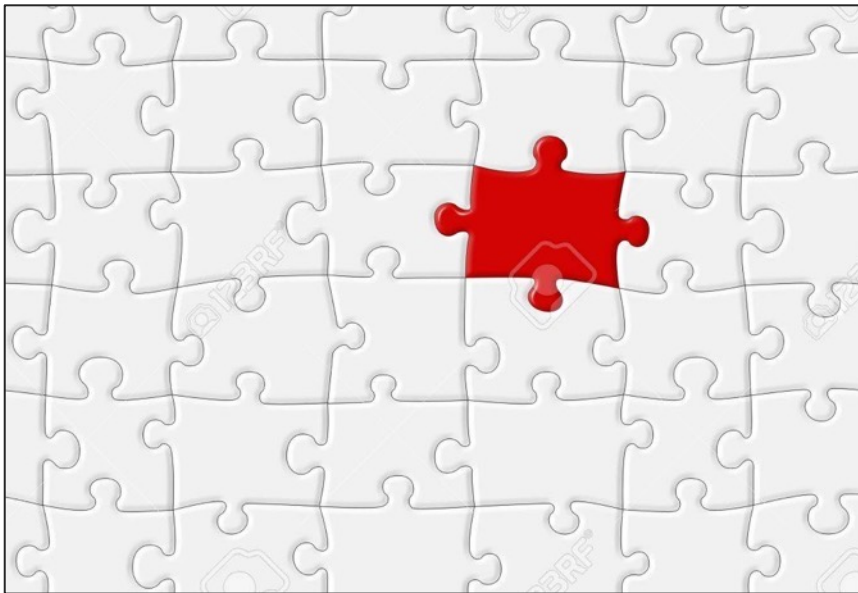




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A Different Starting Point



TOC and ProConCloud



Value Creation



The 3 Laws of Value Creation

1. Important unmet opportunities – *to make an impact*
2. Shared concepts and language – *for effective collaboration*
3. Recuring team Value-Creation Forums – *to learn, improve, and create faster than the competition*

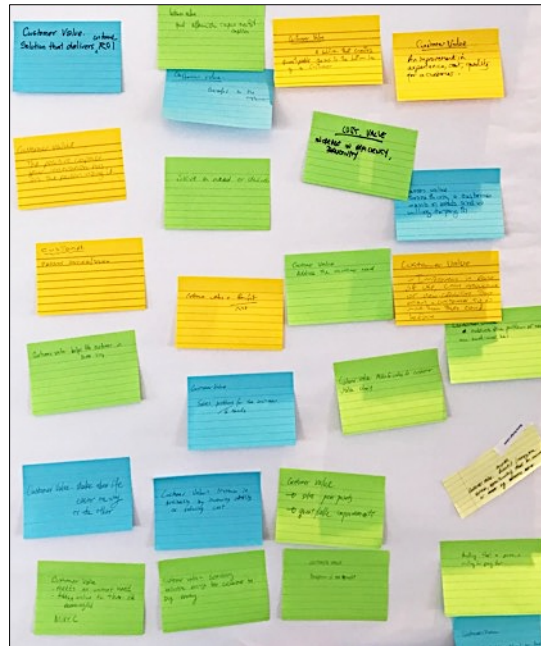


No Agreement: What Does This Mean?

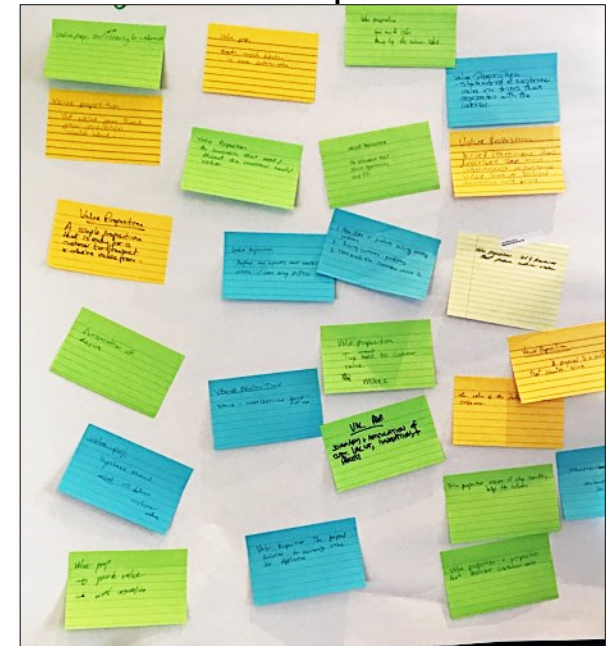
Innovation



Customer Value



Value Proposition



Top Silicon-Valley Company



4,000 Mousetrap Patents: Innovation?

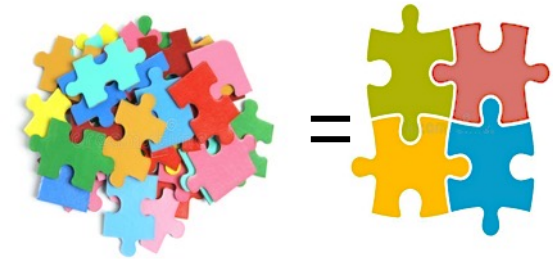


Invention: Something novel reduced to practice



Innovation and Value Creation?

Value creation: Process of addressing an important end-user need with a solution that is better than any alternative and that addresses the needs of all stakeholders



Innovation: Delivery of new end-user value to society with a sustainability model and ROI



Hey Siri



What is End-User Value?

$$\text{Value} = \frac{\text{End-user Benefits}}{\text{End-user Costs}}$$



Versus



Benefits & Costs as perceived by the end-user — not us



NABC Value Propositions

Address an important unmet end-user and market

Need with a unique, compelling, and defensible

Approach: offering & business model with superior ($>2X$)

Benefits/costs when compared to the

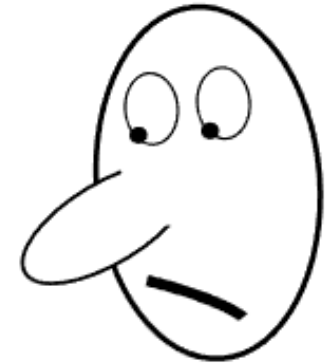
Competition and all other alternatives



The Most Common Failure: 95-99%

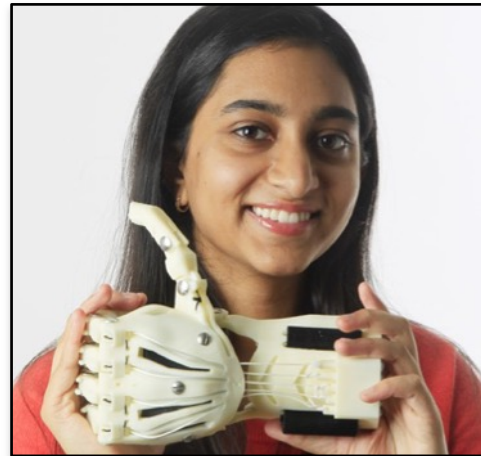


Oh no, not again!



