



University of the West of England, Bristol

**THE REGIONAL ECONOMIC IMPACT OF BRISTOL
AIRPORT:
ASSESSING CONTRIBUTIONS TO THE DEBATE**

FINAL REPORT

A report for Business West

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EXECUTIVE SUMMARY

1. At a time when environmental issues have become prominent in public debate, plans for airport expansion such as that intended by Bristol International Airport (BIA) inevitably come under both the media spotlight and attract the attention of campaigners against such development plans. It is common in these circumstances for both sides (those leading the development and those opposing it) to produce their own studies, evaluating the associated economic impacts and challenging, wherever possible, their opponents view of potential impacts associated with the development; the future development plans for BIA were no exception.
2. BIA has produced for consultation, revised in line with comments received, and finally submitted to the Department of Transport, its Master Plan for airport development in the years ahead (BIA Master Plan 2006 – 2030) in November 2006. As part of this process, in 2005, *The Bristol International Airport (BIA) Economic Impact Study* was commissioned jointly by Bristol Airport management and the South West Regional Development Agency and conducted by Roger Tym and Partners (published in Oct 2005 and Oct 2006 [revised]). In 2005, *The Economic Impact of Bristol International Airport*, was published. This is a study conducted by Professor John Whitelegg of Eco-Logica, Lancaster for the Parish Councils Airport Association.
3. In these main reports, both protagonists assessed the employment, income and, *inter alia*, other related economic impacts associated with BIA development, projecting very different outcomes from airport expansion. In 2007, academics from the School of Economics at the University of the West of England, Bristol, were commissioned by Business West to examine both reports and to comment on the approach undertaken in each and the acceptability of the assertions made. The UWE report which follows, therefore, is concerned only with exploring the accuracy or otherwise of the conclusions drawn on the potential regional economic impact of BIA expansion in the Tym Report and the validity or otherwise of the criticisms relating to those conclusions proposed by the Whitelegg Report and the Stop Bristol Airport Expansion lobby group (based upon that report).
4. Bristol International Airport (BIA) has enjoyed rapid growth in recent years and has helped to generate new business and employment opportunities within its sub-region. It is recognised as one of the fastest growing regional airports in the UK with a catchment area which includes ten counties in the South West of England and South Wales and with a potential market of some seven million people who reside within two hours travelling time from the airport. Bristol International Airport currently serves over 100 destinations and in 2006 carried over 5.7 million passengers; a figure which has more than doubled since the new £27m terminal opened in March 2000. National and regional forecasts suggest that demand for air travel will increase dramatically over the next 25 years and the implications for BIA are for a significant increase in passenger numbers to 8.1 million annually by 2015 and 12.5 million annually by 2030. In the context of these growth forecasts, BIA is expanding in terms of terminal space, facilities, associated businesses and car parking.
5. Conventionally, regional *economic* impact analysis is part of a much broader form of regional impact analysis encompassing “the direct and indirect effects of a particular

project in terms of its economic, demographic, environmental, social and fiscal¹ impacts” (Cartwright et al, 1983). Every organisation operating within a specific geographic region has an economic impact, although estimating that impact may be quite subjective. This is because the precise economic impacts estimated depend entirely upon the methodology employed in their calculation. To estimate the economic impact of a specific organisation within a region – or of any change to that organisation’s activity within the region – the conventional approach universally adopted by mainstream economists is to separate and estimate three key components of the ‘impact’ – the direct, indirect and induced effects of the organisation on the region. These three separate impacts may then be combined to give an estimate of overall impact, adjusted as necessary for any exogenous factors that may affect the final result. There may also be additional ‘catalytic’ economic effects on a region attributable to spillover impacts on other key sectors (e.g. tourism). It should be noted however that some economists have been critical of conventional economic impact studies, particularly when applied to non-industrial or commercial activities (i.e. the arts).

6. The Tym Report is both very detailed and incisive. It presents a thorough analysis of both the underpinning rationale for Bristol International Airport expansion and the economic impact to be expected from that expansion. The report applied conventional economic impact study methodology and draws appropriate, suitably cautious, conclusions. It applies economic analysis in a professional and realistic manner and, even taking into account its own conservative approach still suggests that the expansion of Bristol international Airport can be justified in terms of significant net employment and income gains, both directly at the airport and throughout the wider regional community. The report draws upon a vast range of published material regarding the economic dimensions of airport expansion and strengthened the rigour of its analytical approach by utilising the results of corporate studies of that impact, as well as input derived from extensive consultations with BIA management and their partners. It includes an analysis of original primary data gathered through a survey of South West businesses designed to identify the extent to which BIA was valued in facilitating business travel.
7. The Whitelegg Report is somewhat unusual in the context of academic studies of regional economic impact in that it sets out immediately to present a fixed and clear agenda – in essence, to challenge conventional wisdom about the beneficial effects of the aviation industry in general and airport development in particular. Rather than offering an alternative conventional academic economic impact study of the expansion of BIA, then, the Whitelegg Report must be seen more as a direct critique of studies such as the Tym report and, as a result, makes little attempt to hide the fact that it has an agenda of its own to pursue. The author is to be complimented for making his stance clear from the start.
8. Whitelegg concludes criticising BIA’s Tym Report for: “poor analysis, poor evaluation, inadequate economics and a naïve belief in the ability of one very heavily subsidised sector of the economy to deliver jobs”. In our independent assessment of both reports, we conclude that the Tym Report contains sound economic analysis, delivered to a very high degree of professionalism. The ‘economics’ is not

¹ Here, “fiscal” refers to public sector finance

‘inadequate’ but is in line with the existing established body of well-judged, professional and academic reports and peer-reviewed papers and the fact that Tym questions the power of forces such as the multiplier and is willing to check for its accuracy with independent research and alternative estimation techniques suggests that the approach is anything but ‘naïve’.

9. It is our opinion that the Whitelegg Report has several valid contributions to add to the discussion and a range of arguments that could have been developed to greater effect. Unfortunately, the tone of the Report, its transparent anti-aviation value-judgement from the start, and its unconventional use of economic concepts to support some of its assertions serve both to weaken its case (which does have some merit) and creates an unduly biased and misleading outcome.
10. The discussion about the economic impact of Bristol International Airport and its expansion plans turns on the issue of methodology and in that respect we conclude by summarising our earlier points:
 - a. In our independent assessment of both reports, we have to conclude that the Tym Report contains a tried and tested conventional approach, employing well-judged cautious estimates of regional economic impacts. In our judgement, the Tym report meets a very high degree of professionalism. The ‘economics’ is not ‘inadequate’ as suggested by the Whitelegg report but is in line with the existing established body of established, professional and academic reports and peer-reviewed papers and, furthermore, Tym incorporates careful checks on the validity of the multiplier effects employed. This, together with numerous other examples of carefully balanced analysis, suggests that the approach employed by Tym is anything but ‘naïve’.
 - b. It is our opinion that the Whitelegg Report does raise a number of valid issues and makes an important contribution to the debate. We feel that some of the issues raised and the arguments employed could have been developed to greater effect. Unfortunately, the tone of the report, its transparent anti-aviation value-judgement from the start, and its sometimes unconventional use of economic concepts to support some of its assertions serve both to weaken its case (which does have some merit) and creates an unduly biased and misleading outcome.
 - c. Overall, we conclude that, as has been the case in numerous other considerations of airport impact, the regional economic case for BIA expansion is accepted. As stated at the outset, however, the economic argument is but one element of an overall regional impact analysis, including economic, demographic, environmental, social and fiscal impacts, and conclusions about the net impact can only be made when all such relevant parameters are considered together.

