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**About This Issue** Page 2  
*David Walden*

**The Future of Work** Page 3  
*Greg Gonzalez*

**Improving Design Productivity Through Design Reuse** Page 9  
*Sreenivasa Rao*

**Getting the Most Out of Technologists** Page 13  
*David Walden*

**Reflecting on Obstacles to Innovation — An Example  
of Using Causal Loops** Page 23  
*Compiled by the Editors*

**The MAP Strategy Planning Process and  
the Baldrige Award** Page 37  
*Steve LaPierre*

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# Reflecting on Obstacles to Innovation — An Example of Using Causal Loops

Compiled by the Editors

## I. Introduction

On July 9, 2002, representatives of five CQM members from the Boston area and staff of the CQM Cambridge office met to create causal loops relating to obstacles to innovation. At the time some people from Boston area member companies had been asking CQM president Gary Burchill for help in improving their skill with causal loop diagramming. Simultaneously, there had been discussion about obstacles to innovation. Therefore, Gary called a meeting at which causal loop generation would be practiced on the topic of obstacles to innovation.

The business people participating in the meeting all had some familiarity with causal loop diagramming, having used the tool or at least having learned about its use (for instance, in an CQM MBC course<sup>1</sup>). The meeting offered an opportunity to improve causal loop diagramming skill while focusing on a kind of complex, somewhat intangible, problem that is of interest to many (e.g., innovation) and for which causal loops are a particularly useful tool:

- Innovation is complicated and messy which requires a tool like causal loops that can show networks of cause and effect with delays and not just immediate linear cause and effect.
- Causal loops are particularly useful to seeing the unintended consequences of what you are doing.
- Causal loops are well suited for helping people with different points of view about the paramount issue to see how the issue they emphasize is part of a greater network of issues.<sup>2</sup>

Present at the meeting were:

- Bob Stasey and David Zawadzki — Analog Devices
- Mary Bernier and Joe Veranth — Bose
- Krista Blair and Sharon Kalus — Boston Federal Reserve Bank
- Eric Bergemann, Gary Burchill, Mike Dattilio and Steve LaPierre — CQM Cambridge office
- Tom Headley and Marci Sindell — Haemonetics
- John Petrolini — Teradyne

In preparation for the meeting, Gary asked the participants from each of the above mentioned institutions to create an LP diagram on the theme of "What are the obstructions that inhibit innovation at

<sup>1</sup> *The Center for Quality Management Journal*, Vol. 11, No. 1, (Spring 2002), Mastering Business Complexity Special Issue.

<sup>2</sup> Peter Senge et al., *The Fifth Discipline Fieldbook*, Chapters 13-24, pages 87-190, (New York: Currency Imprint of Doubleday, 1994). *The Center for Quality Management Journal*, Vol. 11, No. 1, (Spring 2002), Mastering Business Complexity Special Issue, pages 65-76.

<company name>?" and to bring the LP diagrams with them to the meeting.

The agenda for the meeting was as follows:

1. Presentation and study of the LPs
2. Net Touch on the blue level labels from all of the LPs to determine the common stories regarding innovation obstructions
3. Creation of factor names from the red level labels of each LP by a pair of people including one from the company of the LP and one not from the company
4. Provide each participant with a complete list of factor names; with a pair of people handling each story from step 2, go through the list of factor names selecting those which seem relevant to the story
5. Still in pairs, create a tentative causal loop involving the factor names selected in step 5
6. Group the causal loops developed in Step 6 that have a common story/loop label
7. Working in teams, refine the group causal loops developed in step 7 into intermediate causal loop diagrams
8. Integrate the intermediate causal loops into a single overall causal loop

## II. The detailed steps carried out at the meeting(s)

The following sections, each numbered as per the above steps, describe the work of the people at the meeting, providing a detailed example of the creation of causal loops from LPs, noting various points of causal loop creation technique that were discussed by the participants, and highlighting some difference in point of view that various participants had about obstacles to innovation.

This paper is intended to provide a detailed example of the creation of causal loops. It should also be useful to readers wanting to stimulate their own thinking about obstacles to innovation; however, this paper doesn't claim to draw any firm conclusions about obstacles to innovation.

### *1. Presentation and study of the LPs*

Figures 1 and 2 show two of the six LPs that were presented. The LPs have been edited to make them anonymous.

