

# Basing economy on materiality: an analysis of Sydney's freight flows

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## ABSTRACT

This paper is part of a systematic examination by the authors of Sydney's changing political economy within its largely self-imposed globalisation agenda. This part seeks to unravel the changing nature of Sydney's material connections across the Sydney basin economy and with other places. The analysis is based on novel uses of GIS-based software and its application to freight flow data. There are employed to describe and delineate the composition, intensity and direction of materials flows arising from the functioning of the Sydney economy.

Two questions are explored. First, we seek to expose the global city metaphor as narrowly defining what Sydney is and how it operates economically. Second, and following Blomley's (2005) call for a new look of the idea of 'property', we undertake a resurrection of the materials sector of the economy as having important political presence. Here we ask: what is the substance of a material such that it is worth moving? how are materials politicised by their generation, distribution and appropriation? how do spatial contexts influence the ways materials are valued and assigned meaning? and what is the role of materials in deterritorialising and reterritorialising urban economies. Of course, this privileging of materials flows deliberately holds back the presence of the services, property and finance sectors. We reserve these for later analysis.

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## INTRODUCTION

This paper is part of a systematic examination by the authors of Sydney's changing political economy within its largely self-imposed globalisation agenda. This part seeks to unravel the changing nature of Sydney's material connections across the Sydney basin economy and with other places. The analysis is based on novel uses of GIS-based software and its application to freight flow data. There are employed to describe and delineate the composition, intensity and direction of materials flows arising from the functioning of the Sydney economy.

The paper here presents a selection of preliminary analysis of freight data that show flows of materials within Sydney and to and from other places.<sup>i</sup> A key part of the paper is an exploration of

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<sup>i</sup> Figures accompanying the analysis are presented at the 2005 State of Cities Conference.

the idea of materiality. A core argument is that materials continue to play a key role in the Sydney basin economy though one that changes as the nature and direction of the non-material economy changes.

The paper has five further parts. Section 2 presents a pragmatic argument against the idea that the materials economy has become redundant or, at least, overwhelmed by a non-material one. Section 3 discusses the notion of materiality, while section 4 applies this conceptualisation to the Sydney basin economy. Finally, section 5 reveals some of the analysis of Sydney's freight flows and then some conclusions are made.

## **AN ALLEGED DISPLACEMENT OF THE MATERIAL**

The Globalization and World Cities (GaWC) project (see Taylor 2003) selects a narrow set of indicators to define global city status. The indicators trace operational linkages within global firms in the accountancy, advertising, banking and finance and law sectors. As a matter of course, then, the global city is constructed according to the extent to which hosts connection points for the non-materials sectors, specifically those concerned with the provision of business and professional services. Yet, by exposing other linkages (and therefore other things that are attended to by agents of the Sydney basin economy) we show how a differently constructed Sydney appears.

The GaWC approach can be seen to lie within what might be called the post-industrial society paradigm. This paradigm has been constructed through the re-iteration of the theme of *displacement*, especially of western manufacturing by production operations organised around the non-material sectors. This re-iteration commenced roughly with accounts of automation and restructuring at the end of the Fordist boom (witness Harrison and Bluestone's, *Deindustrialization of America*, 1982), then followed accounts of new international divisions of labour (witness Fröebel, Heinrichs and Kreye's *New International Division of Labour*, 1980; Dicken's *Global Shift*, 1986), claims for profound shifts in the nature of contemporary economy, work and culture (Piore and Sabel's *The Second Industrial Divide*, 1984; Lash and Urry's *The End of Organised Capitalism*, 1987; Harvey's *Condition of Postmodernity*, 1990) and, more recently, claims for the displacement of materials-based processing economies by weightless, information and services based activities dominated by immaterial labour (for a radical exposition of this latest transformative step see Hardt and Negri's *Empire*, 2001).

The displacement idea has thus become common in contemporary political economy analysis. For example, Quiggan (1995) points to "the shrinking of the goods economy" alongside "a shrinking of the goods economy required to support it", as if these propositions were unproblematic.

At least three, largely pragmatic, concerns can be identified with the displacement idea. *First*, there is the view expressed within Marxist analysis that capitalist production processes instil labour value into both material capital and material goods and that services are ancillary to such processes. Hudson (2005, esp. chapter 3) is an exemplary of this view. It is a view that is reproduced often in public advocacy pamphlets and other material, especially from industry groups and trade unions, arguing that "manufacturing matters" to an advanced economy.

