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Help! My New Director of Analytics* Wants to Get Rid of SAS®! What Should I Do?

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ABSTRACT

How would you answer this question? Most of us struggle to articulate the value of the tools, techniques, and teams used to harness analytics. How do you help the new director understand the value of SAS® to you, your job, and your organization? In this interactive session, you will discover the components that make up total cost of ownership (TCO) as they apply to the analytics lifecycle. What should you consider when you evaluate total cost of ownership and why should you measure it? How can you help your management team understand the value that SAS provides?

*When appropriate, replace with Director of IT, Chief Analytics Officer, Chief Information Officer, or similar title.

INTRODUCTION

When faced with this dilemma, what should you do? Once you dry the tears and take a few deep breaths, you should realize that the Director is actually asking you to justify the value of SAS®. The same concepts apply whether you are discussing software, hardware, human capital, or any other item your employer provides. You need to articulate what gains these items derive in terms of money saved or money spent. At a macro level, the main goals are to minimize cost and risk and/or maximize profits. Figure 1 shows the definition of "value" (Merriam-Webster).

VALUE – relative worth, utility, or importance OR the monetary worth of something

Figure 1. Value Definition

Typically, when you express the value of a resource you will express it in terms of expense, return on investment, or total cost of ownership.

The audience for this paper is analytical users and administrators at all levels who need to be able to articulate the value of using SAS (or any other resource) to their management. This paper will cover different ways of expressing the value and encourage thinking about the value for the entire analytics lifecycle, not just the user's particular focus area.

WHY DOES THIS HAPPEN?

The first question we need to address is why does this situation happen? In conversations with several SAS customers in the past couple of years, this question arises when a new analytics director takes over the role. Typically, the first thing the new person does is to examine their budget to find ways to cut costs. Often they are not familiar with SAS or how it is used to benefit the organization, so it seems like an easy line item to eliminate and save their department money, while also making an immediate impact in their new role.

Unfortunately, this is not the best way to evaluate line item expenditures. First many people do not realize that the budget is just part of one side of a balance sheet, the liabilities side. See Figure 2 for a definition of "balance sheet."

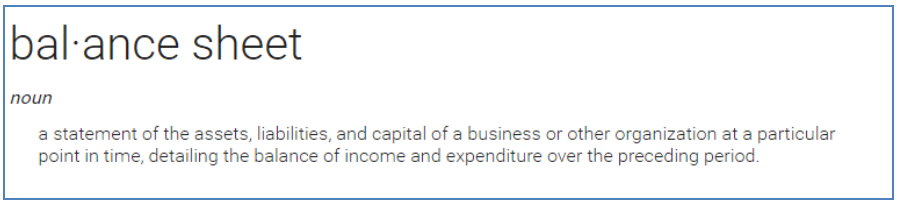

Figure 2. Balance Sheet Definition

By definition, Assets – Liabilities = Net Worth. When you take away a liability such as the cost of software, logically you think the Net Worth rises, but this approach is short sided. For example, when you take away a critical business tool that people often use, you will need to replace the tool or processes or both to accomplish the same business objectives. If you are replacing the tool, you also have to consider other costs such as training and time for employees to learn a new tool.

To better evaluate whether a tool is cost effective, it is much more convincing to use other financial metrics instead of only using the budget. Here are the two most common metrics:

1. Return on Investment (ROI). (See Figure 3. ROI Definition.)
2. Total Cost of Ownership (TCO). (See Figure 4. Total Cost of Ownership Definition.)

Considering both metrics will help the Director make a more informed decision.

