DEVONWAY

WHITE PAPER

Excel vs. DevonWay vs. Maximo: A Tale of Three Operational Software Approaches

Abstract: There are so many different technologies to choose from when it comes to selecting the right software to help you manage your operations, that it can be overwhelming to pick the right one. In this whitepaper we examine three different approaches from three different vendors, all potentially valid but some more suitable for certain use cases over others. The first approach, low-cost personal productivity apps, is represented by Excel; the second approach, no-code platform-based solutions, is represented by DevonWay; and the third approach, traditional enterprise resource planning (ERP), is represented by IBM Maximo. We review the scope of the three approaches, their implementations of certain common features, and how those implementations were informed by the particular problem space they were designed to address.

A Brief History of Operational Software

Operational software took recognizable form in the 1960's, when the first attempt at digitizing workflows for businesses was sold as Inventory Control Packages, software tools that helped supplement written records that were used to keep track of a company's inventory. That software evolved in the 70's with materials requirement planning (MRP), which would take the inventory that a company had on hand and use that information to digitally configure parts into products that would follow a manufacturing plan.

During the 80's and leading into the 90's, MRP's began to evolve into true ERP systems, expanding past simple manufacturing processes and extending into the realm of digitally managing virtually all the operations of a traditional business, as evidenced by the diagram below.

