Dedicated Friends:
A Critical Thinking and Visualization Case Scenario

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ABSTRACT

Significant changes have been made to the Certified Public Accountant (CPA) Exam, based on feedback from more than 3,000 stakeholders across the accounting profession. Among the many changes is an increased emphasis on data analytics and visualizations. This requires students to not only know how to prepare visualizations, but also to use critical thinking skills to evaluate and to interpret visualizations. The newly revised CPA exam is expected to launch in January 2024.

The paper presents a case scenario involving Dedicated Friends, a nonprofit entity. Visualizations are provided to show the financial state of the nonprofit.   Students are then asked to address a series of questions and provide a memo on the financial state of the nonprofit based on the information provided in the tables and visualizations.

The case scenario can be used in an accounting or analytics course to introduce visualizations and to help build critical thinking skills.

Keywords: accounting, analytics, visualizations, critical thinking, Tableau, CPA exam

This is a fictitious case. All information contained herein was fabricated by the author(s). Any similarity contained herein to actual persons, businesses, events, etc. is purely coincidental and is the responsibility of the author(s). Please contact the case author(s) directly with any concerns.

INTRODUCTION

Data analytics, visualizations, and critical thinking topics are included on the newly revised CPA (Certified Public Accountant) exam.   Accounting faculty need to better prepare students for the new topics covered in the CPA exam. In order to assist faculty in this objective, the authors have developed a case scenario that focuses on visualizations and critical thinking. The case can be used in accounting and/or analytics classes to introduce visualizations and to build critical thinking skills.

The paper is organized as follows: purpose, case scenario, teaching guide, conclusions, references, and appendix. The purpose section discusses analytics in the revised CPA exam. The case scenario presents information and asks one to address a series of questions and provide a memo of recommendations. A teaching guide provides case learning outcomes and rubrics. The appendix includes tables and figures referenced in the paper.

PURPOSE OF THE PAPER

The newly revised CPA exam that is expected to begin in January 2024 has a significant focus on analytics. One change to the overall testing format is that the new exam follows a core + discipline licensure model. The "Core" exam covers accounting, auditing, and tax concepts (AICPA and NASBA, 2021). CPA candidates also select one of the following disciplines to test in: business analysis and reporting, information systems and controls, and tax compliance and planning (AICPA and NASBA, 2021). Regardless of the discipline chosen, the same license is awarded to all candidates that pass the exam and meet the other licensure eligibility criteria. Analytics is included in the "Core" portion of the exam and is also included in the discipline area, "Business Analysis and Reporting" (AICPA and NASBA, 2021).

Table 1 (Appendix) highlights some of the topics related to critical thinking and visualizations (AICPA and NASBA, 2021). For example, in the core section of the exam one will be required to "identity financial data risks and opportunities using relevant facts to make appropriate financial decisions" and "describe data visualization techniques" (AICPA and NASBA, 2021).

The purpose of this paper is to help prepare students for the critical thinking and visualization requirements of the newly revised CPA exam. A case scenario with an accounting and financial focus is presented to the readers.   The case scenario includes income statements and several visualizations (created using Tableau Desktop) that showcase revenues, expenses, net income, and benchmarking information using a variety of graphical techniques such as line charts, treemaps, column charts, map, and pie charts.

The case asks the reader a series of questions based on the income statements and visualizations. One is also asked to provide a memo with recommendations and conclusions based on the case findings. The memo will also cover benchmarking comparisons and conclusions. The case can be used in introductory/intermediate accounting and analytics courses to introduce visualizations and to help students build critical thinking skills.

CASE SCENARIO

Joe is an accountant at a CPA firm.   Joe's company strives to give back to the community and does some pro bono work for several nonprofit organizations.   Joe's boss has provided Joe with the following tables and visualizations for Dedicated Friends, a nonprofit organization.

- Tables 2 and 3 (Appendix) include the income statements from 2010 to 2016 and 2017 to 2022.
- Figure 1 (Appendix) is a visualization showing the revenue, expenses, and net profit from 2010 to 2022.
- Figure 2 (Appendix) shows the sources of revenue from 2019 to 2022.
- Figures 3 and 4 (Appendix) show pie charts of the revenue sources for 2019 and 2022 respectively.
- Figure 5 (Appendix) is a visualization showing the expense types from 2019-2022.
- Figures 6 and 7 (Appendix) are treemaps that breakdown the expense types for years 2019 and 2022 respectively.
- Figure 8 (Appendix) is a map denoting the charitable donations per state.
- Figure 9 (Appendix) shows the number of people in need served by the nonprofit.
- Figure 10 (Appendix) shows the average revenue and net profit per person in need.

Joe has also been provided with benchmarking data in Figures 11 through 14 (Appendix). Data has been collected from three other comparably sized organizations. These organizations are labeled A, B, and C.

- Figures 11 and 12 (Appendix) show the average revenue and net profit per person for Dedicated Friends and the other three nonprofits.
- In addition, the expenses to revenue and net profit to revenue ratios are shown in Figures 13 and 14 (Appendix).