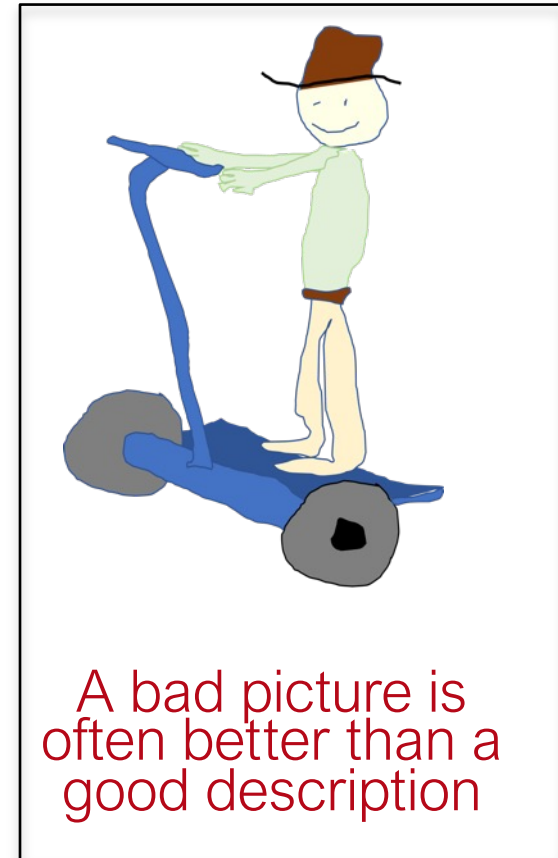
Specific, Quantitative, & Memorable

- Use stories
- Images
- Sketches
- Trend graphs
- Mock-ups
- Models



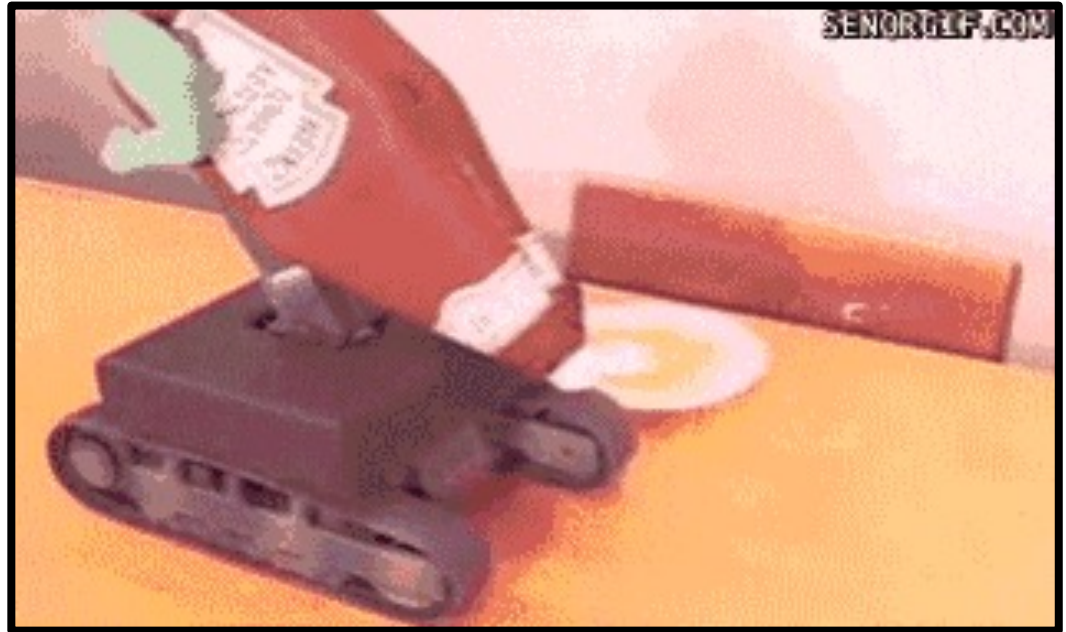
Quantify

No bigger, better,
faster, cheaper





What do Innovations Look Like?



They all surprise



Reframing: 5-What's

1. Situation?
2. Problem?
3. Why not solved? The primary limiting factor?
4. Actual need?
5. Actual solution?



5 What's Reframing: iPhone

Situation: Rapidly increasing number of applications on mobile devices

Problem: Tiny keys are slow and inconvenient

Why not solved: More keys don't scale

Actual needs: 1) Reconfigurable display and 2) a better stylus

Actual solution: Small computer, full operating system, and with “wow factor” multi-touch





Important Needs, Not Just “Interesting”

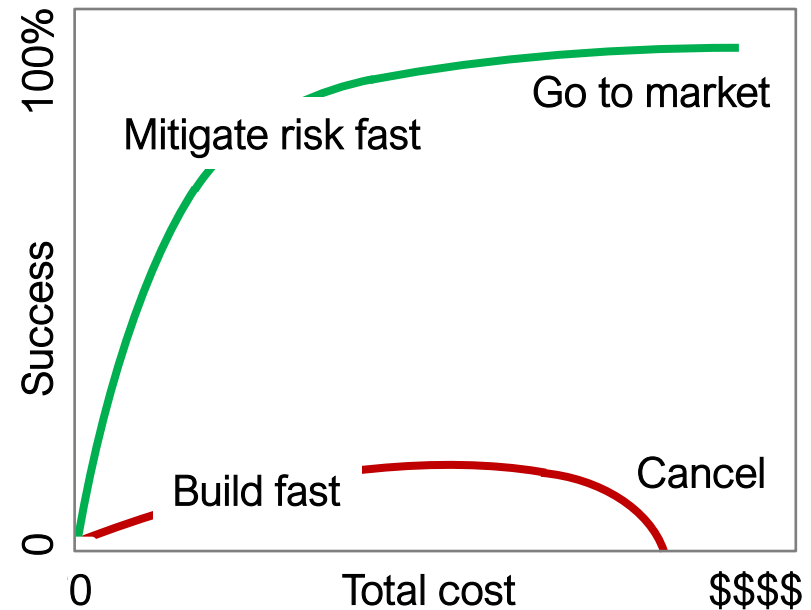
- Important, growing opportunity
 - Enterprise defines
 - Growing white space opportunity
 - Beach-head that can be “owned”
 - Defensible solution *and* business model
- Customer really cares, a high priority – urgent
- You and your company really care





Risk-Impact Mitigation: MVEs & Not MVPs

- Most build fast
 - **MVP**: Minimum Viable Product
 - Usually, the wrong solution
 - Devastates staff when cancelled
- MVE: Minimum Viable Experiment



