Sustainable airport operations: Broadening the focus from noise and pollution

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Abstract
This paper uses an in-depth case study of an airport to elucidate how a regional airport achieves their sustainability aspirations. It looks at the framing of the sustainability concept and how a broad set of stakeholders (including employees, service partners and providers, customers, policymakers, community members and other agents) interact and engage to negotiate a shared view of sustainability. The study maps how sustainability manifests in the airport and illustrates how it is possible to move the debate beyond growth and noise, balance priorities and align shareholder value with stakeholder value.

Keywords: Airports, Operations, Sustainability

Background
Airports are of strategic significance to the UK economy as a whole and to the regions they serve. The presence of an airport attracts inward investment, affecting economic activities such as exporting and business location decision-making. The associated infrastructure and service capabilities are also linked to regional employment opportunities. However an airport has a quantifiable impact on biodiversity, noise and air pollution and climate change. In addition there are implications for surrounding roads and traffic, as well as social costs to nearby communities. In addition to these economic, social and environmental impacts, airports also represent a distinct operational and supply chain challenge: they are resource and technology intensive, safety and time critical, and subject to multiple regulatory constraints. Given their role and impact within society it is valuable to understand how they can manage operations sustainably to deliver on their economic, social and environmental responsibilities.

The challenge to integrate environmental and social issues into the management of operations within both service and manufacturing firms has grown significantly over the last two decades, and as Gialandris et al (2015) note, many are now also attempting to ensure the operations and performance partners both upstream and downstream in the supply chain are more sustainable. The implication being firms must now address the diverse expectations and informational needs of multiple stakeholders (Gonzalez-Benito et al., 2011; Hall and Vredenburg, 2003) with varying degrees of saliency.

This is significant for this research because to date, sustainable airport operations research (and to a certain extent policy makers) have largely focused on noise and pollution as the key evaluative criteria against which to measure airport accountability. This however misses the point – it presupposes that the economics and infrastructure requirements that drive airport growth, are balanced by social and environmental issues

that can be coalesced into two discrete yet powerfully emotive issues. It also fails to recognize the range of stakeholders (whether they be partners, service providers, customers, community members or shareholders) who are intertwined at a single location and who can contribute to the debate. While never denying that noise and pollution are challenging and impactful issues, this research seeks to open up the discussion on airport sustainability and understand how an airport can meaningfully interpret the concepts of corporate social responsibility (CSR).

An airport is a business composed of diverse stakeholders, who have a multiplicity of interpretations, expectations and informational needs with respect to sustainability. Collectively, these expectations and needs form a prism of stakeholder accountability, a lens through which the airport justifies their actions and behaviours across its extended operations. This case presents evidence to show an airport can develop a broader view of sustainability, a view that acknowledges (and is accountable for) it's impact and seeks to remain engaged with stakeholders. It shows that while it is not always possible to have the 'approval' of stakeholders at all times, it is possible to have processes that retain their legitimacy, engagement and contribution. In terms of contribution, while practitioners may be interested in the best practice proffered here, from a theoretical perspective this work also advances our empirical understanding of stakeholder theory, particularly in terms of stakeholder identification and salience (Mitchell et al., 1997).

Summary of methodology utilised

The logic of this study is inductive, and the theoretical contribution based upon empirical analysis. The theoretical framing of CSR is informed by Brundtland and the triple bottom line concept (Elkington, 1997; Norman and MacDonald, 2004 and Pava, 2007), and the subsequent discussion of how the airport understands and executes its sustainability responsibilities is underpinned by stakeholder theory (Mitchell, 1997).

To gain a deeper insight into sustainable airport operations an in-depth demonstrative case study was undertaken with a leading UK airport to understand the research issues Eisenhardt (1989) and Miles and Huberman (1984). The case was selected as it is an independent airport; it's operations are not supported or buffered in any way by being part of a larger organization. It was also apparent from initial analysis of various press releases and reports that the airport had improved its business performance while engaging across a range of CSR measures.

Primary and secondary data was collected: comprising of 10 in-depth interviews, observations of the Operations Director's weekly meeting and of terminal and airside operations on a quarterly basis over 12 months, and the shadowing engineering and terminal managers while they were on duty. Access to performance data and company reports was also provided. Additional information was sourced from Home Office and Civil Aviation Authority and the published reports of the Airports Commission to the Department of Transport were also reviewed. Ideas and insights that arose during field visits were discussed with respondents to review and verify (Voss et al., 2002) and the triangulation of data collection methods from different sources in the organization increased the reliability and validity of the results. (Eisenhardt, 1989; Yin, 1994; Voss et al.2002 and Easterby-Smith et al., 1991).

