

Project Proposal – Group 3

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Introduction

The Internal Revenue Service (IRS) is the nation's tax collection agency and administers the Internal Revenue Code as enacted by Congress. The IRS assists taxpayers and enforces the law to ensure tax responsibilities are met. The IRS brings in about 92 percent of all federal revenue. In Fiscal Year 2017, the IRS collected \$3.4 trillion in tax revenue, processed 246 million tax returns and other forms, and issued more than \$437 billion in tax refunds and outlays.

The IRS remains one of the most cost-effective investments in the federal government. For every \$100 collected in taxes, the IRS spends only thirty-five cents. The IRS enforcement programs collected \$56.9 billion in Fiscal Year 2017, a return on investment of about \$5.1 for every \$1 spent.

However, federal agencies are under increasing pressure to do more with fewer resources, and the Internal Revenue Service (IRS) is no exception. Since 2010, the agencies annual budget has been reduced by \$900 million and the IRS has lost almost 17,000 full-time employees, while the number of returns has increased to nearly 150 million households. Key measures of enforcement activities, including audit rates, have declined in several categories. At the same time as IRS resources have shrunk, demand for help from the IRS has surged in key areas. The IRS needs to refocus its efforts on efficiency while continuing to perform their primary mission, to provide America's taxpayers top quality service by helping them understand and meet their tax responsibilities and enforce the law with integrity and fairness to all.

Problem Statement

The Financial Planning and Analysis office is responsible for incorporating attrition rates into labor projections for the IRS and allocating labor funding accordingly. Because staffing reflects two thirds of the IRS' total funding requirements, any changes in staffing levels have a significant impact on fund requirements. One element that requires further understanding is expected attrition for proper financial planning and risk assessment. Since the transfer of money between accounts is complicated due to the federal appropriations process the initial allocation of labor money must be as accurate as possible. This project involves studying and modernizing the system used to project those attrition rates to look for efficiency improvements. How can the Financial Planning office ensure that labor funding allocations reflect the best use of available funds? Accurate forecasting allows for an avoidance of lapsed federal funding, a mitigating of funding risks, and reliable strategic planning.

Scope

Clarifying the scope of the project involved several conversations with our project sponsor, Mr. Afzaal Shamsie. Afzaal Shamsie is the Senior Manager in charge of Financial Planning and Analysis for the Internal Revenue Service.

Initially, Mr. Shamsie was interviewed to define the problem and identify his objectives. This initially resulted in a qualitative value function of one level that we treated additively. This resulted in seven total objectives as follows: a) discover the historical attrition-to-FTE conversion rate, b) investigate the sensitivity of the attrition rate to various factors, c) investigate which models are more accurate during which circumstances, d) investigate how the attrition models can be improved, e) produce a white paper studying inter-plan attrition and comparing the Financial Planning and Analysis methods of modeling attrition (Method 1) and the method created and used by the Research, Applied Analytics, and Statistics office (Method 2), f) investigate how the dollar impact of labor reductions might be converted to full-time equivalent (FTE) dollars more accurately, and g) compare the benefit of being able to reduce labor funding levels to the risk of the IRS divisions not being able to complete their essential objectives.

In a follow-up email, Using Value Focused Thinking, our team interviewed Mr. Afzaal Shamsie to quantify the benefit that he would get from the completion of the various objectives. This identified the sponsor's values and helped the team rank and categorize Mr. Afzaal Shamsie's requirements. The requirements are in three categories, things that are important to him (Must Do - #1, #2), things that he would like (Can Do - #3, #4, #5), and things that aren't particularly important to him, but he'll accept (Low Priority - #6, #7). These things are then listed ordinally to let us know what we should work on first. The identification of the decision-maker's values will help drive the team's decisions and should enable the team to proactively conquer roadblocks in the event of problems. The completion of these requirements can function as measures with an overall objecting being "the Completion of the Project to Mr. Shamsie's Satisfaction". We believe this Affinity Diagram-style mapping provides a risk analysis advantage over Alternative-Focused Thinking.