Improvement possible: $>2X$



iPhone Touch Screen MVE

buffs





NABC Action Plans

Hook: Story & grabber

NABC

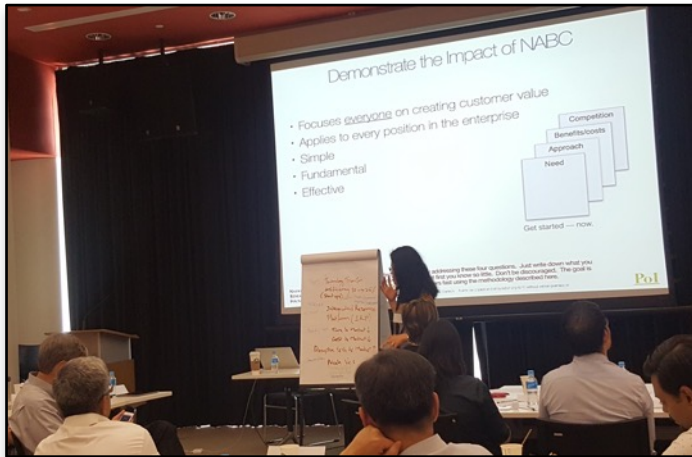
Action: What's next?



- Practice: improve both the message and delivery
- Enthusiasm is essential
- *Bring-it-to-life* – so they will never forget it



Value-Creation Forums



Good: keep it

Improve: fix it

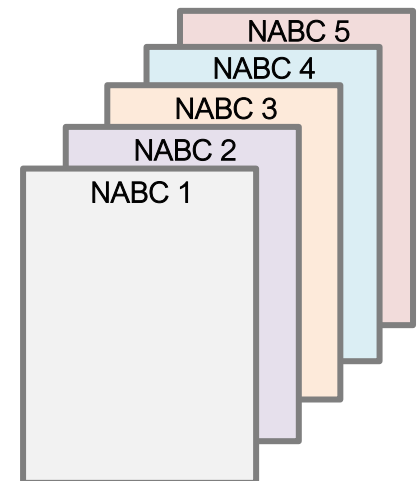
Eyes of the end-user

Eyes of the funder



“Which is better, A or B?”

- 3-5 teams, 2-10-minute NABC's
- Every 2 to 4 weeks
- Presenters listen to feedback, no arguing





Build Value Step by Step

Core concept

- Need
- Approach
- Benefits/costs
- Competition

Fundamentals

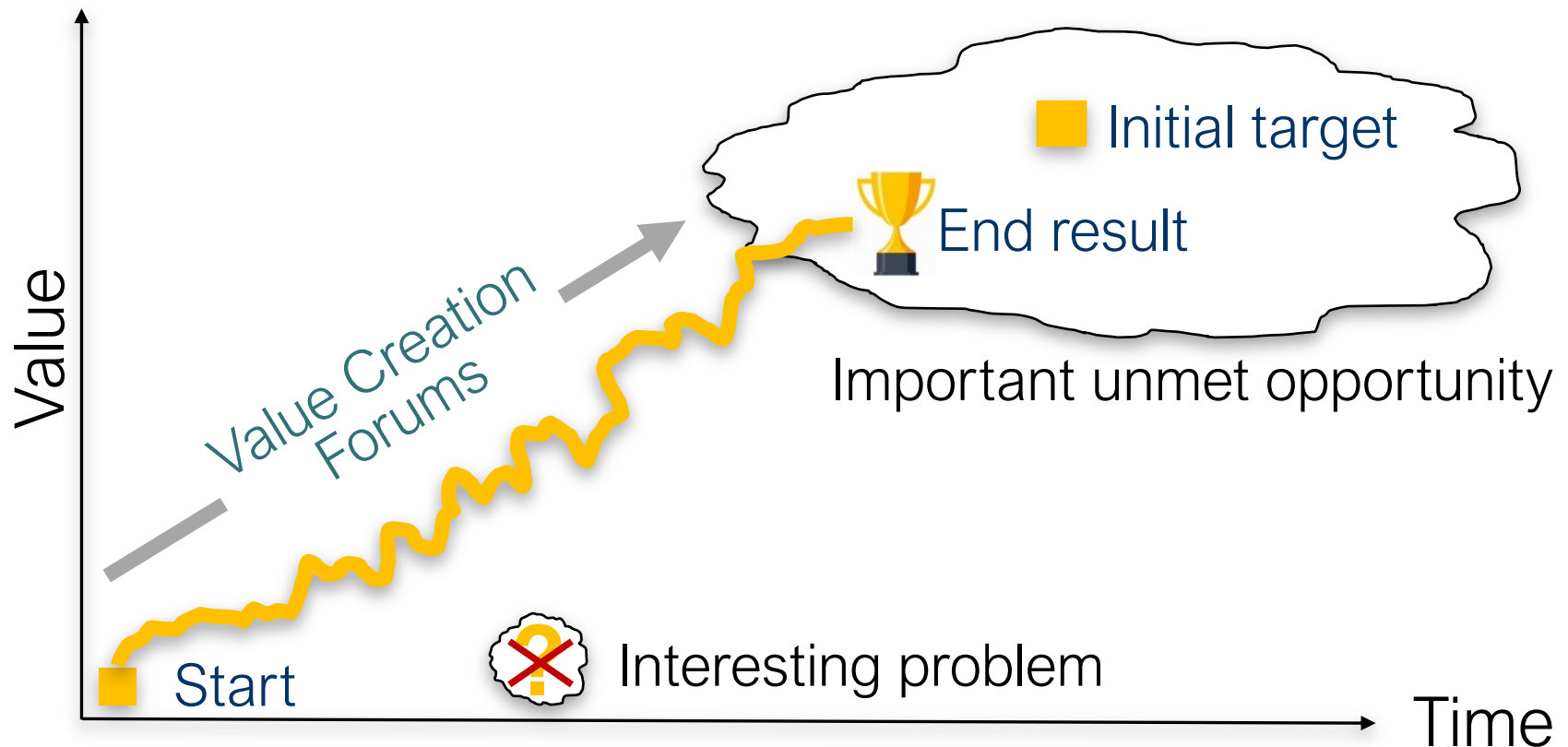
- Opportunity space & beachhead
- Business model
- Key insights
- Solution & sustainability model
- Risk reduction
- Sustainable advantage
- Champions & teams

Innovation

- Improved product
- New product
- Venture
- License

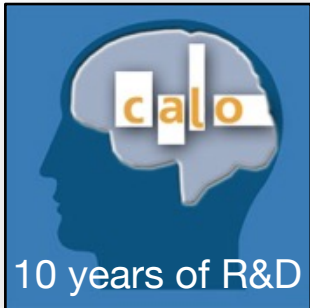


How High-Value Innovations Develop





Example: Paradigm Shifting R&D to Siri



Your NABC value proposition — the core concept



The 3 Laws of Value Creation

1. Important unmet opportunities – *to make an impact*
2. Shared concepts and language – *for effective collaboration*
3. Recuring team Value-Creation Forums – *to learn, improve, and create faster than the competition*

