



Nash Equilibrium for Business Leaders



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Nash Equilibrium for Leaders

Abstract: This short article proposes making the business value of the Nash Equilibrium more available to business leaders and to offer a mental map for its application in strategy development, business performance and measurement. Nash's approach proves that a strategy exists that is good for you, good for your competing and cooperating stakeholders, and is so sturdy that full transparency will not diminish its payoff outcome. In other words, there is an 'equilibrium' strategy in a stable, productive, organic balance with the other business forces (Porter, et al). Although there are no really ugly formulas or indecipherable mathematics ahead, there are some very cool graphs and ideas.



Introduction

In the movie, *A Beautiful Mind*, Russell Crowe portrays the brilliant mathematician John Nash, Princeton University legend, Nobel Laureate, and paranoid schizophrenic. The movie describes Nash's personal struggles, failures, and triumphs, as well as something of the mind of this creative genius, and just the barest hint of his insights into competitive game theory and the Nash Equilibrium. As a management consultant, and a recovering math major, I was inspired to research Nash and his prize winning work from a business management perspective. Not surprisingly, I discovered that it had some valuable insights into leadership, competitive strategy, performance, operations and, ultimately, organizational culture.

Applications of Nash Equilibrium

Definition: The Nash Equilibrium exists when your strategies value is unchanged, whether you know your competitor's strategy, or not, and this is also true for your competitor. In other words, if competitors have the same outcome probabilities after their opponents plan is revealed, then the competition is in a Nash Equilibrium.

Conditions: in its simplest form, the competition is between two players with one strategy each, where a win for one player is a loss for the other. Although the math can get sticky (it took a genius to figure it out, after all), a Nash Equilibrium will exist for multiple players with multiple strategies with mixed (non-zero sum) outcomes. Basically, it can apply to all competitive games from sandlot soccer to global thermonuclear war. More importantly, it can be applied to business competition, cooperation, bureaucratic turf battles, internal budget fights, and about anywhere you have competing strategies, policies, programs, and priorities.

Limitations: Nash equilibrium is not necessarily the highest value outcome. For example, two competitors, after revealing their strategies, may decide they will get greater benefit by forming a cartel to fix prices or use collective bargaining to fix wages. A strategic equilibrium might be of no value: a 'belling the cat' strategy might be in equilibrium, but the results for the mice are no better with the strategy than without.

Value: The simple insight, and the subsequent rigorous mathematical proof, is that you cannot assess the value of a competitive strategy without taking in the strategy of the other competitors. As a corollary, in most mixed strategy competition there is a stable, sustainable, and predictable strategy that benefits both you and the competitive group you work within. What this means is that a strategy exists that is good for you, good for your competing and cooperating stakeholders, and is so sturdy that full transparency will not diminish its payoff



outcome. In other words, there is an ‘equilibrium’ strategy in a stable, productive, organic balance with the other business forces (Porter, et al).

How to think about it.

Challenges: Rarely are competitors’ strategies fully known to you. Truth be told, they may not be fully known to themselves, as yours may not be known to you. However, much can be determined by the pattern of previous actions and forecasting that pattern onto the current competition, be it a response to a request for proposals, a border incursion, or the Super Bowl.

Additionally, seeing a strategy that requires a sustained investment and promises a larger payoff as more valuable than a strategy that requires a smaller investment and gives an immediate payoff, takes measurable intellectual horsepower and considerable personal and organizational courage. Always in short supply, these unique attributes of management have no substitutes, and cannot be conjured up on demand.

