

# Asset management stewardship: The effectiveness of public-private mix governance structures

David E. Mills, Kerry Brown, and Jennifer Waterhouse

**Abstract**—Major infrastructure assets are often governed by a mix of public and private organizations, each fulfilling a specific and separate role i.e. policy, ownership, operation or maintenance. However, it is increasingly problematic to maintain separate and distinct governance arrangements for each of these functions due to their criticality to achieving social outcomes such as supply of water, power and transport and their interdependency in terms of risk management. The success of long term asset management is therefore becoming reliant on coalitions of organizations and groups working in a co-coordinated and collaborative way to deliver services. Yet, it is unclear how to conceptualize these networks of relationships and to determine the types of entities and arrangements that will best contribute to successful collaborative governance. Stewardship theory is revisited to provide a lens through which asset management governance can be examined. It is argued that the concerns of the community in regard to the long-term sustainability of infrastructure assets from environmental, accountability, strategic and business perspectives may be well served by a renewed conceptualization of stewardship theory.

## I. INTRODUCTION

STEWARDSHIP theory offers a lens through which to examine the demands upon major infrastructure asset managers to improve the performance of the asset, not only against economic measures but to meet developing public values of sustainability of use and intergenerational responsibility. Major infrastructure assets are now governed by a mix of public and private organization types, each fulfilling a specific and separate role i.e. policy, ownership, operation and/or maintenance. The mix of organizational types reflects the late 20th century heritage of economic rationalist reforms labeled New Public Management (NPM) and includes government departments, statutory corporations, government companies and private companies. NPM reforms brought efficiency to infrastructure service provision but through their focus on the self-interest of the individual organization [1] may have resulted in governance arrangements, organizational forms and contractual arrangements which do not necessarily progress non-economic public values and the collective 'Public Interest'. Agency theory is key to that focus on the self-interest of the individual [2],[3] underpinning both the relationships between the organizations and the formal

contractual arrangements, typically between a government entity and a private sector service provider.

Stewardship theory is different from the agency model of both the principal and the agent pursuing rational self-interested utility maximization by purporting that in certain circumstances the agent acts in the interests of the principal, even to the detriment of the agent [4], [5], [6]. Stewardship theory highlights the limitations of the strict agency model and through the framework of psychological and situational factors identified by [5] provides a medium through which the features of current infrastructure asset governance arrangements can be considered and offers the possibility of enhancing the outcomes of infrastructure asset management.

The public environment of the 21<sup>st</sup> century has reconsidered the benefits of private sector delivery of services expressing concern that NPM reforms have injected private sector values, responsibilities and actions into the management of public sector delivery that are detrimental to public good [7]. Governance arrangements which eschew individual self-interest alone and look to also pursue the interests of other stakeholders have emerged. Relational contracts have been introduced for infrastructure construction projects [8], [7], [9] and hybrid mixes of organizations from the state, market and network modes [10] have demonstrated the capacity to both meet economic objectives and to provide a decision-making process which includes non-economic public values [1].

In response to this shift in strategic orientation, different approaches to conceptualizing the operation of new organizational and structural arrangements for the provision of public goods and services are required. Whilst research has begun to consider the use of new governance arrangements in solving 'wicked' social issues [10], there is also a need to consider the appropriateness of alternative governance arrangements in relation to large infrastructure assets which, if mismanaged, present a high risk to governments, private sector providers and the community.

This paper will firstly discuss the modern public environment. Secondly, the forces shaping infrastructure stewardship will be considered. Thirdly, the notion of stewardship and stewardship theory and its links with agency theory will be explored. Fourthly, infrastructure governance arrangements are reviewed. Finally, opportunities for research which may lead to a more precise understanding of the emerging stewardship responsibilities of governments and private providers of infrastructure will be explored with

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D. E. Mills is with the Queensland Audit Office, Brisbane, Queensland Australia 4000 e-mail: david.mills@qao.qld.gov.au.

particular consideration given to the ways in which stewardship theory can be applied to assist in understanding current relationships between actors and the relationships which are seen as desirable to meet the complete stewardship responsibilities.

