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CONSTRUCTING FUTURE SCOTLAND

Rethinking Infrastructure Policies

CONSTRUCTING FUTURE SCOTLAND:

Rethinking Infrastructure Policies.

Duncan Maclennan¹.

1. Origins, Themes and Approaches

Construction Concerns

This paper originated in a set of questions posed to the David Hume Institute (DHI) by construction industry leaders in Scotland². Responses to them, developed in this paper, are summarised in Chapter 6 and readers short on time can move directly to that executive summary.

The construction sector ‘view’ was that policies shaping planning, project ‘pipeline’ organisation and the procurement of infrastructure investment fail to maximise long term benefits for the Scottish economy. There was particular interest in whether planned or expected infrastructure activities were harmonised with local economic and training policies in ways that would both avoid sector skills shortages, and maximise construction employment opportunities, over the long run, for the Scottish workforce.

Addressing these specific questions necessitates the consideration of a number of broader, bigger themes about infrastructure and policy in the Scottish economy. It not only creates a need for recognition of the changing and uncertain contexts that Scottish households, workers, firms and governments currently face, which are discussed in Part 2, but also requires an understanding, too often missing in public debates and policies, of the ways in which infrastructure provision not only shapes employment but has major, often unmeasured, implications for growth and productivity.

From Sir James Steuart’s (1805) advocacy of the Forth and Clyde Canal in the late 18th century through the Toothill Report’s (1961) grand plan for Scotland’s economy to the current claims for (and against) HS2 much is made of infrastructure’s role in the economy. It is however, a complex relationship, and despite a growing number of high level reviews on effective prioritisation for economic growth (Andres et al, 2015; World Economic Forum, 2012; National Audit Office, 2013) the major ways in which infrastructure projects and national programmes will affect growth are seldom carefully thought through in advance of implementation or monitored and measured successfully ex post. Part 3 of the paper sets out a definition of infrastructure and notes some major economic features of the construction sector in Scotland.

Government influences on how infrastructure investment is planned, funded, procured and delivered, has major impacts on what construction skills are required, and indeed when and where within Scotland. The ‘governance’ of the Scottish ‘infrastructure system’ is considered in Part 4. The consequences for skills demands, and local policy efforts to manage them

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² I am grateful to the David Hume Institute and Policy Scotland for their support in producing this paper and am grateful to the thirty plus people interviewed as part of the project who contributed time and ideas with equal generosity. Morrison Construction gave financial support to DHI for the production of the paper but left me to pursue the research independently. My colleagues Alice Oldfield and David Waite both stimulated my thinking and corrected many of my errors. Those remaining are all of my own making

effectively, are explored in Part 5. The final section of the essay, 6, provides an integrated overview of possibilities for policy change identified in the earlier sections.

This paper represents an early rather than last word on Scottish infrastructure policy. Much is done well in the governance system and there have been significant improvements in Scottish Government infrastructure policies throughout this millennium, particularly over the last five years. Recently the Scottish Government have published a review (Robertson and Clondillon, 2015) of the infrastructure issues arising from development and planning decisions rather than infrastructure policy, planning and prioritisation per se. This essay takes an infrastructure oriented perspective and is concerned with a wider definition and scope than adopted in that extensive research paper. It is based on an examination of the literature available and reflections on a series of 25 interviews, undertaken between June and November 2015, with policymakers, at Scottish and local government levels, executives in public utilities and construction sector firms, consultants and trade related bodies. The paper also draws on 10 interviews with federal and state/province infrastructure policymakers in Australia and Canada. These are regarded as good practice infrastructure policy nations with three level systems of government not fundamentally dissimilar to the quasi-federal arrangements emerging for Scotland within the UK. This short study is intended to raise issues and foster debate rather than provide definitive empirical evidence though where it was available it was used.

The essay addresses some of the major strengths and weaknesses of the broad systems for providing infrastructure in Scotland and highlights possibilities for policy change and better management in the future

Growing Interests in Infrastructure Provision.

Infrastructure, and public spending on infrastructure maintenance in particular, has been in the public eye of Scotland. As 2015 draws to an end failed steel structures have closed (temporarily) the Forth Road Bridge and reminded the nation of the importance of infrastructure in facilitating daily living and working patterns. Infrastructure has also, if less obviously in the public gaze, gained a renewed prominence in public policy thinking since the start of this millennium. Downward pressures on public capital spending and borrowing after the 1970's had led to significant contractions in infrastructure investment across the OECD. By the end of the 1990's, however, a desire to address the obvious infrastructure deficits that had accumulated was allied both to programmes to provide for renewed urban growth and, after the Global Financial Crisis (GFC) in 2008, to promote economic stability.

Relative to other similar OECD countries, such as the USA, Canada and Australia, the UK has been relatively slow to reconsider and re-stimulate infrastructure investment. In Australia, for instance, investment planning and prioritisation approaches have improved demonstrably over the last 15 years and increased public capital spending and investment in cities has, after the short-lived Abbot government, returned to the centre stage of policy debate. While, in Canada, the Trudeau government has committed to raising public borrowing to support infrastructure at levels that, until last month, seemed likely to fall back to pre-2000 scales. Federal, provincial and municipal infrastructure programmes in Canada have all grown throughout this millennium.

Scottish Policy in the UK Context: Different, Generous, Innovative?

Scotland's policies for infrastructure, water, energy and housing differed from those in England prior to devolution and they have shown sustained divergence after 1999, and especially since 2010. For the last four years, there has been a deliberate and successful

Scottish Government effort to sustain investment programmes in difficult times. The autumn bulletin (2015) of the Fraser of Allander Institute underlines how it is these programmes that are just stopping the Scottish economy from slipping into recession as 2015 ends. Post 2010 expansions in borrowings by governments (Scottish and local) have raised infrastructure spending significantly. Although this raises issues of future claims on Scottish revenue budgets (The Guardian, December, 2015) it is likely that new borrowing powers for the Scottish parliament, as fulfilment of the terms of the Smith Commission settlement, will leave the possibility for further infrastructure borrowing and investment by future Scottish Governments.

Welcome as these Scottish stabilisation efforts have been, it is arguable that there has been somewhat greater innovation in infrastructure policy frameworks emanating from Westminster, albeit within a weak governance of infrastructure policies. At the UK level the Public Accounts Committee of the House of Commons have, since 2011, drawn attention to the limitations of the UK government's infrastructure strategy as comprising little more than a list of big projects. The Armitage review (2013) highlighted the need for new strategic approaches in infrastructure provision and the wider Adonis review (2014) highlighted the importance of strategic infrastructure in shaping future UK economic performance.

A number of constructive changes in policy approaches have emerged since 2012. The UK Infrastructure Commission announced in the autumn of 2015 hints at the beginning of a more appropriate governance of long term infrastructure approaches for England, at least, or perhaps, Britain. The autumn spending review (UK Government, 2015), though short on details, implies a rising commitment to infrastructure spending in England to 2020 (despite falling local government programmes). Other policy initiatives have also fostered change. Water industry policy in England has driven two decades of private sector-led innovation in water infrastructure provision; something that, despite the obvious strategic and management competences of Scottish Water, it has not been possible to fully emulate in Scotland. City Deal approaches, reinforced by the Heseltine growth review, have re-focused major metropolitan areas on the role of infrastructure in growth and productivity improvement, and that approach has now spread to Scotland. This paper considers the need for the development of a Scottish equivalent of the Infrastructure Commission and how it might interface with its London-based counterpart.

There is no reason why policy change in Scotland and England, in a devolved system of government, should be identical in aims, instruments or timing. The point of devolution is to facilitate difference, and innovation. However, certain shifts in national and global circumstances and policy ideas require most administrations to consider similar directions of change at much the same time. Policies for infrastructure and cities seem to fall into this category across the OECD. A new Scottish Government after the spring of 2016 will need to refresh city policies and shape an improved infrastructure provision system to more effectively promote growth, and inclusion towards 2020.

These Scottish changes need to be set in the UK context. Major infrastructure investments have spillover effects and create cross-administration network effects, there is an urgent need for the UK government and all the devolved administrations to establish an effective, recurrent 'table' at which to discuss and align cross-border investment intentions. The COAG mechanisms in Australia and the federal/provincial meetings systems in Canada demonstrate how important this process is (and how difficult it can be) and the glaring omission of intergovernmental cohesion in the UK.

Doing Good, Doing Well: Could Do Better?

Hopefully this review of issues and opportunities will draw the debate about possible changes in the governance of infrastructure policies into the public arena. There is a strong case to be made that Scotland needs some different emphases and approaches in how we envision, plan, build and use our infrastructures. Much good work is done in these areas already. However, there is a case to be made that Scottish approaches to infrastructure are top-down, particularly as council borrowing and spending is strictly controlled by Holyrood, and substantially driven by the Scottish Government. They still have an ‘informed centralist’ tone. Within that approach the national economic strategy, infrastructure strategy and the National Spatial Planning Framework are only loosely, and unclearly connected and that there is an absence of a consumer/market perspective (the interests of businesses and households) in the structures of infrastructure governance and policy. In the most recent Scottish Government document on research on infrastructure and planning (Robertson and Clondillon, 2015), for example, the market is portrayed as short-term and impatient in its approach whereas the planning system takes a longer, broader, more informed approach. This view is somewhat old-fashioned. Arguably closely linked politics and planning decisions in Scotland have, on occasion, taken narrow and short term perspectives whereas private infrastructure investors (in power and telecommunications, for example) may take a longer and wider view in their investment strategies. Both planning and the market have key roles to play in resource allocation and the key challenge is to shape the governance arrangements that will foster longer term and wider perspectives.

After half a century of major government roles in infrastructure spending in Scotland (from motorways, new towns and new bridges after 1960) there has also been relatively little attention to developing an evidence-based perspective on the economics of infrastructure and the recursive interaction of infrastructure investments and planning decisions. Scotland is not alone in this regard. The Auditor General for Ontario (2015) has recently drawn attention to the absence of information and monitoring in provincial infrastructure decisions and even where key information exists some Australian states have noted a reluctance to use it (Deloitte, 2012). This gap, in infrastructure evidence, reflects the general lack of R and D in the Scottish construction sector and an academic interest that has been somewhat oriented to engineering rather than economic and management issues. This is an opportune time to refashion how we think about and deliver infrastructure.

Infrastructure policy making is always a difficult area of public policy. It usually involves large tranches of government expenditure (and commonly associated government borrowing) that challenge budget limits. It means fixing capital, public and private, for long future periods and in specific, embedded places. It is always beset by significant risks and uncertainty, sometimes about the past as well as the future. In a world that favours flexibility in labour markets, technologies and ideas, the inherent characteristic of infrastructure is fixity in place. Mistakes made are difficult to remedy or remove and structures embedded shape change for decades ahead.

Change Now.

Scottish infrastructure policy currently faces a ‘perfect storm’ of policy uncertainties. The UK is set to debate membership of the EU and the outcome of that process will influence not just demands driven by economic change but financial possibilities, procurement, safety and environmental legislation pertaining to construction. Within the UK framework, despite

policy innovations in infrastructure and city deals, policymakers and investors all face a 'radical' Capital Spending Review in England (UK Government, 2015). In England major government capital programmes are set to change in ways that will have 'consequential' effects for Scottish budgets. Consequent construction sector demands in England have the potential to compete away construction sector interest in investing in Scotland (and indeed vice versa). In broad terms both the recent UK spending review and the Scottish Budget for 2016 (Scottish Government, 2015b) indicate a likely increases in infrastructure spending with a boost to housing investment budgets though the sustained cutback in resources for local governments (city deals excepted) is a source of some uncertainty especially in Scotland where local government taxes remain frozen. Finally, the firming up of tax and borrowing powers to achieve the recommendations of the Smith Commission together with evolving proposals to change the nature of local government taxation in Scotland are also critical to who invests in infrastructure in Scotland and how it is paid for.

As these uncertainties have been growing, new autonomies, for subnational and local governments have been emerging, and this is not simply a UK and Scotland process. Throughout Europe and the US, there have been growing calls for metropolitan areas and regions to take the lead in refashioning infrastructure provision, indeed a growing sense that national levels of governance (despite their elastic tax bases) will not fix infrastructure issues for the future, see Puentes and Katz (2014) for an American perspective. Much of public investment in Scotland is controlled by the Scottish Government and a clear challenge for the future will be to establish competent governance of more bottom-up led infrastructure provision.

In Scotland, it is not clear whether the major Scottish Government public spending programme on infrastructure of the post-2011 period can be sustained. In the UK as a whole, public spending on infrastructure has fallen by a half since 2010 and by 2016 is expected to have incurred a 70 percent cut from its peak level (2007).

That said there are arguments that overall government spending on construction, or in facilitating construction, might well expand to 2020. Housing programmes are to expand, albeit with different emphases, in Scotland and England. Although central government transfers to municipalities are set to fall significantly to 2020 capital spending may increase. Old, vertical silos of spending are emptying and unlikely to be refilled as they once were. However, cities are recognising that their futures increasingly lie in their own strategies and actions so that new horizontal linkages, across government areas, sectors and potential funding streams are being made to choose and fund essential infrastructure. The 'city deals' policy in England has given this approach impetus, reinforced by changes to business rates arrangements. Further, there is currently much interest in exploring the connections between city economic strategy, infrastructure investment plans, strategic spatial plans and economic outcomes across metropolitan areas, as past work has highlighted how unlinked these activities can be. Now, arguably, the importance of raising metropolitan and regional economic growth has overtaken construction of real estate for the welfare state as the key driver or infrastructure programmes. This growth emphasis requires new rationales, different assessment criteria and new funding approaches. There is also, arguably, a growing realisation that slow project implementation, cost overruns and non-transparent prioritisation are too prevalent in delivering UK and Scottish infrastructure and that new, smarter approaches are required.