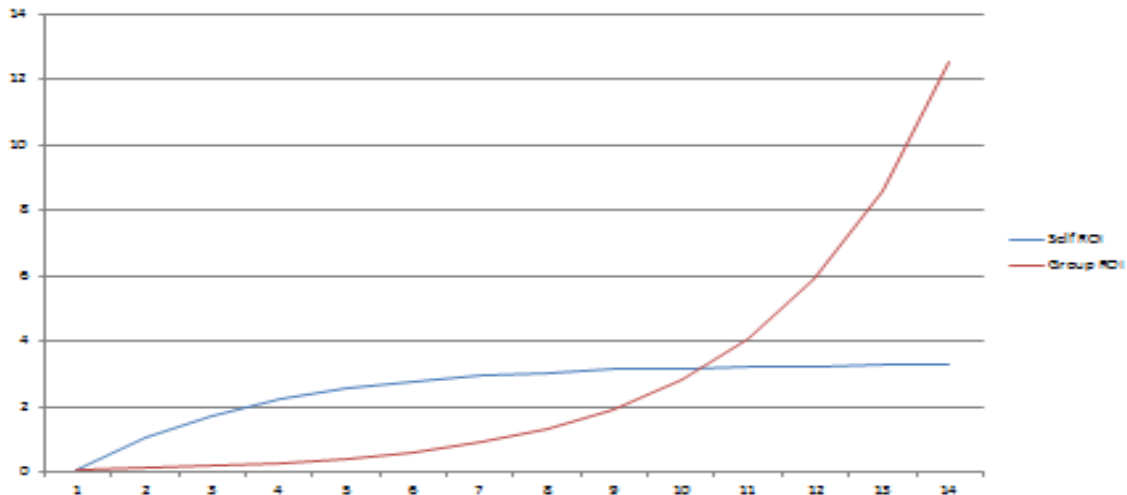
Finally, choosing one strategy limits the value of the other. Investing in a strategy that gives immediate benefit takes resources (time, talent, financial) that are denied to strategy that requires sustained effort with a deferred return. In short, you can’t have your cake and eat it, too.

Building the mental map

Competing strategic perspectives: Below is a simple graphic that displays the two strategic approaches. The bottom axis measures time and the side axis measures payoff. The blue line is a strategy that focuses exclusively on what is best for that competitor. The red line focuses on what is best for the stakeholders (customers, stockholders, employees, community, etc.).

This basic model illustrates the value and tradeoffs of the two the strategies. The blue strategies give greater return sooner and then plateau. Red strategies yield low returns now with rising returns much later. The Blue strategy focuses on rapid benefit to one company alone.

