



THE TECHNOLOGY OF ASSET MANAGEMENT AND MAINTENANCE CULTURE IN ENSURING SUSTAINABLE DEVELOPMENT

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Abstract

Much of the developing world is facing rapid urban development. The UN statistics indicate that 70 per cent of the World's urban population will be concentrated in developing nations by 2030. As cities continue to expand, city governments continuously struggle to provide services to the people. Clean water, sanitation, sewerage services, housing and waste disposal are some of the myriad of services that have to be provided in order to maintain a certain level of acceptable services for human consumption and for the health, safety and comfort of urban dwellers. Yet as city managers continue to expand infrastructure, there is also the hidden but real costs of maintenance of these infrastructure and services.

Cities are built environments and so too are the infrastructure that are built to serve communities. Thus, communities and infrastructure are intertwined. To achieve quality of life for communities in the urban environment, the service delivery must be there. If there is a break in electricity supply, or there is lack of water supply, or even when a lift within an apartment complex breaks down, the quality of life of its residents deteriorates. As city governments and service providers spend more to upgrade urban service delivery systems, more resources will be used, much more energy and costs incurred to keep the urban assets in working order. This will ultimately lead to unsustainable development.

A new technology called Asset Management will be introduced in this paper. Although the technology has been in practice in countries such as Australia and New Zealand in the last 20 years, it remains a new phenomenon in many developed as well as developing nations. This paper will examine the systemic approach in the planning and management of the urban environment, such that this relationship between communities, service systems, quality of life and urban sustainability, may be revealed.

Keywords: Asset Management, Maintenance, Sustainable Development

INTRODUCTION

This paper intends to introduce a new paradigm in urban planning and management, in order to ensure sustainable development. As a country progresses and the rate of urbanization seems unstoppable, there will be an increase in its infrastructure to perform and deliver services to an ever growing urban population. To ensure the services are optimally received, it poses an increasingly greater challenge. This paper will look at cities as part of a web of life, and that without human intervention in managing cities and its assets, will mean deterioration in the quality of life of urban dwellers.

Cities will be seen as living organisms. Having no means to regulate and manage itself without human intervention, the urban system will eventually breakdown. This paper will show that to attain a good quality of life and sustainable urban development for communities in urban areas, human intervention must be present and managed at the optimum. The planning and management of the human environment as a living organism will be introduced as Good Asset Management, and that the best practice for the planning and management of urban Malaysia, lies in the science and technology of Good Asset Management.

MALAYSIA'S RAPID DEVELOPMENT

On 31 August 2005, Malaysia will celebrate the 48th Anniversary of National Independence. In a time span of less than five decades, Malaysia has been transformed from an insignificant country dependent on primary products like rubber and tin into a modern economy with the gross domestic product (GDP) coming mainly from the industrial and service sectors. Despite being a small nation, Malaysia is now the 17th largest trading nation in the world. In the 2003 World Competitiveness Yearbook, among countries with over 20 million populations, Malaysia is ranked fourth after the United States, Australia and Canada. With this rapid economic growth, Malaysia's per capita income has increased from RM1, 132 in 1970 to RM13, 683 in 2002. This is estimated to rise to RM14, 954 in 2004—more than a thirteen-fold increase over slightly more than three decades. More significantly, our purchasing power parity (PPP) has jumped from US\$1,247 to US\$8,862 in the same period. In the 2004 Budget, it was forecast that the PPP will increase to US\$10,000 (or RM38, 000) in 2005. Concurrently, the incidence of poverty has been reduced from 52.4 per cent of households in 1970 to 5.1 per cent in 2002.

As Malaysia is moving towards greater economic growth both locally and globally, urbanisation will further intensify throughout the country. This will lead to a higher volume of infrastructure development in all sectors. In other words, the nation's wealth of physical assets will grow in tandem with the continuing expansion of urbanisation and the support systems of all sectoral growth. All these are evident in the Budget Strategy 2005 and the Government should be complimented on its forward planning approach, especially in the appropriate allocation of operation and development budgets to support growth in all sectors.

Urban economists tell us that at the peak period of urbanisation and economic growth, a nation's asset stock could grow at an annual rate of 8%. Settling down to a stable condition, annual asset stock increase will level out at 1.5% to 2%, as in the case of most developed nations. Looking at Malaysia's persistent efforts in sustaining economic growth with substantial allocations of funds for infrastructure development, the country's asset stock does not seem to have leveled out but is hovering at the mid-level range of growth.

