Marketing for Charitable Organization: What's Matter for Incentivizing Monetary Online Donations for Next Generation Education
การตลาดสำหรับองค์กรเพื่อการกุศล: ปัจจัยที่มีผลต่อการจูงใจเพื่อบริจาคเงินผ่านช่องทางออนไลน์เพื่อการศึกษาของคนรุ่นต่อไป

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Abstract

The advent of Internet of Things (IoT) has increased efficiency and amount of cash inflow for various industries including nonprofit and charity, shifting from a classic donation box to an online donation platform. Granularity in givers' digital footprint allows nonprofit to better understand the behavior of online donors. The paper studies the variables that influence the likelihood of charitable school projects being fully funded. To obtaining donor behavior, samples of 332,281 charitable school projects in United State of America from 2000 to 2016 has been collected and multivariable logistic regression technique is applied. These projects raised fund online through "DonorsChoose" channel. The finding reveals that number of students reach, poverty level, resource type, project cost, student grade level and most and importantly project funding incentives such as "Double your impact" and "Almost home match" are statistically significance. To be more specific, projects regarding charitable trip and visitor experience have greater odds of being fully funded, compared to other resource types. Moreover, projects for higher school grade 9 to 12 also have greater odds of being completely donated, relative to those of younger students. We suggest the use of monetary incentives to incentivize and inspire donors to give more which result in accelerating charitable project success.

Keyword: Charitable Marketing, Nonprofits, Donation, Internet, School Projects

บทคัดย่อ

ความก้าวหน้าของการสื่อสารผ่านอินเทอร์เน็ตได้เพิ่มประสิทธิภาพและกระแสเงินสดรับให้กับองค์กร
ต่าง ๆ ซึ่งรวมถึงองค์กรเพื่อการกุศล ส่งผลให้เกิดการเปลี่ยนแปลงของกระบวนการดำเนินงาน เช่น การรับ
บริจาคเงินผ่านช่องทางออนไลน์แทนการตั้งกล่องรับบริจาค นอกจากนี้คุณภาพและความละเอียดของข้อมูลที่
ได้จากการสื่อสารผ่านอินเทอร์เน็ตได้ช่วยให้องค์กรการศุกลเข้าใจพฤติกรรมของผู้บริจาคเงินผ่านช่องทาง
ออนไลน์มากขึ้น งานวิจัยฉบับนี้จัดทำขึ้นเพื่อศึกษาปัจจัยที่มีผลต่อการจูงใจเพื่อบริจาคเงินผ่านช่องทาง
ออนไลน์ ผ่านปัจจัยที่มีผลต่อความสำเร็จของโครงการเพื่อการกุศลในแง่ของการได้รับเงินบริจาคตาม
เป้าหมายที่กำหนดไว้ โดยศึกษาจากกลุ่มตัวอย่างจำนวน 332,281 ชุด จากโครงการเพื่อการกุศลของโรงเรียน
ทั่วประเทศสหรัฐอเมริการะหว่างปี ค.ศ. 2000-2016 ซึ่งเรี่ยไรเงินการกุศลผ่านช่องทางออนไลน์ในเว็บไซต์
"DonorsChoose" โดยใช้วิธีการวิเคราะห์การถดถอยพหุคูณ (multivariable logistic regression) เพื่อ
ศึกษาปัจจัยที่มีผลต่อความสำเร็จของโครงการฯ ซึ่งสะท้อนถึงพฤติกรรมการบริจาคเงินผ่านช่องทางออนไลน์
ผลการศึกษาพบว่าปัจจัยที่มีผลต่อความสำเร็จของโครงการฯ ได้แก่ จำนวนนักเรียนที่โครงการฯ ครอบคลุม
ฐานะของโรงเรียน ประเภทของโครงการ จำนวนเงินบริจาคที่โครงการฯ ตั้งเป้าไว้ ระดับการศึกษาของ
นักเรียน และแนวทางการให้เงินสมทบยอดบริจาค ซึ่งเป็นปัจจัยที่มีความสำคัญสูงสุดหากเทียบกับปัจจัยอื่น ๆ
ที่กล่าวมาข้างต้น นอกจากนี้ โครงการเพื่อการกุศลที่รับเงินบริจาคเพื่อนำไปใช้เป็นค่าใช้จ่ายในการเดินทาง
จะมีโอกาสประสบความสำเร็จมากกว่าโครงการประเภทอื่น ๆ รวมทั้ง โครงการเพื่อการกุศลที่รับเงินบริจาค
เพื่อนำไปให้นักเรียนช่วงชั้น 9 ถึง 12 จะมีโอกาสประสบความสำเร็จมากกว่าโครงการที่รับเงินบริจาคเพื่อ
นำไปให้นักเรียนในช่วงชั้นอื่น ๆ ที่ต่ำกว่า ดังนั้น จากผลการศึกษา ผู้วิจัยสนับสนุนให้องค์กรเพื่อการกุศลใช้
วิธีการสมทบเงินบริจาคในการทำการตลาดเพื่อเพิ่มแรงจูงใจให้ผู้ที่บริจาคเงินและผู้ที่สนใจบริจาคเงินผ่าน
ช่องทางออนไลน์