## II. MODERN PUBLIC ENVIRONMENT

Infrastructure governance arrangements in the modern public environment have been formed through decades of reform to the roles of public sector and private sector actors. Current public environments were extensively reformed during the 1980s and 1990s. These NPM reforms were based on Public Choice theory which criticized public sectors as being monopolistic, bureaucratic and inefficient [2] [11] [7] for which the solution was the opening up to competition of previous public monopolies through activities such as privatization, commercialization and contracting out as well as the wide application of neo-liberal economic models and the adoption of private sector management principles. Such economic models and private sector management practices were not only applied to genuine market situations but also to non-market circumstances [1] and market based remedies were applied to public infrastructure notwithstanding infrastructure typically being natural monopolies [12].

The NPM reforms have meant that many of the values of private sector management have become values of the public sector [13] [7]. Yet governments or their entities are not simply required to maximize profits but rather are subject to political influence and are often required to meet other objectives, such as the public interest [14] which for the UK government translates to the need to have regard to other, shared or collective values requiring collaborative rather than competitive organizational forms [15]. More directly Beck-Jorgensen & Bozeman [16] argue that privatization and contracting out often have the effect of eroding public values.

These criticisms of NPM evokes the question as to whether current governance arrangements for infrastructure assets have the capacity to perform a stewardship role that considers the shared values of the community and the 'public interest'. Redford [17] defines the 'public interest' as being the best response to a situation in terms of all the interests and the concepts of value which are generally accepted by a society. Stone [18] builds on that definition adding the dimension of active pursuit of shared, collective values. This pursuit of collective values contrasts with the market-based (NPM) concept of the public interest being the sum of the self-interest of individuals. Recently Denhardt & Denhardt [1] have asserted that governments need to ensure that the public interest predominates through meeting democratic norms and values by devising solutions to public problems, and the processes by which such solutions are implemented. Meeting those additional non-economic 'public interest' values is a key challenge for infrastructure asset governance.

Public values are relative and may even be ambiguous and conflicting, requiring a trade-off through judgment which

often tends to be subjective [19]. The values underlying infrastructure asset management remain substantially based on economic rationalist principles resulting in 'short-termism' i.e. profit at the expense of longevity [20]. Community values have strengthened in relation to the sustainability of use and intergenerational responsibility to be met by infrastructure assets. These values often conflict with the improved economic performance required of the asset. The challenge is for infrastructure governance arrangements to be constructed to provide decision-making mechanisms to both include the complete range of economic and non-economic values and resolve the conflict.

## III. INFRASTRUCTURE STEWARDSHIP

Infrastructure stewardship is emerging as a feature of asset management practice developing in response to a combination of forces active across most societies. This paper explores those forces which are shaping the stewardship role so as to focus the more detailed consideration of stewardship and Stewardship theory discussed thus far in this paper. Asset management has developed a focus that has been limited to decisions as to the how of asset maintenance [21] particularly the use of information and communication technology systems, and e-maintenance systems [21]-[25]. This limited focus has been challenged with propositions that infrastructure asset management be strategic and comprehensive [26], extending from the sustainment tasks such as preventative maintenance and repairs to encompass modernization tasks such as replacement due to obsolescence and change-in-use modifications and disposal [27]. A further limitation of asset management literature [23], [28] has been the focus on the single organization and whether the approach is operational or strategic, but only within that organization. This need for a strategic perspective for infrastructure asset management has been driven by a combination of forces including heightening risk and accountability, financial reporting standards, conditional government funding and reducing maintenance funding [23], [28]. The response by asset managers to the shortage of funds has not been to directly resolve the funding crisis but rather to focus on information technology based information systems or decision support [29], [27].

## IV. STEWARDSHIP

Stewardship has a long history dating back many centuries. Saltman & Ferroussier-Davis [30] acknowledge the Biblical reference of the parable of the talents where stewardship is portrayed as entrusting the steward with something of value and the steward being obligated to improve the asset. In a public sector context the concept of stewardship of assets for the public good was a mainstay of its operation but this underpinning principle was supplanted in the reforms of the 1980s with the drive to implement commercial principles as a public sector value. More recently stewardship as a guiding principle or public value has re-emerged as a response to calls

to take into account the long-term effects of a broader range of issues such as environmental sustainability and intergenerational responsibilities.