Joe's boss has tasked Joe with the following:

1) Address the following questions based on the information provided.
   - Discuss the revenue sources of the nonprofit. What are the major sources of revenue? Discuss the revenue sources from 2019 versus the revenue sources from 2022.   Where are the majority of the charitable donations coming from? Discuss the pattern of revenue over the past several years. Has it been increasing, decreasing, and/or staying flat?
   - Discuss the expenses of the nonprofit.   What are the major expenses? Discuss the expenses in 2019 versus those in 2022.   Discuss the pattern of expenses over the past several years.
   - Discuss the net profit, which is the amount available for people in need.   Has this amount been increasing, decreasing, or staying flat over the past several years? What implications does this have to Dedicated Friends' service area?
   - Discuss the number of people served by the nonprofit. Discuss the pattern of the average revenue per person in need and average net profit per person in need over the past several years? What does this say about the service area?

2) Provide a short, one-to-two-page memo to management on the financial health of the Dedicated Friends organization. The memo should include recommendations and conclusions based on the visualizations and information provided.   In addition, the memo should benchmark on how Dedicated Friends compares to similar organizations designated as A, B, and C.

TEACHING GUIDE

This case study focuses on building critical thinking skills and introducing visualizations. It is recommended that students be familiar with the format of an income statement and understand terms such as revenue, costs, and net profit. Students should also be familiar with different types of graphs such as line charts, pie charts, column charts, maps, and treemaps.

The teaching guide includes case learning outcomes, a recommended supplement to the case, and rubrics.

Case Learning Outcomes

The following are some accounting and analytics course learning objectives that can be assessed by this case scenario:
1) Interpret information conveyed through various visualizations.
2) Demonstrate sound critical thinking skills based on a business scenario.
3) Assess the financial state of an organization using reports, visualizations, and other provided information.

In addition, the case scenario can also be used to help students prepare to meet the visualization and critical thinking requirements discussed in the *CPA Evolution Model Curriculum* (AICPA and NASBA, 2021). Table 1 (Appendix) highlights some of the critical thinking and visualization information found in the *CPA Evolution Model Curriculum* (AICPA and NASBA, 2021). In the case scenario, students are presented with different types of visualizations.   These visualizations help prepare students to meet the "describe data visualization techniques" requirement which is addressed in Part 1 Section 1 Module 8 Topic 5 Visualization (AICPA and NASBA, 2021)   In addition, the reader is asked to address a series of questions and prepare a memo based on the visualizations and information presented in the case. This exercise helps prepare students to meet the "identify financial data risks and opportunities using relevant facts to make appropriate financial decisions" requirement discussed in Part 1 Section 1 Module 7 Topic 1 Critical Thinking (AICPA and NASBA, 2021).

Supplement to the Case

Instructors may want the students to build the visualizations in the case with Excel, Tableau Desktop, Tableau Public, or other appropriate software applications. This will provide an opportunity for students to practice creating visualizations.   A learning outcome for this supplement could be as follows: "build appropriate visualizations using technology in order to correctly convey information to the intended audience." The case supplement will help prepare students to meet the Part 2 Section 1 Module 10 Topic 6 Advanced Data Visualization learning objective "apply data visualization methods to specific data sets and circumstances" as the

students prepare for the revised CPA exam (AICPA and NASBA, 2021).   Instructors may request the case data for this scenario by contacting the authors.

Rubrics

Tables 4 and 5 (Appendix) provide a grading rubric for the visualization questions (1 through 4) and the memo. The rubrics are based on 10 points.

CONCLUSIONS

Visualizations and critical thinking skills are an important part of the newly revised CPA exam. This paper presents a case study that can be used to help students learn and acquire skills in visualizations and critical thinking. The case scenario can be used in an accounting and/or analytics class to introduce visualizations and to build critical thinking skills.

Income statements and visualizations are provided to showcase the financial state of the nonprofit organization.   The case then asks the reader to address a series of questions and to write a memo about the financial state of the nonprofit organization.

REFERENCES

- AICPA and NASBA. (2021). CPA Evolution Model Curriculum. https://nasba.org/wp-content/uploads/2021/06/Model-curriculum_web_6.11.21.pdf
- Tableau Desktop Professional Edition

APPENDIX

Table 1: Critical Thinking and Visualizations Topics (AICPA and NASBA, 2021)

Section	Description
Part 1: CPA Evolution Core, Section 1: Accounting and Data Analytics Core, Module 7: Critical Thinking, Topic 1: Critical Thinking	"Identify financial data risks and opportunities using relevant facts to make appropriate financial decisions"
Part 2: CPA Evolution Discipline, Section 1: Business Analysis and Reporting (BAR) Discipline, Module 10: Advanced Data Analytics, Topic 1 Advanced Critical Thinking	"Evaluate stakeholders' interests and recommend a course of action by developing relevant questions, examining bias, calculating probabilities and weightings, and comparing and engaging alternative and iterative analyses"
Part 1: CPA Evolution Core, Section 1: Accounting and Data Analytics Core, Module 8: Financial Data Analytics, Topic 5 Visualization	"Describe data visualization techniques"
Part 2: CPA Evolution Discipline, Section 1: Business Analysis and Reporting (BAR) Discipline, Module 10: Advanced Data Analytics, Topic 6: Advanced Data Visualization	"Explain and apply data visualization methods"