At this stage, we determined that this project will do the following (in order of importance and priority):

1. Produce a white paper studying inter-plan attrition and comparing the Financial Planning and Analysis methods of modeling attrition (Method 1) and the method created and used by the Research, Applied Analytics, and Statistics office (Method 2).
2. The office currently assumes that each employee will leave the IRS on average in the middle of the year. They use this to calculate an attrition-to-FTE conversion rate. Our project will discover the historical attrition-to-FTE conversion rate.
3. Investigate the sensitivity of the attrition rate to various factors.
4. Investigate which models are more accurate during which circumstances.
5. Investigate how the attrition models process can be improved.

6. Investigate how the dollar impact of labor reductions might be converted to full-time equivalent (FTE) dollars more accurately.
7. Compare the benefit of being able to reduce labor funding levels to the risk of the IRS divisions not being able to complete their essential objectives.

Then, to ensure that the objectives and their associated measures are mutually exclusive, we removed objective #6 as it overlaps with objective #2. Additionally, during a regular check-in with Mr. Shamsie, he offered objective weights of 70% on objective 1, and 25% on objective #5. This re-orders the objectives such that there are now only two Must Do objectives (#1 and #5), and four Low Priority objectives (#2, #3, #4, and #7).

Based on this feedback, we now know that we'll focus our priorities on producing the main deliverable of this project, a white paper studying the two existing attrition models and documenting the situations in which one is preferable to the other. We will then use interviews combined with systems diagrams to document the system and recommend improvements. We will then move on to the Low Priority category as time permits. Throughout the process we will focus on the following questions:

- Which models are more accurate during which circumstances?
- How can the models be improved?
- What is the sensitivity of the rate to various factors?
- What is the benefit of being able to reduce labor projects compared to the risk of the IRS divisions not being able to complete their essential objectives?
- How can the dollar impact of labor reductions be converted to full-time equivalent (FTE) dollars more accurately?
- Based on historical projections, what is the attrition to FTE conversion rate?

Items that are out of scope include the following:

- Creating a new modeling system
- Restructuring the workflows of the IRS
- Redirecting manpower at the IRS

Preliminary Requirements

Based on the scope of the project, the primary project requirements are as follows:

1. Produce a white paper. This white paper shall:
 - a. Contain the results of a study of inter-plan attrition and comparison of the two existing attrition models
 - b. Model the labor projection system used by the Financial Planning and Analysis Team and suggest process improvements.
2. Produce a web page for George Mason. This web page shall contain the data from Requirement #1, potentially reformatted for online viewership.
3. Communicate progress on Requirements #1 and #2 to both Mr. Shamsie and Dr. Laskey at key decision points to mitigate the risk of not meeting their requirements.

The Federal appropriations process, the various departments in the IRS, and the norms and procedures of the Financial Planning and Analysis team are interconnected and inter-related wholes. The team will have to identify as much as possible the inherent organization within the complex situation. In general, since the IRS is a large organization, the team shall utilize Systems Thinking to explore the properties of the system which exist once the parts of the system have been combined into a whole.

For additional details, see the Scope section.

Technical Approach

In general, our project will primarily use Excel for data analysis and PowerPoint for diagramming. The team may use Tableau and R for data analytics or data visualization as needed. The IRS uses an Integrated Financial System (IFS) database to generate reports. The team member who works in the IRS will gain access to the IFS and use it to generate preliminary Excel documents to be sent to the team for analysis and processing. Any systems engineering diagrams will be produced in Microsoft Office or open source software. The team will use Google Drive for all project-related documents. All documents will contain no Personally Identifiable Information in accordance with federal privacy standards.

Within the IRS, currently two different attrition models are used, a general one created by Financial Analysis to estimate the short-term needs of specific parts of the IRS, and a specific one created by the IRS research division. Hiring exemptions and buyouts, and how they play out in the budgeting process must also be considered.

