

The Sales Central Power Index

Leveraging Game Theory to Drive Growth

The most successful results for any company come from an offer their existing clients a broad array of applicable products. This provides the double benefit of meeting the ever-changing client need with the reduced acquisition cost incurred in selling to existing client. The challenge comes from the facts that each client has unique needs and objectives and their understanding and usage of any product is driven from these goals.

The cornerstone to building a successful campaign to increase product penetration and share of wallet needs to address all sides of this issue. The appropriateness of each offering is paramount. An understanding of the client's objectives, which drives what products a client will buy, is a vital. In addition, a complete understanding of the client's life cycle determines whether the introduction of the product is critical. The potential influence upon the broader relationship with a financial advisor and the financial services company makes selecting the right product for client at the right time the key to unlocking the real potential within any financial services arena. For most, this key has remained elusive

The recent turmoil in the industry has upset many clients to the point where the Financial Advisor needs to understand these criteria more than ever. Making the right proposals at the right time helps to overcome broad industry trends. Our key unlocks the door to this level of relationship, not only with a small and select portion of your business, but rather, with the entire relationship base across the entire enterprise.

Knowing current product usage of their clients does not enable knowledge of how complete each client relationship is. In order to meet changing client needs with Firm products (and grow towards a 100% share of wallet with all existing clients,) an iterative research is required to identify the next most appropriate product for each client by considering what products they use now. This has historically been done through the development of close personal relationship between advisors and clients. Successful advisors have these relationships with segments of their business. Unfortunately, the bandwidth of these advisors is limited by the time required to develop these successful relationships. Many organizations try to solve for this by delivering marketing materials touting a specific product. These campaigns have always had very low acceptance, specifically because of the untargeted approach taken. These campaigns need to be targeted to only those clients to whom the offering is adding value. This allows for less time wasted, for both the client and the advisor. Determining the correct population for each offer expands the bandwidth of advisors by enabling them to have more targeted communication, building trust by showing clients a thoughtful approach to their needs. Introduction of targeted offerings is a good start for companies to deliver appropriate messages, however in order to solve the issue completely, the targeting must be applied on holistic not partial view of the client.

The foundations for developing this perfect solution are in the calculation and application of the Power Index. This index has its roots in Game Theory and uses some of the algorithms inherent to this science.

Recognizing that each client is a player in their unique game enables the Principles of Game Theory. Game Theory states that if there is a game, there are rules, players, and groups. If a player wants to join the group, that player wants to gain positively from this alliance. For the group to let this player in, they need to benefit from the addition. Constantly changing rules are applied in a timely manner to the right game (client needs), the right player (client), and the

right group (product offerings.) A client will not buy a product if the need is not recognized. A company will not sell unprofitable products to generate long-term losses.

Sales Central has designed the perfect solution. We are the first to apply the principals of Game Theory specifically to the activity of Cross-Selling. We have developed our Power Index to complete the science. Three main differentiators result from our position:

- 1) We offer the only algorithm tailored to enterprise-wide cross selling. Since Sales Central is the first company to implement Game Theory & develop our Power Index around cross selling. Our Power Index allows our clients to identify, on a per client and per product level:
 - a) where the client is in their journey of completing the 100% wallet share products offered by the company
 - b) what each client is most likely to need
 - c) what each client is most likely to buy
 - d) the ranking of all products by the propensity of each client to need or want
- 2) We have the ability to tell our clients the importance of each product in the overall relationship with each client. Through our Power Index, we can answer the most critical questions and allow our clients to use this information to improve their client relationships.
 - a) How important is Product A to the overall relationship?
 - b) To what extent did the free checking or free trades impact the depth of the client relationship?
 - c) How much does online business contribute to the bottom line?
 - d) What is the relative importance of all products against each other?
- 3) We also have the flexibility to apply our process to any natural segment. This science can be applied at the enterprise level, at a business line level, on specific books of business, against customer segments, regionally or at any other segmentation that the business needs this intelligence or sees potential ways to benefit from the analysis.

Power Index has its roots in the Cooperative Game Theory of Coalition Formation. There exists significant mathematical and scientific theory behind this that merits explanation. Although there are several proprietary aspects to our methodology, the following lays out how the process works.

In the example we use to explain coalitions and power index there will be players and specific rules to decision making. Whether to alleviate a conflict or sell more products, the fundamental idea is there are winning coalitions [customer accepts the offer] or losing coalitions [customer denies the offer, or customer accepts but company loses money]. Winning or pivotal coalitions are called Swingers. In our application, rules work both ways so that the desired effect is when the customer and company mutually win. Customers get appropriate offers, and company sells and promotes the winning coalitions of profitable products.

