Perception Mapping and Contradiction Resolution of Voice of the Customer (VOC)

Problem Solving Custom Methodology Case Study

David Conley

Innomation Corp

2010

This information may not be reproduced without the written consent of Innomation Corp

Agenda

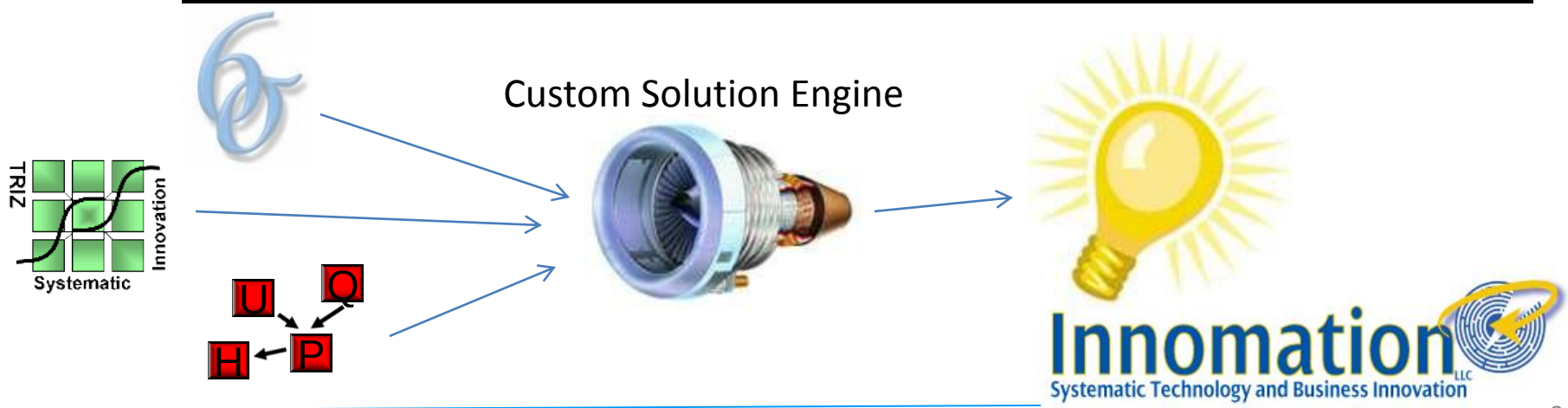
- **Custom Solution Engine**
- Case Study Client and Project
- Solution Engine Process Map
- What is Voice of the Customer?
- What is Perception Mapping?
- What is TRIZ?
- What is Contradiction Modeling?
- How to Develop a Perception Map from VOC
- Scoring the Map
- Contradiction Analysis
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

Custom Solution Engine

- Components from 3 disparate methodologies are merged to create a custom solution engine.

Customer Solution Engine Profile		
Component	**Solution Methodology**	**Methodology Category**
Voice of the Customer	6 Sigma	Administrative/Quantitative
Perception Mapping	Flowscape	Administrative/Qualitative
Contradiction Analysis	Theory of Inventive Problem Solving	Science/Qualitative
40 Principles	Theory of Inventive Problem Solving	Science/Quantitative



This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- **Case Study Client and Project**
- Solution Engine Process Map
- What is Voice of the Customer?
- What is Perception Mapping?
- What is TRIZ?
- What is Contradiction Modeling?
- How to Develop a Perception Map from VOC
- Scoring the Map
- Contradiction Analysis
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

Case Study Client

- Presbyterian Healthcare Services (PHS) is a not-for-profit system of hospitals, a health plan and a growing medical group. For more than 100 years, Presbyterian has been committed to a single purpose -- improving the health of individuals, families and communities throughout New Mexico.
    - 7 Hospitals throughout New Mexico
    - Largest provider of health care services in New Mexico
    - 1,200,000 patient visits per year
    - Employees more than 490 Physicians and Practitioners

This information may not be reproduced without the written consent of Innomation Corp

Case Study Project

- **Problem Statement:** PHS needs to Increase utilization of available operating room hours

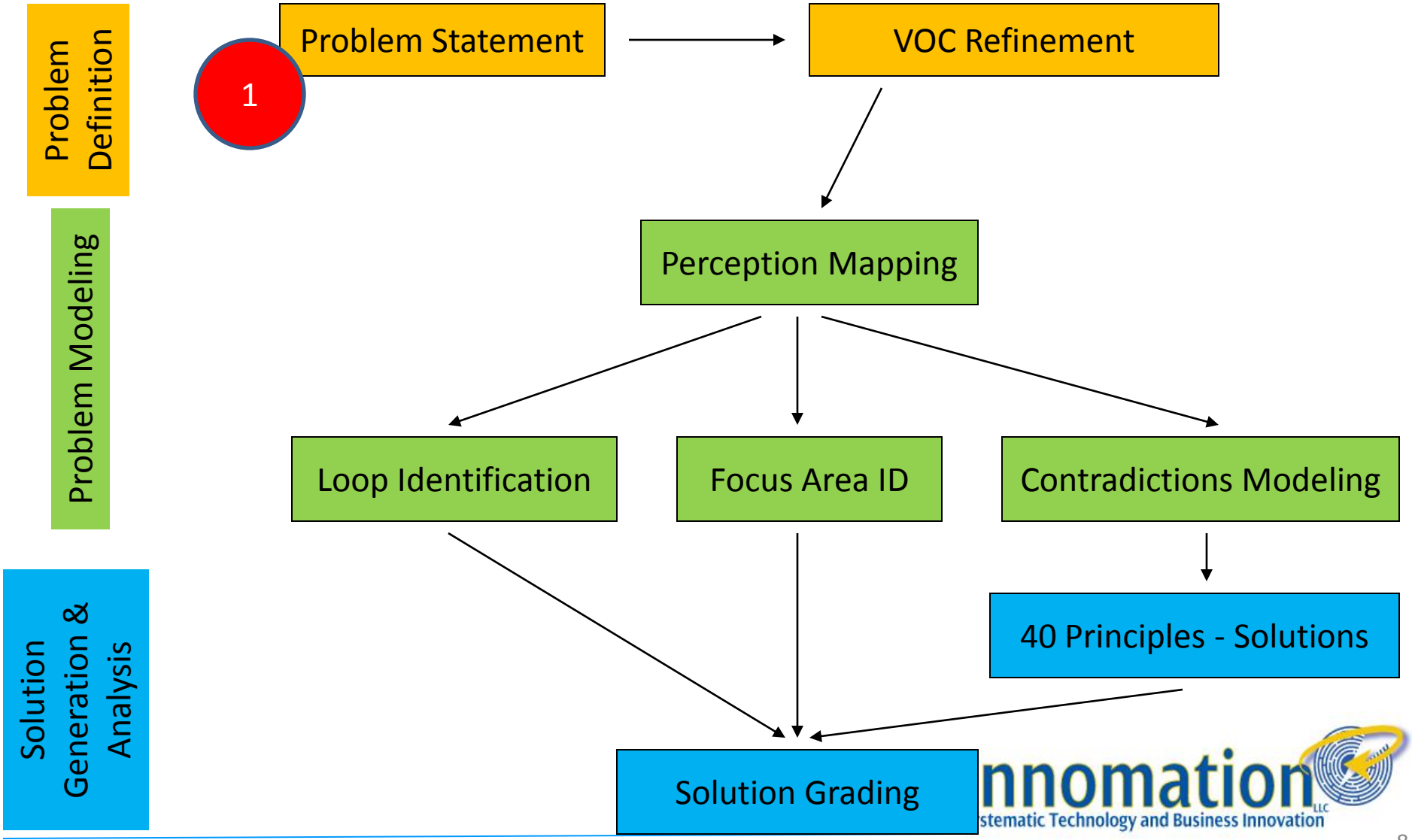
This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- Case Study Client and Project
- **Solution Engine Process Map**
- What is Voice of the Customer?
- What is Perception Mapping?
- What is TRIZ?
- What is Contradiction Modeling?
- How to Develop a Perception Map from VOC
- Scoring the Map
- Contradiction Analysis
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

1

- **Problem Statement:** PHS needs to Increase utilization of available operating room hours

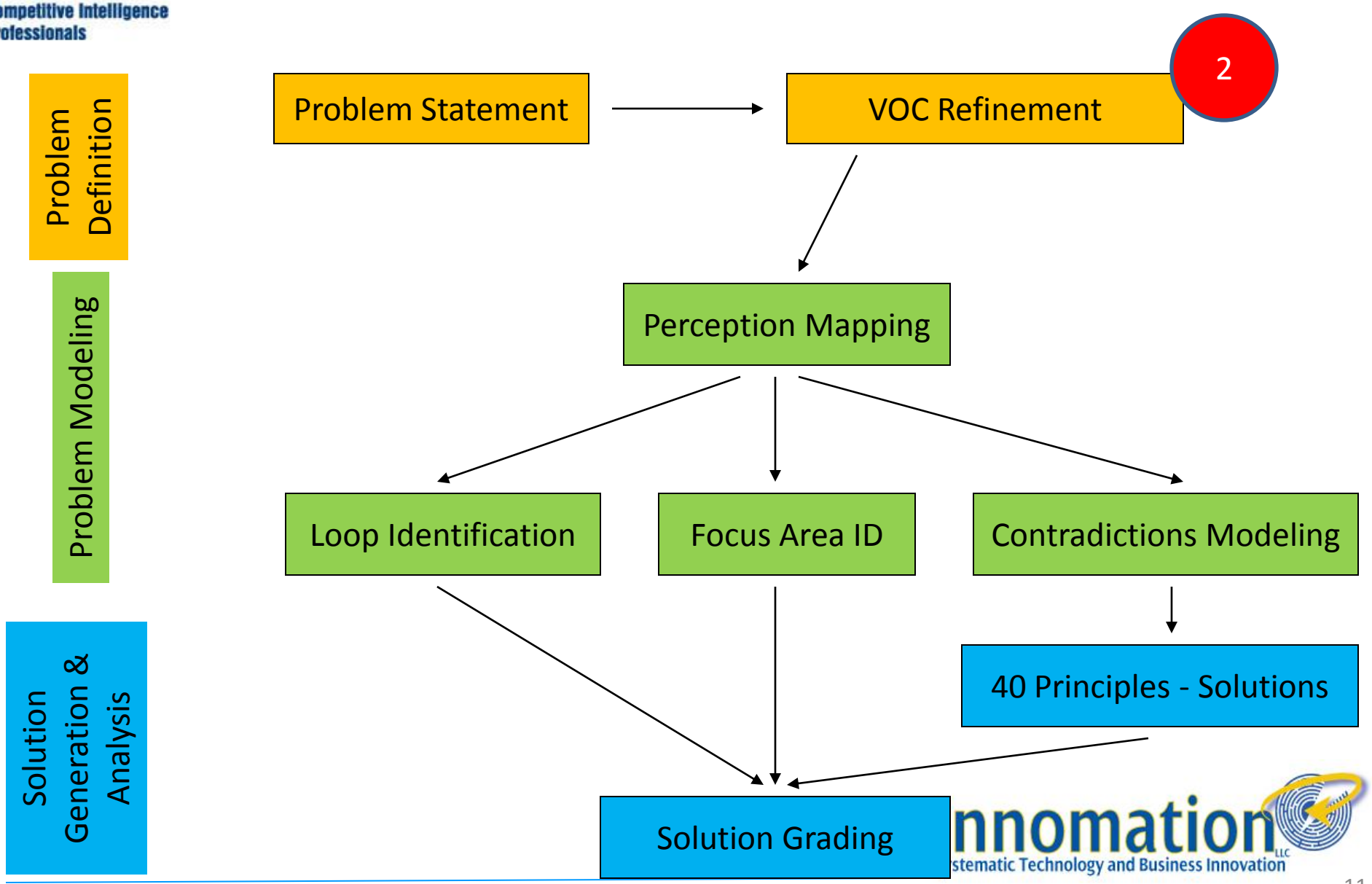
This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- Case Study Client and Project
- Solution Engine Process Map
- **What is Voice of the Customer?**
- What is Perception Mapping?
- What is TRIZ?
- What is Contradiction Modeling?
- How to Develop a Perception Map from VOC
- Scoring the Map
- Contradiction Analysis
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

Voice of the Customer (VOC)

2

- **Voice of the customer** (VOC) is a term used in business and Information Technology to describe the process of capturing a customer's requirements. In this case study the VOC was in association with a 6 Sigma analysis.

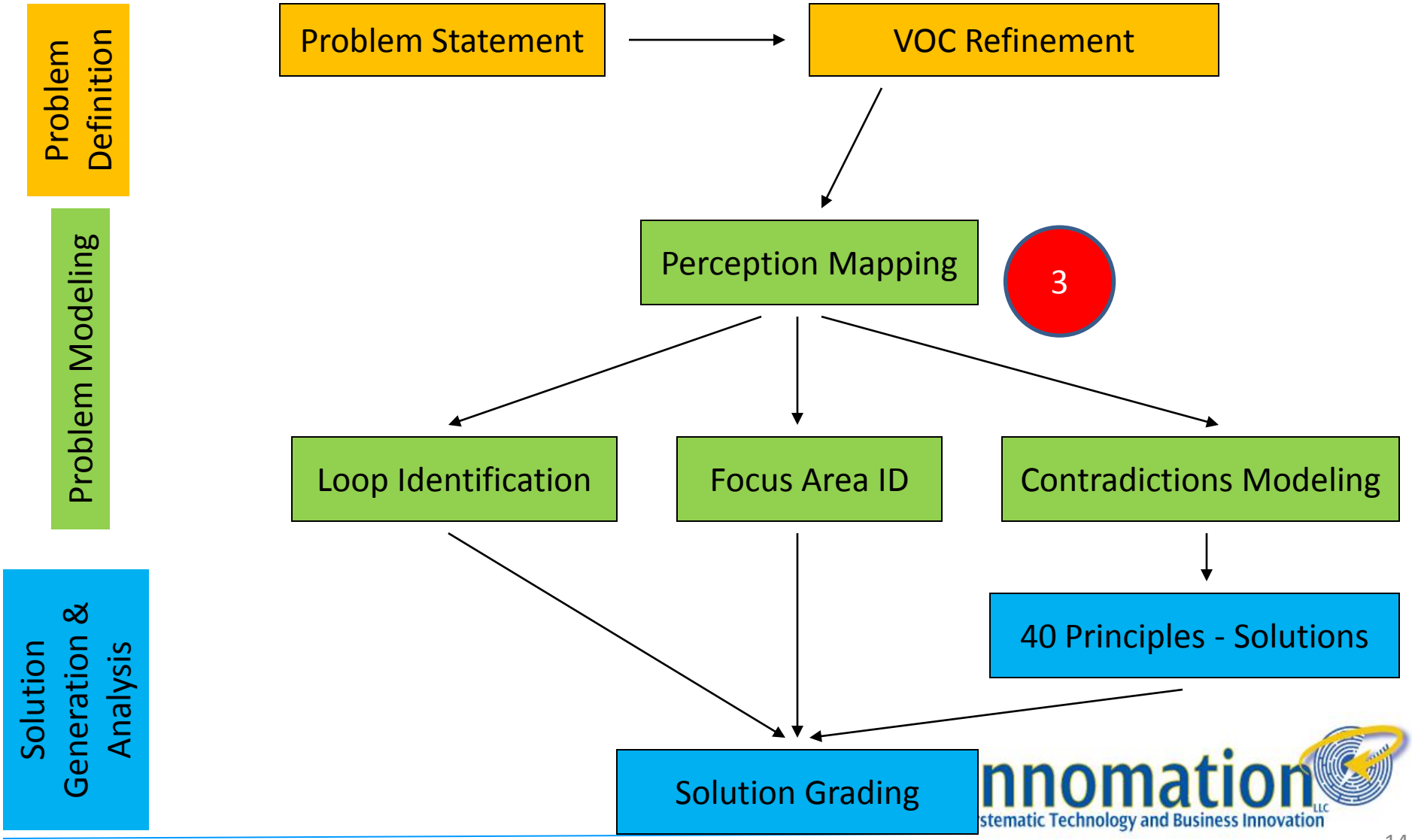
This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- Case Study Client and Project
- Solution Engine Process Map
- What is Voice of the Customer?
- **What is Perception Mapping?**
- What is TRIZ?
- What is Contradiction Modeling?
- How to Develop a Perception Map from VOC
- Scoring the Map
- Contradiction Analysis
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

