

# TECHNOLOGY FOCUS

## LEVERAGING LOW COST ICT FOR EFFICIENCIES IN THE CONSTRUCTION INDUSTRY



Against a background of foreign and domestic pressures on the construction industry, this article explores some of the opportunities for the use of low-cost ICTs to enable and enhance what is broadly referred to as "Lean Construction" practices, and looks at the practical experiences of a real-world case study.

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The local construction industry is under siege! Many of the indigenous businesses in the sector are struggling to stay afloat under the twin pressures of anaemic, low-growth in the domestic economy, and the irrepressible competitive pressures of foreign-based enterprises armed with deep capital, heavy machinery and low-cost labour, with little protection from Government policy interventions. The recent MSBM Roundtable, themed "Construction as Driver for Economic Growth," emphasised the critical importance of greater efficiencies in the financing and operations of local construction companies in order to remain sustainable businesses. In this article, we explore some of the opportunities for the use of low-cost ICTs to enable and enhance what is broadly referred to as "Lean Construction" practices, and look at the practical experiences of a real-world case study.

### CONSTRUCTION MANAGEMENT SOFTWARE

One can readily find integrated construction management software that purports to offer a holistic solution to enhance the effectiveness of the construction project life cycle; however, these solutions can be relatively expensive. Alternatively, with open minds and a little help from creative IT practitioners, small construction companies can find effective solutions to address specific functional needs, many of which are available as low-cost, open source software solutions. We take the following simplified view of the stages of the construction process in order to explore some of these solutions.

jobs in on time and within budget. Estimation software can range from simple spreadsheet templates to more sophisticated cost estimation software that provides specialised features such as:

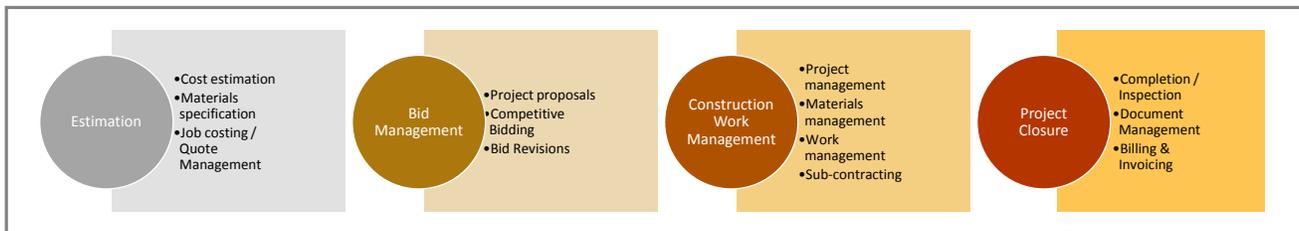
- Building Product / Materials Cost Database / Calculators
- Ability to quickly re-price estimates based on changing parameters such as exchange rate, job rates, material prices
- Re-use and share estimates across multiple bids, contracts



**Estimate\*** (<http://estimate.wanhive.com/>) is one example of an Open Source web based construction cost estimating software that provides a lot of these features. Designed for medium and large Civil

Efficient and accurate estimation is key to responsiveness to project opportunities, effectiveness in the competitive bidding process and ultimately the ability to bring jobs in on time and within budget.

Construction and EPC (Engineering Procurement and Construction) companies, it can be used to estimate how long projects will take, do cost analysis, and tender evaluation. **Estimate\*** also provides industry-



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specific calculators for a wide variety of trades and businesses, including but not limited to: *General/Industrial Construction, Carpentry, Plumbing, Electrical, Tile Work, Concrete Work, Landscaping, and Maintenance & Repair.* ▶

With the benefit of effective estimation, the key to delivering a quality built artefact on schedule, within budget, while controlling waste, minimising financing costs and ultimately delivering to a satisfied client, depends on effective construction project and work management. Microsoft Project is a popular tool often used by project managers, but there are several open source alternatives. One such interesting option is **OrangeScrum** (<https://www.orangescrum.org/>) a free, open-source project management tool with a robust community that is continuously adding new features. While not specifically a construction management tool, **OrangeScrum's** features make it particularly suitable for the construction industry and for small and medium-sized businesses in general. In addition to the common Project Management features for resource and task planning, monitoring and control, it integrates time tracking, customisable workflow management, expense tracking, invoice and billing management, and document sharing through Dropbox and Google Drive. A distinctive feature is the mobile App which integrates field work with back-office support, a compelling feature for construction site management.

