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Alternative and Conventional Infrastructure Business Models: Developing a Typology (WP1.3)

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Garden Bridge, London



Source: TfL, <https://consultations.tfl.gov.uk/rivercrossings/garden-bridge>

Vision: Joanna Lumley – improve green space and connections in the city

Capital Funding:

£30m Citigroup

£30 Treasury

£30 Transport for London

+ £85 to go

Asset ownership and management:

Garden Bridge Trust registered charity

Albert hall, London



Source: Visit London, <http://www.visitlondon.com/things-to-do/place/58843-royal-albert-hall>

Vision: Prince Albert – promote understanding of arts and sciences

Capital Funding: sale of seats on 999 year lease (seats can be sold on as an asset)

Asset ownership and management: registered charity but in trust for the nation

Urban Infrastructure in a time of Austerity?

Cities face a challenge: reduced growth and increasing population has reduced the public spend on infrastructure development.

Prompted by the need of urban residents to improve the **sense of place** and wellbeing, new business models for infrastructure development have emerged (bottom up and down down).

Outline

- Business models and infrastructure: new lessons?
- Building a compendium of infrastructure business models
- Typology of business models
- Examples: *District heat Networks* and *Crowdfunded developments*
- What can we learn from alternative infrastructure business models and why does it matter?

Business Model Concept

- How a firm engages in business activities –
‘A narrative combined with a financial model’ *(Bryson et al., 2014).*
- Multiple definitions and uses in the business and economics literature. Centre of understanding the **strategy** that uses inputs and outputs to create economic value in the value chain.

Key Concepts and Business Models - Towards a typology of infrastructure business models

A word cloud of key concepts for infrastructure business models. The words are arranged in a roughly horizontal line from left to right, with varying sizes and colors. The colors range from yellow to dark green. The words are: Value, Contract, Governance, Networks, Revenue, Asset, Funding, Capital, Service, Regulation, Ownership, and Finance.

Value
Contract
Governance
Networks
Revenue
Asset
Funding
Capital
Service
Regulation
Ownership
Finance

Definitions – Business Models and Infrastructure

“Business model: The organisation’s chosen system of inputs, business activities, outputs and outcomes that aims to create value over the short, medium and long term” (International Integrated Reporting Council, 2013:6)

“...infrastructure as the artefacts and processes of the inter-related systems that enable the movement of resources in order to provide the services that mediate (and ideally enhance) security, health, economic growth and quality of life at a range of scales” (Dawson, 2013: 4)

The iBuild Definition of an Infrastructure Business Model (IBM)

“The system of physical artefacts, agents, inputs, activities and outcomes that aim to create, deliver and capture economic, social and environmental values over the whole infrastructure lifecycle”

(Bryson *et al.*, 2014:11)

Business models and infrastructure: new lessons?

- Infrastructure has a lifecycle, lock-in and complex forms of value to providers and users – ***multiple stakeholders.***
- Complexity of infrastructure in cities – ‘**hidden**’ infrastructure & revenue generation over time.
- **Repurposing** of infrastructure in the urban area – new or existing/new purpose – generates layering of different models.

Approach: Building a

compendium of infrastructure business models

1. Compendium of models using a pro-forma.
 - Focus on infrastructure examples
 - Focus on alternative forms
 - Exploring variations of business models
 - Identify cases within the UK and overseas, planned and realised
2. Identify a typology of business models in infrastructure.
 - Identify primary categories and their variations
 - Identify core examples
 - Supplement core examples with secondary examples

How is Value Created in Infrastructure Business Models?

| Business Model Element | Characteristics |
|--|--|
| Vision | Origins Objective - drivers and opportunity, proposed services and assets, resources Value proposition |
| Delivery | Value capturing mechanism Management of the value network (actors and governance mechanisms) Scale and temporality |
| Outcomes | System outcomes (economic, environmental and social) Risks Impact |
| Relationship with other business models and assets | Identifying temporal and spatial links between infrastructure business models |

Identifying Infrastructure Business Models

Three methods:

1. **Bottom up UK approach**
Regional Growth Fund bids, LEP infrastructure plans, City Deal ...
2. **Top down approach from overseas**
Scan at a national level for core examples of infrastructure
3. **Infrastructure class for alternatives**
Work through media coverage for alternative developments within infrastructure class (energy, water, road, rail, waste, public transport...)