Presentation of case

Birmingham Airport is the UK's third largest airport outside London and like all UK airports is subject to regulation by the Civil Aviation Authority (CAA). It is located is eight miles south east of Birmingham's city centre and covers an area of 775 acres. CAA data on passenger movements for 2014 indicates Birmingham is the seventh busiest airport in the country, behind four of the London airports, Manchester and Edinburgh and by 2020 they are forecast to handle around 15 million passengers a year, an increase of six million passengers. Birmingham Airport is one of the West Midlands' largest employers, supporting some 6000 jobs on site. Of this number, approximately 500 are direct employees of Birmingham Airport, the remainder are contracted service suppliers or Border Force employees. Given there are around 140 organisations based at the airport - it presents a complex and concentrated supply chain and a distinct operational challenge.

The airport has a unique ownership structure with Birmingham City Council (along with the other six councils in the West Midlands) owning 49% of shares; the Ontario Teachers' Pension Plan and Australia's Victorian Funds Management Corporation owning 48.25% of shares and the Employee Share Trust owning the final 2.75%. The airports operating profit in 2014 was £27.9m and it was also the airport's third consecutive year of passenger growth, they handled 9,707,449 passengers, an increase of 6.5% compared to 2013. Birmingham's business/leisure passenger split is 20% business and 80% leisure and the airport is home to over 50 airlines (both charter and scheduled) including global flag carriers such as Emirates, American Airlines, Air France and Lufthansa. There are 143 direct routes, including daily flights to New York, Istanbul, Dubai and a further 280 global connections are available via connections with hub airports. The bulk of cargo at the airport is carried in the cargo holds of passenger flights rather than by dedicated cargo flights, however it is still a valuable aspect of airport business.

The airport is currently operating with spare capacity, and could increase passenger numbers without need for further investment in infrastructure. The airport's strategy focuses on further developing the firm's position as one of the best airports in the country. They are also active lobbyists for a balanced aviation strategy for the UK.

Revenue is derived from two key income streams: aeronautical income and commercial income. Aeronautical income reflects the charges levied on the airport's airline customers. These charges (tariffs) cannot exceed the CAA regulated maximum allowable yield per passenger. The tariff structure through which the aeronautical income is recovered from airlines has many elements but three key ones are presented in below:-

- Passenger fees
  Fees per passenger are based on the number of passengers on board an aircraft, and are levied in respect of all passengers.
- Landing charges
  Landing charges are levied for substantially all aircraft. These are calculated in accordance with the certified maximum take-off weight, engine nitrogen oxide emissions and noise certification values.
- Parking charges
  Aircraft parking charges are levied while the planes are on the ground – there is a set fee structure based on the size of the plane and services provided.

Commercial income is generated from business activities on the airport site including concession fees from retail operators; direct income from car parks, advertising revenue; the provision of facilities such as baggage handling and passenger check-in and the rental of airport premises such as aircraft hangars, cargo storage facilities, maintenance facilities and offices. The airport facilities can significantly impact the overall appeal of the airport to airlines, for example, recently Monarch Aircraft Engineering leased a newly built aircraft maintenance facility, creating 150 new jobs at the Airport. It is the first UK hangar to have the capability for Boeing 787 Dreamliner maintenance, with sufficient capacity for other wide body aircraft, such as Boeing 777, 747 and Airbus A350.

Operational Context

This study views services as economic activities offered by one party to another, where customers do not normally take ownership of the physical elements involved. An airport provides facilities to airlines and passengers – and retains ownership of its assets – so is effectively a service provider. A service is also understood to display intangibility, inseparability, heterogeneity and perishability, and these criteria also fit airport operations. Intangibility is present as both passengers and airlines (the customers) derive value from airport services without obtaining ownership to any of the tangible elements. As services are delivered in real time in front on customers so inseparability also manifests. Heterogeneity occurs as the markets served vary considerably – from day to day and even during different times of the day with varying airlines and types of passenger being served, and the offering is perishable – unused capacity is lost and represents an immediate cost.

Sustainability from an economic, environmental and social perspective

> *'Bringing the direct economic and social benefits to the Centre of the UK, and playing our part as a responsible and proactive citizen whilst minimizing the impact of our operations on the environment.'*

Economic value

The airport is committed direct and indirect contributions to regional economic growth in the long term. The value of regions to the UK economy is key lobbying attribute of the firm, and together with other airports and stakeholders (e.g. Businesses such as MG Motor UK) they are robust proponents of a 'Balanced Aviation Strategy' for the UK.