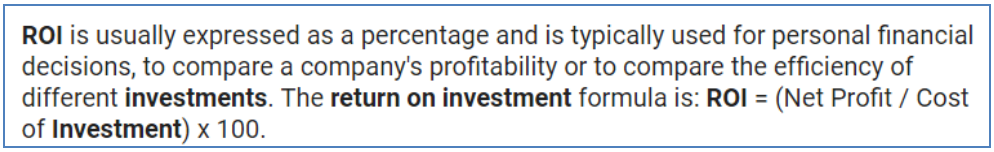

Figure 3. ROI Definition

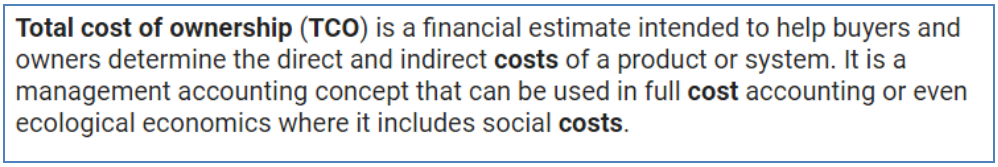

Figure 4. Total Cost of Ownership Definition

This paper will examine ways that you can determine the components that make up Return on Investment and Total Cost of Ownership. These components are not always easy to calculate, and sometimes, it's challenging to even identify them because each application is based on your industry and specific project. The goal is to help you be able to *translate the value of what you are doing to your Director.*

BUILDING A HOUSE EXAMPLE

Before we take on the analytics lifecycle, let's look at a simpler example. Have you or someone you know ever bought a house or had a one built? What are some of the benefits of owning a house and what are the additional benefits of having a house built versus an already completed house?

POTENTIAL BENEFITS

Owning a Home

- Pride of ownership
- Shelter from weather/elements
- A sense of place/community
- Greater privacy

- Stability/putting down roots
- Costs are predictable more stable
- Appreciation and tax free profit
- Mortgage interest deduction
- Property tax deduction
- Retirement savings
- Storage for your belongings
- Potential additional income (renting, roommates, vacation accommodations)
- Freedom to control your environment

Building a Home

- Create the home you want
- Walls, carpet, and tile in the colors you like
- Wiring to suit your needs (such as hard-wired and wireless Internet for home offices and multiple devices, surround-sound systems installed, electrical receptacles where you want and need them)
- Floor plan you desire
- Your choice of fixtures and design elements including faucets, doorknobs, appliances, and so on
- Low maintenance cost – everything is new, so fewer repairs
- Warranties
- Home site selection
- Modern amenities – Cat 5 wiring, TV wiring for hanging on walls, new appliances
- Special features – gourmet kitchens, extended garages, screened in porches
- Energy efficiency
- Safety features – fire-resistant, better electrical wiring, tempered glass

TOTAL COST OF OWNERSHIP

The first step in building a home is finding a neighborhood, also known as “location, location, location.” When you start to search, you will find neighborhood signs like the ones in Figure 5. Neighborhood Sign Examples.

If you look closely, you’ll notice the words “Starting at” and “from the”. These words indicate that *the house will cost more than the price on the sign*. For example, the price will be more than $130,900, $440,000 or upper $200,000. But how much more?

Figure 5. Neighborhood Sign Examples

Additional costs fall into 4 categories:

1. floor plan
2. lot
3. structural changes
4. interior and exterior design

The price on the sign is the base price for the house only. Once you have chosen the floor plan, you will know the exact price for that plan. Then you might have to add to the price of the base floor plan, the price of a lot premium.

Lot premiums can range from $0 for less desirable lots, like those that are in high traffic areas or hilly, to $50,000 or more for more desirable lots, like wooded back yards, corner lots, or lots on a cul-de-sac or golf course.

The next potential cost is any structural changes you make to the house floor plan, such as additional rooms, bigger garage, screened porches, and so on. Structural changes can range from $0 (no changes or covered changes) to $100,000 or more based on how many changes and the extent of the changes.

The next cost is the design options. These are your choices for the exterior and interior of your house. In your plan, there will be standard options that are included with your house, and any upgrades will cost additional money. Upgrades include flooring, lighting, siding, appliances, built-ins, cabinets, granite countertops, faucets, wiring for Internet or surround sound, and so on. These design options can run from $0 to tens of thousands of dollars.

