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Private finance for the delivery of school projects in England

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This paper analyses the use of the private finance initiative (PFI) approach to deliver school projects in England. The findings are based on case-study research in the Building Schools for the Future scheme (BSF), the largest single capital investment in 50 years to rebuild and renew all of England's secondary schools. Up to half of the school infrastructure is to be procured by PFI contracts. A major concern has been the high cost associated with PFI procurement and any subsequent changes to scope. Furthermore, in some cases PFI-funded schools have been closed soon after completion; at great cost to the public sector. The aim of this research was therefore to understand the underlying reasons for these problems. The main conclusion is that the difficulties in BSF arise from not sorting out strategic issues and instituting appropriate organisational frameworks before engaging the private sector. The result of this is a lack of clarity about the long-term needs and end user aspirations. A brief outline of current programme management methods is given and it is suggested that this might be integral to the successful delivery of schools using private finance. A clear strategic vision that cascades into projects via programmes will ensure that the school infrastructure is appropriate for the anticipated strategic benefits and is aligned to the overall service delivery ambitions.

1. INTRODUCTION

Recently, the use of private finance in delivering school projects has come under increasing criticism. For example, a recent parliamentary report on the Building Schools for the Future (BSF)¹ English secondary school renewal scheme isolated the use of private finance initiative (PFI) funding as one of the bottlenecks for the overall success of the scheme. It is not the intention of this paper to expound on the arguments for or against private finance as a means of delivering infrastructure projects. However, evidence shows that PFI is still expected to be a major procurement route in the foreseeable future. According to the construction statistics annual report for 2006,² the value of signed PFI deals was estimated at £5.5 billion, accounting for 13.3% of projected gross domestic product (GDP) for the year. Since its introduction, an estimated £57 billion worth of PFI contracts have been signed and another £22 billion is in the pipeline up to 2011. The value of the PFI construction sector is projected to decline significantly,³ nevertheless, government is still committed to PFI schemes and investment in public sector PFI

projects will remain substantial.^{4,5} This paper examines the following three fundamental questions.

- What is the role of private finance in delivering school projects?
- Why do school projects involving private finance experience complications?
- How can the difficulties be alleviated?

The first part of this paper provides an overview of the research and a review of the context of BSF and the role of private finance. This is then followed by a summary of the key findings and a discussion of the implications.

2. THE RESEARCH

The findings in this paper are based on case-study research of the experience of the pilot schemes and first wave of BSF projects. The BSF cases included: Bradford, Solihull, Newcastle, Manchester, Sheffield, Leeds, Knowsley, Lancashire, Greenwich and Bristol. A study of reports and documents on the BSF schemes in the public domain was undertaken. This was then supplemented by semi-structured interviews with key participants and study of business cases. The interviewees were asked to describe their approach to procurement and the problems experienced. Some private sector participants were also requested to give their version of the main procurement issues. The interviews were digitally recorded then transcribed and analysed using NVivo software (QSR International Pty Ltd, Southport, UK). The detailed results of the research are commercially sensitive and subject to confidentiality agreements; and are therefore not included in this article. Nevertheless, the generic lessons are considered useful for similar schemes in the future.

3. PRIVATE FINANCE AND INVESTMENT IN PUBLIC SECTOR INFRASTRUCTURE

Traditionally, in both the developed and developing world, the funding of public service infrastructure in the twentieth century was dominated by the state. However, as observed by De-Lathauwer,⁶ since the 1980s, economic realities and the growing realisation of the limitations of public funding for infrastructure development have led governments to supplement available public funds with private sector investment.

