LINES, CHAINS AND OTHER (RESTRAINT) DEVICES: Revisiting Porter’s Value Chain with A Malaysian Case Study In The Implementation Of Electronic Tendering For The Construction Industry

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ABSTRACT

This paper examines the validity of Porter’s Supply Value Chain if applied to eCommerce in general and e-Tendering in particular as a solution for modern construction procurement. It is set in the context of an IT-led construction tendering initiative soon to be implemented in Malaysia, the National ETendering Imperative (NETi). NETi integrates and bridges some operational process and components of the entire construction tendering supply-chain onto an electronic or digital medium to transcend geographical, time, economical and people-based error and inefficiency barriers, making it faster, more efficient and more profitable for all the players in the industry. Online or e-tendering is a good test subject for validating the IT/Construction Business connection, because it has been met with mix responses in other implementation projects recently like in the USA, UK, Japan, Singapore, Hong Kong and other countries. By highlighting the need for good governance, one of the focus areas of the paper is to examine how business and process protocols integrate in e-tendering effectively.

Keywords: I.T. in Construction, Tendering, Ecommerce, Value-Chains

INTRODUCTION

“IT Solutions For Your Business Problems”. A common tagline for IT providers, vendors, and even government authorities in touting for a move towards more automation and so-called collaboration opportunities that can be brought in the IT era. Sounds evangelistic? Well, not quite. For some, this has been proven true as new and streamlined work processes starts to increase productivity and accuracy in day-to-day work. For many though, the purchase of expensive “systems solutions” has not generated value to their organization, changes in works has instead garnered dissatisfaction and distrust within users, all at the detriment of its sole cause – the business. So is IT a real solution to all business ills? This paper examines the validity of the claim through an analysis of an IT-led construction tendering initiative soon to be implemented in Malaysia. Online or e-tendering is a good test subject for validating the IT/Business connection, because it has met with a mix of responses in real-life implementation recently like in the USA, UK, Japan, Singapore, Hong Kong and other countries. In some, like in Hong Kong, the programme itself had changed fundamentally after strong industry consensus, in others like with the CALSEC programme (Japan), it has been touted as a new patch for inter-country collaboration with the introduction of new standards and protocols. Some had been industry/contractor driven (Singapore), others client driven (e.g. Tesco – UK). Perhaps after all, we have found a new elixir – or have we really?

INDUSTRY BACKGROUND

Now is a good time as any for a revival of enhanced levels of transparency, efficiency and collaboration in construction. There is beginning to be a gradual liberation of global trade in this industry brought out by the new developments in the General Agreement on Tariffs and Trade (GATT) and the General Agreement of Trade in Services (GATS) from 1993 onwards. There have also been new developments in easing trade restrictions like a
reform in construction procurement by over 20 countries agreeing towards a “Government Procurement Agreement” initiative which came into force in 1996. Nevertheless, the objectives of the tender system in construction even in the global context remains unchanged, that is to devise a most efficient framework to select capable contractors who can complete the construction project within set parameters of time, money and quality.

Within this changing environment, construction procurement needs to be modernised to face its new challenges. The usual way of choosing, selecting and appointing a contractor through a tendering process, (that is simply the acceptance of an offer of price along some prescribed project conditions) must be streamlined. Also termed as “bidding” or “bid process”, the common process is that contractors will be invited to place their offer after reviewing the details of the project (drawings, specifications, requirements, etc.) and conditions attached (time, security, performance, etc.). The employer will then be in a position to choose between the contractors’ bids, in turn accepting the tender offered to him.

Although heralded as one of the cornerstones of business process improvements in the last decade, there has always been some uncertainty on how to implement this model across countries, industries and business networks. Often it is the debate on what is actually the distinguishing feature of a “supply-chain” against a “value-chain”. A common approach to these two is to think of them as one of the same genre. If a supply-chain is defined as the link of activities or process from production by a manufacturer, then the creation of a profit margin at each

**IT IN PORTER’S VALUE-CHAIN: SUPPLY-CHAIN MANAGEMENT WITH A TWIST**

“Bid/Tender Process Re-engineering” - the transforming face of construction procurement is not a new phenomenon. Procurement, being defined as one of the support activities in a value-chain has undergone considerable changes in the last decade. One of them are process re-developments according to the lines of what is described as a Value Chain Model. The term ‘Value Chain’ was used by Michael Porter (1985) to identify the activities organizations perform and links them to the organization’s competitive position. An input-output equation if you will. It clears ideas and concepts about business planning by combining ideas from the minds of business architects, logistics experts, strategists and operational researchers alike. (Diagram 1)

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![Diagram 1: Porter’s Value Chain Model](image-url)
For the last 20 years, that is the prevailing objective of many businesses – construction not excluded. Simply put, it is the quest to build an effective supply/value-chain to increase competitiveness. The movement has a continuing interest with technology development as well; with today’s IT developments, this value-chain planning has spurned out what is often called “integrated planning supply-chain” most commonly implemented in Enterprise Resource Planning (ERP) database applications to drive the same objectives. Often linked with E-Commerce, both, say some technologists are inseparable – that success can be achieved by molding effective linkages in the enterprise supply-chain. Of course their easiest target would be to renovate and reinvent the “procurement” activities of businesses. Why? Because if procurement is the main insertion point of linkages in the chain it goes without saying that improvement in the procurement in any industry, organization or business will improve its overall competitiveness.

