Leveraging ICT Strategy for Malaysian Facilities Management

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1.0   INTRODUCTION

The emergence of the new economy has created a new dimension for leveraging Information Communication and Technology (ICT) Strategy in facilities management (FM). Consequently, the Focus Group of FM Strategic (UM-CREAM) reaffirmed the importance of ICT and instructed the sub-group of leveraging ICT under the UM-CREAM research to conduct a workshop on a Leveraging ICT Strategy for Malaysian FM to respond to the challenges of the new environment. Ideal FM software is an integrated system that permits the management and operations of all the activities in a complex facility. A single point access to coordinate all the activities needed for the smooth operation of the facility. The Building Management System (BMS) should be tightly integrated with the FM software so that operations of building systems are also possible through the FM interface. An FM software is a:

- Management Information System (MIS) for facilities managers. It is a repository of information that allows the control and maintenance of the facility. Information stored in the system includes building geometry and properties as well as equipment details.

- Work flow automation system. It should permit smooth flow of information

through various stages of performing tasks related to the management of the facility. The scope of ICT use in FM generally is diverse and covers: strategic management, building and engineering services management, environmental management, domestic services (such as cleaning, security and utilities supplies), administration and services support (Construct IT, 1997). The main roles and responsibility of facilities manager is to facilitate and enable their clients on focusing to their core businesses while facilities manager taking care of the service function which support them. Thus, FM can be seen as a strategic issue to its recipient. The demand from the clients is also increasing and become more complex that lead FM roles to be embedded and move into core operational functions of clients. In relation with this scenario, ICT is potentially seen for reducing the costs and increasing service level and quality.

This workshop was conducted *to explore and investigate the current practice of FM in Malaysia on how it is maximizing the potential of ICT as tools to support their service function and also to propose the strategic approach of ICT implementation in the organization.* The participants in this workshop comprised of major Malaysian companies involved in the FM business, either as clients or service providers.

2.0   OBJECTIVES OF WORKSHOP

1. To discuss the form of strategy, policy and procedures for the development of ICT in FM in Malaysia
2. To identify the type of ICT applications used for FM organization
3. To determine the level of maturity in the ICT utilization in FM
4. To discuss the development plan of BIM training program
5. To establish a framework on strategic approach for ICT utilization in FM in Malaysia.

2.1   WORKSHOP PARTICIPANTS

The Construction Research Institute of Malaysia (CREAM) / Construction Industry Development Board (CIDB) have invited a good cross-section of stakeholders who were primarily involved in facilities management (FM) to participate in the workshop. 55 participants attended the workshop, of which 53 as listed below together with their affiliations actively contributed to the deliberations and discussions. They came from diverse background in the FM profession, representing the universities, government agencies, FM practitioners and FM consultants. To facilitate cross-fertilization of ideas, the participants were divided into five (5) groups, with each group with a good strategic mix of participants from various organizations and background to avoid "bunching" of participants from the same FM segment.

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Working Group Members Paying Attention to the Presentation

Lively and Passionate Discussions during the Workshop

2.2 Workshop Proceedings

The participants started with the first objective to identify the strategy, policy and procedures Leveraging ICT Strategy for Malaysian Facilities Management. They were provided with current issues, strategy and policies and procedures. For the current issues, there is still lacking of ICT used at environment management and strategic level. Reason for this include the reluctant to invest heavily into integrated ICT, FM system is not normally put in place upon the handover of the building to the owner and lacking of strategic approach for ICT utilization in FM.

To overcome the problem, they provide a number of strategies that can be applied. The proposed strategy is to impose a penalty to the organization that does not apply ICT in FM. The government parties must have a policy for implementing ICT in FM. They also suggested developing a group of skilled personnel to apply ICT in FM. In addition, they also recommended the need to adopt with the relevant syllabus through close collaboration with the industry, give extra points for GBI rating, tax relief, funds for private organizations to implement BIM in FM, and other promotion activities and road shows can be organized to create awareness about the benefits of ICT in FM.

As a conclusion to the first objective, they suggested that the formulation of policies and guidelines should be done in collaboration with the JKR, Construction Industry Development Board (CIDB), universities and industry. Economic Planning Unit (EPU) should play an important role for planning permission for the implementation of BIM in FM.

The participants then discussed the second objective of identifying the type of ICT applications used for FM organization. The discussion revolved strategic management, building & engineering services, environmental management, domestic services and administration & service support. They propose the best management tools for strategic management in Malaysia.