From a private sector point of view, investment is motivated by the business opportunity. This means that there must be a minimum return on invested private capital for a particular investment to be attractive and worth the risks.⁷ Conversely, the

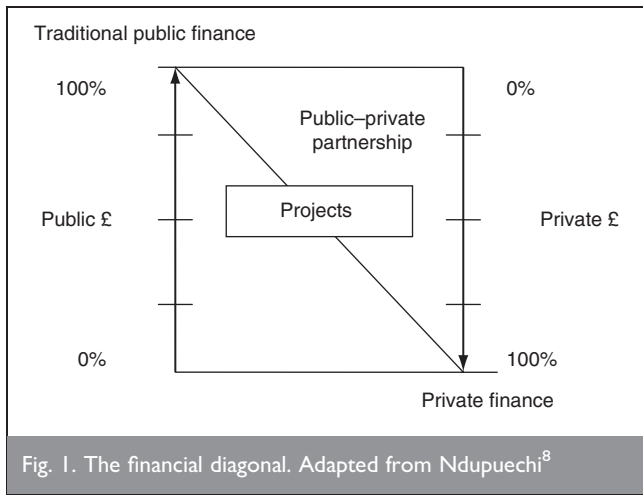


Fig. 1. The financial diagonal. Adapted from Ndupuechi⁸

public sector seeks to balance socio-economic costs and benefits associated with investing in infrastructure. The trade-off between the two is the premise for public-private partnerships and their variants; Fig. 1 illustrates this relationship. It is this apparent conflict of interest that has sparked widespread debate about using private finance to fund traditionally public sector projects.

According to Merna and Njiru,⁹ private finance is needed to ease the burden on government finance. Yescombe⁷ supports that view and states that private finance provides upfront funding to undertake projects that would not have been possible in the public sector due to budgetary constraints. Broadbent and Laughlin¹⁰ argue that the introduction of PFI was an inevitable consequence of the need to explore different approaches to the funding of capital expenditure. Terry,¹¹ however, asserts that the PFI approach was conceived from pressing infrastructure needs, alongside the requirement to keep public expenditure under control, which, when coupled with an ideological commitment to increase private sector involvement in the public sector led to the emergence of PFI. Other authors such as Dunleavy and Hood¹² have argued that PFI is part of a much wider agenda attempting to increase the efficiency of the public sector by the introduction of private sector project management skills and experience. Smith *et al.*¹³ point out that if properly designed PFI projects facilitate better risk sharing and gives the public sector an opportunity to take advantage of the risk management expertise available in the private sector.

Therefore the reasons for using private finance in traditionally public sector infrastructure projects as highlighted above show the potential benefits to both the private and public sector. The next section provides insight into the role of private finance in the context of BSF.

4. BUILDING SCHOOLS FOR THE FUTURE AND PRIVATE FINANCE

The UK government's drive to pursue a knowledge-based economy has placed education at the forefront of its policy with provision of appropriate school infrastructure considered a critical element of the wider agenda to modernise education.¹⁴ According to the Department for Children, Schools and Families (DCSF); formerly Department for Education and Skills (DfES) about £31 billion has been invested in school infrastructure improvement in the last 10 years with 1106 new schools, 27 000 new or improved classrooms and 1260 new children's centres



Fig. 2. Ground-breaking ceremony at a school building site

delivered in England.¹⁵ Similar trends of investment may be observed in Scotland, Wales and Northern Ireland.

BSF was launched in 2003 as a long-term programme of investment and change in England.¹⁶ It was launched alongside other major initiatives aimed at improving the quality of education by providing school buildings and information and communication technology (ICT) infrastructure (Fig. 2).

In order to appreciate the part that private finance plays in BSF, it is important to understand the delivery model for most BSF schemes.¹⁷ At the heart of the approach recommended by DCSF through its Partnerships for Schools delivery body, is the local education partnership (LEP). This is a joint venture company set up between a private sector partner (80%), the local authority (10%), and Partnerships for Schools (10%) to deliver BSF projects (Fig. 3). The local authority has a contract with the LEP called a strategic partnering agreement to deliver the projects for a fixed period. The LEP is the single point of contact for the procurement, delivery and integration of all services required and organises a supply chain to achieve the objectives. The LEP delivers the entire scheme including the buildings, ICT, maintenance and other premises-related services to the schools on a long-term basis. Other types of work may also be extended to the remit of LEP including the delivery of primary schools, healthcare and wider regeneration service. The strategic partnering board acts as the vehicle for stakeholder involvement and consultation. In this model, DCSF takes a policy-setting role and Partnerships for Schools acts as an agent of central government.

