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Why Spreadsheets are the Wrong Answer

ARE YOU ON THE ROAD TO SPREADSHEET HELL?

Why Spreadsheets Are the Wrong Answer

You're invested in it. You've built a spreadsheet that answers so many questions. Links that go up one worksheet and down the next. You've managed to use smart macros, specialized functions and clever workarounds. Outputs that lay out nicely for the chart wizards so even the chart labeling has been automated properly.

All those small, yet critical, details that you managed. Like discovering innovative ways to debug the linked spreadsheets. Making the entry boxes look nice and the calculation engines a work of art. You spent the time and energy and money. You can finally answer those important questions. And you should feel great.

But you don't.

The moment has arrived when someone asks a question you hadn't anticipated. Asked for one thing that your work wasn't designed to do. And what you notice most is that sinking feeling in the pit of your stomach.

Like the juggler who keeps adding one more ball, the questioner's incremental request sounds so much more innocent than it is. It's a feeling shared by thousands of people before you and will happen to thousands after you.

It is the same feeling as having painted yourself into a corner. Because that *is* what happened. You crossed a threshold. You find yourself needing to spend more time managing the spreadsheets than using them to get answers. Debugging has become a guessing game and new features tend to ripple in unexpected places. And yet momentum keeps you building even as you sense you are running into a wall. There is no easy way out.

Why Is This So Common?

Spreadsheets are incredibly powerful and flexible and are not designed to do everything. It's common to find fifteen sheets or more of a spreadsheet file that are linked together to do analyses. In areas like finance, capacity planning, and scheduling, spreadsheets are ubiquitous.

The reality is that most spreadsheet-based projects are not done by spreadsheet experts.

Instead they are experts in other areas, making use of the spreadsheet as an effective tool to help answer their business questions. Spreadsheets, notably Excel, have easy learning curves and a wide array of features that allow a lot to be done. They are remarkable tools. But it is important to understand their limits as well as their benefits.

Building a spreadsheet into its own "hell" is often the path of least resistance. There is no budget allocated at the start. No purchase orders to push through. No time lag between seeing the need and getting started. There are no barriers. So, the effort begins. And starts to bear fruit. So you continue on.

Yet the complexity continues to evolve as the needs evolve. While the spreadsheet grows linearly, the coding complexity often grows exponentially, and the debugging complexity is usually worse. Often

times this process continues even after the user has lost confidence in their own ability to manage and debug the spreadsheet. In many cases, this loss of confidence is not shared with others, especially if the customer for the results of the spreadsheet is the boss.

In a way, you are stuck dealing with a basic human instinct. Survival experts understand this. When lost in the wilderness, the instinctive tendency is to press on. Something is not right, but if you press forward, you will succeed. But the reality is that you are getting more lost. The right move, survival experts advise, is to retreat until you recognize where you are and re-orient yourself. Like being lost in the wilderness, spreadsheets can take you down the wrong path. You can start off in the right direction, but if you go too far, you will find yourself in spreadsheet hell.

Where Do Spreadsheets Hit the Wall?

The answer is surprisingly consistent. It happens when the ideal world meets the real world. In the areas of capacity and financial planning, people lay out spreadsheets with a 'greenfield' mentality, often using a single product and process.

The single most common question asked of WWK is this, "Something is changing in my world and I want to understand what it means". Spreadsheets alone are notoriously unable to address that 'something' and rarely get to the 'what does it mean'.

For example, visibility is always better closer in than farther out. But most spreadsheets look only at set time periods. In a long-term, financial model, you may want to see the near term on a monthly basis, the medium term on a quarterly basis and the long term on an annual basis.

But spreadsheets perform best with fixed time intervals, either years or quarters or months -- but not all three!

In high tech operations, very rarely do operations exist in a steady state for any length of time. There is always a ramp up of a new product and the ramp down of an older product. Equipment performance is a moving target. Spreadsheet models often struggle to add equipment when the user does. And they are even worse when removing existing equipment.