Current IBM Evidence

| Infrastructure type | Number of cases identified | UK | Europe | US | Asia & Pacific |
|----------------------|----------------------------|-----------|-----------|----------|----------------|
| Green Infrastructure | 3 | 1 | 1 | 1 | |
| Transport Road | 15 | 9 | 2 | 4 | |
| Transport Rail | 14 | 7 | | | 7 |
| Public Transport | 7 | 3 | 3 | 1 | |
| Public Leisure | 9 | 7 | 1 | | 1 |
| Communications | 2 | 2 | | | |
| Energy Generation | 16 | 7 | 9 | | |
| Water Supplies | 2 | | | 1 | 1 |
| Waste | 3 | 3 | | | |
| Public Service | 21 | 18 | | 1 | 2 |
| Total | 92 | 57 | 16 | 8 | 11 |

Process of Developing the IBM Typology

- Iterative process.
- Identified similarities in the business models to develop groups.
- From groups identified variations by working through example cases.
- Testing through working through examples.
- Developed primary categories and secondary variegations.
 - **Primary category** and **2-8 variegations** within each category.
 - **Multiple versions** of the typology based on criteria.

IBM Ownership Typology (Categories and Variations)

| Name | Description | Variations |
|----------------------------------|---|---|
| Public-Private Partnership | Service funded and operated through a partnership between government and private business | <ul style="list-style-type: none"> •Public subsidy to private-led management •Publicly owned asset - SPV management •Public/private development and management of new asset •Private Finance Initiative •Public subsidy, private ownership and management •Performance based partnership •Public Special Purpose Vehicle |
| Public | Public finance and management of asset/service | <ul style="list-style-type: none"> •Publicly managed and owned infrastructure (tax) •Public management of community purchase •Funds of funds leverage •National subsidy •User pays charge •Collective management •Fiscal decentralisation •Social equity bonds |
| Private | Privately financed and operated asset/service | <ul style="list-style-type: none"> •Toll •Service rental and usage fee •Privately operated with public subsidy |
| Co-operative/Community Ownership | Organisation owned and managed by its members. Profits shared with members. | <ul style="list-style-type: none"> •Community share scheme •Community ownership •Community asset transfer |
| Third Sector | Third sector ownership of asset | <ul style="list-style-type: none"> •Voluntary •Public-third sector partnership •Third sector asset managed by public sector |
| Trust | Independent local group of statutes (no ownership or shareholders) and surplus revenues reinvested in the trust | <ul style="list-style-type: none"> •Trust ports |
| Mutual | Employees have role in operation and ownership | <ul style="list-style-type: none"> •Public service mutuals |

IBM Typology Version 1: Ownership and Management

| Category | Description |
|-----------------------------------|---|
| Public-Private Partnerships (PPP) | Service funded and operated through a partnership between government and private business |
| Public | Public finance and management of asset/service |
| Private | Privately financed and operated asset/service |
| Community Ownership | Organisation owned and managed by its members. Profits shared with members. |
| Third Sector | Third sector ownership of asset |
| Trusts | Independent local group of statutes (no ownership or shareholders) and surplus revenues reinvested in the trust |
| Mutual | Employee has role in operation and ownership |

IBM Typology Version 2:

Capital Sources: Upfront Financing (often blended)

| Category | Description |
|--------------------------|---|
| Tax payer | Government funded (includes grants, borrowing or transfer of asset) |
| End user | Private sector raise capital for private development |
| Fiscal decentralisation | Additional capture of local tax income from central government |
| Community shares | Sale of share to community member in return for service and ownership of asset |
| Sponsorship | Private sponsor of service |
| Philanthropic donations | Donations from an individual to support specific infrastructure development. |
| Differential rent | Value of land increases from proposed development and is sold to a private developer |
| Crowdfunding | Raising funds from a large number of individuals (both potential users and non-users) |
| Social impact bond (Sib) | Provide upfront capital from private investors to voluntary organisations to fund initiatives not already provided by the local authority for social benefit. Payment by Results (PBR) supported by government, provide a return to the investor. |

IBM Typology Version 3:

Value Creation: Funding Operations (often blended)

| Category | Description |
|--|--|
| User charge and rental | Payment by service user (either one-off or rental charge) |
| Public subsidy | Ongoing finance to support private operation of infrastructure |
| Revenue from another asset | Income from another asset used to support service |
| Revolving loan fund | Revenue from loan repayments |
| Third sector resource | Capability of organisation to deliver service to community |
| Revenue streams from additional services | Additional revenue from multiple service provision from single asset |
| Advertisement revenue | Revenue from advertisement on asset |
| Collective management | Combined management to reduce operation costs |

Concrete, Community and Lifecycles

- Layers of **accumulated infrastructure** that includes a mix of public, private and community models.
- **Legacy** is built around, and helps construct, a sense of place and society at a particular time (visible and invisible aspects). BUT the physical assets and business models have a **lifecycle**, often 30 years +

Alternative Urban Infrastructure: Birmingham District Heating Network

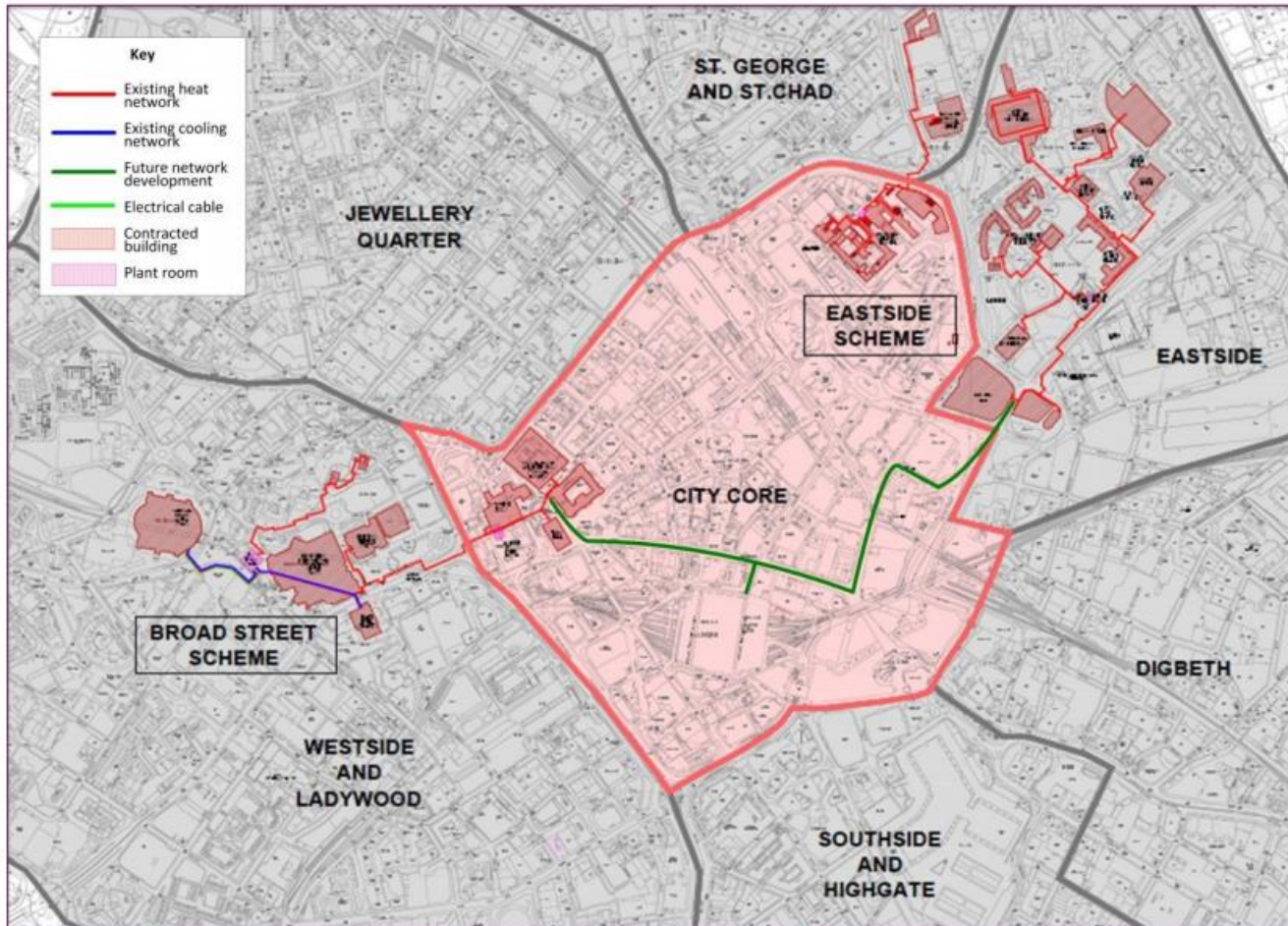


Figure 4: Connection of two district heating networks in Birmingham City Centre

Source: Implementation steps to large scale district heating, SWM, May 2014

Alternative Urban Infrastructure: Crowdfunded Developments

Lowline, New York City



[http://en.wikipedia.org/wiki/Lowline_\(park\)](http://en.wikipedia.org/wiki/Lowline_(park))
<http://thelowline.org>

Luchtsingel Bridge, Netherland



<http://www.luchtsingel.org/en/about-luchtsingel/the-idea/>

What can we learn from alternative business models?

