WHITE PAPER

IS CONSTRUCTION READY FOR PROJECT-BASED ERP?

CONTENT

EXAMINING THE CONSTRUCTION INDUSTRY'S MOVE FROM POINT SOLUTIONS TOWARDS PROJECT-BASED ERP

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For years, enterprise resources planning (ERP) software was to be found primarily within the manufacturing sector. Other forms of enterprise application were employed in other industries, and an increasing number of businesses have been enjoying the efficiencies that come from using a common technology platform and database. The construction industry, however, seemed reluctant to embrace the enterprise application concept and tended to stick with the 'point solutions' that had been developed over the years for each of the various stages of the construction processes.

One reason for this may be the conservative nature of much of the construction industry (with some notable exceptions), meaning that new technologies and ways of working often meet resistance unless there is a pressing reason to change. Another may be the fact that, until recently at least, senior managers in construction (including the IT managers in many cases) only had experience from within the construction industry and had not been exposed to best practice tools and techniques from elsewhere. Thirdly, to be frank, until recently very few of the leading enterprise applications were well-suited to construction. ERP lacked the project-based functionality needed in construction and was better suited to the more process based industries in which it originated.

But demand is growing. In this paper we'll look at some of the factors and drivers behind the trend toward construction ERP and examine the types of functionality and other requirements contractors need to look for when selecting what is often their first-ever enterprise-wide application.

FIVE BUSINESS-CRITICAL FACTORS

Project-based industries such as construction, shipbuilding and offshore engineering have very different business challenges from other manufacturing or process based industries. Almost every project is unique, often with a new team, so each is a new challenge from the outset.

It can be argued that five challenges are common to all project-based businesses:

- Risk
- Cost
- Cash flow
- Time
- Resources

The way these factors are managed, both individually and collectively, determines the success or failure of a project, and ultimately of the project-based businesses behind it. All five factors are variables that should be weighed against each other before any major decision can be made.

THE DRIVERS FOR CHANGE

Moreover, they have to be considered in the light of other drivers that are now moving the construction industry towards a project-based ERP approach. We'll take a closer look at four of these here:

- Consolidation in the construction industry
- Cross functional collaboration
- A move towards off-site construction
- A future with Building Information Modeling (BIM)

CONSOLIDATION IN THE CONSTRUCTION INDUSTRY

Many smaller contracting businesses have merged or been purchased by larger concerns recently, while at the top of the supply chain there have been a number of huge mergers and acquisitions. This activity has created larger construction conglomerates with multiple divisions, each often operating in different disciplines and starting with unique business models. Faced with the challenge of managing a multiple-division enterprise, the directors of this new breed of construction company have been attracted to ERP as a way to gain visibility of business information across their newly enlarged enterprise. It is vital to know quickly how each operating unit is contributing to the whole business so that any restructuring or rationalization that is required may be planned with a full understanding of the facts.

As the construction environment becomes more complex, ERP becomes even more attractive because it can be used to manage a large variety of business activities

at the same time. A traditional 'builder' may well be able to manage with conventional construction software packages, but once the business expands to incorporate utilities, road building, rail maintenance and the extraction of aggregates, most legacy systems will be entirely unable to cope.

Increasingly, these larger companies are now hiring technology leaders with experience from outside construction, and with them comes a wealth of ERP experience to add to the corporate gene pool.

CROSS-FUNCTIONAL COLLABORATION

Even within construction companies that have remained independent, the efficiencies offered by the right enterprise-wide application can create a competitive edge. Traditionally, construction companies have been extremely departmentalized. There were separate departments supported by separate technology platforms for design, estimating, procurement, valuations and construction planning. In many cases even the planning process itself was carried out on a different system at tender stage to that used to manage the project during construction.