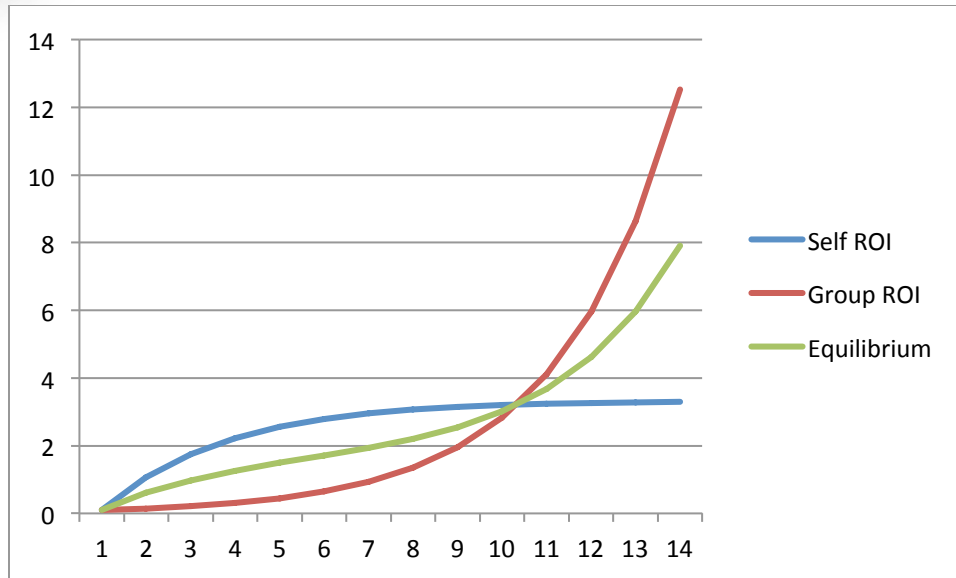
Strategy Payoff



The most obvious business choice is the Blue strategy; it has more immediate return, it appears to less risky since it can be changed or abandoned quickly allowing greater agility, is easier to understand, and can be implemented quickly. A common Blue strategy approach is to move nimbly from one fast growth opportunity to another as returns begin to plateau thereby continuing rapid growth by combining a series of high yield outcomes. This approach does not escape the diminishing returns conundrum; the outcome aggregation follows the same curve leading to a payoff plateau, with increasing costs for decreasing returns at increasing risks.

The intersection of the two strategic approaches illustrates another insight. Although the early, fast return on a business strategy is always appealing, the resources and organizational perspective that this approach requires makes it exceedingly difficult to move from one strategy to another. In other words, committing to one strategy prevents investment in the other; any strategy can only be evaluated in its context.

Nash's insight: Nash's key idea is that strategies must be evaluated in context. His observation, (which I have significantly simplified here) is that there is an equilibrium strategy that invests in both, trading off some immediate return in exchange for greater value later. In other words, there exists a strategy that invests both in your company and in your stakeholders, but does not optimize either. The advantage of this equilibrium strategy is that it is stable, relatively immune from shock, and sturdy enough to be transparent to competitors. Nash's observation is illustrated below.



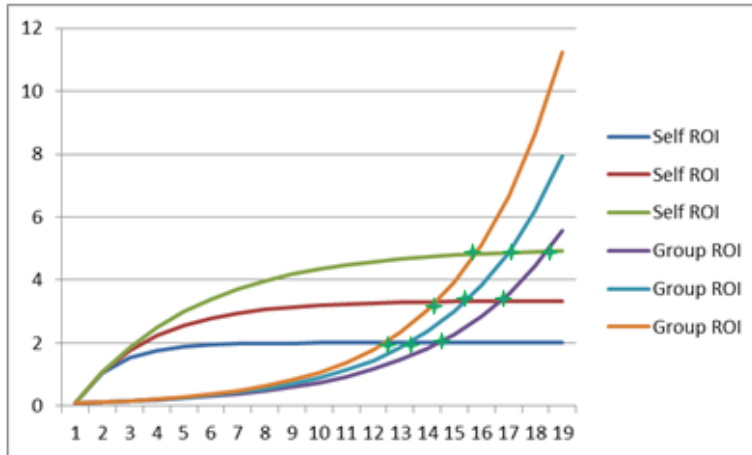
The intersection between the two strategies can be thought of an inflection point for the curve of an equilibrium strategy. Before this point, strategies that maximize self-interest have greater ROI, after this point, and increasingly, returns diminish in spite of increasing investment. It is also the point that group oriented strategies begin to increase their payoff at reduced costs; previous investments come to fruition and are harvested.

The challenge for the Blue strategy is how to avoid stagnation after the inflection point. The challenge for the Red strategy is how to survive until the inflection point when delayed returns balance previous investments. The dilemma is that fully committing to one approach prevents commitment to the other.

Perhaps the best illustration is financial investment strategies. Day trading, with rapid puts and takes, is a short term approach that seeks to concatenate quick returns before they plateau. It puts a premium on rapid decision making and high a volume of tightly focused information and can be a high risk approach. Conversely, value investing, takes much longer to provide considerable returns and is marked by deep research and consideration of a broad set of seemingly peripheral factors. Both strategies can be valuable and a diverse approach that includes both long and short term investments is usually recommended.

