The 'Eco-Efficient' Airport Metropolis: Aligning Economics, Stakeholder Interests and Environmental Objectives

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The coming of the 'airport city' is widely recognised, but research determining stakeholder interests, and in particular, ecological objectives, in meaningful and weighted terms, remains neglected. Some privatised airports increasingly see their most important stakeholders as private equity investors and superannuants in funds that have injected significant amounts into airports, underwriting their expansion and development. Clearly though, there is a role for local residents, precinct users, and ecologically trained economists to play in airport expansion planning and management.

Assuming that 'distanced' airport shareholders are more likely to prioritise economic-based objectives than local community stakeholders and scientific experts, a tension which hitherto did not exist now tempers airport development strategies. I identify 5 "ends objectives" for the airport metropolis out of a longer list the Brisbane Airport Corporation cites. Much effort has been put into developing sustainability indicators. However, these indicators need to be weighted to develop a hierarchy of objectives to achieve a balance between the various interests. Such a balance is not only fundamental to achieving a degree of sustainability, it may also enable synergies of co-operation and integration at the economic, environmental and social levels.

This paper discusses attitudes and approaches to objectives by the airport metropolis stakeholder pool, and canvasses strategies for harmonising interfacial planning and decision making initiatives based on findings. It is preliminary research that provides front-end input for decision-making models whether currently in existence or yet to be designed.

Keywords: sustainability; eco-efficiency; institutional learning; objective alignment; stakeholder interest; interface ecologies.

Eco-efficiency and the airport environment

Ecological concerns have long been an issue for multi-national companies and government bodies. It is no longer uncommon for large organisations to enthusiastically commission a range of internally produced and outsourced studies focussing on ecological impacts and outcomes of their activities. The problem is though that such studies all too often condense initiatives to the 'eco-efficiency imperative' encapsulated by ISO 14001 compliance and the like, meaning that non-

economic and even non-aggregated services tend to be marginalised (ACF 2000, 2004; WBCSD 2006a). By eco-efficiency we explicitly refer to the term's coinage by the *World Business Council for Sustainable Development* (WBCSD) based on the concept of creating more goods and services with less waste and pollution using fewer resources (Schmidheiny, 1992). The Council's idea was to develop a coefficient that responded to the maxim "only what gets measured gets done". The term has become enormously successful as a concept, although in a technical sense it remains compromised by 'offset' and 'rebound' problems. Perhaps even more debilitating from our perspective here is that the term implies that trans-boundary problems are solvable within the originating system, and this can be achieved by existing practices done better.

What tends to be lost to the eco-efficiency concept is the recognition of limits. It does little to evoke, for example, ideas about what can be done with an airport's ecology to contain problems spilling out beyond its precinct. So while eco-efficiency-based strategies can provide significant local benefits, it is contended that superimposing efficiency on existing airport management practices will have little effect in the wider region accommodating a growing airport precinct. To support this claim the concepts of eco-efficiency and sustainability in terms of the ecological imperatives of airport dynamics, and understood generally as development and regional interfaces, are briefly discussed. Second, efforts to measure the performance of the contemporary airport are reviewed with a view to constructing an 'ends' objective framework. This is vital background for the third and final section in which a hierarchy of objectives that re-balances internal airport concerns with regional implications is argued for.

Eco-efficiency's success as an ecological concept has probably got a lot to do with the observation that decision-making nearly always favours economic stakeholders, whether defined as direct equity investors or simply citizens allegedly benefiting from 'nation building', economic growth, and prosperity. The context of eco-efficiency demands at airports is no different. However, with growth of the airport 'entity' usually outstripping development elsewhere, there has been increasing demand for on-site ecological and eco-efficiency problem solving. What is less well recognised is the danger that airport expansion in terms of facilities provided and services offered poses for wider physical and social interface ecologies.

I am not suggesting we unhinge social and urban development from eco-efficiency, but I do submit that socially and politically calibrated ecologically sensitive outcomes require much more than educating employees and the general public about the virtues of eco-efficiency practices. I argue that sustainable progress can only be secured by re-ordering decision-making priorities that have hitherto advantaged economic outcomes. And this requires the articulation and internalisation of ecological objectives from a regional perspective as a major step in responding to the sustainability challenge confronting airports. Specifically, such objectives are likely to address needs and policies concerning infrastructure provision, governance arrangements, stakeholder inputs, non-economic evaluation regimes, and the development of a responsive and informed 'college of organisations'. Furthermore, arranging these objectives into a "hierarchy" (Zaheedi 1986; Keeney 1988; Saaty 1990) not only makes good sense, it also helps to establish a sequential, incremental, and comprehensive plan of action.