- Additional stages – lifecycle / repurposing
- Intermediaries – new forms of legal entity and ownership, public-private-third sector- community interaction
- Drivers – often not the public sector
- Alternative forms of value – but tested before public sector involvement because of risk
- Scalar issue – ***local infrastructure for local need?***

Local – National - International

- Infrastructure provision more fragmented.
- Place-based approaches drawing on local resources but also multiple scales.
- Local infrastructure assets used to support national service.
- National infrastructure assets used to facilitate local alternative IBM.



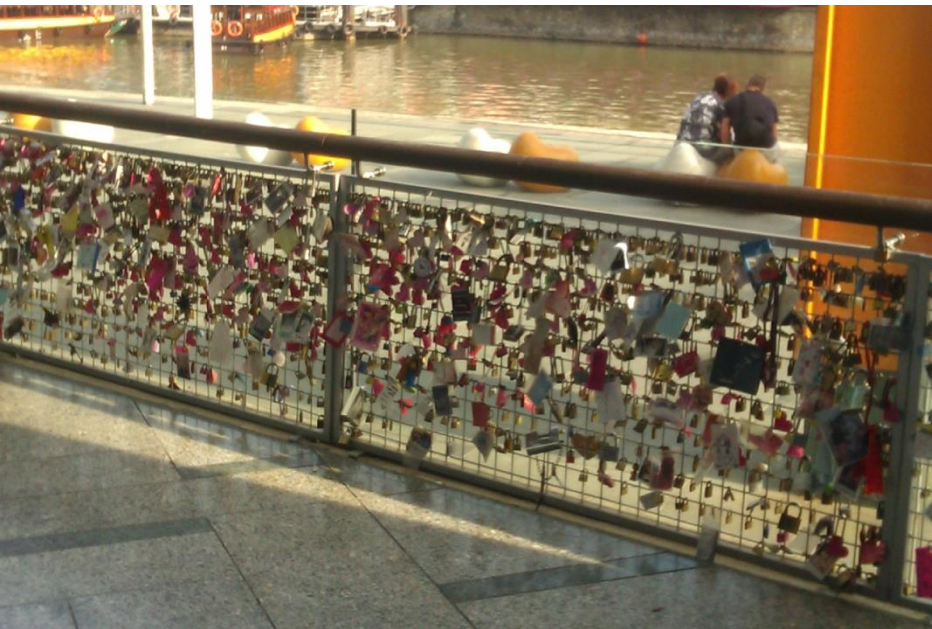
Implications of business models for infrastructure:

- Infrastructure development lifecycle – different IBM models used at different stages.
- Temporality of models e.g. FIT, has implications for how alternative models can be used.
- Purpose of alternative models – proof of concept, initial investment, specific need.
- Development and flexibility of model – does the model emerge or is it locked-in? Implications for the transformation of place.
- Constraints on alternative IBMs

Conclusions

- The provision of urban infrastructure is becoming more fragmented as new place-based or local business models emerge. **A return to the past!**
- There is a **tension** between expectations placed on local economies by national governments and local innovation in the provision of infrastructure.
- Infrastructure Business Model (IBM) concept is useful to understand different ways of realising value for/from local infrastructure

An Alternative Funding Model for Local Infrastructure ?



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