Adequate service provision to customers (passengers and airlines) drives operations and profitability, but the sheer volume of firms involved in delivering the service means that airport attempts to move beyond divisive decision-making and has an inclusive approach to engaging with firms on site – doing business with Birmingham Airport should contribute to the profitability of the involved partners. They also enact a sustainable procurement plan.

Ecological value

The Airport has invested £132 million in infrastructure over the last five years, and over £300 million over the last 10 years including the complete refurbishment of the terminal building to improve passenger flow and capacity; and the building of a new control tower for the airport. The aim was to make efficient and effective use of existing space in the terminal building (rather than expand the infrastructure) and to reposition the control tower (the existing one had been in operation since 1939!) for improved functionality, as well as possible future extension. The airport buildings were updated to minimize ecological impact – particularly in terms of energy use and carbon footprint, but also in terms of building materials and use of alternate energies to fossil fuels. The theme of *'measure, engage and mitigate'* is particularly important with respect to energy use and subsequently to carbon management. The engagement is not just with external consultants but also with employees and partners – for example there is a 'Great Energy Saving Ideas' campaign to increase awareness and participation, and there are energy champions through various departments and centres. The emphasis is not only on the 'airport' but also concession partners and airlines – it is inclusive in it's outlook.

The runway was subsequently extended following consultation allowing aircraft to now fly direct to the West Coast of the United States, South America, the Far East and South Africa. The conditions of the permission (implemented through planning obligations under Section 106 of the Town and Country Planning Act 1990, a mechanism which make a development proposal acceptable in planning terms, that would not otherwise be acceptable) for the runway extension included limits on night flights, noise control and improved public transport links. In addition, the airport also focused on site-specific mitigation of the impact of development and was proactive with respect to maintaining biodiversity and minimising the disruption of ecological cycles.

Ongoing operations are also managed to recognize environmental impact. There is senior manager buy-in with respect to sustainable operations. Energy is viewed as a top controllable cost and while there are self-serving cost benefits, energy usage is a regular item at board level and there are monthly 'Energy & Carbon Reduction' meetings with senior management and department heads. Explicit energy saving targets and goals are set ad monitored. Investment in an 'Environmental Management System' has allowed them to measure the energy use of their infrastructure and machinery, and enabled them to target changes/investment that reduce their energy use and environmental impact.

Aside from their Carbon Management Plan, the airport also has a Climate Change Adaptation Action Plan. This latter plan is an attempt to ensure investment choices today are tolerant to anticipated climate change. The air quality objectives for the protection of human health are independently verified, and while odour is not a specific measure that requires monitoring, it is recorded and has never been raised as a concern for either community or employees

Social value

The airport focuses on quality of life for local communities including eliminating noise and health effects from local emissions, the traditional measures they are accountable for. However they also focus on fair distribution of economic revenue to all surrounding communities and stakeholders, and distribution of access to the airport (not just for

onward travel but for employment), they are also active in staff, partner and community education, training and development.

Noise is the key issue for many but not necessarily all community members. The airport has the 3rd largest impact in the UK because of it's urban location, and the issue is both ground and air noise. Investment in technology to enhance energy efficiency has already been noted but there is also investment to mitigate community impact, for instance investment in the runaway control system allowed 'for segmentation of the taxiway centrelines' an innovation which makes possible advanced aircraft routing facilitating enhanced safety levels but also close adherence to flight paths to minimize noise disturbance. In addition there is provision for monitoring so non-compliance can be addressed.

In addition, the Airport Noise and Operations Management System (ANOMS) accurately monitors the airport's management of noise and operations. This information helps the airport identify and measure sources of noise and ensure compliance to operating requirements. This information is also shared with community stakeholders on request and a direct link monitoring link is provided to council airport monitors. Data transparency combined with advanced warning of changes to flight paths (due to meteorological conditions) is the airport's approach to this issue. They also have portable noise monitoring devices for community members and complaints management processes that are mapped out to explain how questions are recorded, responded to and also shared with other relevant stakeholders e.g. Local Councils.

Birmingham Airport has been recognised for minimising environmental impact on its communities, and the Environmental Noise Accreditation (ENA), an independent accreditation programme that recognises and accredits the efforts and achievements of airports to manage noise, identifies Birmingham as 'community driven' and focussed on the needs and expectations of its stakeholders.