A PARADIGM SHIFT TO A MAINTENANCE CULTURE

It is a fundamental fact that a nation's asset stock is there to provide service deliveries—it is a mean to an end and not an end itself. Intrinsicly, however gloriously they may boost Malaysians' ego, assets are there firstly to support the optimal functioning of various sectors of the nation's economy; and secondly to provide efficient public service under the management of various local governments. This is fundamental to the continuing enhancement of the citizens' quality of life.

All physical assets whether infrastructure or buildings, and including their sub-assets in the form of facilities, fittings, plants and equipment have a life span of their own. All assets deteriorate over time and unless they are proactively maintained by timely repair and replacement of their working parts, they will not be able to perform their intended service deliveries. In time, if maintenance is neglected, the assets will eventually become economic liabilities. At worst, poor condition of an asset can even pose public risks. When assets are not performing, a delivery system under a portfolio will fail. When more than one delivery system fails to function in various sectors, a nation's economic system will falter, social costs will increase and the citizens' quality of life will decline.

In his consistent push to have Malaysian industries competing in the global market, the Prime Minister further stresses that "the Government will ensure a

conducive environment, including development of R&D, provision of funds, increased promotional and marketing efforts, provision of logistics services and”, again “improved public sector delivery system, in line with the objective of achieving sovereign competitiveness”.

In short, the Government is fully aware of how imperative it is that the national asset stock be well maintained across the functional and economic life span of public assets, as well as sub-assets. Only by such persistent efforts by all Malaysians will the nation be able to ensure optimal performance of its delivery systems to all sectors and the community.

While Malaysians have shown the world that they can build any world-class infrastructure or buildings, they have yet to show a positive attitude towards asset maintenance, let alone demonstrating prowess in maintaining the nation’s valuable stock of assets. It is for this reason that the Prime Minister has been urging Malaysians to take note of the stigma of “First World Infrastructure, but Third World Mentality” in caring for assets.

In terms of land mass, population and economy, Malaysia is a small nation. However, in terms of the relative size of the nation’s asset stock for the support of service delivery systems—from transportation systems to telecommunication systems, world’s tallest twin buildings to state-of-the-art international airport terminal systems, information and communication technology (ICT) systems to world competitiveness, this country is by no means a small player—in fact, many in the world community consider Malaysia a developed nation. Under such impetus, it is timely for Malaysia to develop a Maintenance Culture forthwith.

LIFE CYCLE OF URBAN ASSETS

In this emerging new asset management science, critical and creative “criteria” from asset- to- asset-to community relationships are established to serve as primary guides for the “planning”, “acquisition”, “operation and maintenance” as well as “recycling, revitalization or disposal” of urban assets. These form the Four Phases of Total Lifecycle of an Asset (see Figure 1).

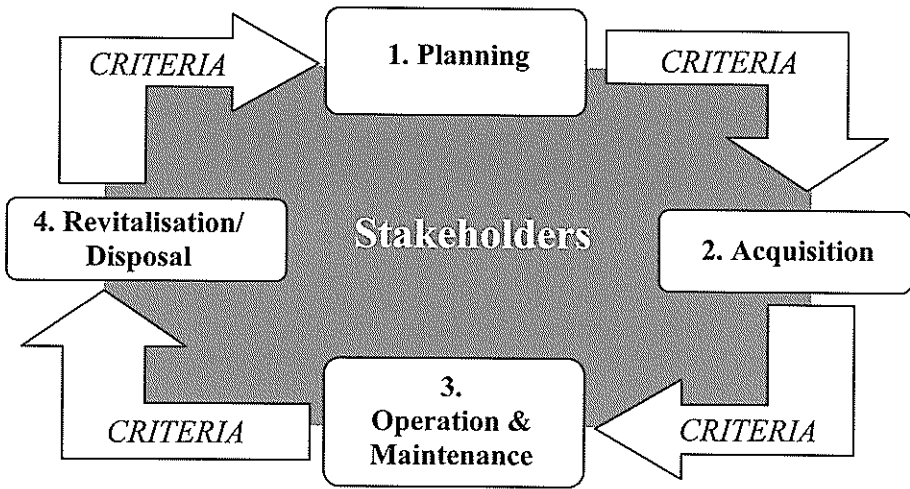


Figure 1: Total Lifecycle Management of Urban Areas

In good urban governance, it is imperative for the municipality concerned to have a comprehensive and dynamic system of recording all its assets in a computerised assets register. With such a register, a municipality can instantly obtain precise knowledge of exact locations, condition and level of performance of all assets — not only as individual assets but also in relation to a host of other asset systems, with regard to service delivery performance. In order to ensure spontaneous human interventions to maintain a city as a healthy and vibrant living system, the municipality must use a systems approach to manage the assets and sub-assets, each of which is a system by itself.