# WHAT ARE THE OBSTRUCTIONS THAT INHIBIT INNOVATION AT XXXXXX?

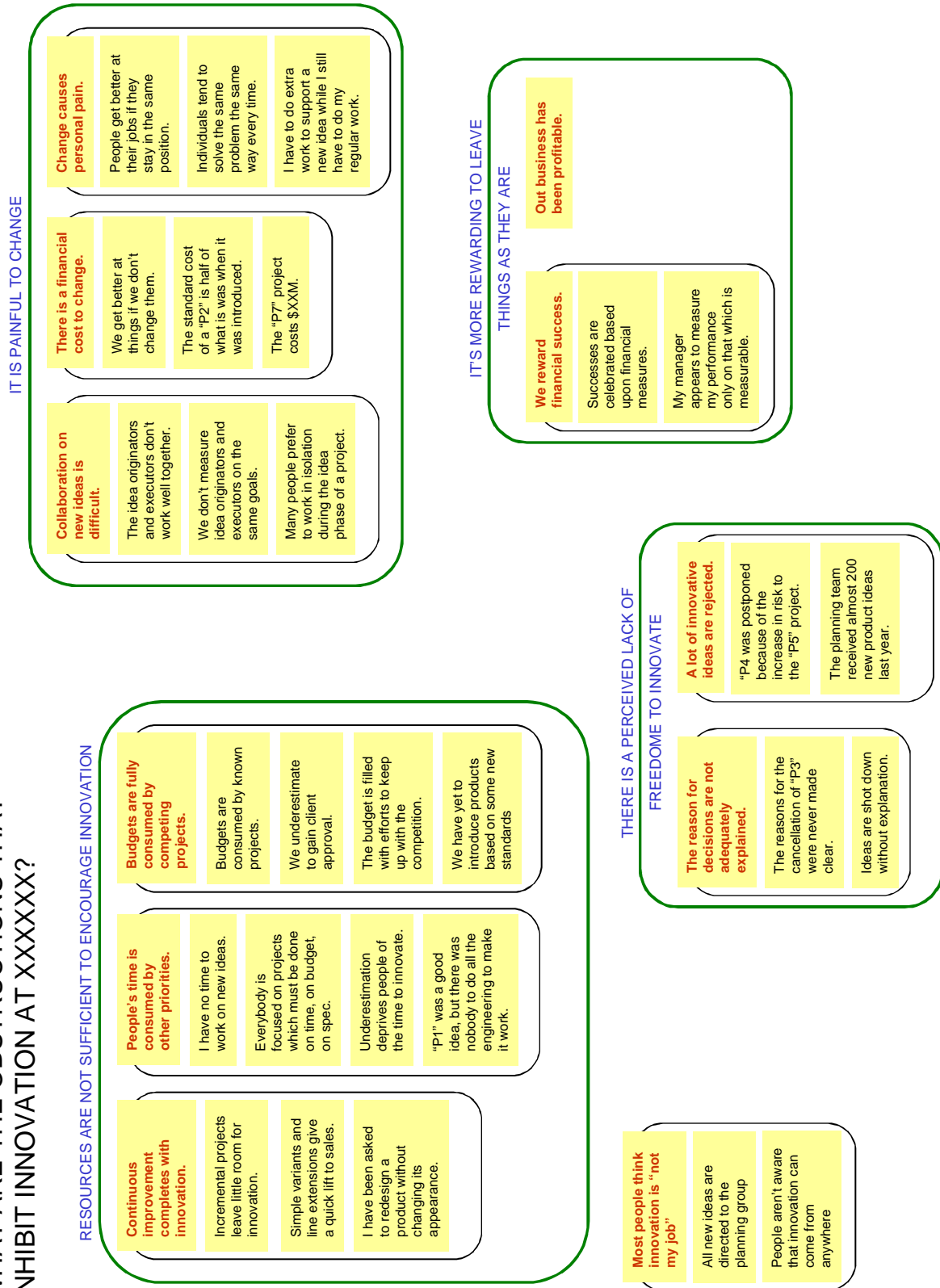


Figure 1

**WHAT ARE THE OBSTRUCTIONS THAT INHIBIT INNOVATION AT XXXXXX?**

**A FOCUS ON SHORT-TERM PREDICTABLE EARNINGS GROWTH AND PROBLEMS CREATED IN THE PAST RESTRICT US FROM FOCUSING BROADLY ON THE CUSTOMERS' NEEDS AND STAFFING FOR INNOVATION**