Once you add all these costs, you'll derive *the total cost of building the new house*.

Standard House	**$250,000**
Lot Premium	$10,000
Structural Changes	$15,000
Design Options	$25,000
Total Cost to Build House	$300,000

Table 1. Total Cost of Building a Home

The cost to build the house went from $250,000 starting price to $300,000 for the finished product.

Is this the total cost of building the house? Not even close. To close on or legally purchase the house, you will have all the standard costs for title searches, title insurance, inspections, and so on. You might also have deposits and hookup fees for your utilities. You will likely have additional costs for landscaping. And we haven't even mentioned the biggest one, a mortgage. If you obtain the typical 30-year mortgage, there will be additional closing costs plus the interest you pay over the 30-year term. In fact, if we expand this example to total cost of home ownership, your mortgage interest is likely to be your biggest expense, long term. In addition, you will need to add insurance, taxes, upgrades, repairs, maintenance, and utility charges.

The truth is there are many more expenses as you make your new house into your home such as furniture, electronics, linens, blinds, and so on.

Even in this simple example of building a house, you can see that determining the total cost of home ownership becomes complex pretty quickly. You can break it into pieces and accurately estimate the actual cost of building the house.

Total cost of ownership for a house has the same major components as the total cost of ownership for software. These costs can be broken down into 3 key areas – acquisition costs, operating costs, and personnel costs. (See Purchasing & Procurement Center.) Within these areas, here are some of the component costs:

- Purchase Price
- Maintenance
- Upgrades
- Repairs
- Service
- Support
- Training
- Insurance
- Staffing

By now, you can see how purchase price, maintenance, upgrades, repairs, service, insurance, and staffing (builders, contractor, trades people) all play a part in total cost of ownership for a house, but you might be less certain about the training and support aspects. When you buy a new home, the seller/supervisor will teach you how to maintain and sustain the home's critical systems, such as heating, air conditioning appliance operation, water heater, sprinklers, garage door, security, and wiring options like built-in surround sound or Internet and phones. Also included with a new home is a warranty. Typically, the first year will cover almost anything that might happen within the home, so the builder will provide the services to repair any problems that might arise. Now you can see that the total cost of home ownership includes all 9 of these components.

RETURN ON INVESTMENT (ROI)

Return on Investment is the Net Profit divided by Cost as defined in Figure 3. To calculate this for the new house, you would have to sell the house. For example, 5 years after purchasing, the house sells for $350,000. The profit would be $350,000-$300,000 for a total of $50,000. A simple ROI is calculated as $50,000/$300,000 * 100 = 16%.

You can certainly make this calculation more complex (and possibly more accurate) by considering all the costs that went into the house over the time of ownership, plus adjusting the calculation for the time of ownership to have an annualized return. In fact, long-term financial calculations are adjusted for inflation too.

BUILDING A PREDICTIVE MODEL EXAMPLE

Just like building a house, there are benefits to building a predictive model. Listed below are both general benefits and benefits for specific applications.

BENEFITS

General

- Save money (cut cost)
- Make money (increase profit)
- Understand relationships in your data
- Make informed business decisions

Specific Applications

- Gain new customers/donors/constituents
- Retain customers
- Optimize logistics/workforce
- Reduce waste/fraud
- Manage risk

What happens when we apply the 9 home building component costs for total cost of ownership to building a predictive model? This example will simplify the process since each application can be quite different, while including the items that are common across different applications.

PURCHASE PRICE

To build a model, you need software, hardware, people, and processes. The software you use depends on what type of model you want to build and the size of your data. Sometimes the software will determine the hardware, but more often than not the hardware plays a bigger role in the software used because many organizations have hardware standards and polices. The costs for hardware and software are usually considered “hard costs”. These costs are usually fixed, so there are no surprises or variations.