Birnberg [31] identified a hierarchical progression or maturity of the relationship between the steward and the owner of the assets in the principal-agent relationship. Birnberg [31] observes that the steward might merely protect an asset, might act to maintain the asset in its original form, might seek to grow the asset or might be provided with an asset and charged with achieving an outcome. For this latter model Birnberg [31] cites the example of modern corporations where executives are accountable to the shareholders, i.e. the owners, for an outcome such as profit as distinct from merely maintaining the specific assets.

Stewardship principles operate in many contexts. The North American forest wood sector has a focus on sustainability over an asset which has a life-cycle with a timeframe similar to that of infrastructure assets. A key element of governance being the Forest Stewardship Council (FSC) which provides a market-based certification and labeling scheme which adds value to the wood product from a marketing perspective. The FSC is a multi-stakeholder NGO with members from civil society, environmental groups and the industry supply chain. The FSC belongs to the Corporate Social Responsibility (CSR) model of governance systems which Verdonk et al [32] note requires active, conscious consumers. Many infrastructure assets do not exist within a market with attendant consumers.

Environmental stewardship has progressively developed into a form of governance [33] comprised of all forces driving the environment related agenda forward, including government regulations, economic incentives and social pressures.

Stewardship theory may therefore provide a means to help explain the emergent view that the relationships between individuals and organizations are something more than reflections of the agency model self-interest of actors and help extend agency theory beyond its economic interpretation to include non-economic influences including the psychological (such as identification and power) and the situational (management philosophy and power) [5].

The key assumption of Agency theory is that directors [4], managers and staff [5], [6] are trustworthy and are inherently motivated to act in the interests of the principal, even if this is to the detriment of the agent as well as there being potential for the goals of the agent and principal to be perfectly aligned [5].

The new public environment that has been emerging for some time provides a counterpoint to the economic model, achieving an acknowledgement of a need for organizations or individuals to act in the 'public interest'. The concept of stewardship in this context is argued to offer insights as to how the economic model of governance with its reliance on agency theory might be extended to provide a model of

governance that facilitates the achievement of stewardship responsibilities.

## V. INFRASTRUCTURE GOVERNANCE

The stewardship of infrastructure assets is currently performed through governance arrangements involving a mix of public and private organizations, each fulfilling a specific and separate role i.e. policy, ownership, operation or maintenance. This section seeks to understand the features of the key organizational elements of current governance arrangements by an examination of the traditional department, contracting out to private companies and Private Public Partnerships (PPP's).

The traditional department originates from the mid 19<sup>th</sup> century British experience. However, the newly formed Australian states found departments to be inappropriate for railway systems, development programs and commercial activities [34]. For these purposes statutory authorities were strengthened with the status of corporate bodies [35]. In the 1980s and 1990s the use of statutory corporations for infrastructure was often replaced by outright privatization or, where the activity remained within the public sector, replaced by government owned companies utilizing corporations law passed primarily for use in the private sector [1], [36]. Government companies facilitated participation in level playing field arrangements for the conduct of government activities and contracting within the public sector [37].

An alternative to departmental provision or outright privatization has been the extensive use of traditional contracts to specify a range of contractual relationships between government departments (or government companies) and private companies. The formal private sector style contracts allowed government to 'steer' by precisely specifying the outputs required and terms of payment, allocation of risk and penalties [37]. Contracts have been considered key to the achievement of efficiency and accountability [37].

Traditional contracts are underpinned by agency theory [38] which is premised on both the principal and the agent being motivated by self-interest utility maximization [2], [3]. Agents seek to maximize their utility at the expense of the utility of the principal, creating a conflict of goals between the principal and the agent resulting in an agency cost to the principal [39].