The discussion for the third objective, that seeks to determine the level of maturity in the ICT utilization in FM. Construct IT, Salford University, UK concluded that there are five

levels in the Level of Maturity frameworks such as Integrated (Level 5): Strategic (Level 4): Planned (Level 3): responsive (Level 2): occasional (Level 1) and Not User (Level 0).

Each level shows the different stage of ICT use in FM. It starts with level 0 which is not supported by any of the ICT, level 1 using the traditional paper method, level2 to assist in managing properties in the business portfolio, level 3 as a assets ICT uses software to help in managing properties in the business portfolio, level 4 used to monitor the assets and level 5 is fully integrated with a remote system to allow 24 hours monitoring asset.

In meeting the fourth objectives is to discuss the development plan of BIM training program. They provide five recommendations for the development plan of BIM training program. Among the proposals is to create awareness of BIM there must be coordination among various organizations to plan for the development of the program, there should be a development plan specifically adapted to Operator BIM (model developer), BIM Administrator (IT staff) and BIM manager (coordinator), BIM also should be structured into the syllabus of Engineering, Technology, Architecture and the Built Environment disciplines, there must be a certification body that can determine compliance with BIM in the organization and should have a special unit to focus on BIM.

Having identified the components that make up the propose strategic approach for ICT utilization, participants concluded their discussion focusing on the process involved to establish a framework on strategic approach for ICT utilization in FM in Malaysia. There are four entities namely, people, process, environment and infrastructure. In summary, for the most effective utilization of ICT are people should be trained adequately, processes should be defined correctly, infrastructure should support the needs of ICT usage and environment should be ready.

3.0   DISCUSSIONS AND FINDINGS

The workshop participants were divided into 5 groups and they deliberated on the objectives listed above. Discussions and findings related to each objective are summarized below.

3.1 Objective 1: Strategy, Policy and Procedures

Current situation: Generally, there are obvious motivations for developing an integrated ICT application to the maximum point of FM practice in Malaysia. The awareness of the potential of ICT application in FM is also evident due to great exposure of its potential benefits within industry. Currently, at the operational level in FM practice in Malaysia has enabled to consolidate its work process within existing building. The FM application is used mostly in large scale commercial buildings and type of ICT application used most are building & engineering services, domestic services and administration & service support. However, there is still lacking of ICT used at environment management and strategic level. Reason for this include the reluctant to invest heavily into integrated ICT, FM system is not normally put in place upon the handover of the building to the owner and lacking of strategic approach for ICT utilization in FM. It was however noted that there have been several ICT initiatives in Malaysia, including those related to FM. Examples include the SCALA system and the e-perunding system developed by the Ministry of Finance for the appointment of consultants. It was mentioned that Public Works Department (JKR) is open to implementing Building Information Modeling (BIM). Their initial experiences with using BIM include projects like the National Cancer Institute (NCI) and 5 standard school buildings and clinics. JKR has formed an FM community which is currently developing a guideline and a system. They have set a target of 2013 for implementing BIM in government projects. In particular, an effort to bring the transition of ICT used in FM from operational level to strategic approach are now in place which the government plays a significant role to achieve this target.

Strategy: One of the most important aspects of strategy plan of ICT used in FM in Malaysia is government – business led. New ICT application means a change in the basic operation of the business which the change should be process-led and not ICT-led. It is recommended to go phase by phase starting from the government and big industry players. A policy has to be first adopted by the government which will encourage people to follow suit. For example, it could be stipulated in government projects that the contractors should use BIM. Government agencies should have the policy in their organizations to implement ICT in FM. A study on the readiness of the industry to move towards ICT in FM should be conducted before the

policy is implemented. Therefore, the industry may identify what are their current capability and plan on how to make an improvement prior ICT investment.

There should be an efforts to develop a pool of skilled personnel to apply ICT in FM. Examples include, comprehensive training, BIM certification, value added to the University syllabus through close collaboration with the industry, introducing ICT at very early stages like primary school, use of games to attract young people, etc. R&D funds for the university and industry should be allocated for addressing issues that affect the adoption of ICT in practice. The R&D project collaboration between academia and industry should be encouraged and promoted and also more efforts should be made towards standardization.

Other activities for the promotion of BIM in FM include giving extra points for GBI rating, tax reliefs, funding for private organizations to use BIM in FM, etc. Promotion activities and road shows could be organized to create awareness of the benefits of ICT in FM. There was a view that outsourcing ICT in FM might be more appropriate because of the high risk involved for small companies. Since technology development is very fast, small companies may not have the resources to keep pace with the developments.