After the hardware and software are installed and configured and people are hired or assigned to the modeling projects, you are ready to build your predictive model.

MAINTENANCE

Maintenance for building a predictive model falls into 2 categories:

1. Maintaining the model
2. Maintaining the hardware and software

Maintaining the model includes monitoring the performance of the model and making it available for other applications, business stakeholders, and other analysts and teams.

Maintaining the hardware and software includes regularly scheduled maintenance such as applying hotfixes and other updates to the current version.

In both categories, these costs are considered soft costs, because we aren’t exactly sure what these costs will be. These costs will have to be estimated for our total cost of ownership calculation.

UPGRADES

Upgrades involve the hardware, software, and model. Technology upgrades occur often. In order to stay current and keep your system running, both the hardware and software need upgrades on a regular

basis. The cost of upgrades includes actual charges for new versions of software or upgraded processors, memory, or components for hardware. The cost for information technology (IT) administration time for upgrading the software or hardware must also be factored in. The costs for the hardware and software updates are considered hard costs because we know the actual cost and the IT administration time would be considered soft costs and we need to estimate.

With predictive models, upgrade and maintenance costs tend to consume more human capital, so the costs involve the analysts' time to rerun, refit, or redevelop a model. Time spent creating new variables or features to use as inputs into the model plus trying new modeling techniques or algorithms also influences upgrade costs.

REPAIRS

When building a model, you'll more often include the model in the maintenance category than in the repair category. The cost for repairs for the software and the hardware typically fall in the category of human capital costs, unless the hardware needs a new physical part. These costs can vary and are difficult to predict (like repairing and replacing home appliances or the roof in your new home); they must be anticipated, because you know at some point you will need to do it. If your hardware fails or suffers damage, it too will need repair or replacement.

SERVICE

The cost for service can include costs for consultants or business experts who help build your predictive model. Service costs must include installation cost for setting up and configuring your hardware and software. You might use consultants or internal resources; either way there are costs to consider.

SUPPORT

The support needed for building a model comes in many forms. You might need support from IT to help gain access to the data and other resources you need for building a model. In many organizations, each department or project pays a "charge back"' from IT for their support. You might need technical support from the software or hardware vendors. Some vendors include technical support as part of the purchase price while others require you to pay separately for these services. You might also need support from the stakeholders and other internal and external communities as you encounter issues with both the data and the modeling algorithms. Often this support is available from public online communities, which typically have little to no charge for participation.

TRAINING

The training for building a predictive model includes education on how to build a predictive model, how to use the software, how to use the hardware and often on how to access, create, and extract the data. Subject matter expertise might also need to be developed. Costs for training vary based on how extensive (how long) the training is and the medium for delivery (e-learning, on demand, or live).

INSURANCE

This concept might not seem applicable to analytics. I too had to think it through. There are many definitions for insurance. The one that best fits our situation is Figure 6 (English Oxford Living Dictionaries).

INSURANCE – A thing providing protection against a possible eventuality

Figure 6. Insurance Definition

So when building a model what are we trying to protect against? I believe that the biggest risk is getting it wrong. What then is the cost of analytics insurance? It is validating the model. Using validation techniques such as hold out samples for honest assessment or using cross validation methods helps us ensure we are getting good results that will apply to new data.

STAFFING

Staffing is one of the biggest costs, if not the biggest in most cases. This includes costs of salaries, benefits, hiring, training, office space, and any other costs associated with being an employee. To build models you will need IT and administrative support for accessing the data, the software and any computer environments. You will also need Business Analyst, Statisticians and/or Data Scientist to build, deploy, and monitor the models. Most often you need management buy in to support and fund the project.

Training will be an ongoing cost, because of turnover and the increasing velocity in new analytical and modeling techniques. Staff will be engaged in ongoing training to sharpen their skills and stay on top on new methods being introduced.