Figure 3 shows how private finance (PFI) fits into the LEP model for the delivery of BSF schemes. Different councils have chosen different approaches for delivery of the schemes; however the use of private finance as part of the procurement seems to be a preferred option by many local authorities. For example, Leeds City Council has opted for the LEP model with a PFI approach for building and ICT.¹⁸ It is not, however, mandatory for any local authority to use the LEP model for delivery of their BSF schemes and indeed some local authorities have based their delivery on non-LEP models. For example, Solihull council opted for a non-LEP model with separate PFI contracts for construction of school

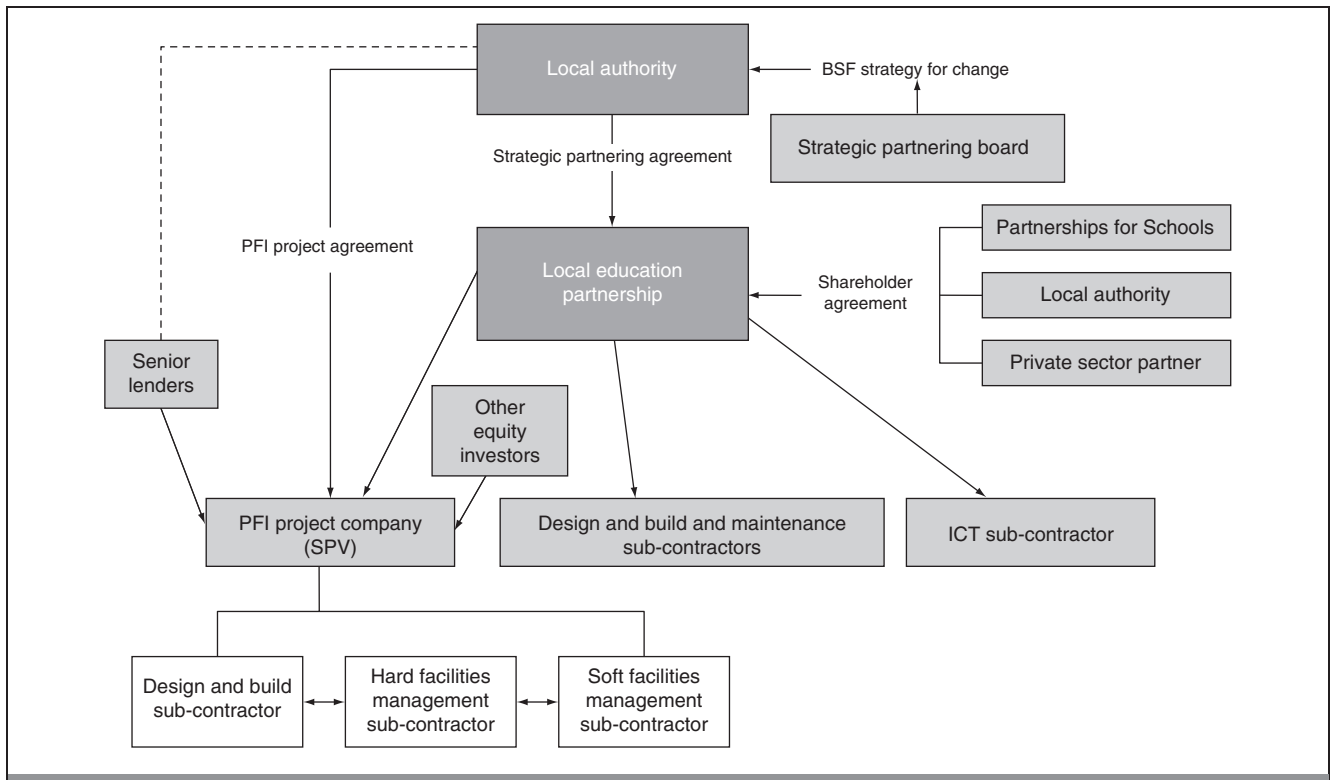


Fig. 3. The local education partnership (LEP) model from ref. 17

buildings and ICT.¹⁹ Furthermore, an element of conventional design-and-build was chosen for schools involving relatively smaller investments. Due to a need to cater for special needs and dwindling pupil numbers, Knowsley council decided to re-organise the secondary school construction under a PFI scheme but with a non-LEP structure.²⁰ Regardless of the variants of the delivery model by local authorities, overall up to half of the projects involve PFI contracts.¹⁷

In summary, the trend in PFI as a procurement route for public sector infrastructure projects shows that market growth in private finance deals has probably peaked. However, government is still committed to using PFI procurement. In the recommended BSF procurement model there is a clear intention to use private finance for procurement of school infrastructure or at least to consider it as a main option. The final part of this paper discusses some of the main findings from the authors' research to date.

