An Economic Analysis of the 2007 SCB conference

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DECLARATION:

In accordance with Rule G4.6.3, I hereby declare that the above-mentioned treatise/dissertation/thesis is my own work and that it has not previously been submitted for assessment to another University or for another qualification.

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DATE: **9th April 2010**

List of Acronyms

AAG	Association of American Geographers
ABPCO	Association of British Professional Conference Organizers
AIPC	Association Internationale Des Palais de Congrès
BACD	British Association of Conference Destinations
DBSA	Development Bank of Southern Africa
DPLG	Department of Provincial and Local Government
EFCT	European Federation of Conference Towns
EO	Executive Office
GDP	Gross Domestic Product
GVA	Gross Value Added
GE	Gross Expenditure
IAEE	International Association of Exhibitions and Events
IAPCO	International Association of Professional Congress Organizers
ICCA	International Congress and Convention Association
IO	Input-Output
IOT	Input-Output Table
LOC	Local Organizing Committee
MEA	Meetings & Events Australia

MIA	Meetings Industry Association
MPI	Meeting Professionals International
NAM	National Accounting Matrix
NMMU	Nelson Mandela Metropolitan University
PCMA	Professional Convention Management Association
SAACI	Southern African Association for the Conference Industry
SAM	Social Accounting Matrix
SECB	Singapore Exhibition and Convention Bureau
SCB	Society for Conservation Biology
TIPS	Trade and Industrial Policy Strategies
UIA	Union of International Associations
UNISA	University of South Africa
WSSD	World Summit on Sustainable Development

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Abstract

The Society for Conservation Biology held their 21st annual conference in Port Elizabeth during July 2007. This was the first SCB conference hosted on the African continent. Over 1500 conservation professionals and students from throughout the world were brought together by the SCB annual meeting. The local organizing committee was interested in the economic impacts associated with the conference and approached the NMMU Economics Department to conduct an economic impact assessment of the conference. The Economics Department invited the researcher to undertake this study towards obtaining an MCom degree in Economics.

The economic impact of conferences stems from two sources, namely: expenditure by delegates (the demand-side) and the expenditure by conference organizers (the supply-side). The study focused on the economic impacts of the conference for the Eastern Cape. The conference expenditure produced an increase in demand in the Eastern Cape. Only new expenditure originating from outside the Eastern Cape were considered.

An increase in the demand for one industry's output will create additional demand for the outputs of its supplying industries, because industries are connected through forward and backward linkages. These inter-industry linkages produce a multiplier effect. The initial direct conference expenditure created secondary impacts. The latter were indirect and induced expenditures. In addition to secondary impacts, the SCB conference produced spill-over impacts. The spill-over impacts of the conference were noted (but not quantified).

The expenditure by delegates was determined by means of a delegate expenditure questionnaire conducted during the conference. The expenditure by the conference organizers was determined in consultation with the organizers, using their financial statements. The multiplier impacts were estimated by means of an input-output (IO) analysis, using a Social Accounting Matrix (SAM) of the Eastern Cape as the underlying database.

The three multiplier measures used were: the addition to gross output, Gross Value Added (GVA) and household income.

These multipliers (Type 1 and 2 multipliers) were estimated using open and closed multiplier models. It was deduced that the 2007 SCB conference created a significant and positive net economic impact in the Eastern Cape. The total direct cash injection of the conference was R12.141 million. Using a Type 1 multiplier this direct stimulus is estimated to have caused an extra R16.502 million increase in gross output.

Using a Type 2 multiplier this direct stimulus was estimated to have caused a R19.884 million increase in gross output. The total cash injection of the conference contributed R6.093 million to GVA in terms of a Type 1 multiplier and a R7.344 million increase in GVA in terms of a Type 2 multiplier. Household incomes in the Eastern Cape were increased by R3.384 million.

These results confirm that the hosting of major events and conferences is indeed a tool for promoting regional economic development.