All of these challenges to infrastructure governance in Scotland stand, regardless of whether the it is in or out of the UK, whether Barnett formula 'consequentials' fall by a quarter or a

half, or whether devolution is further strengthened with powers gained by Scotland fully used. These issues centre on the smartness and effectiveness of our system of infrastructure governance and how well we connect capital spending to employment benefits and local economic change. Growing uncertainty reinforces the need to change how we deliver, and there is no time for a prolonged pause for reflection. Good infrastructure contributes to city and regional competitiveness for the long term, and relentless global economic competition is not standing still whilst Scotland and the UK settle their constitutional details.

Making a Case.

The next section of the paper, part 2, sets out a brief description of meanings of infrastructure and proposes the selection of an eclectic definition for the purposes of this study.

2. What is Infrastructure?

More than Public Goods

Most commonly when analysts and commentators write about infrastructure they have in mind public capital expenditure on large-scale fixed investments, providing something akin to traditionally-defined public goods. However, this a perspective rooted in the last century, that over-simplifies the types of investments and actors involved and, in turn, minimises the diversity and challenges in shaping infrastructure policy, planning and provision. An emphasis on largely top-down public and government action and leadership, in the UK and Scotland specifically top-down central government leadership, also goes hand-in-hand with this old-fashioned perspective.

A discussion of what, from an economic standpoint, infrastructure is can usefully start at the notion of 'public goods' but cannot, now, end there. 'Public goods', in the strict economic sense of the term, are goods that if they are provided for one they are provided for all (non-rivalrous in consumption) and, for which, it is impossible, or unduly costly, to exclude individuals from consuming them (non-excludable).

National defence and infrastructure are often cited as the classic cases of 'public goods'. Indeed much publicly provided infrastructure has 'public good' features but more commonly there is rivalry in consumption and possibilities for excluding non-payers. For instance, for the traditional public infrastructures such as roads, bridges and water supplies, there are often typically signs of rivalry in consumption (congestion) and most can have toll or charging systems, designed to exclude individuals who refuse to make payments or to have systems of charging that reflect asset usage. Water rates also reflect usage. Indeed benefit taxation and user charges for such works would have been the charging choice of both Smith and Hume.

Often it is the 'lumpy' nature of necessary investments that induce public action and ownership, rather than non-rivalry and non-excludability, and the policy intervention may be concerned with pricing use when the efficient scale of asset production confers a 'natural monopoly' on the particular asset. In many instances, governments may also seek to address 'market failures' in connecting unlinked networks, each of which may have owners, pricing and technologies that differ and that preclude the capture of wider synergies that emerge beyond local areas (cross-boundary spillovers). There the policy question is whether fragmented ownership of a system is economically efficient.

The provision of particular infrastructure may also be driven by a social objectives to ensure a particular service ('merit goods') or amenity in places or for groups that might not be able to afford the investment (such as remote communities requiring roads). It may also form part of the provision of a core public or welfare service (such as schools for education and hospitals for NHS health provision). It should be noted that the ways in which infrastructure services are priced and, or taxed are important aspects of efficient infrastructure policy. They influence both the usage of infrastructure as well as the nature of the revenue streams that accrue to providers but they are outside the remit of this discussion.

There are, then, quite different economic rationales for public policy intervention in the provision of infrastructure. Distinct forms of infrastructure asset ownership also open up debates about such issues as public and private differences in financing projects and the importance of contestability in shaping system efficiency and innovation. Of course, there are also wider concerns about how infrastructure can shape employment and productivity

growth in the economy. The key to an effective infrastructure policy and system is to be clear on what is meant by infrastructure, the key economic-fiscal features of assets, asset ownership, what role different components of the system play and what different outcomes governments are seeking to produce.

Paying for Infrastructure

Consumers of services facilitated and shaped by infrastructures may not always face prices or user charges for the asset that is provided, or for the services that are used. They may instead pay taxes to cover provision costs. When users are charged for services, they may pay prices set by market competition (toll roads versus public competitors) but more commonly user charges based on some administrative pricing regime are accrued. However, such user charges, that are similar to benefit taxes, convey more information to investors than most other forms of use-unrelated taxes.

Where infrastructure is resourced through taxes and public spending the extent of connection between local preferences and provision will also be shaped by the extent to which fiscal revenues are driven by local (intra-jurisdictional) taxes or by grant in aid transferred from elsewhere and financed from non-local taxes (either through specific grants or by general fiscal equalisation schemes). Where fiscal revenues are 'imported' then the efficiency of the infrastructure system will not only depend on the ability of governments to deliver intended outcomes but also on the effectiveness of 'higher order' government in raising and allocating resources. A top-down system, as prevails in Scotland, is likely to be more driven by political processes than consumer or taxpayer signals. Efficiency in the choice and running of national government projects can then potentially be reduced, despite cross-area coordination being higher. How do multiple governments and multi-locational providers balance these central-local issues? How do firms deal with these tensions which extend beyond the government sphere?

Infrastructure a Workable Definition

So what should we include as infrastructure and how should we describe it in economic terms?

An asset based definition of what to include as infrastructure cannot be appropriately confined to 'public' or 'club' or 'merit' or 'network' goods but should also include some categories of private goods. So how do we form a workable definition? The key defining aspects of what can be called 'infrastructure' are that it is a capital asset (that produce flows of infrastructure services to users), it is fixed physical capital and it is usually geographically immobile (spatially fixed).

Infrastructure assets usually require households and firms to undertake other investment and consumption spending in order to generate infrastructure services (water infrastructure needs a sink and a bath, and soap too; roads require bikes and cars and buses). In consequence infrastructure is usually (and literally) sitting beneath a long supply chain to provide 'services' to households and firms. Defining infrastructure much more broadly than 'public goods' to be spatially-fixed capital investment addresses the need to set demand and supply in place, it links to local and wider network questions, and it highlights what other public assets and services might be needed to effect change in place.

Demands for infrastructure are then derived from the demands made by households and firms (and governments in the case of 'merit goods') for different activities, services and

goods. There may be perception, information and market failure issues involved in these long supply chains but we should not lose sight that there is a service consumer, a household or a firm with an interest in the availability, quality and, perhaps, payment to be made for the final services delivered. Governments may often place the demands for infrastructures investments but the key users are non-government sectors.

Clearly traditional public assets such as bridges, roads, rail, canals, public spaces, and parks qualify as infrastructure as well as the social infrastructures of schools, hospitals, fire stations and community centres. The definition should also include investment in spaces for housing, shops, workplaces and commercial properties (both public and private in all instances) as well as the connecting infrastructures of water supply, waste water removal, energy networks from electricity and gas to district heating and, of course, digital technologies. Arguably, the hockey halls of Mr Harper's Canada, The Tate Northern on Tay and other plazas and cultural arenas all meet the definition. That is, as a sector, infrastructure comprises not simply the old notions of public assets but the built, fixed environment of embedded capital across cities, towns and villages in Scotland, and indeed the connected spaces 'in-between'.

A key reason for this eclectic view is that the supply side of the system of construction firms, of men, and women, and materials, and technologies often responds if not to all these sectors then at least to significantly overlapping segments. Economic policy, for employment and stability choices needs to recognise these overlaps. In many respects, infrastructure in this definition is what the construction sector builds. If economic growth and development rather than old notions of public service efficiency are to shape change then understanding infrastructure as our built, connected environment is critical to constructing future Scotland more effectively.

This definition not only broadens the notion of infrastructure but it also extends the scope of policy beyond public investment to wider markets of provision. Private housing, as well as social provision, is essential economic infrastructure (and Scottish housing policy bedevilled by sluggish supply could well do with using that perspective) as are offices and shops. In addition much of the key service infrastructure now being produced in Scotland is created by private utilities.

For much of the twentieth century the major public utilities in the UK comprised the providers of power/energy (gas and electricity) and water supply/water waste disposal. Their public sector status stemmed from their tendency to be local monopolies and to have significant network/scale economies. Their lines and pipes, and their production and treatment facilities were classed as public infrastructure. After the 1980s there was a significant shift in policy towards privatisation amongst these services and the major utilities, with strong regulators appointed to review services and charges. Scotland largely followed the experience of England and electricity and gas were privatised but, in contrast, water remained within the public sector.

The major utility investors in infrastructure include the 3 energy networks in Scotland that supply the infrastructure for energy supply. SSE (which includes Scottish Hydro) invested £1.5 billion in the UK in 2013 and is widely involved in the development of new energy technologies and infrastructure investments (such as the Beaulieu-Denny Transmission line upgrade). Scottish Power, whose network also operates in parts of England and North Wales, is planning £7bn of transmission investments over the period 2013-20 including the development of a new subsea interconnector running between Scotland and Wales. SGN (Scotia Gas Networks, are 50pc owned by SSE) are the third energy network and they invested £322m in gas infrastructure during 2013/2014 (SGN,

2014). Scottish Water remain within the public sector but are managed at arms-length from government, with Ministers setting outcome targets and standards and a strong regulator assessing standards and pricing performance. During the financial year 2014/15 Scottish Water invested £470m in infrastructure improvement and expansion (broadly equivalent to the recent scale of the Scottish Government's housing programme). Other major infrastructure investors, including BT, are tasked with extending broadband internet throughout the country.

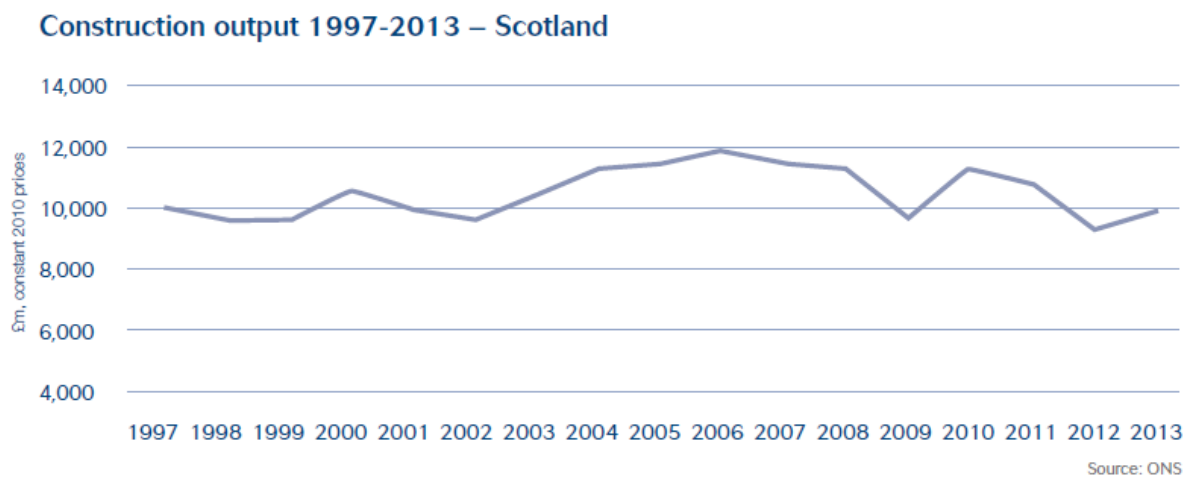
Clearly, along with the Scottish Government, local authorities and other public and private investors these companies make major expenditures in the Scottish economy each year. What role does infrastructure spending play in the economy?

3. Importance for the Economy.

Infrastructure in the Scottish Economy

The long boom, from the mid-1990s until the GFC of 2008, witnessed a significant expansion in Scottish construction sector employment and output (arguably the best measure of change for the broad definition of infrastructure used herein), see Figure 1 below. Sector output levels peaked in 2007-8 and then fell sharply until recovering after 2012. Estimates of the value of sector output rose from £10.6 billion in mid-2012 to £12 billion a year later and they have subsequently risen again.

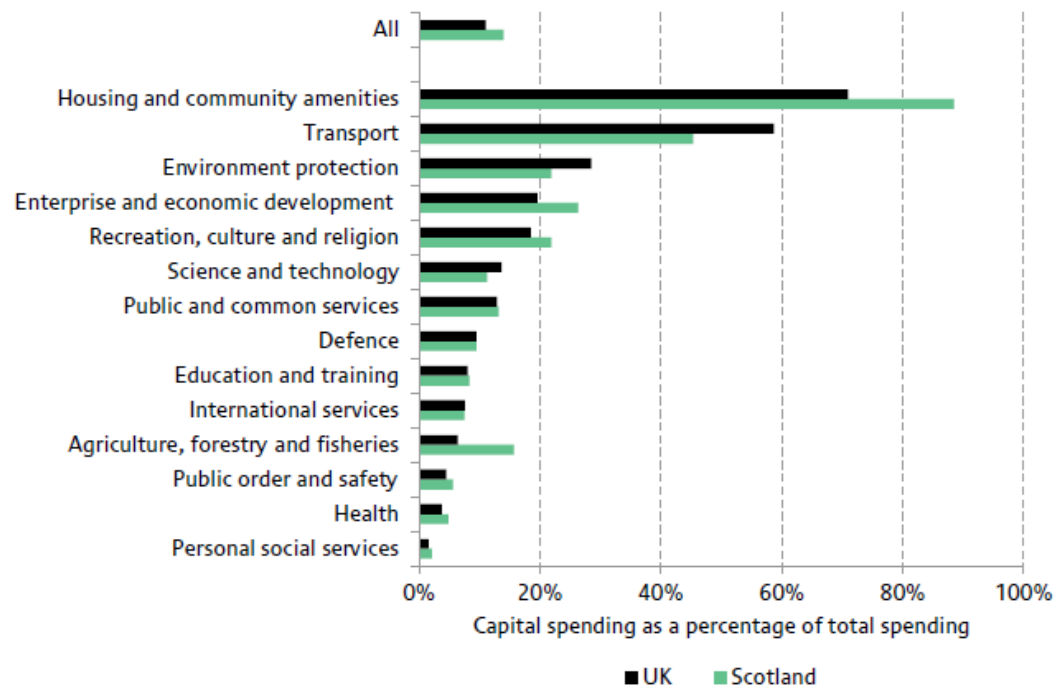
Figure 1. Source CITB (2013)



The composition of output produced has altered significantly over the period. Some of these changes reflect secular shifts in public and private provision for instance with private housing output outstripping non- market housing spending and major retail investment almost disappearing by 2012. The Scottish Builders Federation (SBF) have drawn attention to how the GFC and policy response to it induced significant structural shifts in output between 2008 and 2014. Private construction, in aggregate, fell by 20pc and private housing output even further by 27pc. However, reflecting strong and nimble fiscal management within Scottish Government, public construction rose by 53pc with the (narrowly defined) new public infrastructure sector growing by 35pc (and totalling £3.8 billion in 2014). This is a significant 'stabilisation' effort by any standards. These figures not only emphasise the weight of 'infrastructure' on the demand side of the Scottish economy but highlight the crucial role the sector plays in macro-stability programmes in Scotland. The areas in which Scottish public capital is proportionately significantly greater than in the UK as a whole, see Figure 2 below that is drawn from work by Deaner and Philips (2013), include housing, economic development, rural affairs and culture and recreation, with

lower shares for transport, environmental protection and science and technology.

