TEACHING BRIEF

The Supply Chain Puzzle Game: Highlighting Behavioral Issues in SCM

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INTRODUCTION

Managing the 21st-century supply chain (SC) requires unique skills. Participative learning can help teach them. For example, the Beer Distribution Game is used to show the cost created when information is not shared. Unfortunately, after playing the Beer Game, students often believe technology is the answer to SC coordination. They fail to see how behavioral issues complicate collaboration. A need exists for an interactive exercise to demonstrate the effects of human behavior on SC collaboration. We present the “SC Puzzle Game” as a tool to give students firsthand experience with the behavioral challenges that can hinder SC collaboration.

THE SC PUZZLE GAME

No company possesses all the resources needed to succeed. Managers must bring together the complementary competencies of SC members. In this respect, managing a SC is like putting a puzzle together. Managers who learn to identify the right “puzzle” pieces regardless of where they are located in the chain can help their companies succeed. Of course, getting other members of a chain to share pieces of the puzzle can be a real challenge.

The SC Puzzle Game itself is simple. Each team is given the pieces to a 50–100-piece puzzle. The teams compete to see who can put their puzzle together first and win a prize. What the teams do not realize is that puzzle pieces have been dispersed among the other puzzles—no team can complete its puzzle without interacting with the other teams.

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Game Setup

The SC Puzzle Game can be played with 4–12 teams of 3–6 players. The game Administrator should plan on a minimum of 40 minutes to play the game. The schedule for a 40-minute game would be as follows: 10 minutes to provide instructions, 20 minutes for a winner to emerge, and 10 minutes to debrief.

Before class, the Administrator obtains enough puzzles so that each team can assemble its own. The puzzles should be distinct, but of a similar type so that it is not readily evident that puzzle pieces have been interchanged. Each puzzle’s pieces should then be placed in a zip-top bag—it is important that teams do not see the puzzle’s actual box that shows the picture of the completed puzzle. After all, managers seldom know what the optimal SC network looks like.

The Administrator removes three pieces from each puzzle. The first piece is exchanged on a one-for-one basis with another team’s piece, creating interdependence and the opportunity for mutual exchange. A second piece is transferred randomly to another puzzle. This creates asymmetrical power; that is, the seeking team has nothing of value to trade for its missing piece. The third puzzle piece is placed in a zip-top bag and withheld from all other puzzles. This piece represents regulation, tax policy, environmental issues, and other external forces that affect SC collaboration. Finally, three pieces from an exogenous puzzle are added to each puzzle to represent complexity—excess stock-keeping units, non-value-added activities, or redundant suppliers.

The only other materials required are (1) a reward and (2) a mechanism to identify the winning team. A six-pack of Snickers usually motivates insightful interactions. The candy bars make it easy for members of a winning team to enjoy a personal reward; however, if two or more teams decide to collaborate, too few candy bars exist for everyone to have one. Either a creative reward sharing system must be devised or somebody has to sacrifice. If the Administrator desires to heighten the barriers to collaboration, participation points can be added to the winning team’s grade. To identify the winning team, an overhead that shows a “Winner’s Circle” is projected on the screen throughout the game (see Figure 1). The first team to complete its puzzle uses a designated transparency marker to write its number in the designated spot within the Winner’s Circle. The Winner’s Circle mimics the real-world emphasis on success.

Game Process and Rules

To begin the game, the Administrator invites representatives from each team to come forward and select their puzzles. The Administrator should announce that the zip-top bags are to remain sealed until the game officially begins. The Administrator might say, “Any team that opens its bag before I say ‘GO’ will be automatically disqualified.” The Administrator then explains the game, saying something like the following:

The objective of the game is to complete your puzzle as quickly as possible. You can assemble your puzzle anywhere in the room that you like. The first team to complete its puzzle should have a member of the team come to the overhead projector and write the team’s number in the Winner’s Circle using
Figure 1: The winner’s circle.

The Winner’s Circle

The magic word, “GO,” was never used and that the teams with open bags should be disqualified. Protests will emerge, but it is important to point out that all may not be as it appears, especially in global settings. Because most of the teams would be disqualified, the Administrator announces that a second chance will be given to the disqualified teams. After the teams have replaced their puzzle pieces and sealed their bags, the Administrator begins the game by saying, “GO.”

Once the game begins, many teams immediately begin to put the puzzle together. Others devise a strategy, assigning different team members to specific roles such as to find edge pieces or group pieces by color or shape. The Administrator can then discretely place the zip-top bag that contains the final piece to each puzzle in a central location close to the overhead projector. The goal is to place the bag out of sight, but accessible to someone who is looking for some missing pieces. All of the pieces needed to complete the puzzles are now in play.

Early in the game, someone asks if all the pieces to the puzzles are in the bag. The Administrator should say that, “All of the puzzle pieces are in the room.” All questions should be answered factually. It only takes a few minutes before the first team realizes that some of the pieces in its bag do not belong to its puzzle. Someone quickly guesses that some pieces to the team’s own puzzle are probably missing. While the team may keep this insight to themselves, it is not
uncommon for someone to announce to the other teams that the pieces have been interchanged. As members of different teams scour other teams’ puzzles looking for their own puzzle pieces, the game gets interesting and relationship strategies begin to form.