Agency cost for infrastructure projects typically comes from the selection of the contractor and the monitoring of the contract and legal disputation (even between private consortium partners) [40] which all reduce the economic efficiency of the contracting out model and undermine the policy goal [41]. A recurrent, major contributor to that agency cost of tightly specified, traditional adversarial contracts is the prevalence of disputes and litigation over the performance of the contracted work and associated allegations of opportunism on the part of the private sector service providers [9]. These persistent significant problems with the

traditional contract led to questions about the extent to which the needs of the public were being met and resulted in some cases in the introduction of ‘relational contracts’ [7], particularly in infrastructure construction projects [8],[7],[9]. These relational contracts placed an emphasis on permeable organizing practices intended to yield mutually beneficial outcomes in major infrastructure projects [8]. Inherent in this view is that market structure and the organizing principles of the quasi-market are less important than the form of contractual relationship and the nature of organizational form [7].

An alternative to contracting out and privatization of infrastructure is the PPP. These are used world-wide and are long-term contracts between government and private business for a combination of services, construction or financing in return for some combination of public funds, public assets or user fees [42]. The private element of a PPP may be an alliance or joint owned company which is entirely private sector owned, bringing complexity to PPPs and additional risk to the public partner [40].

The more common form of the PPP is that introduced through the UK Private Finance Initiative (PFI) [42] which aims were to move public sector debt to the private sector and later to achieve value for money objectives such as on-time, on-budget completion or accessing scarce design expertise and construction skills [43].

A learning from PPP’s is the focus on mutual achievement of business objectives based on cooperation around respective competitive strengths, replacing the antagonistic public versus private dualism with harmonious, synergistic duality of partnership [7].

## VI. RECOMMENDATIONS FOR FUTURE RESEARCH

This paper has re-positioned stewardship theory to provide an emergent model for understanding the requirements for the effective governance of large, critical infrastructure assets.

21<sup>st</sup> century governance arrangements which minimize individual self-interest and pursue the interests of others have emerged and have demonstrated the capacity to meet both economic objectives and provide a decision-making process which includes non economic public values. *The emerging questions are:*

1. *How can the knowledge of these emerging forms of governance and Stewardship theory be brought together to conceptualize the operation of new organizational and structural arrangements for the provision of public goods and services?*
2. *What are the principles to be applied in the design of infrastructure governance arrangements which promote achievement of the complete stewardship outcome?*

The organizational types most prevalent in the literature regarding infrastructure are the traditional department, contracting out to private companies and Private Public

Partnerships (PPPs). However, there are other forms including privately owned or government owned companies, statutory authorities and statutory corporations. The extent of the use of each type has not been explored in the literature, even in respect of the relatively narrow scope of a single state or nation nor is there an understanding of the decision-making that goes into choosing a governance form.

Once the typical types of entities or mixes of entities are identified the relationships between component member entities can be examined to gain an understanding of whether the current governance arrangements advance, or indeed even allow, the steward to pursue the complete stewardship objective, addressing both economic and non-economic values. Criteria to be examined may be drawn from Stewardship theory, addressing dimensions such as trust, focus on outputs or outcomes and the perceptions of actors as to responsibility for the interests of others utilizing the models of stewardship developed by Birnberg [31]. A further dimension to be explored is whether asset management decisions are taken at only an operational level or the strategic decision-making level [26].

Stewardship theory, relational contracts and PPPs have each offered examples of relationships which promote the achievement of both shared economic values and the public interest.

## VII. CONCLUSION

This paper presented the emerging stewardship responsibilities of governments and private providers of infrastructure. The paper also considered whether new collaborative arrangements are capable of providing a better (stewardship) outcome than other models such as a single departmental agency carrying out all associated stewardship roles or the contracting out of the entire operation and maintenance of the asset. It is argued there is potential for models to be developed that mix the emerging organizational and contractual forms of governance.

The contribution of these models will be important as the research into infrastructure governance is not advanced with there being a clear need for greater understanding of the relationships which are in play in such a wide range of infrastructure governance arrangements. Stewardship theory emerges as a powerful tool to apply to the examination of case studies of typical and atypical infrastructure governance arrangements.