The variety of changes is virtually unlimited. As you scale up the materials use, the unit cost of the material changes. An upgrade which makes the tool throughput faster this month as compared to last, but only on certain products. Yield improves as those involved with the operation gain experience, but a new product has its own learning curve. And that yield changes at both individual process steps and at the finish line.

Rework loops, repairs, test process flows, metrology sampling, testing, automation, software, licensing, currencies, royalties, labs, QA, transformations, taxes, assemblies and other standard business functions are all stress points for most spreadsheets.

These situations are similar to what was described in the opening. They are all redesign points, where the spreadsheet needs a substantial change as opposed to the simpler changes required during simpler times. Hindsight may show that a limited vision on the part of the customer of the spreadsheet analysis was a contributor to this redesign point. Or it may show that a deeper understanding of programming architecture could have been helpful. And the user may come to realize how many hats they are wearing. But none of this changes the basic situation.

Yes, reality has its unpleasant ways of intruding on the best of spreadsheets.

What is the key to avoiding spreadsheet hell?

It is really a matter of keeping an eye on what is important. Spreadsheets are not an end. They are a means to an end. If the developer understands the value is not in the spreadsheet but in the questions that it answers, they have taken the most important step. Always look at the value of the answer and approach the problem from that perspective.

For example, if the answers needed are 'back of the envelope' quality, a spreadsheet can sometimes provide a useful answer.

If the questions relate to real world complex environments, with lots of moving parts, then the spreadsheet will almost certainly be inadequate.

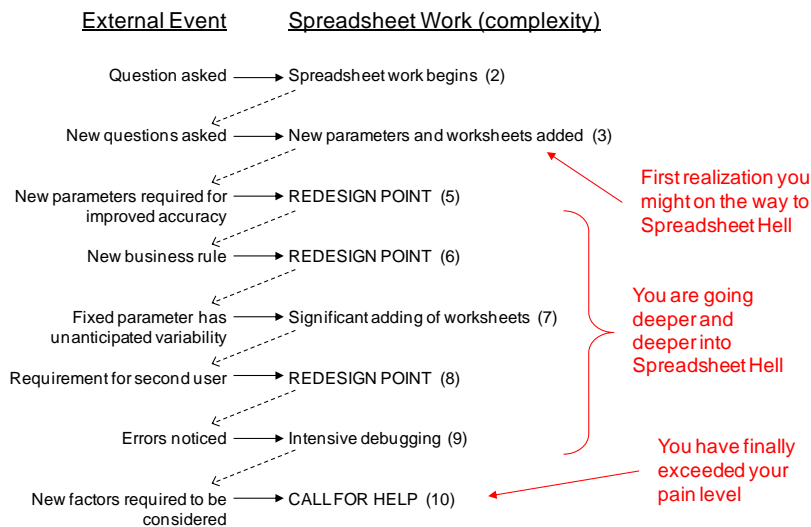
Sometimes the value is not directly tied to the answer or even the quality of the spreadsheet. For example, a supplier developed homegrown cost of ownership model is almost always a spreadsheet. And almost every customer will view it with intense skepticism. They will discount not just your numbers but also the underlying formulae. A spreadsheet that can be unlocked will never be as credible as secure third-party models that conform to relevant standards.

A third caution is to be careful with assumptions and short-cut calculations. For example, many companies operate on four shifts per week. If you build your spreadsheet around a four-shift operation and suddenly someone proposes a five-shift arrangement, you are in hell.

By the time you recognize the signs, you are probably too late to avoid at least a taste of spreadsheet hell, but not too late to change plans before it gets highly problematic.

The key is to see the point of diminishing returns ahead of time and address it then. All too often people reach the point of diminishing returns without budget or plan. That is, they do not realize they are in a crisis until they are deeply in it.

Genesis of Spreadsheet Hell



Now What?

So, you didn't see this coming until it was too late. What can you do?

Start by recognizing where you are. The biggest asset you have is the experience in building this spreadsheet. You do understand the complexity, the issues and the need. Those elements of understanding are a huge part of the value you bring to the operation.