- Graphical Representation of Perception Interrelationships
  - a refinement by Darrel Mann of flowscape methodology defined in DeBono's Water Logic, Viking 1993
- Used when manifold perceptions about a situation or problem exist within various inter-related teams:
  - Customers, Management, Finance, Automation, etc.
- Focuses the problem analysis on:
  - Most unifying perceptions in the set
  - Perceptions that conflict with each other
  - Perceptions that create logical loops (positive or negative)
- Perceptions can be gathered directly by survey or distilled from 6 Sigma Voice of the Customer (VOC) and/or Critical to Quality (CTQ) summaries

3

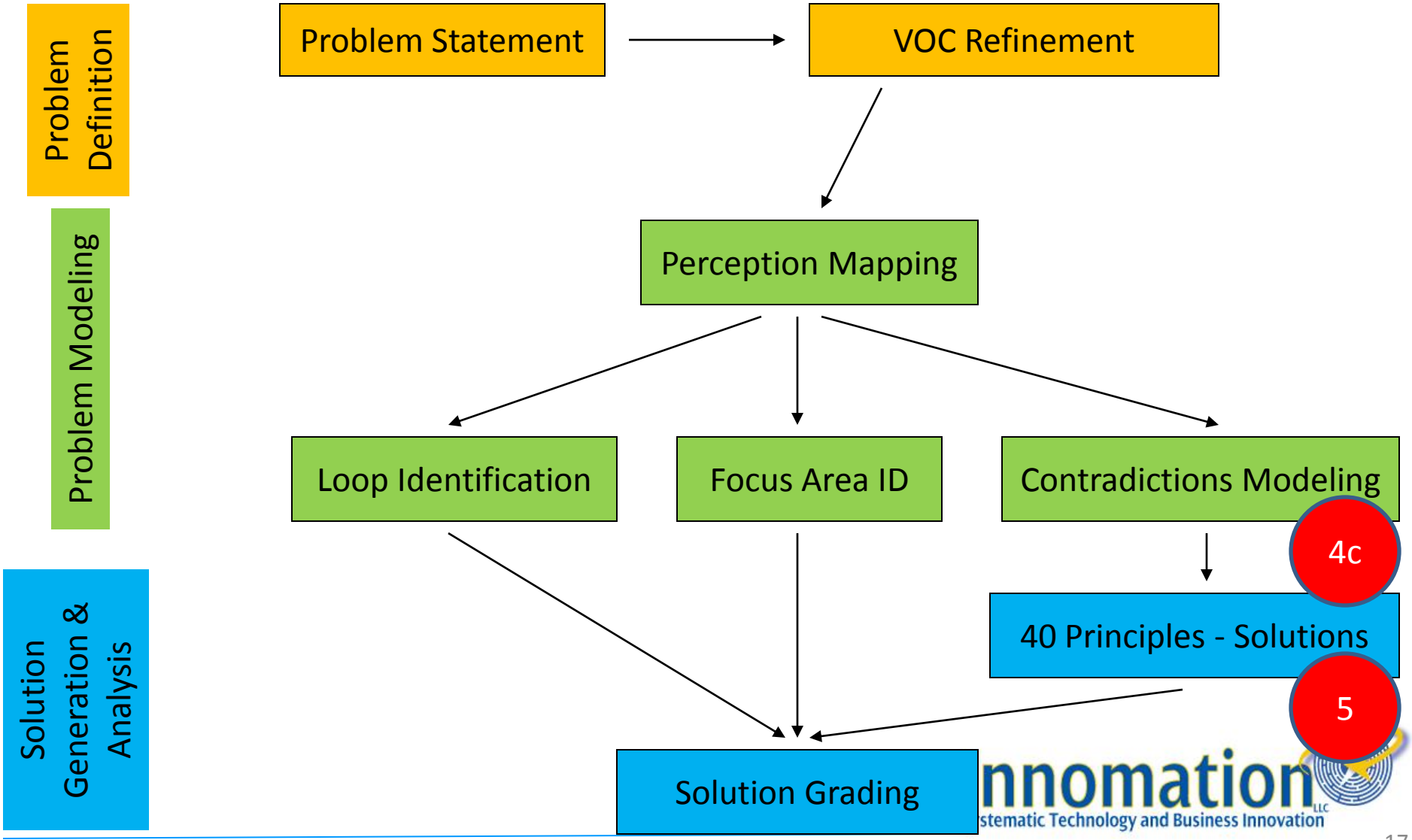
This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- Case Study Client and Project
- Solution Engine Process Map
- What is Voice of the Customer?
- What is Perception Mapping?
- **What is TRIZ?**
- What is Contradiction Modeling?
- How to Develop a Perception Map from VOC
- Scoring the Map
- Contradiction Analysis
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

What is TRIZ?

- Science of Inventive Problem Solving
- Developed by Genrich Altshuller (Soviet engineer working in the naval patent Office) beginning in 1946
- Based on the analysis of over 3 million patents
  - Inventing is based on understanding and resolving contradictions
  - Every method used to solve contradictions can be summarized into a set of Inventive Principles

4c

5

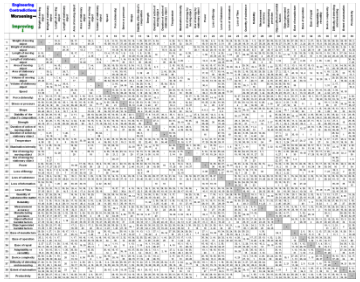
This information may not be reproduced without the written consent of Innomation Corp

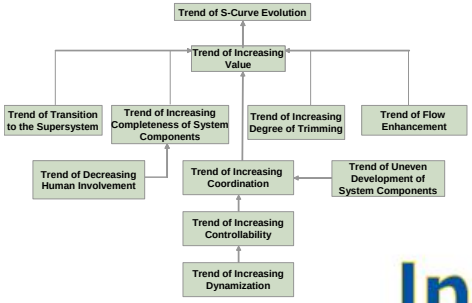
What is TRIZ?

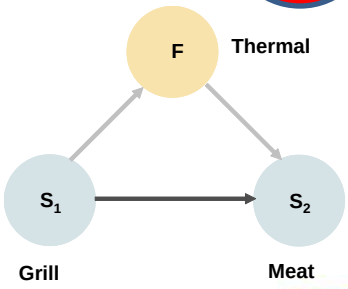
- 1975 - Altshuller's R&D had resulted in all of the major components of Classical TRIZ being conceptualized or developed.
  - Created & validated through patent analysis:
    - 40 Inventive Principles
    - Engineering Contradiction Matrix
    - Trends of Engineering System Evolution
    - Substance-Fields and Standard Inventive Solutions

4c

5







Innomation LLC
Systematic Technology and Business Innovation

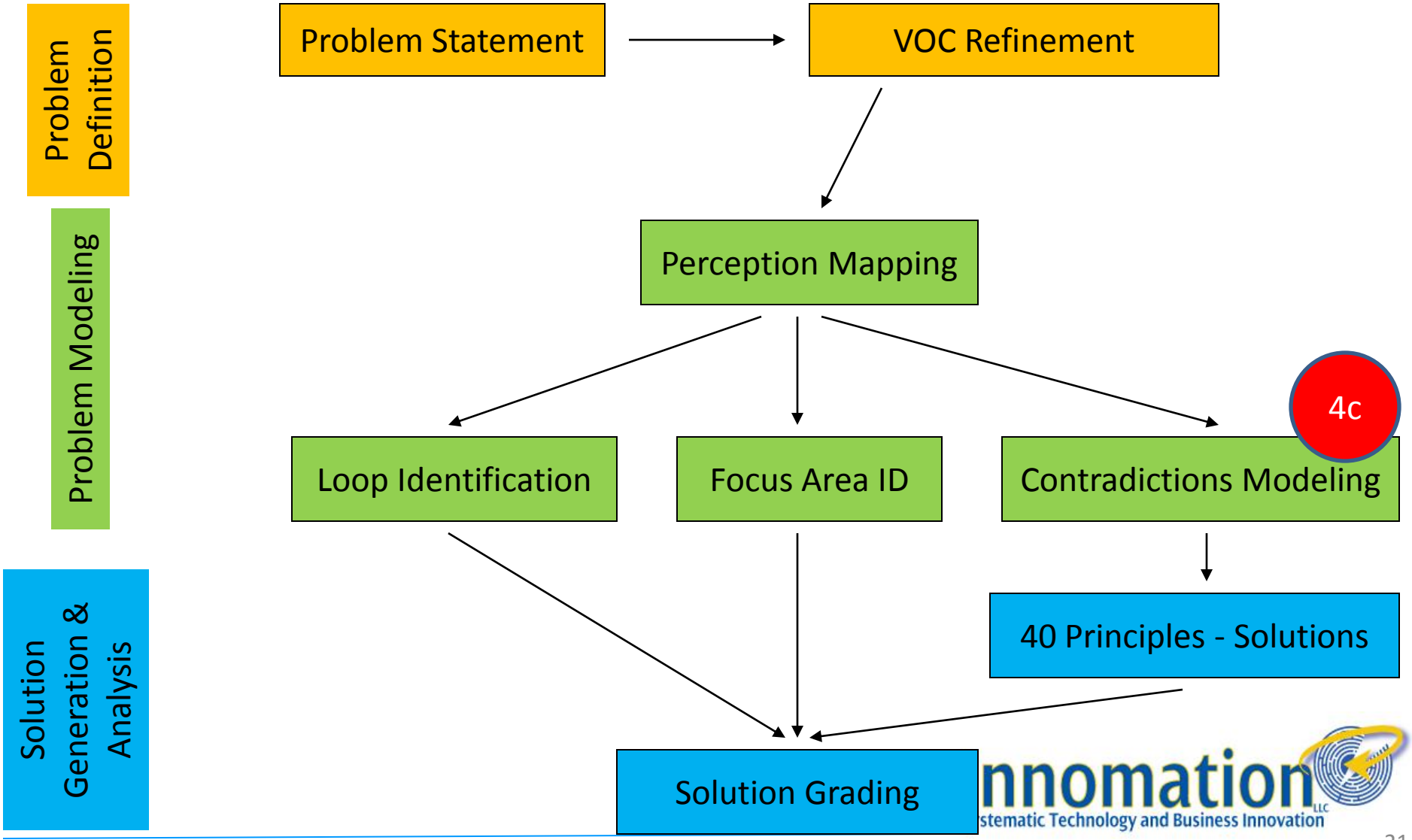
This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- Case Study Client and Project
- Solution Engine Process Map
- What is Voice of the Customer?
- What is Perception Mapping?
- What is TRIZ?
- **What is Contradiction Modeling?**
- How to Develop a Perception Map from VOC
- Scoring the Map
- Contradiction Analysis
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

Contradiction Modeling

- Rudimentary to the Theory of Inventive Problem Solving
- Almost all programs, projects, or efforts are put in motion to address a contradiction
- Contradictions are situations where existing conditions make a desired result difficult or impossible
- Once a contradiction is accurately understood it is fairly easy to find ways to resolve it
- Example:
  - "If I grant surgeons dedicates blocks of time in the OR then they are guaranteed access but overall utilization of the OR can be lower than desired."
    - Contradiction Refinement
      - Facility availability to specific customers versus overall facility utilization

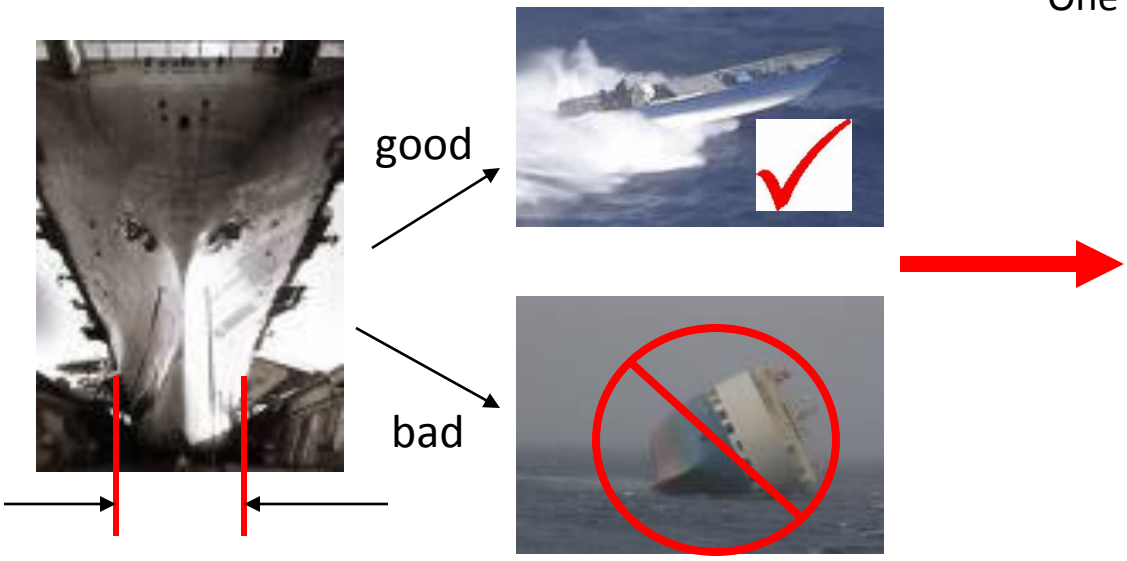
4c

This information may not be reproduced without the written consent of Innomation Corp

Contradiction Modeling

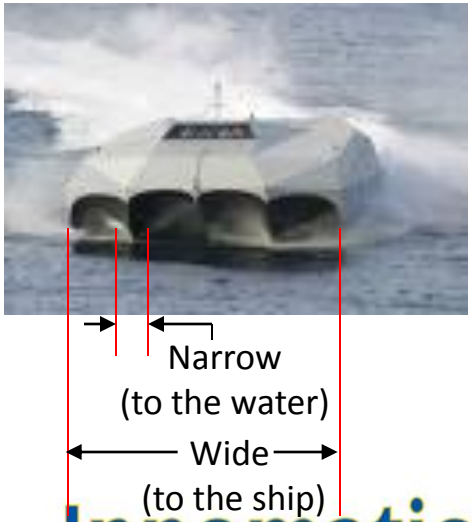
- Both Technology and Business problems are resolved when their underlying contradictions are addressed.