คำสำคัญ: การตลาดสำหรับองค์กรการกุศล องค์กรเพื่อการกุศล การบริจาค อินเทอร์เน็ต
โครงการของโรงเรียน

Background

The advent of Internet of Things (IoT) and a rapid development in communication technology benefit organization in various ways. Explicitly, it significantly increases the efficiency of marketing communication allowing organization to reach more people instantly and almost costless. This leads to an increase in the amount of impression and cash inflow for various industries including nonprofits and charity.

Shifting from a classic donation box to an online donation platform allows nonprofit organization to successfully and remotely connect to their potential donors and successfully

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receive funding. This is confirmed by the increase in online donation an online donation platform in terms of both amount and volume, which was increased by around 500 percent from 2006 to 2016, calculated by obtaining data from "DonorsChoose.com". However, unlike corporation or profit-driven firms, they have not reaped full benefits from a massive digital footprint and data granularity, obtaining from online activities partly due to resources, cost and complexity in data collection, preparation and analysist.

Charitable giving incentives could be driven by various reasons such as personality, tax saving, credibility and reputation. There are many studies discuss the determinant of charitable giving from several aspects such as psychology, consumer behavior and economic. However, the relationship between characteristic of charitable projects including incentives and the likelihood of being successfully funded has not been explored much in the past. In addition, previous studies mainly conducted by using a survey and an experiment. The application of statistical model to learn from the historical data could add value and new insights to the previous finding.

Given limitation in time and resources, the insights from historical donation data would be an important boost and a game changer for nonprofits to specifically and appropriately customized their fundraising for next generation education, through charitable school project, and efficiently target and incentivize those who are willing to give which will sustainably benefit those who need most.

Objective

The paper studies the variables that influence the likelihood of charitable school projects being fully funded. In other words, we aim to explain the how project characteristics and monetary incentives associated with the likelihood of charitable projects being fully funded which means they are successfully funded.

Literature Review

There are various literatures contribute to the determinant of donation amount and the decision to give from the perspective of consumer behavior, psychology, economic and marketing. To attract donors, an incentive for charitable campaign may include tax saving, donation matching incentive, amount of fund request, thank-you gifts, celebrity endorsers and corporate sponsorship. According to previous literatures, many of charitable incentives would

lead to positive consequences. However, an opposite result is also revealed as well. One of the most widely used monetary incentives for donation is tax benefits. Yetman (2013) studied the effect of taxes on nonprofit donation. The contribution of tax price effect varied significantly across nonprofit types. While, Feldman (2010) discussed the result from a national survey on household charitable giving in the U.S. donations of time and monetary asset are substituted, and tax-price of monetary donation also have a positive effect on donations of time. At state level, Teles (2016) used data-driven approach with data from Arizona and Iowa to suggest that tax credit incentive increased both community foundation numbers and amount of contribution per foundation in only Iowa not Arizona. In France, Fack (2010) discussed the positive effect of a tax credit and a deduction of taxable income on charitable contribution, using difference-in-difference identification. In the U.K., Smith (2012) presented evidence relevant to policy debates including limiting tax relief on donation. Match-style tax reliefs are likely to be more effective than rebate-style incentives.