In Attrition Model 1, we will use the PURE and PURE + Interplan excel dataset used by the Financial Planning and Analysis office. PURE accounts for the count of people that have left the IRS (pure loss) and moved to a different organization, retired, or generally have left the company. Interplan accounts for the count of people who have left a division of the IRS, but joined another division within the IRS. We plan on interviewing team members to discover how and why this report gets generated, and what it is used for. We will use this data to inform the white paper studying the uses of the two attrition models (Must Do - #1).

We then will combine these data sources for the past ten years into a large database containing all attrition data for both methods broken down by Financial Plan, Fund, Functional Area, and Pay Period. We can then run data analysis on this dataset to discover the effectiveness of the various attrition projections the team has used in the past (Must Do - #5). We can also use this combined dataset to determine the attrition-to-FTE conversion rate (Low Priority - #2). Finally, we will generate and test our own hypotheses about how attrition could be more easily and accurately projected (Must Do - #5), writing our results in the final white paper (Must Do - #1).

In Attrition Model 2 we will look at the model designed specifically by the research division of the IRS, Research, Analytics, and Applied Statistics (RAAS). Compared to Model 1, Model 2 is more accurate since it considers additional employee characteristics, such as the age and tenure of the employees. Unfortunately, Model 2 is difficult to run as it requires access to a sensitive dataset and knowledge of the data analytics tool SAS. Due to privacy concerns, we may not be able to run this model ourselves.

Like Model 1, for Model 2 we plan on interviewing several of the people in charge of this model to find out how and for what purpose it gets run. We will use this information to inform the white paper that compares the two attrition models (Must Do - #1). Since we may not be able to run the model ourselves, we will rely on interviews extensively for this portion. We will focus on the sensitivity of this attrition rate to various factors like age (Low Priority - #3), the accuracy of the model (Low Priority - #4), and whether the model can be easily improved to make it useful for the Financial Planning and Analysis Team (Must Do - #5), summarizing our results in the final white paper (Must Do - #1). All SAS data will be exported to Excel for processing.

If time permits, we will then conduct a risk analysis of all proposed modeling systems in accordance with lessons learned in SYST 659 and SYST 573 to complete Low Priority Objective #7.

Mr. Shamsie runs a seven-person team, and our group expects to be in contact with them at least three days a week. The team expects to show preliminary results to Mr. Shamsie at key decision points to confirm that the project is on the right track and the methodology meets his requirements. The team hopes that this will ensure that the project is aligned with Mr. Shamsie's strategic objectives and fits with his vision. The team will also ensure that other members of Mr. Shamsie's team are pre-briefed on the project so that we can incorporate their comments and suggestions. In addition to a white paper to be presented to Mr. Shamsie, the team plans to reformat the paper in a format suitable for displaying on George Mason's Capstone web page.

Expected Results

Since attrition modeling is a long-standing problem that has not been successfully analyzed so far, the team expects to find that the datasets are large and unwieldy. It is likely the data will require significant processing and that getting the data in a workable format will be time consuming. In addition, given the complexities of the federal government, the team expects to find that multiple, interlocking dependencies will make system modeling complicated.

However, ultimately the team believes we can accomplish all of the Must Do goals (#1 and #5) as well three of the Low Priority goals (#'s 2-4). Low Priority Objective #3 may be complicated if it turns out that access to the RAAS' methodology and data has to be through a third-party. However, the team believes that information through interviews combined with our hands-on access to the raw data for Methodology #1 will allow us to complete this objective regardless.

Specifically, our team hypothesizes that Methodology #1 will turn out to consist of a variety of crude methods that can be easily analyzed and improved upon once the system is analyzed and the dataset is systematically organized. The team further hypothesizes that RAAS' model will turn out to be more accurate but that RAAS might be unwilling to either allow us to have hands-on access or to allocate manpower to our suggested improvements.

