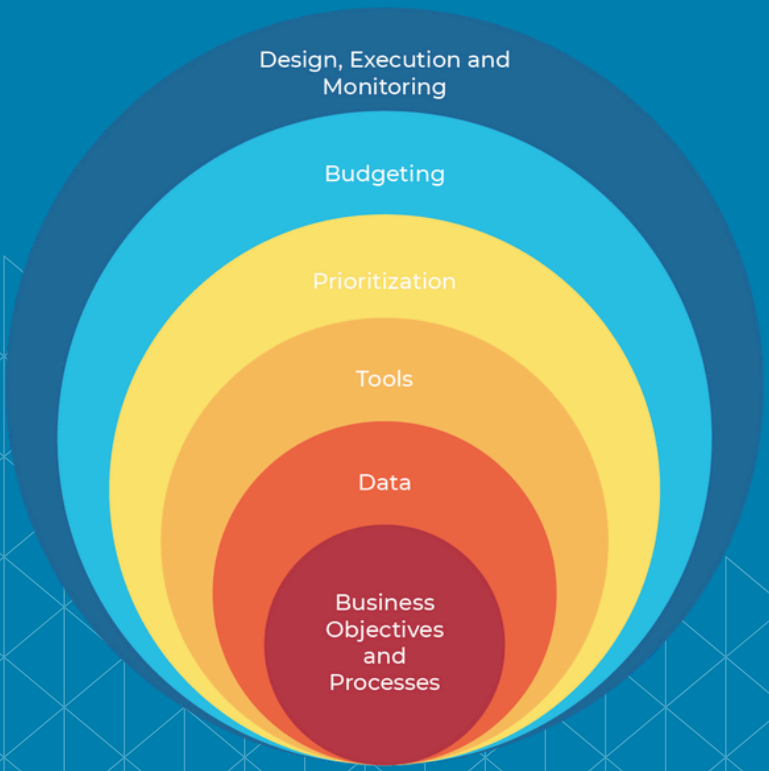
"Peeling the Onion" on Integrated Asset Management



Author William Roth
President and CEO, Roth IAMS

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CHAPTER 1

AN OVERVIEW

What is in a name? It is an age-old question. I thought I would explore our company name a bit further to help demonstrate what we think is a better way to approach facility and infrastructure asset management. The IAMS in Roth IAMS is not about dog food (yes, we have heard that one before), but rather it stands for Integrated Asset Management Strategies.

The term Asset Management by itself is one of those terms that has a definition that is wide enough to fly a 747 (a little homage to the world's first jumbo jet as it is was recently retired) through. It can mean a lot of different things to a lot of different people. Once you add Integrated to the front it can get even more confusing.

This eBook will walk through the Integrated Asset Management (IAM) Framework that we use to explain our philosophy to our clients. The graphic used throughout presents the framework that we affectionately call "the Onion", hence the title of the paper.

At the highest level, IAM is about making better decisions on how to allocate your limited capital and maintenance dollars based on a clear understanding of the priorities of an organizations' diverse group of stakeholders. As with many things in life, while it appears simple and straightforward, doing it requires constant discipline and effort.

Although this eBook goes through the framework layer by layer, it is critical to understand that IAM is not a linear process. The actual journey tends to be very iterative, with clients moving back and forth between the levels of the framework (or layers of the onion).

AT THE HIGHEST LEVEL, IAM IS ABOUT MAKING BETTER DECISIONS ON HOW TO ALLOCATE YOUR LIMITED CAPITAL AND MAINTENANCE DOLLARS

CHAPTER 2: THE CORE

BUSINESS OBJECTIVE AND PROCESSES

Getting started can sometimes be the hardest part. The whole world is a blank sheet of paper, and in theory, you can go wherever your imagination can take you. While this can be exciting, it can also feel overwhelming. However, when it comes to Asset Management, most organizations already have the starting point figured out, sometimes they just don't recognize it.

BUSINESS OBJECTIVES ARE AT THE "CORE OF THE ONION" AS PRESENTED IN THE GRAPHIC OF THE INTEGRATED ASSET MANAGEMENT (IAM) FRAMEWORK.

In our experience, the best way to get an entire organization behind an Asset Management (AM) Program is to start by focusing on the current Business Objectives and Processes that already exist within the organization.

One of the biggest challenges that we hear from our clients is that they struggle to get senior leadership buy-in for their AM Programs and as such, it is difficult to get a program off the ground. By using the same or similar language in your corporate strategic plan, the senior leadership within your organization will see that the AM Program's goals are "their goals" and therefore both are aligned. I have seen many examples of Boards or Councils doing a "180" in terms of support for AM within an organization, just by using language that speaks to the strategic goals and priorities of the organization. Turning executive-level resistance or apathy into support is critical to the success of an IAM program in any organization.

Beyond just getting buy-in from senior leadership, there is one other critical way that aligning with business objectives is key. What is the point of implementing an AM Program if it does not help to achieve the goals of your organization? It is like having a crew all rowing in different directions. You are most certainly not going to get where you want to go anytime soon.

THE NEXT CRITICAL STEP IS TO LOOK TO LEVERAGE EXISTING BUSINESS PROCESSES AS ILLUSTRATED IN THE INTEGRATED ASSET MANAGEMENT (IAM) FRAMEWORK "ONION" IMAGE.

When we start with a focus on where an organization is today with regards to business processes, we often hear some variety of "The whole point of this exercise is to improve, not to stay the same". While it is true that AM is really all about continuous improvement over time, where we have seen the greatest success in AM programs is when they start from a realistic place focused on current state.

