

Beyond Profits: Leveraging Philanthropy Impacts with Data Mining

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1 Abstract

Philanthropy is as vital as ever to drive sustainable change in the living conditions of billions of people. Yet, individual donors, foundations, corporates, and even governments have often struggled to align their philanthropic goals with society's most urgent demands. Currently, the measure of impact is more anecdotal and not as quantitatively formulated. This paper presents a vision for quantifying the effectiveness of philanthropy using data mining techniques. This idea can further extend to developing data-driven strategies and decision-making process that helps maximize the capability of philanthropists to serve underprivileged communities.

2 Introduction

In December 2016, Hewlett Foundation's 50th anniversary symposium gathers more than 300 leaders from across the social sector to discuss the future of philanthropy. Conversations among philanthropists from foundation executives and nonprofit founders, conservatives and liberals, to artists and policymakers confirmed the importance of philanthropy effectiveness in strengthening society, improving the world economy, and eradicating poverty [4].

A critical point of the conversation was the importance of access and use of knowledge to bring forth an effective philanthropy. In measuring the effectiveness of philanthropy, a majority of funders who attended the conference shared that they rely on their peers and colleagues, as opposed to particular organizations or publications, both as "their most trusted knowledge sources and as their preferred means to gather knowledge" [5].

Furthermore, respondents showed a distinctly high interest on evaluation and assessment of philanthropy, with 44 percent winning against the other 11 options, when asked about what aspects of philanthropic prac-

tice they wanted knowledge about (Figure 1). With such a high demand for measurable outcomes in this sector, this paper provides not only a vision for quantifying philanthropy effectiveness, but also a methodology to maximize the impact that mutually benefits both funders and beneficiaries.



Figure 1: What Funders Want to Know (source: *Peer to Peer: At the Heart of Influencing More Effective Philanthropy*, Harder + Company Community Research, 2017).

2.1 Problem Statement

"The [philanthropy] sector has limited capacity to take on meaningful evaluation. And foundations bypass developmental or formative evaluation at their own risk. Without undertaking this important work up front, capacity for evaluation practices will remain woefully inadequate." – Dr. David Goodman, Director of Impact at Fluxx [2]

A recent survey conducted by the Center for Effec-

tive Philanthropy (2016)¹ stated that only less than 20 percent of funding organizations and individuals engaged in developmental and formative evaluation for foundation initiatives or with their grantees. The lack of capacities to conduct evaluation in a meaningful and appropriate way caused a lot of confusion, misinformation, and conflicting opinions towards the impacts of their philanthropic efforts.

Furthermore, 66 percent of foundations surveyed for the Grant Space Report (2014) does not have proper quantitative data to measure their mission-driven engagement. Also, given the variation in rigor and methodological emphasis of different measurements, there exists inconsistency in evaluations across different organizations and thus unreliability of an assessed impact.

For these reasons, quantitative measurements are critical to measure the overall impact of philanthropy work. This also allows us to ensure that individual donors, foundations, corporates, and governments are not jumping to evaluation without doing the critical work to prepare for assessing impact.

3 Data Mining Approach

The data mining techniques will mainly consist of two parts: (1) statistical analysis and (2) data modeling.

3.1 Statistical Analysis

There will be two sets of variables: (1) dependent, which are the categories of philanthropic causes such as education, health, and poverty, and (2) independent, which include age, gender, and information about both donors and beneficiaries. With multiple dependent variables, a feasible approach would be to conduct a canonical correlation analysis, which would allow for analyzing the correlation and relationships between multiple dependent with the independent variables.

3.2 Data Modeling

The analytical procedures stated in previous section is key to understanding quantitative relationships between a particular philanthropic action and its effectiveness. This relationship, usually represented by a function, will be used to create an optimization model for maximizing the effectiveness score given some philanthropic resources. Constraints in the resources include financial budget and number of volunteers for that particular action.

¹Benchmarking Foundation Evaluation Practices Report

3.3 A Case Scenario

Though a lot of resources may be similar for different causes, they may have different measure of success. For instance, a foundation is managing a fund to support different philanthropic causes in environmental protection, social welfare, and public health. The fund acts as a type of resource and it is shared among all three causes. The money could be used to pay for staff salary, necessary equipment, or to host promotional events.

For the above example, different evaluations will be performed for different causes. In the environmental field, we can measure the effectiveness of a philanthropic initiative by checking the amount the pollution decreased by the initiative. For the social welfare aspect, the effectiveness measure could be the percentage decrease of homeless people in a metropolitan area. Similarly, the public health can be measured using trends of a certain epidemic. In cases where these measures become more complex, we will derive strategies from the statistical analysis.

3.4 Multi-Objective Optimization

Multi-objective optimization fits this problem setting very well. Multi-objective optimization is widely used in decision making for a few decades and there have been complete theoretical research on the related topic².

To model our example above in a mathematical program, we should create a set of decision variables as the amount of fund spent on a specified set of usage for each cause/action. The functional relationship between the spending and the effectiveness is derived from data analysis in statistical analysis section. It is possible to formulate a multi-objective optimization model to generate an optimal strategy to allocate philanthropic resources. The decision maker should make internal discussions and come up with a normalized measure, such as the linear combination of different objective functions, to be used as the true objective function.

Furthermore, we could also derive a pareto frontier by solving a sequel of optimization model. The pareto frontier will provide decision makers with useful information about how to make tradeoff between different causes.

²*Multiobjective Optimization: Interactive and Evolutionary Approaches* scientific paper

4 Conclusion

The above sections represent our vision to embed a more analytical approach in today's philanthropy evaluation and decision-making strategies. The current application of data analytics methods to quantitatively model the effectiveness of a philanthropic organization/initiative is not quite following the rapid scale growth of potentially useful data.

A more sophisticated quantitative analysis should be accomplished in order to develop a data-driven decision making process. This will also help organizations and individual donors across philanthropy sector to make more insightful, reliable, and actionable decisions, and achieve greater impacts of their philanthropic goals.

5 Future Work

Moving forward, we can incorporate a classification problem by using funders' data to identify or predict which particular actions/causes they would most likely donate. The optimization technique would still be used to select the most effective causes for that individual or organization.

Last but not least, we can also develop a matching algorithm between donors to beneficiaries using both classification and optimization techniques.

6 Further Impact

Improving the effectiveness of philanthropy will also provide positive impacts in the following areas:

1. *Increase the capacity of philanthropy*

More efficient work will be made across organizations and individual donors. In most cases, many of them, whether staff or higher level of officers, are spread too thin and often wearing multiple hats – such as managing grants, working on in-house programs, conducting research, and evaluating surveys at the same time. Increasing effectiveness of philanthropy will potentially put people effectively in specific roles to achieve higher performance and even higher efficiency in bringing out results across team dynamics in an organization.

2. *Empower the sharing of data*

With the goal of philanthropy to create the greatest impact possible, the effectiveness of philanthropy will encourage more appropriate use of data, analysis, sharing, and replication. It will also allow funders,

nonprofits, and organizations to leverage their knowledge, expertise, and data. It will also enable them to replicate the work and ultimately expand your impact and achieve more success and overall sustainability. As a result, more organizations will be able to share data and uncover new patterns and insights to further solve complex social problems.

7 Timeline

This vision paper provides a pathway for us to implement our methodology by end of July. We will first gather all necessary datasets by July 15th, and continue to work on the statistical analysis up to July 31st. Then, we will implement a pilot using the optimization technique in the first week of August. Once the pilot result is validated, we will implement different use cases by end of August. Finally, we will put together our presentation in demo and slides. Through feedback and evaluation, we will also keep refining our product before presenting it on September 24th.

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