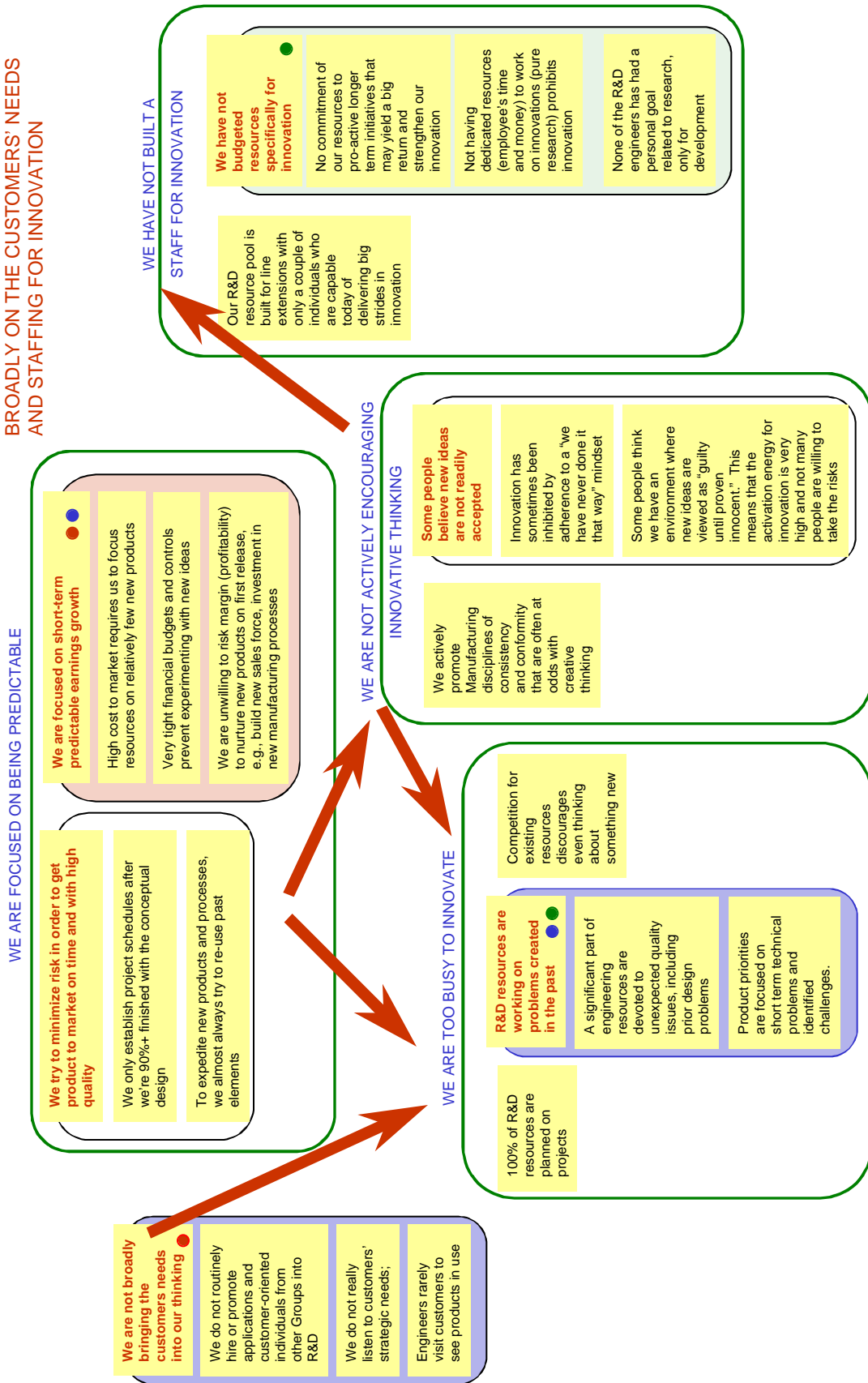


Figure 2

## ***2. Net Touch on the blue level labels from all of the LPs to determine the common stories regarding innovation obstructions***

This step produced the following common stories:

- It's painful to change
- We are not pursuing existing practices and processes that might lead to innovation
- No plan for innovation exists
- There is a perceived lack of freedom to innovate
- The past is a heavy burden on the present
- We are not actively encouraging innovative thinking
- We lack sufficient stimulation for innovation
- We are too busy to innovate
- We lack the time and money to innovate

## ***3. Creation of factor names from the red level labels of each LP by a pair of people including one from the company of the LP and one not from the company***

To provide the ability to trace back to where each factor name came from, the factor names are identified with the number of the LP and a letter denoting which red label it came from (for instance, factor name 4C is the third factor name from the fourth LP). We won't bother to reproduce here the lists of factor names produced from each LP. These can be seen spread across the causal loops illustrated in step 5.

## ***4. Provide each participant with a complete list of factor names; with a pair of people handling each story from step 2, go through the list of factor names selecting those which seem relevant to the story***

You can see which factor names were judged as relevant to each story by looking at the causal loops shown in step 5. The factors with an "X" for the number were factor names created by the team to eliminate a "leap of logic" in the causal loop diagram. Occasionally, when building a causal loop diagram, you are quite happy with the loop's intent but find the transition from one factor name to the next in some part of the diagram represents a leap of logic. Accordingly, you have to create the "missing factor" and number it with an "X" to indicate it did not come from a source document.

## ***5. Still in pairs, create a tentative causal loop involving the factor names selected in step 5***

The tentative causal loops that were created in this step are shown in Figures 3 through 11.

The Os and Ss throughout these figures indicate the relationship between successive factors within a causal loop. For instance, in Figure 3, if "risk aversion" goes up or down, "idea rejection" goes in the same direction; and,