5. KEY FINDINGS AND IMPLICATIONS

HM Treasury has observed that the PFI approach has the potential to deliver outstanding projects on time, on budget and to acceptable quality.²¹ In fact in some instances the level of innovation and creativity involved in financing, designing and constructing infrastructure has provided substantial benefits to the client relative to other procurement routes.²² Some of the main difficulties associated with using PFI procurement in BSF have been around risk-transfer agreements. Translating the agreed risk transfer into contractual terms and, in particular, setting up of the unitary charge and payment mechanisms can be a challenge. A project company set up to deliver a PFI project will base its delivery solutions on the client's requirements and output specifications and will be penalised for not achieving these requirements and specification as set out in the payment mechanism. The general conclusion of our research is that the strategic change management process could and should be

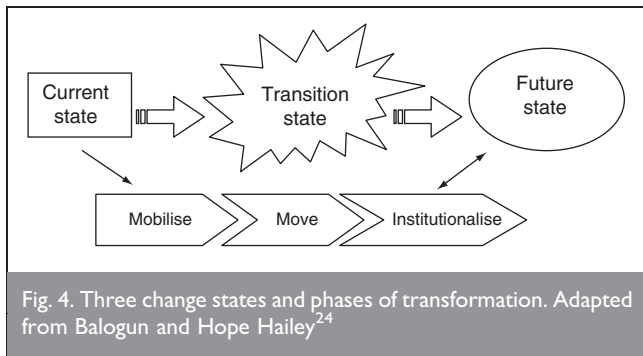
managed better. Three of the main areas of contention associated with this challenge are briefly discussed.

5.1. The strategic vision and transformational change

The potential to get maximum benefit from using PFI is usually dependent upon the clarity of the client's vision and competence to act as an 'intelligent customer' to manage the process and provide the organisational environments needed to achieve the strategic objectives.

In the case of BSF the stated national aim of the scheme is '... to rebuild or renew every secondary school in England over a 10-15 year period'.¹⁷ In this sense the scheme seems to be perceived overall as a series of construction projects; with erecting the physical infrastructure being the focus. Elsewhere it is stated that 'It is hoped that BSF will help transform education for secondary age students by providing 21st Century learning environments that engage and inspire young people, their teachers and the wider community'.¹⁶ The latter is clearly an expression of the strategic aspiration of government and represents a transformational change.²³ Transformational change usually consists of a number of projects and initiatives.²⁴ In that case, the BSF drive to renew school infrastructure should therefore be part of a portfolio of transformational projects, which may include changes in culture, curriculum, training of education staff and organisational reform towards the ultimate vision.

Without a unifying vision, these initiatives can appear to be unrelated, confusing, and piecemeal. According to the report by the House of Commons Education and Skills Committee,¹ the lack of a clear strategic vision and focus on the educational transformation is one reason why some BSF schemes and key players struggle to express what they are trying to achieve. The authors' research discovered that in some local authorities, BSF is viewed principally as an infrastructure building project



whereas in others the relationship between the buildings and the aspiration to inspire future generations and enhance learning is unclear.

A vision generates commitment to strategic change.^{24,25} According to Kotter,²⁶ a vision usually encapsulates what the organisation is trying to achieve; a rationale for the changes to be undertaken; and a picture of the future organisation. The consensus seems to be that good upfront planning is imperative to enhancing the chances of successful strategic change. It would however be wrong to believe that strategic change will unfold neatly in a linear fashion in accordance with the carefully laid plans.^{24,27-31} Interviewees reported that the transition was characterised by surprises with unpredictable and uncertain outcomes. Words such as 'frustrating', 'chaotic', and 'difficult' were often used to describe their experience. The simple model in Fig. 4 illustrates the change states and phases of transformational change.