Policy and Procedure: The features of FM system to facilitate the life cycle of the building should be promoted through the formulation of good policies and guidelines. The careful formulation and design of such policies should be taken place with close collaboration between respective government agencies such as JKR, Construction Industry Development Board (CIDB) and universities and industry. The FM system should use as a built model in the form of BIM with a user-friendly interface, since BIM is emerging as a widely accepted standard. In order to make BIM available for FM operations, incorporation of BIM should be mandatory for obtaining planning permission. Economic Planning Unit (EPU) should take the lead in this. At the end of the construction, BIM should be handed over to the client (instead of as-built drawings as hard copies) and the client will become the owner of the BIM. These policy directives have to be developed by organizations such as JKR and CIDB.

3.2   Objective 2: ICT application for FM

Types of ICT applications for FM can be classified into strategic management, building and engineering services, environmental management, domestic services and administration and service support. These applications are summarized in Appendix 1. There is limited evidence on the use of application for strategic management in Malaysia. However, in other categories there is more wide spread use of applications particularly for larger facilities, sometimes using in-house developed applications. Some examples are listed below:

Strategic management:
- Some large organizations use space and asset management applications tools like Archibus.
- Other asset management applications such as Computer Aided Facility Management (CAFM), Capital Asset Management Information System (CAMIS), Artra and Maximo are occasionally seen to be used.

Building & engineering services:
- Computerized Maintenance and Management System (CMMS), C-Works oriented towards Inventory, Work Order & Preventive Maintenance
- SPATA (used at JKR) records information of type of repair, maintenance schedule, list of equipments, etc. It contains as-built drawing of the facility.
- Building Automation Systems for Heating, Ventilation and Air-Conditioning (HVAC) and lighting.
- ABACUS for maintenance management (planned maintenance and trouble shooting)

Environmental management:
- Autodesk Revit (Manufacturing Extension Partnership (MEP), C&S and Architectural) at the design stage
- Ecotect and Green Studio for building energy management

Domestic services:

- Mostly In-house software for basic data management

Administration & service support

- Some software provide support for waste management
- Specialist applications such as health Information Systems used in hospitals

3.3   Objective 3: Level of maturity

After discussion the results obtained against the Level of Maturity Frameworks (refer Appendix 2) defined by Construct IT, Salford University, UK, the following conclusions were drawn:

- The general overview of the workshop is that the level of maturity of ICT utilization in FM in organizations is at a Responsive Level, wherein the facilities manager uses ICT mainly dictated by others.
- Most of the ICT application used is unable of meeting all the requirements for strategic and tactical elements
- Limited numbers of large well established organization are using ICT to monitor the asset and to provide life cycle costing.
- Some of the organizations are still using the traditional paper method in managing their assets. while some of them still preferring using common system like MS Office (MS Word, Excel, etc.)
- Evident found that none of the organisations does used integrated drawings from construction stage which describe the element of FM, does not really consider during initial stage of construction.
- The roles of FM manager is likely to maintain the building accordingly to meet specific building requirements, statutory obligations and service level agreements within budgetary constraints.

3.4 Objective 4: Development plan for BIM training

Some of the issues related to developing a plan for BIM training include creating awareness of the potential for BIM, skills needs and requirements and planning for short term and long term goals. The workshop participants discussed these issues and provided the following suggestions and recommendations:

- Programs that focus on creating awareness of the advantages of BIM should target all the key stakeholders, for example, clients, developers, contractors, engineers, local authority staff. It will be more effective to start the awareness programs with the top management. There should be coordination among various organizations that plan to develop such awareness programs.

- Skills needs and requirements vary according to the role of personnel in the project. There should be development plans specifically customized for BIM Operators (model developers), BIM Administrators (IT staff) and BIM Managers (coordinators).Existing CAD managers can be retrained to be BIM Managers. Existing draughtsman can be trained to be BIM operators.

- BIM should be structured into the syllabus of the Engineering, Technology, Architectural and Built Environment fields of study. CAD modules in Universities should be expanded to incorporate BIM. A BIM training programme at the undergraduate level should be complemented by BIM service providers. Support from BIM vendors should be sought for the training. Companies like Autodesk are already conducting several training programs every month. These could be linked to and complement University level programs. Other professional development courses should also introduce BIM. For example, it will be useful to include a BIM module in the ICT Training program done by CIDB to the industry.

- It is proposed that there should be a certification body that can determine BIM compliance in organizations. This organization should assess BIM capabilities and issue certification. Such certification will be an incentive to organizations to take active steps towards improving BIM capabilities.