All 3 must be in place for systematic success



NABC Application Challenges

Address an important unmet end-user and market
Need

How to differentiate between **Gap, Problem & Need**
Approach

How to differentiate between **Solution & Win:win Approach**
(a win:win innovation do not require significant sacrifices
and addresses the likely “**Yes-Buts** of all stakeholders)



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Part 2

**The ProConCloud Approach
to Innovation
that creates value for all stakeholders**

Dr. Alan Barnard



THE GUIDING PRINCIPLE FOR ALL MY RESEARCH

***“The goal of all sciences is to
substitute visible complexity for invisible simplicity ...”***



Jean Baptiste Perrin (1870-1942)

WHEN IT COMES TO ANALYZING

1. Why are **THEY NOT BUYING** our amazing Product/Service, or

Why are **THEY NOT BUYING INTO** our amazing Idea/Product/Service and

2. How to **IMPROVE** our **OFFER/INNOVATION** to make it a true Win:win (Truly Irresistible)

...there is a **LOT of visible complexity.**

Is there really some **inherent, but invisible simplicity,**

in the art and science of **understanding WHY & HOW?**



The 5-Step ProConCloud Method

Step 1

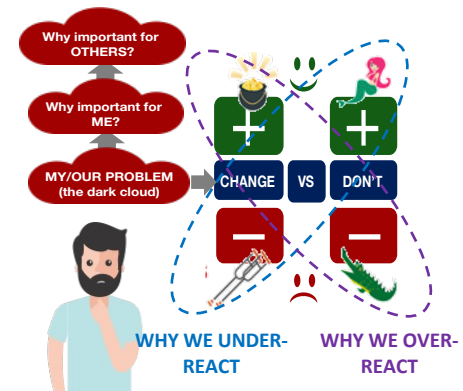
Define the **BUYER's PROBLEM** and
why its **important**



To prevent common mistakes of
Wasting our limited attention by ..
Dealing with Unimportant Problems OR
Procrastinating on Important Problems

Step 2

Define the **BUYER's CONFLICT** and **NEED**
And why it is such a **difficult decision**



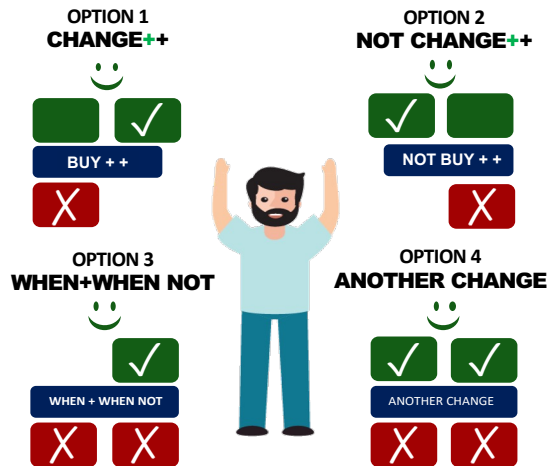
To prevent common mistakes of
NOT Buying when they should ... due to
exaggerated Fears of Loss, Effort or Risk
OR
BUYING when they should NOT due to
exaggerated frustrations or expectations,



The 5-Step ProConCloud Method

Step 3

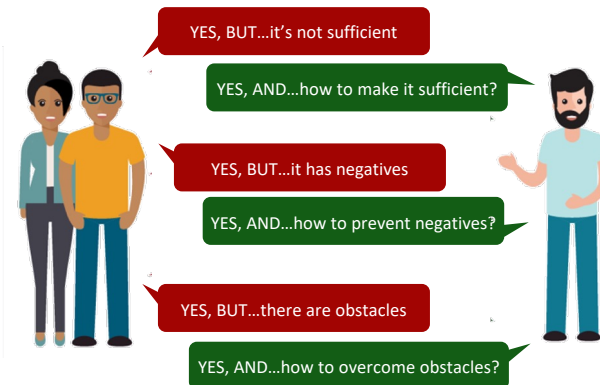
Resolve **BUYER'S Conflict** with 4 **win:win options**



To prevent common mistake of
FOCUSING on only **ONE** resolution
or **compromising**
Not realizing there are 4 viable options

Step 4

YES-AND OFFER to prevent **BUYER'S YES-BUTS**



To prevent common mistakes of
Ignoring valid reservations (Yes, buts)
OR
Using Yes, buts as excuses not to try

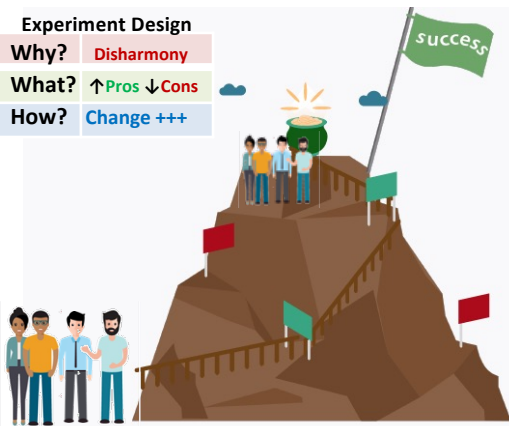


The 5-Step ProConCloud Method

Step 5

Design a **Minimum Viable Experiment (MVE)**

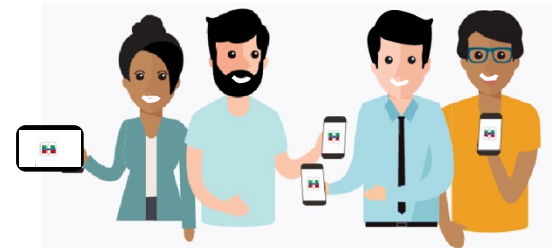
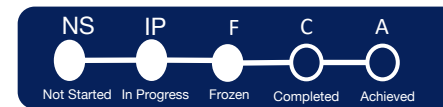
Experiment Design
Why? Disharmony
What? ↑Pros ↓Cons
How? Change +++



To prevent common mistake of
Failing to learn from experience by
doing BAD Experiments

Now Just do it!

Managing **Experiment as a Project**



To prevent common mistake of
Either Procrastinating, getting distracted or
multitasking ...that often results in avoidable
FAILED Experiments



What is Innovation?

Innovation **creates value** for the user and the innovator and other stakeholders involved (win:win:win)

How is Value created?

“Value is created by **removing a significant limitation or tradeoff** for the user (win for user), in a way that **was not possible before**, and to the extent that no significant competitor can deliver (competitive edge and win for innovator)

Dr. Eli Goldratt

VALUE CREATION HYPOTHESIS

True innovation does not require significant sacrifices or trade-offsas these cause resistance. When there is resistance to change (to fund or adopt or buy) ... it is not yet a true innovation...