A simple equation:

\[ \text{Procurement + IT/ERP = Ecommerce/ETendering} \]

Hence,

\[ \text{ETendering = Improvements in Value = Effective Supply-Chain = Competitiveness = Successful Construction Industry} \]

Perhaps this is a simplified view. With IT facilitating procurement – Ecommerce, if you will, the value-chains are not as clear cut as it was first thought. The IT-enabled Value Chain analysis describes the activities within and around an organization, and relates them to an analysis of the competitive strength of the organization. Therefore, it evaluates which value each particular activity adds to the organizations products or services. This idea was built upon the insight that an organization is more than a random compilation of machinery,
Now, if the Ecommerce secondary activity is further broken down into its sub-operational components using the standard definition of primary and support activities – (Porter distinguishes between primary activities and support activities. Primary activities are directly concerned with the creation or delivery of a product or service. They can be grouped into five main areas: inbound logistics, operations, outbound logistics, marketing and sales, and service. Each of these primary activities is linked to support activities which help to improve their effectiveness or efficiency. There are four main areas of support activities: procurement, technology development (including R&D), human resource management, and infrastructure (systems for planning, finance, quality, information management etc.) – the value-chain standard becomes even more diluted with too many interconnecting activities.

Let’s look at this argument from a Malaysian Ecommerce Supply Chain case study in Diagram 3. Malaysia’s Ecommerce environment made up of facilitators, payment enablers, community generators, services and many other entities. More of a Value-Network instead of a Value-Chain. Therefore if construction procurement is to succeed within the Ecommerce technical advances, a different approach must be taken to stimulate efficiency within all points of the value-chain node. It is not simply the adoption of ERP – but a change of direction across-the-board – of theory, of implementation; of business, of government affirmative action.
IT PARADIGM SHIFT: THE CONTRACTOR’S DILEMMA

It is also worth noting that until now, conventional IT focus has been aiming to strategically reduce “cost drivers” in the industry by eliminating unnecessary costs, requirements, processes and duplication. These were postulated to be possible by focussing on:

(a) Improved operating philosophies and process simplification.
(b) Critical review of technical requirements and specifications.
(c) Change from adversarial to an integrated mindset.
(d) Adoption of cost effective technologies like 3D/CAD.
(e) Streamlining procurement processes.

These measures were thought to be able to be implemented by all levels of the industry with IT acting as a catalyst to change. It is thought that this shift in working paradigm can be translated in a straightforward manner across the contractor’s

![Diagram 4: A Conventional Input-Output Model For IT Initiatives](image)

production line to produce lower cost project (production outputs). In short, IT will act as a driver (leader) whose advancement will inject larger movements down the production chain as depicted in Figure 1 below:

PORTER REVISITED: ETENDERING AND A NEED FOR A MALAYSIAN AFFIRMATIVE ACTION

There have been some initiatives worldwide for e-Tendering in construction, as illustrated in Table 1. Some has been successful while others have fallen prey to poor implementation results. For Malaysia, it is no different. Whist there have been many private-based initiatives but nevertheless, the implementation of information and communication technologies by businesses in the construction industry has been very slow relative to other industries. Statistics show (MERC, 2000) that the construction sector have not improved its capitalisation of such new technologies to bring about more productive outputs. For the moment the capital-to-output ratio had risen from 3.0 in 1988 to 6.5 in 1997, suggesting that the use of capital, including I.T. related spending has been increasingly less efficient. There has been little implementation of I.T. related cutting-edge advances in design and manufacturing systems locally.
Table 1: International Comparison Of Government Electronic Construction Procurement Systems (Adapted from Liao, et. al 2002)

<table>
<thead>
<tr>
<th>Country</th>
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<th>Functions</th>
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| USA     | FACNET                                  | • Announcing governmental procurement opportunities  
|         | FACNET applies to open procurement processes if simplified procurement process requirement is met | • Providing related governmental procurement information  
|         |                                         | • Accepting bidding electronically  
|         |                                         | • Processing online payment towards contractors  
|         |                                         | • Collecting related governmental procurement information  |
| Canada  | MERX                                    | • With built-in procurement matching system, contractors can be informed immediately with appropriate procurement cases and receiving related information  
|         | MERX applies to open and limited procurement processes | • Accepting bidding electronically  
|         |                                         | • Providing documents to contractors, confirming orders online and inquiring buyers’ ordering history  |
| Australia | Transigo                                 | Providing online procurement information, bidding processing, government procurement handbook and application from government procurement contractor registration |
| Singapore | GITIS                                   |                                                      |
Moreover, despite a doubling of computer ownership in the last five years, studies have showed (SIRIM, 2003) that local contractors had simply used IT to automate existing processes. Perhaps in the fragmented nature of the construction industry at present, no single organisation can dictate and therefore be responsible for establishing and maintaining the necessary communication networks for a construction project. Consequently, this industry sector is faced with ineffective communication and information processes, which have inadvertently contributed to project cost and time overruns.