Sustainability is not after all achievable if approached as an added extra to the way business is done, making it say goal number 5 in a handful of key objectives (WBCSD 2006b). And nor is it a product of cleaning up your own backyard, if your backyard will continue to impact others in the neighbourhood. It is instead about taking an 'all of stakeholder' approach to rethinking and ultimately reconstituting identified objectives to maximise sustainability outcomes in what amounts to the harnessing of institutional learning. So my final argument is that this institutional learning facilitated by widely held and sequentially structured objectives is the anti-dote for the compartmentalisation of the sustainability challenge driven by a narrow conception of eco-efficiency.

The Ecology of Airport Cities

While much has been written about sustainability, and research in this important area is rapidly expanding, not a lot is known about how organisations are adapting to the new sustainability-conscious environment. Few studies empirically analyse attitudinal change in organisations using sustainability as the key variable, although there is already a voluminous literature focussing on organisational responses in terms of the formation of recommended eco-efficiency-based strategies, positions, policies and the like. This same imbalance characterises airport studies. Before gleaning what we can from the literature we will first position our approach to sustainability, given that there are so many competing ideas in circulation concerning the concept.

Sustainability is conceptualised here as a strategic management idea, and argue that this is precisely how it was conceptualised by the landmark Bruntland Report (1987), which almost single-handedly launched the term into a prominent position in the global lexicon. The implication of this 'institutionalised' and somewhat standardised take on the term is that organisations are obliged to measure their environmental impact, and devise ways of reducing it. This is widely understood, even if the link to the Bruntland Report is not recognised. However, this is also where the 'sustainability problem' entrenches itself, encouraged by eco-efficiency thinking. A series of 'quick grab' solutions and misunderstandings punctuate discussions about sustainability as a new 'add-on' objective rather than as a whole new management framework.

The first myth to be debunked when an organisation grapples with sustainability is the tempting assumption that economic sustainability translates to perpetually increasing profits (or even balanced budgets) acquired through well planned, socially and environmentally sensitive practices. A second suggests that social sustainability, which we assume the WBCSD is talking about when they mention social progress, is misinterpreted as a function of OH & S and HR taken to a new level of quality assurance. This is wholesale diminution of the often ignored, or at least poorly understood second plank of the Bruntland definition – the need for intra and inter generational equity. And a third myth, and one that I draw particular attention to, is that sustainability is too often seen as the responsibility of policy makers and management, while the rest of us passively follow along by faithfully carrying out new directives.

These myths have diluted the sustainability agenda to a palatable blend that accommodates 'business as usual', paving the way for ever greater intergenerational inequity, at least from an ecological perspective. Examining closely how these myths

have emerged, the adoption of sustainability primarily as an organisational management concept appears to be a prime suspect. This need not be a bad thing however, because what can be organised according to business imperatives can be re-organised according to community and ecological objectives at the managerial level. The key to this re-alignment of objectives is to desist from pitching sustainability as something that competes with a number of other concepts that have had significant impact on how we understand the structure and functions of modern organisations. These concepts include Total Quality Management (TQM), customer orientation, learning organisations, and Business Process Re-engineering (BPR) to name a few that have profoundly influenced business for decades. Rather than risk losing focus by trying to accommodate all these ideas into a single 'sustainable' decision-making framework, it is better to bring these more conventional approaches to quality management back in to the sustainability framework. In other words, establish a sustainability framework that makes room for established business practices, and not the other way round.

Such a re-orientation is arguably achievable in any organisation, and there has been many success stories cited in the natural capitalism literature. The distinction that I draw however between eco-efficiency champions and the airport metropolis is the enormous ground to be covered before eco-efficiency can be seriously claimed and the 'permeable boundary' effect. This encourages a sensible breakdown of eco-efficiency into bight-sized pieces, but disaggregated, they fail to challenge all-important overarching objectives. And the insular, inward looking efforts needed for small, disconnected eco-efficiency projects means that wider regional impacts remain largely unaddressed.

The ecology of the airport metropolis is no different to other complex systems. Balances are essential if tipping points are not to be breached leading to system collapse. And achieving a balance implies the observation of limits as previously mentioned. Disturbance is of course unavoidable, but the scale of disturbance is the critical factor. The difference with growing airports is that we are not only talking about natural systems, but social and economic systems that position the airport precinct as an increasingly vital and central organ in the wider entity we call the modern city. What has been historically one of a number of features of city landscapes has become a major hub in its own right, developing a symbiotic interdependent relationship with other centres and elements. Trade for instance, both in human and product terms, is the lifeblood of airports and their cities, displacing and redefining other trade arteries. This in itself points to the economic importance of airports, and by implication, the necessity of maintaining limit-observing healthy airport ecologies and interfaces. Not reflecting this imperative in each of the main objectives of management makes little sense.

