Optimal May Not Be Ideal:
A Territory Alignment Case Study

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1. Introduction

To align a sales force, all you've got to do is specify the objective function to minimize, say, the variance of the workload of the reps. Run the optimization process and, you'll get an extremely well balanced alignment. That's the winner! In actuality, those alignments do not always live up to expectations. Oftentimes, they fare poorly, especially considering their pedigree. How can that be? This article explains this apparent paradox. At issue is our operations research heritage. Indeed, we tend to equate "ideal" with "optimal" where optimal corresponds to a solution that minimizes the objective function. The blunder is we forget the objective function may, in some cases, be a crude approximation if not a misrepresentation of the problem at hand.

This article takes a fresh look at the definition of optimality and underscores two problems: inadequacy and incompleteness. Inadequacy refers to the fact that the objective function may not lead to the intended objective. This can be corrected by spelling out a better objective function. Incompleteness means the objective function cannot capture all the subtleties and nuances, no matter what that objective function may be. The article then focuses on situations that require the buy-in from multiple parties. Each party is viewed as an embodiment of one objective function. There is no right or wrong answer, simply different emphases on different aspects of the problem. The implication is we need to soft pedal optimality in favor of two more important properties: universality and plurality. Universality captures the robustness of the solution vis-a-vis changes in the objective function. Plurality refers to the ability of the problem-solving process to generate multiple solutions. The article also discusses the implementation of an automatic alignment system based on these principles.

2. Inadequacy and Incompleteness

The objective function example mentioned in the introduction is inadequate for two reasons. First, it does not recognize change is disruptive and needs to be kept at a minimum. Going for the optimal alignment may involve expensive relocations, disruptions in customer relationships, and frustrating reductions in the rep's ability to make money (wallet disruption) unless the comp plan is modified accordingly. To paraphrase, we may be better off not to shoot for the optimal endpoint B from A but rather to shoot for a sub-optimal B' because of the lesser friction involved.

Second, the objective function has to capture the dynamics of what is involved. It has to understand this is about physical bodies that move from one place to another and have 40-60 hours in a week. This is why concepts such as windshield time, face time, and territory time size rightly take center stage. From that vantage point, it is not surprising a few decent size customers may have to be dropped (incurs too much traveling) while smaller customers may be picked up (only a stone throw away from larger customers that the rep will be covering anyway). Reps in high density areas, such as New York, may have to forgo top national customers while reps in low density areas, such as Wyoming, may have to visit customers that are well below the cut-off in the national ranking.

Unlike inadequacy, incompleteness is not reflective of the lack of maturity of the modeler. However encompassing the objective function may be, there will always be subtleties that will fall through the cracks. Here are two examples.

Example 1. Consider an alignment based on a 50-50 sales-potential index. Although unlikely, this may lead to a pure potential territory with no sales, suggesting the model is unsatisfactory. Indeed, information has been lost in the process. One way to address this problem is to use vector comparison (the first dimension is sales and the second is potential) instead of the regular scalar comparison (blending of sales and potential in one number).

Example 2. In team sports such as soccer and basketball, players are deployed based on their strengths and weaknesses. Why is it then that in alignment, sales reps are regarded as interchangeable commodities good for 100 index points of workload? For starters, some can accomplish the work of four. Some are VP material while others have only retirement in mind. From a personality standpoint, some have the skills to penetrate new accounts. Some others are great at attending to existing business. Yet others have the energy level that will put the most obstinate customers to shame. Expanding on the vector approach broached above, the rep can be modeled along multiple dimensions: workload capacity, sprinter/marathon score, hunter/skinner score, and so on. Likewise customers can be defined along the same dimensions. Matching customers with reps then amounts to comparing vectors as opposed to scalars.

One can keep on criticizing the model. For instance, the model does not capture the fact that John Smith may be unwilling to relocate because his girlfriend just secured a three-year stint in a large bank although he is single and fresh out of college. Here is another one: the model does not capture the fact that Jane has been sexually harassed by a major customer and a male rep in a nearby territory ought to cover that customer. Those criticisms can be repeated…ad nauseam!

3. Universality and Plurality

If there is an ideal objective function, it may be impossible to articulate. What we can actually capture is an ersatz function. Because we operate in a multi-party setting, there is not one objective function at stake but many. Indeed, each person may be regarded as embodying one objective function, suggesting an outstanding alignment should satisfy not one but a host of objective functions. The crucial attribute here is universality, which can alternatively be viewed as robustness. Indeed, a universal alignment is robust in the sense that a change in the objective function hardly degrades the quality of the alignment.

Unexpected changes in the marketplace (e.g. product recall) or sales organization (e.g. sudden defection of personnel) may render the best alignment irrelevant, suggesting the need for a plan B. The best backup being a lot of backup plans, the key attribute of any alignment design process is plurality, i.e., its ability to generate a large number of solutions. Note plurality begets universality. As we all know, the larger the solution pool, the better the quality of the top solution. Likewise, the higher the plurality of the alignment design process, the higher the universality of the alignments.

4. Implications on Implementation

The key to achieving universality and plurality is through a massively productive alignment design process. Because of the theoretical complexity of the alignment process, enumeration is simply impractical. Indeed, alignment optimization is a spatial variation of the classic knapsack problem which is known to be NP-hard (non-deterministic polynomial). Steepest descent or greedy algorithms are efficient but get trapped in local minima, suggesting superior algorithms such as simulated annealing. Incidentally, simulated annealing has the ability to produce myriads of alignments. This stems from its very approach of building new solutions by tweaking previous solutions.

For that reason, we chose simulated annealing to power the Bayser Aligner, an automatic alignment tool we developed to design ideal alignments for our clients. We started off by making improvements to the classic Metropolis algorithm. First, we endowed memory to the search process to boost its productivity. Second, we developed a gearbox that automatically switches to macro-transitions trials when elementary transitions prove fruitless. This acts like a turbo that takes the focus to a different region of the search space, to identify better solutions.

5. Conclusion

This article articulated four points. First, make sure the objective function is adequate, i.e., captures the basic dynamics of the problem at hand. Second, do not be frustrated if your model does not capture all the nuances and subtleties the eye discerns. Incompleteness is inherent to modeling, not to your skills. Third, the attribute of an outstanding alignment is not optimality but universality, and one way to enhance universality is through plurality of the alignment design process. Fourth, simulated annealing equipped with the proper extensions is an excellent engine to deliver universal and plural alignments.