BACKGROUND and STUDY SCOPE

At a time when environmental issues have become prominent in public debate, plans for airport expansion such as that intended by Bristol International Airport (BIA) inevitably come under both the media spotlight and attract the attention of campaigners against such development plans. It is common in these circumstances for both sides (those leading the development and those opposing it) to produce their own studies, evaluating the associated economic impacts and challenging, wherever possible, their opponents view of potential impacts associated with the development.

The future development plans for BIA were no exception. BIA asked Roger Tym and Partners to conduct a full economic impact study of their expansion plans and this Report (referred to hereafter as the Tym Report) was published in October 2005 and revised in October 2006. In response, the Parish Councils Airport Association commissioned their own report, which was published as: *The Economic Impact of Bristol International Airport*, a study conducted by Professor John Whitelegg, Eco-Logica, Lancaster, 2005 (hereafter referred to as the Whitelegg Report). Additionally, the principal action group opposing BIA development, Stop Bristol Airport Expansion (SBAE) (an alliance of the groups backing the Whitelegg study) have produced their own reply to the BIA/Tym document, authored by J.Birch and entitled *SBAE Response to BIA Economic Impact Study*, November, 2006. This reply will also be considered in this report.

In these main reports, both protagonists assessed the employment, income and, *inter alia*, other related economic impacts associated with BIA development, projecting very different outcomes from airport expansion. In 2007, academics from the School of Economics at the University of the West of England, Bristol, were commissioned by Business West to examine both the Tym and the Whitelegg reports and to comment accordingly on the approach undertaken in each study and the acceptability of the assertions made regarding key aspects of the economic impact of BIA.

The UWE report which follows, therefore, is concerned only with exploring the accuracy or otherwise of the conclusions drawn on the potential economic impact of BIA expansion in the Tym Report and the validity or otherwise of the criticisms relating to those conclusions proposed by the Whitelegg Report and the Stop Bristol Airport Expansion lobby group (based upon that report).

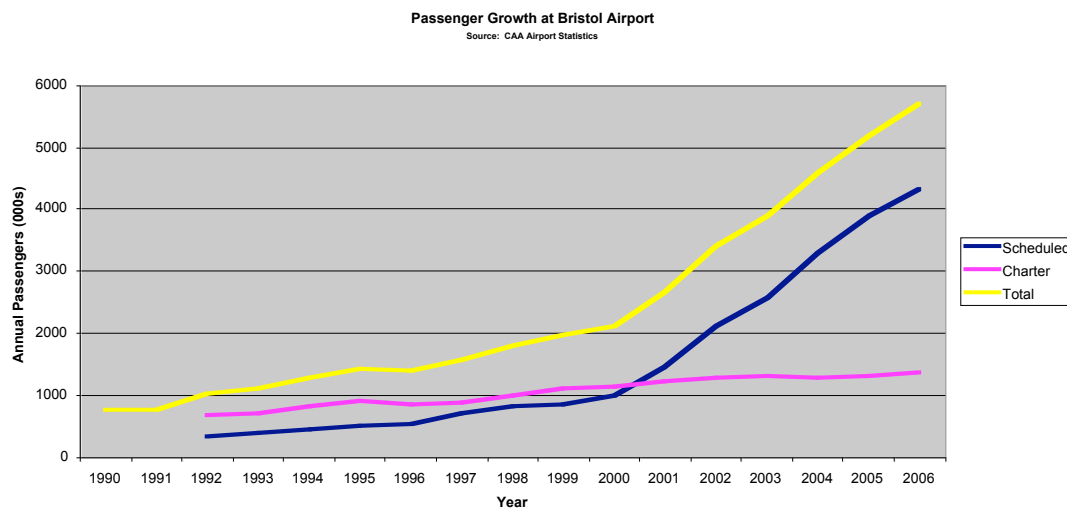
In pursuit of this overarching objective, the analytical section of report is organised into 3 main elements, constituting a stepping stone approach to the principal remit task:

1. A review of accepted approaches to the study of economic impact
2. An evaluation of approaches taken by Tym (2005/) and Whitelegg (2005) against the accepted methodologies discussed in the previous section
3. A distillation and presentation of key findings from Tym and Whitelegg, accepted by the authors of this report as reasonable when examined against the two previous sections.

CONTEXT: Bristol International Airport – Summary Statistics

Bristol International Airport (BIA) has enjoyed rapid growth in recent years and has helped to generate new business and employment opportunities within its sub-region. It is recognised as one of the fastest growing regional airports in the UK with a catchment area which includes ten counties in the South West of England and South Wales and with a potential market of some seven million people who reside within two hours travelling time from the airport.

Bristol International Airport currently serves over 100 destinations and in 2006 carried over 5.7 million passengers; a figure which has more than doubled since the new £27m terminal opened in March 2000.



National and regional forecasts suggest that demand for air travel will increase dramatically over the next 25 years and the implications for BIA, as noted in their master plan, are for a significant increase in passenger numbers to 8.1 million annually by 2015 and 12.5 million annually by 2030. In the context of these growth forecasts, BIA is expanding in terms of terminal space, facilities, associated businesses and car parking.

BIA has produced for consultation, revised in line with comments received, and finally submitted to the Department of Transport, its Master Plan for airport development in the years ahead (BIA Master Plan 2006 – 2030) in November 2006. As part of this process, in 2005, *The Bristol International Airport (BIA) Economic Impact Study* was commissioned jointly by Bristol Airport management and the South West Regional Development Agency and conducted by Roger Tym and Partners (published in Oct 2005 and Oct 2006 [revised]). In 2005, *The Economic Impact of Bristol International Airport*, was published. This is a study conducted by Professor John Whitelegg of Eco-Logica, Lancaster for the Parish Councils Airport Association.

1. Economic Impact Analysis – Methodologies

Conventionally, regional *economic* impact analysis is part of a much broader form of regional impact analysis encompassing “the direct and indirect effects of a particular project in terms of its economic, demographic, environmental, social and fiscal² impacts.” (Cartwright et al, 1983)

Every organisation operating within a specific geographic region has an economic impact, although estimating that impact may be quite subjective. This is because the precise economic impacts estimated depend entirely upon the methodology employed in their calculation.

To estimate the economic impact of a specific organisation within a region – or of any change to that organisation’s activity within the region – the conventional approach universally adopted by mainstream economists is to separate and estimate three key components of the ‘impact’ – the direct, indirect and induced effects of the organisation on the region. These three separate impacts may then be combined to give an estimate of overall impact, adjusted as necessary for any exogenous factors that may affect the final result. There may also be additional ‘catalytic’ economic effects on a region attributable to spillover impacts on other key sectors (e.g. tourism).