Air traffic is projected to continue compound growth by volume and value. Apart from physical and environmental limits to airport growth (Upham et al 2003; Upham 2001b) the global warming effect from the burning of aviation fuels is the most obvious externality of this seemingly unavoidable growth trajectory. However, there are many less obvious and often contextual problems that the airline industry, planning authorities, and government must grapple with to efficiently manage the expanding airport. Indeed, it may be argued that aircraft themselves are not the biggest polluters emerging from growth in the industry. Instead, the support

infrastructure – the escalating accompaniment of dependent, synergistic, and even hitherto unrelated industries and land uses – is beginning to transform the transit-based airport into what has been popularly coined the "aerotropolis" (Kasarda, 2001), understood as hubs of thriving, often lightly regulated and sprawling commerce precincts.

It is therefore clear that an emerging and increasingly important plank of airport management relates to improving sustainability outcomes as prefaced above. However, Paul Upham (2001a) argues that there is a disjunction between policy and practice mitigating airport impacts. What he means essentially is that environmental sustainability theory based on the limits to growth is undermined by the seemingly endless growth trajectory of the modern airport. According to Upham, hinging airport growth and management strategies to a robust understanding of those limits is the only meaningful way that airport development is likely to proceed in any sort of sustainable way. To do this coherently and systematically, a decision support system is required. And central to any decision making model are guiding objectives that not only incorporate imperatives, but couches these priorities in specific business, social and physical environments. And this is why understanding the airport 'context' is fundamental to decision-making modelling.

This 'context' is characterised by rapid change and diversifying use, and a constant flow of regular and infrequent users. Based on this use profile, managing airport development interfaces arguably pivots on the development of a decision support system premised on stakeholder-based objective analysis and guided by measurable and achievable ecologically-based sustainability indicators. A good deal of existing research, much of it reviewed by Francis et al (2002), has focused on developing sustainability indicators for airport and wider mobility contexts (EU 2003). However, the alignment of this body of research with stakeholder-based objective identification has not previously been undertaken. Without this objective alignment it is argued that airport decision support modelling (Yang et al 2005; Upham et al 2004; Thomas 2001), as useful and interesting as it is, will lack the balance needed to significantly improve ecological outcomes.

Reviewing Airport Management Performance

Objective alignment implies objective identification, which in turn must be discrete and measurable to be accountable. It is logical then to briefly review the airport indicator development literature first before substantiating the appropriateness of higher level objectives. As mentioned above, this has largely been done for us by Francis et al (2002). They examined how benchmarking has been used by airport management to internally compare and improve performance using interviews with airport managers and the data obtained from a questionnaire survey of 200 of the world's busiest passenger airports (2002:239).

Their first finding was that benchmarking activity is beginning to be applied across a wider range of airport functions. According to their survey, 72% of airports engage in benchmarking of some description, while 46% undertake 'Best Practice Benchmarking' (2002:246). They also found that this internal performance measuring effort is relatively new. Francis et al (2002: 240) pointed out that "historically, comparative performance of airports amounted to the collection and comparison of

financial and output measures by Governments, who at the time typically owned and operated the majority of airports". And according to Doganis (1978) measures of performance that developed in airports were often based on work load unit (WLU), defined by the processing of a single passenger or the conveyance of 100 kg of freight. This measure, used mainly by airlines, was adopted by airports in the 1980s to provide a uniform measure of output for passengers and freight. Thus, typical indicators that evolved measured WLU against total cost, operating cost, labour cost, number of employees, total revenue, and aeronautical revenue (CIPFA 1980; Doganis 1978, 1983, 1992; Doganis and Graham 1987; Graham 1999; BIE 1994).

WLU-based measures have been used by Graham (2001) to compare European airport financial performance on the grounds that these indicators are progressively more important to the expanding list of airport stakeholders within a context of increasing airport privatisation and commercialisation. Clearly, such measures are a useful starting point from which to scrutinise airport performance. However, to what extent airport performance improves when scored by WLU-based systems is yet to be determined.

While WLU has been a central concept in indicator development, less performance-oriented measures have also been used. These include guideline-based airport design and airport operational standards, and monitoring using a space-user ratio measure of service standards. And in some cases, airport user surveys have been undertaken to further ascertain satisfaction (Francis et al 2002:240; Ashford et al 1995; Caves and Gosling 1999). Francis et al (2002:240) also observed that "new measures for airports that reflect service quality to customers, the environment and an increased focus on commercial, and retail revenues have begun to emerge". However, they point out that "there is little evidence of action to address measures recorded as a starting point from which to improve airport performance" (Francis et al, 2002:241).