**Game Strategies and Expected Outcomes**

The SC Puzzle Game enables teams to pursue competitive or collaborative strategies to obtain missing puzzle pieces. As teams observe others’ behavior, strategies tend to evolve. This fact creates learning opportunities that focus on how a team wins rather than who wins.

One of four process outcomes is possible: full collaboration, selective collaboration, general competition, and impasse. However, in 50+ games, the full-collaboration outcome with all the teams working for a common goal and a win-win reward-sharing scenario has never resulted. A lack of leadership, communication challenges, and self-interest lead to a breakdown in full-collaboration efforts. The other extreme, complete impasse has occurred once.

Selective collaboration and general competition processes occur most often. Selective collaboration involves teams working together to complete one puzzle. The rewards are shared. A leader is needed to sell the idea that working together is the only way to complete a puzzle before one of the other teams. By joining efforts, the alliance teams not only have more people to do the work but they also have more puzzle pieces to negotiate with to obtain their missing piece. General competition strategies are motivated by individual competitive spirit and magnified by the reward system. A “go-it-alone” mindset results. Teams intentionally hinder other teams by refusing to share puzzle pieces. More extreme behavior results when individuals decide that they have been treated unfairly or that they simply cannot win. Puzzle pieces are stolen, the process of marking the Winner’s Circle is sabotaged, and the candy bars sometimes disappear.

**Debriefing**

As the game concludes, the Administrator requests teams to put the puzzles back in the zip-top bags and asks everyone to think about key learning points. A nominal group technique (NGT) can be used to (1) involve the entire class in the debriefing and (2) more fully capture and emphasize the learning points. The Administrator might begin the NGT process by asking:

- “Why was it so hard to assemble your puzzle and what does this imply for SC management?”
- “What aspects of the game process did you find frustrating?”
- “As a manager, what learning points should you remember to improve SC collaboration?”

The debriefing should conclude by reviewing a summary overhead or PowerPoint that reiterates critical learning points. Figure 2 exemplifies key points that should be covered. (Table 1 provides some brief notes to help the Administrator prepare for the debriefing session.) If time is short, the Administrator may lead a brief discussion before presenting the summary slide.
Figure 2: Learning objectives.

Learning Objectives: Putting all the Pieces Together

- Global SC design is more complicated than putting a puzzle together.
- Even when the rules appear clear, subtle but vital issues are hidden in the subtext.
  - relationships  • culture  • connections  • legalese
- Supply Chain managers don’t know what the optimal network should look like!!
- Managers never have all of the pieces—some of the missing pieces might be
  - information  • processes  • technology  • capital
- Missing pieces might be found within the organization or in the hands of
  - suppliers  • customers  • 3PLs  • governments
- Not every one is willing to share the key pieces on a quid-pro-quo basis.
- Some people are willing to go to extremes to further their own self-interest.
- Complexity complicates SC decision-making. Complexity results from
  - SKUs  • DCs  • suppliers  • customers
- Traditional measurement & reward systems lead to counterproductive behavior.

Table 1: Teaching notes for the debriefing session.

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<thead>
<tr>
<th>Learning Objectives</th>
<th>Supply Chain (SC) Decision-Making Element</th>
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<td>SC design is complicated</td>
<td>SC management allows a company to focus on what it does best, outsourcing other value-added activities. SC management requires distinct competencies possessed by multiple chain members to be identified and brought together. Most chains consist of far more than 50 to 100 pieces.</td>
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<td>Subtle issues, clear rules</td>
<td>Managing a global SC requires that managers be aware of cultural, regulatory, legal, and other issues that affect relationship development and collaboration. For example, cultures view time differently. Some are monochromic, others polychromic, affecting not only personal relationships but also project scheduling.</td>
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<td>Optimal network unknown</td>
<td>Network design is dynamic. For example, changes in exchange rates, the emergence of new suppliers, evolving customer requirements, technological innovation, and regulatory issues all influence the number and type of SC members needed to achieve competitiveness.</td>
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As with other simulations, the SC Puzzle Game does not depict reality perfectly; rather, it provides a simplified worldview. Even so, the game demonstrates that behavior is as vital as technology to enabling a winning SC strategy. Further, the dynamic game process and interactive discussion make impressions that participants remember long after the game is played.
**Missing puzzle pieces**: Managers must identify the right of information, technology, and processes needed to build a competitive SC. They must then find the chain member who possesses them.

**Location of missing pieces**: Missing pieces are found in expected places like the company’s network, its suppliers, its customers, and its service providers. However, in global SCs, other groups including governments, nongovernment organizations, and multilateral agencies influence design and collaboration decisions.

**Shared pieces**: Collaboration requires that different members of the chain share information, expertise, and resources of all kinds. Because these pieces of the chain represent power, not everyone is willing to share. Collaboration mechanisms must be built to enhance sharing.

**Self-interest and behavior**: Self-interest is a very powerful motivator. SC managers need to be aware of this and build a culture of collaboration. Several ethical issues can also be discussed here, including ethical leadership.

**Complexity**: Complexity drives costs up and reduces a chain’s ability to respond to customer needs. SC complexity is found in the company’s network, stock-keeping units, and processes. It is also found in the supply base, the customer base, and the service provider network.

**Measurement systems**: The emphasis on a single winner and the nature of the reward promote self-interested decision making. Teams define their world as their team rather than a broader set of potential alliances.

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