In common with most other economic impact studies, however, we feel that both the Tym report and the Whitelegg report overlook an important element of regional economic impact associated with the expansion or contraction of a significant regional organisation. There is much discussion in both reports about **airport-related** business activity and employment but little about **airport-dependent** economic impacts. A certain amount of the ‘dependent’ element will be captured in the induced effects (employment in local shops; pubs, restaurants etc) resulting from expenditure by those directly or indirectly involved in airport-related work. This, however, does not include the effects on **non-airport-related** regional business organisations (for whom airport work is a relatively small part of their business portfolios). Despite its small contribution to their overall workload, some of these organisations may remain viable only because that part of their work which emanates from the airport pushes them into profitability.

Put simply, a business that receives 50% of its income from **airport-related** work is clearly **airport-dependent**. While only 50% of the workforce in the business may actually be engaged on airport work, the entire workforce will depend upon the retention and expansion of that work. It will be the case for certain companies in the locality that work for BIA (which may not be their principal source of income) makes them commercially viable. While not wishing to over-emphasise the point, the conclusion must be that current estimates of local economic impact, if they fail to take account of the additional dependent – over – related activity, will not be able to fully capture the true magnitude of the impact to be expected.

² Here, “fiscal” refers to public sector finance

Returning to the multiplier, put simply, the direct effect attempts to measure the economic activity in a region associated directly with the operation of the organisation itself. These direct effects are derived from a careful analysis of the organisation and usually include the collection of detailed data on employment numbers and wages and salaries paid.

The indirect effects come about through the need for the organisation to service its day-to-day requirements from other supply industries which provide the inputs necessary for the organisation to maintain or expand its operations. These are also the key industries that would lose significant business were the organisation to cease operating in the region. Indirect economic impacts are therefore those organisation-dependent economic activities of the sectors which supply the target organisation and also of those which, in turn, service the supplier industries themselves, moving backwards along the production chain. At a more sophisticated level, regional or local input-output analysis can be employed here to improve the estimation of these effects³.

The induced effects are those associated with the expenditure of wages, salaries and profits earned in the course of the direct and indirect economic activities outlined above. Induced impacts are the economic activity that occurs when the wages and salaries paid out and profits earned by the organisation and its suppliers are spent on consumer goods, housing or, perhaps, on new machinery or factories. It is here that the concept of the regional multiplier comes into play.

The multiplier, a widely employed concept in economic analysis, gives a quantitative expression of the extent to which some initial change in the regional economy (i.e. the direct and indirect impact of a business organisation) is predicted to generate additional effects through interdependencies associated with the economic activities of that organisation. Multipliers are considered to be estimators of the 'ripple' effect of economic activity and the precise size of any multiplier depends upon an economic domino effect of income and expenditure as it moves within a region through the process of economic exchange.

In general, regional employment multiplier estimates are higher than regional income multipliers and their overall impact will depend upon three regional characteristics. First, multipliers tend to be higher in larger regions because less income is likely to leak to other regions in payment for extra-regional supplies and services. Second, multipliers tend to be larger in regions which have several inter-connected industries; i.e. the multiplier depends to some degree on the degree of economic specialisation or diversity of a region. The third characteristic is regional remoteness -the more remote the region, the higher the multiplier since the chance for income and expenditure leakage is much reduced.

³ Models come in three basic forms: Economic Base, Input-Output and Econometric; the latter two being particularly costly to develop, maintain and use. "Regional economic impact models vary considerably in terms of structure, reliability, industrial and geographic detail, flexibility in application and cost of development and use." (Cartwright et al, 1983). Consideration of the merits or otherwise of the alternative approaches is beyond the scope of this report.

There is much academic debate about the appropriate size of the multiplier that should be incorporated in regional impact studies. Impact studies have been conducted in many areas of national, regional and local economic activity across the world and have become the accepted technique to employ when assessing the regional impact of any organisation. However, the debate about the appropriate size of the multiplier effect remains a matter for conjecture.

One area where the size and extent of the multiplier has been explored more deeply (including by the authors of this report) is that of defence. In recent years, the Ministry of Defence has commissioned work to assess the scale of multiplier impacts, particularly at the regional level. As noted in the Memorandum by the Ministry of Defence (RRD 64) to the House of Commons Select Committee on the Office of the Deputy Prime Minister: Housing, Planning, Local Government and the Regions; 2002-3, this is an area of debate among economists and practitioners alike:

“A report, undertaken partly for MoD, by Hartley and Hooper of the Centre for Defence Economics at the University of York in 1995 remains the most comprehensive survey of local multipliers in the UK. The study reported a variety of data problems affecting estimates, including that there are few independent UK studies of local multipliers for defence spending and there are significant limitations in the few that exist, and the defence industry supply chains are very complex”.

Similar data problems confront multiplier estimates when applied to other sectors and aviation and airport construction is no exception. Nevertheless, most conventional impact studies do accept the existence of regional multipliers and tend to adopt perhaps excessively cautious multiplier estimates so as not to exaggerate the likely economic effects of a particular development.

The same memorandum from the Office of the Deputy Prime Minister in 2002, noted above, also notes a contribution from the authors of the current report on the appropriate size of regional defence multipliers:

“Derek Braddon, of the University of the West of England, concluded in a more recent survey that recent estimates of regional multipliers in the defence industry suggest a range of estimates for employment multipliers between a value of one and two—ie for every direct job in defence production there are between one and two additional jobs supported through the supply chain.” (see: <http://www.publications.parliament.uk/pa/cm200203/cmselect/cmodpm/492/492we61.htm>).

A realistic regional multiplier of, say, 1.3 would imply that for every direct job created by a new regional development, it would be reasonable to expect a further additional job in the region caused by indirect effects and 0.3 of a job through induced effects.

Conventional economic analysis of regional impacts, therefore, suggests that this kind of methodology – i.e. summing the three components of economic impact – direct, indirect and induced – still represents the best measure of the contribution that a particular organisation and its evolution over time makes to the economy. It should be noted

however that some economists do tend to be critical of conventional economic impact studies, particularly when applied to non-industrial or commercial activities (i.e. the arts); see for example, Seaman (1986) and van Puffelen (1996)⁴.

The “standard” methodology as outlined above is neatly captured diagrammatically, by the Oxford Economic Forecasting group⁵, see Appendix 1.

Airport Economic Impact Studies

Not surprisingly, given their key role in connecting communities to the *global* market, airports are considered important assets, particularly at the regional level. In addition to providing significant transportation benefits, airports create employment and income generation as well as utilising a wide array of goods and services.

A large number of airport economic impact studies conducted in the United States, designed in a similar manner to that employed by Tym in the BIA study, continue to show just how significant the wealth-creating effects of airport development can be. The evidence is conclusive, as noted below.

The U.S. Studies⁶

Evidence from the United States offers compelling support for the positive economic impact of airport development. For example, a recent economic impact study of Baltimore-Washington airport:

“...shows its unquestionable role as an economic catalyst in the state of Maryland. In 2000, it generated \$6.5 billion in annual revenue statewide, up from \$5.3 billion two years ago. The number of jobs supported by the Airport also increased to nearly 85,000 statewide, an increase of 10,000 jobs since the last study using figures from 1998.