Table 2: Income Statement 2010-2016

Year	2010	2011	2012	2013	2014	2015	2016
Revenues							
State grants	$29,958	$40,378	$ 49,575	$38,565	$ 34,985	$48,560	$27,519
Federal grants	135,018	131,717	141,957	115,033	83,897	129,835	118,200
Community grants	13,116	32,302	22,057	15,415	13,446	30,571	24,498
Fundraisers	254,258	262,545	335,573	300,557	449,299	332,773	409,666
Charitable donations	247,741	285,599	243,279	250,405	312,558	320,572	288,575
Investment interest	68,568	27,198	30,539	67,291	48,465	28,722	52,996
Total Revenue	$748,659	$779,739	$822,980	$787,266	$942,650	$891,033	$921,454
Expenses							
Salaries	$254,252	$288,976	$315,452	$335,468	$344,552	$357,856	$355,124
Benefits	92,424	117,277	111,078	127,651	103,601	110,388	126,872
Travel	15,005	17,525	17,566	19,501	20,485	25,655	27,854
Supplies	18,737	10,425	11,819	13,194	13,850	16,361	14,699
Advertising	12,146	13,122	8,222	8,879	13,114	6,373	7,850
Rent	24,857	34,389	29,212	31,832	24,998	30,009	28,040
Other office related expenses	10,183	4,182	9,356	9,263	11,210	6,471	7,494
Total Expenses	$427,604	$485,896	$502,705	$545,788	$531,810	$553,113	$567,933
Net Profit	$321,055	$293,843	$320,275	$241,478	$410,840	$337,920	$353,521

Table 3: Income Statement 2017-2022

Year	2017	2018	2019	2020	2021	2022
Revenues						
State grants	$35,224	$31,525	$43,394	$45,512	$37,861	$39,781
Federal grants	105,424	133,559	110,053	79,129	132,876	93,147
Community grants	27,793	13,188	18,121	22,310	17,632	21,165
Fundraisers	425,685	457,852	546,245	168,255	201,565	234,526
Charitable donations	348,334	364,369	389,565	301,568	313,686	354,855
Investment interest	31,566	39,166	42,828	69,182	26,959	26,750
Total Revenue	$974,026	$1,039,659	$1,150,206	$685,956	$730,579	$770,224

Expenses						
Salaries	$365,845	$375,525	$394,585	$395,455	$458,565	$498,545
Benefits	110,095	132,680	121,117	133,267	126,402	110,195
Travel	28,594	35,609	45,745	20,145	48,645	60,542
Supplies	16,838	10,563	16,453	16,267	14,188	14,791
Advertising	9,692	13,873	12,242	6,756	10,382	12,711
Rent	29,946	28,643	33,026	45,154	49,512	54,525
Other office related expenses	11,741	5,426	9,451	6,334	9,697	10,159
Total Expenses	$572,751	$602,319	$632,619	$623,378	$717,391	$761,468
Net Profit	$401,275	$437,340	$517,587	$62,578	$13,188	$ 8,756

Table 4: Grading Rubric for Questions

Rating	Description
Does not meet expectations (0 to less than 7 points)	The student has not made a decent attempt to address the question. Major errors or omissions. Poor grammar and spelling mistakes.
Meets expectations (7 to less than 9 points)	The student has made a decent attempt. However, the response does not sufficiently address the question. Some errors in the analysis. Some grammar or spelling issues.
Exceeds expectations (9 to 10 points)	The student has sufficiently answered the question. The discussion response is correct or there is a minor mistake. Excellent grammar and no spelling mistakes.

Table 5: Grading Rubric for the Memo

Rating	Description
Does not meet expectations (0 to less than 7 points)	The student has not provided benchmarking analysis, sufficient conclusions, and recommendations. Major errors or omissions. Poor grammar and spelling mistakes.
Meets expectations (7 to less than 9 points)	The student has made a decent attempt at the memo. There is some evidence of benchmarking, conclusions, and recommendations. However, the memo is not complete and should be strengthened. Some errors in the analysis. Some grammar or spelling issues.
Exceeds expectations (9 to 10 points)	The student has sufficiently provided benchmarking, conclusions, and recommendations. No errors or a minor error. Excellent grammar and no spelling mistakes.