Spreadsheet programming is probably not what management is paying you for anyway. They are paying for answers. You understand the problem and have the skills to analyze it. It's like you've been trying to build a house without power tools. Now you need a better tool.

Once you know where you are, move quickly. This situation is not going to get better on its own. Look at the questions you are being asked to solve and evaluate tools that answer those questions. And look for tools that appear to be able to answer questions that you haven't been asked yet but can see coming.

And finally, add the tool or tools that are needed ... and resource it properly. You are involved in a business process, which, like any other, requires appropriate resources.

A useful analogy to spreadsheet hell is to compare it to a step in the process of growing up. At the beginning, life is simple. As life becomes far more complex over time, change is inevitable. What worked at one point in time is not as useful now. And that is the key to exiting spreadsheet hell. If you see it as a maturing business process, you are well on your way.

Alternatives to Spreadsheet Hell

Why suffer through spreadsheet hell if you can avoid it?

Wright Williams & Kelly, Inc. (<https://wwk.com>) provides Cloud-based software and consulting services to assist our clients in making better business decisions. The focus is on assisting our clients in improving the productivity of their operations while reducing their per-activity costs. We also provide strategic assistance by creating virtual representations of their future-facilities to help manage risk and maximize return on assets and stakeholder equity. Our clients state that they have saved millions of dollars from a single use of our software tools and methodologies.

With more than 4,000 users globally, WWK is the largest privately held operational cost management software and consulting company serving technology-dependent and technology-driven organizations. Its client base includes nearly all of the top 20 semiconductor manufacturers and equipment and materials suppliers as well as leaders in aerospace, defense, photovoltaics, solid state lighting/light-emitting diodes, nanotechnology, micro electro-mechanical systems, thin film record heads, magnetic media, flat panel displays, and healthcare.

Below are our three flagship products designed to help you avoid spreadsheet hell.

TWO COOL®

Understanding manufacturing costs is the first step to increasing profits. The ability to effectively identify cost drivers and manage cost reductions is a competitive advantage felt from your customer base to Wall Street.

Now there is a software platform that measures up to your critical needs. TWO COOL® is the only Cloud-based, cross platform, comprehensive Cost of Ownership (COO) and Overall Equipment Efficiency (OEE) analysis tool. Developed at the request of DARPA/SEMATECH, TWO COOL® is designed to help equipment and process engineers as well as suppliers understand process step level impacts of changes in operating parameters. Whether you need to know the cost impact of capital equipment purchases, alternative processes, or OEE improvements, TWO COOL® is THE choice.

Factory Commander®

Today's increased focus on manufacturing costs and return on investment (ROI) can make even the most seasoned professional feel lost. Could current operations be improved? Will future operations meet financial requirements? Now there's a software tool that guides you on these time-critical missions and clears the way to reaching your goal, Factory Commander®.

Developed with Sandia National Laboratories, Factory Commander® is a Cost and Resource Evaluation software platform that can be applied to any discrete manufacturing or assembly operation. It performs high-level cost analyses of overall factory and individual product costs, manufacturing capacity, and revenues. You can apply these features to both strategic new factory design and tactical current factory optimization.

Factory Explorer®

Manufacturing cost reduction is the topic of discussion and concern around the globe. Increased competition from organizations, already desperate to gain market share at any cost, and shorter product lifecycles are placing downward pressure on ever-thinning margins. Now there's a solution that delivers results.

Factory Explorer® is an integrated capacity, cost, and simulation analysis tool designed to help you make smart business decisions. The Factory Explorer® capacity analysis engine quickly predicts system capacity and bottleneck resources; the cost analysis engine calculates product cost and factory gross margin; the fast discrete-event simulation engine estimates dynamic measures such as cycle time, work-in-process (WIP), and waiting times. These integrated modules eliminate the need to maintain separate factory models. The user interface brings powerful modeling tools to a familiar environment, automating and speeding the factory analysis process.

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