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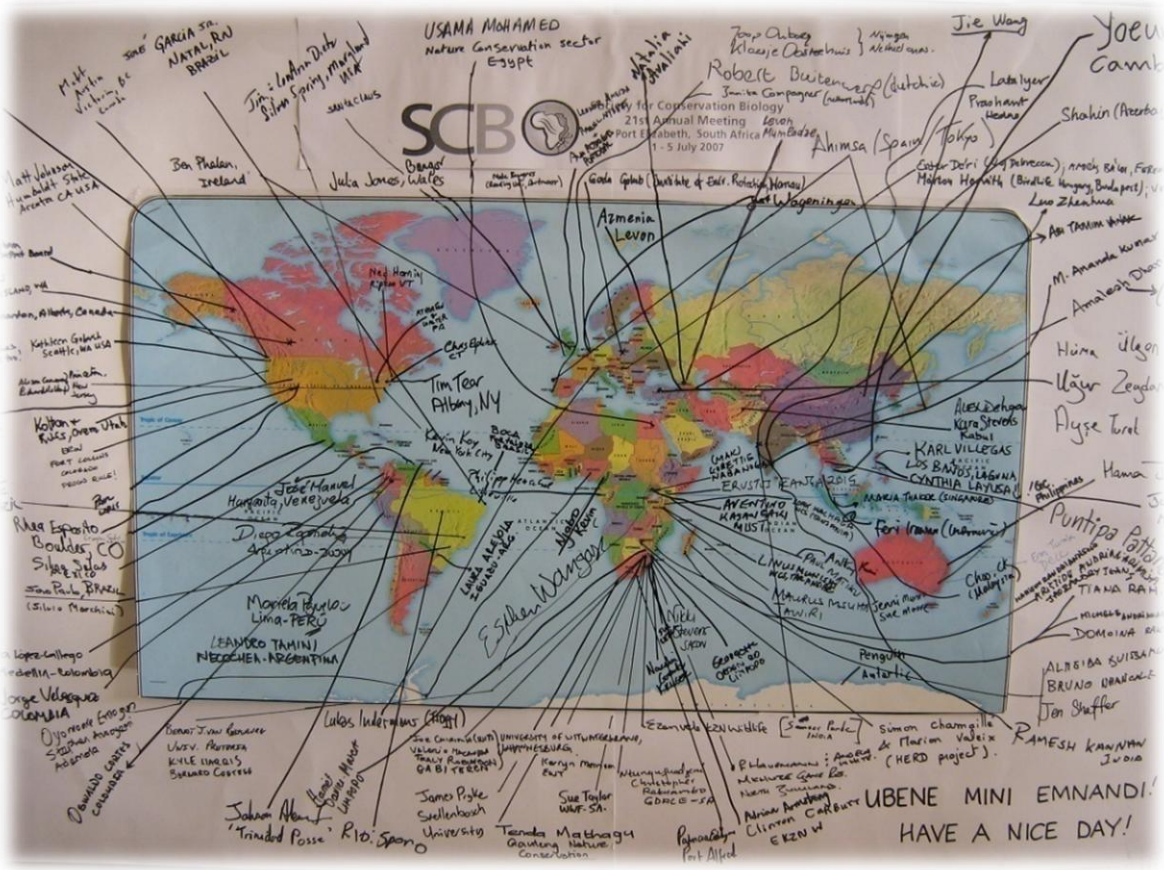


This world map was placed in the foyer of the Oceana residence and delegates indicated 'where in the world' they came from.

1.1. THE BACKGROUND AND RELEVANCE OF THE STUDY

The Society for Conservation Biology (SCB) held its 21st annual conference at Nelson Mandela Metropolitan University (NMMU) in Port Elizabeth during July 2007. The SCB's primary focus is to advance the science and practice of conserving the Earth's biological diversity. The Society has more than 12 000 members worldwide, representing more than a 140 countries (SCB 2007). These members consist of students, educators and conservation professionals.

Internationally, the Society consists of seven regional sections who are each responsible for the conservation needs of their respective continents and oceans. The regional sections are: Africa, Asia, Australasia, Australia and Neotropical America, Europe, Marine, and North America (SCB 2009a). The annual meetings are rotated between these regional sections. These SCB Annual Meetings are a global platform for discussing new research and any new developments in conservation science and practice. The delegates are brought together from every sector in the field of conservation - the biological and social sciences, management, policy, and planning. The meetings feature various symposia, workshops, short courses and field trips. They provide substantial networking opportunities for all the delegates.