Figure 1: Revenue, Expenses, and Net Profit 2010-2022

Figure 2: Sources of Revenue 2019-2022
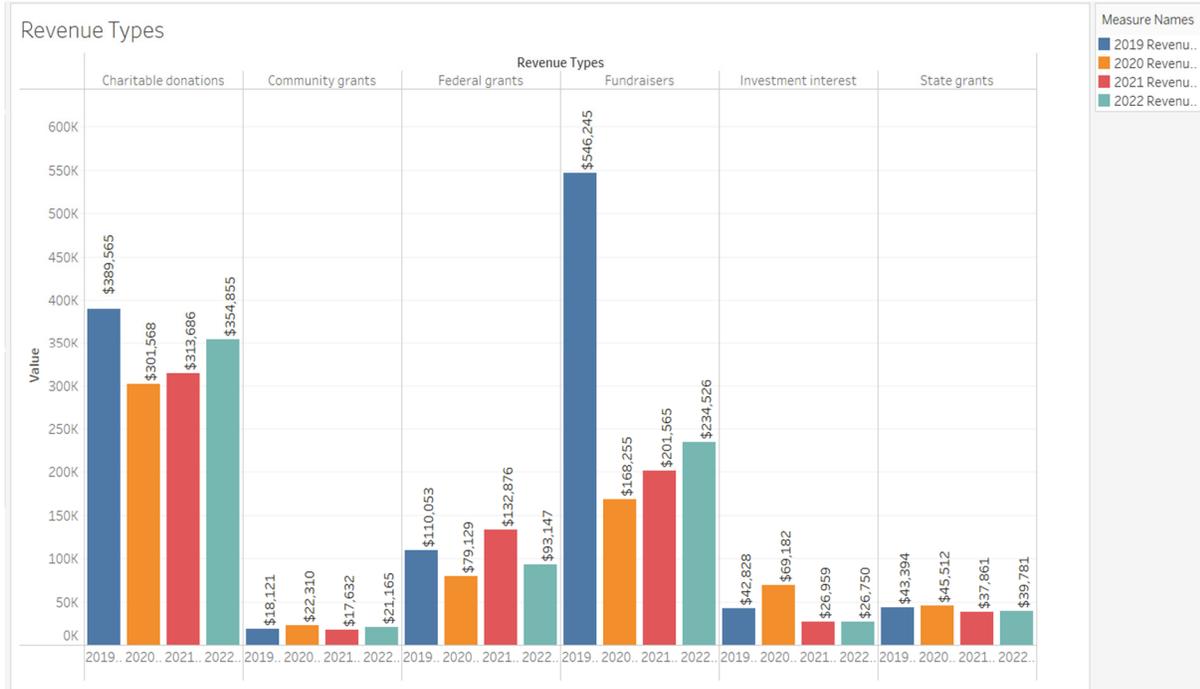
Figure 3: Sources of Revenue 2019
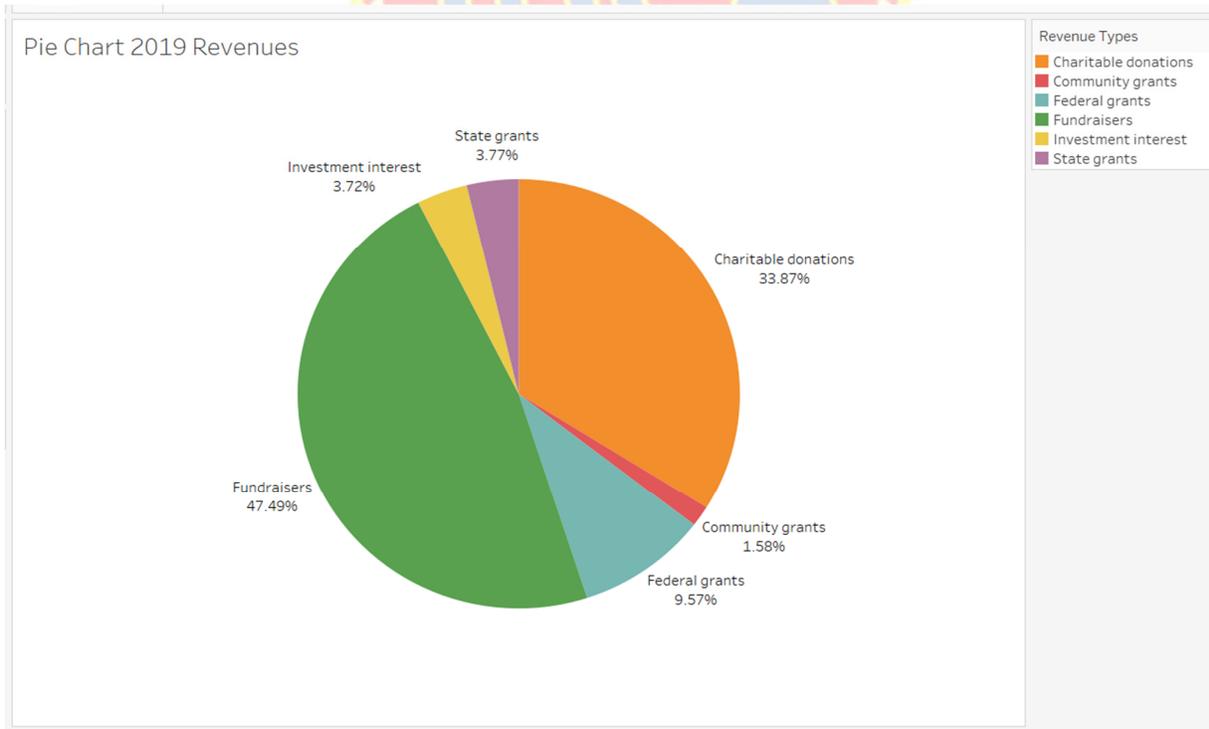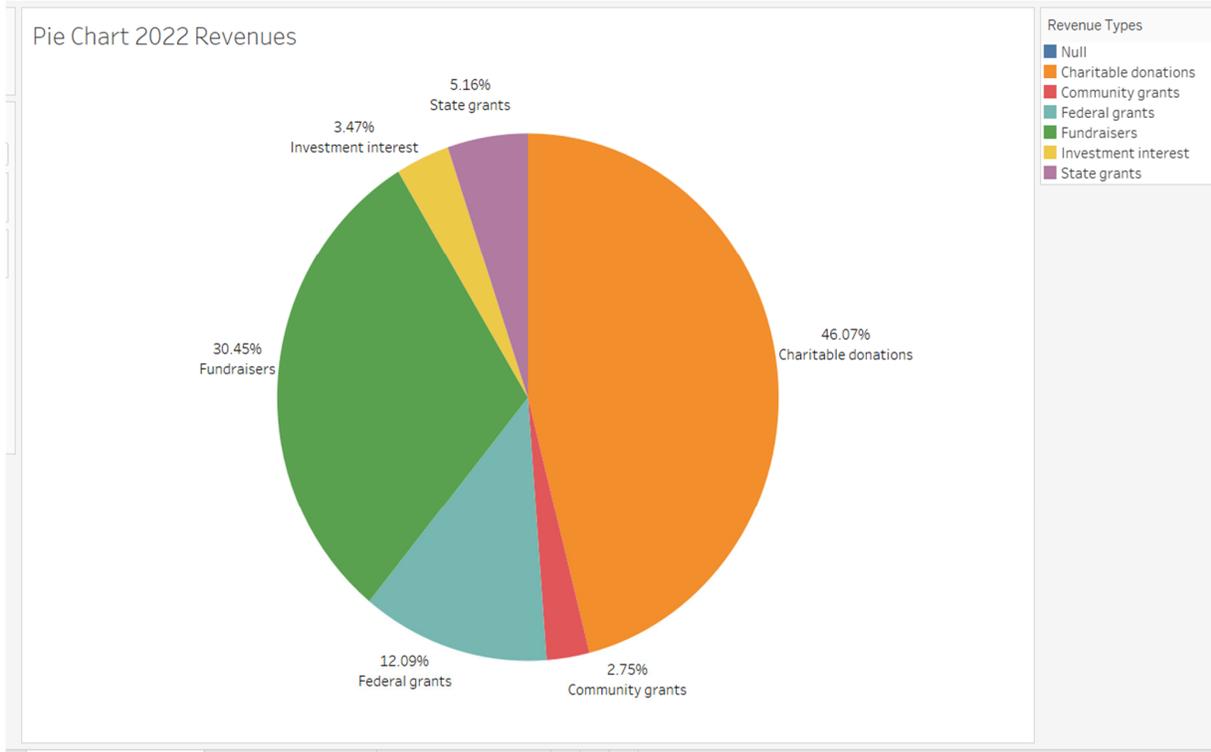
Figure 4: Sources of Revenue 2022