Implementing an AM program is not just an exercise in Asset Management, it is also an exercise in Change Management. After the lack of senior leadership support, one of the most common reasons for failure of an AM program is lack of staff support. An AM program should impact nearly everyone that is responsible for constructing, acquiring, maintaining, renewing, and divesting of the assets in your organization.

A failure to start from where you are is a sure-fire way to kill any buy-in or momentum around a program. Additionally, the exercise of understanding current processes also serves to engage staff from across your organization into the project at the earliest stages. By being genuinely curious and asking great questions, you can create a sense of ownership throughout your team.

Once you have clarity of where you are starting from, you can then begin to look at how "far" you can go in this version of our AM program. As part of the discovery of understanding "where are we now" it is also vital to gain an understanding of your team's capacity for change. If you have a nimble team that is used to and thrives on change (congratulations), then you can go further with this iteration of your AM program.

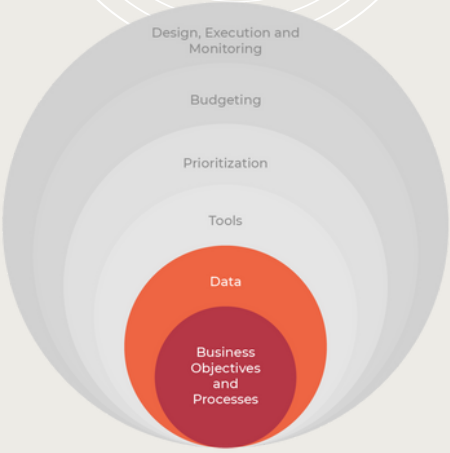
However, if your team is more resistant to change (like many), you may have to tell your AM story in shorter chapters at first, so you don't exceed your organization's capacity to change.

This is one of the most nuanced parts of any AM program. How far do you push with this version. Being too conservative or "sand bagging" won't get you where you need to go. Developing a program that is too ambitious will often fail to launch as it will be seen as unrealistic, and people will give up before they even start.

WHEN IT IS DONE RIGHT AND THE FOUNDATION OF YOUR AM PROGRAM IS BUILT ON ALIGNMENT WITH YOUR CURRENT BUSINESS OBJECTIVES AND PROCESSES, THE ODDS OF SUCCESS SKYROCKET.

CHAPTER 3

KNOWING YOUR DESIRED DATASET



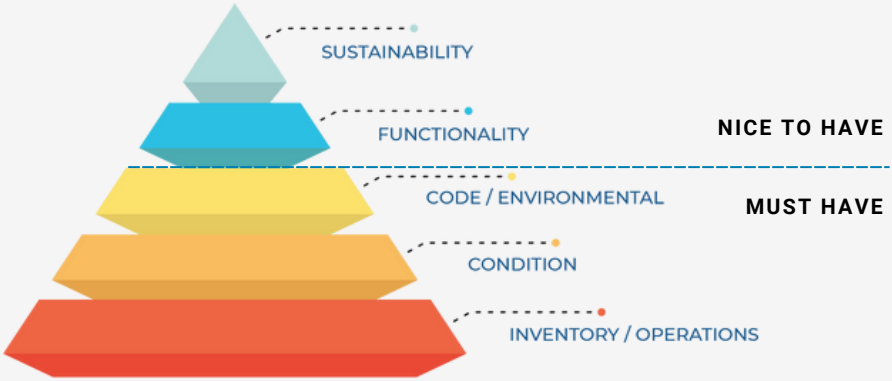
The second tier of the Integrated Asset Management (IAM) Framework (or layer of the Onion) is where we will focus on Data. When we make this shift, we encourage our clients to develop what we call a "desired dataset". Your desired dataset should consist of the types of data you need to answer the questions you have related to your facilities and infrastructure.

For each type of data, you need to decide what specific data you want to collect. For example, if you are doing Equipment Inventory & Tagging, what types of equipment do you want to tag, and what information (beyond Make, Model and Serial Number) do you want to collect on each type of equipment.

It is natural to think that more data is always better. In many cases that can be true. However, before adding more data to your desired dataset you must remember that you need to keep the data up-to-date over time. You need to consider the effort that will be required to maintain the data based on capital renewal and maintenance activities. You do not want to gather an unwieldy dataset that you do not have the capacity to maintain over time.

With a firm idea of what your desired dataset looks like, you can begin to gather existing information as well as identify data gaps that will need to be filled through assessment or inventory projects. Before you start to use existing data, you should ask yourself a few questions. How confident am I in the existing data? Is the data current or legacy data? Do I know where all our data is?

Wherever possible, you want to get value out of existing data. However, only if it will add value and not create more trouble than it is worth downstream. We have many examples of both situations. The key is to take the time to understand the value and the limitations of your current dataset before you decide to leverage it or start over.



Shifting from the layers of the Onion, let's take a look at climbing the "Pyramid". This graphic is used to demonstrate what we call the Hierarchy of Existing Facility Data Needs. The first three tiers of the pyramid are what we call the "Must Haves", and the top two tiers are the "Nice to Haves".

Before we dive into each data type or stream within the pyramid, I want to reiterate that the hierarchy has been built for existing buildings, if you were going to design a new building you would start at the top of the pyramid and work your way down. However, our focus is (almost) exclusively on existing buildings, and as such we recommend that you begin at the bottom of the pyramid and work your way up since you are dealing with real world bricks and mortar assets.