The 2007 conference was the Society's first annual meeting held in Africa and was one of the largest international conferences ever held in the Port Elizabeth area. Since the year 2000 attendance at these conferences has nearly doubled (SCB 2007). Over 1 500 conservation professionals and students from throughout the world were brought together by the 2007 SCB annual meeting. The conference was hosted by the Centre for African Conservation Ecology at the NMMU and the SCB Africa section. The conference was organized by a Local Organising Committee (LOC) based in Port Elizabeth, together with the SCB Executive Office (EO) in the United States of America. The LOC's main sources of funding were the delegates' registration fees and sponsorships. One of the main sponsors was the Wilderness Foundation.

The conference aimed to promote regional development and culture. The organizers procured the majority of goods and services from Eastern Cape organisations (Kerley & Collett 2007:4). Delegates were introduced to African culture by the entertainment, meals and activities that were provided by the conference. The LOC were committed to minimise the environmental impact of the conference by using recyclable products as much as possible. They made use of recycled paper, wooden cutlery instead of plastic, produced an abstract CD rather than an abstract book, and provided delegates with a reusable coffee mug rather than disposable paper cups.

The jet fuel burned to transport delegates to the SCB annual meetings represents over 95% of the SCB's contribution to global warming (SCB 2009b). For this reason, the SCB Board of Governors decided to take responsibility for the carbon emissions produced by the delegates travelling to annual meetings. The 2007 conference was the first annual meeting to offset the carbon emissions for which it was responsible. Delegates' registration fees included a levy towards offsetting the impact of carbon emissions. The 'carbon tax' was voluntary in that delegates could select an 'opt-out' option upon registration if they did not wish to pay the levy (Kerley & Collett 2007:5).

The local organizing committee was interested in the economic impacts associated with the conference and approached the NMMU Economics Department to conduct an economic impact assessment of the conference – this dissertation is the result. Martins and Van Aardt (2004) conducted a similar study, an economic impact assessment of the 2002 World Summit on Sustainable Development (WSSD). Their study is the foremost South African example of conference-impact assessment. Interestingly, the conference theme of sustainable development closely relates to that of the SCB conference - conserving the Earth's biological diversity.

An international example of conference-impact assessment is the study of Randall and Warf (1996). Instead of evaluating a single conference in a specific year, they estimated the economic impacts of the annual conferences of the Association of American Geographers (AAG) on the states in which they have been held, from 1983 to 1994.

Both the WSSD and AAG studies used Input-Output analysis to estimate the conference's economic impacts. A preliminary investigation of the literature on the subject reveals that besides the usefulness delegates derive from attending conferences, such conferences also yield a substantial positive net economic impact within the host region.

The injection of new expenditure resulting from the event can be viewed as an injection of demand into the host economy (Rogers 1998:81). In turn, the increase in demand can give rise to increased output, income and employment. The increased demand stems from two sources:

- The demand-side expenditures of the event, viz. the spending by the delegates and accompanying persons.
- The supply-side expenditures of the event, viz. expenditures by the conference organizers and sponsors.

1.2 THE PROBLEM STATEMENT

As can be gathered from the above, conferences have clearly identifiable economic benefits for the regions in which they are held - direct, indirect and induced benefits. Above and beyond these benefits, there are also spill-over benefits. The aim of this research is to estimate the economic impact of the 2007 SCB conference. This aim will be realised by:

- Estimating the direct cash injection provided by delegate and organizer expenditures.
- Allocating the total injection of new expenditure to the relevant industries.
- Deriving and applying the relevant multipliers (Type 1 and Type 2) to the total injection of new expenditure in order to estimate the total economic impact.

1.3 THE OBJECTIVES OF THE STUDY

The objectives of the study are to:

- Review the impact of conferences.
- Conduct an *Ex-Post* conference-impact assessment.
- Make deductions and draw conclusions from the assessment.

