Project Management in the IT Era

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ABSTRACT

The author has been concerned with the development and application of computer management systems for the construction and allied industries for more than a decade.

Based on that experience the evolution of IT based management systems is traced over that period. The present state of development is examined and an attempt is made to look forward to the possibilities which are becoming daily more apparent.

In particular the role of the Client and his increasing involvement in the process is discussed and examined and the effect of the growing demand for quality control in performance and product, through IT systems is discussed.

Key Words

Project management; IT; client; on-line real time

Introduction

IT is the child of the computer. The computer tool continues to increase its power and capacity almost daily, simultaneously, costs of installations and maintenance charges continue to decrease.

Combined with a growing range of applications and an expanding base of skilled technical users, plus robustness, portability, increased storage, speed of retrieval and reporting, we have reached the stage of realising the IT promise.

To be effective the desired objectives that must be achieved are:

* Information should only be created once by the appropriate participant or software system.
* Authorised recipients should receive appropriate access to information however generated, through security for re-use in accordance with pre-set contract obligations.
* Information should be transmitted on-line and in real time, with the recipient being advised whenever a transaction involving them has occurred;
* Programs mandatory procedures, generating automatic transactions resulting from original or re-used information.
* All transactions between parties should be executed through a central data base.
* All transactions should be audit trailed, showing originator, recipients,

action required, date created, date required, date completed and any other pertinent information.
* Non-conformance by default reporting procedures.

In an attempt to create the IT environment the original approach was to provide integrated solutions dealing uniquely with the various industry specialists. Systems were developed and provided to Architects, Engineers, Surveyors, Contractors, Sub-Contractors and Suppliers. It was expected that the parties whilst dealing with their specific problems would see the benefits to be achieved by communicating with other participants whose systems were compatible and accessible.

Whilst this appeared logical at the time, experience showed that to expect voluntary consensus was to ignore human nature. Convinced of the superiority of their existing systems any compromise for the common good was usually rejected. Paranoia regarding the ownership of and access to "their" information played a major part in refusing information transfer opportunities.

An external force was required to be brought to bear if the benefits of IT were to be made available.

That force is the Client.

Project Management Yesterday ?

Except for Time Control the use of technology by PM to date has been fairly restricted. The PM's principal activity consisted in setting up procedures designed to collect information from those other members of the team responsible for procurement, design, cost, quality and implementation. The information generated was collated by the PM and re-presented to the Client.

The PM by necessity, had to accept the veracity of the information supplied, despite knowing that it had been filtered through politically motivated defence mechanisms created to defend the participant in what traditionally has always been a 'grace and favour' patronage based industry, one not primarily concerned with quality.

In his turn the PM presented his version of events to the Client sanitised to minimise aggravation and to deflect possible blame or claim.

To handle the IT requirements at this level of management, the PM adopted prototype screen surface tools such as spreadsheets, word processing and desk top publishing and in-house generated devices.

For time control, the PM profession implemented PERT and CPN methodologies by utilising commercially available software.

Whilst the profession generally recognises that information flow is the major problem facing them, this need is not well addressed by the above methodologies.

One reason for why PM have been relatively slow to develop IT to its potential could lie in the lack of a consistent definition of the role. Engineers, Architects, Quantity Surveyors, Contractors and other professionals have historically defined

status and job specification, whereas each PM organisation offers different definitions of what constitutes a PM service. The lack of such definition has inhibited the construction of a suitable system.

The Client

Is the Client satisfied with the current quality of management provided ?

A survey of Clients could be expected to reveal a large credibility gap between what the Client wanted and what he received from the Industry.

The never ending stream of methodologies and procurement processes each hailed as being 'the solution', are initially eagerly embraced by Clients, demonstrating his lack of faith in past performances.

It is a sad commentary that Clients generally expect to be disappointed by the Industry, worse they often expect to be cheated, neither getting what was promised in quality, time or cost.

How does the Industry view the Client ?

In some ways the Client can be regarded as the invisible man. They are not expected or encouraged to take too much interest in the process and should appreciate that their main function is to pay the amounts certified, be happy with the quality of product, whenever it is produced.

