

A white paper by Alistair McLeod  
January 2008

# TECHNOLOGY PRIORITIES FOR CONSTRUCTION: 2008 SUMMARY REPORT

## Contents

Introduction	3
Managing the IT investment	4
Strategy focused information technology	4
Information Integration	5
Business Intelligence	5
Communication and collaboration	6
The commodity focused strategy	7
Virtualisation	7
VoIP (Voice over IP)	8
Mobile and remote technology	8
Information security	9
Conclusion	10

## Introduction

The construction industry has experienced a great deal of scrutiny over recent years, with the 'Rethinking Change' task force and the creation of the Strategic Forum for Construction. The holistic aim of these initiatives was to focus the industry on self imposed improvements in efficiency, quality and profitability. Information Technology could well play a part in this, as other industry sectors, such as car manufacturers, have for many years been driven by operational excellence and have seen improvements by well managed utilisation of IT.

Traditionally the construction industry has had an indifferent approach to IT. While investment has risen in recent years, it is still low compared to the worldwide average (1.9% of revenue compared with an average of 3.0%\* - see figure 1). IT has often been used reactively rather than strategically, with investment in 'best of breed' solutions, instead of fully integrated systems. This can sometimes result in poor returns from investments and a view that IT is not effective.

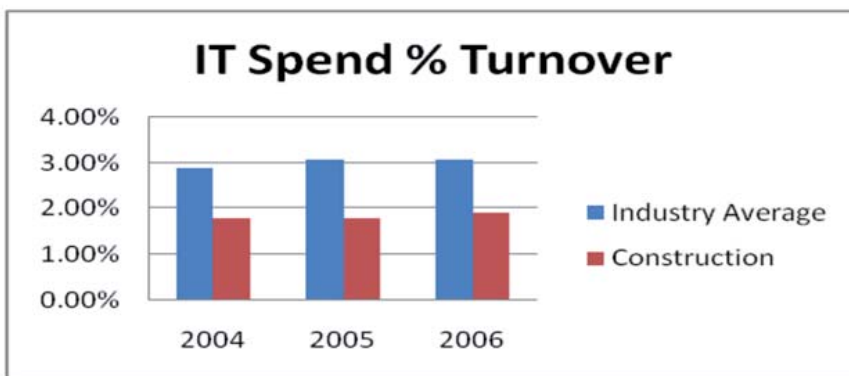


Figure 1: IT spend in Construction

Of course, just raising the IT budget is not necessarily the answer, and the predicted slowdown in growth of the economy in 2008 will put even more pressure on costs and ultimately the IT budget. It is during these periods that IT investments need to be managed wisely in order to deliver the best benefits. IT should have its roots embedded into the framework of an organisation, both as a commodity and a strategic enabler, and will be increasingly pulled in opposite directions by these competing forces. In the future, IT will require tight management from a new breed of CIO and IT Manager who have both business and leadership skills, enhanced by an understanding of new technologies and how they can be applied.

## Managing the IT Investment

It is crucial that an IT investment plan is relevant and embodies the principles of both a strategically enabled and commodity-focused IT strategy. It will require a balance between focusing on the vulnerabilities of not implementing a technology, against using IT to gain a competitive advantage or drive change within the business (and this will be important if the economic predictions are true). For example, protecting information against failure or a malicious attack is very much a commodity-focused strategy; while providing easier collaboration between company resources to improve productivity is very much a strategic use of technology.

Figure 2 illustrates the layers of the IT architecture and where the commodity and strategy focus should be. Investment priorities should be primarily driven by business objectives and external pressures; the CIO and IT Manager will be required to manage these priorities, demonstrate the business benefits and drive through the required projects.