Why? One answer, which came to light during a national survey commissioned by the Malaysian Economic Planning Unit (SIRIM, 2003) was that although over 80% of the construction industry had said that they “cannot manage without IT” and that “IT contributed significantly to their operations”, over 90% of respondents wanted the Malaysian Government to take the lead in strategic directions and applications. A “Top-Down” implementation policy was also favoured by the respondents in the Malaysian construction sector.

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<td>Supplying information such as government procurement announcement, item category, construction category, procurement institution and location announcement publication date, application deadline, bidding winner announcement dates and procurement dates</td>
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These findings show that the Malaysian construction sector differs somewhat in its readiness for e-commerce and full scale IT implementation. While some research in suggested behavioural barriers must be overcome as a first priority, other research focussed on strategic awareness, re-examination of business relationships, supply-chain collaboration evaluations, project coalition buy-in and emphasised the building trust, interdependence and bargaining power for successful re-engineering implementation (Alsagoff, 1996)

Instead, the Malaysian study has given the government an affirmative action to lead the construction industry in IT adoption. It enables the government to feel the pulse of the industry and hence becoming more responsive to industry shifts. There seems to be an underlying awareness that today’s IT enables the industry to become more networked by providing the possibilities to communicate, coordinate and collaborate with external stakeholders with greater efficiency.

**NETI AS A GOVERNMENT LED INITIATIVE**

Following the needs of the industry, a clear direction, for instance the issue of A GOVERNMENT DIRECTIVE from the government is necessary. For its successful implementation, initiatives shall then take the micro-projects approach as a strategy, to leverage on an implement-via-use and produce a quick benefit return model. This not only ensures support, ownership and relevance, but also produces maximized and immediate returns for the effort.

With these objectives, a taskforce under patronage by the Ministry of Works (MoW or “KKR”) Malaysia conceived an initiative for e-tendering or NeTI (National ETendering Initiative). Taking stock of the industry’s needs and national aspirations and armed with case studies from similar government backed initiatives, the National eTender initiative (NeTI) promises to integrate and greatly improve on the tedious and multi-faceted tendering process into a streamlined, progressive and ‘intelligent’ one by use of procedural streamlining and technology empowerment. What distinguishes NeTi from her other international counterparts is that it is designed to integrate with the Malaysian eGovernment Flagship as a 2nd tier infrastructure to like up and interface with all other agencies for construction procurement and tenders as well as project management. By doing this, as illustrated in Diagram 4, NeTi synthesizes all aspects of pre, during and post tender processing for government projects as well as private-based projects; providing not only integration but also streamlined processing of all data and payment directly.
New awareness for a closer examination into IT success has prompted work from different perspectives instead of mainstream strategic areas. Technology adoption and utilization in construction for Malaysia is evolving from the infancy stage and poised to enter the 'growth' stage in the coming years. According to an IT Masterplan for Malaysia (ISIS, 2002), as the Malaysia government progress to the new phase of ICT deployment, it is focusing more and more on the systematic alignment of people, policies, processes and technology. The technology investment constitute only the small portion of the total investment in the initiative, as more resources and time are needed for the soft elements e.g. policies, skills, culture, governance. Therefore we are left with policy, process, people and technology variables in the hunt for the three main objectives of construction tendering (Diagram 2). IT “solutions” typically focus on the process (Workflow re-engineering) and Technology (security, architecture, etc.) but not the qualitative measures of Policy (laws, regulations, standards, etc) and the People (users, knowledge implementation, trust factor, etc.)

For construction ETendering, it is no different. A full scale integrated environment is currently being implemented in phases to deploy IT into the Construction Value Chain (Diagram 6) – NeTI.

Diagram 6: The NeTI Integrated IDEF0 Model
CONCLUSION

Have we found the elusive elixir for construction business ills in e-tendering? Well perhaps it is more of a dichotomy of solutions. On the one hand, IT will truly improve communication and make work more efficient and most importantly make people collaborate more, judging from the implementation across and within countries recently, whether it has been a success or not. One outlook is apparent though, the industry is more and more aware of the need for group effort within itself over and above the “fragmented” label it used to carry as participants scour for more business across blurring country borders. For Malaysia though, having recognized and learnt from others, it is more of implementing a pathway to better “Value Networks” by collaboration and more knowledge intensive communities with the government as catalyst. IT is one but not exclusive source of transparency, efficiency and value. Perhaps we were looking at the wrong tier solution. Is IT a supply-chain solution or a value-chain component? Or is it a totally different being? One that resides in between islands of different Value-Networks? What is clear now, IT is a 2nd tier solution as it is a mere catalyst to 1st tier solutions of better standards, improved communication and more acceptable laws – those are the true elixirs to business problems - not just Porter’s Value Chain Model anymore.

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