



# Editorial: integrating “infrastructure project management” with its “built asset management”

“Infrastructure  
project  
management”

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Mohan Kumaraswamy

*Department of Civil Engineering and Centre for Infrastructure  
and Construction Industry Development, The University of Hong Kong,  
Pokfulam, Hong Kong*

## Abstract

**Purpose** – This paper aims to convey the rationale underpinning this new journal and its timeliness in addressing emerging imperatives in our built environment, to highlight the range of the papers in this first issue and to encourage readers and potential contributors to join the *BEPAM* journey, towards improved built infrastructure.

**Design/methodology/approach** – Drawing attention to the silos within which “project management” research and practice have been largely isolated from those in “asset management”, recent initiatives to bridge this divide are spotlighted, synergised and built upon.

**Findings** – A critical need is identified for a niche one-stop forum to address increasingly important interfaces between project management and asset management of building and civil engineering infrastructure. It is also found to be important to link leading-edge research to cutting-edge practice in physical infrastructure development, while empowering and inspiring authors and readers from many relevant disciplines and diverse regions towards synergistic research, development and dissemination.

**Originality/value** – Articulating the *BEPAM* vision in supplying the missing link between built environment project management and asset management, this paper aims to attract researchers and practitioners from hitherto compartmentalised sub-sectors to engage with, learn from and improve each other in a common mission to efficiently deliver and sustain better built infrastructure worldwide.

**Keywords** Built asset management, Construction project management, “Whole-life” infrastructure management, Sustainable infrastructure, Construction industry, Assets management

**Paper type** Research paper

## Background and introduction

Much has been said, but much less has been achieved, in translating high-level sustainability goals into practice in our built environment. Much of this shortfall may be traced to persisting disconnects between “planning, design and delivery” (in the “project management” phase) and “operation, maintenance and overall

While regretting the impracticality of naming the many who have contributed to the launch of *BEPAM* and this first issue, the Editor would like to at least acknowledge the special contributions of the following: universities, professional bodies and individuals involved in the precursor *Journal of Building and Construction Management*; the Department of Civil Engineering and Faculty of Engineering of the University of Hong Kong and the Centre for Infrastructure and Construction Industry Development for proactively supporting the *BEPAM* launch; our special Emerald team of Valerie Robillard and Kieran Booluck who are a constant source of invaluable support and advice, and also Andrea Watson-Lee who helps with the on-line system; our whole Editorial team and particularly Thomas Ng and Jacky Chung; Gangadhar Mahesh for his inputs; and of course the authors and reviewers without whom this would not be possible.



management” (in “asset management”). Such disconnects are evident in the information-knowledge gaps, and also between the teams working in veritable bubbles within each domain. Unsurprisingly, many ill-informed decisions taken within isolated silos also retard, if not obstruct the increasingly critical built environment sustainability agenda. Fortunately, there has been a rapidly growing appreciation of the major impacts of planning, design and construction strategies and decisions on life-cycle costs and performance of built assets.

Furthermore, the poor status of existing infrastructure assets in many developed countries, confirm that much needs to be done. Taking one example, the American Society of Civil Engineers (ASCE) 2009 infrastructure report card (ASCE, 2010) assigned an overall D grade for “America’s infrastructure GPA” and estimated that it would take \$2.2 trillion over five years to bring it into a state of good repair. It was also reported that “more than a quarter of the nation’s bridges are structurally deficient or functionally obsolete”, while also citing leaky pipes, ageing sewage systems, etc. Second, the many developing countries embarking on rapid infrastructure development programmes should be able to learn lessons from the above, in planning, designing and installing more maintainable and sustainable built assets.

Third, in many more recently developed regions such as Hong Kong, where basic new infrastructure needs have been met, there are major industry shifts from new-build towards maintenance, redevelopment and rehabilitation of built assets. These trends have led to the rapid development of “asset management systems”, e.g. for bridges, roads (pavements), in general internationally, and in organisations such as Departments of Transport in each state of the USA, the Mass Transit Railway Corporation in Hong Kong, etc.