In BSF, the difficulties experienced in the chosen procurement route are usually in the most perplexing phase of the transformation, namely the transition state. The three major decision points in any BSF scheme are at the strategy for change (SfC), the outline business case (OBC) and full business case (FBC). The FBC sanctions the involvement of the private sector partner and selection of the PFI consortium. If the strategic vision is clear the outline designs and output specifications, which serve as the basis for the PFI consortium to prepare their bid, will offer adequate scope for the private sector to innovate the design, construction and operation of the buildings. Subsequently, negotiation of the contracts and payment mechanisms will be based on this vision. If however the strategic vision and end-user aspirations are unclear, the transition state often proves to be messy. This was the case in a number of schemes that experienced complications in dealing with the private sector PFI partner.

In BSF, the stakeholders at the delivery end of the scheme include school head teachers, staff, governing boards, community groups and local authority education staff; among others. Aggregating the different aspirations of the stakeholders to achieve consensus affects the transition period and ultimately the smooth delivery of the projects. The lenders in a PFI scheme need to evaluate the terms of the project's contracts insofar as these provide a basis for its construction costs and operating cash flow and quantify the risks inherent in the project with particular care. If the strategic vision of the BSF scheme is unclear or subject to change, hence affecting the nature of the physical asset, the risk profile inevitably changes. Fig. 4 therefore emphasises the need for concerted effort and ample time to sort out the mobilisation stage; and to clarify the vision and strategic objectives from which the projects and programmes result.

5.2. Managing the design and procurement process

A study by PricewaterhouseCoopers³² provides evidence to support the view that a positive and significant association exists between capital investment in schools and pupil performance. It is therefore imperative that the design process is managed well and sufficient time is allowed for alternatives to be investigated and considered before procurement. Changes in design later in the procurement and negotiation often lead to cost increases because of the knock-on effect on the secondary PFI contracts and agreements.

Robust PFI contracts are a challenge to formulate because of the use of output-based specifications, long contract durations, whole life costing and incentivisation. The PFI process has been accused of failing to take account of how service delivery, and therefore the way in which buildings are used, will change over the course of a PFI contract and beyond, often resulting in inflexible and unsustainable buildings that may become redundant long before the contract expires.³³ In light of the above discussion, rather than criticising the procurement route, the emphasis should be on clarifying the client's needs and end-user aspirations and allowing these to inform the design in order to attain a building that truly suits the objective. In this regard, DCSF has commissioned the Commission for Architecture and the Built Environment (CABE) to provide extra support and guidance to local authorities on getting the best designs. But 'best' designs can only be achieved through a series of iterative processes that are made easier if the vision is clear. In BSF, the fundamental questions that should precede design are: what should twenty-first century education be and what is transformation desired? The answers are not easy to formulate but provide vital inputs for design of schools that will fulfil the national and local educational ambitions.

Along with design issues is the increasing need to include a sustainable procurement approach.³⁴ For this to be possible the right budgetary mechanisms have to be in place. This would mean that along with a whole-life costing approach the focus has to shift from lower upfront costs to sustainable design.

5.3. Linking the strategic vision and infrastructure projects through programme management

Programmes and programme management have been recognised as important vehicles for strategic transformational change in organisations.³⁵⁻⁴³ Despite this growing awareness, none of the pilot and first wave BSF schemes have adopted a programme management philosophy/approach and the appropriate structure that allows the client to continuously co-ordinate the various projects and to align them to the overall transformational strategy. The model in Fig. 5 highlights the pivotal role of a programme management-based approach in achieving transformational change.