Another monetary incentive for donation is monetary matching, Karlan and List (2007) conducted a natural field experiment using direct email with prior donor to test the effectiveness of matching grant on charitable giving. They proved that greater match ratio such as (3:1 and 2:1) relative to smaller ratio of (1:1) had no additional effect of Charitable giving. Huck, et al. (2015) ran a natural field experiment to examine the efficacy of alternative fundraising. They presented the effect of lead gifts, linear and non-linear matching.

In terms of non-monetary incentive, various types of technique are widely used such as "Thank you gift". Interestingly, Chao (2017) pointed out that thank-you gifts decrease the rates of donation in a charitable fundraising campaign because of a shifting in donors' attention toward the salient gift not the intrinsic motives. Another non-monetary incentive celebrity endorser, Wymer and Drollinger (2015) found that celebrity endorsers admirability and expertise are significant estimators of audience intentions of donation. Winterich, et al. (2013) suggested that charitable behavior including both monetary donation and behavior of volunteering is positively driven by recognition.

Apart from incentives impacts on donors' behavior, Elifenbein, et al. (2012) obtained evidence from eBay sellers and found that there is fewer complaints among charity-intensive sellers. On the other hand, from the corporate perspective, Krishna (2011) demonstrated that the more substitution cause marketing for charitable giving the less consumer satisfaction. In

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addition, Bennett, et al (2012) revealed that corporate sponsorship can decrease the willingness to support the nonprofits from donors since they believe that the contribution matter less.
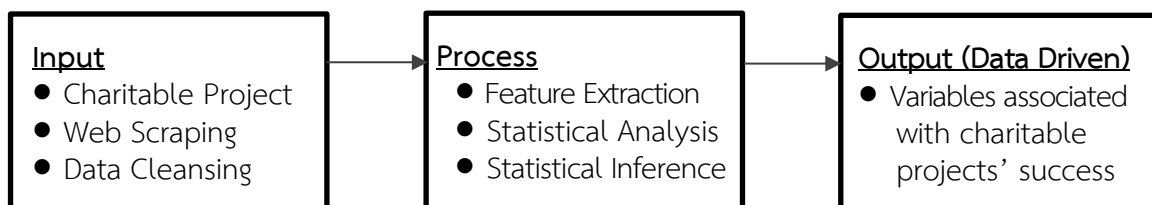
Beside incentives, several fundraising techniques has been suggested to improve effectiveness and efficiency in charitable fundraising. Hoefer (2012) suggested three effective fundraising techniques for nonprofits since traditional way of nonprofit fundraising is less productive. The techniques included affiliate marketing, online donations and memberships and information products. Regarding matching incentives, Anik, et al. (2014) proposed contingent matching incentives, which is made contingent on percentage of others who give, to encourage donors to donate today and commit to donate in the future. The implication was proved by an online experiment. In terms of time-ask, Liu and Aaker (2008) discussed the time-ask effect on the amount of charitable donation. By first asking a time intention question and subsequently request for a donation would result in an increase in the amount of giving since it fosters an emotional mindset. Regarding donation variety, Khodakarami, et al (2015) used data from a major U.S. public university and suggested that the improvement of donation variety increase the likelihood that giver will make subsequent donation, increase amount of donation and reduce donation sensitivity. They emphasized the important of developing donor relationship. To elaborate, most donors initially donate based on single initiative driven by their intrinsic motivation, however, putting marketing effort and develop relationship overtime could influence donors to give based on multiple initiatives. Nonetheless, according to Chao (2017), a laboratory test and field results illustrated that fundraising technique can demotivate willingness to give in some contexts due to attention-based mechanism. The extrinsic incentives can crowd out intrinsic motivation.

The inclusion of charitable incentive could lead to different consequences depending on setting, context and location. We will focus mainly on the effect of "matching incentive" for charitable school projects in the United State of America. In addition, we will explore the relationship between the likelihood of being fully funded and project characteristics, which could shed further light on donors' behavior given projects' type. While, many literatures used survey and experiment, we alternatively let historical data speak and apply statistical models to make statistical inference.

Methodology

To obtain the relationship among projects' characteristic, charitable incentive and how they are funded, we collected data from charitable school projects in United State of America from 2000 to 2016. We used data of 332,281 charitable school projects. The project characteristics that we study includes "number of students", "project cost", "grade level", "poverty level", "resource type". We also investigated the effect of project matching incentive on the likelihood of charitable project successfully funded. With the goal of drawing statistical inference to solve a classification problem, we used multivariate logistic regression to investigate the relationship.