The booming activity at BWI directly or indirectly supports 84,937 jobs in the Washington-Baltimore Region. The jobs of 12,030 people are directly dependent on BWI Airport activity in airline and airport services, freight transportation, ground transportation and construction and consulting. This resulted in an estimated \$358 million paid in wages and salaries in 2000. Of these jobs, 10,465 were generated by commercial airline passenger activity, 961 in construction and consulting, and 604 in air cargo. In addition, 6,369 induced jobs were created in the region due to the purchases of goods and services and 5,692 indirect jobs were

⁴ Van Puffelen, Frank 1996, ‘Abuses of Conventional Impact Studies in the Arts’, *Cultural Policy*, vol. 2, no. 2, pp. 241–54.

Seaman, Bruce A. 1987, ‘Arts Impact Studies: A Fashionable Excess’, in *Economic Impact of the Arts: A Sourcebook*, National Conference of State Legislatures, Washington DC.

⁵ OEF, 2005, Air transport drives economic and social progress (available at <http://www.oef.com/Free/pdfs/ATAGBroBeneAir.pdf>)

⁶ The economic impact of U.S. Airports; Airports Council International, 2002.

generated in the local economy due to the \$236.2 million of local purchases. The EIS also reports that more than \$1.8 billion of total personal income was generated by BWI.”

Similarly, another economic impact study on Hartsfield Atlanta International Airport shows that:

“...in 2000, passenger and airport activity at Hartsfield Atlanta International Airport generated some 45,000 direct jobs, of which the majority, nearly 70%, were employed directly with the airlines serving the Airport. About 3,500 jobs were with air freight carriers, and 2,100 jobs were with ground transportation firms. About 1,800 direct jobs were with retail concessions in the airport terminals, while over 1,800 more direct jobs were with security firms and skycaps. The total airport payroll is \$1.9 billion, resulting in a direct and indirect economic impact of \$3.8 billion on the local and regional economy. The total annual regional economic impact of the airport is over \$17.3 billion.”

According to its economic impact study, Blue Grass Airport, near Lexington, Kentucky:

“...contributes 1,760 jobs in the local economy. The Airport is credited for \$134.2 million in annual revenue and \$45.8 million in worker earnings. This includes the impact from airport businesses, which account for about 1,000 jobs and the impact of the airport on regional industry and tourism that account for the remainder. The Airport also makes a healthy contribution to local tourism. It is estimated that each trip into the community for business generates \$400 in visitor spending while leisure trips generated \$244. In total, it is estimated that \$18 million was spent by visitors using Blue Grass Airport in 1999 and 381 jobs were created in the local economy.”

The story is repeated over and over again. Airports create employment, generate wealth and provide crucial access to world markets. Similar positive economic impacts have been found for airports in Kansas City; Minneapolis-St Paul; Nashville; King County; John Wayne Airport, LA; Oakland; Philadelphia; Rickenbacker; Savannah; Seattle-Tacoma; South West Florida; and Eagle River, among many others⁷.

2. Tym and Whitelegg Reports – An Evaluation of Methodologies

a) Bristol International Airport Economic Impact Study, Oct 2005 (revised Oct 2006), Roger Tym and Partners, Exeter.

The Tym Report is both very detailed and incisive. It presents a thorough analysis of both the underpinning rationale for Bristol International Airport expansion and the economic impact to be expected from that expansion. The Report, commissioned by BIA management and the South West Regional Development Authority applied conventional

⁷ Airports Council International, 2002, The Economic Impact of U.S. Airports (available at: http://www.aci-na.org/docs/US_Econ_Impact.pdf)

economic impact study methodology and draws appropriate, suitably cautious, conclusions.

The report includes an analysis of original primary data gathered through a survey of South West businesses designed to identify the extent to which BIA was valued in facilitating business travel.

In a most thorough analysis of airport employment impact, the Tym Report first employed survey-based supply chain data from on-airport businesses to estimate the indirect employment effects of their procurement of goods and services. This was conducted in relation to 3 supply chain models identified as affecting the airport's business sector – an 'internal economy' where trading takes place between on airport businesses and where 'double-counting' problems occur; a 'central purchasing process' where on-airport business are the offspring of national or international companies and may purchase their inputs outside the region; and a 'local sourcing' model, where on-airport companies also purchase significant inputs from local business with usually positive effects on multiplier estimates. All of these were encapsulated in the Tym Report's survey-based analysis. We consider that this careful approach to the supply chain issue greatly strengthens the Tym report's conclusions since it addresses one of the important issues affecting the regional multiplier, noted earlier. Tym also examines the employment impact of airport-related tourism spend in the region and estimates future employment *growth* that may be attributable to *increased* tourism expenditure and to capital projects for airport construction projects.

To strengthen further the accuracy of the impact assessment, the Tym Report then adopts an alternative method of evaluating the multiplier impacts of BIA activities by employing generic multipliers to airport expenditure in line with the practice in virtually all other economic impact studies. The generic multipliers, adopted as benchmarks, used in this section of the Report was 0.3 for indirect employment and 0.3 for induced employment.

The generic multipliers employed in the Tym Report are very conservative and in line with 'best practice' employed in other studies. The relatively low multiplier estimates, particularly for indirect effects, are justified as the 'leakages' from the regional multiplier impact at BIA are significant due to national and international purchasing by many on-airport companies, limiting the flow of new income to the region.

The tone of the Tym Report is cautious throughout in relation to the estimates of employment impact, recognising concerns in the academic world, noted earlier in this report, about the tendency to sometimes over-estimate the power of the multiplier effect. Indeed, the study clearly makes the point that:

“some of the potential benefits of the growth plans of BIA may be frustrated by constraints on future labour supply. In particular the difficulties in accessing work at the Airport by any means other than the private car may create additional barriers to entry for clients targeted by Jobcentreplus and other local employment initiatives in South Bristol and Weston-super-Mare. Strong competition from other imminent major developments in

Bristol (offering easier access and potentially, marginally better pay) may also hinder recruitment at the Airport.” (Tym Report).

Tym also notes that labour is being sourced for some on-airport employers the new EU accession countries and that this recruitment solution inevitably limits BIA’s capacity to help the long-term and deep-rooted employment problems of particular areas of South Bristol and Weston–Super-Mare. On the other hand, such recruitment does bring into the region a new, young labour force with considerable spending power whose impact on the economy should not be over-looked.

In summary, the Tym Report applies the conventional tools of economic analysis in a highly professional and realistic manner and, even taking into account its own cautious, conservative approach still suggests that the expansion of Bristol international Airport can be justified in terms of significant net employment and income gains, both directly at the airport and throughout the wider regional community. The report draws upon a vast range of published material regarding the economic dimensions of airport expansion and strengthened the rigour of its analytical approach by utilising the results of corporate studies of that impact, as well as input derived from extensive consultations with BIA management and their partners.

b) The Economic Impact of Bristol International Airport, (2005) a study for the Parish Councils Airport Association and conducted by Professor John Whitelegg, Eco-Logica, Lancaster (The Whitelegg Report). Reference is also made in this section to an associated paper, authored by J.Birch and entitled SBAE Response to BIA Economic Impact Study, published in November, 2006.