Figure 2. Percentage of spending accounted for by capital spending, by service area, Scotland and the UK, 2012–13



Source: GERS 2012–13; PESA 2013; DWP benefit statistics; DSDNI resource accounts; HMRC resource accounts; authors’ calculations.

Sourced from Deaner and Philips (2013, IFS).

The overall construction sector, according to the Scottish Annual Business Survey (SABS) (2013), comprises just over 8pc of gross value added (GVA) and is half the scale of the manufacturing sector and around a tenth of the scale of services. The share of the construction sector is currently higher in the major city economies (for 2014, 13.1pc in Glasgow and 9.1pc in Edinburgh). SABS indicates the contribution to GVA diverged for different classes of construction work. In 2013, for instance, specialised construction trades (SIC 43) produced £3.1 billion (50.3% of total construction GVA), while construction of buildings (SIC 41) contributed £2.0 billion (32.2%); and civil engineering (SIC 42) produced £1.1 billion (17.5%). Construction Scotland (2013) also describe the nature of the sector.

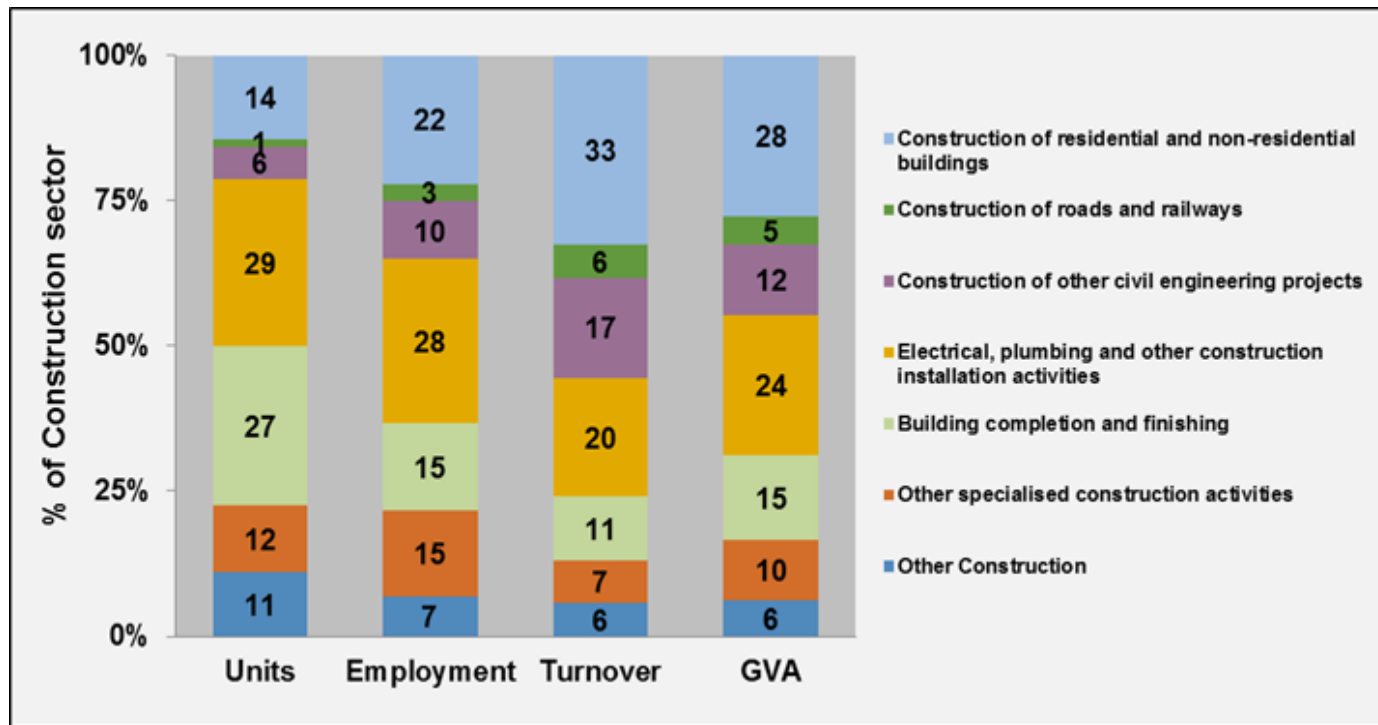
In relation to overall employment, the Scottish Builders Federation (SBF) report that the Scottish construction sector consisted of 176,500 employees in mid-2014, some 58,500 less than the 2008 peak of 235,000 jobs. A distinctive characteristic of the construction sector (arising from both the cyclical instability of demand and the complex phasing of different skills/ trades inputs at different project stages) is the reliance of sub-contracting with self-employed traders in the supply chain. More than a quarter of employees in construction are self-employed and this share has risen slightly since 2008.

SBF also indicate that each £1 million spent on construction typically generates between 15 and 25 jobs, and the figures vary over time as the overall composition of output changes. Housing output, for instance, generates high job numbers and specialised infrastructure construction less. The attraction of the sector as a transmission mechanism for stability

programmes is evident (as long as investments raise productivity rather than being simply 'shovel-ready').

The SABS report also provides a helpful disaggregated view of the more detailed activities involved in the sector, see Figure 3. These figures confirm how important it is to view housing and non-residential construction together with, say, road construction and civil engineering projects whilst continuing to recognise their differences.

Figure 3. Construction sector 2013 - Shares of the sector's Units, Employment, Turnover & GVA



Using Figure 4 (reproduced below), the SABS report also emphasises that, in aggregate, the construction sector had the smallest proportion of foreign-owned employment. Some 7% of employment was foreign-owned (contributing 5% of value added in the sector). This contrasts with the primary sector (which also includes Oil & Gas and Utilities) where around 42% of employment was foreign-owned but this made up 64% of sector value added.

The size distribution of firms in the sector reflects the sub-contracting supply chains described above as well as the dispersal of smaller scale infrastructure and housing projects across almost all of Scotland. Within construction as a whole 88pc of firms have fewer than 9 employees and only 2pc more than 50. That industry size structure has major implications for the sector, creating labour market failures as economically-rational small firms minimise training when their workers are mobile and shaping market failures in construction sector R and D.

Nevertheless, a focus on solely small and Scottish owned firms would fail to capture the 'ecology' of how the construction sector works. Large firms play key roles as sector leaders and attractors of business for the smaller supply chain participants. They have played a significant part in changing management and planning practices in the sector and they have particularly important roles in the civil engineering and transport investment sectors. When government, or others, tender large, complex infrastructure projects, it is these larger

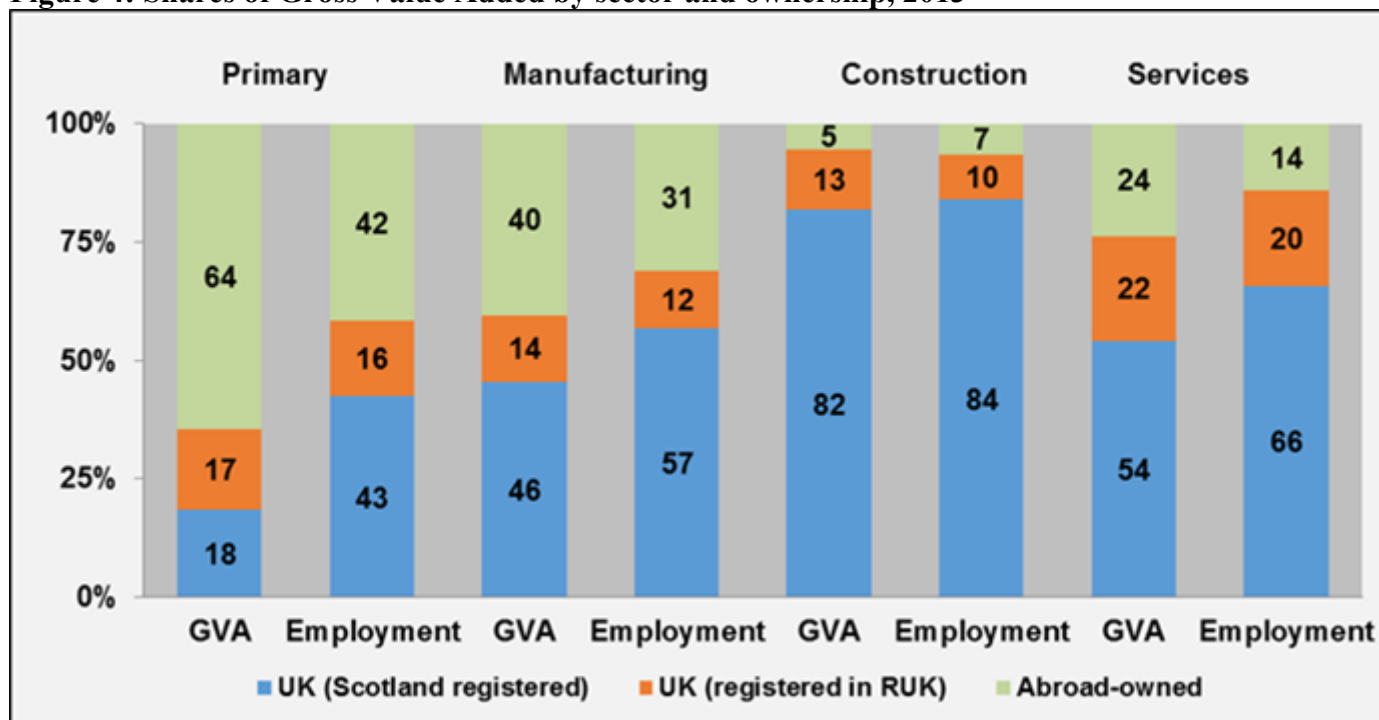
companies that shape the extent to which profits, employment and materials purchases remain within Scotland. Although not an exhaustive sector review, it can be estimated that there are approximately 6 to 8 large contracting/construction companies that would regard themselves as 'Scottish' and that can compete effectively for major projects. Of these, a number constitute Scottish branches of UK-wide or multi-national companies and, as such, in shaping bids, forming strategies and raising finance, they may use corporate strengths located outside of Scotland. There are, then, few major construction companies with corporate headquarters in Scotland.

Interviews for this project suggested that these 'Scottish' firms do, however, primarily rely on Scottish-based supply chains and these companies are an intendedly permanent presence in Scotland. Hard evidence on these patterns would be welcome. These firms also provide connections between the localised Scottish construction sector and the wider world. As part of multi-locational corporates they have an understanding of how infrastructure policies, priorities and procurement are implemented in other jurisdictions and are, in that regard, much more knowledgeable than the government sector.

Most of these large companies also tender for work in different sectors of construction and in the regions of the rest of Britain. Large firms interviewed in the study, and industry wide trade bodies, held the view that if major infrastructure investment is unleashed in England but not in Scotland then resources and efforts will be diverted southwards. If the UK government realise their stated plans for infrastructure investment, not least the development of HS2, there may be at least a short-term lack of capacity in the Scottish construction sector to pursue major projects (and a leakage of Scottish training efforts southwards). At present, there seems to be worryingly little intergovernmental discussion of such issues between Westminster and Edinburgh. Infrastructure investments may be spatially-fixed but the ideas, capital and labour that produce them are very mobile. An effective infrastructure policy for Scotland needs to look outward to Britain and the EU and not simply inwards to Scotland's places.

Public sector procurement is subject to EU rules and there should be a level playing field for contestability between Scottish (and UK) and overseas companies. The 2011 surge in major project investment has seen at least 4 major non-UK companies operating in Scotland and the Queens Crossing and the M8 schemes are widely cited by Scottish commentators as major projects, that because of constraints on domestic capacity, diminished the multiplier effects of the stabilisation programme through leakages out of Scotland of profits, labour payments and materials sourcing. These losses, if they are established, might well be offset by the stretched output from lower costs of construction. There is, at least in the public domain, no hard evidence on these matters but, the strength of feeling expressed by those interviewed from the 'domestic construction sector' is such that the Scottish government would be well advised to undertake and publish a detailed ex post evaluation of the economic impacts of the major projects involved in the 2011-15 stabilisation programme.