1.4 CONSIDERATIONS FOR IMPACT ASSESMENT

The expenditure by the delegates, accompanying persons, conference organizers and sponsors form the main injection of income into a host region (Dwyer, Mellor, Mistilis & Mules 2000a). Only that part of the expenditure which represents an injection of "new money", originating from outside the host region, can be used for the impact calculations (Dwyer et al. 2000a). This new expenditure is referred to as a cash injection[1]. It is important to distinguish between the gross expenditure (GE) encompassing all purchases of final goods and services related to a conference and the injection of new expenditure into the economy (Dwyer 2002:22).

Certain studies have used estimates of the total expenditure related to a conference to denote its economic impact (Braun 1992; Convention Liaison Council 1993). They use gross expenditure (GE), regardless of its origin (Dwyer 2002:22). This practice is wrong since it includes all conference-related expenditure and not just the cash injection of new expenditure (Dwyer 2002:23).

Time-switching can inflate the impact of a conference when delegates/visitors have already planned to visit the area, but then change the timing of their visit to coincide with the conference/event (Burns & Mules 1986). Assuming they do not adjust their visit, their expenditures would have occurred with or without the conference/event (Burns & Mules 1986). These expenditures should not be attributed to the conference/event.

[1] A cash injection of "new" expenditure is sometimes referred to as an in-scope expenditure (Dwyer et al. 2000a).

Delegates and accompanying persons who would not have come to the destination, had the conference not taken place, are referred to as "in-scope visitors" (Dwyer 2002:24). In order to be considered as an in-scope visitor, the conference must be the main reason for visiting the destination. Only new expenditure by the in-scope visitors is relevant in estimating a conference's net (real) economic impacts (Dwyer 2002:24).

The injection of new expenditure has a multiplier effect within the region (Lee 2001). Archer (1976) identifies three components of a multiplier effect:

1. A *direct component* represented by the first round of expenditure.
2. An *indirect component* which increases revenue, employment and income due to the increased demand created by the first round of expenditure.
3. An *induced component* which increases employment, income and revenue still further due to local wages and salaries increasing local consumption.

A cash injection can be viewed as an increase in demand giving rise to a multiplier effect. A multiplier effect can be calculated in terms of output (gross additional economic output), Gross Value Added (GVA)[2], household income and employment (Dwyer 2002:31).

Expenditure does not automatically equate to a net benefit for the host community (Hall 1989:24). Allowance should be made for leakage of expenditure out of the local economy (Rogers 1998:82). As expenditures progress, they have a decreasing marginal impact due to leakages caused by purchases of non-local goods and services (Randall & Wharf 1996:275). The total impact depends on the nature of the local economy and the propensity of consumers and

[2] GVA (at basic prices) is a measure of Gross Domestic Product (GDP) which accounts for the impact of taxes and subsidies (Bannock, Baxter & Davis 2003). This GVA is obtained by subtracting indirect taxes from GDP and then adding subsidies. The GVA at basic prices corresponds to the value of incomes paid to the factors of production – the compensation of employees and the gross operating surpluses of firms. GVA or GDP can be used as multiplier measures, depending on the preferred treatment of taxes and subsidies, on condition that the measure used is clearly identified.

firms to purchase locally produced goods and services (Archer 1976; Mathieson & Wall 1982; Murphy 1985; Van der Borg 1991).

1.5 THE RESEARCH METHODOLGY

This research considers the economic impacts associated with the conference from the viewpoint of the Eastern Cape (see Figure 1.1 below).

Figure 1.1: South Africa by Province

Source: Du Toit (2001)

In economic impact assessment perspective is important (Burns and Mules 1986). As the size of the focus area decreases, the number of delegates that will be considered as "visitors" to the region will increase, and the greater will be the amount of new expenditure (cash injection). Along with a decrease in focus area, the leakage of new expenditure out of the host destination will be greater and the level of the expenditure multiplier will be smaller (Burns & Mules 1986).

An economic-impact assessment can be conducted according to three geographic zones – national, provincial or local (see Table 1.1 below).