- Lessons can be learnt from the experiences of organizations in Malaysia who are promoting BIM. For example, JKR has a dedicated unit that focuses on BIM. It consists of two officers from each discipline and a team is created to champion

BIM. Another organization that is promoting BIM is Malaysian Institute of Architects (PAM). Their vision is to have 30% of architects registered with PAM to be able to use BIM by 2015.

- Finally, published case studies and examples go a long way towards helping organizations develop BIM capabilities.

3.5 Objective 5: Framework on strategic approach for ICT utilization in FM

The proposed framework (Figure 1) is organized around four entities namely, people, process, environment and infrastructure. In summary, for the most effective utilization of ICT

- People should be trained adequately
- Processes should be defined correctly
- Infrastructure should support the needs of ICT usage
- Environment should be ready

The use of ICT involves capturing, storing, manipulating and transmitting relevant data for FM tasks such as property acquisition, building usage, change of use, lease management, space utilization planning, budgetary control, risk management, life cycle cost appraisal maintenance, monitoring and control of building systems and post-occupancy evaluation. Many software systems with varying capabilities are already available for these tasks. Barriers to the adoption of these solutions include lack of man power with adequate skills in ICT, current processes do not permit easy usage of software, lack of IT infrastructure and the non-acceptance of key stake holders. The framework aims to address how these barriers might be overcome.

a) People

Capacity development through training is the key to developing a pool of personnel skilled in the use of ICT solutions. Various options for doing this are already discussed under Objective 4. In addition, effective management of skilled people is important. Skilled people should be motivated to remain in the industry and encouraged to apply innovative solutions.

b) Process

Current FM processes should be critically reviewed in order to identify areas that do not support the application of IT. For example, paper-based tendering procedures restrict the scope of work flow automation. Electronic means of collaboration should be facilitated. Policies and strategies should be developed to encourage the use of ICT.

c) Infrastructure

While hardware is getting cheaper, the cost of software is still high, especially for high-level FM tasks. More efforts need to be put in to encourage the development of low-cost software solutions. Support could be provided for local software developers in the form of start-up grants and setting up of incubation centres. It is noted that CWorks software comes from MTDC's incubation centre.

Developing high speed communication infrastructure is critical. Wireless and wired broadband connections should be available throughout the country. Recent proliferation of smart phones and tablets has created a favourable environment for the use of mobile solutions for FM tasks. Local companies could take advantage of these.

d) Environment

Key people in industry should be ready to accept ICT in FM. Government and related organizations should support the use of ICT solutions. Owners and clients have a big role to play in enforcing the adoption of technology. Promotion activities such as road shows will help to improve the awareness of the benefits of ICT.
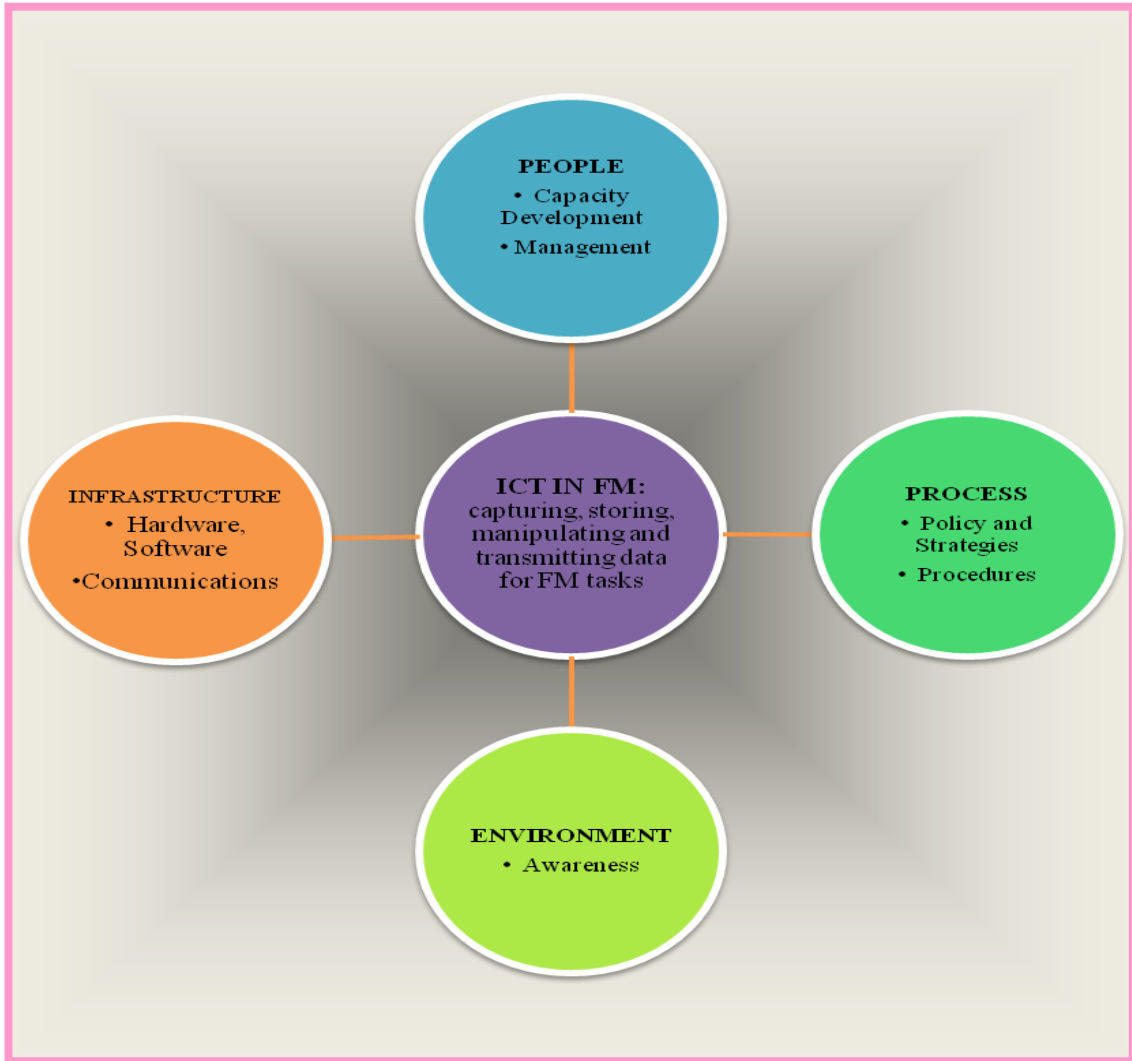
Figure 1: Proposed framework on strategic approach for ICT