Figure 4: Shares of Gross Value Added by sector and ownership, 2013



After Austerity? The Near Future.

Recession in the construction sector in Scotland has cut deep since 2008, and, despite the stabilisation efforts of the Scottish Government and record low interest rates on borrowing employment and output are still below peak levels. There is also a view that cyclical instability hampers the long term productivity growth within the sector. Joblessness destroys worker skills and it induces both occupational and spatial mobility. It also disrupts the often carefully-crafted networks that comprise local construction supply chains. The sector, in Oliver Williamson's terms (Williamson, 1973) is characterised by high costs of incomplete specification of contracts so that there are high transaction costs and downturns smash the trust relationships that reduces them. The post-2008 downturn has been particularly deep so that recovery in the sector will have to be carefully monitored for signs of skills shortages at even quite low levels of output.

There are indications that the recent recovery in Scottish construction sector output and employment are likely to continue. The Construction Industry Training Board (CITB, 2013), see Figure 5 below, have forecast annual average employment growth of 1.1pc per annum for the period 2015-19 creating an additional 1,300 jobs per annum. This anticipated growth in demand is welcome (and will hopefully be sustained) as the Scottish economy is now lagging behind UK growth rates as the system adjusts to lower oil sector activity. That rate is less than half the forecasted rate for the UK over the same period. However, this may not be significant as weaker stabilisation efforts in the rest of the UK have allowed a greater fall in the Rest of the UK (RUK) construction output. Nevertheless, the strong regional growth rates forecast for some regions, such as Wales as well as the south-east, highlight the

importance of reflecting upon how slower employment growth in Scotland will translate into migration of Scottish construction workers south and a renewed interest from larger 'Scottish' firm in RUK business.

Figure 5. Regional Construction Employment Forecasts to 2019 (Source: CITB).

Regional comparison 2015-2019

	Annual average % change in output	Growth in total employment	Total ARR
North East	2.3%	7,660	3,510
Yorkshire and Humber	2.3%	14,940	3,220
East Midlands	2.2%	9,340	3,120
East of England	2.5%	13,690	4,260
Greater London	4.2%	50,440	2,050
South East	2.5%	30,130	2,590
South West	3.6%	22,130	6,320
Wales	5.8%	13,890	5,320
West Midlands	2.1%	12,110	2,320
Northern Ireland	2.2%	3,220	1,490
North West	2.5%	17,130	4,790
Scotland	1.1%	1,320	5,700
UK	2.9%	196,000	44,690

Source: CSN, Experian

CITB forecasts also indicate that, as noted above, there is likely to be a switch in the composition of construction output as the economy recovers. As demonstrated by Figure 6, the growth of market driven sectors, such as commercial property and housing, rises as expected investment in major public infrastructure programmes falls. These broad trends are important because they suggest that, in the future, the major Scottish firms can expect to see fewer major projects than in recent years.

Figure 6. Forecast Growth in Construction Output by Region, 2015-19 (Source: CITB)

Construction output – Scotland (£ million, 2011 prices)

	Estimate 2014	Forecast annual % change					Annual average 2015-2019
		2015	2016	2017	2018	2019	
Public housing	408	8%	6%	0%	3%	1%	3.4%
Private housing	1,345	11%	7%	3%	5%	2%	5.4%
Infrastructure	2,103	6%	-14%	-3%	-9%	-4%	-5.0%
Public non-housing	932	-4%	-4%	0%	2%	1%	-0.9%
Industrial	461	5%	6%	1%	-2%	2%	2.2%
Commercial	1,968	4%	6%	2%	4%	1%	3.4%
New work	7,217	5%	-1%	0%	0%	0%	1.0%
Housing R&M	1,386	0%	0%	4%	4%	2%	2.2%
Non-housing R&M	1,910	-1%	0%	2%	0%	1%	0.5%
R&M	3,296	0%	0%	3%	1%	2%	1.2%
Total work	10,513	3%	0%	1%	1%	1%	1.1%

Source: CSN, Experian

There are two caveats to this conclusion. The first is that the forecasts may be well wide of the mark. They may not have, for instance, fully factored in the reduction in North Sea/North-East activity that may persist as oil prices are now likely to remain sluggish over the next few years. However, on the upside, the City Deals agreed for Glasgow and being discussed for three other cities could also significantly raise construction activity to 2020. New commitments, made in October, to doubling the Scottish government’s housing programme to 2020, will have similar effects if they are realised. The second caveat is that although estimates are welcome and give some focus to future policy, it is surprising that there is no detailed, publicly available, industry-wide econometric forecasting model for the Scottish construction sector.

Scotland needs the capability of simulating the effects of major economic shocks, trends and policy changes for the sector. This is an issue that the Scottish Government, the Scottish Futures Trust (SFT), Skills Development Scotland (SDS), Construction Scotland (CS) and the major cities and the major companies need to address. The standard of economic modelling for the sector could be improved and integrated. The complex, fragmented structure of the industry also seems to be reflected in a raft of capable, but under-resourced professional trade bodies who overlap but never quite integrate their industry research and forecasting capacities. If it is to respond appropriately to the challenges ahead, the sector, which likes to dwell on smart technologies and smart cities, needs to get smarter in understanding the economics of the sector as it exists and how the sector is likely to unfold in the coming five years, ten and twenty and thirty years ahead.

From Hopes to Fears

Key commentators on the Scottish construction sector are now expressing concerns regarding its supply-side responsiveness, even with the current, relatively slow forward growth projections. In addition to recognising the sector skills and networks lost in the recession CITB (2013) draw attention to the likelihood that a fifth of the present construction labour force will retire by 2023. This will shape a replacement demand for 35,000 employees. Labour markets across the OECD indicate that workers adjust their retirement dates and plans according to shifts in pension arrangements, changing legislation and the like so that, in North America, for instance, male retirement ages are now edging towards 70. The capacity to adjust depends on the physical capabilities of workers and their human capital, as well as the nature of the jobs offered. It is quite clear that, in the construction sector, tasks requiring, strength, endurance and physical flexibility will not suit many older workers and the sector faces problems of ageing more acutely than many other sectors, such as the service industry.

SDS recognise the issue of labour force ageing but are also concerned that future output will require different, higher skills training, embodying new technological systems and processes (for instance, in fitting buildings with geothermal and solar heating systems or wiring homes for tele-healthcare provision).

Local authorities and construction firms interviewed were all concerned that these required future skills go beyond the technical skilling that Modern Apprenticeships have delivered effectively. That is, construction firms, and particularly the smaller firm sector, require new workers with generic skills in managing, planning and marketing. However, generic training of that kind will make workers valuable in other economic sectors. More stable and attractive jobs are therefore required to attract youngsters into construction. In short, the sector will increasingly need to acquire more professional skills, to maintain technical trade skills and to adapt to the replacement challenge noted above. The sector literature does not yet show any grasp of potential automation possibilities (and employment threats) emerging over the next decade and this issue needs to be urgently addressed. We return to a more detailed focus on employment, training and sector stability (that was a key driving factor of DHI in commissioning this report) in Part 5 below.

Thinking Longer Term

The discussion of ageing, training and construction employment draws attention to how thinking about construction sector policy has to go well beyond immediate employment effects (the shovel ready mentality) and stabilisation benefits over the economic cycle. Infrastructure investments last for decades, even centuries so it is imperative to think about how projects and programmes for investment impact productivity and growth for the longer term. Indeed, with the emerging City Deals programme, predicated on the aim of boosting infrastructure investment to promote economic growth, and the fiscal revenues to pay for it, there needs to be a new articulation of how programmes and specific projects impact growth. Further, if growth is the objective, then the assessment of major infrastructure projects can no longer (as at present) be driven solely by cost estimates for well-defined output standards and some small allowance for community benefit (see next section). Instead, they have to articulate growth impacts. That is, there has to be a careful

understanding of the economic mechanisms behind and outcomes from major projects.

Such an understanding is currently missing in Scottish approaches to infrastructure investment. Edinburgh are developing a labour market model to get to grips with the employment and incomes consequences of their proposed City Deal activities and this is to be commended. Other City Deals, however, and this is reflected in the proposed Glasgow programme, have modelled impacts on GVA more widely for the transport sector than for any other sector. As a consequence of this approach, City Deals are dominated by often transport programmes. This outcome simply reflects the professional arts and fashions of different sectors of planning and consulting. There is no equivalent GVA model in Scottish housing planning nor in water/energy investment, for instance. Estimates of the economic value of reduced commuting times will thus have an undue, and potentially unbalanced, effect on the infrastructure programmes for cities and Scotland in the decades ahead. Unless infrastructure programmes start to articulate their economic logic chains and track the likely effects of these, the wrong structures of investments will be made.

KPMG (2015), in a recent submission to the Scottish parliaments Infrastructure and Capital. Investment Committee, have noted recent improvements in Scottish experience in this regard. They suggest that in shaping the Glasgow city deal that efforts have been made to assess infrastructure options and impacts across multiple sectors of investment and that there is a new emphasis on GVA and economic growth effects. These documents are not yet in the public domain but such improvements are welcome if they are based on credible urban economic modelling.

The long term, growth cases for infrastructure support need to be made using similar approaches. There are currently no estimates of how overall public capital and other infrastructure investments impact Scottish growth in the long term, and the ex-ante and ex post evaluation of major projects is weak on longer term growth effects. We need to understand better how infrastructure investment impacts local economic development.

The key reason for this is that there is a strong prima facie case that infrastructure provision impacts on productivity. Unduly costly or slowly implemented projects reduce this, while projects in the wrong location or with poor designs may reduce productivity and quickly become stranded, abandoned assets. Infrastructure that facilitates agglomeration economies, that makes new connections between markets, workers, employers and innovators aids productivity growth. Ensuring the elastic supply of homes and offices boosts long term growth and reduces the economic share passing into 'economic rents'.

But, are these the criteria on which our politicians and Parliament decide on the scale and structure of Scotland's infrastructure effort? Have academics, planners and bureaucrats asked and answered the right question to improve Scotland's infrastructure and build Scotland better? The next section considers these questions, exploring how we govern and plan infrastructure in Scotland.

4. Governing the Scottish Infrastructure System

Government and Infrastructure.

The previous sections have drawn attention to the different rationales for public provision of infrastructure, the diversity of providers of infrastructure and the range of ways in which infrastructure outputs feed into the broad aims of governments. The infrastructure provision and funding system has, as noted above, become more complex over the last quarter-century and it is arguably less directly driven by government than prior to the 1980s. Nevertheless, governments remain as key funders and framers of the system.

There are multi-order government influences on infrastructure projects delivered in Scotland. The European Union shapes economic and financial categories, environmental and other regulations as well as framing the key rules of aspects of procurement processes. The UK government not only shapes monetary policies, that have key influences on the scale and timing of new construction but also, with the significant new fiscal autonomies envisaged in the Scotland Act (2015), sets key aspects of wider economic and fiscal policies.

Within Scotland, government actions are not solely driven by Scottish Ministers but are also mediated through local authorities, arms-length public bodies (NDPB's) and joint public-community-private partnerships. These developments are typical rather than unusual for advanced economies aiming to raise infrastructure provision amidst tight budgets for national-level governments. Typically, in Scotland, we have looked to the Scottish level of government to drive the funding and provision of major public and community infrastructure but more complex autonomies are emerging. Relaxation of the council tax freeze and any easing of borrowing permissions on local authorities, emerging from current local fiscal reform measures, may well see a new impetus for locally-led actions. Renewal programmes are likely to involve major community and private investments. Any new reliance on user charges accruing as revenues to councils and quangos may drive investment rather than tax revenues and borrowing approved by Parliament. Regulated by the Parliament, Scottish Water, for instance, finances almost 90 percent of its investment from user charges (water rates) rather than borrowing.

Scottish Government may have to develop new roles as knowledge mobiliser, partner and facilitator rather than customer, funder and regulator as more locally driven demands and resources come into play. There will, in the decade ahead, be a more bottom-up, customer-driven dimension to infrastructure provision and the Scottish Government should prepare for that change. It needs to recognise the extent to which the top-down nature of the existing system has left significant gaps in provision and capacity in Scottish local government regarding forecasting infrastructure needs and demands, arguing economic cases and evaluating and prioritising projects. There is, arguably, a critical skills shortage in intelligence, information, modelling and research for economically-sound infrastructure strategies in the major cities and regions of Scotland. The last decade has demonstrated a considerable capacity on the part of the SG to change and improve sector governance.

Governance Innovations after 2000.

The last decade, despite the GFC, has seen significant changes in the Scottish Government's management of infrastructure policies within Scotland. The recognition of

the need for an improved approach was evident in the review of the Labour administration, led by the late Tom McCabe in 2005-2006. Although this was inconclusive in examining growth effects of infrastructure, it rightly pressed on with internal reforms. The review recognised the existence of departmental silos in expenditure planning, the complexities of dealing with underspends in sectoral budgets and highlighted a need for stronger criteria for project prioritisation and faster elimination of ‘pet projects’. This led to the formation of a cross-departmental internal Infrastructure Board within the SG and better coordination with local authority-led decision taking. Procurement as well as prioritisation issues attracted new attention and a new priority was given to the organisation of a forward ‘pipeline’ of developed infrastructure proposals after 2010.

The advent of the SFT after the SNP led administration were elected in 2008 has shaped better understanding of infrastructure issues in Scotland and promoted new financial approaches, albeit that the system switch from PFI to PPP financing and the Non Profit distributing (NPD) model induced an expenditure hiatus from 2008-2010. Unfortunately, the system may endure a new hiatus as the NPD financing approaches fostered by SFT have now been challenged by EU (ESSA 10). The EU take the view that the PPP structures the agency has fostered should be classed as public rather than private spending and appear on the public spending and debt accounts for Scotland (hence limiting expenditures).