Figure 1: Research process

According to figure 1, we collected data from "DonorsChoose", which is an online donation platform, using Application Program Interface (API) and web scraping. We chose to the U.S. data because the advance of charitable technology and activeness in the non-profit market, relative to other. Size, granularity and length of data were the main reasons, we chose "DonorsChoose" data. In data preparation, we performed data cleansing including changing data format, data type and remove null. After cleansing and preparing dataset, we performed an exploratory data analysis to observe patterns, detected anomalies and checked assumptions. This process provided us a useful information for the later part when forming the model. Next, we extracted features and created new variables that potentially better capture the association between explanatory variables and dependent variable, applying pairwise interaction. We approached the question as a classification problem by using multivariate logistic regression. Since there was a large variation in numerical variables such as number of student project reached and cost, we clustered them into groups as categorical variables. The initial features were as follow. Please see more detail regarding data description in the figure below.

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funded_status = grade_level + poverty_level + resource_type + cost + number_of_student + eligible_double_your_impact_match + eligible_almost_home_match + total_price_ excluding _optional_support

Figure 2: Data

Variable Name	Type	Description
funded_status	Boolean	TRUE if project was successfully funded. FALSE if project wasn't successfully funded.
grade_level	Categorical	The grade level of student participating in the charitable project. There are four types of grade level, namely "3-5", "6-8", "9-12", "PreK-2".
poverty_level	Categorical	The poverty level of charitable school project. There are four types of poverty level namely "highest poverty", "high poverty", "moderate poverty", "low poverty".
resource_type	Categorical	The resource type of charitable school project. There are six types of resource type, namely "Books", "Other", "Supplies", "Technology", "Trips", "Visitors".
cost	Categorical	The charitable fund of charitable school project requested. The variable was originally a numerical variable; however, it is grouped into ten bins.
number_of_student	Categorical	The number of students that school project reached. The variable was originally a numerical variable; however, it is grouped into six bins.
eligible_double_your _impact_match	Boolean	"TRUE" if project was subject to "eligible double your impact match" charitable incentive. "FALSE" if project wasn't subject to.
eligible_almost_ home_match	Boolean	"TRUE" if project was subject to "eligible almost home match" charitable incentive. "FALSE" if project wasn't subject to.
total_price_excluding optional_support	Numeric	Charitable project fund requested.

Result

In order to investigate factors that are associated with the chance of charitable project being successfully funded from a logistic regression, we interpret and compare the odds which are the ratio of the probabilities, calculating by dividing the probability that an event will occur by the probability that the event will not occur. Regarding project incentive for donors, when comparing their odds to other explanatory variables, incentives including "Double your impact" and "Almost home match" are two most important variables that drives project's funding achievement. This result is confirmed by their highest absolute standardize odd ratio. The inclusion of these incentives in charitable school fundraising substantially did foster the project success. In terms of the charitable project characteristic that captured by "number of students reach", "poverty level", "resource type", "project cost" and "student grade level", they are all statistically significance and associated with project success. To illustrate, using "resource type" as a proxy for project objective, charitable "Trips" project type has greater chance of being fully funded comparing to other types such as "Supplies" and "Technology". Next, the charitable project for grade 9 to 12 also have greater odds of being completely donated, relative to those of younger students' project. In addition, the higher number of students reached, the greater odds of being fully funded. While, the lower the amount of project cost, the greater odds of being fully funded. The inclusion of "total price excluding optional support" serves only as a control variable for project size. We ran Variance Inflation Factor (VIF) test to check for potential multi-collinearity issue. We found no concern in VIF test with the initial feature's regression. However, the VIF test with the pairwise interaction for some features is higher than 10 which signals the issue of multi-collinearity among the explanatory variables. Hence, we drop those interaction terms to boost the power of statistical inference for initial features. Please see full result table in figures below.