Unfortunately, in many cases few (if any) of these 'point solutions' were integrated with the core financial system. This meant, for example, that site based valuations and applications for payment were often carried out in complete isolation from the so called cost control process undertaken in the accounts department. It could take weeks to reconcile the two figures, and only then would it be clear whether or not a project was making money. In an industry where real-time information is so desirable, the inefficiencies of maintaining all these data silos has been questioned time and again by CIOs joining construction from manufacturing, financial and other industries. Bringing all of these disparate departments together and getting them working on the same application on the same database can solve some of the problems that many contractors for decades have taken for granted. By unifying all of these departments on a single platform and data set, it becomes possible to put in information and receive an accurate picture of the project from financial and operational perspectives in real time.

This type of unified platform is crucial for proper cost-value reconciliation. Traditionally, as a contractor measured earned value on-site, the back-office accountants would tally supplier invoices and determine the costs. However, reconciling the cost and value figures takes time and effort, and if any action is needed to correct a problem, the project manager may be the last one to know. But with ERP-based cost-value reconciliation, an accurate view of the financial health of the project can be brought up in real time, anytime. This allows a contractor to make smaller and more measured adjustments as work progresses instead of drastic action when it is already too late.

OFF-SITE CONSTRUCTION

Major contractors are investing heavily in factories and production facilities designed to move more work off the construction site and into a more controlled environment. Mechanical & electrical (M&E) contractors have led the way, building M&E sub-assemblies off-site and delivering them 'just in time'. But the off-site construction trend is driving even more activity into highly controlled factory environments with attendant cost, labor and safety advantages. Whereas M&E contractors may have been engaged in off-site construction for some time, the practice is now being taken to a whole new level. Today, entire plant rooms are being designed and constructed in modules for final assembly in position when the site is ready for them.

Other contractors involved in high-rise building projects are prefabricating the risers complete with plumbing, electrical conduits, gas mains, insulation and labeling for the constituent parts and lifting each section into place by crane. This not only reduces the amount of work done on site, but significantly limits exposure to risk that naturally results from doing intricate work at height.

What this really means from a business process perspective is that contractors are turning parts of their operation into manufacturing businesses. As a result, they are looking to the manufacturing ERP vendors for help implementing lean manufacturing practices for construction.

BUILDING INFORMATION MODELING AND ONGOING ASSET MANAGEMENT

Major contractors are feeling pressure from clients to deliver more structured data about the building and this is leading to an increased interest in building information modeling (BIM). BIM can deliver to the client the essential information used to plan maintenance activities, maintenance inventories and budget for the entire lifecycle of the building from handover to decommissioning and replacement. Some contractors are keen to play a greater role in the asset lifecycle management process (ALM). As one major contractor said, "We are no longer builders—we are asset managers. It's just that some of our assets have not been built yet!"

Considering that a building's working life might typically be 30 to 40 times longer than its construction period, with maintenance costs similarly multiplied, the case for an integrated construction and asset management approach is a strong one. Indeed, the trend towards a greater involvement in the full building lifecycle has been talked about for years. By the mid 1990s, contractors were already addressing the issue of buildability with the design & build approach and increasingly branching out into the lucrative facilities management market in search of the long-term revenue stability that comes with it.

Just as these construction businesses have changed, so the suppliers of their business systems have had to develop new solutions to suit these changing business

models. Rather than two distinct processes—construction and asset management—more agile business systems are able to address the entire building lifecycle as a continuum. This includes the design, construction, maintenance and eventual decommissioning of those buildings.

This agile solutions approach makes it easier for construction companies to respond to the changing demands of customers, including making asset and facilities management an integral element of the overall construction process. Take Debut Services (South West) Limited, a UK-based joint venture between Babcock International Group and Bovis Lend Lease, which was formed to deliver a "one-stop-shop" for property construction and maintenance. Whereas a traditional large construction project might see several hundred operatives from various contractors and subcontractors on a single site, Debut's team is able to manage some 9,000 Defence Estates assets spread over 200 sites on a single agile ERP solution. The effect is hugely improved visibility of information compared with traditional methods, allowing Debut to deliver its service more efficiently and to a higher quality standard.