SFT have developed innovative, effective working with local authorities. They have taken the lead role in the formation of 5 innovative regional infrastructure hubs. These ‘hubcos’ promote cooperation across councils and health and other sector providers, not just in the use of new facilities, but in the support services to plan, fund and deliver community infrastructure projects. Their broad role and progress is noted in QMPF (2015). There is a growing viewpoint that the organisation of non-profit and public housing investment is also essential economic infrastructure and that it would benefit from being strategized and sources through the regional hubs.

The future potential of these hubs is discussed further below. Through their hub roles and proximity to government SFT have been able to provide the Scottish construction sector with a clearer and more complete list of projects, priorities and timetables than was previously available. Construction companies interviewed in this study perceive tensions between SFT as hub leaders and local authorities. It is a matter of record that some authorities dip in and out of the hub-structure and this does not facilitate integrated decision taking in the sector. Companies, in the main, regarded local authority procurement processes and projects as being the most problematic that they dealt with. They were often subject to shifting political involvement and tempted by bids that offered apparent low costs but also high risks of non-compliance with contracts (so-called “suicide bids”). Hubs had significantly reduced such difficulties.

From interviews conducted, it was concluded that the major construction sector firms have a generally positive view of the SFT. They concur that SFT has been a major facilitator of better business planning for larger construction firms and, as the sector becomes more diverse, this will become an even more important role. Some executives did have critical observations. Here, for instance, they felt that SFT remained too much “a creature of government” and that it somehow needed, without compromising its roles, to be closer to the industry and larger providers. It could be argued that Construction Scotland, which emerged from the Scottish Enterprise network could play an effective consumer liaison and industry/economic information and expertise roles but, at this stage, it does not seem to have built close relationships with larger providers. Firms further noted that the capacities of SDS to provide national and regional assessments of

construction employment and trainings needs also plays an important role in business planning for the sector.

Policy Management Tools

The key 'governance' instruments deployed in policy are spatial planning, project prioritisation, 'pipeline' development and investment procurement. These system management approaches, developed since 2008, are now being tested, as noted above, in a different setting where projects will have to pay-off fiscally for the Parliament and where productivity and growth have become key policy objectives. With a greatly increased capacity for risk assessment within major construction firms over the last decade, and a relatively low rate of return (of 2 to 3 pc real), it is unsurprising that significant elements of the Scottish construction sector express concern about the period to 2020, let alone beyond.

Industry leaders interviewed in this project stressed the near impossibility of business planning for the next few years with uncertain recovery and major constitutional changes. They also drew attention to how features of planning, prioritisation and procurement approaches in Scotland exacerbated these difficulties. None of those interviewed felt that the Scottish government was, in broad terms, doing a bad job but all of them also highlighted aspects of the system that made planning business and employment more difficult. There was also considerable consistency in the targets of comments of acclaim and criticism. In this section of the paper these key aspects of the 'infrastructure' system are explored. The broad institutional-planning framework for planning and the identification of major investment priorities is discussed, the management of 'pipelines' of work is considered and then attention drawn to a limited number of aspects of procurement processes.

Locating Infrastructure: Planning

All of Scotland's infrastructure investors, from private housing developers to the major bridge builders, have to deliver their structures within the framework of national strategies of quite different kinds and of strategic and local spatial planning rules. The complexity of the processes involved are well set out by Robertson and Condillon (2015).

At the national Scottish level infrastructure spending and construction employment features in the Scottish Economic Strategy as well as public expenditure plans. Arguably, neither plan really addresses or reflects the core of productivity and income effects from infrastructure. There is then, below the 'big' economic plan a National Infrastructure Plan, put in place in 2011. That plan identifies major priorities infrastructure (projects valued individually in excess of £20m) and helps shape production pipelines. In interviews, major firms commented that this needs to be refreshed and treated more as a 'live document' in recurrent decisions. The plan does not contain any explicit spatial targeting or prioritisation. Infrastructure visions and delivered projects have to be 'grounded' in the context of the National (spatial) Planning Framework and within the Strategic Development Plans of the major city-regions. Local development plans articulate the set of sites available over five year periods.

The linkages between economic strategy, national spatial strategy and infrastructure plan are neither firm not extensively articulated or indeed measured. In consequence there is much scope for events, or politics, to shift the mesh between the three different sides of the connected issues of locating infrastructure for economic gain. It also needs to be recognised that there are important differences between infrastructure demands that arise locally from the decisions to site developments in particular places (infrastructure as consequence) as opposed to infrastructure projects which shift and drive patterns of development, and planning permissions (infrastructure as cause of change). Quite different sequencing of planning, financing and infrastructure decisions may be required in infrastructure as 'cause' and infrastructure as 'consequence'. For a long time municipal

infrastructure was largely seen as servicing otherwise induced developments (infrastructure as consequence) and national projects as more 'causal' in nature. The philosophy of the city deal ends that distinction and that municipal infrastructure can induce growth and productivity.

Arguably, indeed argued in detail below, in Scotland spatial plans dominate rather than coexist in symbiotic, recursive relationships with infrastructure investment plans and this may frustrate efficient infrastructure investment. At the local scale the Scottish approach has been for infrastructure to serve planning decisions but now the reverse question may equally apply, how can planning better serve major growth inducing infrastructure investments.

Policy thinking in Scotland, and indeed many other jurisdictions, has not adequately grappled with the interfaces of economic policy, infrastructure and planning. Pamela Blais (Blais, 2015), in drawing attention to how policy disjunctures lead to 'distorted infrastructure' provides a very coherent, and well evidenced illustrations, for Toronto and southern Ontario, of how to move across these different sectors of interest and at different spatial scales. A similar exercise would benefit Scotland.

Planning for Real

The choice and implementation of priorities of national and local planning frameworks is central to the effective and smooth delivery of infrastructure projects. Strategic spatial plans should make clear decisions and highlight the analysis and rationale behind planned infrastructure locations. That intention has to be realistic, be based upon the likely resources to be invested in particular areas and linked to the other policy actions and connections that need to be made to secure full benefits. Strategic spatial plans and the National Planning Framework have to be more than a 'Great Dreaming' for Scotland. When plans are made, say, five to ten years ahead, they require not just imagination in outcomes but also hard realism in likely resource levels. This requires, in effect, some clear commitments from governments on funding and a firm pattern of planning commitments by local politicians. If these conditions do not apply then there can be no realistic sense of private resource commitments to finance and investment in infrastructure; nor can there be any clear estimates of planning gains and fiscal revenues from intended actions. Politics has to get real about what it asks of our capable planners. More effective infrastructure systems require better local political decision taking about where investments should be specifically made, how public reactions to infrastructure plans are managed and whether or not initial project location and design specifications can be maintained. There may also be legal cases challenging planned infrastructure investments. Changes in project specifications, local political bargaining about investments and planning related delays have major effects on the costs and efficiency of the infrastructure delivery system. The ways in which the local planning system is managed will also have a major impact on the funding of projects.

The 'extraction' of planning and infrastructure gains, where existing property or land owners make unearned gains from planning and infrastructure decisions that raise their asset values and potential future incomes, is becoming an increasingly important element in the financing of infrastructure projects. As the strings on the public purse tighten then the unearned gains of existing landowners become a source of interest in funding strategies.

Gain extraction is not, however, a skill delivered in the forefront of Scottish planning education. Gain capture mechanisms or likely revenues are rarely modelled in the preparation of strategic plans and they are more difficult to implement where government funds are not tied to a specific locality/project as they are allocated. Scottish experience in

this regard therefore lags behind international experience (contrast Edinburgh's financing of the tram system with the renewal of Melbourne's Docklands or the remaking of residential areas in downtown Vancouver). There is, nevertheless, a case that strategic land use plans, in order to move towards likely real outcomes, should include an assessment of the potential land gains and tax revenues that their implementation might yield.

Authorities have already found the estimation of TIF revenues difficult, but not impossible, and the challenge of estimating tax consequences of city changing investments has, to date, been beyond those attempting to devise the 'earn-back' scheme in the Manchester city deal. Such gain estimation, to be credible *ex ante*, would require the development of urban econometric models of a degree of sophistication and spatial disaggregation not previously seen in the UK.

This is a topic area that national and local governments have invested more or less nothing in, developing limited data and analysis systems for tracking and modelling the urban economies they purport to manage. Moving forward, major infrastructure support from national governments are likely to seek firmer estimates of the costs, benefits, tax changes and gains of the projects they are to support and to seek faster decision times and less opportunity for provider costs to float upwards. Spatial plans have to be ready when locations are discussed and permissions made before resources allocated, otherwise uncertainties, delays and changes are likely to impede progress.

National/Scottish City Policies

Scottish and UK 'city policies', as noted above (KPMG, 2015) may now be changing the relationships between spatial and investment planning in cities (city-regions). For instance, since 2011, the Scottish Cities Alliance has existed to give informed impetus to growth and infrastructure investment in the major 'blocks' of the Scottish economy and enhance the connections between them. More recently, however, the UK government's City Deal process has rather swamped the priorities of NPF3 and drawn attention to limited SCA progress in delivering city investment strategies.

With Edinburgh, Aberdeen and Inverness also likely to join Glasgow with confirmed 'City Deal' programmes, the robustness and coherence of city visions, the leadership and governance of these areas and the adequacy of their investment and spatial plans comes into stark focus. At this stage, it would be difficult to conclude that the investment strategies for the Glasgow deal will drive productivity growth in the most effective way. The UK and Scottish governments should make the inner workings of the Scottish deals and the estimates of impacts and gains transparent and available to the public.

The City Deal arrangements for Glasgow have put in place an economic progress review process that seems set to ask challenging questions that might usefully have been asked as Deals were formed. City Deals don't move forward at the pace of bolting horses and there is yet time in Glasgow, and elsewhere, to harness investments to raise metropolitan economic performance. The arrangements for the Glasgow city-region Deal include the development of an "Infrastructure Fund Assurance Framework" and a "Gateway Review Mechanism". The Assurance Framework is intended to ensure good value for money and robust business cases in projects undertaken. The deal document highlights 5 key aspects that will feature in it, including prioritisation and investment decision processes. The Gateway Review Mechanism can be used to ensure that policy spending will add a growth imperative to investment decisions, as it is intended to "encourage local leaders to prioritise and invest in infrastructure programme that delivers the greatest economic impact for the local, Scottish, and UK economies" (p9). This will consist of reviews at 5-yearly intervals and there is a clear sense within deal documentation that evidence will be

utilised throughout this process. The Review also established an independent Commission on Urban Economic Growth to analyse the performance of infrastructure fund projects and measure the local and national growth derived from this investment (p10).

Not all of the cities in the SCA have infrastructure investment strategies that have been subjected to such systematic analysis and evaluation as those of the major cities. There is little evidence (at least prior to 2014) of the systematic use of cost-benefit analysis, for example, in local infrastructure programming in Scotland's cities. The SCA, with small catalytic funding, has emphasised the connections and commonalities between the major urban areas in Scotland as well as the need to improve the competitiveness of their individual economic bases. The City Deals, in contrast, have the virtue of promoting change at the city-region or metropolitan scale and focus on quite major projects within metropolitan areas with substantial and intended innovative funding/revenue approaches.

The Scottish Government, arguably, needs to tweak present approaches to cities (the SCA) and major towns to integrate City Deals, SCA and major towns (with the larger towns at much the same scale as the smaller cities) policies into a single coherent, place policy framework. It should urgently review whether the work of cities and towns has actually produced well-planned and designed infrastructure strategies or whether existing priorities for places are just new lists without a clear set of economic rationales or goals. It would be interesting to see the logic chains connecting infrastructure policy spend to expected economic outcomes previously used by Scottish cities and towns and whether they are supported by evidence.

Major firms in the construction industry, interviewed in this study, see the infrastructure plans of the SCA as 'aspirational' and really want to see where the money lies and the likely real time horizons for action. And the city deals, they fear, might just be one more government-led activity they have to keep an eye on, with associated management costs, with little real prospect of action. In relation to Glasgow specifically, Firm participants were also unimpressed that, despite all the claims for united city-region action, in the Glasgow city deal there is not only a central infrastructure team but also a separate team for each of the 8 councils involved. Firms expressed the view that when (if) city deals are struck across a number of areas in Scotland that the SFT, or a similar body, should convene a recurrent Scottish City Deals Forum to include infrastructure investors and construction companies.

These observations are important because as we move into a tighter funding setting for Scottish infrastructure policies well-designed and delivered city and town deals will play a growing role within Scottish infrastructure expenditure totals. Further the governance processes for city deals, such as the monitoring arrangements included in the Glasgow City Deal, will make clear whether or not the economic foundations, and connections, of these new infrastructure initiatives are well established. More scrutiny needs to be given to whether, since the demise of Regional governments in the late 1990s, staff capacities for developing infrastructure programmes exist within Scottish local governments. There is also the question of whether the development of new city-region partnerships to progress city deals creates yet another policy geography to layer upon the existing, and largely successful, regional infrastructure hubs within Scotland. Indeed the question immediately arises as to whether the regional hubs should have the assurance and review measures now proposed for the Glasgow City Deal. These issues are discussed further below in the concluding summary.

Improving Decisions

Approaches to planning infrastructure investment can change within public bodies. Outside of ‘spatial planning’ Scottish Water, with an annual infrastructure budget that dwarfs any of the Scottish cities, provides an informative contrast to the mainstream public sector approaches to infrastructure in Scotland. The provider is regulated with strict performance targets, it has a largely non-political board, it operates Scotland-wide and its revenues (and investment) are largely driven by user fees. These attributes of Scottish Water give its approach to infrastructure investment strategy and planning a very different feel from the NHS, councils and other HUB users. Whilst it has a major priority of renewing existing infrastructures, much energy is focussed on identifying growth opportunities and responding to customer feedback on service delivery.