SUMMARY OF COMPONENTS FOR TOTAL COST OF OWNERSHIP

Table 2 below summaries many of the costs involved in both Building a Predictive Model and Building a home.

TCO Component	Building a Predictive Model	Building a Home
Purchase Price	• Hardware • Software • Analyst and IT Support	• Plan • Lot • Structural changes • Exterior and Interior
Maintenance	• Hotfixes • Cooling and hardware uptime • Evaluate model performance • Managing model • IT support	• Changing Filters • Power washing siding/deck • Lawn care • Routine • HVAC/gutter/appliances cleaning and upkeep
Upgrades	• Software upgrades • Hardware upgrades • Operating system upgrades	• Internet/phone/TV • Landscaping • Built-ins
Repairs	• Replacing bad/broken hardware components • Data center facility	• Warranty • Broken items
Service	• Managing environment • Managing users • Managing memory/storage	• Pest Control • Garbage • Water/sewer • Utilities • Snow removal
Support	• Technical Support • Online Communities	• Warranty • Neighbors • Online communities

Training	• Software • Hardware • How to build models • Database training	• Operation of home's systems • Prevention and early detection techniques
Insurance	• Validation • License agreement • Service level agreements	• Property and casualty (flood,loss, fire, theft) • Warranties
Staffing	• Business Analyst • Data Scientist • Statisticians • Quantitative professionals • IT support • Administration support • Management • Subject matter experts	• Builders • Contractors • Framers • Electricians • Plumbers • Masons • Painters • HVAC technicians

Table 2. Total Cost of Ownership Components Summary

RETURN ON INVESTMENT (ROI)

Return on Investment is the net profit divided by cost as defined in Figure 3. To calculate this for building a predictive model, you would have to add up the relevant costs above and need calculate the profit that your organization gained from implementing this model. In some instances, calculating the profit is direct and easy to do; in other instances, it's much more challenging as the model is part of a more complex project.

ANALYTICS LIFECYCLE

Just as the cost of building a house is only one aspect of the total cost of home ownership, *building a predictive model is only part of creating and maintaining the analytics lifecycle.*

Figure 7 shows the eight steps from the Analytics lifecycle. It includes the following eight steps:

1. Identify/Formulate Problem: Identifying the problem defines what the business needs to know. Once specified you translate the business challenge into something that can be solved with predictive analytics. You need to define the goal, what resources are needed to reach the goal and what criterion will verify that the goal has been reached.
2. Data Preparation: Often data preparation is characterized as taking 80% of the model development effort. With careful planning, this undertaking can be reduced. Planning includes identifying data sources, determining how to combine data sources plus transforming, readying and creating inputs for our models.
3. Data Exploration: Exploring the data is crucial in discovering trends, relationships, anomalies, and even mistakes in the data. Before modeling, the analyst needs to understand the data to make decisions about how to transform and proceed in modeling. This exploration phase is critical to help the analysts create better inputs, which in turn creates better, more accurate predictive models.

4. Transform and Select: The insights gained from data exploration leads us to transform data to meet certain statistical or business criteria. This includes grouping rare levels, transforming for normality, imputing missing values and variable selection. This step helps to ensure the predictive model we create will be robust and valid for new data.
5. Build Model: Building the model includes using multiple algorithms from data mining and machine learning. This is an iterative process where analysts create multiple models and tweak the model settings based on experience and metrics, such as lift, that indicate how well the model is meeting our goals.
6. Validate Model: Using model comparison criteria and best practices such as hold out sampling determine the best model. By validating the model based on a holdout sample, analyst assures that the model will translate well to new data.
7. Deploy Model: Once the best model is determined, the model is ready to be deployed - it's ready to be used it in our application. Often deployment involves taking the model score code and applying to our data. The score code creates indicators and probabilities for each subject (observation/row), that can be used to make business decisions.
8. Evaluate/Monitor Results: Over time, the model needs to be evaluated and monitored to make sure it's still meeting our goals. All model performance will decay over time, so monitoring will help you determine when the model is no longer effective and should be replaced.