Figure 5: Expense Types 2019-2022
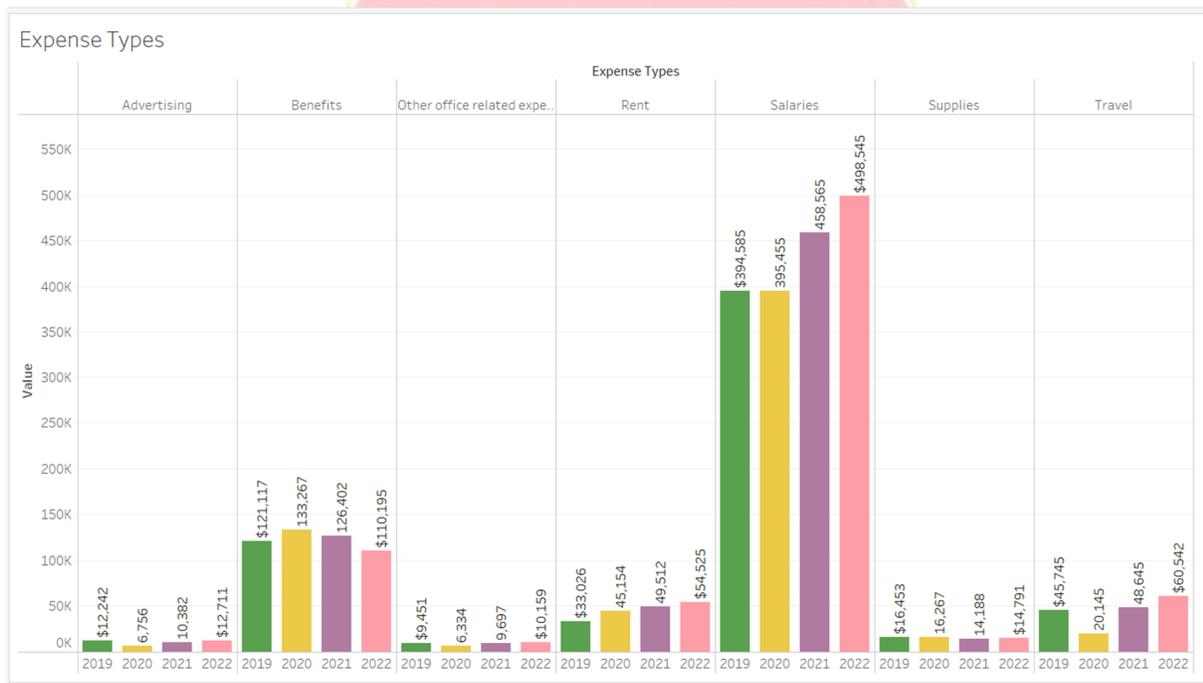
Figure 6: Expense Types 2019

Salaries $394,585	Benefits $121,117	Travel $45,745
	Rent $33,026 / Supplies $16,453 / Advertising $12,242 / Other office related	