Technological Contradiction – A narrow hulled ship is fast but is also unstable



One solution – narrow and wide hull

4c



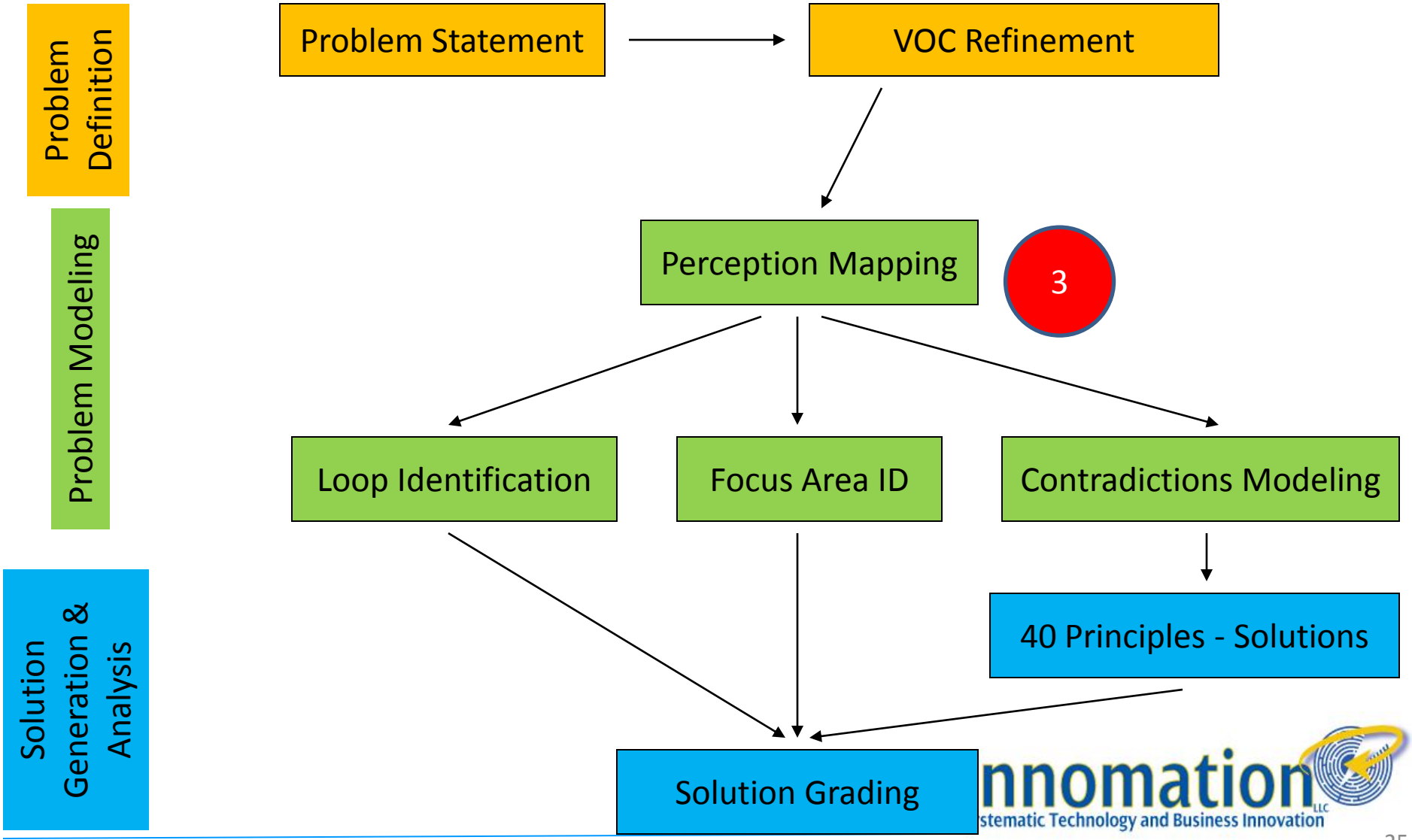
This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- Case Study Client and Project
- Solution Engine Process Map
- What is Voice of the Customer?
- What is Perception Mapping?
- What is TRIZ?
- What is Contradiction Modeling?
- **How to Develop a Perception Map from VOC**
- Scoring the Map
- Contradiction Analysis
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

1. Distil VOC statements to a set of independent concepts
   - Good
     - I need scheduled access to the OR when needed
     - I need my start times in the OR to be predictable

Independent Concepts

   - Bad
     - I need scheduled access to the OR when needed
     - I need to be able to know when I will be utilizing the OR so I can plan my clinic schedule

Related Concepts – represent same need

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

2. List Independent Concepts and Label with an Alpha Character

OR Scheduling Perception Mapping (PM)	
Alpha Identifier	Perceptions
A	Dedicated rooms help patient access for on-call issues
B	Dedicated rooms have a negative impact on utilization
C	Schedulers are critical to the current process
D	Block scheduling reduces communication requirements
E	Communication boards improve information access and flow
F	It is important to have flexibility
G	meeting planned times is important to planning process
H	quality and quantity of staff and equip impacts schedule performance
I	load leveling & sequencing and case matching helps with resource planning
J	need access outside block time
K	Multiple scheduling access methods would be helpful
L	Scheduling rules need to be applied consistently
M	Drs should want to bring patients to the OR
N	Surgeons and anesthesiologists need to accept 24/7
O	Surgeon preference overrides patient preference
P	TOT needs to be 30 minutes or less
Q	Flip rooms are convenient for surgeons
R	Shift change can effect TOT efficiency
S	Anesthesiology variability is an issue
T	Universal rooms would help utilization
U	Layout improvements would help utilization

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

3. For each VOC Statement (Perception) ask "what other perception on the list does this perception lead to most?"
   - Each perception can lead to one, and only one, other perception
   - A perception can have multiple perceptions that lead to it

   - Example:

   B – Rooms dedicated to specific usage models (i.e., brain surgery) have a negative impact on utilization
     - MOSTLY LEADS TO

   T – Rooms outfitted for any and all procedures (i.e., universal rooms) would help utilization

4. Document those relationships

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

5. Record “leads to” relationships between the perceptions

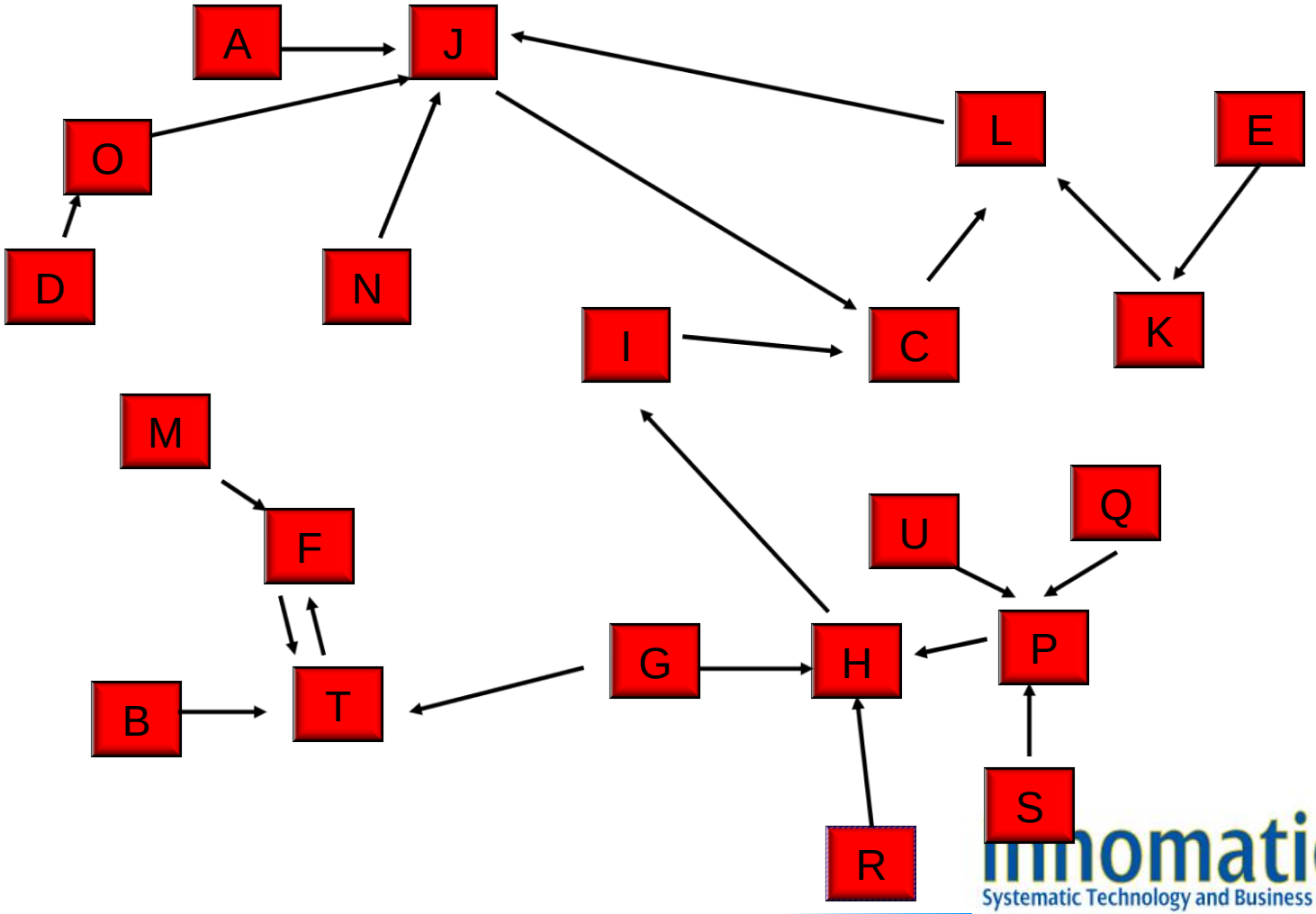
OR Scheduling Perception Mapping (PM)		
Alpha Identifier	Perceptions	leads to
A	Dedicated rooms help patient access for on-call issues	J
B	Dedicated rooms have a negative impact on utilization	T
C	Schedulers are critical to the current process	L
D	Block scheduling reduces communication requirements	O
E	Communication boards improve information access and flow	K
F	It is important to have flexibility	T
G	meeting planned times is important to planning process	H
H	quality and quantity of staff and equip impacts schedule performance	I
I	load leveling & sequencing and case matching helps with resource planning	C
J	need access outside block time	C
K	Multiple scheduling access methods would be helpful	L
L	Scheduling rules need to be applied consistently	J
M	Drs should want to bring patients to the OR	F
N	Surgeons and anesthesiologists need to accept 24/7	J
O	Surgeon preference overrides patient preference	J
P	TOT needs to be 30 minutes or less	H
Q	Flip rooms are convenient for surgeons	P
R	Shift change can effect TOT efficiency	H
S	Anesthesiology variability is an issue	P
T	Universal rooms would help utilization	F
U	Layout improvements would help utilization	P

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

6. Draw a graphical representation of the relationships



This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

7. For each VOC Statement (Perception) ask "are there other perceptions on this list that conflict with this one?"

– Example:

D – Block scheduling reduces communication requirements

- CONFLICTS WITH

J – Need access outside of block time

8. Capture those relationships – if any

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

9. Indicate Conflicting Perceptions

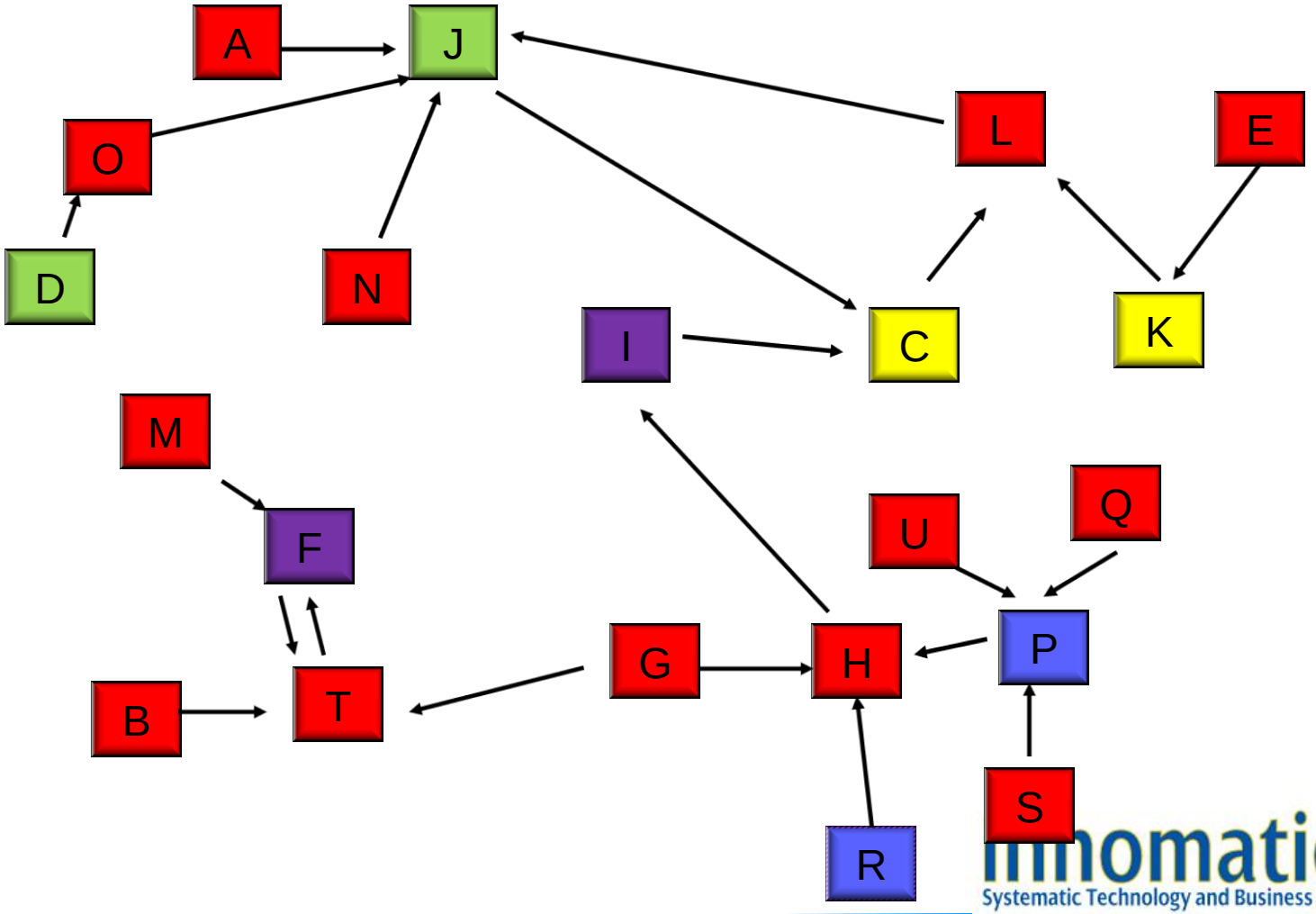
OR Scheduling Perception Mapping (PM)			
Alpha Identifier	Perceptions	leads to	conflicts with
A	Dedicated rooms help patient access for on-call issues	J	
B	Dedicated rooms have a negative impact on utilization	T	
C	Schedulers are critical to the current process	L	K
D	Block scheduling reduces communication requirements	O	J
E	Communication boards improve information access and flow	K	
F	It is important to have flexibility	T	I
G	meeting planned times is important to planning process	H	
H	quality and quantity of staff and equip impacts schedule performance	I	
I	load leveling & sequencing and case matching helps with resource planning	C	
J	need access outside block time	C	
K	Multiple scheduling access methods would be helpful	L	
L	Scheduling rules need to be applied consistently	J	
M	Drs should want to bring patients to the OR	F	
N	Surgeons and anesthesiologists need to accept 24/7	J	
O	Surgeon preference overrides patient preference	J	
P	TOT needs to be 30 minutes or less	H	R
Q	Flip rooms are convenient for surgeons	P	
R	Shift change can effect TOT efficiency	H	
S	Anesthesiology variability is an issue	P	
T	Universal rooms would help utilization	F	
U	Layout improvements would help utilization	P	

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

10. Color Code Perception Graphics with Contradictory Pairs



This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- Case Study Client and Project
- Solution Engine Process Map
- What is Voice of the Customer?
- What is Perception Mapping?
- What is TRIZ?
- What is Contradiction Modeling?
- How to Develop a Perception Map from VOC
- **Scoring the Map**
- Contradiction Analysis
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

11. Score each Perception Based on its Map Location
    - If Perception is:
        - Part of a Loop – score 4 points
        - In a Conflict Chain – score 3 points
        - A collector of other Perceptions – score n-1 points (where n = # of Perceptions leading to that Perception)
    - For Example:
        - Perception J is in a Loop = 4 points
        - Perception J is in a Conflict Chain = 3 points
        - Perception J is a Collector = n-1 = 4-1 = 3 points
    - Total Points for J = 10