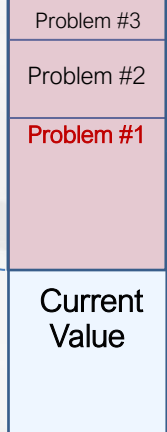
THE 5-STEP PROCONCLOUD METHOD

Step 1

GAP & PROBLEM
To avoid solving unimportant problems

Value Potential

VALUE GAP
Impact or Income GAP



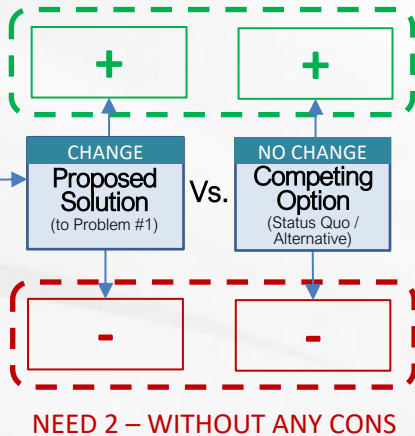
NOTE:

Quantify the GAP in \$\$
Make sure the selected Problem to solve is a significant contributor to the GAP.

Step 2

CONFLICT & NEED
Avoid jumping to solution and inventor's bias

NEED 1 – WANT ALL PROS

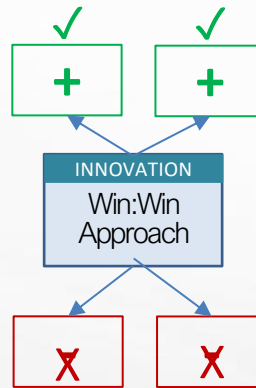


NOTE:

The NEED is not the Problem or Gap. It is the Pros we want to gain and retain without the Cons we don't want to gain or retain

Step 3

WIN:WIN APPROACH
To avoid or reduce tradeoffs



NOTE:

The APPROACH is not the solution but the win:win resolution of the conflict without tradeoffs

INNOVATION OPTIONS

- #1: CHANGE + +
- #2: NO CHANGE + +
- #3: WHEN + WHEN NOT
- #4: ANOTHER CHANGE

Step 4

YES-BUT PLANNING
To avoid ignoring valid Yes-Buts/ Limiting Factors

Stakeholder 1
YES-BUT#1.1:
YES-AND#1.1:
Stakeholder 1
YES-BUT#1.2:
YES-AND#1.2:
Stakeholder 2
YES-BUT#2.1:
YES-AND#2.1:
Stakeholder 3
YES-BUT#3.1:
YES-AND#3.1:

NOTE:

TYPES OF YES-BUTS

- #1: YES-BUT ... not sufficient innovation to be win for all stakeholders
- #2: YES-BUT ... Has major negative for 1 or more stakeholders if it works.
- #3: YES-BUT ... Will face significant implementation obstacles

Step 5

MINIMALLY VIABLE EXPERIMENT
To avoid costly MVPs or misunderstandings

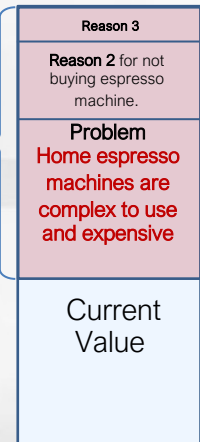
EXPERIMENT DESIGN CHARTER

- WHY** is a change needed now?:
From Step 1, the Problem and the quantified GAP that justifies a change
- WHAT** is the objective of the change?
From Step 2, the Need is to get ALL the PROS without any (major) CONS...
- WHY** is the objective possible but difficult?
From Step 3 and 4,
The key assumption(s) that was challenged and the key YES-BUTS that had to be overcome
- HOW** will the objective be achieved?
From Steps 3 and 4,
The selected innovative win:win Approach to:
a) satisfy the full NEED and
b) overcome all key YES-BUTS (the YES-ANDS)

INVENTOR NEED

GAP & PROBLEM

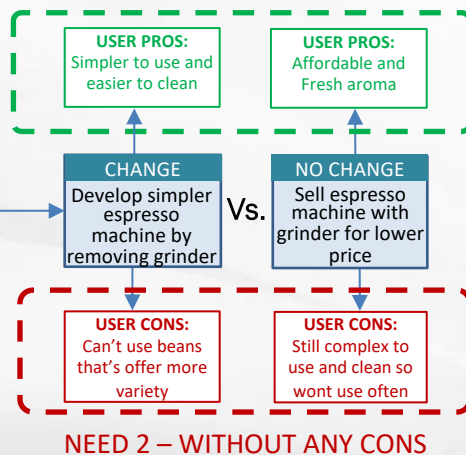
**Impact
or
Income
Gap**



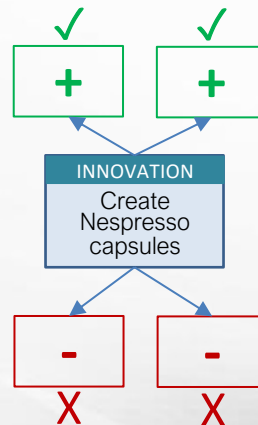
USER/CLIENT NEED

CONFLICT & NEED

NEED 1 – WANT ALL PROS



WIN:WIN APPROACH



YES-BUT PLANNING

YES-BUT #1.1: Retailers will not be willing to stock Nespresso capsules

YES-AND #1.1: Offer capsules online and show retailers compact capsules will have higher revenue/ft²

YES-BUT #2.1: Capsules will increase cost of a cup of home-made espresso

YES-AND #2.1: Show in advertising that cost/cup is same or less

YES-BUT #2.2: Will it really taste and smell like a real espresso?

YES-AND #2.2: Offer in-store promos to let users taste and smell Nespresso coffee

MINIMALLY VIABLE EXPERIMENT

A significant number of coffee drinkers do not own espresso makers due to their complexity to use and high price to buy.

FOR USER: Option to buy an Espresso machine that is simpler and more affordable without compromising on quality or coffee variety.

FOR Innovator: Develop a simpler more affordable Espresso machine that get more coffee drinkers to buy without compromising revenue, margins or increased risk of being copied

Key Assumption to Validate: We believe it is possible to create capsules of ground coffee in a wide variety that will be affordable, simple to use and taste like real espresso

Yes-But #1.1: Retailers will not be willing to stock Nespresso capsules.

Yes-But #2.1: Capsules will increase cost of a cup of home-made espresso

Yes-But #2.2: Will it really taste and smell like a real espresso?