The Whitelegg Report is somewhat unusual in the context of academic studies of regional economic impact in that it sets out immediately to present a fixed and clear agenda – in essence, to challenge conventional wisdom about the beneficial effects of the aviation industry in general and airport development in particular. Rather than offering an alternative conventional academic economic impact study of the expansion of BIA, then, the Whitelegg Report must be seen more as a direct critique of studies such as the Tym report and, as a result, makes no attempt to hide the fact that it has an agenda of its own to pursue. The author is to be complimented for making his stance clear from the start. Aviation is viewed as a small part of the UK’s national and regional economy and Whitelegg argues that job creation claims made for aviation generally and airports in particular are not justified by the evidence.

The report suggests that the conventional view of economists that economic expenditure in a region which creates direct employment which, in turn, generates additional indirect and induced employment and income is based on “a flawed methodology (the multiplier effect) which routinely double counts jobs in other sectors and has no place in a rigorous evaluation of the economic benefits of aviation.”

This is a challenging assertion and may serve only to undermine what otherwise would be a valid point. As noted elsewhere in this report, there is considerable debate about the

size and importance of the multiplier effect but to exclude the concept completely from any form of regional economic impact evaluation of airport expansion (or, indeed, any other large construction project) would be unjustified and perhaps irresponsible. One may question the extent of the multiplier effect but one cannot challenge its existence and, therefore, the need to incorporate it in such analyses, albeit in a cautious manner.

The Whitelegg Report also criticises BIA and the Tym Report for over-estimating the scale of potential employment impact associated with airport expansion. It is here that we consider the Whitelegg criticisms to be particularly unsustainable. The use of generic multipliers in the Tym Report is criticised by Whitelegg since: “with no validation processes available and in the absence of empirical checks on these multipliers, very little reliance can be placed on these estimates”. This overlooks the fact that the Tym Report took into account an alternative employment assessment based upon survey data and on-airport interviews with airport-based companies and produced employment estimates very close to those suggested by the application of generic multipliers (which, in themselves, were very cautious).

Whitelegg introduces what we consider to be a deeply flawed assertion into the debate. It is suggested that multiplier effects must be ignored because “they are unreliable guides to the economic impacts of any sector of the economy and should be discarded in discussions around aviation”. This is justified by the argument that “in regional and sub-regional economics, these estimates are not constrained by actual employment numbers in different sectors of the economy. Put very crudely, it is perfectly possible and reasonable for every large employer ... (to) carry out the same multiplier calculation. The results of this exercise would produce an indirect/induced job total greater than the total employed population in the South West. Put clearly, multiplier calculations are seriously flawed because they involve massive double counting, no back-checking or validation and no constraints that mean the final total must not be greater than "X" where X is an actual employment figure”.

But this argument assumes that every single large employer in the region is actually expanding at the same time and at the same rate. Were this to happen, the Whitelegg assertion would be correct and the entire region would collapse due to a labour supply deficiency of staggering proportions. But it never has happened and never will. Business, by its very nature, is cyclical and the degree of cyclicity varies between different sectors and over different time periods. What is true for the individual organisation (that the impact of its expansion will create important and beneficial multiplier effects at the regional level) is not true for all sectors expanding simultaneously. To suggest that airport expansion at BIA will necessarily imply a mass simultaneous expansion by every major employer in the region, making such gains impossible to achieve is, to say the least, statistically improbable.

Methodologies – Overall Assessment

To conclude the Report, Whitelegg criticises BIA’s Tym Report for: “poor analysis, poor evaluation, inadequate economics and a naïve belief in the ability of one very heavily

subsidised sector of the economy to deliver jobs”. In our independent assessment of both reports, we have to conclude that the Tym Report contains essentially sound if perhaps, cautious, conventional economic analysis, delivered to a very high degree of professionalism. The ‘economics’ is not ‘inadequate’ but is in line with the existing established body of well-judged, professional and academic reports and peer-reviewed papers and the fact that Tym does actually question the power of forces such as the multiplier and is willing to check for its accuracy with independent research and alternative estimation techniques suggests that their approach is anything but ‘naïve’.

As with all economic impact studies, the credibility of the employment estimates derived from the Tym study can only be as good as the methodology and economic multipliers employed in their derivation. Both in terms of analytical approach and multiplier estimate appropriateness, the Tym report meets high standards. The methodology is sound, building upon the best available recent studies of the economic impact of airports (e.g. the York Aviation Study, amongst others) which is used both to locate BIA in the ‘medium density’ category of airports and to derive appropriate multiplier estimates.

It is our opinion that the Whitelegg Report has several valid contributions to add to the discussion and a range of arguments that could have been developed to greater effect. Unfortunately, the tone of the Report, its transparent anti-aviation value-judgement from the start, and its unconventional use of economic concepts to support some of its assertions serve both to weaken its case (which does have some merit) and creates an unduly biased and misleading outcome.

3. Key Findings as accepted by UWE consultants

Initial observations

There are areas of commonality, as well as areas of divergence, in the two reports. However, such areas of commonality are understated, while divergence is highlighted.

Together, the existing reports represent an extensive, if somewhat opaque, consideration of most of the salient variables, with the exception of one or two that may be worthy of further investigation; for example, the difference between airport-related and airport-dependent activity.

In places, a lack of weighting of parameters and analysis inhibits objective assessment. With all discussion points being effectively equally weighted, “minor” issues may cloud “major” and incorrect conclusions may be drawn.

Below we present a distillation of those findings we consider credible and defensible, together with commentary where appropriate.

Detailed commentary and evaluation

Bristol International Airport Economic Impact Study (2005/6), Roger Tym and Partners.

We accept the authors findings that both passenger numbers and persons employed at BIA have increased significantly since 2000; that 49 businesses now operate at the airport; and that some 3,500 businesses located in the South West region of the UK regularly use BIA's services.

We accept the Tym Report's analysis of original primary data gathered through a survey of South West businesses which suggested that BIA was ranked by 33% of businesses in the South West in 2005 as their most frequently used airport and about half of all businesses using BIA in 2005 planned to increase their use of the airport in the future.

The expansion of BIA was ranked as very important or important to over 57% of businesses that responded to the survey with time and cost savings emerging as an important factor. Tym estimated that such savings for South west businesses could amount to over £120m per annum by 2030, which we find an acceptable estimate.

The number of persons employed at BIA reached 2,160 in 2003; 2,577 in 2004 and 2,653 in April 2005. Numbers employed at the Airport have grown considerably, particularly since 2000. In terms of 'full time equivalent' employees, BIA employed 2,284 at the time the Tym Report was written. Most employees live within a limited catchment area (Bristol to Weston-Super-Mare) although some salaried, professional and managerial personnel commute from a longer distance (i.e. South Wales, Herefordshire, Gloucestershire).

The study initially utilises both annual BIA survey data and the results of the research team's own primary research from airport-based employer interviews to identify current direct employment at the airport. This cross-checking procedure ensures that the current employment estimate for BIA identified in the study (2,653) can be fully justified and that seasonal and other employment variations can be quantified accurately. The latest survey (summer 2007) indicates that employment at the airport has now reached 2,854.

As a result of these adjustments, Tym's estimate of a current seasonally-adjusted employment figure of 2,284 appears entirely reasonable. Furthermore, Tym notes that the seasonal variation aspect of BIA employment has diminished in recent years and this development is incorporated in their later forecasts. We conclude, therefore, that the estimation process for direct employment at BIA contained in the Tym Report is both accurate and consistent with best practice in economic impact evaluation studies.