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

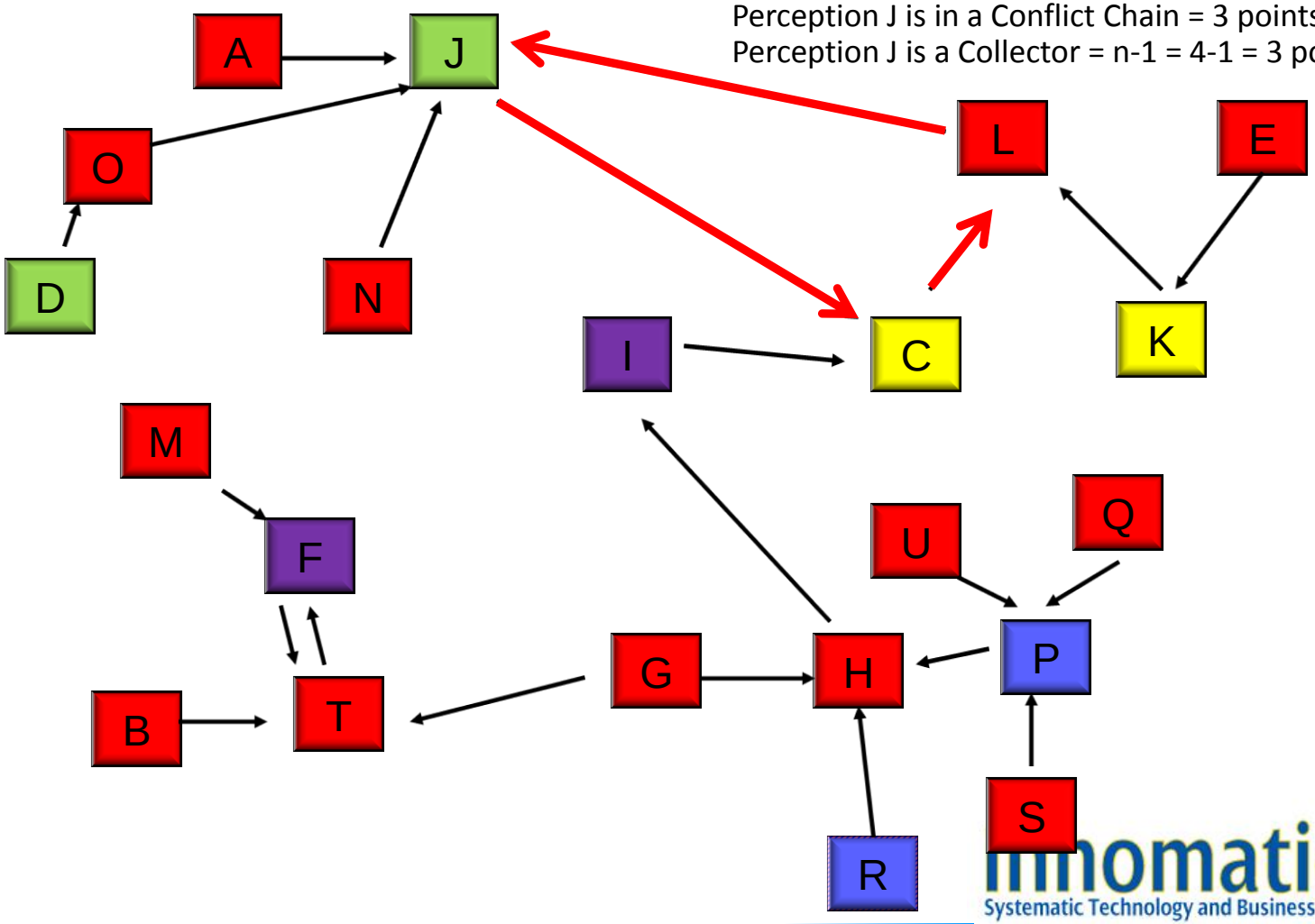
3

11. Score each Perception Based on its Map Location

Perception J is in a Loop = 4 points

Perception J is in a Conflict Chain = 3 points

Perception J is a Collector = n-1 = 4-1 = 3 points



This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

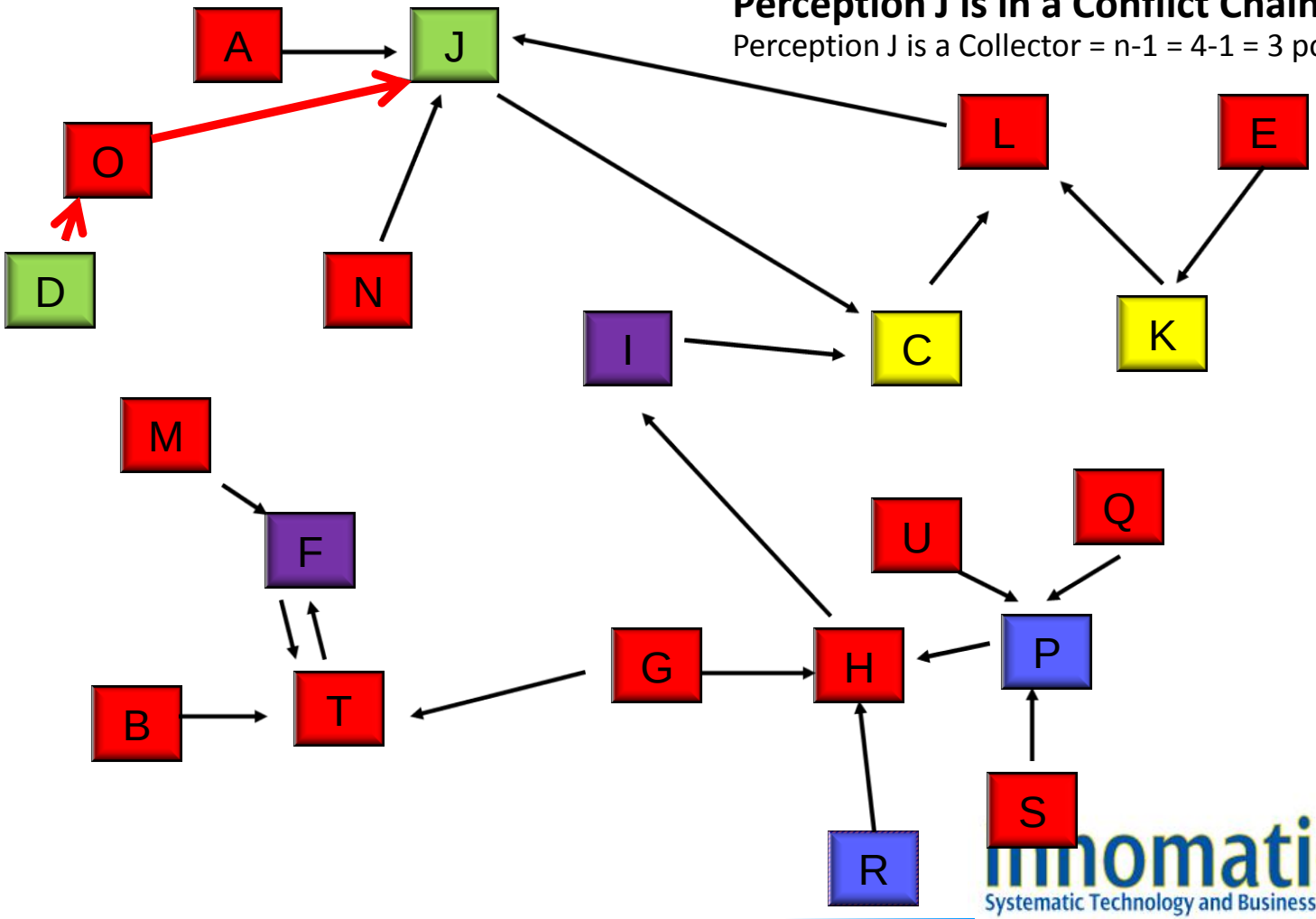
3

11. Score each Perception Based on its Map Location

Perception J is in a Loop = 4 points

Perception J is in a Conflict Chain = 3 points

Perception J is a Collector = n-1 = 4-1 = 3 points



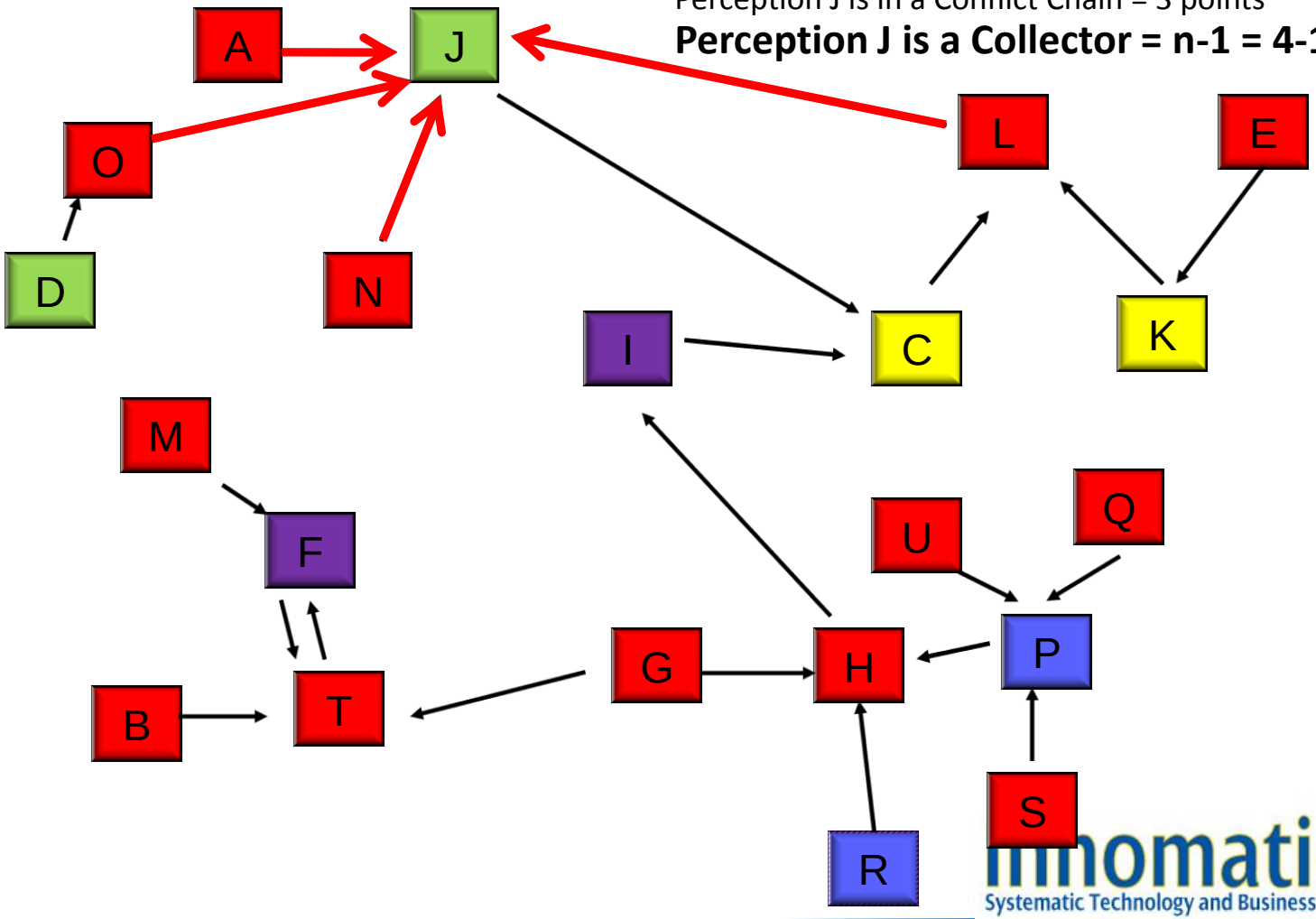
This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

11. Score each Perception Based on its Map Location

Perception J is in a Loop = 4 points
Perception J is in a Conflict Chain = 3 points
Perception J is a Collector = n-1 = 4-1 = 3 points



This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

12. Record all of the Perceptions Scores and Total

OR Scheduling Perception Mapping (PM)							
Alpha Identifier	Perceptions	leads to	conflicts with	loop (4 points)	conflict chain (3 points)	collector (n-1)	Total score
A	Dedicated rooms help patient access for on-call issues	J					0
B	Dedicated rooms have a negative impact on utilization	T					0
C	Schedulers are critical to the current process	L	K	4	3	1	8
D	Block scheduling reduces communication requirements	O	J		3		3
E	Communication boards improve information access and flow	K					0
F	It is important to have flexibility	T	I	4	3	1	8
G	meeting planned times is important to planning process	H			3		3
H	quality and quantity of staff and equip impacts schedule performance	I			6	2	8
I	load leveling & sequencing and case matching helps with resource planning	C			3		3
J	need access outside block time	C		4	3	3	10
K	Multiple scheduling access methods would be helpful	L			3		3
L	Scheduling rules need to be applied consistently	J		4	3	1	8
M	Drs should want to bring patients to the OR	F					0
N	Surgeons and anesthesiologists need to accept 24/7	J					0
O	Surgeon preference overrides patient preference	J			3		3
P	TOT needs to be 30 minutes or less	H	R		3	2	5
Q	Flip rooms are convenient for surgeons	P					0
R	Shift change can effect TOT efficiency	H			3		3
S	Anesthesiology variability is an issue	P					0
T	Universal rooms would help utilization	F		4	3	2	9
U	Layout improvements would help utilization	P					0

Systematic Technology and Business Innovation

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

13. Rank Order Perceptions from Largest to Smallest Total Score

OR Scheduling Perception Mapping (PM)							
Alpha Identifier	Perceptions	leads to	conflicts with	loop (4 points)	conflict chain (3 points)	collector (n-1)	Total score
J	need access outside block time	C		4	3	3	10
T	Universal rooms would help utilization	F		4	3	2	9
C	Schedulers are critical to the current process	L	K	4	3	1	8
F	It is important to have flexibility	T	I	4	3	1	8
H	quality and quantity of staff and equip impacts schedule performance	I			6	2	8
L	Scheduling rules need to be applied consistently	J		4	3	1	8
P	TOT needs to be 30 minutes or less	H	R		3	2	5
D	Block scheduling reduces communication requirements	O	J		3		3
G	meeting planned times is important to planning process	H			3		3
I	load leveling & sequencing and case matching helps with resource planning	C			3		3
K	Multiple scheduling access methods would be helpful	L			3		3
O	Surgeon preference overrides patient preference	J			3		3
R	Shift change can effect TOT efficiency	H			3		3
A	Dedicated rooms help patient access for on-call issues	J					0
B	Dedicated rooms have a negative impact on utilization	T					0
E	Communication boards improve information access and flow	K					0
M	Drs should want to bring patients to the OR	F					0
N	Surgeons and anesthesiologists need to accept 24/7	J					0
Q	Flip rooms are convenient for surgeons	P					0
S	Anesthesiology variability is an issue	P					0
U	Layout improvements would help utilization	P					0

This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping

3

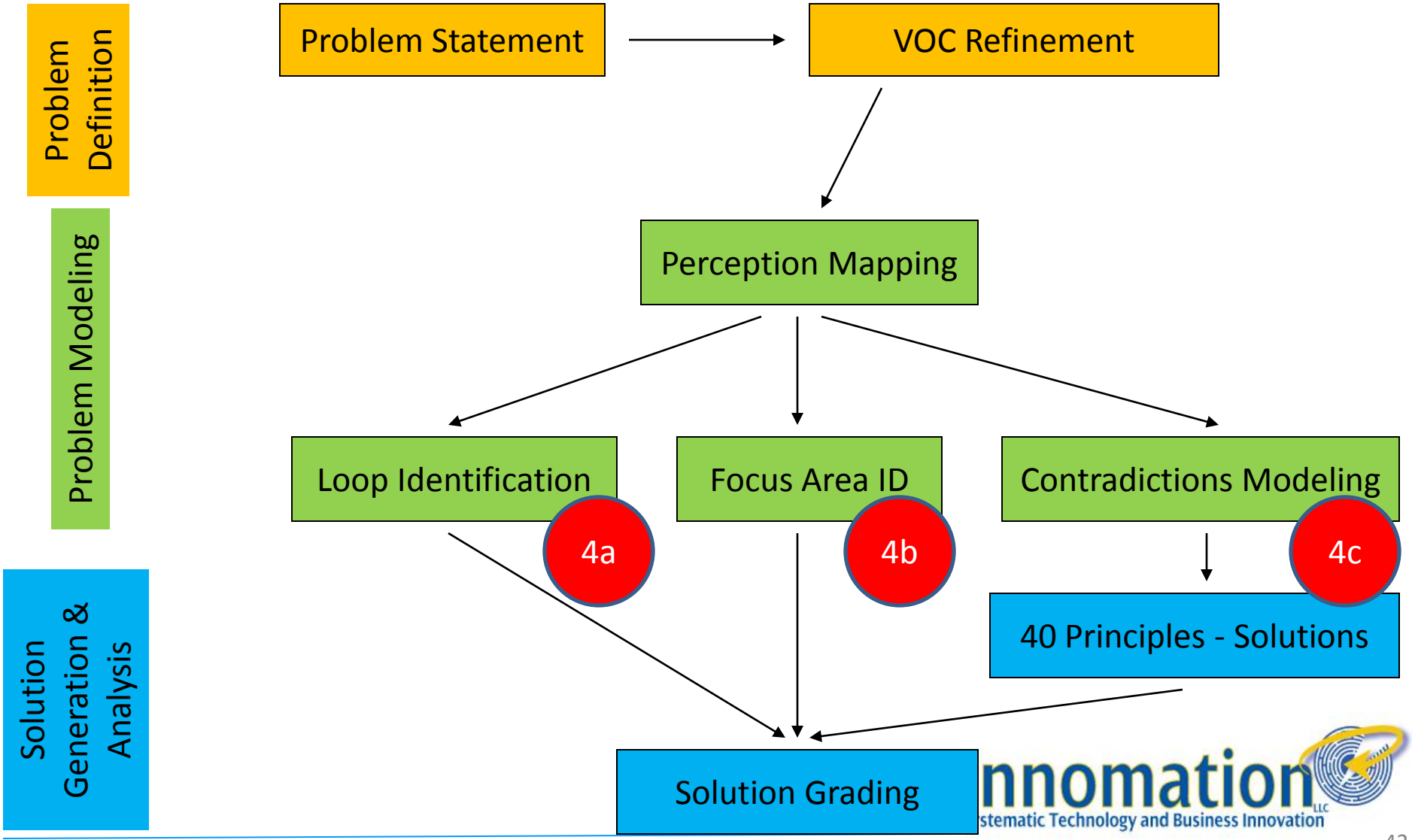
14. Highlight Most Important Perceptions to Address

