

Game Theory

What is it?

Game Theory is the analysis of all possible decision-combinations taken by all participants involved in a strategic issue.

In many business situations multiple decision-makers (or “players”) with conflicting interests must choose an action that affects both the actions other players may take and the rewards for all parties involved.

Game Theory is a branch of mathematics that models such situations in order to determine the **strategies** decision-makers should adopt to **best achieve their goals**.

1994 - John Nash awarded Nobel Prize in Economics for pioneering work in Game Theory.

Due to the complexity of the interactions between players, other more traditional decision analyses are insufficient. Game Theory is precisely about making **optimal decisions** when facing **dynamic opponents**.

Present Day

Traditionally applied by governments and only the largest corporations, advances in computer technology have now leveled the playing field. Professionals today are employing Game Theory models and methodology for:

Stay ahead of the game.

Anticipate and influence the actions and reactions of other parties.

- Arbitration
- Conflict Resolution
- Labour Disputes
- Negotiation
- Bidding
- New Product Introductions
- Engineering corporate strategy
- Forming strategic alliances and joint ventures

Success Stories

Some ground-breaking Game Theory applications:

- FCC to **perform** \$7B auctioning of broadcast frequencies & 3rd generation mobile licenses.
- Homeland Security to **analyze** the risk of future terrorist attacks.
- Hewlett-Packard to **develop** its framework for an automated Negotiation Support System.
- IBM and Mars Inc. to **save** Freight Sales \$70 million a year through a game-theory based procurement system.
- Major League Baseball to **perform** salary negotiations.
- US President George W. Bush Presidential Campaign Strategy Team to **help** win 2 elections.
- Panama Canal Negotiations (1978) to **unravel** intractable diplomatic entrenchments.

Syllogix's Game Theory Process

1. Consultation

- Co-client exploration, and definition of issues and involved parties.
- Market/industry experts brought in, if required.
- Co-client selection of scenario and player preference mappings.

2. Modeling

- Define the “scenario state-space” which lists all possible decision-combinations among the parties involved.
- Preferentially rank decision-combinations according to the goals of each decision-maker.

3. Analyses

Our powerful algorithms conduct and trace Path Analyses (tactics) from the status-quo (the strategic issue as it stands now) to Unilateral Improvements (competitive stance) or Mutually-Beneficial Resolutions (co-operative stance). This provides a step by step means of moving the strategic issue to the desired resolution.

- Equilibria Tests: for identifying the absorbing states (likely resolutions) in the game and the forces that sustain these. These absorbing states are decision-combinations from which no decision-makers would have a unilateral unsanctioned incentive to deviate from.
- Simulations: for iterative scenario/policy testing.

4. Solution Delivery

To ensure full transparency and understanding of the model and its implications, we provide:

- Comprehensive reports detailing recommendations, with:
 - Prescriptive detail: to predict, anticipate and influence the decisions of the other parties.
 - Descriptive detail: for conflict resolution, dispute mediation and arbitration.
- A dynamic real-time decision support system (DSS), if applicable.

Benefit from Game Theory

Improve Negotiation Performance

Define your negotiation position and gain true bargaining power.

Own Your Strategy

Assume control. Seize the initiative. Should you compete or co-operate?

Build Consensus

Single out issues and strategies.

Increase Visibility

Know what to expect - reduce uncertainty, or profit from it.

Identify Opportunities

Break dogmatic thinking. Reveal all options and strategies, and then choose the best one.