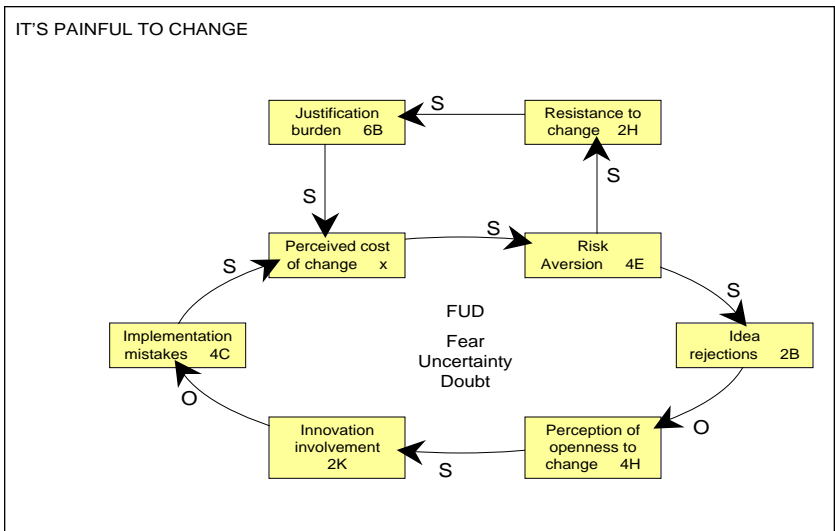


Figure 3

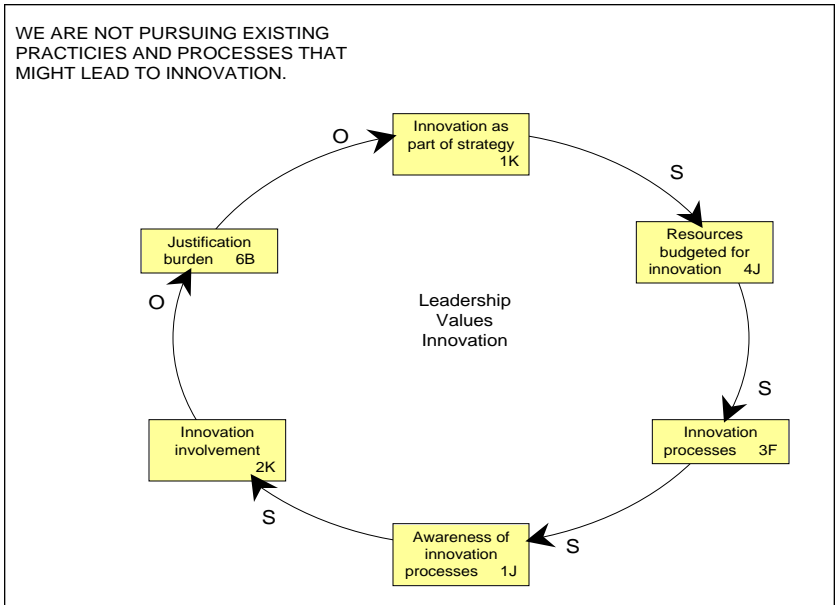


Figure 4

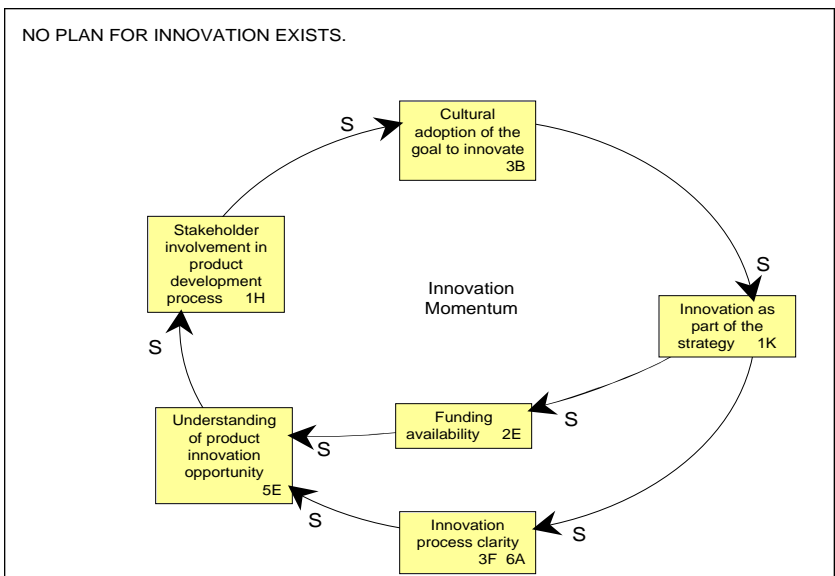


Figure 5

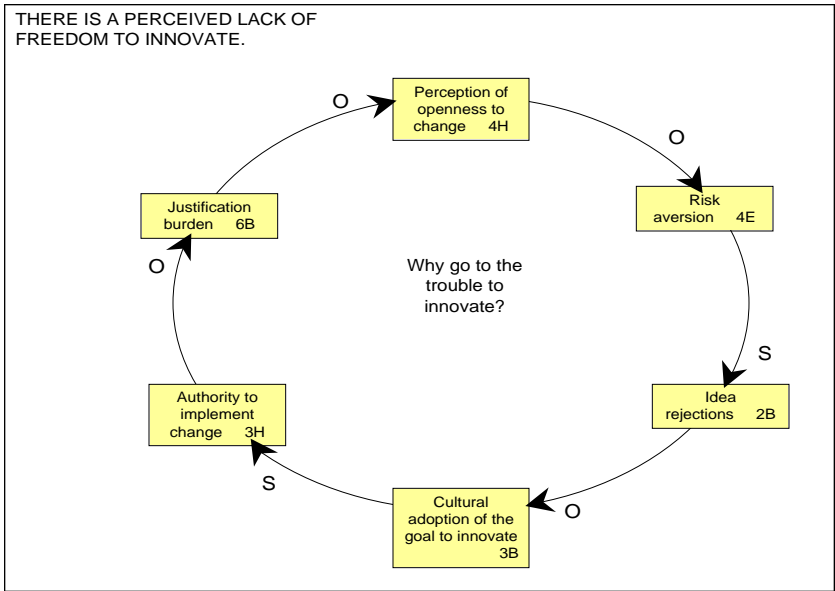


Figure 6

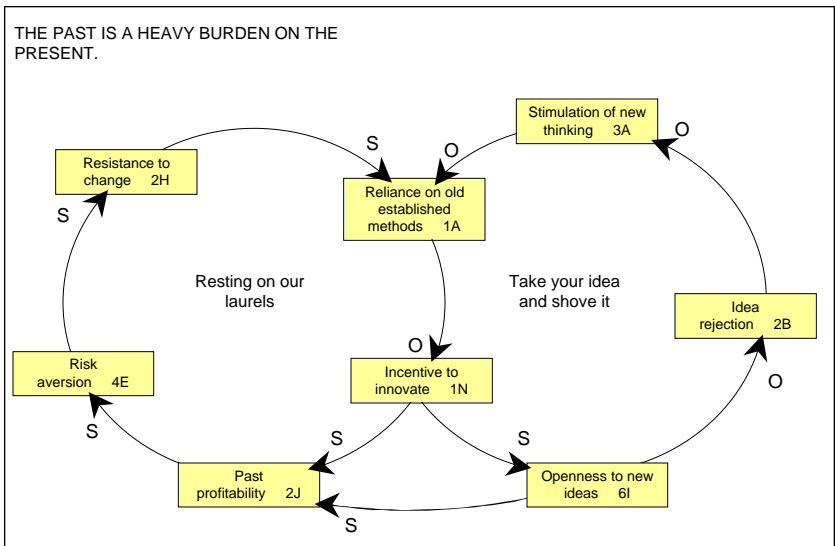


Figure 7

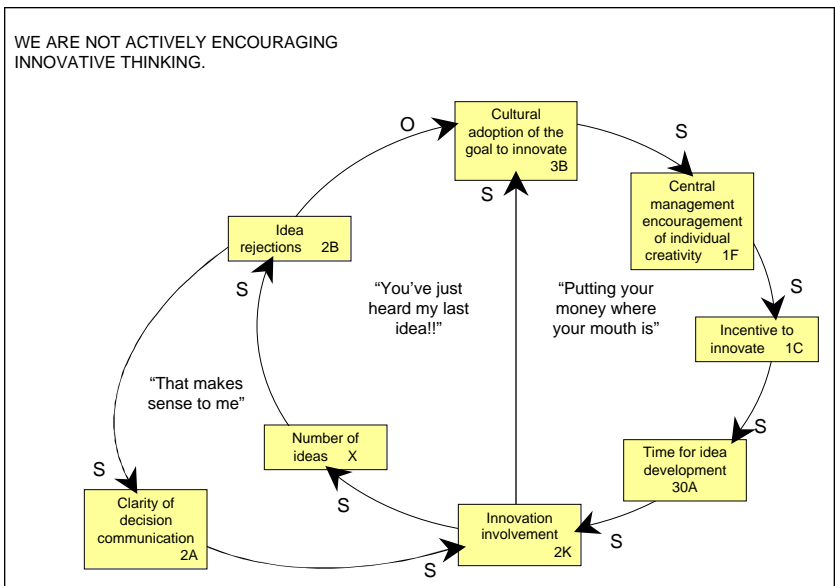