Researchers have also found that while airports have traditionally monitored their own economic performance, some managers are now starting to recognise the benefit of comparing benchmarked performance to other airports, with the view of improving competitive position (Francis et al 2002; Graham 1999, 2001; Centre for Airport Studies, 1998). These efforts are assisted by member organisations, which are also beginning to record and compare airport performance. In the UK, annual airport performance results are published by the Chartered Institute of Public Finance and Accountancy (CIPFA). And a degree of financial scrutiny is provided by the Airports Council International (ACI), which produces an annual economics survey comparing regional performance of airports globally.

The rise in significance of benchmark comparisons for airports prompted the International Air Transport Association (IATA) to publish the *Airport Monitor* commencing in 1993. The *Monitor* has given passenger perception ratings of the quality of service delivered by airport facilities across approximately 60 different airports each year. This has enabled each participating airport to compare their performance with other sample airports for up to 25 service features based on an airline survey. Nevertheless, some airport managers find this survey data too limited, preferring to monitor operations against internally derived benchmarks and comparisons (Francis et al 2002:241). This helps to explain the popularity and regular updating of IATA's Airline Financial Performance Benchmarks publication, which is freely available from its website.

Also emerging is the benchmarking of retailing at airports. This is occurring at a time when many managers are becoming increasingly aware of retail's importance in the airport business. Global airport retail surveys undertaken in 1998 and 2001 are drawn from only 31 airports, but are nevertheless a useful starting point for developing benchmarks based on gross retail sales, retail yield and gross retail sales per square metre (Francis et al 2002; Cerovic 1998; CAS 2001; Favotto 2001).

As Francis et al (2002:241) argue though, "the next step [is] to see how the measures are used and to assess their usefulness to those who use them". And they also see as just as important, studies into the impact of airport operations on local and regional environments beyond the tracking of noise footprints over time, carried out by individual airports, government and communities. IATA was first to address these wider environmental concerns (Francis et al 2002:241) with their *Airline Environmental Reporting 2001 Survey*. This report detailed the many different approaches to airline environmental reporting, while providing guidelines and evidence of good practice for those in the airline-related business wishing to embrace the practice, or do it better (IATA 2001). And IATA also produces the *Environmental Review*, which updates developments in aviation environmental issues. A key focus of the publication is to discuss technological, operational and market-based measures aimed at addressing aircraft noise and emissions, and it also describes regulatory and policy developments.

Airport regulation, or perhaps what is more accurately described as a shift to self-regulation of allied airport organisations, has also rapidly emerged as an issue as many governments are transferring ownership and operation of airport facilities to private corporations. In this context, imposing benchmarking practices on airports is being seen as a way governments can maintain arms-length control of airport activities, while heightening perceptions of transparency and accountability. This is particularly important where it is perceived that new governing regimes for airport premises are less stringent than for other conventionally held property outside the airport jurisdictions that are subject to traditional forms of regulative authority.

Differences in the way airports have been corporatised have contributed to the confusion over the regulative situation. For instance, when the regulatory process was developed for the Manchester and London airports, there was no formal service monitoring requirements (Graham 2005). This is in contrast to the Australian airport privatisation process. Australian airports were required to internally monitor performance, with the UK airports forced to follow suit in 2003. The benchmarks that were then imposed on UK airports were derived from a mixture of service measures and passenger survey responses. It is also expected that aircraft and passenger delays will also be factored into the UK benchmarks in the future (Graham 2005).

Fry et al (2005: 136) point out that improvements generated by performance benchmarking not only reinforces strategies for coping with growing traffic volumes both inside and outside terminal facilities, it is also useful for managing community relations. Clearly from this perspective, the availability of quantitative data and increasing consistency in the use of key performance indicators is only part of the picture. Measuring performance must also include qualitative feedback and rich information flows that alert managers to emerging problems and facilitate speedy solution finding. And the problem of effective information dissemination must also be considered.

However, as Hooper and Greenall (2005:151) argue, “comparing social and environmental performance across the airline sector is fraught with difficulties”. They cite variations in the definitions of indicators and the suite of functions that they are applied to as fundamental obstacles to effective airline sector benchmarking. And perhaps Upham and Mills (2005) make the most comprehensive contribution with respect to suggestions for overcoming difficulties regarding the external use of airport sustainability and environmental indicators in the UK context. They identify the enrichment of stakeholder dialogue through the use of sustainability reporting as the key initiative that would arguably facilitate improved performance-based benchmarking in the first instance, and ultimately the translation of this monitoring into better outcomes. In particular, Upham and Mills (2005) argue that this comprises closer scrutiny of environmental and sustainability reports, and the tailoring of the reports to the specific needs of various stakeholder groups.