*Second*, there are environmental sustainability concerns. One results from a measurement exercise that shows the ongoing reliance of any economy including global city economies, on materials. This is discussed immediately below. Another relates to the physical changes demanded on the territory of the global city region. These arise from the need for residential and other spaces of occupation; and for sites and corridors for waste disposal including as controlled discharges, processing and lodgement in places such as landfill sites, waterways and oceans, and as uncontrolled discharges into the atmosphere, the water cycle and so on. Similarly to demands made by the waste stream,

demands on the territory of a region also arise from demands for corridors and spaces for urban infrastructure. The recent decision by the NSW government to allow further massive reclamation of Botany Bay for the expansion of Sydney's container handling ports facilities from, currently, 1.34 million TEUs per annum to 2.9 million TEUs by 2021 (Dick 2005) demonstrates the critical relationship between the operation of a global city economy, the circulation of production and consumption materials and the material impacts on the environment that arise thereby.

*Third*, there is a socio-political concern. Global city regions are trade-intense economies. In Sydney's case <sup>ii</sup> there are major goods trade connections with other nations which require deliberate and customised political interventions. In particular, these involve negotiated connections with the governments of China, the USA and New Zealand, which, in turn, bear on the nature and direction of Australia's foreign affairs relationships and, obviously, on the nature and extent of other circuits and flows such as circuits of financial capital and migration and other labour flows. The flows of traded materials, then, have surviving, perhaps growing, significance.

Beyond pragmatics, there is a post-structuralist account of materiality which also confronts the displacement paradigm. This is presented in section 3.

### **Sustainability and TMR**

TMR refers to the Total Material Requirements of an economy. The TMR concept draws on perspectives from thermodynamics and derived assessments of the environmental impacts of materials consumption and waste generation. The idea was originally devised by the World Resources Institute in 1997 (see WRI 2002). The United Nations Division for Sustainable Development (UNSD) defines TMR as,

“...a compound indicator reflecting all the physical materials that are mobilized each year to support an economy, including “hidden”, non-economic materials such as mineral overburden, processing waste and soil erosion.” (www.un.org/esa/sustdev accessed 12 October 2005)

According to the UNSD web site, the purpose of the TMR process is to measure the total materials mobilized to support an economy, thus producing an indicator of material-use efficiency and extent of potential physical environment disruption. It is intended as a device for monitoring trends in materials intensity in an economy with a view to identifying possibilities for intervention in the application of sustainability principles.

Poldy and Foran (1999) measure TMR for the Australian economy at almost 180 million tonnes per person per year, which they claim as several times greater than for other OECD countries for which comparative data are available. So too, the *growth rate* of Australia's material flows is estimated to be substantially above those of other OECD nations. Poldy and Foran claim their findings “raise questions about the progress of dematerialisation” (p.1). In a similar study of the UK, Gazley (2005) finds that that nation's TMR increased steadily between 1970 and 2003, while Bringezu and Shutz (2001) report for the European Environment Agency that there has been no significant decoupling of TMR and European nations' GDP in the mid 1990s. In summary, and valuation questions aside, materials appear to have maintained a major physical presence in the modern advanced economy.

But what of the question of value? To address this we turn to a discussion on the nature of materiality.

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ii as shown in figures displayed at the 2005 State of Cities conference

## THE NOTION OF MATERIALITY

First a caveat: the notion of materiality we advance here is different to that discussed by Thrift (2003) who, following Spinoza, uses the word as the ‘other’ to the notion of thinking.

There is another discussion about materiality that we draw on being about the notion of physical or material presence though one beyond a Newtonian view of matter “as passive, inert and dead” (Shapere 2000). Miller’s (2005) collection is a recent exploration of the issue which parallels our interest in showing that the immaterial is not easily separated from the material, capable, for instance, of embarking on a separate growth pathway. Rather, each state – the material and the immaterial – is mutually constitutive of the other. One cannot create the conditions for redundancy of the other.

There are debates that require attention in this discussion. Jones (2004), for instance, drawing on Gosden’s (1994) *Social Being and Time*, proposes that the,

“...notion of materiality encompasses the view that material or physical components of the environment and the social practices enacted in that environment are mutually reinforcing [such that] the material world, and the social practices that take place in that world, bring each other into being and therefore are analytically indivisible” (p.330).

This view contrasts with Hardt (2005) when he revisits his and Antonio Negri’s arguments in *Empire* to argue for the rise of the “hegemony of immaterial labor” being “labor that produces an immaterial product, such as ideas, images, forms of communication, affects, or social relationships.” Hardt asserts that immaterial labour has displaced the previous hegemony of industrial labour, “transforming” other forms of production and “forcing them to adopt its qualities, to become communicative, informational, image-oriented, and so-forth” (p.176).