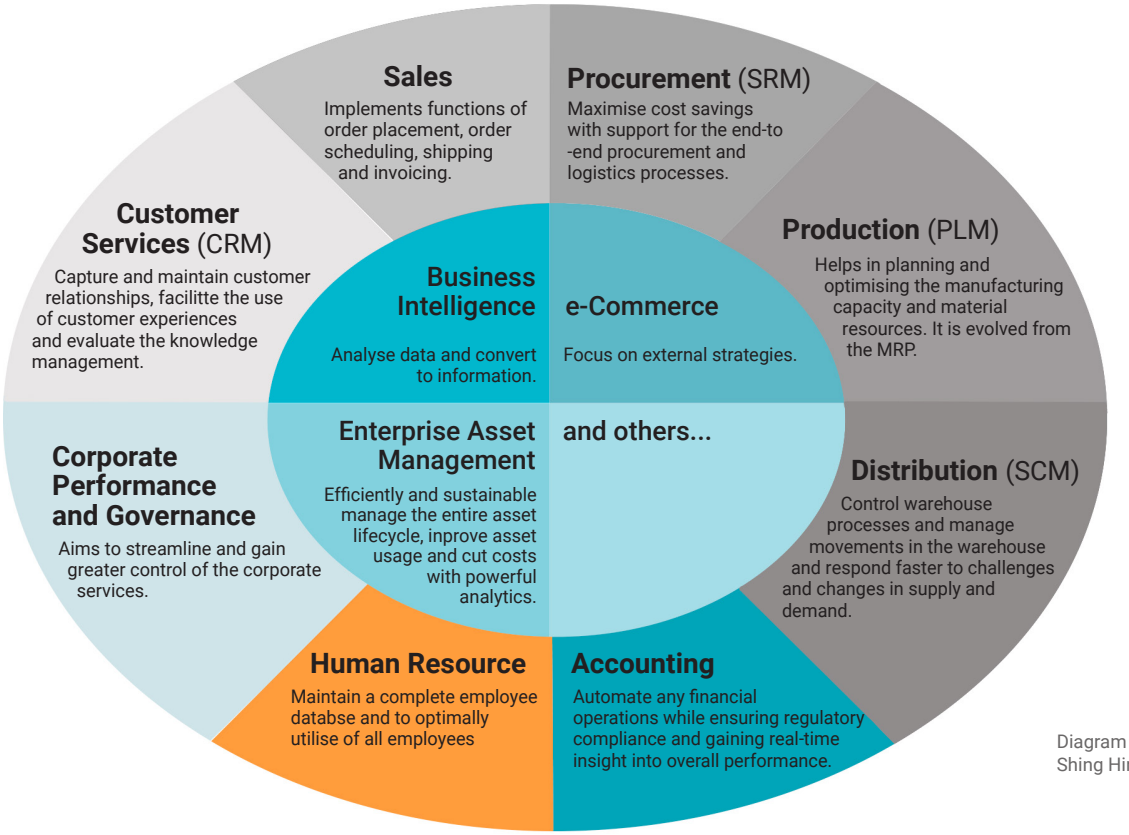

Diagram Credit: Shing Hin Yeung

Today, operational software has evolved even further, driven by the need for ever-more tailored solutions that deliver better regulatory compliance, increased agility in the face of rapidly changing market conditions, or improved competitiveness in the form of ever more efficient execution. The prevalence and quality of all of these tools taken together has served as a rising tide that has lifted the proverbial “boats” - so much so that “digital transformation” is seen as a top 3 priority for businesses that aren’t digital first, according to studies from leading consulting firms and software vendors.

A Modern Example

While the technology landscape has never been more exciting and fruitful for buyers, navigating the different options available can be chaos. As recently as ten years ago, the choices were few and simple: Oracle, IBM, SAP, or a handful of similar providers. The issue, however, is that with traditional systems, the whole idea is to provide a business solution that adheres to the principle of “one size fits all”. In most cases this makes a lot of sense – it’s a great testament to ERP vendors’ scalability and a vast majority of businesses do the same thing. But there are many organizational needs that don’t fall neatly into the predesigned architectures of traditional ERP systems, and hiring teams of consultants to reprogram them would be cost prohibitive.

A large utility in the Southeast faced just that problem when it came to tracking its non-installed assets. While its core assets and equipment were well managed by its ERP system of record, extending that system to the more nimble workflows required by mobile assets did not make financial sense. As a result, the business units turned to spreadsheets, Access databases, and a few homegrown solutions to meet their basic data needs.

But while Excel and Access are much better than nothing at all, the lack of control and governance, which is a direct byproduct of their agility, presented serious issues when under the critical glare of a regulator. If measurement & test equipment was mis-calibrated, and an adverse event occurred at a point that was supposedly given a clean bill of health by that equipment, then the regulator required the utility to provide clear objective evidence that it is able to see the history of all assets and work that was touched by that equipment – a tall order for silo'ed databases spread across a large geographic region.

In this particular case, an asset management implementation tailored to the business need at hand would be an appropriate course of action. It doesn't need the depth of functionality of a full Enterprise Asset Management solution, but it needs to be more traceable than a spreadsheet.

Of course, this is just one example. There are many examples where a spreadsheet is a perfectly fine solution, and of course many where a full-blown ERP/EAM implementation is the right approach. By more closely examining how certain common, core features are implemented across the different approaches, this whitepaper hopes to illuminate some of the advantages and disadvantages each approach inevitably encompasses, and how those practicalities may map to your particular business requirements.

Tools Overview

Microsoft Excel

Everyone's favorite all-purpose tool, Microsoft Excel lets business users quickly stand up a database for data storage and basic analytics. Although meant to be an agile technology that produces quick results, Excel spreadsheets can become full-fledged programs in their own right, especially as Visual Basic macros are incorporated.

DevonWay

DevonWay represents a relatively new approach to operational software made possible by innovations in supporting web and mobile technologies starting in the mid-2000s. Low RAM prices led to architectures designed to favor configurability and usability, rather than work around hardware constraints. Vendors like DevonWay specialize in a metadata-driven approach to delivering highly tailored software that streamline operations by automating manual processes.

IBM Maximo

In this whitepaper, Maximo represents the mature, traditional Enterprise Resource Planning market dominated by large players such as SAP and Oracle. These software packages are purpose-built to address the most mission-critical needs of specific industries in a reliable, scalable way.