Figure 8



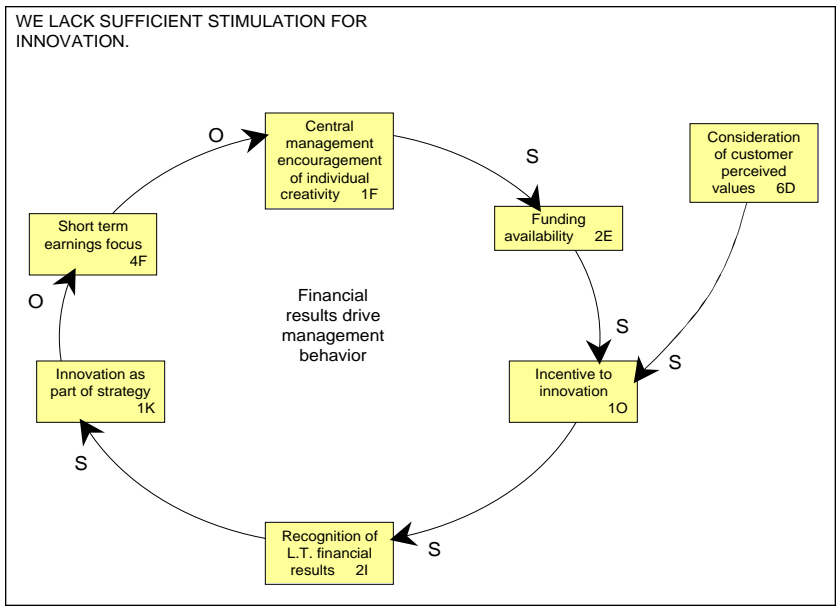


Figure 9

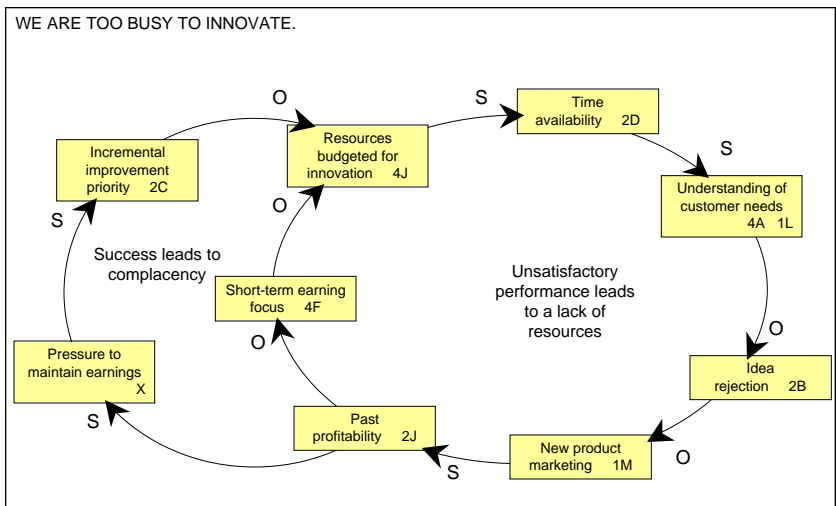


Figure 10

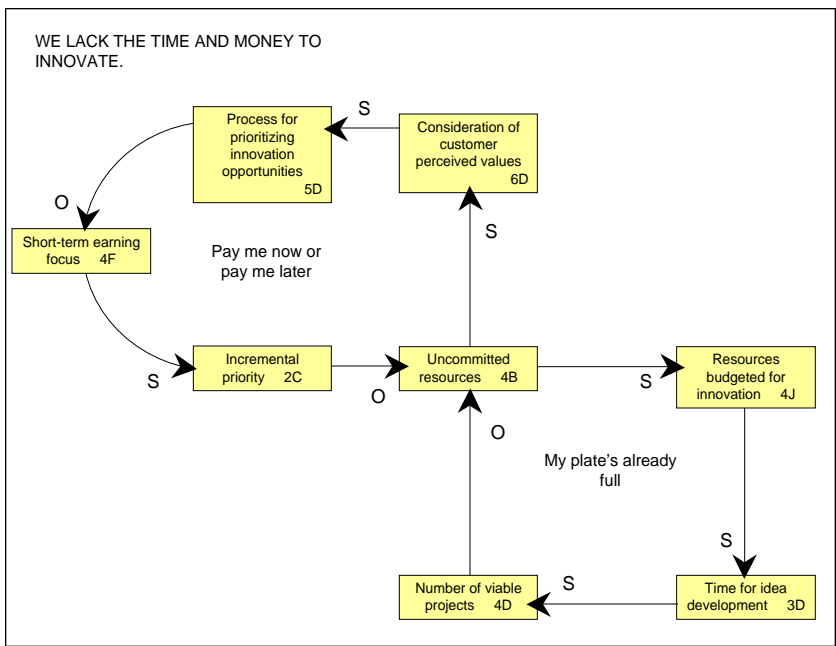


Figure 11

if "idea rejection" goes up or down, "perception of openness to change" goes in the opposite direction.