An authoritative forum is clearly needed to link the development of such asset management systems, as well as to “feedback” their knowledge from practice, to the managers of the planning, design and construction processes. Conversely, enlightened asset managers have highlighted the need for cross-fertilisation with upstream project management principles and practices, e.g. Futcher (2006) made a sound case for “why facilities management needs good project managers”.

Based on such imperatives and trends as above the need was thus recognised for a journal to address these shortfalls in bridging the divides and connecting the essential interface elements across these domains. *BEPAM* is designed as a niche forum to address interfaces between project management and asset management of building and civil engineering infrastructure, while also benefiting from and tapping into relevant progress in the fields of both infrastructure project management and infrastructure asset management.

As further background to *BEPAM*, it may be noted that the core editorial team draws on a useful heritage and relevant strengths, having previously published the *Journal of Building and Construction Management*, and being presently supported by the Centre for Infrastructure and Construction Industry Development (CICID) in Hong Kong. The *BEPAM* editorial team brings on board a wide range of additional international expertise in covering the special thrusts, extra dimensions and extended reach of this new journal. In moving on, the scope expands in particular, to incorporate and integrate the increasingly important asset management focus into built environment infrastructure development and management.

### **Growing importance of infrastructure asset management**

“Infrastructure report cards” from prominent developed countries confirm the woeful state of their infrastructure. For example:

- while the 2009 “report card” of the ASCE assigned an overall D grade to the nation’s infrastructure, five categories receiving D<sup>-</sup> were drinking water, inland waterways, levees, roads and wastewater (ASCE, 2010); and
- the “Australian infrastructure report card” assigned an overall C<sup>+</sup> grade in 2010, which also meant this had not improved from 2005.

The press release in November 2010 highlighted that little or no progress had been made in the past five years (Engineers Australia, 2010). Although a few categories such as ports had improved marginally (from C<sup>+</sup> to B<sup>-</sup>) others such as airports had dropped (from B to B<sup>-</sup>), while the overall grade remained at C<sup>+</sup>.

Lessons learned from the above developed countries can be applied in rapid new infrastructure development as in Mainland China, and many other fast-developing countries worldwide (as in the “BRICS” and “CIVETS”, etc.). To reduce the potentially heavy costs of future repairs and rehabilitation as above, operation and maintenance priorities and needs must be proactively addressed and optimised from the outset. Indeed these costs would not only burden economies, but also the environment and society.

Meanwhile, in places like Hong Kong, the shift from greenfield construction towards rehabilitation, redevelopment and maintenance works, is evident from census and statistics figures, showing such works (construction at locations other than sites) rising from 28 per cent of all works in 2000 to 51 per cent in 2008. Similarly in the UK, “repairs and maintenance” works accounted for 35 per cent of construction output between 1955 and 1976, over 57 per cent in 1977-1980 and has been around 45 per cent since 1980.

Specific programmes accelerate this trend further, e.g. in Hong Kong “Operation Building Bright” (OBB) launched in May 2009 provides financial assistance for repair and maintenance of over 3,000 buildings aged 30 years and more. Having recently been injected with another HK\$1 billion, the funds committed by the Government for such assistance in OBB now total HK\$3.5 billion. OBB has so far approved assistance to repair more than 1,900 old buildings with 200 complete and 500 underway (Hong Kong Engineer, 2011). On the other hand, governments in regions harder hit by the 2009 financial crisis e.g. in Mainland China and USA, crafted pump-priming “recovery packages” that pumped massive amounts of funds into both upgrading/repairing ageing infrastructure, as well as into new infrastructure.