## A CASE STUDY: CREATIVE BUILDERS LTD, BRITISH VIRGIN ISLANDS

We've highlighted just a few examples of some of the software solutions available to construction companies that can help to enhance the efficiency and effectiveness of their operations. For a real-world example of some of these approaches, I sat down for a chat with Phil-Ann Stevens, co-founder and Financial Controller of Creative Builders Ltd, a medium-sized company, located on Virgin Gorda Island in the British Virgin Islands (BVI). She is currently a graduate student in the MSc, Corporate Finance at the MSBM, and strongly believes that the use of technology in all aspects of their young construction business has enhanced their competitiveness and accelerated their growth to becoming one of the top three construction players in their local sector. She recalls that when they

started the company less than seven years ago, as a part-time venture with one contract, active use of technology was primarily as a means of simplifying work processes— email communications, invoicing and accounting using QuickBooks.

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result of tourism developments and much of the construction being financed from overseas, they quickly realised that international clients and investors responded positively to the professional appearance of a company that was responsive to emails, used computer generated quotes and invoicing instead of hand-written documents, and was represented by young, demonstrably tech-savvy professionals.

*We are a small company, but were able to distinguish ourselves in the market, and were able to grow quickly using technology.... We go overseas for specialised training, and visit trade shows every year to stay abreast of the construction software market..."*

## USE OF ICT IN THE CONSTRUCTION PROCESS

Stevens highlighted some of the software solutions used by Creative Builders Ltd. throughout the construction process:

- They migrated from QuickBooks as generic accounting software to "Sage 100 Contractor" construction management software that allows them to integrate their field operations with their back office to keep track of costs, budgets and manage proactively by projecting schedules and costs. "...It has ensured that we stayed within budgets on 95% of our projects and that has gone a long way in building our reputation..."
- SagePro estimating software enables them to be more accurate in their estimates and more cost-effective and responsive in the bidding process. "...At the start, estimation was one of our weaknesses....Contracts are written on the basis of estimates and if we estimated too high we're uncompetitive, and if we estimated too low, we did not have the capital or capacity to absorb losses as did larger companies."

## PRIMARY BENEFITS OF USING ICT IN THE CONSTRUCTION PROCESS

Stevens believes that their active use of ICT throughout the construction process has enabled them to realise all of the following benefits:



- Greater efficiency and cost-effectiveness in their operations
- Competitiveness in winning bids both in terms of responsiveness as well as being perceived as a modern, tech-savvy professional operation
- Efficient execution of construction projects, on-time and within budget
- Effective use of construction materials and reduction of waste

However, for her, by far the biggest impact was in how they were perceived by the market. *“...By virtue of our use of technology, we were able to get a foot in the door, and give ourselves a chance in the industry.... When you’re up against bigger companies with 15 project managers, there has to be something distinctive to level the playing field. Once in, we were then able to use that opportunity to demonstrate our efficiency and productivity and build our reputation....”*

A significant unintended benefit arose recently due to the fact that all of their software, such as Sage 100, are Cloud-based and all their documents and files are stored in the Cloud using One-drive. *“...It saved*



40 employees, carrying out a range of commercial and residential construction projects for local and international clients. They own the only fully computerised concrete batching plant in the BVI and, in order to spread their overheads, are now pursuing growth opportunities in other construction markets within the region and are mobilising their own real-estate development projects. Stevens believes their rapid growth

has been facilitated by deliberately embracing modern technologies in their construction business, not only because of the modern, tech-savvy differentiation that it creates with their clients, but also in enhancing the agility, responsiveness and operational efficiency of their business. According to her, *“...In the construction industry in the BVI and throughout the Caribbean, the future hinges on us being able to incorporate technology into the construction process; if we are going to attract investment, and withstand the external companies competing with us in our own markets, it is an absolute imperative that we become technology-ready, or else we die.”*

As we concluded the interview, conducted at the offices of MSBM, Stevens left to process her payroll and pay the workers at their various construction sites in the BVI via electronic deposit to their bank accounts, before heading off to her next class. ■

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*us thousands of dollars after the devastation of the severe hurricanes that affected BVI, because all we had to do was replace the computers that were damaged; we did not have to bring in any technicians, and we were up and fully functioning very quickly after the event...”*

### ICT-ENABLED GROWTH PROSPECTS

Today, Creative Builders Ltd. is a medium-sized construction and real-estate development company, with more than

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