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Figure 3: Logistic regression result

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Null hyp.: there is no effect of x on funded_status
Alt. hyp.: there is an effect of x on funded_status

                                         OR    OR% coefficient std.error z.value p.value
(Intercept)                                          2.017     0.028  71.118  < .001
total_price_excluding_optional_support 1.000  -0.0%   -0.000     0.000  -5.472  < .001
grade_level|Grades 6-8                 1.092   9.2%    0.088     0.013   7.046  < .001
grade_level|Grades 9-12                1.283  28.3%    0.249     0.014  18.343  < .001
grade_level|Grades PreK-2              1.020   2.0%    0.020     0.010   2.073   0.038
poverty_level|highest poverty          1.238  23.8%    0.213     0.009  23.125  < .001
poverty_level|low poverty              1.243  24.3%    0.218     0.025   8.793  < .001
poverty_level|moderate poverty         1.102  10.2%    0.097     0.013   7.585  < .001
resource_type|Other                    0.847 -15.3%   -0.166     0.015 -10.896  < .001
resource_type|Supplies                 0.793 -20.7%   -0.232     0.012 -20.068  < .001
resource_type|Technology               0.727 -27.3%   -0.318     0.012 -27.178  < .001
resource_type|Trips                    1.742  74.2%    0.555     0.039  14.101  < .001
resource_type|Visitors                 1.237  23.7%    0.213     0.088   2.420   0.016
eligible_double_your_impact_match|t    1.739  73.9%    0.553     0.010  57.967  < .001
eligible_almost_home_match|t           1.975  97.5%    0.680     0.023  29.173  < .001
cost|(200,300]                         0.526 -47.4%   -0.643     0.018 -35.319  < .001
cost|(300,400]                         0.352 -64.8%   -1.043     0.017 -59.688  < .001
cost|(400,500]                         0.283 -71.7%   -1.262     0.017 -72.971  < .001
cost|(500,600]                         0.257 -74.3%   -1.357     0.020 -69.036  < .001
cost|(600,700]                         0.221 -77.9%   -1.509     0.021 -71.043  < .001
cost|(700,800]                         0.200 -80.0%   -1.611     0.022 -71.832  < .001
cost|(800,900]                         0.182 -81.8%   -1.704     0.022 -75.963  < .001
cost|(900,1.5e+03]                     0.175 -82.5%   -1.742     0.021 -83.961  < .001
cost|(1.5e+03,2e+03]                   0.120 -88.0%   -2.123     0.028 -76.733  < .001
cost|(2e+03,5e+05]                     0.119 -88.1%   -2.127     0.033 -63.858  < .001
number_of_student|(10,20]              0.751 -24.9%   -0.286     0.023 -12.263  < .001
number_of_student|(20,30]              0.793 -20.7%   -0.232     0.022 -10.325  < .001
number_of_student|(30,50]              0.818 -18.2%   -0.201     0.024  -8.348  < .001
number_of_student|(50,100]             0.826 -17.4%   -0.191     0.024  -8.068  < .001
number_of_student|(100,200]            0.787 -21.3%   -0.240     0.024  -9.812  < .001
number_of_student|(200,1e+04]          0.791 -20.9%   -0.234     0.025  -9.487  < .001