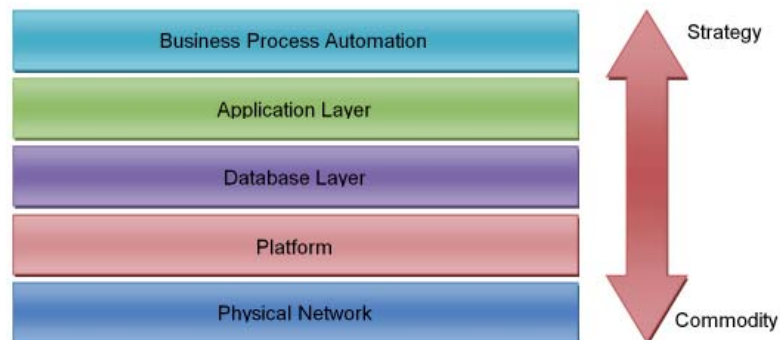


Figure 2: IT Architecture layers

## Strategy focused information technology

Construction organisations need to place IT at the centre of the business strategy, enabling them to use technology more effectively to drive through improvements. CIO and IT Managers should have more involvement in defining and prioritising business strategy so they can bridge the gap between business requirements and technology, ensuring the right IT projects are carried out and the investment is wisely spent. There needs to be a greater emphasis on orchestrating dynamic IT architectures that are supported by fully integrated and accurate information and can quickly change and adapt to external economic pressures and internal business priorities.

## Information Integration

Integration of information is a major priority for construction companies, and in 2008 many organisations still have disparate business systems and fragmented information. Managing project costs against the backdrop of tight deadlines is a critical part of the industry, so it is important to have structured and disciplined IT systems which are completely integrated. The implementation of an ERP system is still without doubt the best long term strategy and will yield the best results. However, with high initial investment, budget constraints and the protection of the current IT investment, this may be impractical in the short term for some organisations. The long term goal should be to plan and budget for the selection and implementation of a suitable ERP system, but in the short term, alternative approaches may be considered to address immediate issues. Fragmented disparate IT systems, for example, could benefit from the implementation of a Service Oriented Architecture (SOA) to help bind the information together, or the deployment of an integration product such as Microsoft BizTalk to create transfers of information between systems. Bespoke interfaces could be developed to 'knit' all the systems together, and a data warehouse can be deployed to help improve reporting across the business. Any approach that is adopted in the short and long term should be part of a well structured and budgeted IT Strategy with clear benefits and a clear plan for achieving change.

## Business Intelligence

Business Intelligence (BI) is back on the agenda in 2008, driven by the current economic climate and the failure of past projects to deliver reliable and useful management information. BI is specifically key to construction companies where costs are disparate and may be recorded in many different places and systems. It is not unusual for estimated costs at the contract stage to be held in separate systems and to be managed by separate people from the engineer's and QS estimates and again from the actual costs of the final project.

Many BI initiatives that were sanctioned 2-3 years ago have not delivered either because of poor data warehouse design, inaccurate information or a misguided investment in expensive third party reporting tools. The same principles apply today as they did five years ago and to achieve success in delivering BI projects, the following points should always be considered:

- A clear definition of the reporting requirements that is related to the business strategy and relevant for the business users.

- Accurate and relevant data. Addressing this issue will be the most difficult and time consuming part of any BI Project, particularly if the information is fragmented.
- Good, solid data warehouse design using proven methodologies such as Dimension Modelling (See Ralph Kimball), ETL design and data cleansing procedures.
- The selection of the most appropriate reporting technology. This can only be done when the above has been achieved. Too many BI projects start off with the technology first.

Finally, seek advice from experts who have a proven track record in delivering these types of projects. Their experience will be invaluable and will help save you time and money.

### **Communication and collaboration**

Creating integrated supply chains and project teams will help share responsibility and risk for the delivery of construction projects and drive improvements in future projects by knowledge transfer and lessons learned. Suppliers, manufacturers, constructors and clients should all work closely together to minimize risk, drive out waste and ensure design quality. Construction companies should be seeking to capitalise on recent advances in collaboration tools, such as Microsoft SharePoint, in helping them achieve these goals. Collaboration technology allows the project manager to pull together all the information for critical processes or projects and provides access via secure portals for all the relevant team members. Members of the team who are external to the organisation do not require access to the business systems, but can access information relevant to them, or can receive notifications of changes to shared documentation, using simple web based interfaces or e-mail. Other benefits for construction include:

- A mechanism for managing the movement of documentation providing tracking, version control and approval.
- With the addition of workflow applications the supply chain can be further automated meaning information can be pushed and pulled seamlessly from back office systems and actions such as e-mails or notifications can be triggered to any person or part of the process depending on specific events.

- Searching is significantly improved, making it easier to find people, expertise and content right across the supply chain.

Microsoft SharePoint is an extremely flexible technology and there are many organisations adopting it for different business use. It can be very powerful but it does need to be tightly managed and have a well defined set of requirements.