Table 1.1: Multiplier Impacts of a Cash Injection per Geographic Zone

	National (Country)	Provincial	Local (city)
Scale of injection	Smallest	Larger	Largest
Rate of leakage in expenditure cycle	Lowest	Higher	Highest

When, considering the impacts of a conference from the viewpoint of South Africa, only expenditure by international delegates may be considered as an injection of income. By contrast, from a provincial viewpoint, expenditure by national delegates from the other provinces are also seen to be income injections. A local (city) perspective considers expenditure by international, national and local[3] delegates as income injections. The deduction is that the multiplier impact may be greater or lesser for more narrowly defined geographic areas. The result depends upon which of the two effects is greater – the scale of injection[4] or the rate of leakage.

1.5.1 *EX-POST* ASSESSMENT

The economic impact of the SCB conference was estimated by means of an *ex-post* assessment, as opposed to an *ex-ante* prediction. There were three alternatives available for estimating the economic impact of the conference. The first option was to estimate only the direct impact of the conference based solely on the direct cash injection of expenditures by the conference delegates and organizers. However, considering only the direct impacts produces an underestimate of impact as it fails to account for the multiplier effects. The second option is to estimate the multiplier impact of the direct cash injection using the multipliers of other studies.

[3] Local delegates are from the 'host' province but not the host city.
[4] Scale of injection refers to the scale/amount of new expenditure injected into the region.

However, the 'borrowing' of multipliers from other studies is often based on unfounded assumptions. For this reason the results of such a multiplier impact assessment may lack reliability. Grant Thornton (2003) 'borrowed' national multipliers to estimate the economic impact of building a conference centre in Port Elizabeth for the Eastern Cape. The assumptions that were used to 'reduce' the national multipliers to a provincial level had no empirical or theoretical justification. The national multipliers were 'reduced' by assuming the provincial multipliers to be a percentage of the national multipliers. For example, the GDP multiplier was merely assumed to be 60% of the national multiplier. The results of these types of analysis are only as valid as their assumptions, and where there is no justification provided for the assumption, the validity is clearly called into question.

The third (and preferred) option is to derive and apply industry-specific multipliers, using input-output analysis, for the industries affected by the specific conference whose impact is being measured. Hosting the SCB conference caused a short-term injection of new expenditure into the local economy. The SCB conference is held in a different country each year. Past studies have shown that economic impacts resulting from income stimuli of this nature can be modelled by means of input-output analysis (Martins & Van Aardt 2004).

When compared to the alternative modelling options available, input-output[6] is an adequate methodology with the principle of parsimony[7] being observed (Burgan & Mules 2000). Considering the demand and supply-side expenditures, input-output analysis was used to determine the multiplier effects created by the new expenditures in terms of output, Gross Value Added (GVA) and household income.

[6] The input-output methodology will be discussed in greater detail in Chapter Four.
[7] The principle that simpler models are to be preferred, *ceteris paribus*.

When applying the input-output methodology, a sequence of steps must be followed. Dwyer (2002:23) identifies the following four steps in estimating the economic impact of a specific conference:

1.) Estimate the cash injection by conference delegates and accompanying persons.
2.) Estimate the cash injection by conference organizers, including sponsorships.
3.) Allocate the total injection of new expenditure to the relevant industries.
4.) Derive and apply the relevant multipliers to the total injection of new expenditure to estimate the total economic impact.

The cash injection by delegates was estimated from the responses elicited through the administration of an expenditure questionnaire[8] to the delegates. Delegates were asked to report their expected expenditure (in Rands) pertaining to themselves and non-delegates/family members accompanying them. The cash injection by the conference organizers was estimated from the expenditure data provided by the conference organizers. The allocation of expenditures and the application of the multipliers were both done with the assistance of input-output analysis. A Social Accounting Matrix (SAM) of the Eastern Cape[9], constructed by Conningarth economists, was used as the basis for the input-output model.