Figure 7: Expense Types 2022

Salaries $498,545	Benefits $110,195	Travel $60,542
	Rent $54,525 / Supplies $14,791 / Advertising $12,711 / Other office related expenses	
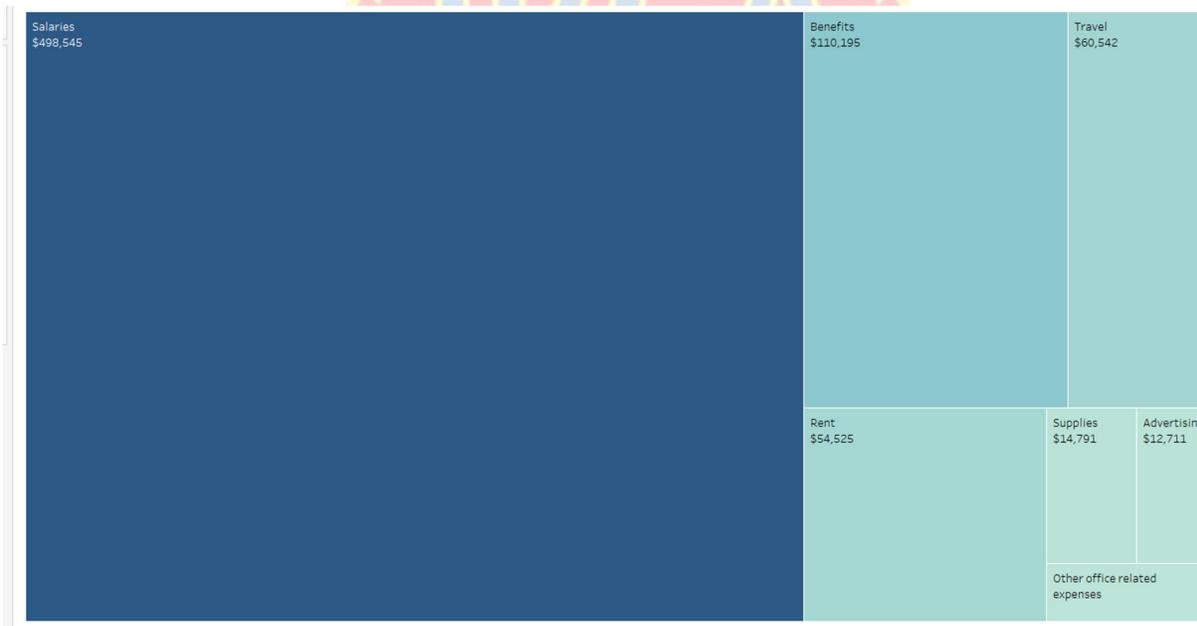
Figure 8: Sources of Charitable Donations
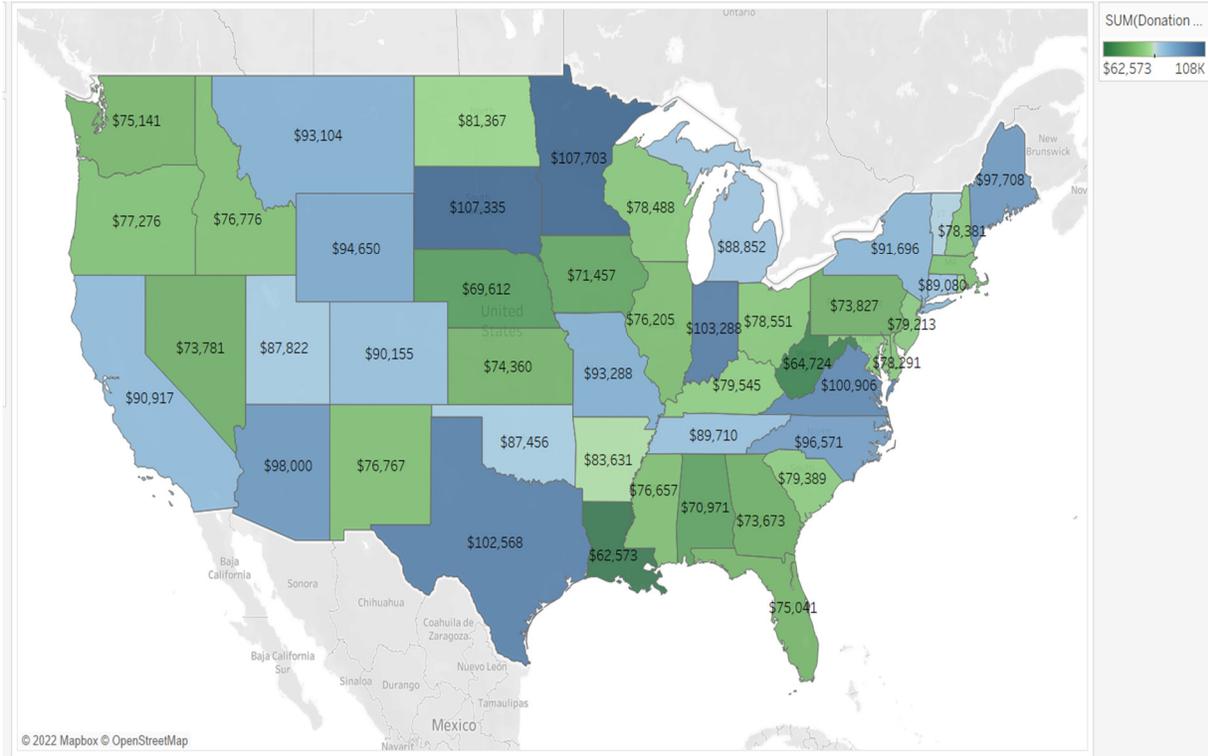
Figure 9: Number of People in Need