## The commodity focused strategy

The main thrust of the commodity focused strategy is to create a secure, resilient and low cost IT infrastructure that puts the emphasis on reducing vulnerabilities, reducing total cost of ownership and minimising risk taking. New technologies should be adopted when they are cost effective and have a proven track record. A number of concepts previously accessible to only the largest budgets are now becoming widely available to everyone and first adopters are already seeing good returns. In 2008, the availability and growth of these technologies will continue.

### Virtualisation

Leading the way is server virtualisation; the switch from a dedicated server for each application, to centralised virtualised servers running multiple applications. The steady rise in performance of new hardware has been climbing faster than even resource hungry Microsoft applications demand. Studies have found that the typical server averages only 10 per cent. Virtualisation makes it possible to achieve significantly higher resource utilisation by pooling common infrastructure resources and breaking the legacy 'one application to one server' model. Other benefits include encapsulation, where an entire server is in effect reduced to a file on a disk. This file can be backed up, moved, copied and replicated, just like any other file. This has huge benefits when it comes to meeting business demands for disaster recovery and resilience.

Finally, the deployment of a storage area network (SAN) allows virtual servers to be shared across multiple disks which allow the virtual server infrastructure to cope with hardware failures. In the event of server hardware failing, the virtual servers that were running can be automatically transferred to available hardware. Not only does this technology help create a highly available infrastructure, but the encapsulation benefit

simplifies disaster recovery. This allows the entire server infrastructure to be replicated in a standby virtual environment, only to be activated if the primary site is lost. Interestingly, none of these concepts are new; the mainframe community has been using precisely these features for many years. What is new is the accessibility of these technologies to the smaller IT budget. We can be sure that typical IT infrastructures a few years from now will be making good use of many of these features.

### **Voice over IP (VoIP)**

Another front runner is Voice over IP, allowing voice and fax data to travel over a data network at the same time as traditional data packets, and travel seamlessly over the internet. This obviously simplifies the network infrastructure because they both share the same cabling, but it also reduces telephone costs because it uses the IP networks to bypass the public switched telephone network (PSTN). Construction organisations can benefit from this technology in the following ways:

- Normal landline telephone cost will be cheaper for short or long distance calls, although costs do vary from one provider to another, with significant savings for larger organisations.
- Enhanced integration with products such as Exchange and Office Communication Server (OCS) provides presence awareness and real time communications with remote or construction site workers.
- Project teams and remote workers have greater flexibility because you can use the company telephone number anywhere there is an internet connection.

### **Mobile and Remote technology**

With the revolution in broadband, 3G and wireless networks, connection to the internet has never been easier. For construction companies this has obvious benefits, allowing organisations to spread wide area networks far and wide and allowing secure access to back office systems, regardless of location. Yet, typically, the flow of information usually comes to a grinding halt when it reaches the construction site. A recent report claimed that construction companies could see a 25% increase in productivity if construction sites were fully integrated with the back office. Bearing this in mind, the real focus for remote working in construction for 2008 will be to provide mobile field solutions allowing users on site to collect, analyse and process

real-time data. Advances in Ultra Mobile PCs (see figure 3), rugged laptops and solid state storage devices that are highly resilient and safe are now making this an affordable reality.



Figure 3: an Ultra Mobile PC

The next generation of these devices, coupled with the consolidation of data transmission (VoIP plays a big part in this), allows site based users to access information and communicate with colleagues in the same way office based users do. Perhaps the days of the walkie talkie are numbered!

### **Information Security**

At the back end of 2007 there were many stories in the media relating to the loss of personal data and information security in general. Whilst most of these issues related to the public sector, it does highlight a general complacency of information security throughout the IT industry. In 2008, having a well defined information security strategy, and in particular compliance with the ISO27001 security standard, will be an imperative. This standard is designed to address areas of weakness in resilience, continuity and security and not only will it ensure your information is safe, but it demonstrates to third parties that you are a secure organisation to do business with. This is a specialised area and there are accredited security consultants and ethical hackers who can help you through the process.

## Conclusion

Information Technology is an enabler and has already transformed many operations within construction. IT can also deliver further significant benefits and construction organisations need to embrace this if they are to see additional improvements.

Delivering IT projects is never easy and will always create change management issues and disruption in a business – but keeping the long term goals in mind is critical. The internal IT department may not have all the answers, and using third party experts will also help to ensure the projects are managed and delivered sensibly.