OR Scheduling Perception Mapping (PM)							
Alpha Identifier	Perceptions	leads to	conflicts with	loop (4 points)	conflict chain (3 points)	collector (n-1)	Total score
J	need access outside block time	C	D	4	3	3	10
T	Universal rooms would help utilization	F		4	3	2	9
C	Schedulers are critical to the current process	L	K	4	3	1	8
F	It is important to have flexibility	T	I	4	3	1	8
H	quality and quantity of staff and equip impacts schedule performance	I			6	2	8
L	Scheduling rules need to be applied consistently	J		4	3	1	8
P	TOT needs to be 30 minutes or less	H	R		3	2	5
D	Block scheduling reduces communication requirements	O	J		3		3
G	meeting planned times is important to planning process	H			3		3
I	load leveling & sequencing and case matching helps with resource planning	C	F		3		3
K	Multiple scheduling access methods would be helpful	L	C		3		3
O	Surgeon preference overrides patient preference	J			3		3
R	Shift change can effect TOT efficiency	H	P		3		3
A	Dedicated rooms help patient access for on-call issues	J					0
B	Dedicated rooms have a negative impact on utilization	T					0
E	Communication boards improve information access and flow	K					0
M	Drs should want to bring patients to the OR	F					0
N	Surgeons and anesthesiologists need to accept 24/7	J					0
Q	Flip rooms are convenient for surgeons	P					0
S	Anesthesiology variability is an issue	P					0
U	Layout improvements would help utilization	P					0

Innomation LLC
Systematic Technology and Business Innovation

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



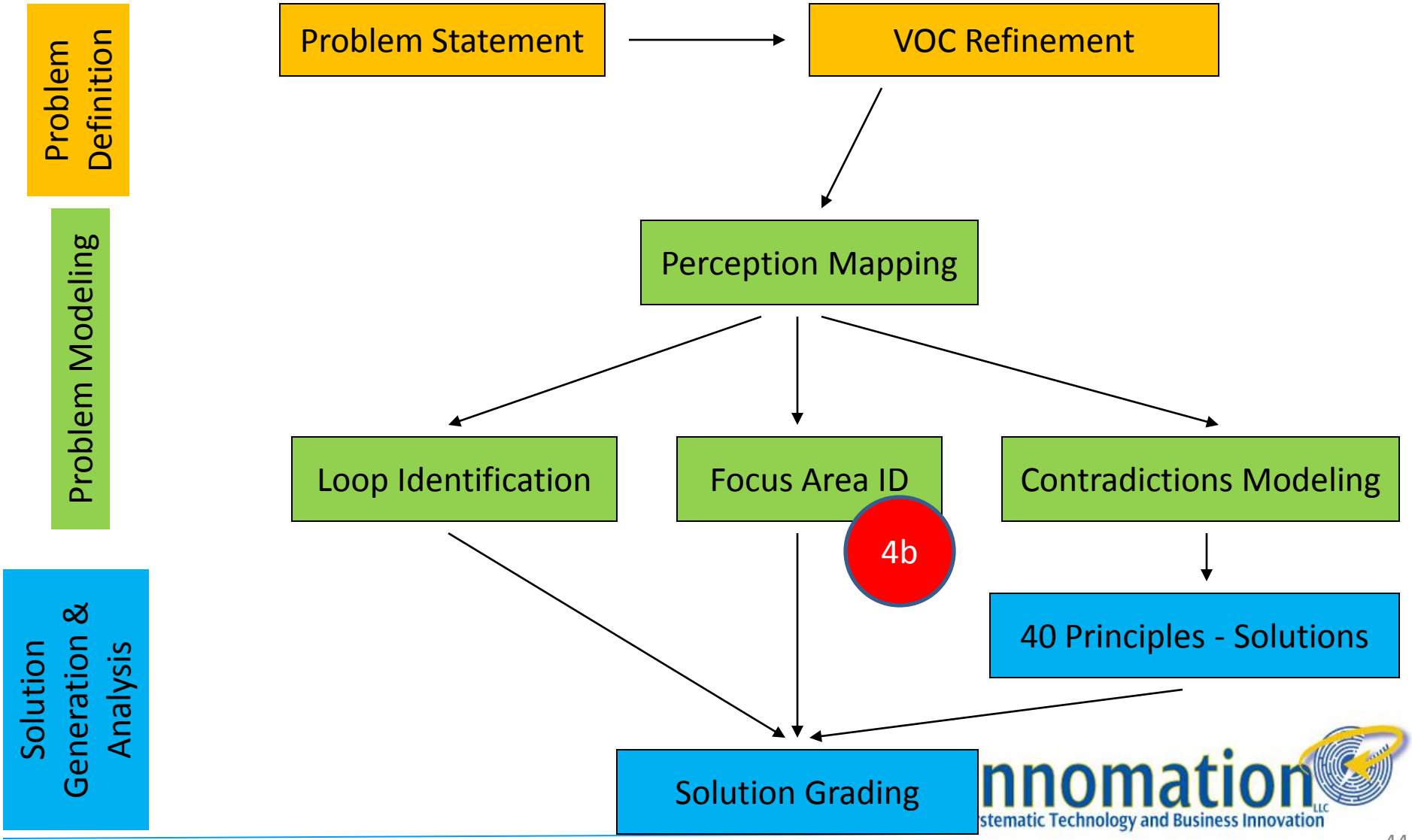
This information may not be reproduced without the written consent of Innomation Corp

Perception Mapping Goal

- Identifying loops of perceptions that either need to be reinforced or eliminated
  - 4a Loops of perceptions are self reinforcing which either need to be supported (good self reinforcing loops) or terminated (bad reinforcing loops)
- Identify the correct problem(s) to address when improving a process or situation
  - 4b While each perception implies a problem to be addressed, understanding how perceptions relate to each other can identify which perceptions "problems" will most effectively address the entire group of perceptions (Perception Mapping and Scoring)
- Identifying contradictions inherent to the selection of perceptions
  - 4c Some perceptions will directly conflict with each other. One of the attributes of TRIZ is its ability to formulate and then transcend contradictions so that each perception is addressed without compromise

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

Focus Area ID

- Choose high scoring Perceptions to address
  - Perception "T" scored the second highest at 9 points
    - "Universal Operating Room would help the over utilization of the facilities."
  - Turn the Perception into a Contradictory Statement
    - "If I have universal ORs then my utilization will be improved but the cost of developing the universal ORs will be very high."
  - Using the Parameters off of the Innomation, LLC Business Contradiction Matrix (InnomationLLC.com) reframe the contradiction and solve using 40 Principles

4b

This information may not be reproduced without the written consent of Innomation Corp

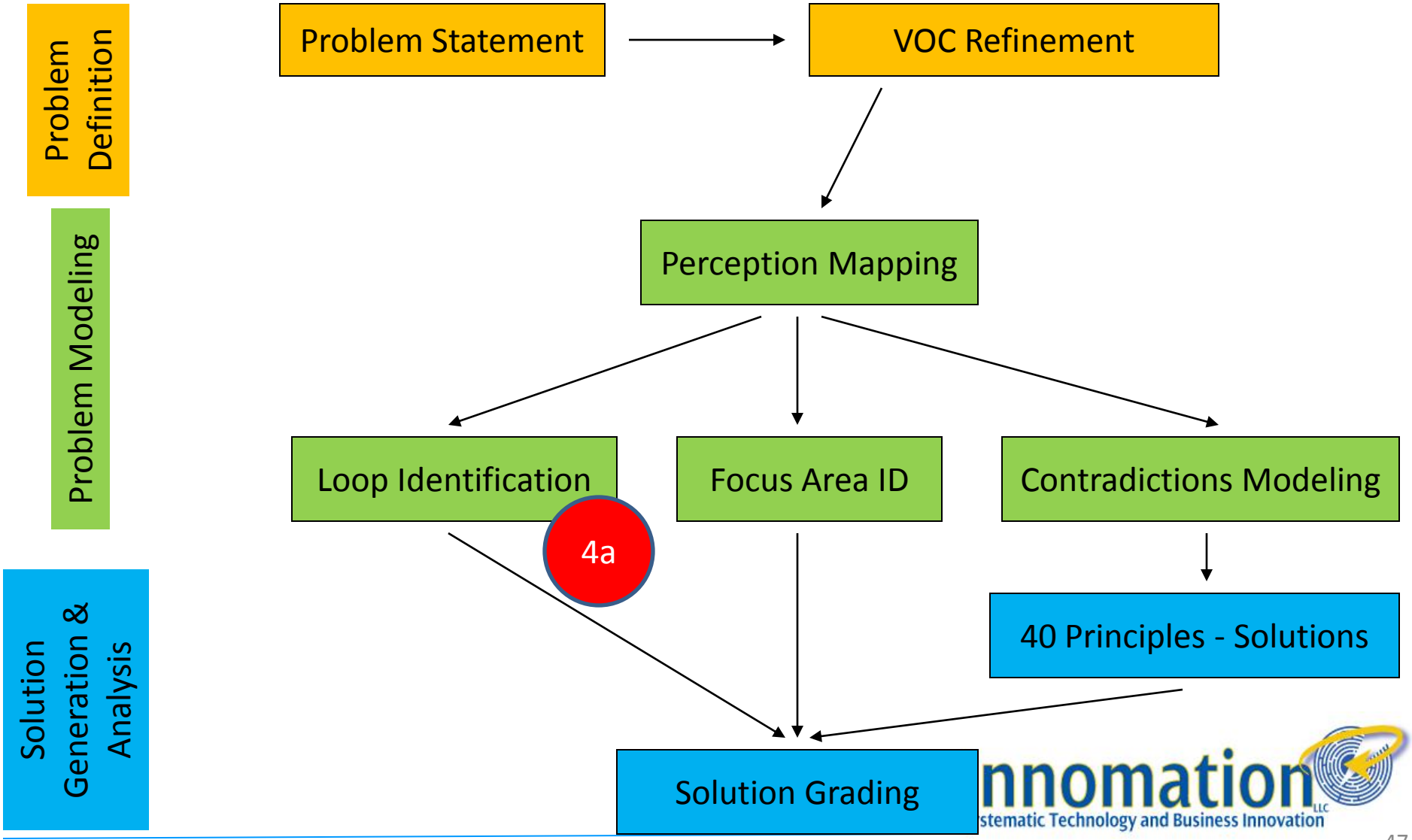
Perception Mapping

14. Highlight Most Important Perceptions to Address

OR Scheduling Perception Mapping (PM)							
Alpha Identifier	Perceptions	leads to	conflicts with	loop (4 points)	conflict chain (3 points)	collector (n-1)	Total score
J	need access outside block time	C	D	4	3	3	10
T	Universal rooms would help utilization	F		4	3	2	9
C	Schedulers are critical to the current process	L	K	4	3	1	8
F	It is important to have flexibility	T	I	4	3	1	8
H	quality and quantity of staff and equip impacts schedule performance	I			6	2	8
L	Scheduling rules need to be applied consistently	J		4	3	1	8
P	TOT needs to be 30 minutes or less	H	R		3	2	5
D	Block scheduling reduces communication requirements	O	J		3		3
G	meeting planned times is important to planning process	H			3		3
I	load leveling & sequencing and case matching helps with resource planning	C	F		3		3
K	Multiple scheduling access methods would be helpful	L	C		3		3
O	Surgeon preference overrides patient preference	J			3		3
R	Shift change can effect TOT efficiency	H	P		3		3
A	Dedicated rooms help patient access for on-call issues	J					0
B	Dedicated rooms have a negative impact on utilization	T					0
E	Communication boards improve information access and flow	K					0
M	Drs should want to bring patients to the OR	F					0
N	Surgeons and anesthesiologists need to accept 24/7	J					0
Q	Flip rooms are convenient for surgeons	P					0
S	Anesthesiology variability is an issue	P					0
U	Layout improvements would help utilization	P					0

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

Society of Competitive Intelligence Professionals

Loops

4a

- Self Reinforcing:
  - Loops reinforce themselves and are therefore self-sustaining
  - Positive Loops – we want the loop to continue as it has a positive effect on our issue
    - Find ways to further reinforce the positive loop
    - Insure that solution do not impeded the positive loop
  - Negative Loops – we want the loop to stop as it has negative effects on our issue
    - Find ways to weaken the negative loop
    - Insure that solution do not support the negative loop

Innomation LLC
Systematic Technology and Business Innovation

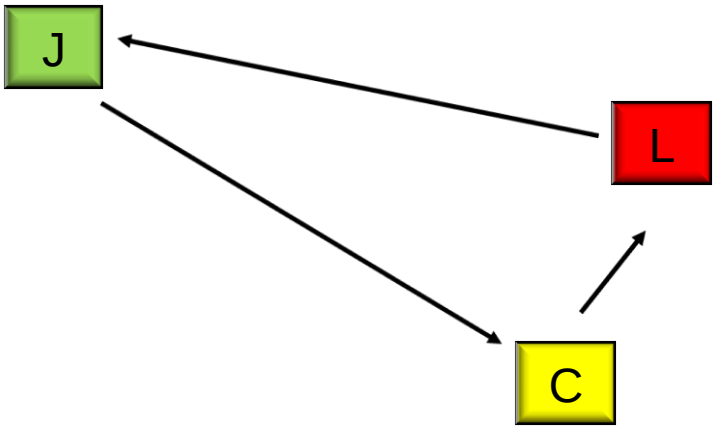
This information may not be reproduced without the written consent of Innomation Corp

Loops

4a

*

J – Surgeons need access outside of block time, which leads to C
C – The Scheduling Department is critical to the current process, which leads to L
L – The scheduling rules need to be applied consistently, which leads to J



* This is a positive loop – we want it to continue and/or be strengthened

This information may not be reproduced without the written consent of Innomation Corp

Loops – Solution Generation

4a

*

J – Surgeons need access outside of block time, which leads to C
C – The Scheduling Department is critical to the current process, which leads to L
L – The scheduling rules need to be applied consistently, which leads to J