Scottish Water, unlike many other infrastructure providers in Scotland, has detailed knowledge of the state of its existing above and below ground infrastructure. For most areas of infrastructure provision there are no, or few, useable estimates of the condition of existing infrastructure and upgrading needs (in Australia there are quinquennial reviews of the state of the nation’s infrastructure: we have no measure on Scotland’s infrastructure deficit and how it is changing). Scottish Water’s knowledge base allows the articulation of a realistic six-year forward strategy with a two-year operations (delivery) plan outlined and forward forecasts for 25 years ahead. Demand drivers for the main activities can thus be assessed prior to the estimation of investment requirements.

The reliance on customer revenues, the Scotland-wide scale of the enterprise and the sound foundations for forward thinking (with a clear commitment to greener infrastructure) allow Scottish Water to reduce uncertainties for its own managers and for the firms who provide new construction and maintenance services. They recognise the importance for stability in competitively selected supply chains. They issue 6-year forward contracts to main suppliers and encourage top-tier contractors (usually Scotland or UK-wide providers) to use local supply chains wherever possible. In their current investment project in Stromness, they have services provided by a supply chain alignment of international, Scottish and local providers. They have pursued that forward looking approach to labour market and hiring strategies. Within a general commitment to attract young people into the construction sector they have increased their hiring of young graduates and now sponsor around 100 apprentices. Can the City Deals and Regional Hubs do the same for other sets of infrastructure investors?

In the Australian context, the imperative to access and manage water supplies effectively put water infrastructure at the core of metropolitan infrastructure strategies and pre-1960s entities such as the Melbourne Water Board led planning and strategic visioning for the city as a whole. The strong Australian culture in public and private infrastructure provision stemmed, arguably, from these arms-length, metropolitan-oriented entities. There is inevitably the question as to why these utilities lie outside the main infrastructure policy debates and systems in Scotland and whether it would improve national infrastructure performance to re-involve them in an expanded SFT and the regional hubs. We return to this question below.

Towards a National Infrastructure Roundtable.

The Public Accounts Committee's characterisation of the UK government's infrastructure plan as not much more than project lists would be an unfair criticism if applied to Scottish Government bodies, such as Transport Scotland, and utilities such as Scottish Water.

They have demonstrably worked on selecting investment priorities. The projects prioritised and even the assessment criteria might be open to debate but, there can be no doubt of a clear prioritisation process with economic content. However, the connection of infrastructure investments to national and local spatial plans is not clear and there are few evidence-based investment priority strategies for individual Scottish cities, city regions or strategic planning areas. In Scotland, we have learnt how to talk the talk of infrastructure delivery and economic growth but we have not yet learnt how to walk the walk (though there are important local exceptions). The informed decision taking that links such issues in Brisbane and Melbourne and Vancouver is not widely apparent in Scotland's larger places.

The Council of Economic Advisers should be asked to review the evidence base, and its utilisation in planning and policy, for infrastructure and city policies in Scotland. This review, informed by improved economic modelling, could then form the basis for an inaugural Scottish Roundtable on Infrastructure Investment that would, year by year, review progress and the evolving connections (or gaps) between the economic strategy, the NPF and infrastructure strategy. Even when realistic plans are made and effective investments prioritised, an important question for the industry is whether they are implemented through well-organised 'pipelines' and whether public procurement strategies are fair and efficient.

Organising Pipelines and Purchases.

The Scottish Government, as noted above, has both managed Scottish public capital expenditure in a more stable fashion than the UK government and significantly raised 'pipeline' capacities. Regardless of how well government plans ahead, unanticipated shifts in demand drivers and local planning and supply capacities can disrupt organised and flexible pipelines. It is not possible, even at great cost, to completely de-risk planned investments that are subject to shifts in costs, funding and other fundamentals, driven/impacted by exogenous effects. Furthermore, as delivering projects has long and complex supply chains, ranging from international finance to local politics, orderly sequencing is never without problems.

With political/public sector influences on sequences of delivery that run from Brussels through Westminster and Edinburgh, and then from Dumfries to Shetland, the challenges are formidable. The Scottish government has, to a significant extent, to react to changes in resources and costs rather than control them. Infrastructure expenditures involve some direct Holyrood control, but many public decisions lie more with local authorities and, while much of the government interest in planning relates to 'space and place', business planning by construction firms, with projects and locations already assigned by government decisions, is more focussed on time. In particular, firms are concerned with the stability of demands for their services (or the flow of projects) in well-defined territories of operation, over a business planning period of at least five years ahead. For large firms, with interests in a variety of major projects in different sectors of specialised public infrastructure, as well as the energy sector and housing across Scotland as a whole, there will be interests in future demands at different spatial scales. Whilst senior management, finance and strategic services may be supported by Scotland-wide flows of revenues, there is also recognition that both skilled and general labour, despite

the relative mobility of the workforce, may be part of locally-constrained supply chains. That is, the possible pipeline of projects at the Scottish level as well as within the regional hubs will be of interest. For smaller firms, the vast majority, the pipelines likely to appear within the local labour market area or some reasonable daily commuting distance/time will be the focus, and the likely future investment and employment demand patterns within these areas will be of much significance to SDS and training agents.

Firms interviewed in this study expressed a great deal of concern about the 'pipelines' of future work. These fears are inevitable given that firms are dealing with supply chains that are partly localised so that shifting demands, both in volume and by place, create labour management difficulties. Managing geography and uncertainty are at the heart of effective management of construction firms. But, whilst firms might rightly be concerned about future major investment in infrastructure, it would appear that Scottish government and the SFT, within the regional hubs, have made substantial efforts to create pipelines of work over the last 5 years. Furthermore, there is an accepted need to establish similar pipelines in the emerging City Deal programmes (the Glasgow City Deal have already published a discussion of how they intend to procure and organise investments).

Interviews with officials at SFT and within the SG revealed both how much attention was given to the investment pipeline and the effective management techniques applied. Firms appreciated that SFT provided a clear indication at a single point within Scotland of the range of different projects to be tendered, their funding status and likely timelines.

Managing a pipeline has been well done given the potential for changing government finances, local political shifts and planning delays to disrupt the flow of work intended within public expenditure plans.

Major Scottish projects, such as the newly opened Borders Rail project and Aberdeen bypass have been extremely long, drawn-out projects that were first 'signed-off' by the first Minister some 15 years ago. There are other examples of much delayed projects with rising real costs. Dealing definitively with project designs, locations and planning arrangements before 'contracts' are signed would not only reduce delays and cost over-runs but make the job of smoothing pipeline demands much easier.

Firms praised the Scottish Government and the SFT for the better managed and accessible pipelines of recent years with better information on proposals and procurement routes. However, as Scotland moves forward, there was a view that the pipelines need to contain more information about projects than start dates and broad scales. Firms believed it would be useful if such information included whether or not projects had secured funding, whether planning issues had been resolved, likely labour skill requirements and governance arrangements for the projects. Large construction companies have become much more sophisticated in their understanding and management of risks over the last decade and their desire for more pipeline 'information' reflects that better management culture. They want to assess ex ante whether or not the risks associated with particular pipeline projects mean that they should include or exclude them from future business search and tendering considerations. Some companies already exclude particular places from their business scanning because of reputations for delay and indecision that impose costs on companies. It is worth noting that firms also have a sense of the riskiness and reliability of the different regional hubs. While none are seen as fundamentally problematic, some are seen as outstandingly effective and others less so.

Some firms also felt that whilst the Scottish government had been effective in overseas advocacy of projects associated with golf and high value tourism, it had paid insufficient attention to engaging overseas interest, especially of sovereign wealth funds, in adding to the pipeline of investment for Scotland's infrastructure. UK government 'sales' efforts have, many believe, come to focus upon London and Manchester rather than other

regions, including Scotland. Nevertheless, the potential power of private finance in shifting Scottish infrastructure investment is well-demonstrated, for example, by the St James Quarter project in Edinburgh, but there is no well-packaged suite of similar plans for much of the rest of Scotland that are 'sold' to overseas equity funds. This is an infrastructure investment role that firms believe Scotland has not yet perfected.

Procuring Projects

Even where pipelines of work exist, with potential projects well described, this does not per se stabilise demands for the skills of Scottish firms, materials suppliers or workers. As noted earlier, present approaches to procurement for public infrastructure investments in Scotland are shaped by Scottish and EU legal requirements and are currently under review in Scotland. Procurement needs transparent, prompt, fair and efficient processes. Although Scottish approaches are well regarded, and have improved since the advent of SFT, the construction sector expresses some concerns about present approaches.

Larger firms that operate in other UK regions, and some regional divisions of multi-national construction companies, drew attention to what they feel are distinctive weaknesses in the overall Scottish approach to infrastructure policies and practise. They have a sense that the Scottish Government follows the letter of the law in implementing EU regulations on purchasing whilst other countries do not always do so. France and the Netherlands were both mentioned by several interviewees from different large companies that operated multi-nationally as examples of where national interest was often put ahead of 'exact' legal interpretations. This is not an encouragement to legal laxity, but rather underlines a particular difficulty.

Scottish companies have three particular misgivings about the propensity of SG and SFT to implement the letter of EU law. The first is that there are 'suicide' bids by non-local companies that promise more than they could ever expect to deliver simply to stay in business and may thus then fail but suffer minimal reputational risk in their home markets. This critique is just as applicable to UK and Scottish companies and is not inherently about EU rules though there are a number of examples of such project outcomes involving European companies in Scotland. The second critique suggested that SG scoring of contracts does not pay enough attention to the longer term effects of tender outcomes on the Scottish economy. When non-Scottish firms win contracts there is the potential for profits, wages and materials demands to leak out of the Scottish economy reducing multiplier benefits (though they usually work in partnership with Scottish firms and use Scottish supply chains). Some Scottish firms that were part of multinational enterprises argued that other EU countries do pay more attention to local/national impacts in scoring of contracts. This issue would require much fuller research before any hard conclusions were reached but this is a policy question worthy of consideration.

The third concern noted was that the Scottish Government have promoted too many very large projects in short time frames and, with such a limited number of large Scottish firms to respond, it was inevitable that major foreign companies would become significant providers, such as on the M8 improvements and on the Forth/Queens Crossing. Given the policy challenge that the Scottish Government faced in raising infrastructure spending quickly after 2011 this observation may be fair but somewhat harsh. The tail-end of the new Southern General Hospital, The Aberdeen Bypass, the M8 and Queen's Crossing were all strategic chunks of infrastructure that helped stabilise the Scottish economy: the essence of the problem is that they were big chunks in a quite small economy. Unless City Deals drive up investment demands quickly, this situation is unlikely to re-occur in

the next few years. However, industry highlights that the packaging of infrastructure work into a steadier stream of smaller parcels would, whilst meeting EU rules, create a more favourable context for developing Scottish construction skills and firms.

At present, public procurement sets out synoptic standards that relate to construction quality and performance, the services/targets driven by new investment and the costs involved. Clearly, however, the key infrastructure/service goals can be delivered in different detailed ways and with different associated costs and benefits. Achieving better environmental outcomes are a common example (and though this report focusses on economic concerns the significance of better infrastructure decisions for meeting carbon targets is equally crucial). Local communities (somehow defined) may also benefit more or less from different approaches to construction and in the use of revenues. Scottish infrastructure contracts allow a proportion of bid costs to be used to support community benefits. In public transport infrastructure contracts in Scotland, a maximum of 10 percent of bid are commonly devoted to a community benefits plan and spending. Nine-tenths of spending is focussed on cost-effectiveness in delivering the main construction/service standard goals. This approach has been particularly important within PFI and PPP initiatives for providing infrastructure. Procedures, such as the STAG approach in transport investment, are explicit in the ways in which contracts will be screened and goals/costs weighted. They are therefore regarded as essentially fair, open processes that avert any significant, subsequent and costly contract challenges.

There are two significant investment planning problems in this approach. The first, and this is a particular concern in the City Deal process, is that the framework does not incorporate any explicit capture of the economic growth effects of investment. In the philosophy of City Deals, it is not enough to measure well-defined infrastructure services. Instead, as KPMG (2015) clearly understood, it is necessary to read across from these outcomes to growth effects. The Scottish position is further complicated as a further connection must be made from growth in jobs, incomes and asset values to the consequent long term tax revenues that will accrue to local, Scottish and UK governments. The fuzziness of measuring gains in TIF projects and the near abandonment of measures such as 'Earn Back', in the well-researched Manchester City Deal bid, and similar schemes for Cambridge, suggest that this is an area where policy vision and rhetoric has run ahead of system information and research realities. This question, of accurate assessment of the fiscal revenue impacts of projects, is for the future, but the future will be here quite soon.

The second problem in investment planning relates to community benefit estimates. Large construction firms make significant efforts to investigate potential benefits from projects in the pre-contract phases. It is not clear, however, why, in social and economic terms, a fixed percentage of community benefit expenditures should prevail. Different projects may have quite different balances of community spillovers vis-à-vis infrastructure service benefits.

The designation and delivery of community benefits is a set of issues that troubles infrastructure investors, construction companies and local authorities. Some bidding contractors perceive a potential moral hazard problem, in which some firms tendering promise significant community benefits but deliver few. There is a belief, expressed in the interviews of industry experts that the Scottish Government could do more to produce better monitoring and evaluations of community benefit. Evaluation still rests with procuring departments/groups and there is a case for that to change. Local authorities dislike that contractors report delivery of community benefits to the Scottish Government rather than them.