As a city is a living system involving the interconnections between the human community and the systems of service delivery arising out of the urban assets, we must look at this whole perspective as the ultimate relationships in a “web of life” as illustrated in Figure 1. In this respect, we must realize that no two situations with respect to where and when an asset system interacts with a community are the same. For each situation we must therefore identify a set of “stakeholders”. With such a group, we must use the “epistemic” science to involve an appropriate method of questioning the stakeholders as an integral part of our asset management’s holistic and systemic process.

By involving all the above systems thinking processes, the city is then embarking on the systemic process of **Good Asset Management for Total Lifecycle Management** of all its asset systems in close interrelationships with

the human communities. Through such a systemic process of deliberate human intervention, the city will be able to recycle and revitalize and thus function as a living system.

ASSET MANAGEMENT

Asset management is the greatest management challenge faced by custodians of public and private infrastructure in the world today. In order to do good asset management, asset managers need to know what their assets are, where they are located, what condition they are in, how they are performing and what stage are they in terms of their life cycle. This knowledge, called asset knowledge is then matched with the users' needs and expectations to develop strategies on how the use, value and return from this infrastructure can be maximised.

Asset management tools and technologies provide the fundamental strength to enable organizations to make informed decisions i.e. decisions based on both short term and long term needs. These tools and technologies enable organisations to effectively practice good asset management by:

- Quantifying current infrastructure holdings – what do we own and where it is.
- Qualitatively analysing infrastructure holdings – what condition is it in, what level of service is it providing, what is its capacity and functionality.
- Analysing performance – how has infrastructure performed in the past.
- Predicting performance – how will infrastructure perform in the future.
- Planning – short-term plans for routine maintenance, medium term plans for pro-active maintenance and long term plans for periodic maintenance.
- Analysing whole of life of infrastructure to determine best investment strategies and maintenance practices.

Planning decisions for new assets should be based on national, regional and local policies and consider budget constraints – for example, a decision to build a new highway should be based on sound provision needs of connectivity, network routes and corridor management.