Please note that this is a circle and not a straight line; *it is not only a process but an iterative process, one we learn from and continue to improve based on our learnings.*

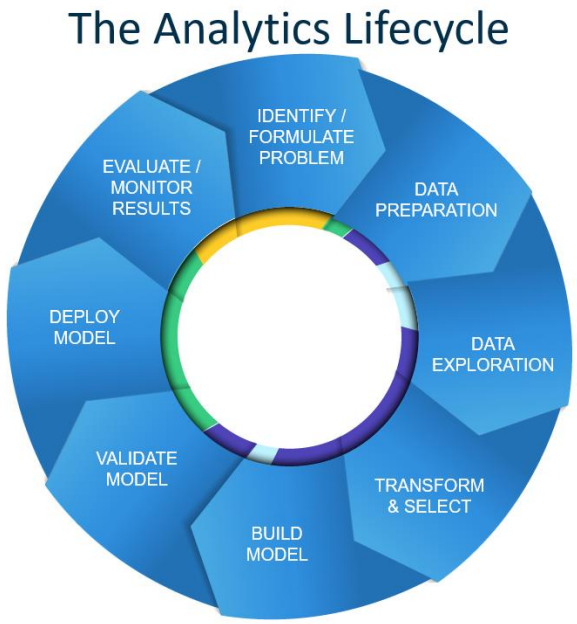

Figure 7. The Analytics Lifecycle

ANALYTICS LIFECYCLE IN ACTION

Before diving into the different costs of the analytics lifecycle, let's look at some examples of applications. The list is long, vast and wide, but the blog "Big Data Made Simple" lists the following 14 applications in the post "14 useful applications of data mining" (Rajkumar P. 2014).

- Future Health Care
- Market Basket Analysis
- Education

- Manufacturing Engineering
- Customer Relationship Management (CRM)
- Fraud Detection
- Intrusion Detection
- Lie Detection
- Customer Segmentation
- Financial Banking
- Corporate Surveillance
- Research Analysis
- Criminal Investigation
- Bio Informatics

Please note this list is representative it is not exhaustive.

You can see that predictive modeling is certainly a key component in addressing or solving these business challenges, but not the full solution. For example, once we predict who is likely to be fraudulent, what do we do with this information? How do we apply it and how do we make business decisions from it? We also need to keep in mind a fraud detection/prevention initiate focuses on minimizing risk and preserving our reputation versus a market basket analysis focuses on increasing sales and improving customer service. When we conduct our total cost of ownership calculations, we need to make sure that we are comparing to the correct metrics (that is, what we made versus what we saved).

According to CIO magazine, no organization buys software just to own it (Doig, 2015b; and Ascendant Consortium).

> *It's all about the return on investment or ROI. The software is bought to realize benefits that flow from use. There are four categories of benefits:*
>
> 1. ***Increases in** things like revenue, profit, growth, efficiency, speed, compliance.*
> 2. ***Reductions in** things like costs, time, complaints, attrition, complexity.*
> 3. ***Improvements to** things like productivity, processes, quality, reliability.*
> 4. ***Creation of** things like strategy, alignments, new products, new processes.*
>
> *(This list of benefits is from the work of David A Fields of the Ascendant Consortium. Disclosure: I have paid for and taken one of David's training courses.)*

When you are wanting to prove value of software or any other purchase investment, your value will be determined using a combination of these 4 categories.

SAS has compiled many examples of applying the analytics lifecycle. In the Recommended Reading you can find several examples. You can search for others using the terms "ROI", "Return on Investment", "TCO", and "Total Cost of Ownership". Also, you can find individual customer stories on the SAS website. These stories will give you real life examples from customers that have used SAS to solve a problem with the analytics lifecycle and other SAS products. Here are some of the stories that are included:

Orlando Magic uses analytics to help increase retention of season ticket holders, which in turn increases their subscription renewals.