The key features of the model highlight the distinction between the overall strategic issues, which shape the policy, and tactical project issues, which are focused on achieving time, cost and quality objectives. Ideally the contextual issues provide a basis for deriving the content of each project in a way that fulfils strategic objectives. Programme management attempts to bridge the gap between context and content and aligning projects to the overall strategy. In a BSF model of transformational change, the programme manager role would ideally be taken by someone who understands all aspects of the strategic vision including the link

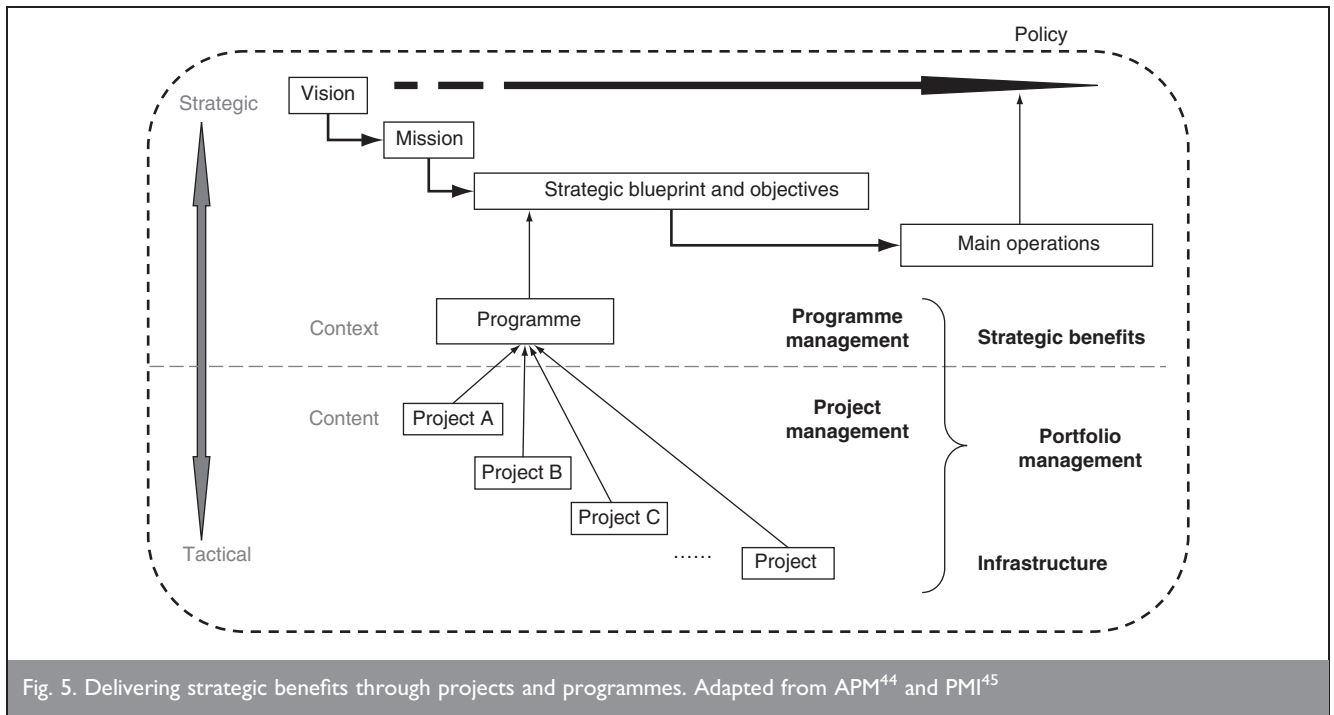


Fig. 5. Delivering strategic benefits through projects and programmes. Adapted from APM⁴⁴ and PMI⁴⁵

between the built infrastructure and the other cultural, organisational and curriculum change projects. Such an approach is very useful when PFI is the chosen procurement route since programme management concentrates on the strategic benefits of projects in order to achieve an overall common goal.⁴⁶ The simplified model in Fig. 5 would also allow the individual project managers to concentrate on fulfilling their objectives in terms of time, cost and quality of the physical infrastructure. This synergy between project and programme would lead to increased efficiency and delivery of schools that meet strategic objectives and fulfil central government's policy requirements.

In summary, this paper has reviewed the role of private finance in public sector infrastructure procurement. In particular the case of BSF, the challenges local authorities face with using PFI procurement to a large extent stem from managing the strategic change and key decisions before involving the private sector PFI partner.