Constituent loops within an overall causal loop are given a description, for instance, "fear, uncertainty and doubt" in Figure 3. There are fourteen such descriptions on the causal loops of Figures 3 through 11.

**6 & 7. Group the causal loops developed in step 5 that have a common story/loop label; Working in teams, refine the group causal loops developed in step 6 into intermediate causal loop diagrams**

The constituent loops from step 5 that seem to be related were combined together and refined into "intermediate" causal loops, as shown in Figures 12 through 16.

Three of the loop labels from steps 5 were combined to create the causal loop of Figure 12; the three loop labels are shown in the upper left corner of Figure 12. Three loop labels were combined for Figure 13. Two loop labels were combined for Figure 14. Two loop labels were combined for Figure 15. Four loop labels were combined for Figure 16.

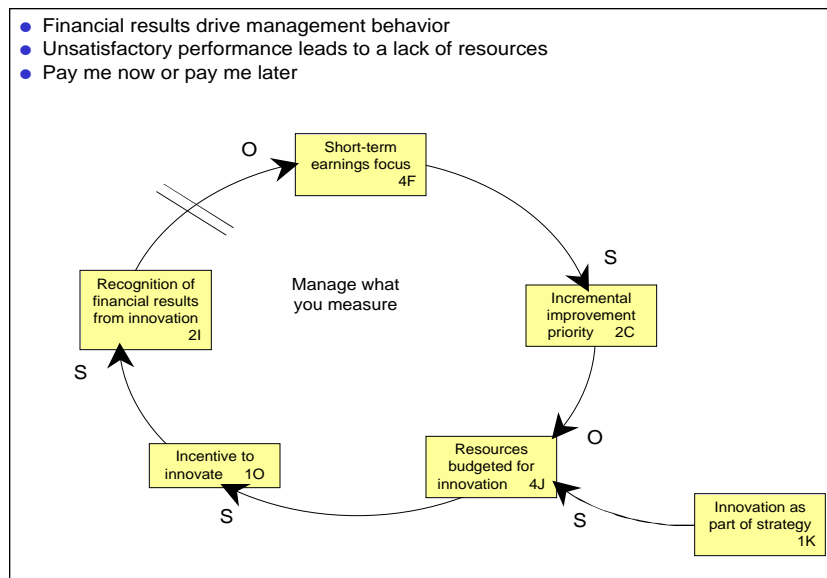


Figure 12

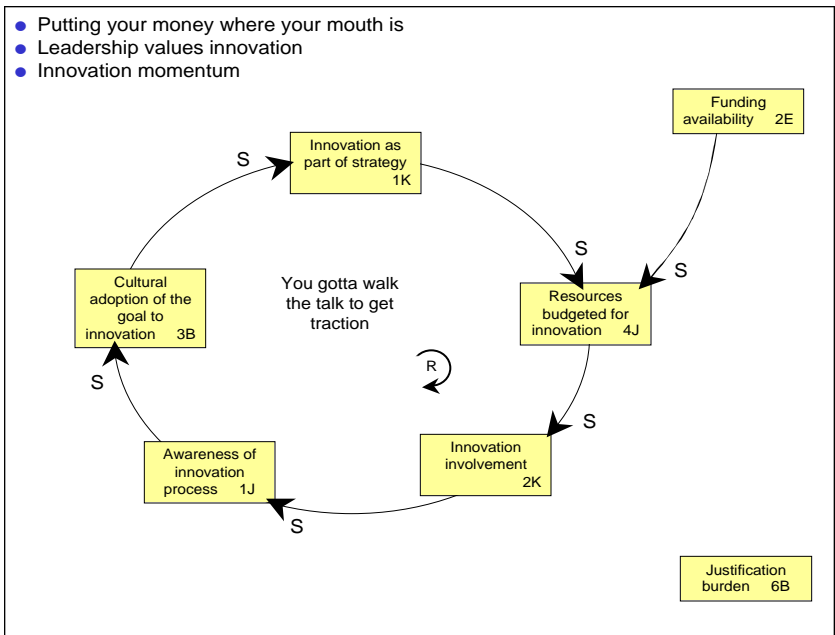


Figure 13

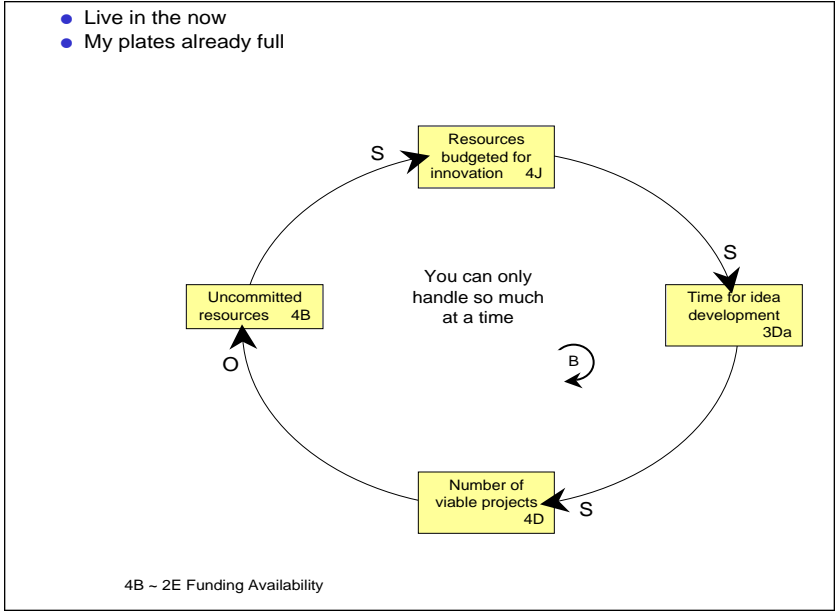