1-800-FLOWERS uses analytics to increase customer engagement and satisfaction. This helps them create long lasting relationships.

World Wildlife Fund uses analytics to help increase donations while lower cost.

Highmark saves millions of dollars by finding patients who qualify for higher reimbursements.

Scotiabank improves customer service through targeted campaigns, which equals annual growth of 80,000-100,000 new accounts.

North Carolina Department of Transportation finds better way to build roads, avoiding polluting natural water sources.

New Zealand Ministry of Health created accurate diabetes data to use to provide appropriate and timely care.

Farmers Mutual Group leverages customer data for delivering faster response to customers in disaster zones.

EDF Energy identifies and reduces churn levels using customer insights gained from predictive modeling and segmentation.

Statistics Estonia painted a national portrait with analytics, accelerating information delivery by 50% and saved more than 1 million euros.

TOTAL COST OF OWNERSHIP

Let's delve deeper for the costs associated at each step of the analytics lifecycle. The CIO magazine article "Calculating the total cost of ownership for enterprise software" addresses these costs based on whether the software is cloud based, off-the-shelf, or custom (Doig 2015a). For the purposes of this paper, we will categorize the costs into 3 key areas:

1. acquisition costs,
2. operating costs and
3. personnel costs

All 3 categories include the prior costs outlined, such as software, hardware, staffing, and so on, spread over multiple steps in the analytics lifecycle, that is, as individual costs such as software or hardware often spread over multiple steps in the analytics lifecycle.

Acquisition Costs

Acquisition Costs include the hard costs to buy the software and hardware that support all phases of the analytics lifecycle for your application or project. These costs include taxes, commissions, and other associated fees. Also included are the costs for installation, setup, and implementation, which might include consulting costs. Additional users, upgrading capacity, upgrading supporting software or systems would also fall into this category.

Operating Cost

Ongoing operating costs include the day-to-day costs to keep the system running. These costs include customization, integration, providing external interfaces or access for users, security, governance, data migration, depreciation, downtime, documentation, vendor support, and more. Eventually there will be end-of-life or retirement outlay, such as archiving and storing old models, data, and audit trail documentation that might need to be referenced in the future.

Personnel Cost

Personnel Cost includes all staffing requirements. IT usually provides administrative support from creating, supporting, and maintaining the technology environment to providing access to the data to ongoing user support. Business analysts, data scientists and statisticians provide the data wrangling, predictive modeling, model deployment, and model monitoring services. Training, retaining, and ongoing training for all staff should be included as well. Expenditures for administrative support, consulting, and end-user support should also be included. Fully loaded rates for salaried staff's benefits must also be factored in.

Opportunity Cost

I would be remiss not to mention opportunity cost as well. Opportunity cost is defined in **Error! Reference source not found.**.

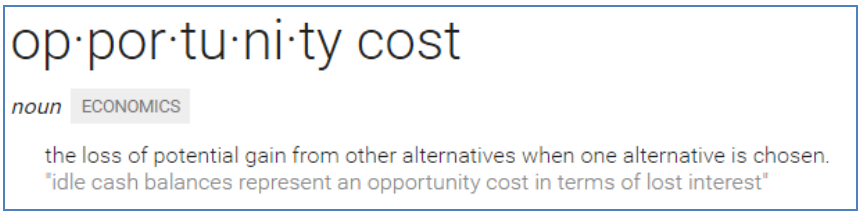

Figure 8. Opportunity Cost Definition

When making a decision, or assigning resources to business goal(s), what do we lose by making one decision versus another. In our house building example, if we select one neighborhood over another, what are we sacrificing? For example, one neighborhood might offer a pool and the other one doesn't, but it offers larger lot sizes and lower homeowner association fees. One neighborhood might be closer to work or schools and so on, and its property tax rates are higher. The same is true for software. One software might have highly responsive and quick problem-solving technical support where another might have slow or self-service support that might not always address your specific needs. *Opportunity cost is not included in TCO or ROI, but it must be a considered when purchasing or replacing a product or service.*

RETURN ON INVESTMENT

In the analytics lifecycle, we must weigh tradeoffs whenever a decision is made to invest in a new project or change our analytics ecosystem. Table 3 outlines these potential gains and challenges.