We concur with the Tym estimates that indirect employment associated with BIA's supply chain amounted to 1,306 jobs in 2005 with a further 978 'full time equivalent' jobs being induced in the BIA sub-region from the expenditure associated with these levels of direct and indirect employment.

Converting all employment estimates to ‘fulltime equivalents’, the Tym Report estimates that BIA plays an important role as employer within the region, supporting some 3,327 direct, indirect and induced jobs and we feel that this is a valid and suitably cautious estimate.

Tym’s examination of the employment impact of airport-related tourism spend in the region suggests that a further 1.097 ‘full time equivalent’ tourism-related jobs were supported by BIA’s activities in 2005, giving an overall employment impact estimate of 4,424 regional jobs.

We believe that the Tym estimates are strengthened by the adoption of an alternative method of evaluating the multiplier impacts of BIA activities by employing generic multipliers to airport expenditure in line with many other airport impact studies. On this basis, the 2,284 FTE direct jobs at the airport were estimated to create 685 additional indirect jobs and 891 induced jobs in the region; an overall total of 3,860 or 16% more than the survey data suggested.

With regard to future employment growth that may be attributable to increased tourism expenditure, Tym’s tourism-related employment impact analysis predicts 630 additional jobs between 2005 and 2015 and a further 356 jobs between 2016 and 2030 and we find these estimates entirely reasonable.

Further, Tym suggests capital expenditure for airport construction projects on new BIA facilities over this period is forecast to create 465 FTE ‘temporary’ jobs over the growth period to 2030 with 16 further FTE jobs over part of this period attributable to the construction of a new hotel. Once constructed, this hotel will create a further 67 FTE direct, indirect and induced jobs; we accept these estimates as valid.

The figures presented above lead Tym to estimate current employment at BIA as amounting to 0.45% (or 2,284) of employment in the West of England sub-region and 0.11% of all employment in the South West region. Taking into account all direct, indirect and induced employment associated with BIA increases the contribution to sub-regional employment to 0.65% and to 0.16% of all employment in the entire South West region.

Tym highlights forecasts of direct, indirect and induced employment growth at BIA, under different business and economic scenarios, which will see BIA’s contribution to regional and sub-regional employment double at least in the period to 2030 and far outstrip average expected employment growth in the South West region. The study uses these estimates to emphasise the regional significance of BIA as a current and, more importantly, future employer.

The Economic Impact of Bristol International Airport (2005), Stop Bristol Airport Expansion (SBAE)/John Whitelegg, Eco-Logica.

We accept that the view contained the Whitelegg Report that BIA is a small player in the economy of the South West and that, while welcome, its contribution to employment now is minimal. However, we would refute the suggestion contained in the report that it will remain so in the future and that BIA expansion should not take priority over other regional construction projects. While direct employment at the airport may only increase marginally over time, the future indirect and induced employment effects will depend on how successful airport expansion is and how many people are attracted to the region, directly or indirectly, through the development of the airport and its services. If the number of travelers using Bristol International Airport increase sharply following development, the spin-off effects for the local and regional economy could be quite significant.

We accept the assertion in the report that aviation in the UK is a publicly subsidised activity. However, there is considerable evidence⁸ to suggest that this sector is subsidised far less than either road or rail transport. Furthermore, since all of these subsidy estimates are subject to serious limitations in terms of what should be included in the calculation, it seems to us inappropriate to challenge airport development on public subsidy grounds. Furthermore, the notion of an air travel subsidy hinges on the supposed anomalies in the taxation system. In the same way, it could be argued that supermarkets compared with restaurants, that is, food bought in a supermarket is VAT free, but food bought in a restaurant incurs VAT.

We accept the assertion in the Whitelegg report that the future business of BIA will depend principally upon the role of low cost airlines and tourism (although we also expect business travel growth to continue given the survey feedback referred to elsewhere). However, we do not accept the report's perspective that these are essentially, non-sustainable activities with little real economic spin-off, with the ability to increase downward pressure on wages and the capacity to relocate at any moment. The low cost airline sector has been one of the most remarkable growth areas in transport in recent years and the number of flights has more than doubled in the last 5 years. The volume of low cost flights worldwide in April 2006 was 13% higher than a year earlier, which was in turn 19% higher than in April, 2004. Some 14% of all flights are with low cost carriers globally and also some 17% of seats. We see no reason for this trend to be reversed and believe that these airlines will represent a driving force stimulating regional economic growth in the future. This conclusion is strengthened by recent evidence of new deluge of low-cost operators and routes opening up at BIA. For example, Ryanair have recently opened their 20th European base at BIA with low cost routes to Bratislava, Budapest, Derry, Dinard, Katowice, Knock, Milan, Porto, Poznan, Riga, Rzeszow and Wroclaw, Salzburg, Turin, Beziers, Pau and Bergerac. Easyjet have also added new routes for 2008

⁸ See, for example, Hansard (4 December, 2002; column 801W at: <http://www.publications.parliament.uk/pa/cm200203/cmhansrd/vo021204/text/21204w03.htm> and also Bradbury N and G. Nalty; The Great Road Transport Subsidy (1996) at: http://www.igreens.org.uk/great_road_transport_subsidy.htm

from BIA to Biarritz, Split and Olbia while Flyglobespan is opening a new route to Toronto from BIA later in 2008. Lufthansa will also be flying from Bristol to Frankfurt (an important business route) from 2008. These developments indicate that this crucial sector of air travel is set to expand significantly at BIA and will provide an important source of new growth in the region.

We accept the report's view that business travel provides only a very small part of BIA's travel demand and that, on balance, the future economic impact of the airport on the regional community must therefore be judged primarily in the context of increased dependency on tourism and low-cost leisure travel. However, we are less pessimistic than the Whitelegg report in both areas. We expect low cost leisure travel to expand significantly at BIA in the future and are convinced from the business survey results mentioned elsewhere that the business sector will also prove an important growth source for the future. If anything, BIA expansion will only serve to make business travel even more convenient and therefore more attractive to corporate clients within the region and perhaps beyond.

We accept the importance of a range of other key issues raised in the Whitelegg report, including the importance of BIA parking plans; airport-related road congestion issues, the perceived deficit in tourism spending and the potential impact of higher fuel charges among others. Whitelegg argues that all of these should be fully considered in the study and we accept that these are all valid issues that merit more detailed consideration. However, we are not convinced that the current evidence on any or all of these issues is sufficient to warrant adopting a negative view of BIA expansion. There will be economic impacts associated with each issue, both positive and negative, but it would necessitate a wider and more in depth study than has so far been contemplated for these important issues to be fully explored.

We do not accept the report's criticism of the BIA Master Plan for failing to "adopt a realistic and transparent economic perspective", in particular in failing to recognise two issues: the large tourism deficit (i.e tourists leaving the UK spend far more money abroad than in-bound tourists spend in the UK) and, similarly, the large deficit in foreign direct investment (FDI) since UK companies and financial institutions invest far more abroad than non-UK institutions invest in the UK. We feel that these criticisms are controversial. Both tourist expenditure in the UK and FDI coming into the country are desirable elements of a modern global economy since both create employment and income-generating opportunities. More important, if BIA expansion leads to any increase at all in the share of national FDI or in-bound tourist expenditure coming to the South West region then this should be viewed as a good thing with positive economic impacts on the local and regional economy.