Project Plan

We've mapped out research plan for this project till the end of the semester. The plan below addresses the Must Do and proposed Low Priority performance measures. Relevant coursework is noted in parenthesis. At a high level, our plan can be described as follows:

- **February - Task Preliminary**
 - Analyze requirements and create system for fulfilling requirements (505/510-style)
 - Create and document record-keeping/task management system (505/510-style)
- **February - Task 1: Begin a white paper studying inter-plan attrition and comparing the two existing attrition models.**
 - Get overview of the two models
 - Get historical data that we can use the two models on
 - Architecture diagrams for both models (520)
 - Using the two models in different situations to explore model effectiveness
- **March - Task 5: Investigate how the attrition models can be improved.**
 - What other factors can be considered in these models
 - Any recommendations on how to make these models more accurate (611)
 - Write up results in white paper (530)
- **March - Task 4: Investigate which models are more accurate during which circumstances**
 - Identify different circumstances - recession, growth, etc
 - Overlay model behavior on various time intervals and compare prediction with actuals using standard deviation, margin error, etc (531/515)
 - Write up results in white paper (530)
- **April - Task 2: Based on historical projections, discover the attrition-to-FTE conversion rate**
 - Discover when the team normally estimates the Attrition-to-FTE conversion ratio
 - Discover the typical error rate of the various attempts
 - Analyze the risks involved in overstating vs understating this number (573/659)
 - Analyze different ways of calculating the Attrition-To-FTE conversion rate
 - Write up results in white paper (530)
- **April - Task 3: Investigate the sensitivity of the attrition rate to various factors**
 - Sensitivity analysis (most sensitive? Least sensitive?) (531/515)
 - What factors are under the IRS' control?
 - Write up results in white paper (530)
- **May: Complete project**
 - Finalize white paper
 - Get final feedback from Decision Maker
 - Dry runs of final presentation

A chart of our proposed task breakdown is below.

PLANNED HOURS - Time planned for each task by week																		
	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
		25-Jan	1-Feb	8-Feb	15-Feb	22-Feb	1-Mar	8-Mar	15-Mar	22-Mar	30-Mar	5-Apr	12-Apr	19-Apr	26-Apr	3-May	10-May	
WBS	Task																	Total
1.0	Analyze Requirements	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	18
2.0	Create task management system	0	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	9
3.0	Get overview of two models	0	4	10	8	3	0	0	0	0	0	0	0	0	0	0	0	25
4.0	Get historical data for both models	0	3	10	8	3	0	0	0	0	0	0	0	0	0	0	0	24
5.0	Architecture diagrams for both models	0	0	8	8	8	0	0	0	0	0	0	0	0	0	0	0	24
6.0	Use both models in different situations	0	0	0	15	15	15	0	0	0	0	0	0	0	0	0	0	45
7.0	Analyze and write up results	0	0	6	15	25	0	0	0	0	0	0	0	0	0	0	0	46
8.0	What other factors can be considered	0	0	0	0	0	10	8	6	3	0	0	0	0	0	0	0	27
9.0	Recommendations on how to make models more accurate	0	0	0	0	0	10	8	6	0	0	0	0	0	0	0	0	24
10.0	Identify different circumstances	0	0	0	0	0	0	10	8	6	3	0	0	0	0	0	0	27
11.0	Overlay model behavior on various time intervals	0	0	0	0	0	0	10	8	8	6	0	0	0	0	0	0	32
12.0	Historical information about federal budgeting process	0	0	0	0	0	0	0	10	15	10	20	0	0	0	0	0	55
13.0	Create background diagrams	0	0	0	0	0	0	0	0	0	0	10	8	5	0	0	0	23
14.0	Identify normal attrition-to-FTE conversion ratio	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	6
15.0	Discover typical error rate of various attempts	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	6
16.0	Analyze risks involved in overstating/understanding value	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	6
17.0	Analyze different ways of calculating attrition-to-FTE conversion rate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.0	Write up results in white paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19.0	Sensitivity analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20.0	What factors are most sensitive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21.0	What factors are least sensitive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22.0	What factors are under the IRS' control	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23.0	Website and finalize white paper	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	15	45
	Total	6	19	43	54	54	35	36	38	32	19	30	17	14	15	15	15	442