Upham and Mills (2005) explain that one of the airports they looked at in their study is embracing this objective, and is intending to begin environmental and sustainability benchmarking and reporting within the next five years. Capacity to undertake this task is apparently being built up by comparing efforts reported by similar sized airports and through consultation with the Airport Operators Association (AOA). Upham and Mills (2005) also found that a number of small and medium-sized airports expect to enlist consultants to advise them with their stakeholder dialogue. Interestingly though, they report that two medium sized airports are adamant that they would not make environmental or sustainability reports publicly available unless forced by legislation.

What Upham and Mills (2005) actually mean by effective environmental sustainability reporting is what they call objective life cycle analysis (LCA) of the airport system measured in terms of impacts, and referenced to global, regional and local environmental thresholds. They recognise that regular LCA of such large systems such as airports are impractical, and therefore advocate substituting core indicators for “resource inputs to the airport, waste emissions at the site and waste outputs leaving the site, plus indication of impacts on local environmental quality” (2005:176). Such indicators, they concede, will need to take into account typical data availability and what can reasonably be expected of airports. They also argue that the integration of operational and environmental sustainability indicators supplemented by appropriate social and economic benchmarks would help to highlight linkages within the system. Finally, Upham and Mills (2005) view such efforts as working systematically towards a generic set of relevant global reporting initiative indicators.

This discussion of airport sustainability indicator development is vital to understanding the selection of inputs for emerging decision support models (Yang et al 2005; Upham et al 2004). Yang et al (2005:280) explain that “with the increasing application of information technology in airport operations and planning, recent years have seen the development of a number of models to help improve its operation, assess economic effects, evaluate environmental impacts, etc.” Yang et al’s contribution to this area is significant though in that they designed a “society-oriented model’’ that has the potential to integrate a number of sub-models to form a hierarchical open structure to allow interaction and negotiation between different parties” (2005:280). Yang et al (2005:289) argue that with the complexity of sustainability problems associated with airport operations, it is not appropriate to

assess sustainability using discrete indicators alone. They prefer a synthesised approach, arguing that such a model is crucial because:

> "the sustainability of an airport—and hence, its future growth potential—has to consider the incorporation of and harmonisation between its operations, the environment, local residents, the economy and the ecosystem" (2005:281).

Yang et al (2005) build on the work of Malczewski (1999) combining multi-criteria decision making with geographical information system (GIS) techniques by adding in the hierarchical interactions characteristic of human society. For Yang et al, the knowledge extraction component lies at the centre of their model (see figure 1), and underpins the entire airport operations and planning system. By this they mean the

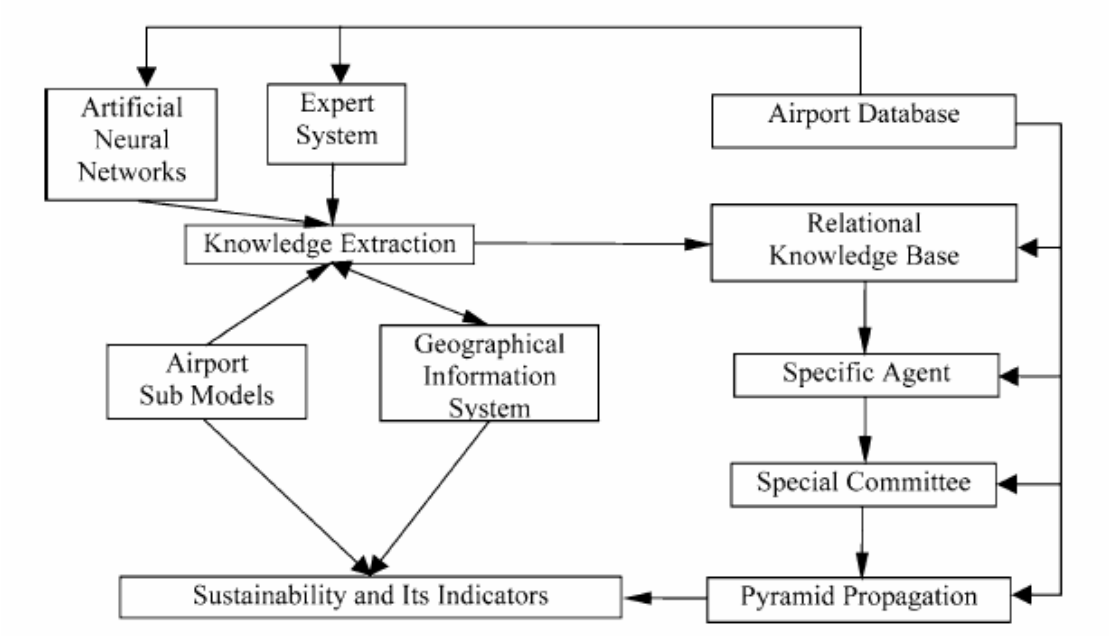

Figure 1. (Extracted from Yang et al 2005:287; Upham et al 2004)