### **Bridging the divides and linking the silos: concepts, pointers and examples**

The above needs and trends point to the value and advantages of an appropriate platform to enable cross-sector learning, linking those engaged in built environment project management with counterparts in built infrastructure asset management. In this regard, some lessons may be learnt from Singapore initiatives to boost “maintainability”. Following successful injection of “buildability” into designs that must achieve minimum buildability scores, a Singapore industry report (C21, 1999) also called for more maintainable buildings, with maintenance cost audits, etc. A maintainability grading system was proposed ([www.hpbc.bdg.nus.edu.sg](http://www.hpbc.bdg.nus.edu.sg), Chew, 2010). Elsewhere too, needs are noted for “designing facilities management needs into

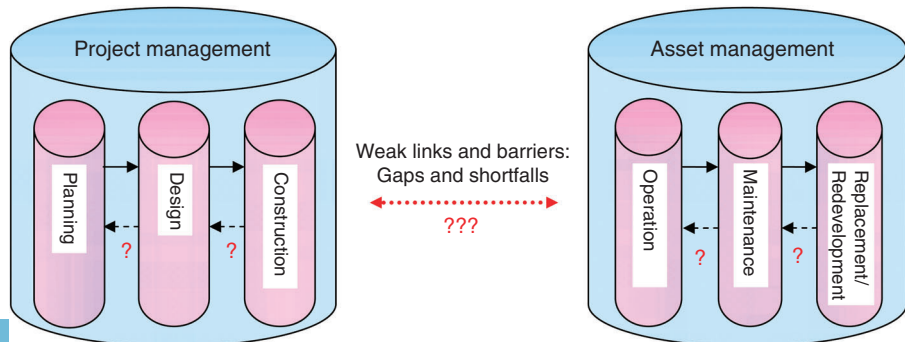
infrastructure projects” (Edum-Fotwe *et al.*, 2003), and also for “sustainable adaptation of existing facilities” (Love and Bullen, 2009).

There is a growing need to establish smooth channels for rapid exchange of relevant knowledge and skills between hitherto fragmented groups working in either design, delivery, operations or maintenance, etc. This is confirmed by initial findings from an ongoing research exercise entitled “Management of infrastructure rehabilitation redevelopment or revitalisation”. Interviewees in Hong Kong lamented the difficulty in sourcing accurate information from the design and delivery stage for supporting decisions in the operation and maintenance stage. In an example from a completed Hong Kong project, the client had to inject additional third-party expertise to assist the main contractor to pilot and develop vertical greening solutions in choosing the optimal soil mix and plant species mixes for the panels (Mahesh *et al.*, 2007).

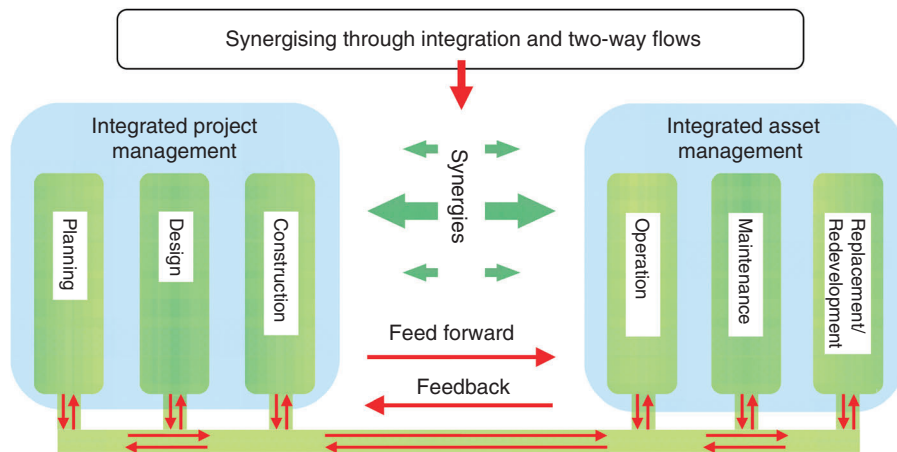
In a broader study in USA, this lack of “interoperability” in “stovepipe”-style data storage systems was said to have cost the capital facilities industry \$15.8 billion in annual operating costs even many years ago (Gallaher *et al.*, 2004). Continuous information flow to support life-cycle management of facilities using technologies such as BIM has been advocated to achieve seamless information flow (Singh and Dunn, 2008; Faiz and Edirisinghe, 2009) and has worked in some organisations (Eastman *et al.*, 2008). But adequate standards for managing infrastructure asset data are needed (Sabol, 2006) and still awaited.