Test solution concepts against support or destruction of Loops

* This is a positive loop – we want it to continue and/or be strengthened

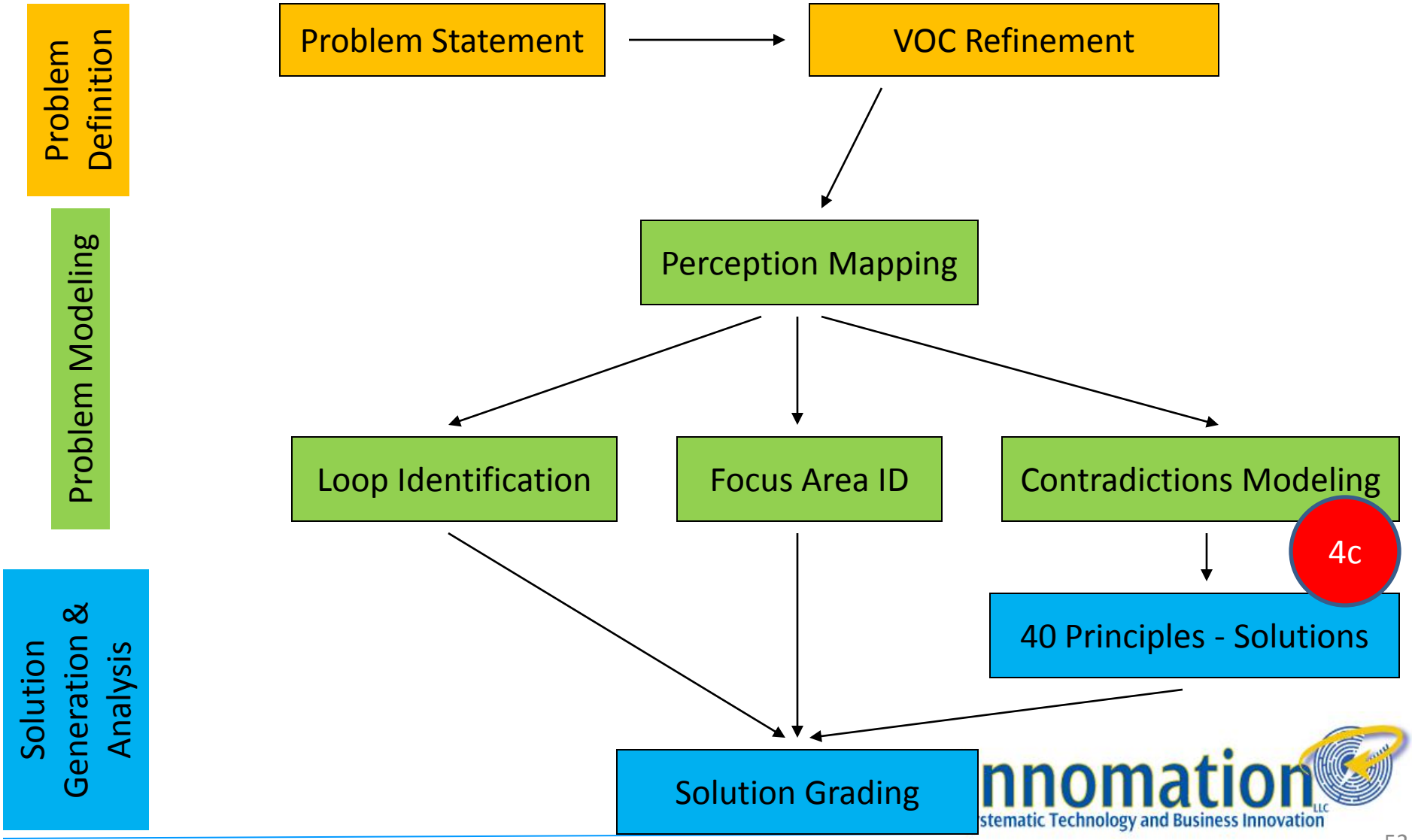
This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- Case Study Client and Project
- Solution Engine Process Map
- What is Voice of the Customer?
- What is Perception Mapping?
- What is TRIZ?
- What is Contradiction Modeling?
- How to Develop a Perception Map from VOC
- Scoring the Map
- **Contradiction Analysis**
- Solution Generation and Evaluation

This information may not be reproduced without the written consent of Innomation Corp

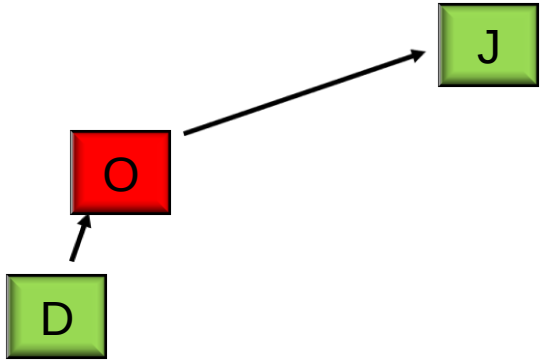
Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

Conflicts / Contradictions

- D and J are in conflict



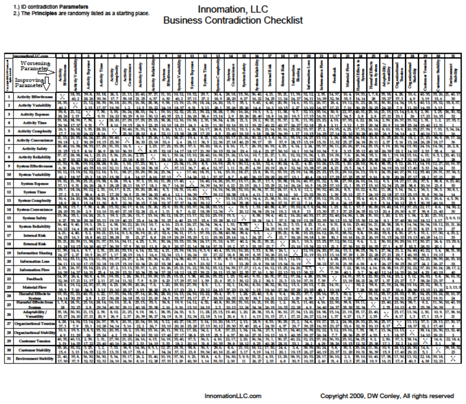
- D – Block Scheduling reduces Communication Requirements
- J – Surgeons need access to OR outside of block periods

4c

This information may not be reproduced without the written consent of Innomation Corp

Conflicts / Contradictions

- Choose parameters from the Innomation, LLC Business Contradiction Matrix that reflect the conditions of the contradictory requirements:
  - D – Block Scheduling reduces Communication Requirements – **Communication Flow**
  - J – Surgeons need access to OR outside of block periods – **Adaptability/Versatility**



1.) ID contradiction **Parameters**
2.) The **Principles** are randomly listed as a starting place.

Innomation, LLC
Business Contradiction Checklist

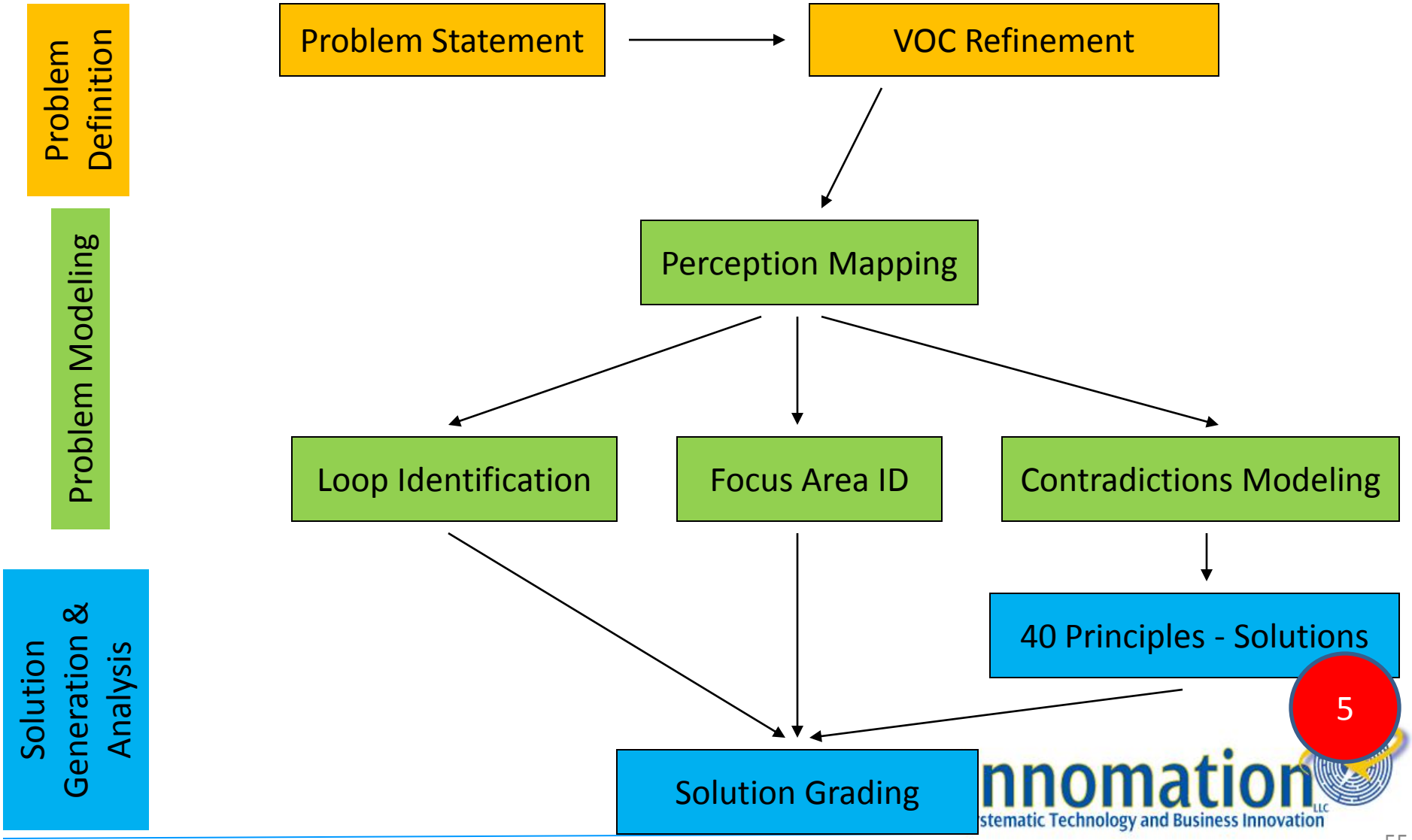
InnomationLLC.com

Copyright 2009, DW Conley, All rights reserved

4c

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

Conflicts / Contradictions

- Utilizing a Business Contradiction Matrix:
  - Look up the identified contradiction parameters on the matrix and locate the convergent Principles associated with the resolution of that particular parameter pair
    - 25 – Self service
    - 6 – Universality
    - 37 – Thermal Expansion
    - 40 – Composite Materials
    - 15 – Dynamics
    - 19 – Periodic Action

5

This information may not be reproduced without the written consent of Innomation Corp

Conflicts / Contradictions

- Utilize the Business Examples for the 40 Principles (InnomationLLC.com) to help identify what the application of a principle may look like:
- For example: 25- Self Service

  A. *Make an object serve itself by performing auxiliary helpful functions*

  – Use project work to train employees
  – Place advertisements on your products
  – Gather phone numbers form shoppers for future marketing efforts and to track demographics
  – Use inventory tracking numbers to not only trigger re-orders but also to understand seasonal variations

5

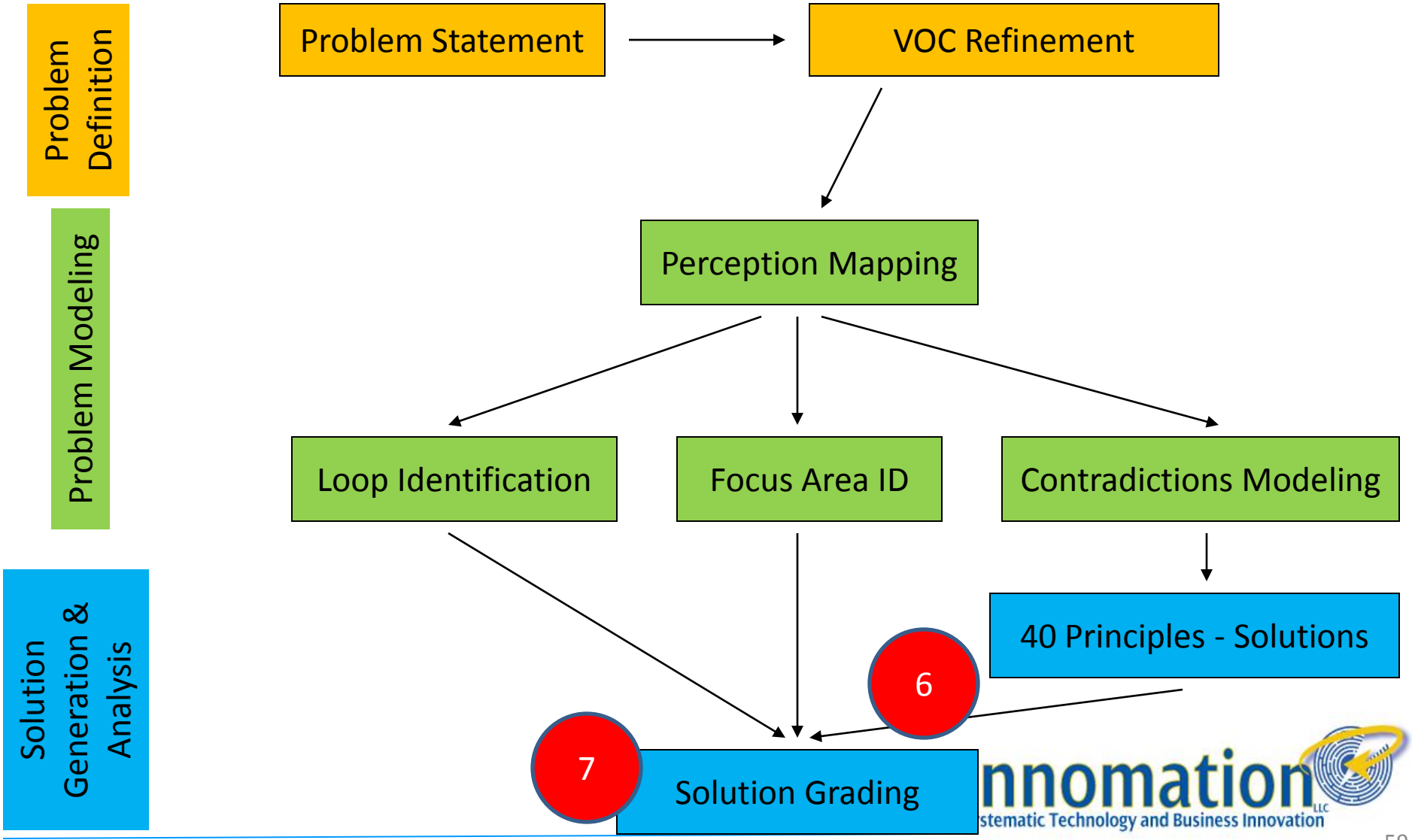
This information may not be reproduced without the written consent of Innomation Corp

Agenda

- Custom Solution Engine
- Case Study Client and Project
- Solution Engine Process Map
- What is Voice of the Customer?
- What is Perception Mapping?
- What is TRIZ?
- What is Contradiction Modeling?
- How to Develop a Perception Map from VOC
- Scoring the Map
- Contradiction Analysis
- **Solution Generation and Evaluation**

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

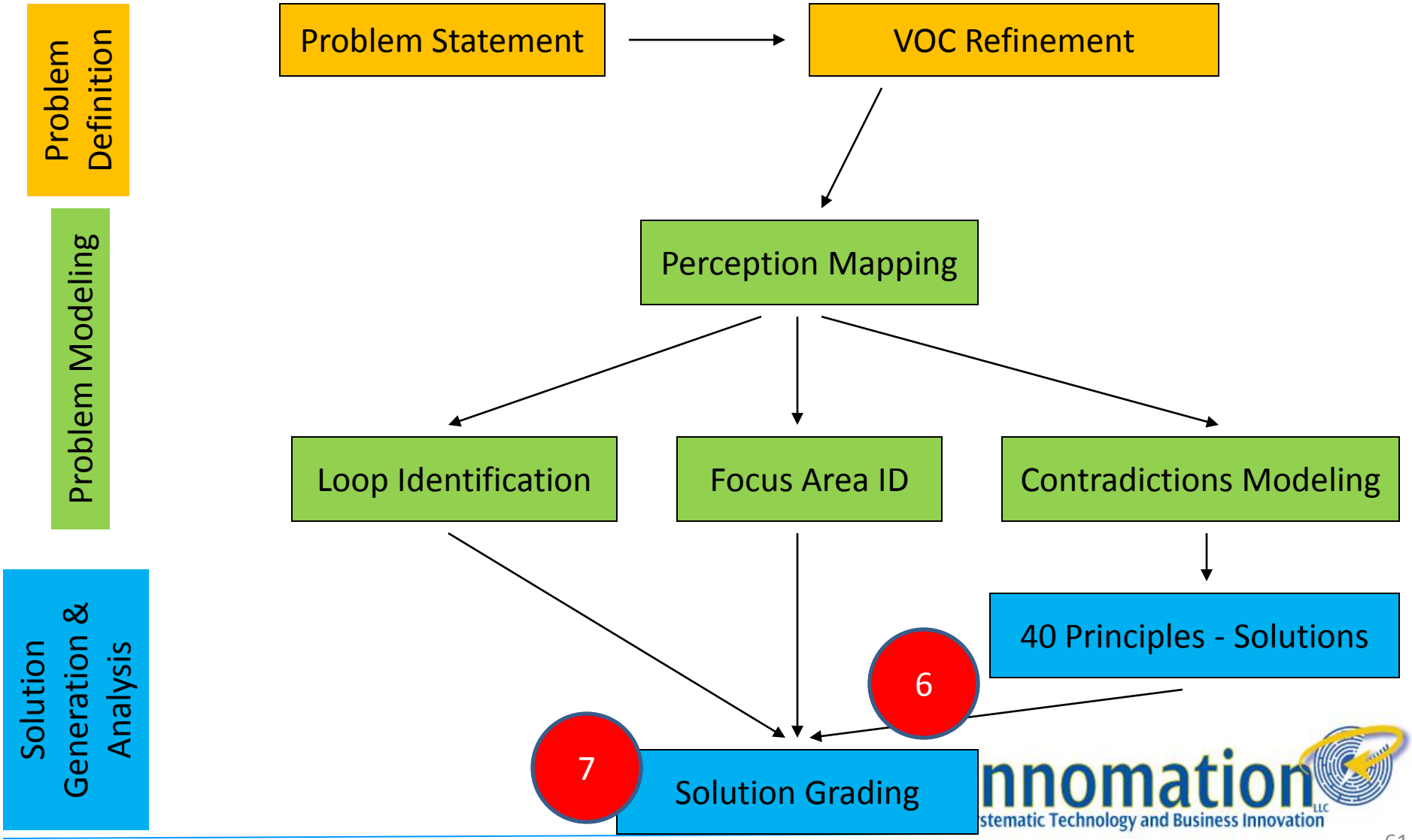
Conflicts / Contradictions

- Use "Focused Brainstorming" to generate solution concepts for the indicated contradiction based on the identified principles:
  - 25 – Self service
    - Remotely accessed web based case scheduling
  - 6 – Universality
    - Develop standardized forms to gather information need for case scheduling
- Principle Combinations – Self service/Universiality
  - Standardized broadcast views of scheduling system (wall monitors, PDAs, etc.)