process identifying the relationships that exist between different subsystems and factors (Yang et al 2005:286). They incorporate a pyramid structure, which they refer to as a "pyramid-committee". Such a structure, they allege, emphasises the interaction between different nodes such as the cause and effect relationships between emissions and passenger numbers, or between noise and engine type for example. From their perspective, the airport database, GIS, and various airport operational and environmental models are potential servers for the knowledge extraction operation with a view to establishing a relational knowledge bank. In what Yang et al call their prototype model, the airport database consists of monitoring and operational data. "Neural networks", or simply methods of learning from data, are adopted to map the relation between airport operations and noise distribution, waste production, water use, energy consumption, and emissions. They leave the determination of characteristics of residents and ecological conditions to model users as these vary significantly between airports.

In their model, society-oriented auditing evaluates the balance between demand for air transport and environmental pollution, and acts essentially as a check on the capacity to absorb increasing externalities. Individual criteria for each indicator are then tested within the proposed development time scale. These parameters are fed into the pyramid at the bottom and work their way to the top following complicated interactions within the knowledge processing structure (Yang 2005:289).

In theory, running the Yang et al model will generate appropriate sustainability indicators. However, several questions are glossed over by them. Importantly, what is the actual composition of the pyramid committee? Is this an arrangement of the total stakeholder pool? Can the largely temporal store of stakeholder knowledge be expanded over time using techniques such as Button's (2003) 'meta-analysis'? What is the balance of power existing amongst this committee, and does this balance skew knowledge feedback and objective selection? And if this is so, can the implied imbalance be redressed, presumably by developing indicators that will advance sustainability? These questions can't be answered here, but they are nevertheless worth alluding to now, and revisiting when the overarching objectives, and stakeholder composition and priority, are more clearly articulated.

In this respect, Upham et al (2004) reported on a survey of a sample of stakeholder views concerning the concept and components of airport environmental capacity. The stakeholders surveyed represented airport managers, airlines, air navigation service providers, government agencies and non- governmental organisations. The survey was designed to elicit opinions that could potentially inform research on operationalising the concept of environmental capacity, but apparently no effort was made to determine how representative the sample was of all stakeholder interests, nor were the responses weighted in any meaningful way (Upham et al 2004:199).

In an effort to identify the extent of the airport stakeholder pool, I refer to various airport master plans and supporting documents. Many of these plans furnish an expansive list of airport stakeholders, most of which have an economic interest in the operation of airports. However, the Sydney Airport Master Plan also points out that various unidentified community groups and residents, both underneath and outside flight paths, are also legitimate stakeholders that deserve consultation on certain issues and on their request (SACL 2003/4:148). Such inclusive concessions do little though to identify a hierarchy of stakes relating to the various interests.

One way of helping to determine a weighting of stakeholder interest is to disaggregate submissions to the Master Planning process. For instance, the 1998 Brisbane Airport Corporation (BAC) Master Plan process attracted a total of 4183 submissions, of which 3605 were letters and 578 were of a more formal nature (2003:44). The public response to a large extent reflected a controversial proposal to build a more western parallel runway to the existing runway. The endorsement of the BAC Master Plan by the Minister for Transport and Regional Services, Mr Anderson, subsequently became the subject of a senate inquiry.

By contrast, the 2003 Plan attracted only 452 submissions, including 421 letters and 31 formal submissions, with 4 coming from political representatives, 2 from government agencies, 15 from business and industry, and 10 from the public (2003:44). The disparity in the submission of letters over formal submissions no

doubt reflects the public's lack of resources and capacity to register concerns in greater detail, and shouldn't be uncritically taken to be a diminished interest in the process. Nevertheless, analysis of submissions to the master planning process clearly has its limits.

Instructive of the Brisbane Airport management's view of stakeholders is the Forward to the Brisbane Airport Master Plan (2003), which actually claims that the most important stakeholders "are average Australian families, through the superannuation funds invested in BAC". It can be safely assumed that this 'distanced' economic stakeholder would on average prioritise economic-based objectives related to airport metropolis development. However, the question remains if it is possible to balance this widely shared 'limited interest' with objectives and concerns raised, for instance, by stakeholders motivated to make submissions to the master planning process?