Figure 14

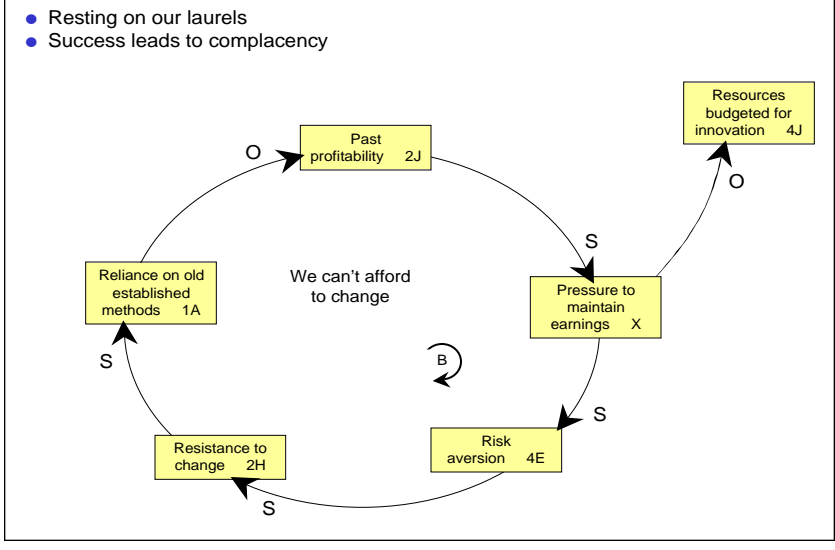


Figure 15

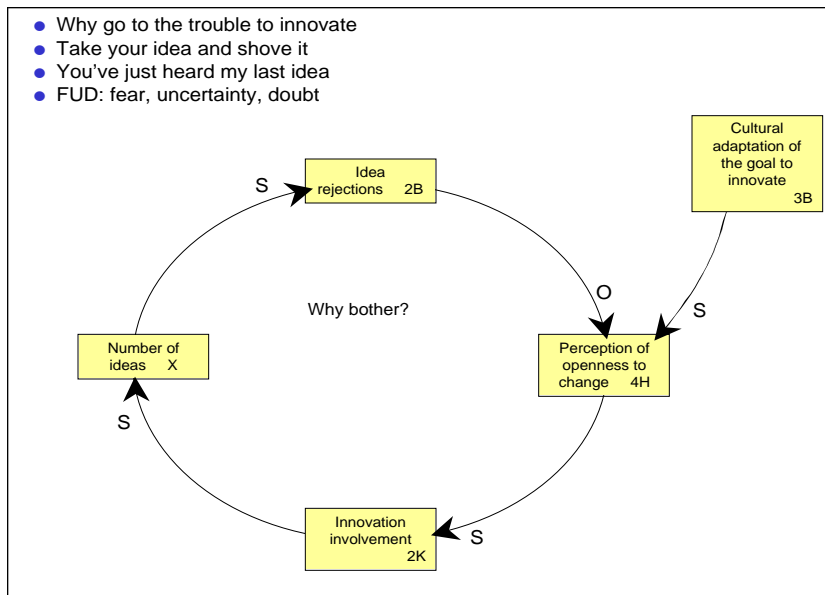


Figure 16

### 8. Integrate the intermediate causal loops into a single overall causal loop

Although the step of combining the individual loops into a single integrated loop was attempted by the group of people at the July 9 meeting, time ran out, and another meeting was scheduled.

A second meeting was held on August 8 at Bose. Present for the second meeting were Bernier, Burchill, Dattilio, Sindell, Veranth, and Zawadzki.

In between the two sessions, Gary Burchill reworked the intermediate loops from the first meeting, to make them simpler. He then drafted a final causal loop diagram out of his revised versions of the intermediate loops. At the start of the second session, Gary walked the rest of the participants through his re-structured intermediate loops into his integrated causal loop diagram, seeking validation and improvements from the participants. The final integrated causal loop is shown in Figure 17.