6

This information may not be reproduced without the written consent of Innomation Corp

Solution Engine Process Map



This information may not be reproduced without the written consent of Innomation Corp

Solution Generation and Scoring

- Approximately 15-20 Contradictions were analyzed resulting in 384 Solution Concepts
- Solution Concepts should be pared down to the most effective
- Concepts can first be scores against Cost, Implementation Time, and Complexity
- Choose *X* Short, *X* Medium and *X* Long term solutions for additional analysis *(x = 10 to 30)*
- Score the remaining solutions Concepts against:
  - Support of High Scoring Perceptions
  - Support (or destruction) of Loops
  - Support of VOC

7

This information may not be reproduced without the written consent of Innomation Corp

Case Study Result Samples

- Short-term, Inexpensive, Easy
  - surgeon to maintain a back fill list of non-critical cases
  - document the cost of a delay or nonproductive time and provide visual indicator
  - fill block time from the end to the beginning, release early start for others if not filled (fill the block backwards)
  - give surgeon an option for overbooking elective non-critical cases
- Med-term, Mid-range cost and complexity
  - concentrate high variability cases to one day or one room so other days/rooms are highly predictable
  - countdown on SMARTRACK board (visually demonstrate time remaining to on time start or on time close-delays) Can use color coding to signify delays, especially turnover
  - e-paging to doctors for case time update
  - segmentation of schedule by case type so all similar cases are done on the same day or in the same room
- Long-term, Expensive, Complex
  - patient navigator (concierge)-- gets patient through the process from the time the decision is made for surgery until they are discharged home
  - completely separate scheduling systems by service lines
  - operating on one side of room and prepping on the other side (sterile barrier)
  - absence of activity in an OR is an indication of schedule problems - motions sensors
  - dynamic configurable rooms that move as needed
  - RFID on surgeons, patients, gurneys, equipment to signal location in the building
  - operate in patient's inpatient room

This information may not be reproduced without the written consent of Innomation Corp

Innomation, LLC
David Conley - Principal

- Education – BS Nuclear Engineering, MBA Finance, TRIZ L4
- Work Experience
  - USAF Philips Lab – R&D Officer
    - Plasma Physical
    - Space Based Nuclear Propulsion
  - Johnson and Johnson – Process Engineer
  - Phillips – Facilities Engineer
  - Lockwood Greene – Engineering Consulting
  - Intel Corporation – Engineering, Automation, Manufacturing, Finance, Management
  - Innomation LLC – Technical and Business Innovation Consulting
- Go to **InnomationCorp.com** for more information

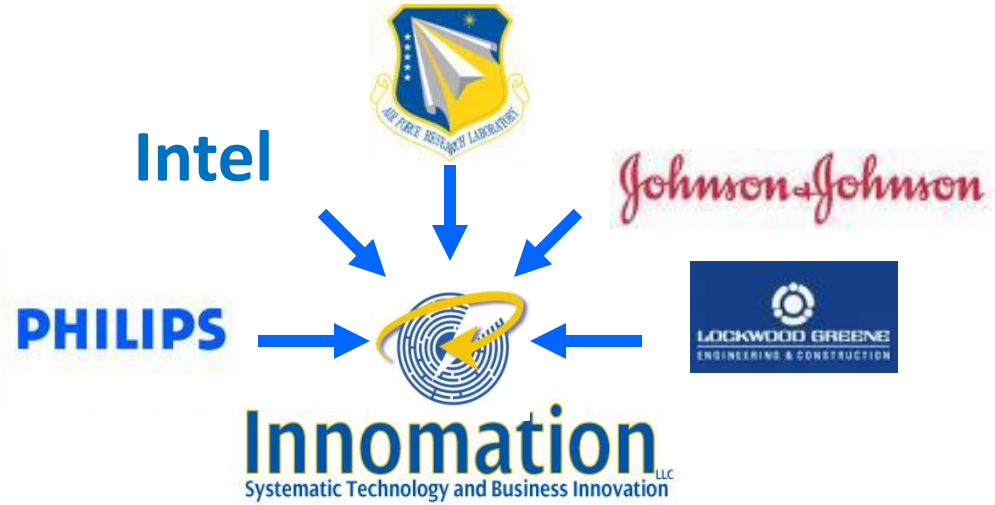
Intel

Innomation LLC
Systematic Technology and Business Innovation

This information may not be reproduced without the written consent of Innomation Corp

Innomation, LLC
David Conley - Principal

Experience and knowledge converged into consultation services



This information may not be reproduced without the written consent of Innomation Corp

Acknowledgements

- Thanks to Presbyterian Heath Services for their support of this project and the associated case study.

This information may not be reproduced without the written consent of Innomation Corp

Back-Up Material

- 40 Principles with Business Examples
- Business Contradiction Matrix

This information may not be reproduced without the written consent of Innomation Corp

40 Principles with Business Examples

Innomation
Systematic Technology and Business Innovation

40 Inventive Principles with Business Examples

Principle 1. Segmentation

A. *Divide an object into independent parts.*

- Segment multiple similar installations (ex., production machinery) into separate installation modules
- Use 7 step problem solving
- Divide a work force (micro or macro) into functional areas
- Multiple sales interfaces (kiosks, mobile, store front)
- Divide an organization into different profit centers
- Segment a large project into tasks
- Segment your market by customer profile
- Use Strength, Weakness, and Opportunity and Threat analysis
- Delineate different product attributes to the customer

B. *Make an object easy to disassemble.*

- Mix and match services
- Flexible savings plans
- Use of 3rd party business services
- Use of contracted workers
- Modular manufacturing processes
- Modular panels for office space
- Intermodal shipment systems

C. *Increase the degree of fragmentation or segmentation.*

- Empower entire organization for some functions (ex., safety)
- Push decision making to the lowest level possible
- Employee suggestion programs
- Telecommuting employees
- Multi-source training programs

Principle 2. Taking out

Separate an interfering part or property from an object, or single out the only necessary part (or property) of an object.

- Provide only highest value added services/products and contract support services
- Improve inter-organizational communication
- Eliminate performance reviews
- Eliminate weakness based management philosophies (concentrate on employee strengths)
- "There are no bad employees just bad systems"

Copyright 2009, DW Conley, all rights reserved

Go to **InnomationLLC.com** for more information on TRIZ and Systematic Innovation for Business

- Gives business examples for TRIZ 40 Principles
- Available form InnomationLLC.com under About Us – Articles, Presentations and Materials

Innomation LLC
Systematic Technology and Business Innovation

This information may not be reproduced without the written consent of Innomation Corp

Business Contradiction Matrix

1.) ID contradiction Parameters
2.) The Principles are randomly listed as a starting place.