Inventory/Operations

The base of the pyramid deals with the most granular level of data that you typically manage within a building, your equipment inventory, which generally drives your maintenance activities within your facility. To properly build a Preventative Maintenance Program or even to just track the costs associated with reactive maintenance, you need to understand what equipment is present within your facility. As part of the process, we highly recommend that you also tag the equipment with a barcode or QR code to make data management and retrieval easier. We call this process Equipment Inventory & Tagging (EI&T).

Condition

The next stage of the pyramid or data stream is your condition data, generally developed as part of a Facility Condition Assessment (FCA). FCA data is typically at the element level, which involves rolled up inventory data based on similar dates of construction, condition, material type, etc.

For example, in your inventory you may have three individual boilers. However, in your FCA if two boilers are older and one is newer you would likely have two elements, one for the two older boilers and one for the new boiler. If they were all the same age/condition, etc. you would likely only have one boiler element, with a quantity of 3.

In theory, if you collect your inventory data you can begin to roll it up into element level data that can form the basis of your condition dataset. However, most clients do not have a detailed enough inventory, or have gathered their FCA dataset prior to completing their EI&T process. Additionally, if you develop your FCA dataset properly, you can also extract EI data from the FCA dataset for certain types of equipment. With a detailed understanding of your condition, you can forecast your future capital renewal needs and gain an understanding of your Deferred Capital Renewal and Maintenance (DCRM) Backlog.

Code/Environmental

The third layer of the pyramid is Code and Environmental data. Although these items are generally legislated, in most cases issues that exist are grandfathered and generally only require addressing when completing capital renewal (often condition-based) projects. Most organizations have a clear understanding of their environmental issues, particularly asbestos-containing materials (ACMs). However, often the data is not integrated into the capital planning process. The worst words that a Project Manager can hear during a renewal project is "what's that" and it turns out to be unexpected ACMs.

With regards to regulatory information, most organizations only do deep dive code reviews as part of preconstruction activities/design, which makes perfect sense as the issues only need to be addressed when disturbing the element. Doing a detailed code assessment of an entire building is very expensive and if you are not doing specific construction, you risk a change in certain codes between the time when you do the assessment and the time of the actual construction activities.

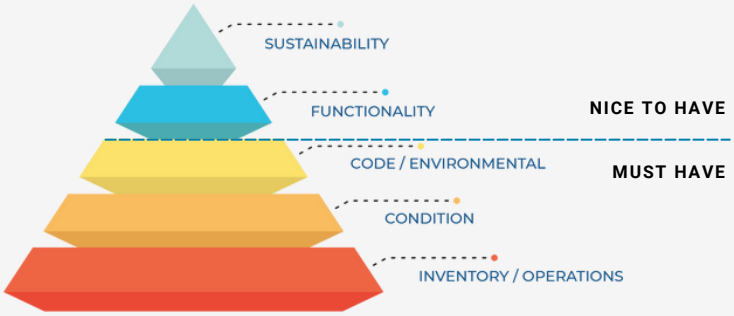
FOR THE PURPOSES OF PRELIMINARY CAPITAL PLANNING, WE OFTEN RECOMMEND THAT CLIENTS CONSIDER ADDING A CONTINGENCY FOR ADDRESSING CODE ISSUES WHEN CERTAIN TYPES OF WORK ARE BEING DONE IN OLDER FACILITIES.

The one specific regulatory issue that I do want to call out is Accessibility. Depending on the jurisdiction that you operate in, Accessibility can be very time sensitive with regards to mandated compliance. Generally, with the Americans with Disabilities Act (ADA), the requirements are fairly standard across the U.S. Within the Canadian market, each province has slightly different requirements and levels of regulation.

It is important that you understand the applicable accessibility requirements and you understand the issues that exist within your facilities. Ideally, we recommend that you use the Uniformat II element structure for your accessibility data so that you can easily integrate it with your condition dataset when doing a capital plan.

Wrapping Up the Must Haves

If you don't have a detailed understanding of the Must Have data (the bottom three tiers of the Pyramid), then much of your strategies to address Functionality and Sustainability will be diverted to deal with failures or issues associated with capital renewal or reactive maintenance needs.



Functionality

How functional are your buildings, or specific spaces within them? Having a clear understanding of the standards that you use for answering that question (e.g., square footage/student for educational facilities) is vital in starting to understand the functional adequacy of your buildings. There are space standards for many different types of buildings or spaces that can be used to determine space needs in terms of functionality.

With clarity of the standard, it is simply a matter of comparing your existing buildings to those standards, and where there is an issue, developing a high-level cost estimate of how to address the issue(s) (e.g., an addition on a building, renovating the floor plate, etc.).

The second aspect of functionality is tied to features within a building that you would install in a newly constructed facility of a similar type. For example, if you have an older building and it does not have proper ventilation or air conditioning (as a new building would), what would it take, and what would the costs be to bring it up to your current functional standards.

As the program within a building evolves, you may need to make changes to spaces within a building such as converting an office into a laboratory to meet the needs of an expanding or new educational program. As your program needs evolve, understanding the changes that will be required within a building to meet those needs is critical, including initial costs estimates.

When building a capital plan, you may decide to do specific projects or renovations purely for functional enhancements. However, it is important to integrate the element replacement information into your condition as well as code/environmental datasets as you may also address issues associated with those data streams as part of the project. There may also be opportunities with some incremental increase in scope of a project to pick up some additional code liabilities or DCRM issues.

The same holds true in reverse when you are doing projects purely for capital renewal reasons. There may be opportunities to improve the functionality of a space or building for a modest increase in the scope of a project.