With a view to visualising and addressing the above issues and barriers, Figure 1 is developed to portray the current “silo”-type isolation (as also indicated by Singh and Dunn, 2008), as well as disjointed one-way information flows and barriers. Next, building on and applying the basic “information exchange” conduit indicated by Huell (2010), Figure 2 shows the proposed two-way knowledge flows in the present scenario.

Indeed, the above two-way knowledge flows assume greater significance in single point “delivery networks” or “integrated supplier” consortia that can also address life-cycle issues, e.g. in design-build, where concurrent engineering can also be applied (Evbuumwan and Anumba, 1998); in design-build-operate (as in some water supply schemes); and in public private partnerships (PPP). Smoother two-way knowledge flows are needed along such supply chains, driven by commercial imperatives in single point risk-reward groupings. Such two-way flows are valuable for example, in designing for optimal operations and maintenance (Edum-Fotwe *et al.*, 2003); designing



**Figure 1.**  
“Silo structures” and  
“one-way flows” in typical  
built environment  
infrastructure  
management scenarios



**Figure 2.** Feedforward and feedback for overall gains through two-way knowledge flows via dynamic interfacing

for durability and optimal life-cycle costs (Ugwu *et al.*, 2005); evaluating sensitivity to sustainability (“sustainability capacities”) in teams (Kumaraswamy *et al.*, 2007); and “environmental performance assessment” (Tam *et al.*, 2006).

Technology to bridge present “divides” between “project” and “asset” management is fortunately becoming available, e.g. with “extended” BIM (Huell, 2010). But these also need revamped organisational systems, with proactive “capacity building” and “learning” dimensions, that must extend traditional “project management competencies” (Edum-Fotwe and McCaffer, 2000). It appears timely to:

- inject specific strong sustainability dimensions and drivers into; and
- integrate, first international bodies of knowledge in “project management” (e.g. as developed by the US-based Project Management Institute and UK-based Association of Project Management), with second, emerging bodies of knowledge in “asset management” e.g. on bridge management in UK, highways in USA and “total asset management” in Australia.

In terms of organisational systems, in an example from a corporate management perspective, a case was made for “integrating project, programme, portfolio, asset and corporate management” by McGrath (2007). He proposed a set of integrating principles, governance roles and managerial relationships in a restructuring exercise, designed to assist with the delivery of major roads programmes in the Queensland Department of Main Roads in Australia. Indeed the scope of *BEPAM* will extend into such organisational issues as well, as will be evident from some papers in this and forthcoming issues.

### Editorial vision of *BEPAM* mission

The primary aim of the new journal is to provide a unique platform for deliberating on, disseminating and validating cutting-edge research and development in infrastructure construction project management and built infrastructure asset management on a common platform, given the increasingly critical intersections and convergence between these domains, e.g. due to “whole life” and sustainability imperatives. The *BEPAM* focus is thus more on the interface issues which are proving increasingly critical, and which are not specifically addressed in existing specialist

journals that focus on either infrastructure construction project management or built infrastructure asset management or facilities management.

Two other *BEPAM* aims are to connect both established and upcoming researchers with progressive practitioners in these fields; while also proactively linking research and practitioner communities worldwide, i.e. from countries outside the traditional catchment areas of journals in these fields to join in a truly international forum.

The dual coverage of built environment project management and asset management recognises imperatives to serve and cater to:

- (1) the many engaged in the former field who wish to cross-link to the latter, given the inexorably growing needs for design and construction to cater to, and indeed enhance infrastructure asset performance over their life cycles; as well as
- (2) infrastructure asset managers who need to inject inputs at appropriate points to improve important decisions made in the planning, design and construction of the assets they must manage, operate, maintain and eventually decommission/demolish — the increasing worldwide popularity of PPP is one domain that has brought such needs into sharper focus, given the inherent integrated and longer-term management responsibilities.