Properties close to the airport have been insulated with new windows and in a linked initiative they also have an ongoing programme to re-roof properties (over £12M so far) as part of their Wake Vortex Protection Scheme. Technically these repairs are the airlines are responsibility but the airport has adopted responsibility. There is recognition within the airport that not all community members are equally proficient at lobbying for assistance and they are attempting to address this through both formal programmes and informal engagement. In addition there is a Community Trust Fund, which assists non-profit concerns in the surrounding areas and an educational facility to engage with local schools. There are regular community engagement opportunities based in local libraries and an active social media communicational channel focused on the community. Airport developments whether driven by infrastructure development or Government policy can sensitize community relations (not uniformly nor to the same degree) and they have consistently involved senior staff in communication events and advocated detailed (where possible) explanations of airport decision-making.

The airport is a complex business with multiple stakeholders and reporting requirements. It's also an environment where firms and customers are in close proximity and service failures are immediately evident, and the operation as a whole is safety critical and subject to ongoing security issues. The senior leadership views engagement with stakeholders as crucial to enable airport to thrive in this environment.

As such it has framed it's service providers as 'partners' and emphasises working as a team to succeed. There are Community Spirit Awards, Great Business Partners nominations, Airport Newsletters, awards for all staff (as opposed to direct employees) and shared training initiatives. To illustrate, the Birmingham Airport Skills Academy (BASA) is delivered by a local college with the airports assistance, and this facility offers employees at all the 140+ companies on site the opportunity to gain further qualifications in management, customer service, and engineering. The BASA also supports the local community by providing free of charge courses for people who are unemployed or on another primary benefit, and the airport also has also developed a partnership arrangement with a local job centre to increase recruitment from local communities.

Discussion

This paper has described the way in which stakeholders in a specific place and time have sought a balance between the economic, ecological and social impacts of an airport. While taking a focal viewpoint of the airport, it has considered various perspectives of sustainable operations including communication and engagement; commitment and policy; planning and implementation; measurement and evaluation; and review and improvement. The evidence indicates the airports comprehensive approach to partner engagement and robust engagement with the community ensures the diverse organisations and stakeholders do work to a common sustainability goal and achieve business success.

While not adopted by the airport the CSR standard ISO26000 emphasise of inclusion multiple stakeholders and it is established within sustainable supply literature that managerial decision-making benefits from drawing on a broad range of stakeholders (Sarkis et al., 2010 and Pagell and Wu, 2009). It is logical that there are different views of sustainability within the value chain; there is an understanding it will need to be negotiated, socially constructed even, within and between stakeholders. At the airport sustainability is very much interpreted as a process rather than an outcome (similar to WCED, 1987, p. 46) and it acknowledges the diverse nature of stakeholders and their inherent perspectives will mean that specific outcomes may not be possible. That does not however mean dialogue is closed or is devalued, input can still be gathered so inclusivity in design and execution can be maintained. There is also the issue of saliency and recognizing the significance of stakeholder input can vary from issue to issue. Indeed, it is important to note that stakeholders within the same community or organizations of a similar type are not necessarily advocating for similar outcomes, nor is their advocacy comparable.

While further exploration is necessary, the airport's outlook that sustainability is a process rather than an outcome is fundamental to their growth and success. In addition, a closer analogy is Wood's (1991) early work framing the principles of CSR at institutional, organizational, and individual levels; to illustrate the analogy, the airport assesses environmental impact, stakeholder management and proactive responds 'issues' – and the outcomes of sustainability are interpreted as social impacts, programs, and policies.

Conclusion

Airport operations are such that they require the input, coordination and cooperation of various technologies and stakeholders; it is a complex system vulnerable to multiple

dependencies. Globalisation is also driving growth consumer growth and choice; there is new technology in terms of aircraft and infrastructure and national policy is transitioning not only in the UK but internationally. Thus the challenge to integrate environmental and social issues into airport management has grown significantly in recent decades.

Birmingham has developed an approach to sustainability that not only meets tangible operational requirements, but also engages the various actors and harnesses the intangibles that draw together disparate organizations to work as a unified team. While not denying there is debate and disagreement between stakeholders, the process approach adopted by the airport does retain long term meaningful engagement from a diverse range of stakeholders and has managed growth and profitability in a time of austerity.

This paper reports early findings and indicates there is a need for more nuanced research on the interaction among stakeholders and how concepts like shared value manifest. Also is of interest is how a firm can manage saliency amongst stakeholders, and how they adapt when disparate issues can lead to variance in this concept.

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