Players have weights and quotas. From the client perspective, asset allocation against a risk profile determines the weights and the total wallet becomes the quota. Similarly, products and services will have weights and quotas. Corporate initiatives will push the advisors to sell one product, the quota, and advisors will self-select products on an appropriateness and profitability continuum, the weighting. These are the weights and quotas that create the game. It is the understanding of swinger products that is critical to optimizing offers, and increasing the focus on business driven products.

Though product combinations can be taken as coalitions, the cross-sell 'Economic Game' is more complex. Initially, the quotas are not predefined because there is no upper limit in how much can be distributed. The nature of financial services eliminates a traditional quota calculation that would be based on a measurement of capacity. Financial products are imminently scalable and this adds a certain amount of complexity. Also, rather than having a universal agreeable weighting bank, there only exists a unique weighting for a specific organization that is self reported. This also adds complexity. Nonetheless, we are able to use the existing information and calculate our indexes.

Cooperative game theory generally deals with finite sets of players and outcomes in which coalitions are formed in such a way as to derive higher gains to their members. There are several ways to define and measure a solution to each game based on the unique sets of mathematical assumptions. For example, the solution may measure efficiency, or additivity, or monotonicity, among others.

- From our research, we have isolated one particularly useful approach in the Shapley-Shubik Equation, which brings a fresh solution to multi-colinearity. We have found that the results to this equation allow us to identify the drivers of each customer's satisfaction. This equation is generally expressed as:

$$\phi_i(v) = \sum_{S \subseteq N \setminus \{i\}} \frac{|S|! (n - |S| - 1)!}{n!} (v(S \cup \{i\}) - v(S))$$

- Where $\phi_i(v)$ is the average 'net' contribution of a variable i addition to any regression S with n regressors excluding i .
- Today many statistical software products exist that will offer 'all possible regressions'. These are implemented to calculate Shapley-Shubik values i.e. the 'true' contribution of any given factor.
- Variants of this game theory approach have been implemented in supply-chain management and other allocation models.
- Sales Central draws on this component of Game Theory in developing its cross-sell model based on the value of a product to the company and its power index based on the relative value of a product to a client.

The theoretical concept behind our approach draws from in depth work done in areas of voting and power indices. However, there are key differences making our 'Game' exponentially more complex:

- Traditionally, Game theory usually results in either A or B being selected from two alternatives. In reality for financial services, many product mixes can co-exist.
- In Game theory, a winning 'coalition' often satisfies additive or super additive requirements. For example, the sum of individuals is less than or equal to the some of the whole. In the case of financial services, the same product mix can yield different profits for different households and certain additive conditions may or may not hold. (By virtue, cross-sell may subsidize some product).
- Additional complexity is due to the lack of independent profit figures associated with certain financial products. Gross income is easy obtainable, however, it is without any standard pricing. The nature of client management is working with clients across the spectrum of available products, with flexible pricing to determine solutions on a holistic

level. The result is that even when product profitability does exist, figures can be grossly misleading for some products because of the intermingled nature of a relationship. As an extreme example, the latest financial crisis shows how those calculations can go wrong. We mitigate these risks by looking not only at what a client will purchase, but also at what they need.

Winning coalitions are defined as follows:

A product forms a winning mix if it adds to sustainable profit of the mix while not sacrificing its own margin. When this condition holds true, the product is called a 'swinger' and is therefore pivotal for a given mix. The definition above is used to derive the probability of a swinger product as the ratio of all relevant swinger product mixes to the total number of coalitions or permutations that include the product under consideration.

For example, suppose that there are only two trust fund households in the Bank. Suppose also that the swinger probability calculated says that $\frac{1}{2}$ can be the same as of DDA. We require that the power and thus the value of a product will reflect its importance and therefore its frequency. We would then define the following:

- Product A Power = swinger probability of A, weighted by Likelihood of A in the population
- Product A Value 1 = Normalized Power of A
- Product A Value 2 = Share in total profit (using Value 1)

This relatively simple example is calculated across two products. Our model reviews the thousands of possible combinations and the millions of customers involved. The study revealed that only a negligible fraction had negative outcomes. While possible in short term, negatives profits would not be sustained in equilibrium between supply and demand for bank products.

Let us look at a relevant example: John Doe, Jane Miller, and Kevin Smith are three executives from XYZ Company. They all are currently Stock Plan clients, and have initiated their relationship with you through the Employee Equity Compensation Plan Administration product suite. Since then, they have been utilizing some other products from their Financial Advisor. Mr. Doe switched his mortgage and joined the card program. Ms. Miller also joined the card program, started a low-level risk account and she is provided advice with an annual asset-based fee from a Strategic Advisor. Mr. Smith has a Hedge Fund portfolio, is currently paying off a luxury purchase financed through you, and is utilizing an automated bill payment service.