Feature Comparisons

Feature #1: Configurability

Excel: Excel is extremely configurable. Configurability and its low price point have made Excel a popular choice for most professionals who view and process data. Excel's foundation is the key to its relatively easy configurability. Being a Microsoft tool, Excel enjoys an industry standard code base that is attractive for developers who build macros and plugins, a robust offering that only further increase the configurability options. The range of expertise needed to support the various configuration options range from novice to expert, depending on your productivity or data needs.

DevonWay: DevonWay's tool specializes in automating any organization's operational processes (i.e. those processes that deal with human or physical capital in a reliable, repeatable way). Like many no-code/low-code platforms, an implementation begins life as a series of installed modules that are then extended with the specific data, workflow, and business rule requirements that an organization needs in order to meet its specific business need.

Maximo: Maximo's long history, combined with an entrenched user base and relatively open API, allows for configuration to be done at a much more granular level. Because Maximo configuration requires coding as well as ongoing IT support, this is a good solution for organizations that already have that skillset, especially those for which that skillset is a sunk cost. Ultimately, with Maximo, like many large ERP systems, going this route gives you ultimate flexibility but requires you to align your entire organizational workflows around the tool.

Feature #2: Scalability

Excel: Excel's scalability has a defined limit, both in the size of a spreadsheet and in the number of collaborators that can act on it simultaneously. Although tools like OneDrive and SharePoint make collaboration easier, the tool is best suited for small datasets (a few tens of thousands of rows maximum) operated on by a small number of trusted users.

DevonWay: DevonWay has a stateless architecture that supports both horizontal and vertical scaling, as well as an in-memory search engine that eliminates the need for index maintenance. Because its high levels of configurability are partly due to its metadata-driven data model, however, it is best suited for datasets in the low-billion rows or smaller.

Maximo: Because Maximo has a data model tailored to its process architecture, it also enjoys the highest ceiling in regards to scalability, although that scalability requires ongoing support by IT in regards to index and table maintenance

Feature #3: Security

Excel: Although Microsoft has shown itself to be committed to resolving vulnerabilities as soon as it becomes aware of them, the fact is that Excel will remain a popular target for malware attacks due to its far reach. Moreover, since spreadsheets are essentially databases that can easily be attached to emails, data can end up "in the wild" with just a few inadvertent mouse clicks.

DevonWay: Because DevonWay's tool is used primarily by large, highly regulated businesses, security is a foundational aspect of DevonWay's platform. Governance roles are decided on during the implementation planning process and are applied throughout the user experience, including down to the field level if necessary.

Maximo: Maximo's security infrastructure is highly configurable. At a software level, the number of governance options and security settings is very large, which allows for very fine control.

Feature #4: Search

Excel: Search in Excel is rudimentary. There is a basic 1:1 keyword search within the product but advanced search features are non-existent. At scale, searching Excel becomes even more of an issue. As a result, from a search perspective, many data professionals use Excel as a low-tech repository, adding information to a spreadsheet, but then importing that spreadsheet into another data tool for synthesis and analysis.

DevonWay: DevonWay uses an in-memory NoSQL database for search, which eliminates the need for writing SQL queries or tuning indexes. DevonWay's search extends to any structured or unstructured data in the database, including uploaded attachments, and forms the basis of its analytics engine.

Maximo: Maximo surfaces search results through traditional SQL queries. This is an industry standard approach and highly scalable for organizations with database administrators that can perform the index maintenance necessary for ensuring optimal performance.

Feature #5: Analytics

Excel: Excel in itself is a popular analytics tool. Creating charts is an easy, no-code process. For basic analytics tasks, for the price, Excel is a very good tool, although it is limited to basic charts and pivot tables.

DevonWay: Instead of pre-set report templates, DevonWay includes integrated ad hoc reporting, charting, trending, and statistical process controls, all with built-in notifications. Training business users on how to create their own ad hoc analytics is typically handled during the implementation phase of a project or through a paid support plan.