The argument that the deficit at the national level means an economic loss to the UK and its regions is not adequately robust, nor defensible. This is because there is no guarantee that the 'opportunity cost' of the net overseas expenditure in both cases would be tourist expenditure or investment actually in the South West region. If tourists intend to travel overseas for a holiday, they are likely to switch departure airports rather than simply take

their holidays in the UK. Some may choose to do this anyway for other reasons but this will, at best, have a tenuous link with BIA expansion. It is an overstatement to suggest that those companies wishing to invest overseas will simply switch their investment to the UK if travel facilities in the region make their global investment search more difficult. As profit-seeking entrepreneurs, they will invest where their market analyses tell them the return is likely to be highest. More important, however, the improvement of travel facilities at the regional level, therefore – and BIA expansion in particular – gives the region a chance to capture a greater share of future FDI inflows to the UK as the world becomes better informed about what the region can offer the global business community. Without BIA expansion, it is more likely that the world's top global companies will be disinclined to locate in the South West region if it so neglects its international travel infrastructure that staff have to undertake long and costly journeys to London or Birmingham before they can make use of a large, modern, genuinely global airport.

The Whitelegg Report also challenges the BIA claim to be currently an important international link for business by highlighting the fact that only 20% of passengers travel from BIA for business reasons, despite the positive view of the airport and its future growth expressed in the Tym Report. Once again, this criticism is controversial. Whatever the current situation regarding business travel from Bristol, it is unlikely to improve significantly unless the airport is permitted to do its job properly and develop new and better facilities and services. Surveys noted in the Tym Report suggest a great deal of interest among the business community of the South West region in using the airport in the future and BIA expansion should enable that potential interest to be turned into reality.

Whitelegg then asserts that “it is perverse” to exclude concerns about “the realities of the aviation industry”, particularly large increases in fuel costs and the consequent attempt to reduce overall costs through cutting labour. The reality is that aviation and air transport more generally, are industrial sectors which have – like all others – to come to terms with global change. The “redundancies, geographical re-positioning and wage cuts” that the Whitelegg Report highlights could also be viewed as important steps towards creating a world-class industry where expansion, additional employment and wage increases would follow. These dynamics are all part of global economic adjustment over time and the only way to survive at the industrial or at the regional level is to secure sustainable competitive advantage. The further development of an already highly successful modern airport is a key element in that process.

In their published report, SBAE identified “principal areas of disagreement” and we now turn to consider these areas.

According to SBAE (2005) there are important disagreements between the two reports in five main areas: Employment Impact; Benefits to Business; Inward Investment; Competitiveness; and the Tourism Deficit.

SBAE believes that there will be fewer jobs created than the projections given because both the low-cost airlines and the airport aim to increase productivity by reducing costs. For example, it has been stated that there will be no check-in staff in 5 years, and Ryanair have shown that they intend to phase out hold luggage, therefore reducing baggage handlers. We agree that direct employment gains may not be as great as the largest estimates but such points as this only marginally reduce anticipated growth.

SBAE notes that only 20% of current flights are for business purposes, so business passengers could increase substantially without increasing passenger numbers much or even at all (if leisure passengers are displaced). Most routes are clearly tourist destinations and so attract little or no business custom. We accept this is an interesting point but feel it constitutes an alternative hypothetical strategic scenario which could be considered by BIA, rather than an argument against estimates around stated plans.

SBAE states that it is not feasible for BIA to cover the large set of frequent reliable services to a known set of destinations, favoured by business customers. Many of BIA's routes are infrequent or inconveniently timed, forcing business people to either stop over at their destination or travel back using another airport. This cancels out time saving in using BIA rather than another airport and can also greatly increase costs due to loss of working time, transport and accommodation costs. The Tym report ignores these issues, merely summing up saved time travelling to BIA versus another airport. Our understanding here is that the local business community support the existence and expansion of BIA and in doing so, presumably see certain benefits in terms of cost/time savings and/or convenience on the one hand and actual or potential revenue gains on the other.

SBAE comments that BIA state in several case studies that it allows access to export markets, yet it has no real freight handling, nor plans to increase it. We accept this point but note that allowing access to export markets does not necessarily mean physically exporting. In often simply means improving the buyer/seller relationship through the two way flow of business travellers.

SBAE believes that the BIA case for inward investment is purely assertion, and does not lead on from the preceding sections of the Tym Report. It is clear that the deciding factor for investment in high tech industries is the presence of a skilled workforce, and often one with entrepreneurs willing to form start-ups. It is obvious that the presence of BIA has little or no bearing on decisions to invest in search firms and also clear that expansion of BIA will have no effect either, unless it managed to compete with Heathrow in the frequency of flights to such long-haul destinations to the target growth markets for many of these firms in the Far East or on the USA's West Coast. We would simply comment here that, the business community support BIA. Internationally, a successful regional airport is seen as important in attracting FDI to a regional economy.

SBAE draws attention to the fact that the Tym report asserts that the Bristol area has a "substantial proportion of its employees working in high tech service sectors, leading Milan, Turin, Lyon, Frankfurt and Munich. However Bristol's connectivity is very low –

seventy fifth in Europe in terms of passenger numbers” (section 8.29). The report critics argue that this statement is used to justify that BIA must expand and contend that there is no causal relationship between having a large and expanding local airport and being able to have a thriving high tech sector in the region, since Bristol is sufficiently connected through existing BIA flights and more importantly through Heathrow to enable this thriving sector to operate in the region. We refute this criticism as being largely conjecture.

The Tym Report is criticised again for its claim that the spending by overseas visitors in the region using BIA was £38m in 2004, of which £22m was leisure spending. This is expected by Tym to increase substantially to £44m total by 2030 but is challenged as little evidence is given as to why this will be. The critics assert that CAA figures show nationally a very slow rise in inward tourism and a much higher rate of increase for outward tourism.

There is no mention in the main report on outward tourism spending, but an appendix (3) states that in 2004 £526m was spent abroad by leisure passengers from BIA, and this is expected to grow to £1079m by 2030. Comparison of the leisure inward and outward spends (and taking into account a 12% leakage ie some people fly into BIA for destinations outside the South West), shows the leisure spending deficit is £526m minus £24m, reaching £502m in 2004, rising to £1079m minus £44m, to become £1035m in 2030.

This means that BIA is currently enabling a deficit of over £0.5bn per year and plans to increase this to over £1bn per year, to the UK economy as a whole. These figures of BIA's own report tally very well with previous calculations published by SBAE.

This is an interesting point but scarcely serves to challenge the case for BIA expansion. Tourism is now the world's biggest industry and offers enormous economic gains if developed properly. Failure to develop BIA would effectively limit future potential growth in this area and divert these gains elsewhere.