Perhaps such a reconciliation isn't entirely necessary though if we are to assume that stakeholders are more the means to objective formulation and not the ends themselves. As Keeney explains, "the hierarchy of objectives should include only ends objectives and not means, as this leads to double counting in evaluation" (1988:398). Admittedly Keeney is talking about strategies and benchmarking here, but arguably similar principles apply to the active alignment of interests. The key is to aggregate interests and end objectives into categories, and then sort them on the basis of the governing rationale. Using the Brisbane Airport as an example, we can commence this task by listing the 9 development objectives identified by the BAC itself (2003:50-2). These are:

1. Facilitation of safe passenger, freight, and aircraft movement
2. Meeting future capacity needs
3. Generating economic growth
4. Sound environmental management
5. Balancing economic impact and environmental benefit
6. Business and industry development on airport land
7. Accessibility and land use
8. Improvement of quality of services
9. Sound business management

Of these, 'meeting future capacity needs', 'improvement of quality of services' and 'sound business management' are considered means to the ends covered by the other 6 objectives. Moreover, there is a potential contradiction that exists between the objectives of 'sound environmental management' and 'balancing economic impact and environmental benefit'. Specifically, sound environmental management by certain standards may not allow the balancing of economics and environment. For the purposes of this analysis, 'balancing economic impact and environmental benefit' has therefore been discarded. This leaves the following list of shortened ends objectives:

1. Safety
2. Economic growth
3. Sound environmental management
4. Physical and corporate development
5. Access

Re-balancing Airport Objectives

Solution-focussed approaches tend to pay less attention to who, why and how questions about identified problems than those that commence from a more fundamental premise that examines the nature of the problem itself. Efforts to fully understand the broad context of a problem help in establishing connections between various interests, their objectives, and the issues underlying the perceived problem. Such analysis arguably ensures that eventual solutions are actually the most appropriate, and by extension, the most sustainable over time.

While appreciating the sheer complexity of the sustainability problem, at its simplest, managing sustainability is about getting priorities right. Historically, these priorities have been needs-based, with Maslow (1954) arguing that societies pursue a hierarchy of needs. Organisations act in the same way, although it would be more appropriate to talk of a hierarchy of objectives. Indeed, some scholars have argued that it is better to organise hierarchically than systemically (Keeney and Raiffa 1976; von Winterfeldt 1980; Keeney 1988). This is facilitated by understanding "customer-based" criteria in a context where stakeholders, understood in an expansive sense, actually matter. This inclusiveness is important because management objectives invariably represent relatively narrow, internally focussed interests, which are likely to compete with wider stakeholder concerns. And this competitiveness is likely to be counter-productive in achieving overall goals because rather than encouraging eco-efficiency, it tends to entrench combative win-lose dichotomies.

Clearly though, stakeholder objectives are paramount for encouraging participation and building trust, which in turn is crucial to sustainability outcomes. Keeney explains that the assembly of a "hierarchy of objectives" that are aggregated into categories helps to balance the organisation's perspectives with the interests of a range of others (1988:396). This he suggests helps to advance the process from an art to a science (1988:397). According to Keeney, these 'subjectively organised' hierarchies can then be tested through scenario modelling and evaluation, and stakeholders consulted to ensure that the arranged hierarchies accurately reflect their perceptions.

Perhaps the most significant determinant for stakeholder impact from airport externalities is location. There is no reason why the analysis of locational preferences cannot be performed empirically by ranking various attributes using multicriteria assessment techniques based on the judgements of carefully selected respondents as input variables. Specifically, the analytical hierarchy process (AHP) is particular useful for this type of approach (Zahedi, 1986). Saaty (1990) explains that the AHP technique is based on a pair-wise preference comparison of elements, attributes or alternatives. The pair-wise comparison is usually performed using a standard transformation where a scale of 1–9 is analogous to nine verbal statements regarding the importance of element *A*1 in relation to element *A*2, for instance. On this scale, a score of '9' means that 'attribute/alternative *A*1 is extremely more important than *A*2', while '1' indicates an equal importance between *A*1 and *A*2. This generates a ratio between *A*1 and *A*2 which conveys clear information about the relationship. Saaty (1990) further explains that conducting the reciprocal comparisons of all elements then allows the construction of a comparison matrix.

Kauko (2004) applies this method to the context of house price analysis, enabling quantification of nearly unmeasurable elements of quality to arrive at a ranking of attributes regarding their relative importance and, subsequently, to arrive at a ranking of alternative houses or locations. Such an AHP exercise also enables differentiating and targeting various respondent groups, from the point of view of residential choice criteria composed of a set of attributes that describe the object in question. As a result, it may be found how various preference profiles differ from each other—for example, inner-city verses suburban types of preference formation. Such information can be valuable, when a model based on more large-scale data fails to deliver, or if the analysis contains more intangible characteristics that are mixed with elements of a more tangible nature (Kauko 2004:1514). The weighted ratios are then ideal for constructing a hierarchy of importance, or in the airport impact context, a more appropriate term might be a hierarchy of attachment.