The building owners also benefit from the ERP approach to construction and maintenance, with vital data on every element of their buildings being captured and held for reference, possibly years later. Not only can the system record, for example, the dimensions and type of lift motor that has been installed, it can also manage the planned maintenance schedule, recording planned and reactive maintenance carried out and list the spares required for each type of service. Whenever service engineers are called out, they can have at their fingertips, on a PDA if appropriate, the full service history of the motor together with details of where spares might be kept in that building and who to speak to if expenditure needs to be authorized. It makes for a quicker, more efficient service for all concerned and minimizes down time.

Having the single system approach to construction and maintenance almost eliminates the traditional rush at the handover of each project as operation and maintenance manuals are written. With agile ERP solutions constructors are increasingly able to link the construction and asset management processes together, which can only mean better accountability, productivity and quality output from the industry as a whole in years to come.

> "The construction industry has changed. ERP has changed. There has never been a better time to invest in ERP for construction"

So if the construction industry is ready to embrace the 'enterprise solution' approach, what should its IT decision makers be looking for? Should they try to select a system that addresses all of their needs in one? If so, what happens when those needs change in the future, as they inevitably will? These are really questions about agility—the agility of the business to react to change and the agility of its business systems to support it.

THE VITAL IMPORTANCE OF AN 'AGILE SOLUTION'

IT systems are often found lacking just when they are needed most. When a company grows, the demands on its IT systems may exceed their capacity, or when a new company is acquired, it can take an inordinate length of time to get a reliable financial overview of the new larger business. When senior management is stretched to the limit, these IT shortcomings could hardly emerge at a worse time.

Facing Economic Challenges

The construction industry suffers more than most in periods of economic decline. It is pulled down early as soon as the economy loses the confidence to invest in the built environment and its recovery is held back by the glut of empty properties on the market when the upturn finally arrives. In order to survive these difficult times, senior managers need accurate, up to the minute information on the performance of every part of their business so that problems can be addressed quickly and action taken where necessary to prevent losses and to boost profitable activities.

Managing Successes

During better trading conditions, successful companies grow. They introduce new people and teams into a previously stable working environment, sometimes even introducing additional layers of management, changing the way the organisation works and stretching lines of communication. Struggling to manage this growth the last thing Directors need is for IT systems to let them down. But for all sorts of reasons, this is just the time when that often happens. For instance, reaching the operational limits of a key software system so that it needs to be upgraded or replaced at short notice—and without the usual budget preparations—with knock-on effects on other systems, leading to a major IT upgrade and retraining project just when the company's resources need to be directed elsewhere.

Preparing for acquisitions and mergers

The managers of a new enlarged company need visibility of its entire financial and operational position to inform any decisions they need to make about restructuring and streamlining the business. To achieve this they need access to historic data and current transactional information to understand how each part of the business is contributing to the whole. Add to this list the vast array of 'legacy' systems still in use, long after technology has moved on. Whenever two or more companies merge, it is almost inevitable that they will currently be using different systems, often in different ways from each other. Before reaching a coherent picture of how the business is performing, it may be necessary to devise reporting systems to read from each financial system, port data from one system to the other or even replace a core IT system altogether, just when the IT teams and accounts departments are learning to work together.

Embarking on a new business direction

Increasingly, companies are diversifying into new areas to seek improved returns. Others are deciding that they need to specialize to compete, changing they way they have operated for years. The IT significance of these changes is that few envisioned them when the current IT systems were bought. For example, a contractor who buys a financials package incorporating project cost control and change management may find it does everything they want, until they branch out into off-site construction, bringing new demands on their IT systems or forcing them to replace them altogether with a more comprehensive package.

Reacting to unexpected external factors

Sometimes we see external factors coming and can prepare our businesses, and our IT systems, for them. Changes in legislation and the tax system, for example, are beyond our control, but they tend to be announced well in advance and the nature of the change is thoroughly documented. This allows software vendors or IT departments to make necessary amendments before go-live day. Other factors, not always foreseen, include competitors bringing new products to market or advances in technology raising the level of customers' expectations. Whatever happens, we now know that sooner or later the IT systems will be called on to adapt or evolve.