CONCLUDING STATEMENT

The discussion about the economic impact of Bristol International Airport and its expansion plans turns on the issue of methodology and in that respect we conclude by restating our earlier points:

In our independent assessment of both reports, we have to conclude that the Tym Report contains a tried and tested conventional approach, employing well-judged cautious estimates of regional economic impacts. In our judgement, the Tym report meets a very high degree of professionalism. The ‘economics’ is not ‘inadequate’ as suggested by the Whitelegg report but is in line with the existing established body of established, professional and academic reports and peer-reviewed papers and, furthermore, Tym incorporates careful checks on the validity of the multiplier effects employed. This,

together with numerous other examples of carefully balanced analysis, suggests that the approach employed by Tym is anything but ‘naïve’.

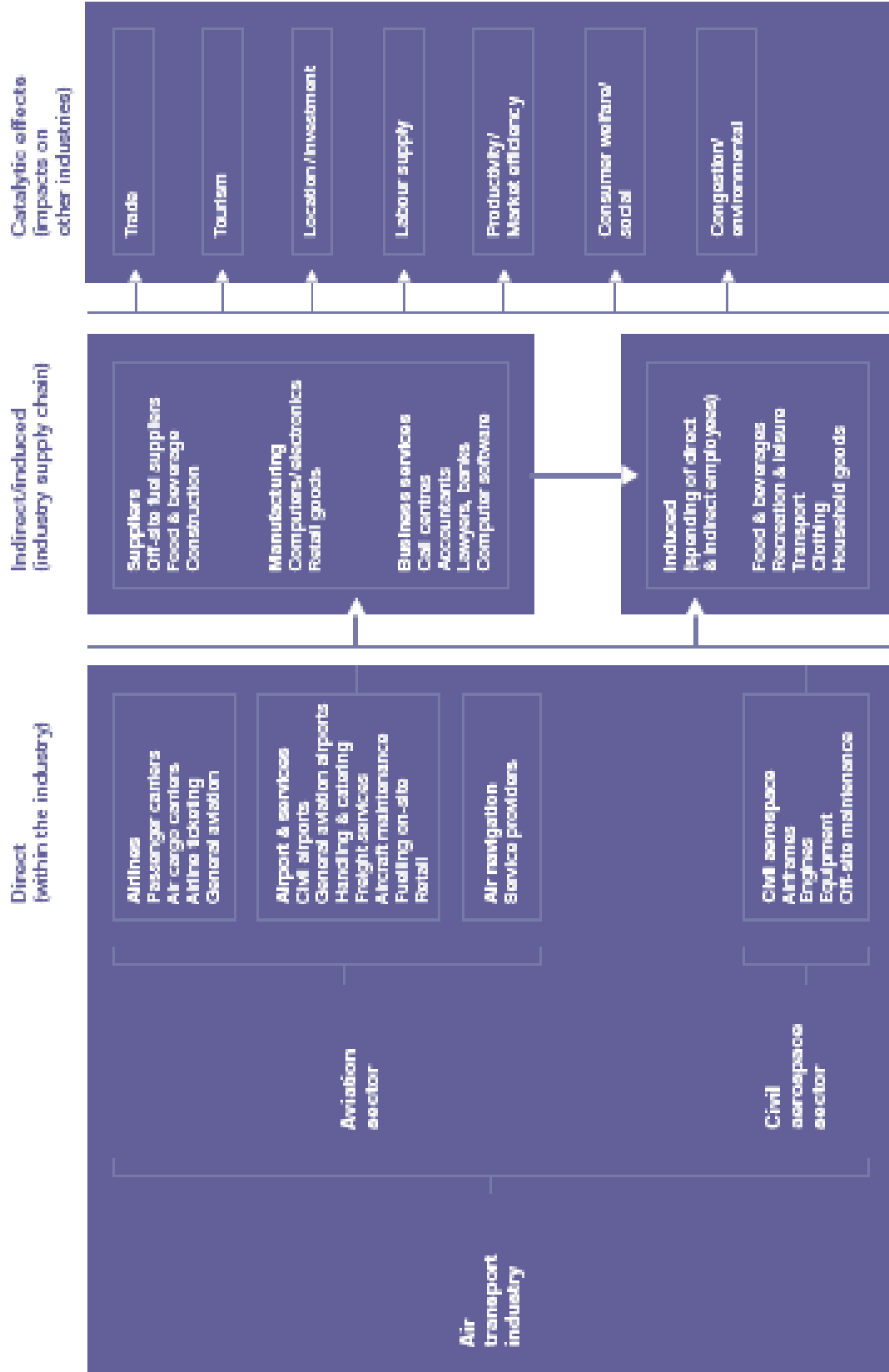
It is our opinion that the Whitelegg Report does raise a number of valid issues and makes an important contribution to the debate. We feel that some of the issues raised and the arguments employed could have been developed to greater effect. Unfortunately, the tone of the report, its transparent anti-aviation value-judgement from the start, and its sometimes unconventional use of economic concepts to support some of its assertions serve both to weaken its case (which does have some merit) and creates an unduly biased and misleading outcome.

Overall, we conclude that, as has been the case in numerous other considerations of airport impact⁹, the regional economic case for BIA expansion is accepted. As stated at the outset, however, the economic argument is but one element of an overall regional impact analysis, including economic, demographic, environmental, social and fiscal impacts, and conclusions about the net impact can only be made when all such relevant parameters are considered together.

⁹ Such as Manchester, Coventry, and Bournemouth airport studies.

APPENDIX 1

The air transport industry and its economic impacts



Source : OIEF, 2005

BIBLIOGRAPHY

Airports Council International, 2002, The Economic Impact of U.S. Airports (available at: http://www.aci-na.org/docs/US_Econ_Impact.pdf)

Birch. J., 2006, SBAE Response to BIA Economic Impact Study, November.

Bradbury N and G. Nalty, 1996, The Great Road Transport Subsidy (available at: http://www.igreens.org.uk/great_road_transport_subsidy.htm)

Cartwright et al, 1983, Modelling the Regional Economic Impacts of Major New Military Bases, President's Economic Adjustment Committee, Office of the Assistant Secretary of Defense, The Pentagon, Washington DC

Hansard (4 December, 2002; column 801W) (available at: <http://www.publications.parliament.uk/pa/cm200203/cmhansrd/vo021204/text/21204w03.htm>)

Oxford Economic Forecasting, 2005, Air transport drives economic and social progress (available at <http://www.oef.com/Free/pdfs/ATAGBroBeneAir.pdf>)

Office of the Deputy Prime Minister, 2002, Memorandum by the Ministry of Defence (RRD 64) to the House of Commons Select Committee on the Office of the Deputy Prime Minister: Housing, Planning, Local Government and the Regions; 2002-3 (available at: <http://www.publications.parliament.uk/pa/cm200203/cmselect/cmselect/cmmodpm/492/492we61.htm>)

Roger Tym and Partners, 2005, Bristol International Airport Economic Impact Study, Oct 2005 (revised Oct 2006), Exeter.

Seaman, Bruce A. 1987, 'Arts Impact Studies: A Fashionable Excess', in *Economic Impact of the Arts: A Sourcebook*, National Conference of State Legislatures, Washington DC.

Van Puffelen, Frank 1996, 'Abuses of Conventional Impact Studies in the Arts', *Cultural Policy*, vol. 2, no. 2, pp. 241-54.

Whitelegg, J, 2005, The Economic Impact of Bristol International Airport, a study for the Parish Councils Airport Association and conducted by, Eco-Logica, Lancaster