Montag (2005) confronts Hardt’s view – and indirectly that of the role of immaterial labour in Hardt and Negri (2003) – in arguing that materiality is no less singular (as revealed through abstract processes of decomposition and recomposition, rather than demonstrations of the capacity for physical separation of matter into other ingredients) than non-materiality. Drawing on the example of the theatre as ostensibly involving non-material labour in the production of a non-material product, Montag points to the continued presence of materials, including the body, in theatrical performance. Conversely, we add that products such as clothing and food increasingly incorporate the non-material alongside the material with the incorporation of image, brand and convenience (among other things) into the substance of the food or clothing product. These examples point to the role of non-material labour (or non-material production or consumption) as inevitably mobilising (rather than displacing) the material.

Hence, we seek to make distinct claims about the notion of materiality and about its place in the contemporary economy. *First*, like all things and all ideas, materiality relies for its existence on the existence of language. The passage of the material into the substance of the immaterial (and *vice versa*) is both language encased and language enabled. Thus materiality has an immaterial quality, through its definition by language. Fortunately, in most cases language does an efficient job in the signification of a material by objectifying it “into a single, easily nameable thing that, like a chair, is taken for granted – mere furniture” (Punday 1998, p.5). By and large (and fortunately), society agrees on simple, uncontroversial language depictions for its common objects. Irrespective, “the material” is understood as “something produced out of one’s relation to social and linguistic objects” (ibid p.7) and, thereby, the social and the linguistic construct the qualities of “the material”.

*Second*, materials only have meaning through their relations with the other objects and humans that surround them. Punday (1998) shows how this produces a temporality in the quality of materials.

And through direct observations of the passage of air freight, Lopez (1998, esp. chapter 5) similarly draws attention to the perishable nature of all goods due to diminishing lengths of product life cycles arising from technological change and marketing processes that accelerate redundancy.

*Third*, as should be becoming obvious, we argue that materials do not have a pre-existing tenure or place in the world. Like any object, idea or life form, their presence is contingent. The conditions for their existence must be established. The nature and flows of materials in an economy, therefore, depend on the nature and direction of that economy and on its constituent parts and on all the external forces and objects that are connected to that economy, such is the complex nature of materials.

## **MATERIALITY AND THE SYDNEY BASIN ECONOMY**

As ever, Sydney's materials flows have physical dimensions esp. weight and volume that makes their movement significant. They are transported mostly in containers (with equivalent twenty foot lengths, or TEUs) which require accessible ports, sophisticated port handling systems, storage and trucking depots, and numerous trucks and so on. So too, Sydney's materials flows interact continuously with material and non-material labor, with a range of skills and qualifications, for their arrivals, transformations and departures. They also move into and out of predominantly non-material worlds – logistics systems, advertising campaigns, sales strategies, financial plans and the like.

Then the materials world intersects with the world of consumption – the store, the human body, the household and other sites of consumption. Anticipation of these intersections guides material flows and transformations. So too does the arrival of materials into these sites and the use that materials are subject to. Of course, as shown in the food and clothing examples above, the consumption of materials cannot be separated from the consumption of the non-material. Moreover, the presence of non-material desires and fulfilments during consumption is capable of altering materiality substantially. The taste of wine or cheese changes according to circumstances, as do the appropriateness of a piece of clothing or the appearance of its colour.

The argument, then, is that the material and the non-material over-determine each other's existence throughout production, distribution and consumption phases. There are aspects of the relationship that are dialectical and others that are mutually constitutive. This interdependence doesn't just survive transformation, it induces it and propels it. In other words, there can never be a periodised displacement of one by the other.

## **MATERIAL FLOWS IN SYDNEY**

Analysis of project data reveal the following general arguments:

- Sydney operates as a city-region with a high proportion of materials flows having origins and destinations within the Sydney basin economy.
- The presence of Sydney as a primate city in NSW is shifting to a situation where it is the highest order centre in an urban hierarchy that includes Melbourne and Brisbane.
- The Hunter and Illawarra regions are being absorbed into Sydney's internal material economies.
- Inclusion of the Hunter and Illawarra into the analytical space of Sydney elevates Sydney's performance as an autonomous regional economy.

Tables 1, 2, 3 and 4 contain data that illustrate these generalisations. Further illustrations were provided at the 2005 State of Cities conference.

**Table 1 Freight destinations with Sydney origins, by road, 2001, percentage of all freight tonnage**

Destination	Percentage of all freight (tonnes)
Sydney	66.2
Hunter	3.8
Illawarra	11.2
Rest of NSW	7.0
Melbourne	4.7
Rest of Victoria	0.8
Brisbane	3.0
Rest of Queensland	0.4

Source: processed from ABS Catalog 9220.0

**Table 2 Freight destinations with Sydney origins, by road, 2001, percentage of all freight tonnage, Sydney destinations removed**

Destination	Percentage of all freight (tonnes)
Hunter	11.3
Illawarra	33.0
Rest of NSW	20.8
Melbourne	13.9
Rest of Victoria	2.3
Brisbane	8.9
Rest of Queensland	1.3

