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Construction IT and the ‘tipping point’

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Abstract

Using the “tipping point” as a metaphor, the paper argues that the construction industry is ready to reap the benefits of using information technologies. Construction IT as an appropriating discipline is enabling us to have devices to speculate about designs, to have innovative modes of collaboration, communication and practice. “Virtuality” is the password for construction professionals to cross over into the experimental realms of installation and operation. The paper identifies the ingredients needed to ‘tip’ the balance for an accelerated penetration of information technologies into the construction industry. Core technologies are described as the prime mover of radical transformation in the construction industry.

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1. Introduction

Malcolm Gladwell [1] in his international best seller entitled ‘The Tipping Point’ identifies a phenomenon whereby an activity or a technology suddenly emulates the kind of behaviour that we see when we talk of an epidemic in medical terms. It is a significant point in time when there is a dramatic moment when everything can change at once. The situation moves from incremental to revolutionary change in what appears, to the observer, a very short space of time. Gladwell attempts to identify three

characteristics required for this phenomenon. Firstly, contagiousness where the concept or idea suddenly becomes the accepted wisdom and produces a new paradigm which the vast majority follow. Secondly, a period where little causes can have big effects and thirdly, where change happens not gradually but at one dramatic moment. He applies this to many instances where social behaviour becomes revolutionary but the same can also be said of technology.

It was the introduction of the personal computer which suddenly made the power of that computational machine available to the masses which in turn led to changes in communications and the way people undertook many of their normal activities whether it be leisure, communication with friends, purchasing travel tickets or discovering knowledge. The world

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changed in the space of less than one working lifetime to something quite new. Partly it was contagious as the word was passed on as to what this technology could do for the everyday life of people and once imparted it was difficult to stop: partly it was the fact that a relatively small but significant piece of software, the Internet, enabled people to access knowledge and interact with it through the machine at their office or their home; partly it was the dramatic possibilities which were seen, suddenly, by so many, that help create a critical mass of activity which brought the investment, intellectual capital and imagination to produce the Internet we have today. Of course there were many factors which aided and abetted the change but viewed from a distance these major drivers created an epidemic in human behaviour which still continues today.

2. The tipping point for IT in construction

So what happened to the Construction Industry and the application of Information Technology? Here is an industry which appears ripe for reaping the rewards of improved communication. It requires vast stores of interdisciplinary knowledge. It needs visual imaging of a finished product and simulation of performance because the cost of physical prototyping is just too prohibitive. It demands quicker and better means of connectivity because of the geographical distances between its participants.

The recent short-term forecasts for when the industry might get its act together, e.g., when its supply chain will come ‘on-line’, have all proved much too optimistic. There have been significant mini epidemics, for example, when contractors of all sizes suddenly found the benefit of the mobile phone to communicate in a difficult, distant and often dirty and noisy environment. The industry was one of the first to take this particular technology on board in a big way. But what about the big changes where collaborative working in design, manufacture and operation are seen and exercised through a virtual model for the benefit of all stakeholders in the process: where remote sensing and control allows machines to manage and direct activity in what are often hazardous environments: where ordering and purchasing all resources can be done electronically:

where it is possible to ‘try before you buy’ and know what you are going to get and why.

The industry is sometimes described as the worlds largest, but here, you see this great industry locked into its craft technology which in principle has not changed for millennia. The management has become more complex, certainly, and so have some of the physical structures. In many cases, they could not be built except for the support of computer technology. However, the wide scale adoption of the machine to harness its power in a way that can be seen in, say, the aircraft industry, is just not in place despite the excellent aspirations and investment made by enlightened clients such as British Airports Authority. Where there is movement, it comes from collaboration between individuals such as the way in which the Frank Gehry Partnership has worked with Dassault Systems to adapt software originally designed for aircraft design to meet the aspirations of one of the world’s great architects. It is interesting to see that in this case it was another industry that provided what was needed to achieve a new free form structure which has excited the world.

These breakthroughs are relatively minor outbreaks of a benign driver which pave the way for what might be. The epidemic is still to come. There are signs that mass breakout is possible soon and this volume of papers spells out through the work of some of the ‘thought leaders’ in the field what is happening, what might happen, what should happen and what should definitely not happen! Although the term ‘thought leader’ seems to have Orwellian overtones, it does capture one important aspect. It identifies the power of thought and the imagination to provide visions of the possible which provide the first ingredient of the ‘tipping point’, that of contagion. So what of the other two ingredients? If we can identify little causes which can have big effects then we may be well on the way to radical change.

A view of the industrial/social world we live in would provide us with the following trends which coming together might provide the spark for ingredient number two. As with all epidemics, it is impossible to predict but somewhere in the soup of ideas and developments lurks a minor change which will revolutionise the way the construction industry works.

- *Convergence*: The last decade has seen a massive change in digital technologies which has seen all

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