There are numerous products available offered through the Wealth Management business lines or through other business lines, such as investment banking, asset management, insurance, portfolio management, or lending products. Third Party products also are available for use by Wealth Management clients. Our solution can be implemented at the enterprise level to leverage further the corporate level relationships and to increase individual level product utilization. However, for this example we will focus on the Wealth Management business line and available products.

Within the Wealth Management business line, managing money for clients is typically done with two or three primary core products and as many as ancillary products appropriate. The identification of core products is much clearer than identifying ancillary products, which are relatively small impact products. Although these ancillary products might not represent a large

portion of profitability, they may be essential for customer satisfaction and retention. Even though they are only a small piece of the pie, it could be tremendously important piece of the pie to the client. They play an important role keeping each client satisfied rather than having them take portions of their business to a competitor. These are the needs and opportunities that, when identified, lead to the best results.

We begin our algorithm by capturing client and product relationships within you. We define what the most appropriate next offerings are by calculating the Power Index per client & per product. Both core and ancillary products are measured for their importance to the client and all cross-sell opportunities are identified with their relevant power index. It is vital to apply the algorithm on an individual level to distill and reveal the complex influences between product lines and client needs. This is especially true in wealth management because financial services products influence each other on both from a client choice and a client satisfaction perspective. By calculating each Power Index, we determine where each client is in the completeness of his or her relationship with the company and identify what are the next products that should be offered to each client. The algorithm is not limited to one or two selected products, rather it applies across the entire spectrum of products and services. For each available product, the power index enables us to rank the priority of offerings.

Table 1.1 Current Products Usage

Mr. Doe	Power Index	Ms. Miller	Power Index	Mr. Smith	Power Index
Employee Equity Compensation	1.0	Employee Equity Compensation	1.0	Employee Equity Compensation	1.0
Mortgage	0.9	Fixed Income Equity Account	0.5	Hedge Fund	0.5
The Card Program	0.1	The Card Program	0.4	Bill Pay	0.3
		Strategic Advisor	0.1	Financing of Luxury Purchase	0.2

Table 1.2 Sales Central Identified Next Best Products

Mr. Doe	Power Index	Ms. Miller	Power Index	Mr. Smith	Power Index
Home Equity Line of Credit	0.6	Fixed Rate Annuity	0.9	30 Year Fix Mortgage	0.6
Long-Term Care Insurance	0.5	Hedge Fund	0.8	Private Equity Fund	0.5
IRA	0.1	Life Insurance	0.4	The Card Program	0.3

Table 1.3 Aggregation of Individualized power index - Product Lines Probability Matrix

	(TI)	(NTI)	(I&A)	(FYH)	(FLP)	(ERP)	(PPM)	(ABC)
Equity Compensation Plans (ECP)	0.307	0.389	0.202	0.258	0.285	0.244	0.210	0.311
Traditional Investments (TI)		0.484	0.231	0.307	0.343	0.288	0.241	0.378
Nontraditional Investments (NTI)			0.280	0.390	0.442	0.362	0.295	0.492
Insurance & Annuities (I&A)				0.202	0.218	0.194	0.173	0.243
Financing Your Home (FYH)					0.286	0.244	0.210	0.311
Financing Luxury Purchases (FLP)						0.269	0.227	0.348
Employee Retirement Plans (ERP)							0.185	0.370
Professional Portfolio Management (PPM)								0.420

In this example, the study would result in highlighting the need (Table 1.2) for a HELOC and Insurance for Mr. Doe, Annuities, and Hedge Funds for Ms. Miller and Mortgages and Private Equity for Mr. Smith. These conversations would yield results in each category. Even if each individual sale is not made, the intelligent approach itself enhances the overall client relationship. The other benefit of this study would be to highlight the products that would yield the best results for any corporate initiative. (Table 1.3).

This process is best utilized in an iterative fashion. Just as the trusted advisor relationship is built over several interactions with the clients, this process enables a similar relationship to be built on a much greater scale that could otherwise be managed by any single advisor operating on a one-to-one basis. Therefore, it is recommended that after going through once, applying this intelligence and gathering the evidence of success, it becomes part of the periodic processes used by the organization. Having this become an iterative process will deepen and complete the best possible relationship with clients. This is recommended to ensure ongoing success, where grouping and profiling are natural by product of our solution and operating in this effective and efficient manner becomes intertwined in the ongoing procedures of the firm.