Selected Innovation Approach: Another Change

Develop a home Espresso machine that uses capsules

- + Offer capsules online and show retailers compact capsules will have higher revenue/ft²
- + Show in advertising that cost/cup is same or less
- + Offer in-store promos to let users taste and smell Nespresso coffee



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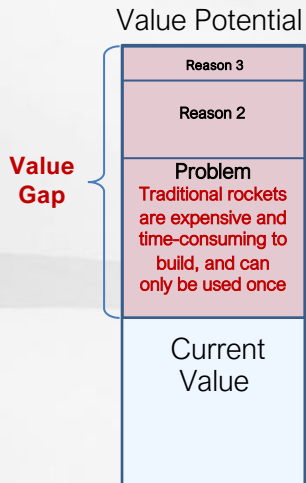
PROCONCLOUD CASE STUDY: ROCKETS & SPACE SHUTTLES

INVENTOR NEED

USER/CLIENT NEED

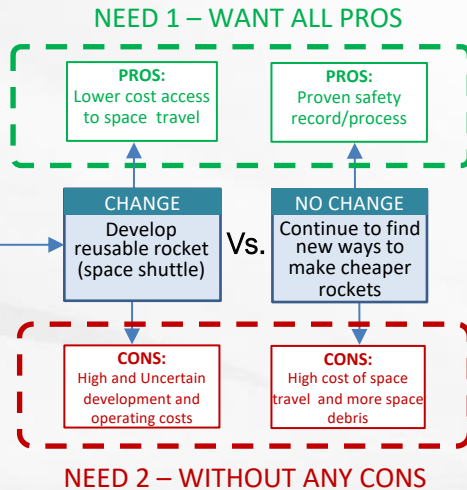
Step 1

GAP & PROBLEM



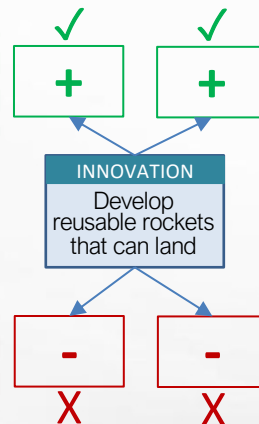
Step 2

CONFLICT & NEED



Step 3

WIN:WIN APPROACH



Step 4

YES-BUT PLANNING

SH 1: Rocket scientists
YES-BUT #1.1: Concerns about potential damage to rockets during re-entry and landing
YES-AND #1.1: Develop heat-resistant materials and shielding, implement precision landing technology to ensure safety
SH 2: Suppliers & manufacturers
YES-BUT #2.1: Concern over reusable rocket impact on businesses, adapting to new tech requirements
YES-AND #2.1: Collaborate on developing new tech, diversify product offerings for both reusable and traditional rockets, seize emerging market opportunities
SH 3: Space agencies
YES-BUT #3.1: Challenges with adjusting to new regulations and safety standards for reusable rockets
YES-AND #3.1: Collaborate with agencies to develop guidelines and ensure compliance, provide transparent data on safety and reliability

Step 5

MINIMALLY VIABLE EXPERIMENT

WHY is a change needed now?: <i>Decreasing launch costs and expanding access to space are essential for the growth and sustainability of the space industry, and reusable rockets offer a potential solution.</i>
WHAT is the objective of the change? FOR USER: Have access to reusable rockets that reduce costs, increase launch frequency, and make space exploration more accessible without compromising safety. FOR Innovator: Develop reusable rockets that reduce production costs, increase launch frequency, and expand market opportunities without compromising safety, revenue growth, or long-term profitability.
WHY is the objective possible but difficult? <i>Key Assumption to Validate: It is possible to develop reusable rockets that can land safely, reduce costs, increase launch frequency, and make space exploration more accessible without compromising safety.</i> Yes-But #1.1: Concerns about potential damage to rockets during re-entry and landing Yes-But #2.1: Impact of reusable rockets on suppliers and Manufacturers' businesses Yes-But #3.1: Adjusting to new regulations and safety standards for reusable rockets
HOW will the objective be achieved? <i>Selected Innovation Approach: Another Change</i> Develop a reusable rocket that can land + Develop heat-resistant materials and shielding, and implement precision landing technology for safety. + Collaborate with suppliers and manufacturers to adapt to new tech requirements and diversify product offerings. + Work with space agencies to develop guidelines, ensure compliance, and provide transparent data on safety and reliability.



Field Testing the ProConCloud Method

5 DAY WhyAreTheyNotBuying **CHALLENGE**

**Are you puzzled by WHY your customers are not buying,
or not buying more of your amazing product or service?**

Do you want to discover the **real reason** WHY they are not buying?
and

HOW you can improve your offer to make it irresistible?

Without

Spending a lot of time or money on surveys,
market research, or marketing consultants?



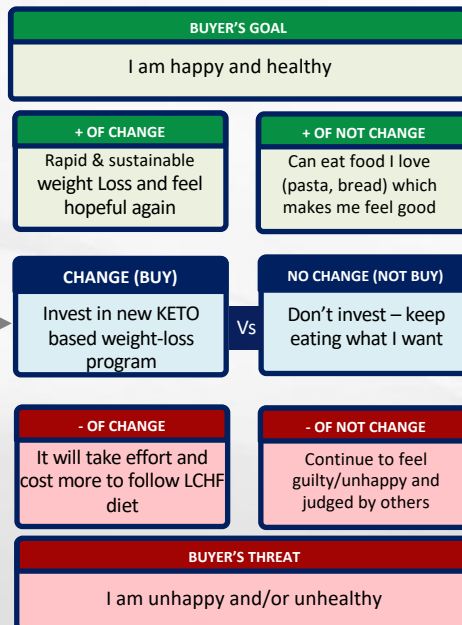
Why are they not buying my KETO Weigh-loss Program