Sustainability

The pinnacle of the Pyramid is data associated with Sustainability, that focuses on the performance of your facilities. Energy audits, proper control sequences & proper commissioning will all help to understand how your building is performing and how sustainable it is.

WE ARE VERY SUPPORTIVE OF ENHANCING BUILDING PERFORMANCE. HOWEVER, WE SUGGEST THAT THE BEST WAY TO DO IT IS NOT IN ISOLATION, BUT AS PART OF A PLAN THAT CONSIDERS ALL ASPECTS OF THE PYRAMID IN AN INTEGRATED FASHION.

To reduce greenhouse gas emissions, many organizations put a lot of focus on energy and building performance. However, without first getting a handle on the other data streams, the best intentions to improve performance can fail. For example, putting a high efficiency HVAC system in a building with a leaky envelope will end up blowing that high efficiency air right out into the outdoor environment.

Additionally, if a space is reprogrammed and goes from a 12-hour occupancy to a 24-hour occupancy, much of the modeled savings associated with an upgrade will be eliminated.

One final note on efficiency. Most organizations use a simple payback (It costs $100,000 and we will save $20,000 annually means a payback of five years) to determine if an energy upgrade is considered.

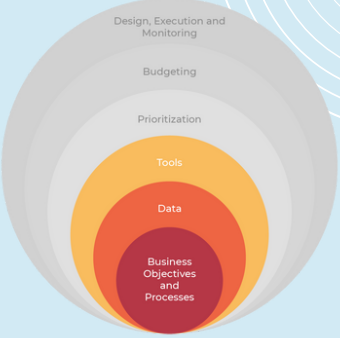
In instances where a piece of equipment requires replacement for condition reasons (risk of failure), we recommend that you use a differential payback to determine if an upgrade is within an organization's investment tolerance. For example, if the replace-in-kind scenario for our upgrade above is $80,000, the upgraded equipment is $100,000 and the energy savings is $20,000 annually, as opposed to a simple 5-Year Payback (which may be longer than some organization's acceptable period), we would suggest that the differential payback is 1 Year ($20,000 difference between replace-in-kind and high efficiency divided by the $20,000 annual payback).

Since you must spend the $80,000 regardless to replace the unit that is at risk of failure, we feel the differential payback is a smarter measure to use when considering upgrades and will result in more efficient buildings in the long run.

AS YOU WORK YOUR WAY UP THE PYRAMID, THE KEY IS TO TRY TO FIND COST SAVINGS AND EFFICIENCIES IN INTEGRATING SOLUTIONS TO ISSUES FROM EACH TIER OF THE PYRAMID IN THE SAME PROJECT.

CHAPTER 4

FILLING YOUR TOOL BELT



Let's get back to our IAM Framework (the "Onion") and talk about putting our data to use by selecting the tools that we are going to use to leverage and manipulate our dataset.

Data by itself has limited value. The value is unlocked by the tools that you use to store, manage, and manipulate the data. Let's start with the importance of having the right tool for the right job.

Before we get too deep into the discussion or tools, I want to first say that Excel is in my opinion one of the most powerful tools in the world. For many organizations, it is the best place to start. First, nearly everyone has a license (so it's like it is free) to Excel and it can do a lot of great analysis and visualization. One of the most exciting days of my career was the day I discovered Pivot Tables (yes, I am a data nerd!).

However, the challenge becomes that once datasets become larger, or when you have relational datasets that differ in some ways but overlap in others you start to exceed Excel's capabilities. That being said, if you have a small to medium sized portfolio and are only concerned with a single tier of the data Pyramid, Excel is often a great way to get started on your AM journey.

When you have moved beyond Excel's capabilities and begin to utilize other tools, there are some key issues you should think about when picking whatever type of tool/software that you are considering.

The first temptation when looking for AM software is to put Tools at the center of the onion. I want to challenge the approach of picking your software first before you understand your overall objectives and have clarity with regards to your dataset. There is a perceived upside to this approach. For one thing, figuring out what data you want/need is hard. Buying software is generally easy and can feel like progress. Additionally, if you don't know exactly what data you might want/need, the out-of-the-box software can help provide you with a solid head start.

The challenge arises in that every software has it strengths, weaknesses, and limitations. One of the biggest issues is that many software products allow for limited configuration or customization (as this adds layers of complexity to the code). However, until you know the specifics of your desired dataset, you won't be able to figure out which software is right for you.

I have worked with many clients that licensed a piece of software only to realize that it was not able to handle/house their data in the format and style that they wanted, or it was not able to provide the analysis or reporting they wanted. However, since they were locked into a long-term license, they were tasked with adjusting their AM processes to match the software instead of using the software to enable their process. This is basically the tail wagging the dog.

I can remember having a conversation with a software support person about the way that a calculation was being done in their product. The client had requested that we work with their firm to adjust the software to meet their needs. However, the software did not do the calculation the way the client wanted. The person told me that I should go back to my client and tell them that they are wrong and the way that their software did it was the best way. Needless to say, we recommended that the client go in another direction with regard to continuing to use this product.

The role of your AM tools is for them to do what you want them to do. You should not have to change the way you do AM to fit your software, instead, you should select your software based on your data and what you want to do with it.

RESIST THE "SHINY OBJECT" THAT IS A SOFTWARE DEMO. BE PATIENT AND TAKE YOUR TIME TO FIND THE RIGHT TOOL(S) FOR THE JOB YOU WANT TO DO. THIS CAN ONLY BE DONE AFTER YOU HAVE CLARITY ON YOUR DATASET AS PREVIOUSLY MENTIONED.