Construction firms are naturally interested in raising their competitiveness and establishing and stabilising future demands for their services. Their concerns about

employment go well beyond community benefit effects. They are also presently much concerned with the supply side of construction labour and, in particular, potential skill shortages. This is discussed in more detail below.

5. Employment and Training for the Future

Addressing Surpluses and Shortages

There is a policy history in Scotland, stretching back at least to the New Life for Urban Scotland projects at the end of the 1980s that has sought to link local construction efforts in renewal projects with the substantial stock of unemployed labour, especially of young people. Work incentives, placement schemes, compacts between schools and employers, refashioned college courses and other instruments have emerged and been successfully used, in some places, at some times. The Community Benefit component of infrastructure contracts still often directly deals with such issues but, there is growing interest by construction firms and industry bodies in how education and training efforts across the broad spectrum of the lifelong learning system, from secondary schools to graduate schools, can produce a sufficient flow of adequately-skilled labour for the future. These concerns do arise from workforce ageing (discussed above) but are also driven by an acute industry sense, expressed in interviews, that skills shortages will appear quickly as the construction sector recovers from recession.

All industries fear adequate labour shortages. However, there were a number of strong beliefs, expressed in interviews with construction sector executives, that economic and education policymakers in Scottish government need to address. The first is that there are substantial skill gaps that will appear, quickly. The second is that the construction sector's skills needs receive little attention in the funding strategies for education, training and research in Scottish universities and colleges. The third is that, at local or regional scales, there needs to be better, complete assessment of skills requirements. Finally, as noted above, the ways in which Scottish government manages and monitors the community benefit elements of infrastructure contracts must also change.

More than Multipliers

The strong policy interest in the efficacy of infrastructure investment in generating employment, income and strong multiplier effects through fiscal stimulus in periods of recession was extensively explored above. However the infrastructure/labour market interface goes well beyond multiplier effects. Sectoral labour demand instability across cycles as a whole, and not just the downturn phase, raises concerns for firms and government. Firms and government all need to look beyond cycles to the longer term issues of productivity and competitiveness. This requires organising a more effective interface between two complex systems, the infrastructure investment demand sector and the market supply of adequate flows of appropriately skilled labour.

Nevertheless, this broad statement oversimplifies the problem. Construction sector demands occur in distinct sectors with different skill mixes required, construction demand is localised at specific places and competitive contracting may mean imports of non-local strategic, and other, skills. Moreover, the mix and volume of labour skills required changes through the different stages of major capital projects. The labour supply system is similarly complex. Workers choose to be in the construction sector in a given occupation. But, they can shift occupations, change their sector of interest. They decide where to live, whether or

not they are prepared to commute and/or live in more or less adequate temporary accommodation. That is, large contractors and small construction firms may have to compete against other sectors and other regions and cities for appropriate labour supplies. Good national and local economic policy making will seek to maximise the short and long term benefits from public spending. If there is a problem of unemployment or under-provision of required skills in a locality then local labour market policies have to address questions of how to raise appropriate stocks and skills of labour.

Where growth is the only issue, then policy responses may range across housing supply and transport links as well as training. However, where local unemployment has been a sustained issue, or is anticipated to increase in the future, then training potentially surplus local labour becomes a priority. In the Glasgow Housing Stock transfer discussions in the early years of the millennium the Scottish Government and Glasgow City Council recognised that the major additional housing investment flows that would run from the decade after 2002 would substantially raise labour demands in the renovation sector. On the back of this, some two thousand apprenticeships were successfully created so that major income and employment benefits accrued to residents in the local labour market area.

The era of 'hard' manpower planning (that would address the issues needed to balance local/regional labour markets) passed decades ago, as the complexity of local labour markets and the difficulties of local employment forecasting were recognised. Forecasting these issues at the Scottish aggregate level is not without difficulties, but the question remains as to how to look forward if precise estimates and plans cannot be made.

A combination of credible forecasting, good monitoring, re-forecasting and flexible policy strategies is clearly needed. Nevertheless, even with the best information systems in place, a further question remains as to what the appropriate role is for local authorities, or local partnerships, in shaping the construction labour market interface. There is evidence of good, and improving, practice, in some areas of Scotland, which, allied to the strategic/information roles of Skills Development Scotland (SDS), provides an at least competent response to these difficult challenges. The SDS 'Skills Investment Plan for Scotland' (SDS, 2015) provides a comprehensive, empirically informed review of the issues involved.

This study did not involve a detailed audit and evaluation of construction sector skills programmes across Scotland and the example used below is intended solely for illustrative purposes and to highlight the challenges faced.

Making Connections.

Even when firms and governments make reasonable efforts to identify sector skill requirements and shortages, there remain a number of significant economic coordination problems in linking future local skills requirements with labour supply and training requirements. Aside from inevitable uncertainty about future, local demands, firms (and governments) face two further 'information' externality or spillover difficulties. First, training requires potentially expensive investment in the skills of particular individuals that will last and have value beyond the medium term. If individuals are disinclined to enter or invest in training or the construction sector, then firms or governments need to offer sector training incentives. In sectors with high labour turnover, where trained individuals may be likely to switch their employers or occupations, firms are unlikely to pay for training as worker commitment to them for the long term may be limited. This is particularly the case where workers are given generic skills that are in growing demand, such as improved IT understanding and introductory management and supervision skills. There is, nevertheless,

evidence, from recent SDS research, that it is precisely such skills that the small-firm subcontracting chains in construction need most. The second difficulty, however, compounds this issue as small firms are less likely to fund training and employment than large entities.

A similar ‘spillover’ issue arises for more localised governments or partnerships for training, where skills budgets may be spent on employees who then move outside the local labour market area within the highly mobile construction workforce. It would be unlikely that small firms and very local governments, in the face of these spillover and externality effects, would, or would be expected, to lead a suitable-sized training effort. Sorting the governance architecture for construction sector skills may require multi-scale partnerships and a cocktail of private, public, local and Scottish resources. There already exists a wide range of bodies engaged with construction sector training and local economic development and indeed there may be a case for some simplification rather further proliferations. However, to make training connect with other appropriate measures, there has to be a local, but more than local authority, response.

Local authorities need to be at the core of any action for change. At present, within the arena of market failures and government spillovers noted above, councils have three key obligations. First, to mesh with local economic development strategies, they have to have some sense of the future changes in labour supply and demand within their areas (something relatively well provided by Skills Development Scotland’s regional-local assessments) and how packages of planned infrastructure investments are manifested in demands for different skills. Secondly, aside from the general labour market effects of construction activity, there is a local authority responsibility to link skills assessments to local training programmes and providers, and ultimately the school system. Finally, local authorities have a responsibility to ensure that the Community Benefit dimensions of large contracts are met and that they support and are supported by other local actions.

City of Edinburgh local authority has widely effective economic development strategies and a coherent approach to its local employment and training strategies. It is chosen here to represent good policy and practice in linking skills and construction agendas.

The city works in partnership with others, aware of how city boundaries under-bound the extent of the labour market and the easy leakage of its actions into surrounding areas. Over the last few years, it has received ‘accelerator’ support from the Scottish government to invigorate a prioritised pipeline of 12 projects in the city (including housing and other property uses) over the next decade. In approved schemes, such as the Pennywell project, it has envisaged a workplan and packages of ‘job skills and training’ that will be generated at each phase of development over the decade ahead. The City has range of other measures to promote investment demand and is currently developing a ‘City Deal’ that needs to be factored into imminent plans for infrastructure investment and relevant labour demands. That ‘Deal’ requires a labour market area-regional perspective. At present The City of Edinburgh recognise that they may not always have the right skills package available for every firm precisely when and where they want it (and that would be an unreasonable expectation about what a council can do as a labour market agency). Their approach is to offer training and vacancy availabilities to city residents and then, sequentially, to applicants from more adjacent local authorities. But ‘Edinburgh first’, in a narrow municipal sense, cannot remain the objective and process in the City Deal.

The City also interfaces with the supply chain for different kinds of training, ranging from schools through colleges to universities. Some of these training providers are focussed on the city, others more region- and Scotland-wide, while many more range from the local to the global in their client groups. The SDS regional assessments provide important information to all of these agents operating both on construction demand (and related policies) and in the training provision sectors. Nevertheless, a better estimation and articulation of how labour migration can exacerbate or assuage skill shortages is needed (the involvement of immigrants and labour crews originating in eastern Europe appears, for instance, to have played a critical role in construction sector performance in Scotland since 2000). A much more precise understanding of the origins, destinations and employment location choices of graduates in construction and management than presently used is also required. That said SDS provide a sound template of information for the future that, in the absence of any convincing econometric modelling of employment and economic change in Scotland's city regions, allows for some forward thinking.

The work of SDS is best understood at the scale of Local Labour Market Areas, rather than individual local authority areas (or indeed aggregations of them). For decision taking and analysis that relates to the demand for and supply of infrastructure, Local Housing System Areas, Strategic Development Planning areas (around the four main cities), Regional Infrastructure Hubs and, now, City Deal boundaries all come into play. This is a rather complex 'tartan' of policy planning and delivery maps, to accompany the alphabet spaghetti of construction sector training and education groups. A simpler landscape of areas and institutions might facilitate more integrated, stable and effective sub-national decision taking.

Local authorities are key organisations within the Regional Hub partnerships promoted by SFT. They can choose to opt out of the Hub structure for some investment projects. There may be value in the Scottish Government rethinking the detailed boundaries, rules and roles of the Regional Infrastructure Hubs. At the very least, there needs to be an integration of the boundaries of hubs, strategic planning areas, local housing market areas and Local Labour Market Area's with the regional boundaries of SDS similarly aligned. Within these improved spatial/area frames better-integrated data and analysis systems could be developed and a coherent forward forecasting of infrastructure investment within regions and localities of Scotland developed.

It is unclear whether the weakest link in forecasting construction skills requirements is presently the uncertainties that arise in relation to the labour market change or the required future level of regional infrastructure investment. Scotland has ignored the question of coherent analysis and forecasting for sub-national economic change and there are no openly available models or estimates for the big geographic chunks of Scotland. Interviews with city officials indicated that Edinburgh currently believes that there is the potential for the city to gain close to 50,000 jobs by 2020, with significant numbers added in construction. But, are these estimates consistent with job plans for Scotland as a whole and the other regions of Scotland? How much displacement, additionality and competition is involved? Econometric modelling never calculates all the answers but it provides a coherent framework for bringing together what we know and posing questions.

Stronger, multi-sector infrastructure hubs, with local public sector actors obliged to participate and major private investors also engaged, could transform local infrastructure planning and investment. In the concluding sector of the paper, we return to the importance or permanent, integrated hubs in shaping different governance for infrastructure investment in Scotland.

Local authorities, and indeed regional hubs, require a close and informed relationship with the training sector; and they usually do. Training partnerships are widely developed in Scotland (such as Joined-up-for Business in Edinburgh). Even a cursory overview of these arrangements, however, raises the question of how cooperative institutions are within partnerships and whether the pressures on educational agents to compete drives less than optimal outcomes.

There are currently UK government proposals to change the funding of some local training programmes. As an austerity measure, the Treasury have proposed to increase the proportion of training/apprenticeship costs paid for by employers. That is, the proportion to be paid by employers for training will rise over the training period. The nature of this proposed scheme does not seem well-suited to the market failures and spillover effects (referred to above) that prevail in the construction sector. The interviews undertaken for this project suggest that this measure has little support in Scotland and within the construction sector, where firms already pay a levy to support the Construction Industry Training Board. Here, it is seen as a double tax on industry training.

Support for local construction, and related training initiatives is an important component of Community Benefit Schemes and the comments made above on the design and monitoring of Community Benefit elements of projects has particular salience in relation to labour market training.

6. A Summary for Policy Debate: Building Scotland Better

The Study.

1. This was a short study of some of the key interfaces between the Scottish construction sector, employment and the economy. Of particular concern was a perceived instability in the flow of major public capital projects and the implications of ‘feast and famine’ for efficiency and Scottish employment in the construction sector.

The Context: Austerity, Land and Localism

2. Modern economic perspectives on competition and growth emphasise the importance of creativity and flexibility as key sources of economic growth and, since the 1980s, national and local economic development strategies have highlighted the importance of raising human capital quality (skills) and innovation rates. In the last few years, there has been a new attention to the roles that land, planning, housing and, most frequently, infrastructure play in shaping local, metropolitan and national growth. ‘Land’, broadly defined, is back in the mainstream of economic thinking, and, with this, comes the recognition of the importance of making large-scale public investments, often debt financed, that far from being flexible constitute spatially-fixed, place-embedded and long-lasting entities. Good infrastructure decisions, that will boost productivity for the longer term, require an understanding of how resources are placed in and shape the real dimensions of future geographies for economic development. This is always a demanding policy task.
3. The GFC and prolonged, slow recoveries, have given expanded fiscal support for infrastructure investment in many of the OECD economies, including Scotland. Now, as restraining public debt is displacing employment stabilisation as the dominant policy task, there are emerging questions about continued commitments to expanded infrastructure programmes. The outcomes of the UK CSR have fashioned an uncertain context for Scottish infrastructure investment to 2020.
4. Two others uncertainties arise from processes of and debates about constitutional change. The outcome of the looming debate and referendum regarding the UK’s membership of the EU will impact interest rates, financial possibilities, procurement rules, health and safety in construction and environmental standards. Closer to home, the new tax, spending and borrowing powers for the Scottish Parliament, and indeed any changes in local government taxation arising from the ongoing Scottish review, will create a changed context for infrastructure investment and support. These changes are not, however, a reason to pause for a long reflection on how to rethink infrastructure policy for Scotland. It is argued below that there are ‘infrastructure system’ changes that will be of benefit regardless of what EU/UK constitutional changes unfold. The new fiscal autonomies for Scotland, with a significant share of Parliament’s resources now flowing, for the first time, from Scottish incomes, mean that infrastructure investments made in Scotland will have to pay off in jobs and incomes. The future budgets of the Parliament will be influenced strongly by the

effectiveness of infrastructure decisions and this is a striking change from past arrangements.