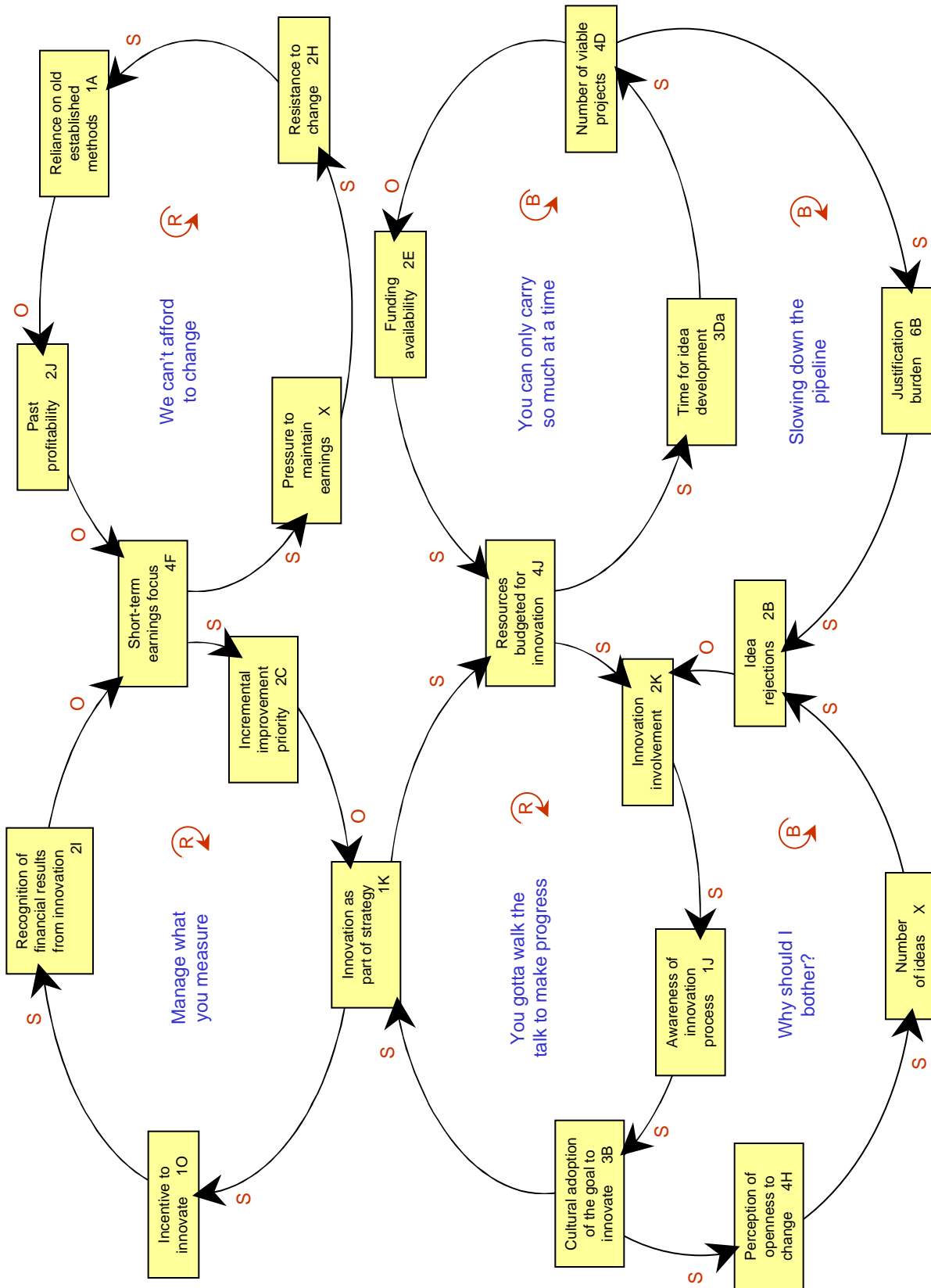


Figure 17

### III. Reflections by some of the participants

Mike Dattilio says:

"It seems that a group going through this process can only bring it so far, maybe to the 1st level causal loops, the intermediate at best. At that point, it really takes one person who is experienced with causal loop building to take all the intermediate loops and combine them into the integrated diagram. That task is not a group exercise. Once the integrated is put together, the group can review and suggest improvements.

"Another observation was that simplifying the intermediate and final loops by eliminating factor names in the flow where possible gave strength to the final diagram. A systems purist might disagree with this, but for our purposes of looking at the whole system to see where we might take action, the higher level view was perfect. Having the first level loops were then useful if we were trying to take action."

Marci Sindell says:

"A key learning for me about using complex causal loops to drive action was to present one single loop at a time, with a "catchy" label, in order to build up to the bigger story created by the combination of the loops. When Gary Burchill walked through the innovation loops in this way, it was very powerful.

"Also, it is very difficult to create complex loops in a group. It works best to do single loops in small groups, evaluate them in a larger group, then let the best causal loop-maker in the group go off and work out the integration to share with the larger group. Steve LaPierre thought he had figured out how to do this in a group, but then in facilitating for us changed his mind, too, and worked through it himself.

"Finally, it is better to simplify loops before labeling them. Some people just can't think in the multiple dimensions required to integrate loops — this is definitely a skill earned with practice."

Eric Bergemann says:

"It is probably impossible to create a single unified theory that addresses the obstacles to innovation in any organization. Nevertheless, I think participants on our teams discovered many shared experiences, and shared pain, which point the way towards a more comprehensive understanding of what is required to innovate in an organization. The common framework was first apparent through recurring themes in the individual LPs — then, through the relative ease with which factors from those diverse LPs were combined into tight, logical intermediate loops — and finally, in how the integrated loop tells a coherent story about the importance and difficulty of balancing daily work, improvement work, and breakthrough work.

"While I wish that causal loop diagramming could still be made easier, it is encouraging to see how it can build directly upon widely disseminated LP skills."

Gary Burchill says:

"This mutual learning exercise demonstrates three essential points that are important for CQM members to appreciate.

"First, problems that are persistent within one company may also be pervasive across the wider CQM membership. In this instance, obstructions to innovation impacted: service (Federal Reserve Bank and CQM), consumer electronics (BOSE), medical equipment (Haemonetics), capital equipment

(Teradyne), and electronic device (Analog) companies. While there were many common themes across the participants, most company's also brought unique perspectives. Several us instantly recognized a "unique" perspective brought by one member as also relevant to our organizations even when it did not appear on our LP. In short, the organizational defensive routines that a given company has create "blindness" that prevent us from "seeing" some relevant things. Fortunately, each company has its own set of blinders and collectively we end up with a much wider field of view.

"Second, since every participant shares the "common language" of Language Processing diagramming, it was a very efficient way for everyone to get grounded in the specifics and generalities of any given company's innovation obstructions. The trust that has been built up by the participating companies also facilitated a willingness to share less than flattering perspectives of ourselves. This allowed us to quickly make the connection to another company's obstruction that was relevant but missing from our own LPs.

"Third, taking the LPs one step further into causal loop diagrams was really useful. An LP allows a given individual to ensure their paramount concerns are represented in the discussion. Causal loop diagrams illustrate how the major concerns of one participant are directly, or indirectly, related to the concerns of someone else. In this way, it significantly improves the ability of participants to legitimize the perspectives of others. We know from our work on conversations, that legitimizing the perspectives of others is essential to building a multi-view that allows us to find the shared concern that leads to effective commitments for action around the high-leverage points identified in the causal loop diagram.

"Finally, while the primary purpose of our mutual learning session was to gain more experience with a specific tool, many of us found significant benefit in what we learned about obstructions to innovation."