Figure 10: Average Revenue and Net Profit per Person in Need
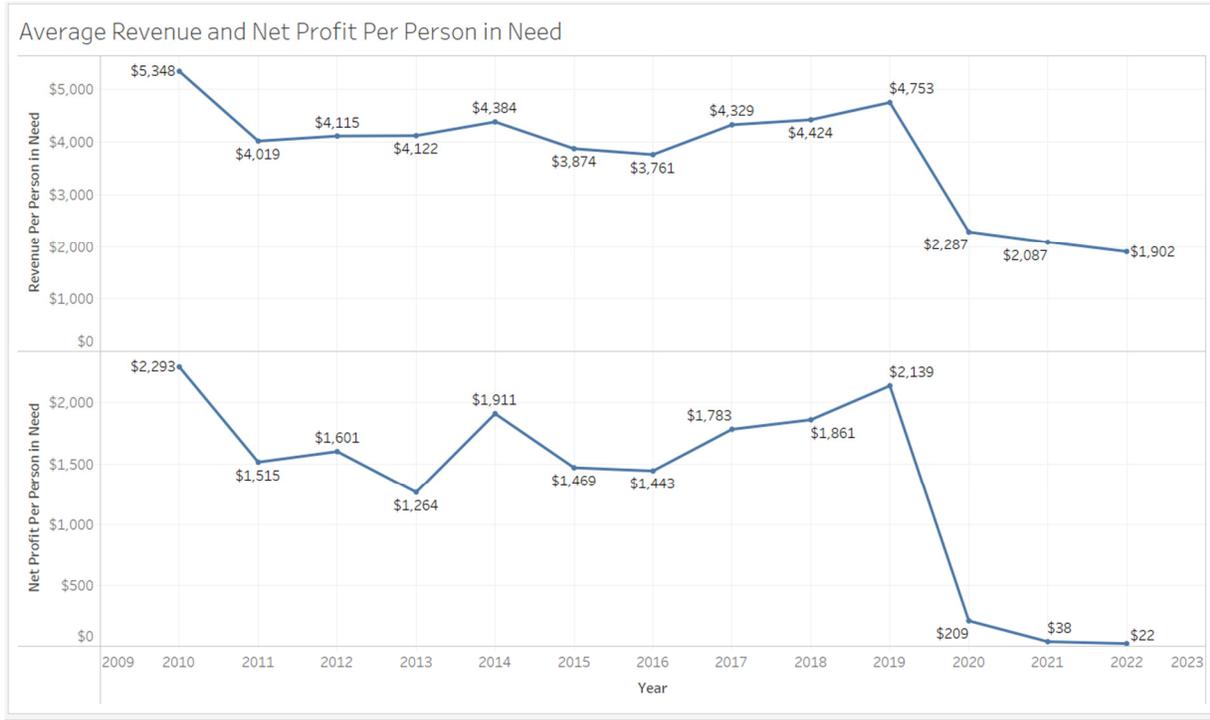
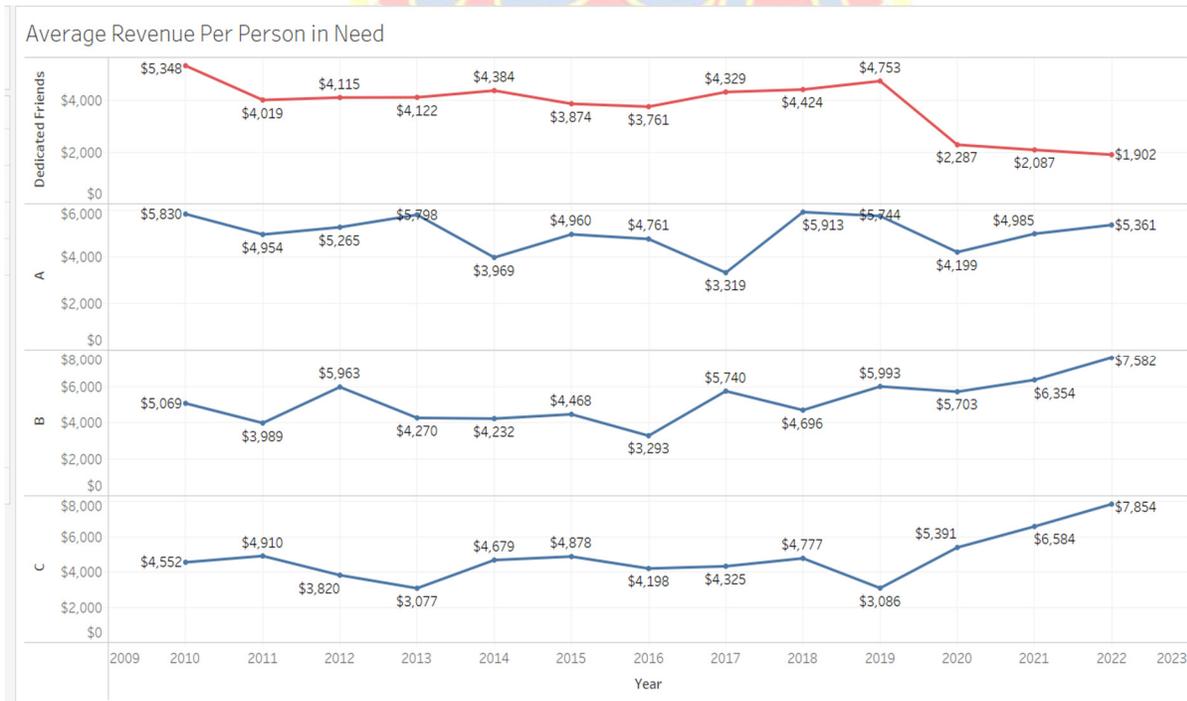**Figure 11: Average Revenue Per Person in Need Benchmarks**