The Industry appears generally oblivious to the fact that to be in the position to control the finance required to enter this high capital, high risk business of building, most Clients must be successful and street wise individuals in their own businesses. As such, they would be well versed in contractual obligations, promises and failure to perform.

However, most Clients find themselves as non-technical participants in an Industry which utilises almost every facet of our society, is itself a morass of documentation, information, cross obligations, specialists, processes and procedures. No wonder then the Client usually proves to be an easy if quite often an infuriated victim.

Why is this and can it be changed ?

Project Management Today

IT will only come into its own when it is a pre-condition by a Client as a requirement for the management of his project. Systems that do not provide the Client with more protection and fail to integrate him into the process will increasingly be discarded by him.

Clients are realising that when making the initial appointments they are in a powerful position to set out the conditions of engagement and to insist on the systems to be adopted by the parties.

The device that is required to be provided by PM is one that allows the Client as a non-technical participant to utilise IT to monitor the quality and performance of all those parties to the process, to be informed whenever a failure to perform has occurred and to be promptly advised of the likely consequences to themselves.
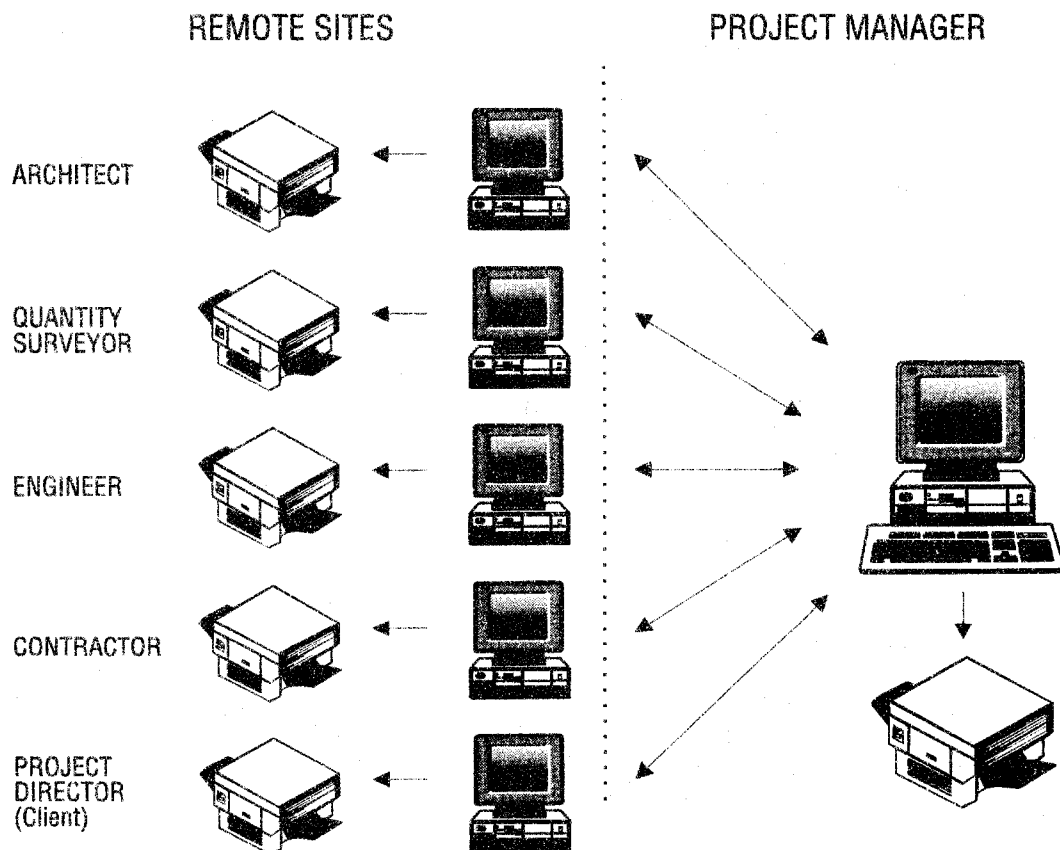
The value of such a device is not restricted to the Client, all parties to the project benefit by being involved in a managed process, where all transactions are audited and recorded. So the performance of the Client is as much under scrutiny as any other party.