Introducing agile solutions

IT managers in construction need to be able to identify these shortcomings in their legacy systems. And, crucially, they need to be able to adapt and evolve to prevent compounding their problems when they select replacement systems, which must be as agile as their businesses have to be. Hence the need for agile solutions a class apart from conventional enterprise software. I have created a checklist to help businesses recognize agile solutions from the wide range of other software available:

An agile solution

1. Can adapt to suit your business
   If a software vendor suggests a different way of running your business, ask yourself whether it is because the software you are being offered cannot cope with the way you want to work?

2. Is able to adapt to changes after implementation
   If a business is to remain agile then its business systems need to be able to adapt to changes during its working life. A truly agile solution will take these in its stride.

3. Will provide all necessary information at every level of your business, in real time
   There is no longer any need for different departments, disciplines and management levels to use different software to do their work. They simply need a

different view on the same information in order to work effectively. Windows clients, web clients, personal portals and mobile devices all have their strengths and weaknesses.

4. Is truly component-based
   If a project based cost control system, for example, is to adapt to a new way of working, then it may need to undergo some fairly major changes without interrupting the current users. A reliable way of achieving this is to employ a modular software structure based on a truly component based architecture.

5. Is based on open software standards
   Even today, far too many software vendors tie their customers into their own interpretation of connectivity and reporting standards. For a solution to be considered truly 'agile' it must employ open software standards, allowing the customer the choice of how systems are to be interfaced and by whom.

6. Leaves the customer in control
   Some software may be bought direct from the author whereas some may only be purchased through resellers. Even some of the apparently independent software vendors turn out to be owned by remote companies far removed from the software writing and support. A vital question to ask then is who actually controls the future of the product? You do not want to hear "we can't do that, it's against company policy" the next time you ask for a modification to support a new business requirement.

7. Promotes a rapid return on investment
   In the medium to long term, buying the right software system should give a positive return on investment, but in the short term it is a significant cost and that money needs to come from somewhere. The modular nature of agile solutions enables customers to invest first in the areas that cause them the greatest difficulty at the moment, i.e. the areas that are most likely to offer swift returns. Starting with a relatively modest investment and thereby minimizing the risk of the project, each module proves itself before others are brought online.

8. Embraces up-to-date technologies as standard
   A service-oriented architecture (SOA) is widely considered a 'must have' technology in modern software. SOA first became available in the mid 1990s when just a few pioneering companies adopted it as their standard for development. A sound track record of successful SOA development is vital if a vendor is to produce truly agile solutions. Without it, substantial development resources must be spent catching up rather than working on customer driven requirements.

In short, enterprise solutions for construction need to be at least as agile as the firms they support. They need to be well written, using up-to-date technologies, employing a flexible component-based architecture and have the backing of a vendor with a real commitment to its customer's future success.

SO, IS CONSTRUCTION READY FOR PROJECT-BASET ERP YET?

I believe that many players in the construction industry, not just 'top 10' level contractors, now have both the need and the will to embrace project-based ERP solutions. Furthermore, I believe that these companies now have a real choice of ERP solutions, allowing them to chose the one best able to meet their needs and agile enough to adapt as those needs change.

Construction is no longer restricted to a choice between industry specific point solutions and unwieldy inflexible ERP products designed for manufacturing. They now have a real alternative—agile, project-based ERP.

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ABOUT IFS

IFS is a public company (OMX STO: IFS) founded in 1983 that develops, supplies, and implements IFS Applications™, a fully-integrated, component-based extended ERP suite built on SOA technology. The company has more than 2,000 customers in more than 50 countries and focuses on seven main industries: aerospace & defense, utilities & telecom, manufacturing, process industries, automotive, retail & wholesale distribution, and construction contracting & service management. IFS has 2,700 employees and net revenue in 2008 was SKr 2.5 billion.

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En4803-1 Production: IFS Corporate Marketing, January 2010.