By recalibrating objectives to reflect ecological imperatives in what is increasingly a politically dynamic airport environment, stakeholder links that facilitate a substantiated message of socially responsible behaviour assume greater importance. Such links can be supported by practical environmental strategies such as water or energy saving initiatives. However, a more explicit environmental effort does not translate to a lesser emphasis on social sustainability. Issues such as legitimacy, power arrangements, marginalisation and conflict resolution underpin nearly all environmental issues. Thus, a more sophisticated, comprehensive, and ultimately "hierarchical" analysis of diverse social interests that positions airport management as honest brokers, needs to take place.

The economic imperatives are in no way diminished by these discussions. Instead, I argue that understanding the economic benefits of objectives constituted through a sustainability lens requires more precise ways of identifying the 'premium' or added value of sustainability-based enterprise. I have undertaken preliminary property economics-informed research in this area previously (2006), but much more needs to be done to demonstrate the soundness of those propositions within a market context. Nevertheless, there is promise that we will soon have a better understanding of the economics, ecology and social implications of organisation-based sustainability objectives. In the meantime, while many already widely celebrate the alleged added value of industrial ecology in the market (Mitchell et al, 2001), the added value of a sustainability mindset, at least over the longer term, is likely to remain in need of demystification.

It's not that the demystification task is all that difficult. Hierarchical objective alignment hinged to sustainability themes requires systematically thinking through the mix of businesses and land uses in question. Prioritising a staff culture change is important, but employees need to have constructive outlets in the market and the community generally, and strong internal horizontal linkages. The most important objective then from an organisational perspective is to facilitate changing values, attitudes, expectations and most of all, behaviour that reflects the politics of the airport-related markets. Traditional 'top-down' approaches where a content expert downloads on a passive audience will not deliver this successfully. Nor is it sufficient to provide airport precinct users and employees with information on what is 'right'. 'Knowing' the right thing is not 'doing' the right thing. Many people are already aware of the changes needed to become more sustainable. Frameworks for

communicating objectives that facilitate a transition from awareness to action is what's needed.

Objectives that bring about the social changes required for more sustainable outcomes tend to be more effective if they are espoused by trusted, credible sources such as 'team members' interacting in informal social settings. Such objectives would engender the exchange of ideas with a view to shared understanding. Once airport managers, and by extension, employees and users, are excited, engaged, enabled and empowered by sustainability-based objectives, they become motivated to pass it on to other stakeholders and the community at large. In this way, a hierarchy of objectives built on sustainability precepts becomes a powerful agent of change.

Conclusion

Stakeholders are becoming more visible to airport managers, even if it is their money that is being largely recognised. And there is an emerging realisation of the importance of sustaining a safe, profitable, environmentally sensitive and equitable airport business, understood as an evolving urban hub in its own right. This is nothing less than adaptation to a dynamic market economy that is faced with growing socially and environmentally driven political constraints. This environment is forcing managers to factor in externality-driven market failures, making the environmental and social impacts of corporate activities more apparent, more costly, and much more important.

As a managerial concept and tool, sustainability principles lay a foundation for including organisational concerns that reach beyond the financial realm. This provides a richer and more transparent self-management layer by extending the focus of business activities to include social and environmental issues. I have argued here that sustainability encapsulates all the characteristics of modern management strategies. Thus, for reasons of plain good business sense, the managers of large and expanding entities such as airports would do well to internalise core sustainability objectives. To this effect, I suggest five objectives organised hierarchically, and distilled from a longer BAC list. What remains to be done is to flesh these ends objectives out by articulating the means of achieving them. Specifically, this can be done by further developing Yang et al's (2005) model in the way outlined here, and feeding into it appropriate variables yet to be identified from the literature, in order to determine appropriate sets of sustainability-based indicators.

Essentially, I am suggesting that there are significant benefits to be realised by both airport managers and the community through the re-constitution of objectives from an 'economics first' perspective with sustainability tacked on, to a shortened list of objectives that explicitly prioritise a balanced appreciation of sustainability. The difference is subtle yet profound. Clearly, in the case of expanding corporative airport businesses where politics is forcing sustainability on management, explicit sustainability ends objectives will help managers navigate a way through this volatile climate. Sustainability initiatives are in no way a panacea for the successful development of the airport metropolis, however, explicit sustainability objectives can provide a distinct advantage over existing management strategies. And it is only this 'sustainability first' approach that has any hope of negotiating the incoming tide of

challenges facing new city development patterns generally, and airports more specifically.

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