Our experience already indicates that where such a device is available the Client is enthusiastically adopting it.

Total Project Information Management

Approximately 3 years ago we produced our first integrated, multi disciplinary on-line real-time management system designed to incorporate the IT opportunities and to maximise the benefits of integrated management.

We named the system "CLIENT", being "Computer Linked Information Exchange Network Technology".

REMOTE SITES   PROJECT MANAGER

ARCHITECT

QUANTITY
SURVEYOR

ENGINEER

CONTRACTOR

PROJECT
DIRECTOR
(Client)

A typical CLIENT network

Individuals, disciplines and organisations providing the necessary diversity of skills, operating from terminals remote from each other are brought together as interactive contributors through a central database. This provides the foundation for exercising greater discipline on the whole team, informed decision making, and a framework for a quality system.

Information is distributed in real time to uniquely identified recipients, setting in motion contractual processes, obligations and responses with transactions audited through the system facilities.

Access is controlled within agreed limitations by a security system which sets parameters for each user.

With on-line real-time distribution of information, management is provided with the ability to implement a pro-active system, enabling forecasting, trend reporting and problem prevention rather than reacting to problems that have occurred. Management leads the project momentum rather than being carried along by it.

A feature of the system is default or exception reporting, where the mutually agreed performance parameters are monitored by the reporting of failure to meet identified obligations.
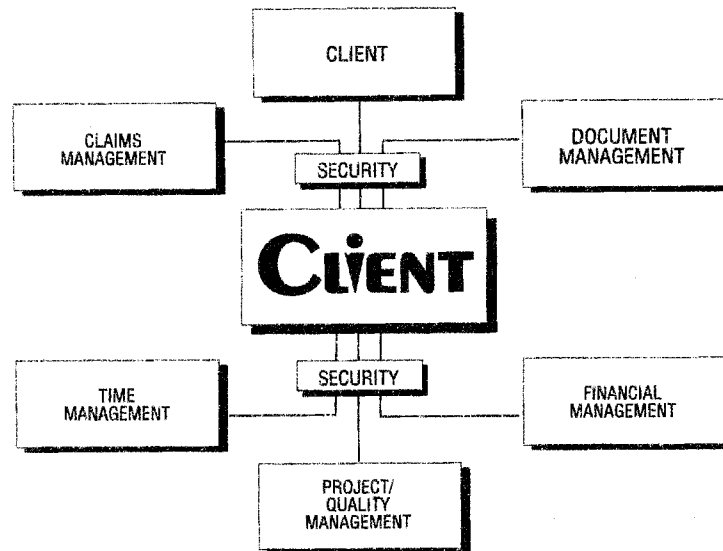
CLIENT - The Integrated System.

The system provides the following features.

Information Management

Information generated by formal and informal transactions between the parties are recorded with date, originator, respondent, status, performance requirements, keywords and other significant information. Subsequent tracking and audit trails can be generated to recreate historical environments and facilitate the settlement and resolution of claims thereby minimising legal disputes.

Direct access to information and records is available to authorised participants resulting in reductions in administration costs.

Process Management

Within the various modules the user is provided with features that **manage** specific procedures, time scales and individual obligations established to conform to the agreed contractual obligations. For example, Contract Adjustments procedures will determine who may create/amend/view all or any of the information created, which of the parties must provide financial, time or budget information, etc. and within which time scale. Similar procedures exist in other modules.

Communication Control

Correspondence; Fax; Phone; Verbal - The system recognises two types of communication, firstly that originating from parties not connected to the system and secondly communications generated interactively through the system.

Both types are sequentially numbered and registered on the system, identifying originator, recipient, dates, subject, contacts and category. A file reference option is provided to identify the physical location of any document, such reference point is anticipated to be used for retrieval of OCR and/or imaged documents.

Individual communications may be assigned for action by any of the parties and such actions will be managed by the procedures.

Organisational standard letters can be set up and managed by the **standard templates** option procedures.

Cross referencing and key words are available on any actions generated through the correspondence option.

Correspondence may be searched at any time for items relating to a particular subject, or items containing a keyword or key-phrase in the contents description. Searches may also be for All, or for a particular recipient/sender.