Benefits	Challenges
Increased productivity	Staff training and retraining
Better insights	Integration difficulties
More collaboration	Incompleteness of vision
Better management visibility	Poor vendor support
Improved communication	Productivity losses
Faster and more informed decisions across departmental boundaries	Potential legal ramification
Improved management control	Risk of failure

Table 3. Return on Investment Benefits and Challenges

Each of these benefits and challenges have associated price tags and gains that must be considered in your decision-making. The above benefits and challenges are not always easy to accurately measure; educated estimates can be considered.

Return on Investment for the analytics lifecycle should be continuously measured as realized cost savings or increased profit numbers become available.

TOTAL COST OF OWNERSHIP (TCO) VERSUS RETURN ON INVESTMENT(ROI)

When should you use total cost of ownership and when should you use return on investment? Ideally you should use both, but that's not always possible. Calculate total cost of ownership when choosing between software (or products or services). *TCO makes comparison based on cost only*. This technique allows you to make the business decision to buy based on a combination of actual and estimated costs. TCO answers questions such as which software is more cost-effective? Which fits into my projected budget? What types of returns must be realized in order to justify this expense?

Return on Investment makes comparisons based on expected outcomes. This approach evaluates whether certain business initiatives should be pursued, and for how long? Is another project better? Often the first year of a project will have negative ROI. Take for example, buying a new house. The first year of home ownership usually has a negative ROI. Over time, with property value appreciation and tax savings, homeownership ROI usually turns positive.

CONCLUSION

If you give me one dollar and I give you five dollars in exchange, how many dollars will you give me? All that you have! This is an over-simplification of our challenge, but it provides a solid guideline regarding how we should evaluate business decisions. I know people who spend hundreds of thousands of dollars on Facebook ads. On the surface, you might think that is way too much money to spend, but they make $5 for every $1 they spend. They have easily justified ROI on their $100,000. When you purchase anything, business metrics like total cost of ownership (TCO) and return on investment (ROI) help you communicate and evaluate holistic business value, instead of focusing solely on the price tag.

When faced with the question “should we buy or continue to support software like SAS (or any other technology product or service),” your best offense is to be able to establish its value. Establishing value involves outlining, understanding, and quantifying costs, as well as understanding the many benefits, gains, and reductions such as profits, risks, and expenditure savings. When you articulate the value of SAS to your director, it will make his or her decision to continue using SAS much easier. Make it a yes-brainer!!

Although the considerations outlined here were derived from numerous customer meetings and advisors, perhaps you have encountered others. Contact your SAS Account team or the author if you want to discuss your specific scenario in more detail. We welcome and encourage your anecdotes and real life experiences of how you overcame your challenges.

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RECOMMENDED READING

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- *Finance for Nonfinancial Managers, Second Edition.* Gene Siciliano. Available http://amzn.to/2iMmuDf.
- *How to Measure Anything: Finding the Value of Intangibles in Business.* Douglas Hubbard. Available http://amzn.to/2hPBnGr.
- *Better Business Decisions Using Cost Modeling, Second Edition.* Victor E. Sower and Christopher H. Sower. Available http://amzn.to/2j1Hghq.
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SAS WHITE PAPERS

- Managing the Analytics Life Cycle for Decisions at Scale: How to Go from Data to Decisions as Quickly as Possible http://www.sas.com/content/dam/SAS/en_us/doc/whitepaper1/manage-analytical-life-cycle-continuous-innovation-106179.pdf
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