Step 1 – Buyer's Problem And why its important

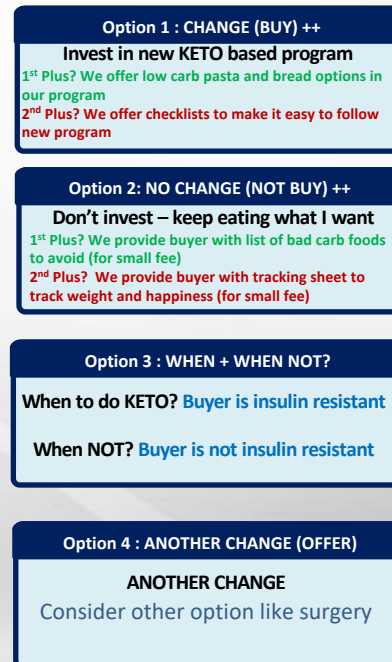


Imagine this is you...
Person diagnosed with early stage diabetes

Step 2 – Buyers Conflict And why its difficult to decide



Step 3 – Resolve Buyers Conflict With one of 4 new win:win options

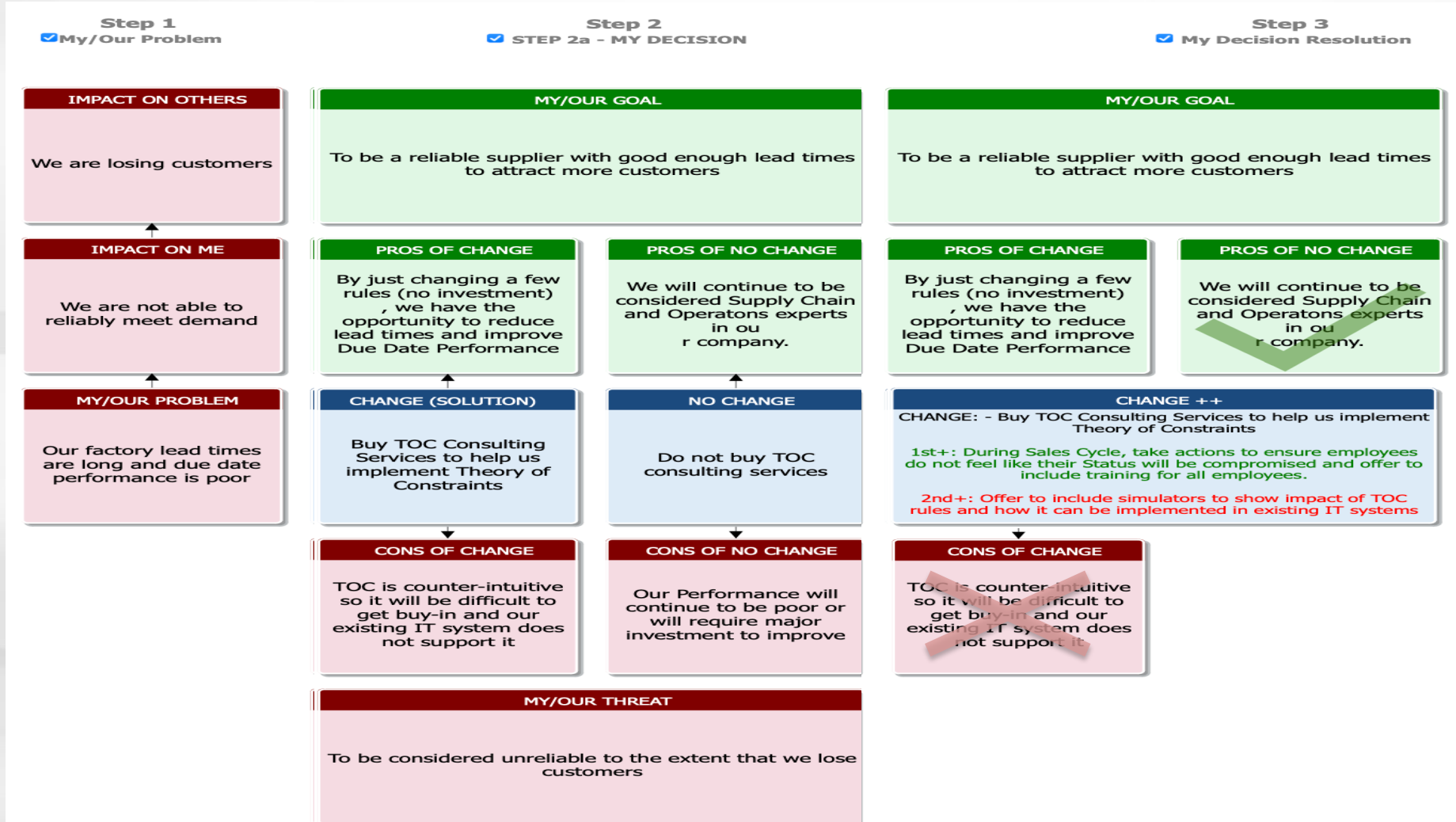


Step 4 – Overcoming YES-BUTs Identifying YES-ANDs to Offer





Why are they not buying our TOC Consulting Services?





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Part 3

Teaching ChatGPT the ProConCloud Approach

Dr. Alan Barnard



This was the prompt to GPT-4

Can you please do your best to answer these questions the example above?

Step 1. GAP AND PROBLEM

What problem is it solving and why is it important?

What is the current performance, what is the potential performance, and what are the problems that are preventing the current performance to achieve the potential performance?

Step 2. CONFLICT AND NEED

What is the proposed solution to deal with the BIGGEST problem that is preventing the current performance to achieve the potential performance, and what are the pros and cons of that proposed solution? What is a Competing option that also has the potential to deal with the BIGGEST problem that is preventing the current performance to achieve the potential performance, and what are the pros and cons of the Competing option?

Step 3. WIN:WIN INNOVATION

What was added or removed from the proposed solution that made it, so it got all the pros (of both the proposed solution AND the competing option) and a few (or no) of the cons of both options? What was the breakthrough that made it so there was no major tradeoff?

Step 4. STAKEHOLDER YES-BUTS AND YES-ANDS TO ENHANCE INNOVATION

What were the concerns that other stakeholders had that limited adoption, purchases, or ongoing usage? Please write it, so their concern starts with "Yes but..." and the way the solution dealt with that concern, please start that with "Yes and..."

Step 5. MINIMALLY VIABLE EXPERIMENT

Please summarize all answers by answering these questions.

A. WHY is a change needed now? (From Step 1, the Problem and the quantified GAP that justifies a change)

B. WHAT is the objective of the change? (From Step 2, the Need is to get ALL the PROS without any (major) CONS...)

C. WHY is the objective possible but difficult? (From Step 3 and 4,

The key assumption(s) that was challenged and the key YES-BUTS that had to be)

D. HOW will the objective be achieved? From Steps 3 and 4, The selected innovative win:win Approach to: a) satisfy the full NEED and b) overcome all key YES-BUTS (the YES-ANDS)



This was the GTP-4 Response:

I will use the Swarm Robotics innovation as an example to answer the questions based on the given steps.

Step 1. Gap & Problem

Swarm Robotics solves the problem of coordinating and controlling large groups of robots to accomplish complex tasks. The current performance of individual robots is limited by their ability to collaborate and communicate effectively. In contrast, the potential performance with swarm robotics allows for improved efficiency, adaptability, and resilience in manufacturing and assembly line environments. The main problem preventing current performance from achieving potential performance is the lack of effective coordination algorithms and technologies for large-scale robot deployments.

Step 2. Conflict & Need

2. The proposed solution is to develop and implement advanced swarm algorithms and communication systems to enable robots to work together autonomously and efficiently. Pros include increased efficiency, adaptability, and resilience. Cons may include complexity in implementation and potential difficulties in managing the swarm. A competing option could be a centralized control system that manages the entire robot fleet. Pros of this option include better predictability and ease of management, while cons include a single point of failure and less adaptability to dynamic environments.

Step 3. Win:Win resolution

3. The breakthrough in swarm robotics comes from the combination of decentralized control and sophisticated communication methods, which allows robots to exhibit both autonomous behavior and global coordination. By incorporating elements from both the proposed solution and the competing option, swarm robotics achieves the pros of increased efficiency, adaptability, and resilience without the major cons of complexity in implementation and management difficulties.

Step 4. Yes-But & Yes-And

4. Concern: "Yes, but what if the robots become too difficult to manage and control?"

Solution: "Yes, and that's why swarm robotics incorporates self-organizing algorithms and monitoring tools to enable efficient management and control of the swarm while maintaining adaptability."