Construction and Infrastructure

5. The construction sector is large in overall scale, comprising close to a tenth of Scottish employment, and, after growing steadily through the long boom to 2008, contracted significantly, only recently recovering past levels of output. The Fraser of Allander Economic Commentary of autumn 2015 makes very clear that the Scottish Government (in contrast to the UK Government) made a major effort to increase infrastructure investment after 2011 and that addition to aggregate demand is presently stopping the Scottish economy from slipping back into recession as 2015 ends.
6. We have to look beyond the short term job boosts and multiplier effects to explore the economic consequences of infrastructure investment. It is essential that policies ensure that the construction sector builds the places where Scots live and work and that transport and other connections link firms and individuals in ways that serve the economy, the society and the environment for the long term. Construction does not just build homes, sewers, bridges and concert halls but the structures it produces shape the productivity of the economy, the inclusiveness of the society and the sustainability of the environment. It contributes to all the big outcomes of local and national government in Scotland and this must be recognised in how programmes and projects are evaluated and funded.
7. The infrastructure sector is diverse as well as important. Investment in the built environment, that includes the often separate categories of housing, retailing, commercial and private property, as well as public infrastructure, is driven by different demands. These demands differ not just by function (homes, shops) but by categories of buyers; for instance individuals are the major drivers of new housing demand in Scotland, while firms drive retail and commercial demands. Public bodies and governments are the main investors in more complex infrastructure projects and networks.
8. The emergence of new technologies in communications and the privatisation of former public utilities now mean that significant shares of major, spatially-fixed investment are now driven by private rather than public investors. The demands for infrastructure, its ownership and funding arrangements have become significantly more complex in the last thirty years. For instance, in Edinburgh there are major infrastructure projects at the airport, around the University and in the St James' Quarter that are not publicly-owned but may be subject to public planning and regulation.
9. The outcomes that governments seek from infrastructure investments are becoming more complex and the diversity of the ownership and financing of the sector have grown significantly. Public capital spending on pure public projects is no longer the largest share of Scottish infrastructure investment and this has major implications for integrated public policy and planning.
10. Half a century ago, in a NEDO review of the construction sector, Burn (1964) wrote that the industry was 'like a large and shambling giant that had difficulty in coordinating its large and different limbs to move forward'. In the respects noted above, the industry has become even more complex but, in many ways, it has also

become considerably smarter. Firm, finance and project management techniques have improved significantly, particularly for the larger Scottish providers who are part of a wider UK or international group. In these organisations, perhaps in some contrast to the myriad of sub-contractors, management of resources and risks is now quite well-developed and there are strong business cultures. One interviewee suggested that construction remained a ‘stupid’ industry (delivering ‘smart cities’) but this seems unfair. Looking from outside the system the sector seems to have replicated its own scale/skills fragmentations in a large number of overlapping industry training and representative (lobby) groups. This fragments oversight and policy expertise for the sector and there is a real question as to whether the sector has too many representative bodies to be effective. The question of how well informed the sector and governments are about the infrastructure gaps and opportunities that exist in the country. Are these industry capacities to understand issues and opportunities are actually matched within government? More particularly, there must be a concern that, since the Scottish local regions were removed in the 1990’s, local governments in Scotland may not have the strategic skills to play fully effective roles in shaping infrastructure demands and delivery.

Cyclical Instabilities and Pipelines

11. Cyclical instability is a widely reported aspect of the construction sector. In broad terms, the market sector is pro-cyclical, so that when the general cycle turns up or down construction often shifts ahead of the general cycle. The consequences of the GFC have been a significant fall in Scottish output in particular construction sectors, namely housing and retail construction and these reductions reflect not just local demands and policies but also the operation of international economic factors together with the influence of national, UK, monetary and fiscal policies. However, public capital investment in Scotland after, 2009 has remained markedly more stable than in other regions of the UK. Whilst the Scottish housing market has a cyclical pattern that largely corresponds to northern England and Wales, publicly-funded capital has been more stable than in these regions. The Scottish Government has performed relatively well in both forestalling deeper capital cuts and in phasing projects over time.

There is little prima facie support for the starting question of this paper, namely that Scottish government policy have exacerbated cycles and reinforced labour market instabilities. The economic record suggests otherwise. However, in rapidly procuring putting large ‘chunky’ projects to secure significant short-term stability gains, there was always, given the international tendering processes and the cross-border mobility of construction labour and materials, the possibility of the substitution of Scottish firms and resources for non-Scottish competitors. How government ‘sizes’ construction tenders and how it phases them into the market will invariably impact the balance of local/non-local resources used in production. Selecting the phasing of investment programmes requires balancing cost competitiveness now with the creation of wider benefits and longer-term local capacities.

12. An assessment, based on a small number of interviews, of the procedures by which the Scottish Government assembles and organises a pipeline on investment projects suggests that this is a well organised area of government business and it has improved considerably in the last decade. Construction industry bodies tended to this share this view, although they reiterated the need to construct a larger number of smaller projects wherever this did not compromise efficiency. They were, however, more

critical of government in other respects. There was a widespread feeling, for instance, that the national spatial planning framework had relatively little, ex post, influence on where investment was made and that the national infrastructure plan, although intermittently updated, was not seen as a ‘living’ document. Government is therefore seen to have become more convincing at organising business, or delivery, but not more credible in planning what it ultimately delivers.

13. Despite relative Scottish stability in spending on major projects, there may be problematic aspects of this employment and other economic outcomes of Scottish construction spending. Even with supported demand levels there is no guarantee, in competitive procurement processes, that Scottish spending supports Scottish-based firms (as non-regional firms may tender), or that local labour is always employed on contracts. Furthermore, even if all Scottish spending on infrastructure was to fall competitively to Scottish-based firms, there is no automatic linkage into a well-organised labour market and training system that will supply and remove diverse construction talents as and when the industry deems it suitable to do so. There are potential policy and planning failures in shaping major investment projects and market failures in sub-contracting and training. A key feature of the sector is that 90 percent of firms in the sector, are sub-contractors with fewer than 9 employees, reflecting traditional responses to fluctuating and changing demands for particular skills.

Priorities and Planning

14. These raise important questions regarding the ‘system’ for thinking about, planning and delivering infrastructure in Scotland. There has been a strong rhetoric across most governments in the advanced economies since the 1990s that infrastructure investment promotes productivity and economic growth. In fact, the econometric evidence after 1990 does not support this proposition at the macroeconomic scale. More convincing evidence exists at sub-national regional and, particularly, metropolitan scales, where large investment tranches can be related to particular goals and outcomes monitored. There is more or less no such evidence in Scotland.
15. Scotland is moving into different times. As elsewhere, new technological possibilities and living patterns are shifting infrastructure requirements. There is little evidence of a coherent ‘foresight’ exercise for Scottish construction and infrastructure. As noted above, as the Scottish Parliament increasingly relies on Scottish fiscal revenues, the imperative for infrastructure projects to deliver enhanced Scottish incomes, during and post construction, is becoming more important. At the same time, more of the advocacy for infrastructure spending, as in the Deals, relates to how it drives growth and not to some simpler measure of particular public service/ amenity delivered. The drivers of construction, and the structures of the industry are more complex, but also are the public policy goals that are being articulated. With growth and productivity for the long term, and not just short term cost and outcome measures, now regarded as key drivers of investment, new perspectives, planning and procurement rules are needed for infrastructure planning and, with this, economic development measures need to be included within project evaluation criteria. Do we have the economic skills and knowledge to build Scotland better? We may be a nation of engineers but do we face a challenge of missing infrastructure economics?

16. This raises the question of how ambitious we want to be about infrastructure in Scotland at national, 'hub' and local scales. The Scottish Government now stresses the importance of an 'inclusionary growth' policy framework, with investment promoting fairness as well as growth. This takes us well beyond typical policy notions of displacement and the multiplier in thinking about projects. It also calls into question the notion of simple rules in project selection such as 90pc cost/10pc community benefit tender cost split and whether these really have any role to play. A more explicit policy cause-effect chain is required and a wider, informed assessment of the major project outcomes needed. The currently prevailing information-poor and weak monitoring features of Scottish infrastructure decision taking cannot support such an approach in any convincing way.
17. The advent of the SFT has shaped a much more professional approach to the planning and financing of Scottish infrastructure. Nevertheless, there is still a wide acceptance of less than convincing ways of informing, modelling, evaluating and programming multiple sector, growth oriented investments, as, arguably, reflected in the investment strategies of the major Scottish cities and the Glasgow City Deal. There is a lack of information and assessment; a lack of economic modelling; a lack of outcome evaluation and monitoring and a lack of transparency in local bureaucracies. They need to publish the logic chains used to connect policy levers to intended outcomes and to put the models and data employed into the public domain to be subjected to critical scrutiny. There needs to be more applied economics and less alchemy in the city, infrastructure and planning debates in Scotland.
18. There must be a significant step change in local competences in this area of work in Scotland and infrastructure system research and planning needs to be on a comparable footing to (and possibly integrated with) the currently robust Scottish approaches to local housing system analysis. Scottish Water, still in the public sector, illustrates how rigorous evidence can be used to shape credible investment strategies. Too often bids from local to national levels for infrastructure construction, whether in initiatives such as City Deals or growth accelerators, are made on inadequate estimates and are not usually underpinned by fixed and definitive local planning decisions that will allow projects to start with minimal delay.
19. The construction industry needs to be engaged and consulted in the formation of such informed local investment plans. Whether these plans come from a city or a town or a wider geography, they must, at least, contain an evidence-informed story for change that can evolve as circumstances change; not a fixed blueprint but a flexible guide for moving places forward in a thoughtful, coherent fashion. Arguably, that is not what we do now, nor is it clear at present whether local spatial plans serve the investment strategy or vice versa.

Skills, Shortages and Training.

20. Construction labour supply, training and wider community benefits have to be key components of the discussion of economic impact for growth in cities and hubs. When construction demands expand within a particular regional labour market, the diverse, unfolding pattern of labour demands (and not just community benefit client groups) need to be grasped across all infrastructure providers and understood by those responsible for local economic development. The local authority then has to set the likely demands in the context of known shortages/surpluses, the overlapping demands

of other sectors, the training demand responses of firms and the supply responses of schools, colleges and universities. In some parts of Scotland, this function is performed impressively well. In others, however, this is less the case and there are questions about the optimal geographies for policy actions.

21. Skills Development Scotland has recently undertaken a major, quality review of construction sector skills and their regional skills assessments form an important basis for authorities working to link training and construction sector labour issues. However, within their analyses there is arguably insufficient attention to labour mobility into growing regions and to the destination behaviours of university graduates. Their work usefully highlights how, within local labour settings, the construction sector will have to compete with other sectors for workers with management skills, for instance. Nevertheless, it is clear that if there is to be improved infrastructure-construction plans (that also integrate planned housing investments with other sectors) these would also serve as a basis for a more coherent discussion with local/regional skills development planners and providers.
22. There are a number of current policy worries pertaining to the labour-infrastructure interface. The UK Treasury's recent proposed 'training levy' suggests that firms should pay a rising proportion of apprenticeship costs in new apprenticeships. This suggestion essentially ignores both the market failure arguments for policy support and that construction firms already pay a training levy to the CITB. The industry, and indeed local authorities interviewed, had significant misgivings about the definition, scale and monitoring of the Community Benefit element of schemes. The falling support for further education colleges that have played key roles in the provision of relevant construction sector labour skills was also highlighted as problematic.

A New Governance for Infrastructure Policy

23. There is an imperative to modernise the governance of infrastructure/capital spending in Scotland. At local scales it is clear that the strong economic spillovers into economic outcomes and labour markets requires a wider than local authority perspective and 'hubs' may therefore be a more coherent scale for integrating infrastructure, housing and labour market policies. At the national scale, the growing significance and professionalism of infrastructure provision has seen an increasing role for private as well as public investors. It is no longer sufficient to take a government-sector only view in infrastructure coordination.
24. There is a case as Scotland develops a new infrastructure-construction system for hubs linking upwards through an Infrastructure Scotland that would build upon SFT capacities. This model, in broad terms, works well in Australia which has a widely admired infrastructure provision system. Infrastructure has long planning, gestation and service delivery horizons. It has effects that spread well beyond single jurisdictions and it has to be provided via coherent, efficient networks. Above all, it has to serve a vision of what places can become in the future. Politics will always have short-term and narrow concerns as well as longer, wider goals. Mainstream civil servants rarely have the time to grasp how local systems work in detail if they are also to serve their Ministers well, and, for the present at least, local authorities do not have the skill sets to construct major infrastructure projects nor are they at the right geographic scale to capture spillovers effectively.

25. An Infrastructure Scotland, that brings together all of the main demand sectors of interest, including Scottish Government, local authorities, agencies and quangos together with the major utilities, the main supply side capacities of construction firms, the financial sector and training institutions, could provide that long-term, practice-based insight for Ministers and policymakers. If this was done, not simply to create a Scottish version of the emerging Adonis Commission, but based on hubs with significant local government influence, then a novel integrated governance system for Scottish infrastructure could emerge. Furthermore, if, as suggested by the Smith Commission, appropriate inter-governmental mechanisms were developed between Westminster and the devolved administrations, we might then have an infrastructure governance system in the UK that would begin to compare more favourably to those of other countries.

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