If the first temptation of meeting your tool requirement is buying your software too early, the second temptation, is trying to find a single piece of software that does it all. People have often asked why we don't call the tools layer "software". While it is true that most of the tools that we use are software, I feel that it is more about the job the tool does as opposed to the specific software that is important. Additionally, software to me is a singular term whereas tools implies that there are multiple tools in your tool belt. I think this is an important distinction.

For nearly my entire career, my clients have all been looking for the one piece of software that does everything they need and does it well. To-date I have not found such a platform. There are tonnes of different pieces of software, many with a significant number of modules (Work Orders, Space Planning, Capital Planning, Move Management, Equipment Management, Energy Management, etc.). If you listen to most software salespeople (and yes, I do sell software as well), you will think that every module within a suite is the best-in-class product.

The truth is that modules of some software are world class (usually the initially launched module), while others are mediocre or just plain bad. Based on today's market, trying to find a single software that will provide you excellence across the Asset Management spectrum is like trying to use a single screwdriver on every different type of screw.

One of the reasons for this is that many software companies have grown by acquiring other smaller companies and "integrating" the other modules onto a single platform. The truth is oftentimes when you scratch below the surface, the two modules are two entirely different products that are barely integrated at all. I have even seen it that after an acquisition, so many of the original programmers leave and the remaining staff barely know how to even support the acquired module, let alone be able to integrate it into the acquiring platform.

PERHAPS SOMEDAY, THERE WILL BE A SINGLE SOFTWARE PLATFORM THAT DOES EVERYTHING THAT FACILITY ASSET MANAGEMENT NEEDS AT THE HIGHEST LEVEL. UNTIL THEN, WE WILL CONTINUE TO RECOMMEND THAT OUR CLIENTS PICK THE BEST TOOLS FOR EACH SPECIFIC JOB NEEDING TO BE DONE AND SORT OUT THE INTEGRATION.

I support the idea of using multiple different tools to do different jobs. However, to do that effectively, the tools that you use must be open to sharing data with and receiving data from other tools, better known as integration.

As software has continued to evolve, there are very few closed systems anymore. However, a decade or so ago there were many platforms that did not "like to play with others". They were trying to force clients into using all their modules by not integrating with other tools. Thankfully, the market has moved most of these dinosaurs away from this approach.

However, "open" does not mean the same thing for every piece of software. Ideally you want a tool that has no limitations in terms of how it can integrate with other products. To do so, you need to have a highly customizable system that allows you (not their programmers) to create custom fields that can become the integration points in the data. Most software allows you to add at least some custom fields to your dataset.

Unfortunately, in many cases you need to pay the developer to add the custom fields that facilitate the integration. This costs money and takes time, slowing down your integration. Try to find tools that are easy to make your own, by yourself. You will thank me later!

Next, once you can add custom fields to facilitate the integration, you must have tools that allow users to import and export data easily. Again, you do not want to have to get a support person or developer to import or export your data, especially if you have limited support hours with your license.

Finally, you need to decide how you are going to integrate your tools. There are generally two main approaches, flat file, and API (Application Programming Interface), yes, I had to google it to make sure I was using the right term.

Flat file integration is when you export an Excel or CSV file from one product that is then imported into another piece of software. This is generally a manual process and works for non-transactional datasets.

THE NICE THING ABOUT FLAT FILES IS THAT IT IS GENERALLY EASY TO BUILD THEM WITHIN SOFTWARE. IT IS TYPICALLY JUST A CUSTOM REPORT THAT YOU CAN BUILD IN CONJUNCTION WITH YOUR SOFTWARE PARTNER. SOME SOFTWARE EVEN HAS REPORT BUILDERS THAT WILL ALLOW YOU TO BUILD THE REPORT YOURSELF.

For instance, for capital planning datasets, we often use flat files as capital plans, once developed, they generally don't change dramatically throughout the year.

When you are dealing with more transactional data (e.g., work orders), you may want to look at an API. APIs are essentially live links between two software products. You decide which database is the parent and which is the child. When a piece of data is changed in the parent database, it immediately sends it to the child database where it is updated. Generally, the data in the child database is read-only so it can only be changed in the parent database.

APIs require programming and often need collaboration between the development teams of both software products. They can be very powerful but will likely require an investment of both time and money to build.

Now that you have the right data in the right tools and your tools are talking to each other, we can get down to the business of Prioritizing our actions, which will take us to the next layer of the Onion.

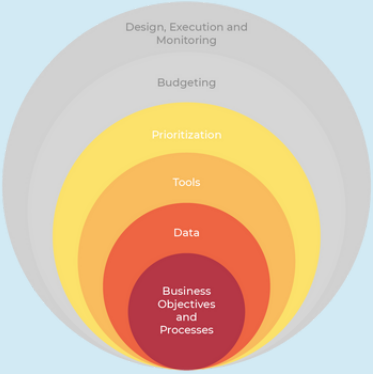
CHAPTER 5: WHICH HIGH IS HIGHER THAN HIGH

PRIORITIZATION

A nearly universal challenge that organizations face is a lack of sufficient funding to address their current DCRM backlog.

However, in recent months, with a lot of government stimulus spending still working its way through the economy, I have spoken to a few lucky organizations that claim to have too much money to spend currently. This is the first time in my nearly 30-year career that I have heard of people having this issue. However, this surplus of funds will be short-lived and are not likely to be able to keep up with future capital renewal needs as buildings continue to age.

No matter what level of funding you have, it is almost never enough. As such, determining the best place(s) to invest your limited capital dollars is vitally important for any facility and asset manager to achieve the highest value for money that is possible.