Step 5. Minimally Viable Experiment

A. The change is needed now because current robotic systems lack the efficiency, adaptability, and resilience required for large-scale robot deployments in manufacturing and assembly line environments.

B. The objective of the change is to enable large groups of robots to work together effectively and autonomously, achieving all the pros without any major cons.

C. The objective is possible but difficult because it requires challenging traditional assumptions about robot control and overcoming concerns about manageability and control in a swarm robotics system.

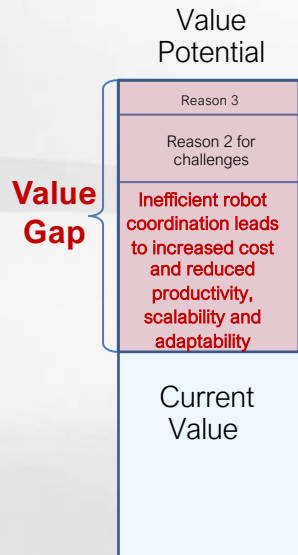
D. The objective will be achieved by developing and implementing advanced swarm algorithms and communication systems, combined with decentralized control and sophisticated monitoring tools to address manageability and control concerns.



PROCONCLOUD CASE STUDY: SWARM ROBOTICS

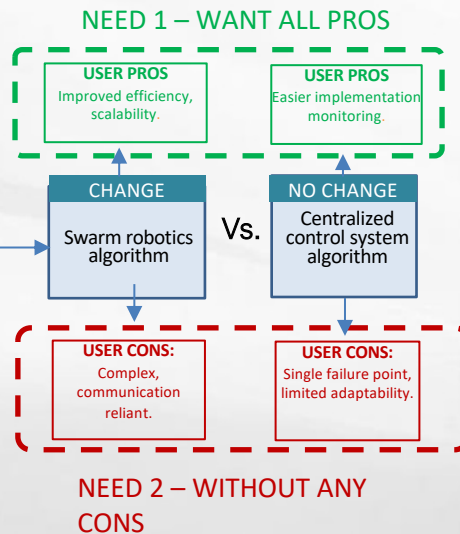
Step 1

GAP & PROBLEM



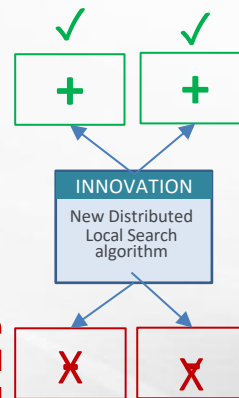
Step 2

CONFLICT & NEED



Step 3

WIN:WIN APPROACH



Step 4

YES-BUT PLANNING

Stakeholder 1: Retailer
YES-BUT#1.1: swarm robotics might be difficult to implement and maintain.
YES-AND#1.1: start with smaller-scale implementations and gradually scale up as they gain experience and
Stakeholder 2: User
YES-BUT#2.1: issues with communication and connectivity
YES-AND#2.1: mesh networks can help ensure reliable communication between robots in the swarm
Stakeholder 2: User
YES-BUT#2.2: the initial costs might be high.
YES-AND#2.2: the long-term benefits of increased efficiency, adaptability, and fault tolerance can offset the initial investment.

Step 5

MINIMALLY VIABLE EXPERIMENT

WHY is a change needed now?:

Current methods for managing multiple robots in industries like manufacturing and logistics lack coordination, adaptability, and scalability, limiting efficiency and increasing operational costs.

WHAT is the objective of the change?

FOR USER: Enhanced efficiency, reduced operational costs, and improved reliability in managing multiple robots working together.

FOR MAKER: Develop swarm robotics systems that offer decentralized control, better adaptability, and scalability without compromising performance or increasing complexity.

WHY is the objective possible but difficult?

Key Assumption to Validate: Decentralized control can improve adaptability and scalability in robot management.

Yes-But 1: Swarm robotics might be too complex to implement and maintain.

Yes-But 2: Communication between robots could become an issue.

Yes-But 3: Initial setup costs may be high for some companies.

HOW will the objective be achieved?

Selected Innovation Approach: Another Change
Develop swarm robotics systems with standardized communication protocols and robust algorithms to simplify implementation and maintenance.

+ Offer modular solutions that can be easily integrated with existing systems.

+ Develop methods to handle communication challenges and ensure seamless operation.

+ Provide cost-effective solutions to minimize initial setup costs for various businesses.

Interesting Note:

The above analysis was done by GPT-4 in response to request to apply ProConCloud method to Swarm Robotics innovation. See PREVIOUS pages



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Part 4

Final Thoughts And

Q&A



- An innovation process creates VALUE for all stakeholders
- Innovations resolves conflicts or contradictions (should not require sacrifices)
- The Innovation Process should be SIMPLE (few steps and specific sequence to complete the steps)
- The SIMPLER it is, the easier for Humans to learn and apply.
- That is also true for AI like ChatGPT – it can learn HOW to follow an innovation process to invent NEW solutions
- You need to create fast feedback cycles to allow the human teams and AI to get better and better
- The most valuable feedback is the YES-BUTS from your dream customers. Their “No” decision is your biggest competitor
- We would love to get YOUR feedback testing out NABC and ProConCloud



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Presenter Bios



Dr. Curtis Carlson

Professor of Practice,
Northeastern University

Distinguished Executive in
Residence, WPI

CEO, SRI International 1998-2014



Dr. Curt Carlson, an acclaimed innovator and thought leader, transformed SRI International as its CEO and played a key role in creating innovations like HDTV, Intuitive Surgical, and Siri. His teams have earned two Technology & Engineering Emmy Awards, and he has contributed to over twenty-five start-ups. Currently, a professor at WPI and Northeastern Universities, Carlson teaches value creation and innovation, while his company, Practice of Innovation, assist organizations in enhancing their innovative performance.

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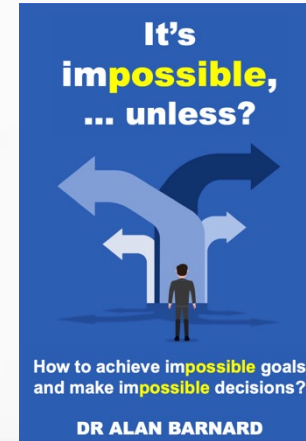
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Dr. Alan Barnard

CEO, Goldratt Research Labs

Chairman, Odyssey Institute

Forbes Technology Council Member



Dr. Alan Barnard is an entrepreneur, strategy advisor, research scientist, app developer, author, coach, philanthropist, lecturer, podcaster, and lifelong learner. Alan is considered one of the world's leading Decision Scientists and Theory of Constraints experts. Alan is the CEO of Goldratt Research Labs, which he co-founded with Dr. Eli Goldratt, author of THE GOAL and creator of Theory of Constraints. In 2006, Dr Barnard received the TOCICO Lifetime Achievement Award

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