The further development of stewardship theory and proposed research of the current infrastructure governance arrangements will provide data and information to be used by those interested in the outcomes of infrastructure assets. Stewardship theory is concluded to offer insights into arrangements for the ‘good’ governance of infrastructure assets.

## REFERENCES

- [1] R. B. Denhardt & J.V. Denhardt, *The New Public Service: Serving, Not Steering*, M. E. Sharpe, Armonk, NY, 2007.
- [2] C. Hood, "A Public Management for All Seasons?", *Public Administration*, Spring 1991, 69:3-19.
- [3] R. W. Waterman, & K. J. Meier, "Principal-Agent Models: An Expansion", *Journal of Public Administration Research and Theory*, 1998, Vol. 2, 173-202.
- [4] L. Donaldson & J. H. Davis, "Stewardship Theory or Agency Theory: CEO Governance and Shareholder Returns", *Australian Journal of Management*, 16(1), 49-65, June 1991.
- [5] J. Davis, F. Schoorman & L. Donaldson, "Toward a Stewardship Theory of Management", *Academy of Management Review*, January 1997, Vol. 22(1), 20-47.
- [6] D. M. Van Slyke, "Agents or Stewards: Using Theory to Understand the Government-Nonprofit Social Service Contracting Relationship", *Journal of Public Administration Research and Theory*, 2007, Vol 17, 157-187.
- [7] D. Grimshaw, S. Vincent & H. Willmott, "Going Privately: Partnership and outsourcing in UK public services", *Public Administration*, 2002, 80(3), 475-502.
- [8] J. Waterhouse, K. Brown, C. Flynn, "The Pacific Motorway: A Case Study Examining Public Sector Management Dilemmas", *Journal of Contemporary Issues in Business and Government*, 2002, 7(1), 21-28.
- [9] R. Keast, J. Waterhouse, K. Brown & M. Mandell, "Hard Hats and Soft Hearts: Relationships and Contracts in Construction and Human Services", *EGPA Conference*, Berne, Switzerland, August 2005.
- [10] R. Keast, M. Mandell & K. Brown, "Mixing State, Market and Network Governance Modes: The Role of Government in "Crowded" Policy Domains", *International Journal of Organizational Theory and Behavior*, Spring 2006, 9(1), 27-50.
- [11] D. Osborne & Ted Gaebler, *Reinventing Government*, Reading MA, Addison-Wesley, 1992.
- [12] J. Cannadi & B. Dollery, "An evaluation of Private Sector Provision of Public Infrastructure in Australian Local Government", *Australian Journal of Public Administration*, September 2005, 64(3), 112-118.
- [13] R. B. Denhardt & J.V. Denhardt, "The New Public Service: Serving Rather than Steering", *Public Administration Review*, Nov/Dec 2000; 60 (6), 549-559.
- [14] O. Hughes, *Australian Politics*, 3<sup>rd</sup>ed., Macmillan, South Yarra, 1998.
- [15] T. Entwistle & S. Martin, "From Competition to Collaboration in Public Service Delivery: A New Agenda for Research", *Public Administration*, 2005, 83(1), 233-242.
- [16] T. Beck-Jorgensen & B. Bozeman, "Public Values Lost? Comparing cases on contracting out from Denmark and the United States", *Public Management Review*, 2002, 4(1), 63-81.
- [17] E. Redford, "The Protection of the Public Interest with Special Reference to Administrative Regulation", *American Political Science Review*, 1954, 48(4), 1103-1113.
- [18] D. Stone, *Policy Paradox and Political Reason*, HarperCollins, New York, 1988.
- [19] H. De Bruijn & W. Dicke, "Strategies for Safeguarding Public Values in Liberalized Utility Sectors", *Public Administration*, 2006, 84(3), 717-735.
- [20] J. Woodhouse, J., "Asset Management", *The Woodhouse Partnership Ltd.*, Newbury, UK, 2001.
- [21] A. Tsang, "Strategic dimensions of maintenance management", *Journal of Quality in Maintenance Engineering*, 2008, 8(1), 7-39.
- [22] D. J. Vanier, D.J., Why Industry Needs Asset Management Tools, *Journal of Computing in Civil Engineering*, Vol. 15, No. 1, January, 2001 35-43.