Interface areas can for example, include useful linkages (e.g. in decision making) between procurement, design management or construction management (in project management); and operation and maintenance (O&M), or other whole-life issues (in asset management); as well as other potential synergies in the management of the projects and their resulting built environment assets. Interface areas may also be addressed through relevant issues in sustainability, PPP, infrastructure security/resilience, etc. or on how planning/design decisions affect downstream O&M or conversely how lessons from O&M can “inform” better upstream decisions – towards more “maintainable”, “operable” and sustainable design management.

Of course a specific paper may possibly focus more on either project management or asset management, but the linkages and interface areas should be highlighted, as increasingly useful in practice, e.g. in targeting enhanced sustainability.

In terms of types of papers, *BEPAM* targets to publish:

- rigorous research, including both empirical and theory-building exercises;
- comprehensive reviews of relevant research and/or practice domains, that lead to the development and presentation of significant “new knowledge”; and
- in-depth case studies of industry innovations and/or research applications, that generate valuable “new knowledge” of interest to leading practice and/or academia.

It is hoped that this section, albeit possibly more detailed than expected, will help to clarify the scope and types of papers that *BEPAM* targets to attract, and indeed, even inspire! For specifics on the journal requirements, see [www.emeraldinsight.com/bepam.htm](http://www.emeraldinsight.com/bepam.htm)

### ***BEPAM* papers in this issue and beyond**

The papers in this first issue speak for themselves, while their abstracts summarise them well. I will neither attempt to re-analyse the contents, nor to paraphrase the abstracts here. Instead, I draw attention to the wide spectrum of topics covered, as well



as the spread and span of both the backgrounds of the authors and their current affiliations. It is hoped that this initial cross-section will provide a sound starting point in setting the scene for future contributions and participation.

For example, the seven papers reflect the range of *BEPAM*, while also demonstrating its diversity and indicating its intended scope. For example, infrastructure types covered here include roads, water supply systems, harbour-front, buildings in general, as well as airports; while the authors are from four different continents and various disciplines, and they contribute on a range of sub-issues including financial, people-related and organisational.

Furthermore, papers that focus on asset management issues, also link relevant specifics to upstream project management decision making in keeping with the *BEPAM* thrusts. Conversely, those focusing more on project management issues, link to related asset management priorities and performance imperatives.

Second, while reviews are in progress of other submissions for future issues, three papers that have been recently accepted following their review cycles, are mentioned here, just to provide a flavour of our continuing *BEPAM* journey. These papers are the following:

- (1) on developing an enhanced “management framework for the built environment” – that was tested on organisations in both Europe (mainly Austria) and the USA;
- (2) on boosting road infrastructure performance – from Singapore; and
- (3) on a case study of conflict dynamics in a dam project in Nepal, interestingly by authors now based in the Middle East and the UK.

Also interestingly, the “conflict analysis” on this dam project adopts a systems dynamics approach, which those interested may consider to juxtapose (after the second *BEPAM* issue), with the “Pawlak’s framework” approach used in the conflict-analysis paper on the Hong Kong harbour-front design in the current issue.

### **Consolidating and moving forward**

Although it may appear that *BEPAM* is championing a cause of integrating the domains of “project” and “asset” management with almost a missionary zeal, we are doing nothing more than recognising the realities and stating the obvious. Both domains within themselves have arguably not seen much recently, in terms of breakthrough concepts or dramatic performance gains. On the other hand, the global sustainability imperatives not only demand integrated approaches, but open opportunities for significant synergies and surges in joint added value for all stakeholders, of course including the end-users.

For example, significant efficiency gains can arise from integrated models, propositions and improved practices in organisational and supply chain management that bridge the current divides between built environment project management and its infrastructure asset management.

What else? In seeking answers to such questions, we invite you to join us in our journey through future issues, particularly if any ideas or examples in this editorial or any of the papers in this inaugural issue have resonated as worthy of attention. Indeed if they have struck chords with your own current or expected interests and/or work, you are warmly welcomed to join more proactively, say as a potential author and/or reviewer.

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**Corresponding author**

Mohan Kumaraswamy can be contacted at: [mohan@hku.hk](mailto:mohan@hku.hk)

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