In the face of increasing demand for scarce resources from the public sector budget, the use of private finance will continue to provide an alternative source and an opportunity to deliver value for money through enhanced risk sharing and use of commercial expertise from the private sector for the short- to medium-term future. Nevertheless the public sector client may experience problems when trying to implement particular sectoral programmes.

The key transformation stages of these projects need to be well managed to avoid some of the pitfalls. The strategic vision and transformational change aspirations must be clarified before involving the PFI private sector partner. This approach will be useful in managing the design process, procurement and stakeholder issues. Furthermore, a clear vision that cascades into related projects ensures that all projects are aligned to the overall service delivery ambition.

Recent thinking in project management practice has identified the significance of moving away from the single project paradigm to a

multi-project approach and that a programme management approach will assist in fulfilling this goal and delivering the change desired. Therefore the case is made for utilising programme management within innovative private funding models in delivery of school projects such as BSF. The authors are currently engaged in further research in this area.

REFERENCES

- HOUSE OF COMMONS EDUCATION AND SKILLS COMMITTEE. *Sustainable Schools: Are we building schools for the future?* In HC 140-I, ed. HM Stationery Office, London, 2007.
- DEPARTMENT OF TRADE AND INDUSTRY (DTI). *Construction Statistics Annual Report 2006*. TSO, London, 2006.
- MARKET AND BUSINESS DEVELOPMENT (MBD). *The UK PFI Construction Market Research Report*. Market and Business Development, London, 2006.
- LATHAM M. *Improving Public Services through Better Construction*. National Audit Office, London, 2005.
- HM TREASURY. *Transforming Government Procurement*. HM Treasury, London, 2007.
- DE-LATHAUWER W. Scenarios for transport infrastructure of Europe: planning and financing. *Tunnelling and Underground Space Technology*, 1995, 10, No. 1, 45–51.
- YESCOMBE E. *Principles of Project Finance*. Academic Press, San Diego, CA and London, 2002.
- NDUPUECHI F. *Financial Engineering for Project Finance*. PhD thesis, University of Leeds, 2003.
- MERNA T. and NJIRU C. *Financing Infrastructure Projects*. Thomas Telford, London, 2002.
- BROADBENT J. and LAUGHLIN R. The Private Finance Initiative: clarification of a future research agenda. *Financial Accountability and Management*, 1999, 15, No. 2, 95.
- TERRY F. The Private Finance Initiative—overdue reform or policy breakthrough? *Public Money and Management*, 1996, 16, No. 1, 9–16.
- DUNLEAVY P. and HOOD C. From old public administration to new public management. *Public Money and Management*, 1994, 14, No. 3, 9–16.