Figure 12: Average Net Profit Per Person in Need Benchmarks
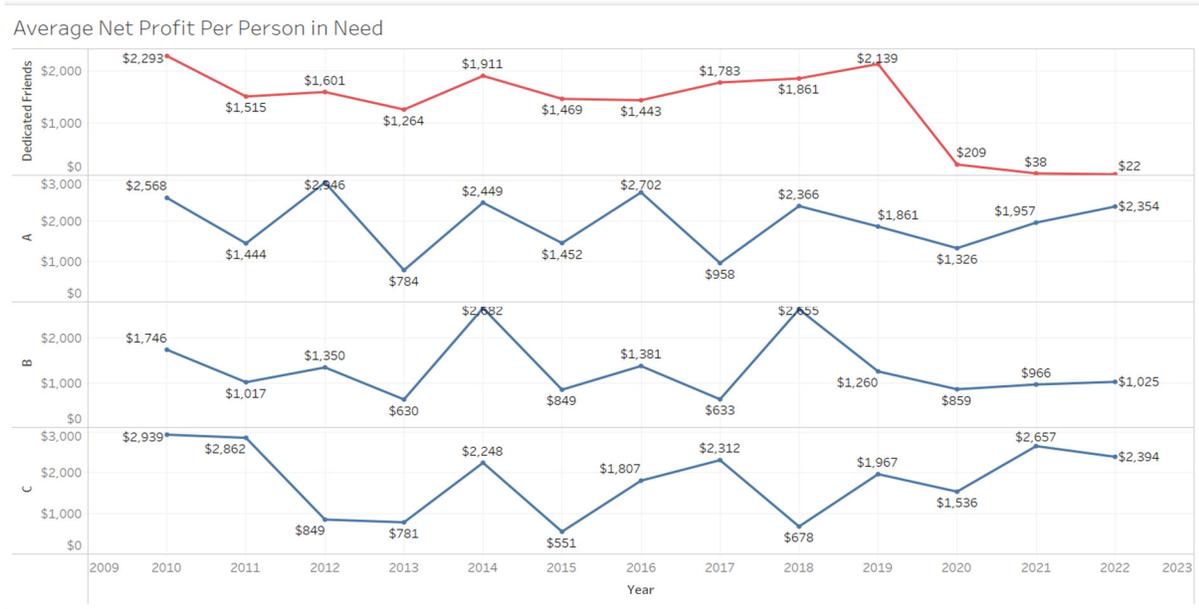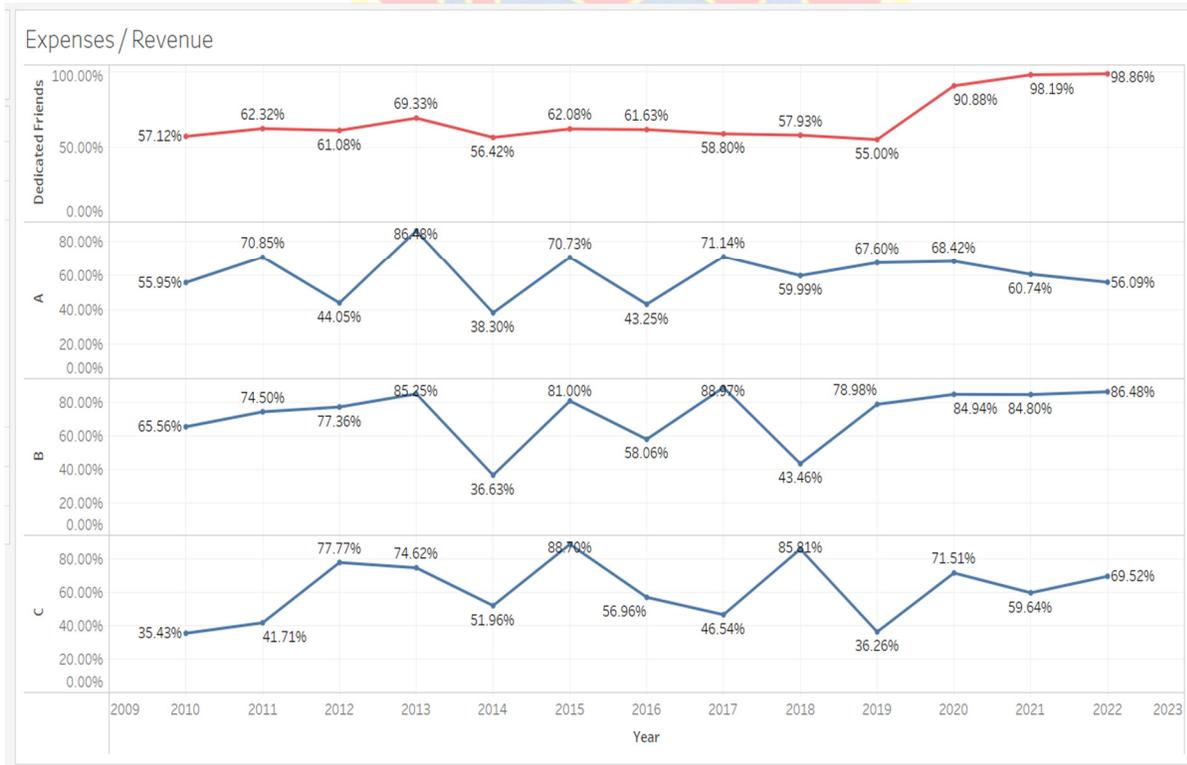

Figure 13: Expenses / Revenue Benchmarks

Figure 14: Net Profit / Revenue Benchmarks