Strategic management:

- Application of ICT covering capture, storage, manipulation and transmission of data on property acquisition, change of use, building usage, lease management, space utilization planning, budgetary control, risk management, life cycle cost appraisal, procurement strategy, supplier management, human resource management, post-occupancy evaluation, statutory requirement, facilities management strategic planning

Building and engineering services management:

- Applications of ICT covering capture, storage, manipulation and transmission of data on building usage, premises management, asset management, property records, condition surveys, briefing, budgetary controls, QA plans and reports, service level agreements, specification, service scheduling, performance monitoring, flexible working, tele-working, day-to-day repairs, minor building works, planned preventive maintenance, equipment management, plant management and telecommunications

Environmental management:

- Applications of ICT covering capture, storage, manipulation and transmission of data on building energy management, health & safety, statutory requirements, utilities and fire safety

Domestic services:

- Application of ICT covering capture, storage, manipulation and transmission of data on security, cleaning, waste/refuse disposal, internal landscape, caretaking, portage, messengers/couriers, post, catering, functions and events, first aid, pest control, car parking, grounds maintenance and transport

Administration and service support:

- Application of ICT covering capture, storage, manipulation and transmission of data on office management, legal and insurance affairs, financial management,

procurement policies and procedures, contract management, service level agreements, benchmarking, customer feedback, training, reception, room bookings, help desk, ICT management, document record management, reprographics and transportation management.

<u>Appendix 2</u>

Integrated (Level 5):

- An integrated ICT package helps in the management of the asset. The system is fully integrated with a remote system to allow 24 hours monitoring asset including lease details, floor areas, rent and rate reviews etc

Strategic (Level 4):

- Facilities management ICT package is used to monitor the asset. The software records all work carried out on the asset and prompt when maintenance work is required. The costs associated with the maintenance of the asset are recorded and used to provide life cycle costing

Planned (Level 3):

- The facilities manager uses ICT asset software to help in managing properties in the business portfolio

Responsive (Level 2):

- The facilities manager uses ICT dictated by others to produce document to help in managing properties in the business portfolio

Occasional (Level 1)

- The facilities manager uses traditional paper methods to manage the properties in the business portfolio. Some information is produced using standalone spreadsheets and word processor

Not User (Level 0)

- Facilities management is not supported by ICT within the business

4.0 Acknowledgements

Construction Industry Development Board of Malaysia (CIDB)
Construction Research Institute of Malaysia (CREAM)
Faculty of the Built Environment, University Malaya