- [23] R. F. Cagle, Infrastructure Asset Management: An Emerging Direction, 2003 AACE International Transactions.
- [24] M. Halfway, J. Vanier & T. Froese, "Standard data models for interoperability of municipal infrastructure asset management systems", *Canadian Journal of Civil Engineering*, December 2006, 33(12), 1259-1269.
- [25] J. Amadi-Echendu, K. Brown, Nalinaksh Vyas, J. Lee, J. Mathew, R. Willett & Bo-Suk Yang, "What is engineering asset management?" *Proc. 2nd World Congress for Engineering Asset Management*, Harrogate, UK, 2007.
- [26] E. Too, M. Betts & K. Arun K. "A strategic approach to Infrastructure Asset Management", In Sirikijpanichkul, Ackhai and Wai, Shih Hoi, Eds. *Proceedings BEE Postgraduate Infrastructure Theme Conference 2006*, Gardens Point Campus, Queensland University of Technology.
- [27] P. S. Lufkin, A. Desai, & J. Janke, "Estimating the restoration and modernization costs of infrastructure and facilities," *Public Works Management & Policy*, July 2005, 10(1), 40-52.
- [28] D. Tranfield, D. Denyer & M. Burr, "A framework for the strategic management of long-term assets (SMoLTA)", *Management Decision*, 2004, 42(2), 277-291.
- [29] P. W. Jolicoeur, & J. T. Barrett, "Coming of age: Strategic asset management in the municipal sector", *Journal of Facilities Management*, July 2004, 3(1), 41-52.
- [30] R.B. Saltman, & O. Ferroussier-Davis, "The concept of stewardship in health policy", *Bulletin of the World Health Organization*, 2000, 78(6), 732-739.
- [31] J. Birnberg, "The role of accounting in financial disclosure", *Accounting, Organizations and Society*, 1980, 5(1), 71-80.
- [32] M. Verdonk, C. Dieperink & A. P. C. Faaij, "Governance of the emerging bio-energy markets", *Energy Policy*, 2007, Vol. 35, 3909-3924.
- [33] T. Gray & J. Hatchard, "Environmental stewardship as a new form of fisheries governance", *ICES Journal of Marine Science*, 2007, 64, 786-792.
- [34] R. Wettenhall, "Exploring Types of Public Sector Organizations: Past Exercises and Current Issues", *Public Organization Review*, September 2003, 3, 219-245.
- [35] R. Wettenhall, "Autonomy issues in Australian non-departmental public bodies", *9<sup>th</sup> International Research Seminar on Public Management (IRSPM)*, Milan, April 2005.
- [36] I. Thynne, "The Incorporated Company as an Instrument of Government: A Quest for a Comparative Understanding," *Governance: An International Journal of Policy and Administration*, 7(1), 59-82, January 1994.
- [37] C. Hood, "Which contract state? Four perspectives on over-outsourcing for public services." *Australian Journal of Public Administration*, September 1997, 56(3), 120-131.
- [38] M. Muth & L. Donaldson, "Stewardship and Board Structure: a contingency approach", *Corporate Governance*, January 1998, 6(1), 3-28.
- [39] M. Jensen & W. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs, and Capital Structure," *Journal of Financial Economics*, 3, 305-360.
- [40] G. A. Hodge, "The risky business of public-private partnerships" *Australian Journal of Public Administration*, December 2004, 63(4), 37-49.
- [41] K. Baker, J. Justice & C. Skelcher, "The Institutional Design of Self-Governance: Insights from Public-Private Partnerships", *XII Annual Conference of the International Research Society for Public Management*, Brisbane, March, 2008.
- [42] K. Brown, "Are Public-Private Transactions the Future of Infrastructure Finance?" *Public Works Management Policy*, 2007, 12(1), 320-324.
- [43] G. A. Hodge & C. Greve, "Public-Private Partnerships: An International Performance Review", *Public Administration Review*, May/June 2007, 67(3) 545-558.