Innomation, LLC
Business Contradiction Checklist

InnomationLLC.com		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Worsening Parameter → / Improving Parameter ↓		Activity Effectiveness	Activity Variability	Activity Expense	Activity Time	Activity Complexity	Activity Convenience	Activity Safety	Activity Reliability	System Effectiveness	System Variability	System Expense	System Time	System Complexity	System Convenience	System Safety	System Reliability	Internal Risk	External Risk	Information Sharing	Information Loss	Information Flow	Feedback	Material Flow	Harmful Effects to System	Harmful Effects from System	Adaptability / Versatility	Organizational Tension	Organizational Stability	Customer Tension	Customer Stability	Environment Stability
1	Activity Effectiveness	X	18, 35, 40, 2	28, 26, 30, 36	35, 18, 39, 36	26, 3, 17, 7	21, 13, 39, 18	20, 40, 21, 25	37, 27, 6, 37	11, 10, 6, 30	10, 12, 40, 2	19, 34, 37, 11	29, 7, 27, 2	30, 4, 18, 9	28, 18, 28, 20	15, 36, 9, 27	36, 40, 36, 22	4, 21, 34, 25	35, 21, 11, 24	11, 36, 24, 27	32, 12, 34, 31	2, 35, 16, 39	14, 35, 32, 36	35, 4, 35, 5	19, 33, 14, 34	1, 7, 8, 28	35, 18, 35, 27	4, 28, 37, 3	33, 6, 4, 9	40, 35, 3, 19	35, 26, 15, 6	21, 40, 17, 30
2	Activity Variability	18, 35, 40, 2	X	21, 12, 2, 15	35, 39, 17, 27	36, 18, 19, 29	20, 35, 1, 2	16, 18, 12, 5	29, 36, 13, 22	35, 24, 18, 37	24, 26, 9, 32	15, 7, 5, 13	35, 1, 28, 1	9, 40, 35, 26	4, 40, 35, 26	20, 36, 10, 15	14, 4, 2, 27	16, 3, 10, 13	5, 2, 13, 10	14, 6, 33, 11	33, 11, 26, 37	26, 4, 17, 7	19, 12, 10, 30	31, 23, 29, 32	26, 31, 24, 28	30, 30, 14, 7	19, 5, 24, 9	1, 28, 11, 29	14, 35, 7, 3	4, 29, 3, 13	5, 35, 8, 37
3	Activity Expense	36, 4, 28, 26	21, 12, 2, 15	X	7, 36, 9, 31	3, 35, 24, 22	36, 33, 30, 29	34, 1, 8, 16	11, 30, 30, 12	19, 10, 40, 35	32, 32, 23, 2	25, 21, 26, 26	39, 22, 36, 6	36, 26, 15, 14	7, 36, 2, 9	16, 26, 29, 26	19, 3, 26, 40	5, 2, 18, 8	11, 36, 16, 26	9, 7, 19, 5	32, 13, 17, 15	35, 18, 16, 31	30, 6, 11, 17	22, 37, 34, 5	40, 31, 2, 6	25, 16, 2, 8	21, 15, 27, 21	13, 14, 33, 1	5, 8, 5, 26	2, 36, 17, 22	3, 25, 16, 35, 32
4	Activity Time	35, 18, 29, 36	34, 30, 17, 27	7, 36, 9, 31	X	28, 20, 8, 16	27, 26, 19, 15	17, 39, 26, 9	25, 26, 22, 23	36, 28, 10, 13	12, 16, 28, 24	19, 34, 3, 3	2, 35, 28, 28	36, 34, 17, 29	4, 28, 8, 5	21, 3, 33, 40	29, 2, 19	30, 21, 34, 37	2, 31, 11, 35	19, 22, 40, 22	40, 27, 26, 27	25, 4, 32, 18	25, 25, 27, 14	4, 19, 21, 30	37, 35, 6, 22	28, 14, 2, 36	2, 36, 20, 9	26, 37, 10, 28	35, 32, 1, 24	1, 36, 23, 40	1, 2, 12, 35, 37
5	Activity Complexity	26, 3, 17, 7	34, 18, 19, 39	3, 35, 24, 22	28, 20, 8, 16	X	39, 40, 25, 30	31, 33, 5, 36	5, 36, 8, 8	9, 26, 33, 11	5, 11, 15, 38	6, 28, 28, 28	16, 17, 17, 29	28, 8, 8, 5	15, 32, 33, 40	19, 3, 39, 9	6, 38, 9, 18	25, 14, 28, 28	33, 16, 36, 39	25, 20, 1, 17	33, 37, 19, 15	27, 2, 16, 29	19, 35, 27, 14	6, 25, 21, 30	17, 33, 28, 40	16, 10, 30, 20	8, 10, 26, 9	35, 9, 24, 14	20, 35, 4, 2	27, 39, 40, 16	7, 33, 13, 33	5, 34, 24, 19
6	Activity Convenience	21, 18, 29, 18	20, 35, 1, 2	36, 24, 30, 29	27, 26, 19, 15	39, 40, 25, 30	X	16, 5, 36, 33	25, 26, 23, 25	1, 10, 6, 5	38, 27, 3, 4	19, 4, 6, 28	8, 21, 1, 11	32, 10, 36, 26	30, 17, 27, 28	21, 35, 40, 3	30, 22, 17, 39	9, 1, 8, 36	34, 11, 17, 27	33, 19, 24, 26	24, 27, 13, 15	13, 15, 15, 33	1, 26, 31, 2	38, 36, 27, 24	34, 18, 24, 29	21, 8, 10, 11	21, 25, 2, 17	20, 31, 5, 16	18, 2, 15, 24	21, 23, 26, 28	36, 9, 18, 17	35, 17, 24, 36
7	Activity Safety	20, 40, 21, 25	16, 18, 35, 12	36, 35, 5, 5	17, 26, 31, 33	31, 33, 16, 5	5, 2, 37, 1	X	8, 35, 32, 18	30, 1, 35, 38	39, 24, 14, 17	15, 10, 35, 18	28, 40, 17, 21	16, 6, 39, 26	8, 16, 11, 7	26, 19, 36, 19	36, 19, 4, 25	6, 14, 2, 24	35, 37, 36, 11	20, 26, 37, 14	25, 15, 9, 19	35, 36, 11, 20	26, 37, 14, 25	15, 9, 19, 20	34, 15, 20, 34	35, 38, 38, 26	26, 39, 22, 2	14, 10, 32, 10	2, 33, 14, 19	35, 4, 24, 16	14, 36, 26, 2, 8
8	Activity Reliability	21, 29, 37, 27, 6, 37	12, 5, 28, 34, 33, 22	8, 16, 34, 1, 30, 12	26, 9, 25, 13, 22, 20	28, 10, 26, 8, 8, 8	36, 33, 25, 26, 29, 18	X	8, 35, 30, 1, 8, 35	32, 18, 30, 18	14, 17, 8, 36	18, 17, 18, 18	21, 39, 24, 33	26, 15, 7, 18	32, 24, 10, 4	23, 4, 34, 36	10, 4, 9, 4	21, 27, 8, 11	30, 10, 31, 6	16, 3, 24, 27	10, 34, 32, 31	34, 1, 36, 34	7, 9, 8, 29	3, 15, 36, 22	35, 12, 40, 36	18, 26, 35, 35	39, 38, 38, 40	22, 2, 32, 10	14, 10, 2, 14	3, 33, 14, 19	35, 4, 16, 18
9	System Effectiveness	11, 10, 6, 30	19, 38, 24, 19	19, 16, 40, 35	36, 26, 10, 32	10, 19, 11, 33	17, 26, 6, 36	30, 1, 35, 18	X	30, 1, 39, 38, 15	24, 15, 36, 17	10, 28, 40, 35	16, 39, 31, 26	31, 26, 13, 40	31, 26, 13, 16	10, 7, 21, 9	21, 27, 1, 31	31, 32, 32, 31	36, 1, 36, 4	4, 27, 4, 31	10, 26, 35, 37	1, 25, 19, 28	7, 6, 26, 38	26, 38, 35, 3	35, 3, 38, 1	12, 35, 19, 18	5, 12, 13, 16	26, 10, 6, 15	22, 2, 14, 10	12, 27, 10, 14	10, 39, 35, 37
10	System Variability	10, 12, 6, 30	13, 19, 24, 19	32, 32, 40, 35	12, 16, 10, 32	5, 11, 11, 33	38, 27, 6, 26	33, 29, 30, 26	30, 24, 11, 36	25, 34, 38, 18	X	17, 40, 18, 31	1, 14, 1, 36	33, 31, 18, 27	18, 27, 13, 40	23, 6, 36, 13	36, 11, 33, 15	33, 15, 25, 16	25, 16, 14, 36	25, 25, 15, 21	15, 21, 29, 10	16, 13, 19, 6	19, 6, 24, 35	40, 27, 36, 12	12, 35, 40, 26	35, 40, 27, 37	18, 2, 37, 23	29, 1, 28, 26
11	System Expense	19, 35, 35, 22	21, 39, 18, 31	25, 21, 26, 26	19, 38, 24, 3	6, 28, 28, 28	10, 4, 31, 11	3, 5, 18, 18	15, 10, 18, 2	11, 29, 36, 7	17, 40, 7, 14	X	16, 40, 36, 29	14, 26, 36, 32	35, 35, 36, 2	13, 17, 27, 1	26, 27, 17, 3	17, 3, 35, 36	36, 18, 16, 24	18, 16, 40, 37	40, 37, 31, 22	3, 34, 27, 36	27, 36, 28, 35	28, 10, 14, 37	12, 9, 3, 35	14, 12, 15, 32	34, 25, 28, 36	17, 26, 37, 8	37, 5, 38, 8	8, 9, 23, 40
12	System Time	27, 2, 35, 13	5, 13, 38, 6	6, 21, 17, 29	4, 21, 36, 5	17, 29, 31, 39	24, 33, 40, 4	12, 1, 36, 39	X	39, 12, 18, 38	15, 6, 11, 5	11, 38, 14, 10	23, 32, 39, 21	1, 39, 25, 12	27, 7, 24, 19	22, 18, 27, 13	25, 15, 31, 8	1, 39, 22, 18	23, 35, 1, 39	25, 12, 27, 7	24, 19, 22, 18	27, 13, 25, 15	31, 8, 39, 34	34, 1, 8, 10	12, 35, 24, 25	28, 38, 8, 20	16, 2, 37, 33	8, 25, 8, 19	27, 1, 34, 14
13	System Complexity	30, 4, 18, 9	24, 26, 28, 24	38, 28, 19, 34	38, 34, 11, 30	26, 8, 32, 8	32, 10, 26, 15	16, 6, 7, 18	16, 39, 32, 17	16, 19, 32, 37	1, 14, 37, 37	34, 26, 34, 30	14, 16, 39, 12	X	33, 15, 12, 34	25, 19, 38, 28	34, 4, 32, 6	21, 36, 29, 36	31, 10, 37, 31	40, 4, 27, 27	9, 37, 7, 14	35, 12, 26, 31	35, 25, 21, 6	1, 1, 24, 15	35, 4, 26, 39	40, 8, 2, 5	25, 15, 9, 14	10, 20, 33, 12	3, 9, 28, 5	4, 10, 29, 40	16, 33, 33, 31
14	System Convenience	28, 26, 28, 20	15, 7, 35, 26	7, 36, 2, 9	6, 28, 10, 13	15, 32, 40, 40	17, 8, 16, 40	14, 26, 33, 26	26, 26, 10, 32	25, 6, 33, 24	31, 31, 35, 37	35, 37, 34, 28	35, 15	X	10, 5, 1, 35	40, 36, 4, 37	35, 18, 8, 19	8, 19, 40, 36	4, 37, 35, 18	8, 19, 8, 19	35, 30, 1, 28	35, 1, 35, 37	32, 1, 32, 1	40, 1, 37, 3	36, 30, 37, 28	10, 40, 14, 19	14, 19, 37, 28	20, 21, 22, 19	17, 8, 6, 6	34, 30, 2, 2
15	System Safety	15, 36, 9, 27	35, 1, 35, 26	16, 26, 29, 26	21, 3, 33, 11	19, 3, 19, 40	21, 26, 23, 23	11, 7, 33, 4	13, 16, 14, 36	30, 12, 31, 25	18, 27, 6, 40	13, 17, 23, 13	32, 10, 15, 25	25, 19, 6	19, 3, 35, 29	X	8, 38, 20, 12	39, 6, 18, 24	40, 2, 16, 21	16, 21, 37, 3	40, 33, 17, 27	27, 27, 22, 33	32, 40, 32, 12	14, 36, 13, 32	1, 24, 15, 30	31, 10, 12, 24	1, 20, 9, 1	2, 13, 37, 30	1, 34, 16, 18	2, 20, 12, 3	21, 10, 3, 9, 9, 11
16	System Reliability	36, 40, 16, 22	9, 40, 14, 24	19, 3, 28, 40	29, 2, 19, 22	6, 38, 9, 18	30, 22, 39, 17	26, 19, 10, 7, 9, 4	10, 7, 4, 16, 39	23, 6, 13, 9	26, 27, 11, 32	36, 34, 26, 6	34, 4, 6, 34	1, 35, 11, 34	8, 38, 34, 18	X	5, 3, 34, 21	34, 21, 25, 25	5, 15, 33, 19	8, 25, 8, 35	31, 6, 27, 16	9, 31, 23, 1	8, 16, 11, 7	23, 40, 30, 7	16, 21, 1, 15	28, 36, 30, 1	28, 9, 6, 13	14, 34, 27, 33	36, 34, 8, 25	18, 12, 8, 19	33, 21, 28, 27
17	Internal Risk	4, 21, 34, 25	4, 40, 16, 3	5, 2, 36, 3	39, 21, 25, 14	9, 1, 8, 36	36, 19, 25, 27	25, 27, 32, 6	6, 36, 11, 1	17, 5, 39, 33	21, 36, 40, 38	40, 38, 30, 4	5, 3, 1, 35	21, 36, 40, 38	30, 4, 5, 3	X	21, 7, 30, 26	39, 18, 1, 30	30, 3, 19, 16	16, 21, 26, 19	31, 15, 24, 33	19, 13, 40, 28	5, 8, 36, 10	25, 36, 32, 5	8, 19, 20, 33	8, 8, 33, 27	20, 5, 30, 1	17, 30, 4, 2
18	External Risk	35, 21, 11, 24	20, 39, 10, 15	11, 36, 16, 26	31, 37, 40, 27	33, 16, 36, 39	34, 11, 37, 9	4, 25, 30, 10	1, 31, 13, 8	30, 26, 26, 6	33, 35, 20, 37	33, 34, 21, 14	24, 17, 38, 14	31, 15, 37, 31	4, 37, 19, 2	40, 2, 37, 3	35, 21, 21, 7	X	26, 1, 23, 16	10, 3, 15, 34	15, 25, 37, 22	37, 12, 13, 31	36, 12, 3, 27	9, 4, 36, 10	1, 2, 28, 29	36, 10, 16, 35	30, 29, 37, 1	14, 17, 4, 37	30, 27, 10, 8	26, 4, 28, 33	13, 29, 6, 1
19	Information Sharing	11, 36, 24, 27	14, 6, 2, 27	9, 7, 19, 5	2, 36, 26, 27	3, 25, 31, 1	35, 15, 19, 16	6, 14, 32, 16	32, 32, 6, 16	4, 23, 33, 24	25, 19, 13, 13	18, 16, 6, 8	6, 3, 40, 4	35, 16, 16, 20	3, 15, 1, 6	4, 38, 28, 1	3, 15, 1, X	12, 19, 24, 28	28, 24, 37, 24	10, 3, 18, 37	33, 13, 13, 16	37, 29, 1, 29	22, 28, 27, 21	38, 28, 36, 5	37, 36, 21, 2	34, 40, 40, 22	40, 22, 1, 4	34, 40, 40, 22	1, 4, 30, 38, 30
20	Information Loss	32, 12, 34, 11	33, 11, 13, 10	32, 13, 17, 15	11, 35, 32, 18	33, 37, 19, 15	24, 27, 2, 19	2, 24, 31, 30	30, 26, 34, 23	4, 26, 22, 39	14, 36, 34, 40	40, 37, 16, 3	12, 2, 9, 37	8, 7, 9, 40	33, 8, 25, 10	25, 10, 13, 3	12, 16	X	9, 7, 4, 28	29, 13, 37, 7	11, 40, 15, 21	15, 21, 34, 6	31, 39, 26, 27	39, 25, 39, 27	4, 9, 26, 27	39, 27, 24, 2	26, 27, 33, 35	32, 23, 38, 39	20, 35, 10, 32
21	Information Flow	2, 35, 34, 13	26, 37, 13, 10	35, 16, 16, 29	23, 23, 15, 33	27, 2, 13, 15	13, 13, 35, 37	1, 23, 15, 34	10, 26, 38, 34	25, 23, 37, 28	31, 22, 24, 36	39, 32, 17, 1	35, 12, 36, 26	34, 39, 11	17, 27, 28, 36	11, 6, 35, 11	16, 12, 36, 13	15, 25, 37, 1	24, 26, 33, 28	9, 7, 37, 22	X	33, 39, 13, 17	7, 22, 40, 1	36, 16, 33, 27	4, 16, 40, 3	18, 36, 35, 22	19, 27, 32, 1	32, 22, 35, 18	37, 20, 30, 24	24, 28, 17, 2
22	Feedback	10, 39, 32, 36	14, 37, 14, 37	16, 37, 26, 4	29, 4, 30, 9	16, 29, 4, 39	15, 35, 19, 35	10, 34, 30, 1	38, 34, 26, 26	37, 28, 35, 18	18, 17, 16, 27	28, 21, 26, 11	18, 20, 22, 35	27, 10, 1, 35	27, 10, 1, 39	27, 10, 1, 35	27, 10, 1, 39	27, 10, 1, 35	33, 13, 38, 27	37, 24, 4, 26	33, 38, 1, 35	X	7, 39, 13, 19	40, 1, 16, 21	3, 7, 24, 40	13, 14, 16, 33	16, 33, 24, 24	4, 28, 40, 19	40, 19, 8, 35
23	Material Flow	14, 37, 32, 36	26, 4, 17, 23	30, 9, 11, 17	4, 34, 2, 11	19, 35, 27, 22	1, 26, 16, 7	11, 36, 16, 6	35, 26, 11, 26	35, 25, 15, 21	3, 36, 24, 26	34, 26, 26, 25	1, 25, 12, 24	35, 40, 15, 37	1, 35, 10, 37	40, 26, 10, 37	24, 4, 26, 35	35, 38, 1, 35	29, 13, 37, 24	4, 26, 35, 38	33, 13, 13, 16	37, 29, 1, 29	22, 28, 27, 21	29, 7, 40, 33	1, 22, 30, 12	36, 39, 15, 9	15, 14, 27, 2	5, 12, 36, 30	1, 5, 8, 36	30, 31, 34, 4
24	Harmful Effects to System	19, 35, 31, 23	31, 23, 2, 14	40, 31, 2, 8	6, 22, 1, 28	17, 33, 30, 1	34, 18, 26, 30	26, 36, 7, 6	1, 20, 29, 10	10, 22, 35, 2	38, 4, 16, 13	24, 10, 10, 22	38, 4, 39, 7	1, 28, 35, 37	23, 40, 1, 8	5, 8, 6, 4	6, 4, 38, 25	39, 7, 38, 16	39, 7, 30, 4	30, 2, 2, 7	X	19, 11, 35, 17	35, 17, 28, 33	7, 38, 34, 25	34, 25, 33, 24	35, 10, 30, 31
25	Harmful Effects from System	1, 7, 8, 28	28, 31, 32, 25	25, 16, 2, 8	28, 14, 29, 34	16, 10, 40, 30	21, 8, 25, 15	25, 15, 35, 3	36, 8, 29, 11	19, 9, 14, 12	14, 12, 6, 32	40, 8, 30, 26	30, 26, 31, 10	16, 21, 19, 20	19, 20, 1, 2	36, 5, 11, 40	4, 16, 22, 30	30, 8, 19, 11	X	25, 40, 23, 36	36, 7, 28, 17	2, 35, 10, 13	12, 24, 34, 24	37, 35, 30, 32	32, 34, 2, 35	11, 7, 32, 33	25, 27, 32, 33	38, 7, 25, 27	9, 2, 11, 36	10, 40, 19, 9
26	Adaptability / Versatility	35, 18, 35, 27	30, 30, 24, 20	21, 15, 27, 23	2, 39, 20, 9	8, 10, 26, 9	21, 25, 2, 37	9, 19, 26, 39	38, 1, 26, 27	38, 35, 10, 34	24, 33, 8, 32	9, 3, 11, 34	11, 28, 25, 8	25, 15, 5, 14	19, 40, 20, 6	1, 20, 13, 13	28, 36, 6, 13	33, 6, 33, 15	36, 10, 27, 1	27, 34, 27, 21	13, 20, 26, 27	18, 36, 12, 14	15, 14, 1, 37	21, 19, 9, 27	35, 17, 11, 7	23, 40, 2, 35	X	25, 17, 8, 17	13, 34, 1, 3	2, 30, 17, 1	10, 9, 15, 9, 21	17, 36, 14, 28
27	Organizational Tension	4, 28, 37, 3	14, 34, 7, 9	13, 14, 9, 1	26, 37, 35, 5	35, 9, 20, 31	20, 34, 2, 35	19, 18, 5, 12	5, 12, 40, 27	18, 27, 3, 14	1, 10, 20, 18	18, 17, 2, 13	2, 13, 28, 9	8, 35, 31, 26	31, 26, 6, 33	21, 2, 34, 6	1, 19, 27, 5	25, 2, 24, 38	29, 35, 25, 36	35, 25, 36, 35	25, 17, 13, 33	X	13, 13, 37, 3	28, 13, 17, 35	17, 30, 17, 12
28	Organizational Stability	35, 2, 17, 7	7, 9, 33, 1	10, 28, 35, 18	10, 28, 34, 34	14, 5, 16, 22	22, 2, 26, 7	26, 7, 33, 10	20, 26, 35, 18	27, 8, 28, 2	25, 28, 27, 13	30, 12, 29, 30	37, 40, 20, 4	24, 33, 4, 37	29, 7, 39, 25	16, 33, 2, 27	4, 37, 29, 7	39, 25, 16, 33	2, 27, 34, 40	16, 33, 25, 36	32, 22, 5, 18	7, 35, 36, 7	5, 36, 14, 7	25, 34, 13, 13	8, 17, 18, 37	X	18, 37, 32, 1	2, 40, 6, 6	13, 40, 6, 40
29	Customer Tension	4, 9, 3, 19	11, 29, 14, 35	26, 17, 22, 37	25, 24, 23, 40	4, 2, 16, 36	15, 24, 26, 2	14, 10, 33, 14	32, 10, 19, 9	17, 40, 18, 2	27, 17, 29, 10	38, 8, 16, 32	25, 15, 8, 30	25, 5, 39, 35	6, 37, 39, 40	30, 16, 18, 28	27, 31, 28, 31	19, 13, 10, 5	40, 35, 33, 1	39, 27, 26, 24	26, 24, 2, 4	7, 7, 28, 36	36, 25, 27, 4	4, 33, 1, 3	18, 37, 25, 36	7, 35, 14, 10	14, 10, 29, 21	X	3, 17, 1, 37	3, 35, 1, 28
30	Customer Stability	40, 35, 15, 6	40, 13, 3, 13	2, 36, 16, 35	1, 31, 12, 31	27, 39, 13, 31	21, 23, 18, 17	24, 16, 35, 4	6, 15, 3, 34	14, 19, 34, 27	35, 47, 21, 23	35, 3, 8, 39	4, 10, 34, 40	22, 17, 16	2, 20, 21, 40	36, 34, 31, 1	30, 27, 40, 16	22, 32, 23, 37	20, 36, 40, 33	21, 20, 24, 2	4, 29, 38, 26	19, 15, 19, 15	25, 37, 11, 20	11, 36, 36, 39	15, 9, 17, 40	20, 21, 32, 33	25, 37, 3, 1	19, 15, 32, 33	X	14, 6, 5, 1	22, 18, 4, 36
31	Environment Stability	21, 40, 17, 30	35, 8, 37, 5	36, 30, 32, 32	36, 30, 32, 24	5, 34, 16, 36	35, 17, 24, 36	26, 2, 8, 16	33, 40, 12, 28	10, 19, 37, 35	37, 36, 3, 39	9, 25, 40, 30	30, 8, 1, 14	4, 5, 39, 33	34, 30, 23, 2	3, 9, 9, 30	33, 21, 6, 35	4, 33, 15, 3	13, 29, 6, 8	38, 31, 30, 5	20, 33, 10, 33	28, 17, 2, 40	36, 10, 31, 4	2, 5, 13, 3	35, 10, 37, 26	10, 40, 21, 27	17, 36, 16, 21	17, 30, 6, 17	13, 32, 40, 3	22, 18, 4, 38	39, 18, 32, 23	X

InnomationLLC.com Copyright 2009, DW Conley, All rights reserved

- Relates contradictory parameters to the 40 Principles
- Available form InnomationLLC.com under About Us – Articles, Presentations and Materials

Innomation LLC
Systematic Technology and Business Innovation

This information may not be reproduced without the written consent of Innomation Corp