Defining the "best place" and "highest value" for your organization is the foundation of prioritization. It is not a universal formula that everyone can use. For prioritization to truly to work and provide you with the best decision support, it must be tailored to your organizational objectives and processes (the "core of the onion"), draw upon the dataset that you have available and are managing (Layer 2 of the onion), and can be supported by the tools and technology that you have chosen (Layer 3 of the onion).

With the competition for capital continuing to intensify as assets age, energy/resource prices rise, and government regulation becomes more intense, simplistic “High, Medium and Low” or other categorical prioritization methodologies employed are no longer sufficient to manage portfolio risks.

Most organizations lack the capital funding required to address even their “High” needs, not to mention Medium or Low priorities. How can you answer the question "Which High is Higher than High" based purely on categorical priority.

To go beyond simple priority categories, organizations need to develop a numerical priority system, which will allow them to rank order your recommendations. There are two primary methods that can be used to develop a numerical priority for facility and asset data in today's market. I am sure there are other statistical models that could be applied. As I am not a master statistician, I will focus on what we see in the market today.

The first approach is Pair Wise analysis, which is where you compare criteria against each other to determine which is preferred (A vs. B, A vs. C, B vs. C). For more on Pair Wise, check out the Wikipedia page. Using statistical analysis based on the pair wise comparisons you can develop a score for a specific item or criteria. The benefit of Pair Wise is that it is a recognized statistical process. However, the drawback for facility and asset management professionals is that most of us are not statisticians (it is fairly complex), and the process is difficult to configure and revise over time as priorities change (removing or changing one criteria requires that you redo all of the comparisons within the calculation), and it can be seen as a bit of a black box in terms of how the final number was calculated.

The second method is fundamentally a weighted categorical calculation. At Roth IAMS we call it Multivariable Prioritization or MVP. A client develops a series of priority categories based on key decision-making criteria that are used, or there is a desire to use, when selecting which needs will get integrated into a capital plan (e.g., risk management, impact to users, regulatory, etc.). Assets and elements are then ranked and scored within a tailored scoring system for each criterion. Each category is given a weight based on its overall importance (each category is generally not created equal) to the organization. Based on these scorings and weightings each need in a dataset is given a numerical priority score.

THE POTENTIAL DRAWBACK OF THE MVP PROCESS IS THAT IT CAN BE OVERLY SIMPLISTIC IF THE CATEGORIES ARE TOO SIMPLE AS WELL. HOWEVER, IT IS INTUITIVE AND WHEN CATEGORIES AND SCORING ARE DONE WITH CARE, STAKEHOLDERS FROM ACROSS AN ORGANIZATION (FACILITY PROFESSIONALS AND LAY PEOPLE) CAN UNDERSTAND THE BASIS OF THE PRIORITY.

With a numerical priority score or number, you are no longer stuck in a categorical world of trying to sort out which projects to do when you run out of money in the middle of a category. However, there is more to prioritization and capital planning than just numerical priority.

Let's consider the concept of priority as a decision-support tool as opposed to a decision-making tool. Going from a "list of needs" provided in an engineering report (i.e., a condition assessment, energy audit or accessibility assessment) to a prioritized multiyear capital plan can be a complex challenge. There are many competing factors that are vying for limited capital dollars. Therefore, having a clear and easy-to-understand method of prioritization is critical. It is equally important to remember that prioritization is not about making the decisions, it is about supporting the decisions.

Our clients are generally looking for a system that will allow them to simply rank-order their needs so they can go as far down the list as their budget will take them. The problem is that there are often (if not always) non-technical reasons that capital renewal decisions are made as part of an annual capital plan. Oftentimes, these issues are made based on political or business issues (e.g., we hired a new professor, and they need a new lab, we are moving the police services into our current recreation centre building, etc.).

Projects that are driven by business decisions, as opposed to being based on capital renewal needs, are often the first projects to get prioritized. Even though these projects are driven by non-renewal factors, it is important to capture what elements will be included in the project so the data can be updated.

Additionally, if there are buildings within the portfolio that you may be considering for demolition or disposition, you may not want to spend any money on these buildings, regardless of the priority (excluding Fire and Life Safety issues of course, assuming the building is occupied).

ALSO OF NOTE, DECISIONS TO COMBINE MULTIPLE NEEDS INTO PROJECTS OR PROGRAMS MAY RESULT IN MAKING DECISIONS TO REPLACE ELEMENT(S) THAT HAVE A LOWER PRIORITY. THIS WILL HELP TO TAKE ADVANTAGE OF ECONOMIES OF SCALE WITHIN A SPECIFIC BUILDING (PROJECT) OR ACROSS YOUR ENTIRE PORTFOLIO (PROGRAM SUCH AS ROOFING).

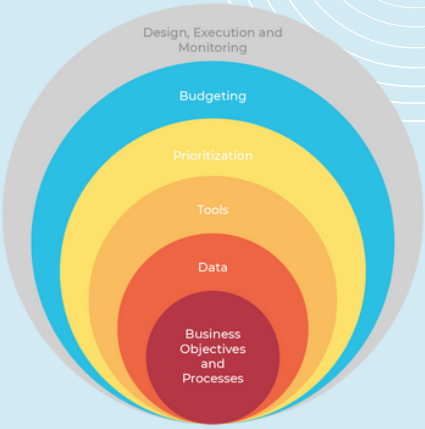
Next, you should consider including allowances in your annual budget. An allowance is an allocation of budget that is set aside to address issues related to needed spending (e.g., asbestos abatement, painting, plumbing, etc.) where the specific element or building has not yet been decided, or where smaller amounts will be spent to address an issue across multiple buildings. Most of our clients have between three and ten allowances that they include in their annual budgeting process.