Object Management

Documents; Samples; Prototypes - The object management module provides control over the issue of documents or objects such as drawings, shop drawings, samples, specifications etc. Information is provided regarding production, amendments and the distribution of documents among the participants to the

contract. It tracks design document production and the approval process against targets.

Standard Templates

This module is provided to enable users to create the numerous standard forms, reports and documents required for administration and management purposes.

The format, layout and graphics of each template are user defined. Variable data fields which control the input and output options for each type of report are also user defined.

Whilst hard copies are produced for physical transmission, all authorised recipients are immediately advised through the **email** option whenever a standard document has been completed and their **status** report is also updated. Such recipients have the option to view or print out a copy of the document which will display only that information the recipient is entitled to access.

The obligations of recipients with regard to transactions on standard templates can be established giving the system the ability to implement default reporting procedures, thus maintaining quality principles.

Project Documents

Briefs; Specifications; Conditions of Contract; Conditions of Engagement - This facility is designed to facilitate the management of these documents which form the contractual basis of the project or process arrangements.

Conditions of Contract, Conditions of Engagement and/or Employment, Project Briefs, Standard Specifications and other industry standards can be established in the user account and then transferred in whole or part into each project.

Amendments and changes are controlled and recorded through security.

Only authorised parties having access to the original project document and to the current amended version, together with a trail of identified changes.

Cross referencing and key words are available on all project documents.

Financial Management

Budget Management; Variations; Progress Claims - This module provides for the management of financial transactions and deals with original budgets, estimated rise and fall, budget transfers and scope changes and provides a current commitment statement by recording the actual transactions such as let contracts, PC Sum expenditures, agreed rise and fall, contract adjustments, scope changes and cost risks plus the unlet balances or cost checks.

Time Management

The Time Management facility offers the opportunity to create networks or to directly input or download from proprietary systems such as 'Primavera'.

The system is used to monitor and archive the revisions occurring to the contract network. The module provides control of the activities and their related resources, cash flow requirements etc. and comprises a critical path network system.

Facilities also include activity resource allocation and histograms.

Information on time delays is created under the system and procedures implemented to manage the consequences of potential or actual claims.

Space Management

The Space Management Module is provided to allow for the control and usage of space. A register of details relating to land, buildings, departments, rooms, work stations etc. is created, which identifies staffing, space sizes, finishes, fittings, services and loose furniture and equipment for each space. This register can be created as a design budget which is then monitored against the actual design.

Quality Management

Non Conformance Register - This facility is provided to manage the processes of identifying, describing and rectifying departures from the contractually agreed quality standards. It is applicable to various stage occurring through the design, construction, defects and asset management processes.

Non-conformance items arising from design reviews, tests, trials, inspections, client complaints or quality audits are registered, showing originator, respondent, dates, locations, priorities and a full description of the defect.

Future

In the three years since we produced our first prototype the acceptance by Client bodies has accelerated. Major developers in Australia, Singapore and Hong Kong have purchased and installed CLIENT as their PM system. Government authorities in Hong Kong and Australia are using it on major projects. To date approximately S$2 billion of projects have been or are presently being managed through this system. The recognition by Clients has been almost instantaneous, whilst they may not have the technical know-how of our industry, always remember they are businessmen who understand contractual obligations and rights.

Two developments have already emerged from the CLIENT product. The first is a further expansion into the industry vertical market and concerns the development of a fully integrated IT system for Government construction authorities. With CLIENT as the management core we are developing a completely integrated system embracing all IT facets of their business.

The other opportunity is initially being exploited by ourselves. We have installed

CLIENT as our in-house quality and business management system, with very encouraging results. We believe that we have created a business toll with far reaching applications irrespective of the nature of the business concerned.

Conclusion

What is required today is a new view of PM. That is, PM must be concerned and involved with the management of the total process, to lead in the achievement of a quality product by providing quality management.

Utilising the computer IT procedures offer PM the way to fulfil their own and the Clients objectives at the same time providing their profession with the tools of quality.

The participants in the Construction Industry must face up and adapt to a realignment of traditional practices, changing relationships and procedures and methods with a consequent redistribution of historical responsibilities and accountability.