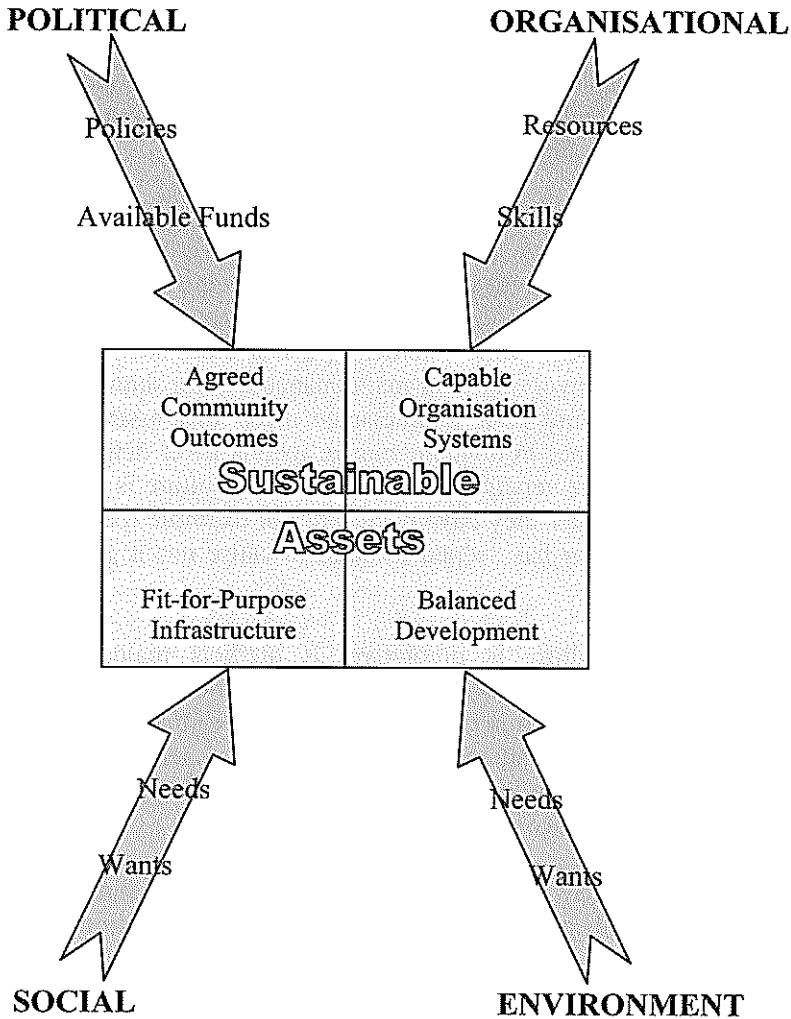


Figure 2: Sustainable Assets

Operational decisions for type of maintenance, timing of maintenance and location of maintenance should be a function of organisational resources and local skills. Availability of resources and skills often determine allocation of maintenance resources (see Figure 2).

Social decisions for planning assets and disposing assets should be driven by wants and needs of the users, citizens, businesses and community. For example provision of public toilets and their standards of hygiene should be need driven.

Finally all asset decisions must consider environmental demands of today and the future, particularly to preserve our natural resources. Asset management decisions **MUST** consider all these aspects to ensure that decisions are based on real needs and service level requirements. Integrated planning is good asset management leading to sustainable assets.

So whilst it is wonderful to have an infrastructure plan, we need to ensure that the plan is actually the best plan, i.e. plan based on good decision making. Good decision making involving good maintenance culture shows low life cycle costs. Smart decisions and good maintenance also mean that asset problems do not recur time after time. Good maintenance has eliminated most problems. Poor decision making involving poor maintenance culture shows high life cycle costs. Poor decisions and poor maintenance mean that asset problems keep recurring time after time. Poor maintenance means asset deteriorates quicker and needs more frequent repairs. Poor maintenance culture is reactive. It fixes asset problems much after they have occurred. For example roads have cracked and deformed and water has seeped through to cause much greater pavement damage.

Good maintenance culture is predictive. It predicts major problems and determines best maintenance decisions well before the major problems occur. For example regular inspection of foundation cracks in buildings would enable early grouting to prevent failure. Similarly ad-hoc asset management means decisions are based on individual or local knowledge only without any linkages to organisational or regional policies and planning.

Good asset management is integrated asset management and is based on a combination of social, political, environmental and organisational needs. It is the result of good, solid, integrated knowledge. A combination of good asset management and good maintenance culture leads to lowest lifecycle costs, best service delivery and sustainable assets.

CONCLUSION

A city or a municipality is a living system. It is constantly subjected to forces of change from within its systems assets and their sub-systems and from external conditions—social, political, economic and environmental. It is a dynamic system that needs to be constantly evaluated, modified, upgraded, renewed and revitalised in order to achieve holistic ecological sustainability.

Since a city is a web of life, any changes made to any part of the urban system and sub-systems affect the other systems. Therefore, changes cannot be made in an ad-hoc manner nor be based on the traditional reductionism approach. In other words, the effects of changes are not confined to the assets themselves. A whole systemic process involving careful dealing with the interrelationships between assets, the community and the overall ecological sustainability — social, political, economic and environmental factors — is needed. In short, we need to involve the systemic processes of good asset management to continuously maintain and revitalise our cities and municipalities.

Thus under the systemic structure of good asset management for a city or a municipality, the following quality demands are intrinsic:

1. Systems capacity building.
2. Accountability,
3. Transparency,
4. Community involvement as vital stakeholders-the concept of inclusiveness.
5. Eradication of marginalization of the informal sector in dual economies.
6. Poverty alleviation through systematic enhancement of quality of life for all citizens.
7. Close partnering between municipalities to achieve a strong and healthy web of life.
8. Benchmarking.
9. Best practice.
10. Effective leadership with holistic systematic support.
11. Ecological sustainability for total living urban systems.
12. Forming integrity of good governance.

Each of these forms the sub-systems of total and strategic asset management.

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