Finally, organizations are ready to start to make decisions based on the numerical priority system. This is when you can really start to leverage your MVP or other numerical priority. Once you are mainly or solely focused on DCRM needs, you can start to look at rank ordering what gets included and excluded within your estimated budget.

I don't know anyone (not even Chat GPT) that has created a calculation or algorithm that can integrate all the nuances that are considered as part of developing a prioritized multiyear capital plan. There is no "easy button," at least not yet. In the meantime, we can leverage business goals and objectives to develop numerical priorities that can support decisions but not yet make decisions. That part we must leave to the people!

CHAPTER 6: SHOW ME THE MONEY

BUDGETING



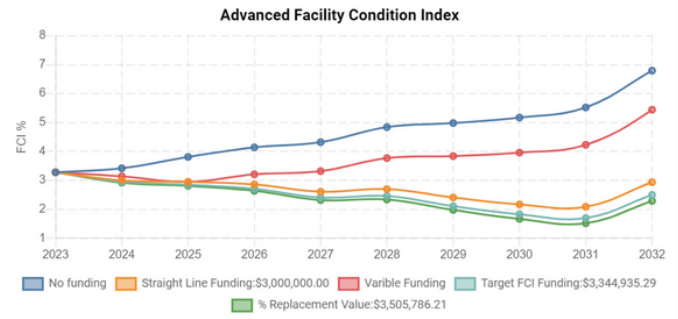
As we move to the next layer of the onion, Budgeting, we explore how you can try to leverage the data, tools, and prioritization methods that you have in-place to secure additional funding, or at a minimum, spend the money that you do have much more wisely.

Nearly every public sector institution across North America (and around the world I presume) has a DCRM Backlog problem. This is the result of decades long underfunding of capital renewal (and maintenance as well). The ultimate payoff of any IAM program is getting more budget to address your DCRM backlog.

Securing additional funding is about taking all this complex technical data and telling a story to an audience that typically knows little about facilities. I am not going to dive too deep into Telling Your Asset Management Story here, however the folks that hold the purse strings are often finance professionals, educators, healthcare providers, politicians, etc. Coming at them with a bunch of technical data is a sure-fire way to get ignored.

Knowing your specific audience is why we recommend you get your stakeholders involved in developing your prioritization. This way, they see themselves in the story you tell based on the priority you developed. It is critical that you present your current needs while also providing a look into the future based on different funding scenarios. Today could be bad, but 10 years from now could be much, much worse. Alternatively, you could have a large amount of DCRM currently, but the increase over time is not that great as most things are already in your DCRM. It is critical that you provide a snapshot of not just today, but the next 10 to 20 years (or further depending on how far into the future your organization forecasts).

For example, the graph below provides a Facility Condition Index (FCI) funding forecast based on five different funding scenarios. No funding (what if we do nothing), Straight Line Funding (what if we invest the same amount every year), Variable Funding (what if we get a one-time or short term increase in funding and then revert to the norm), Target FCI (how much funding is needed over 10 years to hit a specific FCI) and Percent of Replacement Value (what if we invest a certain percentage of our total CRV in annual renewal).



They say pictures are worth a thousand words. Pictures like the one above can be worth a million dollars, literally. Turning data into graphs and stories will help your stakeholders to better understand your facility and asset management needs and processes. In many cases, we have seen clients be able to take their story and end up getting increased funding for DCRM, which can overtime start to bend the curve and allow you to improve your facilities or campus.

The final consideration that clients need to make is not just how much do I need, but how much can I realistically do? Where DCRM numbers are so large that they become hard to comprehend, we recommend (especially in the early days of the evolution of an IAM program) that you focus more on what work you could realistically accomplish while still getting value for your money.

By starting a bit smaller, but grounded in reality, you are setting your team up for a higher likelihood of success and therefore you can start to build momentum. In addition, as you build capacity on your team you can start to absorb more funding each year in terms of capacity to do work. This can create an "upward spiral" as opposed to securing too much money that is not spent wisely, creating distrust, and resulting in future funding cuts. Sometimes it is better to walk before you run.

IAM can help you build greater trust through the budgeting and funding process, even if it does not result in you securing additional funding.

Unfortunately, not every organization has the opportunity to secure additional capital renewal funding at a specific point in time. It may take a few years of sharing your forecast before you are lucky enough to secure additional funding.

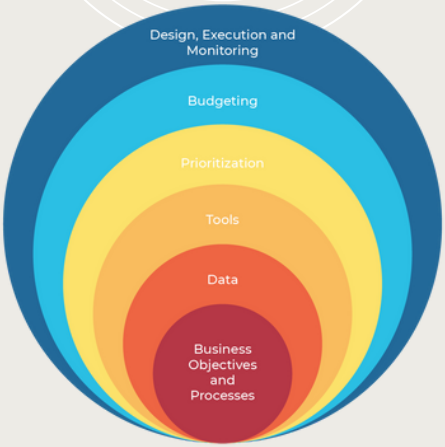
However, just because there may not be a new pot of capital renewal funding available today, it doesn't mean that you shouldn't use the same rigor and approach to develop and communicate your capital renewal plans. In these cases, the goal is primarily to explain how you are making the decisions with the money that you have. By showing that you are spending your limited funds wisely (based on the organizational goals that were integrated into your prioritization system), your credibility with your stakeholders will increase.