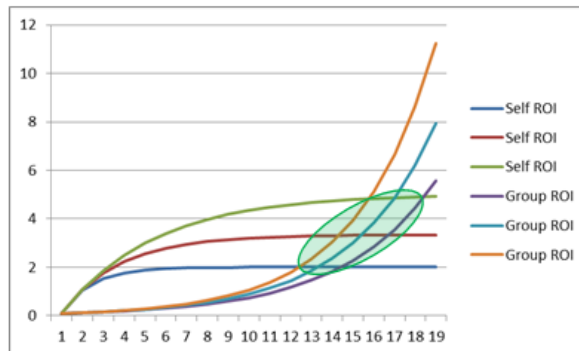
Complex model: Multiple strategic approaches that chain, combine or sequence different strategies are an excellent way to spread risk in response to unknown conditions. Additionally, just as there are complex sets of competitors, there are complex sets of strategies. What this means is that there are multiple equilibrium strategies as well with multiple inflection points where competing strategies intersect. The graph below illustrates this more complex domain.

Multiple competing strategies



This set of strategy intersections, when expanded into fluid environment of business interactions and rapid responses generate a cloud of inflection points that correspond to a set of equilibrium strategies. This cloud, illustrated below, is the aiming point of a business strategic, operational and organizational vision. It is the set of conditions which enable an organization to embark on a virtuous cycle of organic, stable, and sustained development.

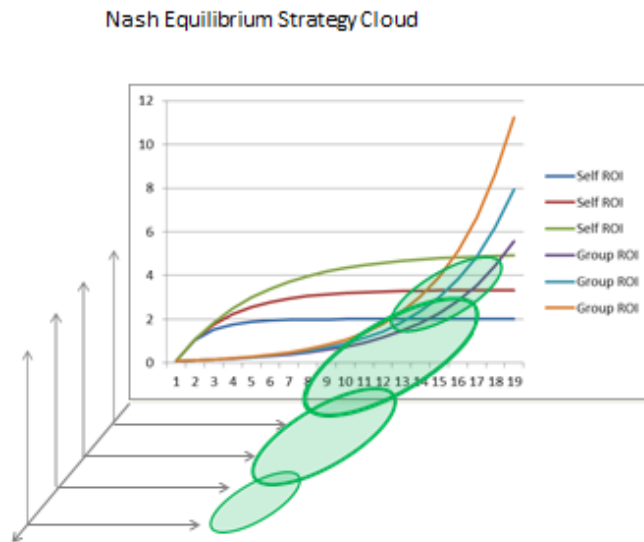
Nash Equilibrium



The challenge for an equilibrium strategy is what immediate return should be traded off now for what greater return later. The cloud is the mental model for business strategy planning and decisions; it is the strategic aiming point that yields the best return for the company, the community, both long term and short term. It is stable, sturdy, and transparent. This model



provides a rigorous, measurable performance structure to envision, develop and manage that equilibrium to the inflection point, and beyond it. This model can be further expanded over time, since neither strategy initiation nor payoff is simultaneous, but fluid and dynamic, as illustrated below.



The payoff

The nature of an equilibrium strategy is its stability and its transparency. This inherent sturdiness is the foundation for organizational confidence, adaptability, and business survival and expansion. In addition, this model, when fully documented and adopted is an excellent tool for measurable, long term performance metrics. It provides a structure for a data centric measure of community and stakeholder value, promoting key performance indicators and rigorous analysis of strategic value, in context with competing strategies and conditions. It gives the business leader and decision maker a richer perspective for strategic business decisions. This model, adapted for the business circumstances, creates the context essential to evaluating strategies and strategic results. It provides a strategic resiliency and a basis for continuous change and response to unexpected events.

The most important payoff to this model is it provides an organization a mental map for decision and operations. It changes the way an organization thinks in the context of its community of actors, including its competitors in balance with its customers, suppliers and other stakeholders and circumstances. This begins the sequence of organizational transformation



from thought to action, repetitive action to habits and policy, habitually executed policy to shared expectations, and shared expectations to manifest organizational culture.

VICI Labs

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