Maximo: Maximo's analytics tools are most completely provided through integration with Cognos. While Cognos is a full-featured business intelligence tool, setup and maintenance can be expensive, so this is best suited for large organizations that have already purchased this tool or have budgeted for it. IBM also supports machine learning through its Watson IOT offering, particularly for use cases such as asset performance management, production optimization, and production quality insights.

Feature #6: Usability

Excel: One of Excel's core value propositions is its usability. However, the flip side of Excel's usability is that it's so user friendly that over time, a power user can often create tables and charts that aren't able to be universally understood or traceable in a way where another user can begin the process of understanding.

DevonWay: The modular, configurable nature of the DevonWay platform allows for organizations to control their

own user experience, but within limits informed by industry standard best practices. The goal is to use familiar user interface metaphors in order to minimize training and change management.

Maximo: Maximo mirrors other legacy ERP tools in that using it is idiosyncratic. It doesn't follow necessarily the most modern UI and UX best practices. As such, the learning curve is steep. However, given how mission-critical Maximo implementations are for so many businesses, power users of Maximo are considered very valuable to those same businesses, so the learning curve is often worth the climb.

Feature #7: Mobility

Excel: While there is a mobile version, Excel is not best leveraged for mobile. Editing or viewing spreadsheets or charts on the phone isn't an optimal or natural experience outside of spot fixes.

DevonWay: DevonWay's mobile app is an extension of DevonWay's platform, but instead of replicating every DevonWay feature to a mobile interface, only features that naturally extend to remote work are included in the app. For example, remote workers can use DevonWay's mobile app to take pictures at a worksite when doing inspections.

Maximo: If Maximo has a weak point, it is its mobile app. A clunky user interface and features that don't always consistently work are common themes when users have reviewed the app. Users have also complained that the app in general happens to be slow and doesn't support a natural user experience that is optimized for workflows that can be done on the go.

Feature #8: Auditability

Excel: Excel is not designed for auditing as much as its charts and spreadsheets represent a small portion of the auditing process. Additionally, there aren't any native functions that allow for the preparation of Excel spreadsheets for auditing activities.

DevonWay: Every data object in DevonWay has built-in history tracking down to the field level, as well as an audit trail of all workflow actions performed. This allows for organizations to reconstruct the history of any piece of data at any point in time.

Maximo: Auditing within Maximo is not a core competency. The main functionality that supports auditing is enabling E-audit within your Maximo instance. But this activity also requires configuring audit tables, which is labor and code intensive, both for setup and for general maintenance. For an easier route, support for auditing activities is usually surfaced through plugins from companies in Maximo's partner ecosystem.

Conclusion

Managing your business operations is a complex and extremely fluid job. Balancing between being strategically proactive, and adjusting to real time changes on the fly can seem daunting. Luckily there are software tools to assist us in our day to day tasks. Here are some additional things to consider when choosing an operational tool:

1. **What is your ultimate business goal?**
   Whatever tool you choose to help you must align with your business goals, objectively and defensibly.

2. **Is it scalable?**
   This question is twofold – are the internal processes and workflows created to reduce complexity as your organization grows? And can your tool support your organization's growth without becoming complicated financially or functionally? Determining how to plan and adjust for scalability is usually the number one issue businesses face when choosing tools that aid in digital transformation, but as long as thought is put into the exercise, you can mitigate a lot of risks.

3. **What does your business care about most?**
   When choosing an operational tool, many times all the bells and whistles can inspire many different workflow detours that take away from your original goal or plan. By staying focused on what your business needs most, you not only will avoid cost overruns from unexpected scope increases, but your focus will allow you to be more opportunistic and implement the other bells and whistles you see at a more appropriate time.

Appendix

https://www.slideshare.net/bernardmoon/internet-of-things-hardware-industry-report-2016

https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0150.html

https://faculty.biu.ac.il/~shnaidh/zooloo/nihul/evolution.pdf

https://selecthub.com/cmms/eam/ibm-maximo-vs-sap/

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