13. SMITH N. J., MERNA T. and JOBLING P. *Managing Risk in Construction Projects*. 2nd edn. Blackwell Publishers, Malden, MA, 2006.
14. DEPARTMENT FOR EDUCATION AND SKILLS (DFES). *Better Buildings, Better Design, Better Education*. DfES, London, 2004 (A report on capital investment in education).
15. DEPARTMENT FOR CHILDREN, SCHOOLS AND FAMILIES (DCSF). *New Figures Show the Scale of School Building across England*. November 2007. Available from: http://www.dfes.gov.uk/pns/DisplayPN.cgi?pn_id=2007_0075. Accessed 16/05/2008.
16. DEPARTMENT FOR EDUCATION AND SKILLS (DFES). *Building Schools for the Future—A New Approach to Capital Investment*. DfES, London, 2003.
17. PARTNERSHIPS FOR SCHOOLS and 4Ps. An introduction to Building Schools for the Future. In *Partnerships for Schools and 4Ps*. PFS and 4Ps, London, 2007.
18. EDUCATION LEEDS. *Building Schools for the Future 2007*. Available from: <http://www.educationleeds.co.uk/BSF/>. Accessed 02/10/2007.
19. SOLIHULL METROPOLITAN BOROUGH COUNCIL. *Building Schools for the Future 2007*. Available from: <http://www.solihull.gov.uk/>. Accessed 02/10/2007.
20. KNOWSLEY COUNCIL. Future schooling in Knowsley 2006–2008: towards 21st century learning environments. In *Knowsley Communications*. Knowsley Metropolitan Borough Council, Huyton, 2006. See <http://www.knowsley.gov.uk>. Accessed 27/11/2008.
21. HM TREASURY. *PFI: Meeting the Investment Challenge*. HM Stationary Office, London, 2003.
22. NATIONAL AUDIT OFFICE (NAO). *PFI: Construction Performance*. HM Treasury Office, London, 2003.
23. JOHNSON G. and SCHOLES K. *Exploring Public Sector Strategy*. Prentice Hall, Harlow and New York, 2000.
24. BALOGUN J. and HOPE HAILEY V. *Exploring Strategic Change*, 2nd edn. Prentice Hall/Financial Times, Harlow, 2004.
25. NADLER D. A. and TUSHMAN M. L. Organizational frame bending: principles for managing reorientation. *Academy of Management Executive*, 1989, 3, No. 3, 194–204.
26. KOTTER J. P. *Leading Change*. Harvard Business School Press, Boston, MA, 1996.
27. ASHBURNER L., FERLIE E. and FITZGERALD L. Organizational transformation and top-down change: the case of the NHS. *British Journal of Management*, 1996, 7, No. 1, 1–16.
28. BECKHARD R. and HARRIS R. T. *Organizational Transitions: Managing Complex Change*, 2nd edn. Addison-Wesley Pub. Co., Reading, MA, 1987.
29. BROOKS I. and BATE P. The problems of effecting change within the british civil service: a cultural perspective. *British Journal of Management*, 1994, 5, No. 3, 177–190.
30. CONNOLLY M., CONNOLLY U. and JAMES C. Leadership in educational change. *British Journal of Management*, 2000, 11, No. 1, 61–70.
31. DONALDSON G. *Corporate Restructuring: Managing the Change Process from Within*. Harvard Business School Press, Boston, MA, 1994.
32. PRICEWATERHOUSECOOPERS. *Building Better Performance: an Empirical Assessment of the Learning and other Impacts of Schools Capital Investment*. Department for Education and Skills, London, 2003.
33. CABE. *Design Quality and the Private Finance Initiative*. Commission for Architecture and the Built Environment, London, 2005.
34. DEPARTMENT FOR THE ENVIRONMENT, FOOD AND RURAL AFFAIRS (Defra). *Procuring for the Future*. Defra, London, 2006.
35. ARTO K. A. and DIETRICH P. H. *Strategic Business Management through Multiple Projects*. John Wiley & Sons, Inc., New York, 2004.
36. LYCETT M., RASSAU A. and DANSON J. Programme management: a critical review. *International Journal of Project Management*, 2004, 22, No. 4, 289–299.
37. MARTINSUO M. and PAIVI. Role of single-project management in achieving portfolio management efficiency. *International Journal of Project Management*, 2007, 25, No. 1, 56–65.
38. MORRIS P. W. G. and JAMIESON A. Linking corporate strategy to project strategy via portfolio and program management. *International Journal of Project Management*, 2006, 25, No. 1, 57–65.
39. OGC. *Managing Successful Programmes*. HM Stationery Office, London, 2003.
40. PELLEGRINELLI S. Shaping context: the role and challenge for programmes. *International Journal of Project Management*, 2002, 20, No. 1, 229–233.
41. PELLEGRINELLI S., PARTINGTON D., HEMINGWAY C., MOHDZAIN Z. and SHAH M. The importance of context in programme management: an empirical review of programme. *International Journal of Project Management*, 2007, 25, No. 1, 41–55.
42. REISS G. *Programme Management Demystified: Managing Multiple Projects Successfully*. E & FN Spon, London and New York, 1996.
43. SRIVANNABOON S. Linking project management with business strategy. *Project Management Journal*, 2006, 37, No. 5, 88–96.
44. ASSOCIATION FOR PROJECT MANAGEMENT. *APM Body of Knowledge*, 5th edn. APM, High Wycombe, 2006.
45. PROJECT MANAGEMENT INSTITUTE (PMI). *The Standard for Portfolio Management*. Project Management Institute, Newton Square, PA, 2006.
46. PELLEGRINELLI S. Programme management: organising project based change. *International Journal of Project Management*, 1997, 15, No. 3, 141–149.

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