Source: processed from ABS Catalog 9220.0

**Table 3 Freight origins with Great Metropolitan Region (GMR) destinations (includes Hunter and Illawarra), by road, 2001, percentage of all freight tonnage**

Destination	Percentage of all freight (tonnes)
GMR	87.2
Rest of NSW	5.9
Rest of Australia	6.9

Source: processed from ABS Catalog 9220.0

**Table 4 Freight origins with Great Metropolitan Region (GMR) destinations (includes Hunter and Illawarra), by road, 2001, percentage of all freight tonnage, GMR origins removed**

Destination	Percentage of all freight (tonnes)
Rest of NSW	45.8
Melbourne incl. Geelong	20.7
Rest of Victoria	7.3
Brisbane incl. SE Queensland	14.8
Rest of Queensland	3.8
Rest of Australia	8.5

Source: processed from ABS Catalog 9220.0

## CONCLUSIONS

Two points are made. Measurements of the material base of advanced economy – conducted primarily for measurements of sustainability – reveal that the materials base of economy is not declining in either absolute or relative terms. The study of materials flows, then can reveal the geographic nature of the sustainability of advanced city economies including the nature and role of transport systems in constructing a materials economy, the aggregate effects of private sector logistics systems, the efficiency (or otherwise) of transport infrastructure and the intersection of materials flows with household consumption patterns.

Materiality, the character of materials, and non-materiality overdetermine each other such that the idea of a periodised industrial transformation from one to the other is illogical. The study of materials flows, then, can reveal the spatial operation of the non-material. If one co-exists with the other, then spatial patterns (not necessarily coincidental one) might be observable. This remains a key research component of a wider project.

## REFERENCES

- Blomley, N. (2005) Viewpoint: Remember property? *Progress in Human Geography*, 29, 2, 125–127.
- Bringezu, S. & Schutz, H. (2001) Total material requirement of the European Union, *Technical Report No 55*, European Environment Agency, Copenhagen.
- Dick, T. (2005) Botany expansion brushes aside doubters, *Sydney Morning Herald*, 15 October 2005, 9.
- Dicken, P. (1986) *Global Shift: Industrial Change in a Turbulent World*, Harper & Rowe, London.
- Fröebel, F., Heinrichs F.J. & Kreye, O. (1980) *The New International Division of Labor*, Cambridge University Press, Cambridge, UK.
- Gazley, I. (2005) Trends in UK material flows between 1970 and 2003, *Economic Trends*, 619, 39–47.
- Gosden, C. (1994) *Social Being and Time*, Blackwell, Oxford.
- Hardt, M. (2005) Immaterial labor and artistic production, *Rethinking Marxism*, 17, 2, 175–177.
- Hardt, M. & Negri, A. (2001) *Empire*, Harvard University Press, Harvard MA
- Harrison, B. & Bluestone B. (1982) *The Deindustrialization of America*, Basic Books, New York.
- Harvey, D. (1990) *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change*, Blackwell, Oxford.
- Hudson, R. (2005) *Economic Geographies: Circuits, Flows and Spaces*, Sage, London
- Jones, A. (2004) Archaeometry and materiality: materials-based analysis in theory and practice, *Archaeometry*, 46, 3, 327–338
- Lash, S. & Urry, J. (1987) *The End of Organized Capitalism*, Polity, Cambridge
- Lopez, B. (1998) *About this Life: Journeys on the Threshold of Memory*, Harvill Press, London
- Miller, D. ed. (2005) *Materiality*, Duke University Press, Durham NC.
- Montag, W. (2005) Materiality, singularity, subject: response to Callari, Smith, Hardt, and Parker, *Rethinking Marxism*, 17, 2, 185–190
- Piore, M.J. & Sabel, C.F. (1984) *The Second Industrial Divide: Possibilities for Prosperity*, Basic Books, London.
- Poldy, F. & Foran, B. (1999) Resource Flows: the material basis of the Australian economy, *National Futures Group Working Document 99-16*, CSIRO Wildlife and Ecology, Canberra.
- Punday, D. (1998) Theories of materiality: moving through Kathy Acker's Empire of the senseless, *Genders*, 27, 1–5 ([www.genders.org](http://www.genders.org) accessed 12 October 2005).

Quiggan, J. (1995) Categories set up in savings hurdle, *Australian Financial Review*, 20 March, pages unknown.

Shapere, D. (2000) Matter, in *Concise Routledge Encyclopedia of Philosophy*, Routledge, London, 544.

Taylor, P.J. (2003) *World City Network: A Global Urban Analysis*, Routledge, London and New York.

Thrift, N. (2003) Performance and ..., *Environment and Planning A*, 35, 2019-2034.

World Resources Institute (WRI) (2002) *Ideas into Action: WRI Annual Review 2002*, WRI, Washington.