Pseudo R-squared: 0.07
Log-likelihood: -194142.579, AIC: 388347.157, BIC: 388679.283
Chi-squared: 29333.279 df(30), p.value < .001
Nr obs: 332,281
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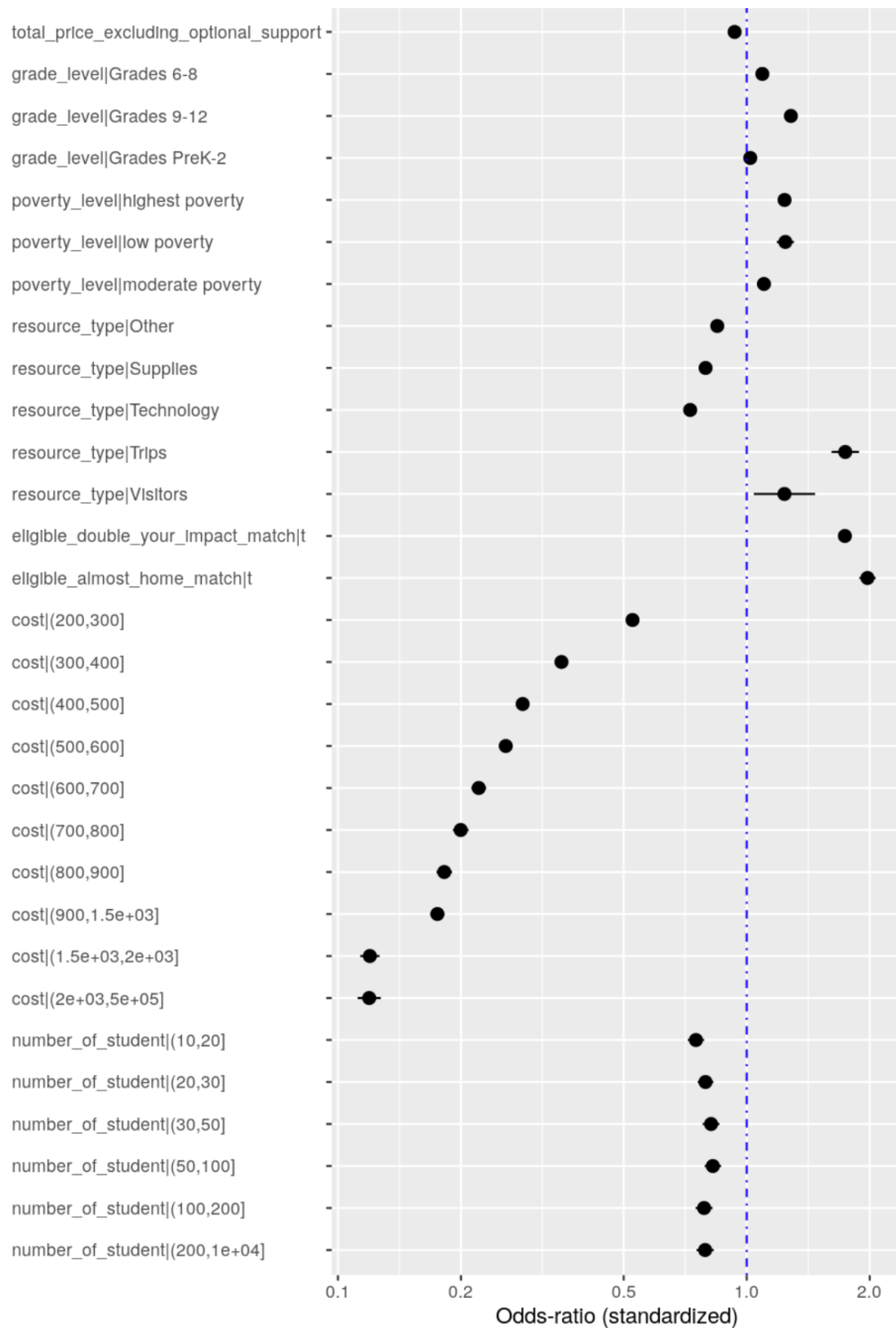
Figure 4: Odd ratio plot

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Conclusion

This research contributes to the non-profit fundraising and charitable literature. It provides a better understanding of the positive relationship between monetary matching incentive and the likelihood of the projects being fully funded. In addition, the relationship between the project's characteristic, including number of students, project cost, "grade level", "poverty level", "resource type", and the likelihood of the projects being fully funded is explicitly statistically significance. The finding would allow nonprofit organization to learn more about how matching incentive would affect the success of fundraising projects and donor behavior which lead us to form a better donation campaign and strategy.

Additionally, understanding the relationship between charitable project characteristics and the likelihood of successfully funded would help marketer of charitable project understand more about pattern of donation for charitable school projects. Similar to marketing for profit-driven companies that focusing pricing and promotion, charitable marketer could properly address amount of fund requesting and matching incentive for donation that increasing amount of successful funding and accelerating a decision to give, resulting in a reduction in the length of fundraising activities, which will ultimately benefit those who need most.

In addition, the study contributes the charitable literature, alternatively using 15-year of historical data from actual school projects through data-driven method. This allows us to capture behavior and patterns which provide alternative result from using a survey or a short-term experiment.

Lastly, our data driven result confirms the benefit of using monetary incentive in driving charitable school project funding success which is in accordance with previous literatures. To boost charitable project success, we therefore recommend the use of monetary incentives as a marketing strategy for charitable school project to incentivize donors. These incentives should also be customized based on projects' characteristic.

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