This increased credibility will lead to greater trust, and in our experience a more streamlined review and approval process for future capital plans. In one case, in just two budget cycles we were able to assist a K-12 school district in turning the annual budget review process from a "celebrity death match" (their term) into a collaborative exercise that resulted in streamlined approvals. What used to be a long, drawn out, contentious "negotiation" process, became an easy and much more cordial discussion and approval meeting.

Finally, if/when there is additional funding released, the trust and credibility that you have built up with your stakeholders will allow you and your team to nimbly respond to the additional funds.

CHAPTER 7

IT AIN'T OVER EVEN WHEN YOU THINK IT'S OVER.



Here we are, the outer layer of the "Onion".

All the work that we have done so far is in preparation for addressing your DCRM backlog. We are finally at the point of designing and executing on our prioritized plans. This is where the rubber hits the road, and the investments are made in improving your existing facilities. Keep in mind however that the work is not done when the construction is over!

Many of our clients breathe a sigh of relief when the construction/renovation projects are complete and their buildings "get back to normal."

However, there is a vital last step that, if ignored, runs the risk of reducing many of the benefits of the IAM approach achieved so far. Post-project monitoring and data reconciliation must be done to close the loop on the cycle. There are a few keys points here that are important to make about data reconciliation.

First, if you don't keep your data up-to-date based on the actual projects that you complete, you will not be able to interrogate your data in the future. Your forecast will be wrong. There is nothing worse (and I have been in the room when it happened) than standing in front of your Board asking for money to fund a list of projects and someone says, "Didn't we approve that last year?" Every other item and point that you are trying to make may be correct, but it won't matter as your credibility will be shot.

Don't let your data go rotten on the vine as you go through year after year and complete capital renewal. Although it takes discipline, it is much easier to update it as you go, as opposed to forensically trying to do it at the end of a year, or even worse after a few years.

Second, when trying to "sell" your stakeholders on your plan, you will almost assuredly have promised some type of a result, perhaps a reduction in Facility Condition Index (FCI), reduction in energy usage, improvement of the indoor environment, or some other level of service. However, if you simply finish the project and move on, how do you know if you achieved what you set out to do.

A great example of this came following the first generation of green buildings. The certifications were mostly based on the design and construction, not the actual operations. When the existing building certification process came along measuring how the actual buildings were performing, many of the greenest buildings were not performing as designed. There were (and still are) lots of reasons this can happen. However, the key message is that if the operators of these buildings had bothered to measure, they would have realized that something was amiss and moved to correct things much sooner.

The above example focuses on promises broken which will happen. When it does, it is critical that you understand why, try to fix the issues, or in the worst case, avoid making the same mistake twice.

The real benefit comes when you can demonstrate that you have done what you set out to do. By proving that you got the results that you promised, you can go back to your stakeholders and use the proof as ammunition to seek more resources to address more renewal work.

IF YOU CAN ACHIEVE COST SAVINGS AS PART OF YOUR PLAN (ENERGY SAVINGS, DECREASED MAINTENANCE, ETC.) YOU ARE LUCKY AND CAN FUNNEL THOSE SAVINGS INTO MORE RENEWAL, CREATING YOUR OWN TYPE OF COMPOUND INTEREST TO HELP CONCUR YOUR DCRM BACKLOG.

CHAPTER 8
SUMMARY

An important point to make as we wrap this up - although we presented this process in order (from the core out), it is anything but linear.

Oftentimes an organization will bounce from one layer to another and then back again a few times over the course of their annual planning journey. As you iterate through the framework, it is critical that you understand where you are and what you need to focus on as you move from layer to layer.

It is also vital that things don't end when a project is done. The follow-up and monitoring create even more data to support the data you already have. This can then be leveraged by the tools and allows you to update and validate your prioritization as you begin to build your new prioritized multiyear plan. The journey never ends.

In a previous iteration of this framework, IAMS stood for Integrated Asset Management Solutions. When I founded Roth IAMS, I decided to change it to Integrated Asset Management Strategies. Over the years people have asked me why, and I have never had an answer that completely satisfied me. Recently, I had the pleasure of attending an internal facilities summit at a US University. During one of the presentations, the head of campus security made a statement that just clicked in my head.

When speaking of their on-campus security, the Chief said, we decided to stop calling it a solution because the issue never really goes away. We started to call it a strategy because it is always evolving and needs our attention and discipline. As soon as he said it, I realized I finally had the right answer for why we changed the name.

Implementing the IAM Framework for your organization is not a solution that is going to eliminate your DCRM. Rather, it is a strategy that you must constantly adjust and evolve as your circumstances change.

I hope that this has provided you with ideas and insights that you, your team and your organization can use to join us on the journey of Solving the World's Deferred Capital Renewal and Maintenance Backlog Crisis!!!!

AUTHOR

BILL ROTH

Roth IAMS was founded in 2014 by Bill Roth who had a vision for a company where all employees worked together towards a shared vision: To Solve the World's Deferred Capital Renewal and Maintenance (DCRM) Backlog Crisis. In just over eight years, Roth IAMS has grown from a company of one to a company consisting of over 80 full-time staff located across Canada and the United States.

Roth IAMS is one of the largest firms in North America that focuses exclusively on existing infrastructure asset management. We have provided services across North America for public and private sector clients since 2014.

We have created a unique niche within the market by providing professional management and engineering consulting services tailored to each client's specific business objectives and processes. We have been successful in securing some of the largest contracts available across the market for Facility Condition Assessments.

Roth IAMS
Integrated Asset Management Strategies