An input-output model represents a nation's (or a region's) economy in matrix form. It enables one to generate predictions of the effect of changes in one industry on others, and by changes on the part of consumers, government and foreign suppliers on the economy (Wikipedia 2007). The input-output (IO) matrix forms the foundation of the input-output model (Martins & Van Aardt 2004). It is a quantified and summarized version of all transactions that have occurred between the major economic stakeholders in a particular year (Martins & Van Aardt 2004). The most important aspect of the matrix is the division of these transactions into the main sectors of the economy.

[8] See Chapter Five for a full description of the survey instrument and the sampling process.
[9] The social accounting matrix (SAM) for the Eastern Cape is representative for the year 2004.

The traditional IO matrix was extended in this study to show expenditure flows between households, government and the rest of the world (Reinert & Roland-Holst 1997:96). When an "extended" database is used the IO matrix becomes a Social Accounting Matrix (SAM) (Reinert & Roland-Holst 1997:96).

A SAM provides greater analytical scope than the traditional IO matrix (Reinert & Roland-Holst 1997:96). The SAM itself is a stepping stone to the construction of "the multiplier model". Matrix algebra is used to derive a "Leontief Inverse" matrix which gives the multipliers for each sector of the economy. Constructing a regional SAM is an expensive and time-consuming exercise. For this reason, compiling an SAM represents a research project in its own right.

The total cash injection was allocated to the relevant sectors in the SAM (as *step three*) and the corresponding multipliers were applied (*as step four*). The total multiplier impact was determined from these calculations. The *ex-post* assessment focused attention on the Eastern Cape and not on the Port Elizabeth area, there being no IO Table/SAM currently available for the latter area.

1.6 THE SPILL-OVER BENEFIT AND COST IMPACTS

Benefits

In addition to secondary (indirect and induced) benefits, the SCB conference produced spill-over benefits. The spill-over benefits of a conference may be: increased future tourism inflows due to the goodwill created, increased local human capital formation due to skills/knowledge transfer through the conference, and the availability of conference organizational and equipment capacity for hosting such events in the future.

Costs

A spill-over cost impact is the environmental cost of the conference in the form of carbon pollution[10].

1.7 THE ORGANIZATION OF THE STUDY

The dissertation is arranged as follows: Chapter Two provides a theoretical overview of the conference industry. Chapter Three defines and describes the multiplier concept used in impact assessment. Chapter Four describes the methodology for conducting an *ex-post* impact assessment of a specific conference. Chapter Five applies this methodology to estimate the economic impact of the 2007 SCB conference. Chapter Six considers the spill-over benefit and cost impacts of the conference. Chapter Seven draws the conclusions.

[10] A video conference would have been a substitute, but such a conference would not have generated the networking potential created by the face-to-face interaction. The merits of substituting a video conference for a 'normal' conference will depend on delegates' trade-off of carbon pollution versus increased networking opportunities. Delegates' opinions on this trade-off were elicited as part of the delegate expenditure questionnaire. They weighted the network benefit more highly than the carbon cost (see Chapter Six).

Chapter 2: An Overview of the South African Conference Industry

2.1 INTRODUCTION

The conference industry is a relatively young, fast growing industry (Rogers 1998:19). The term conference is a generic one used to describe a miscellaneous mix of communication events. The coming together or meeting of people dates back to the early days of civilization (Rogers 2008:3). The international conference industry consists of various types of events (Rogers 2008:2). These events bring people together to exchange ideas and information, through discussions or negotiations, to strengthen business relationships and to promote new ideas among individuals and organizations (Rogers 2008:2).

Various terms are used to describe this type of event, for example, summit, meeting, conference, assembly, convention, congress, AGM, briefing and training (Rogers 2008:2). The main elements and objectives are all similar (Rogers 2008:2). A common element is the bringing together of people for face-to-face interaction (Rogers 2008:2). The idea of conferences being an industry is a fairly new concept. It evolved during the second half of the Twentieth Century (Rogers 2008:2).

Conferences can yield substantial positive net economic impacts for the regions in which they are held. For this reason, conferences can be used as an instrument for regional economic development. In view of the economic development potential conferences possess, this chapter considers the foundations and historic development of the modern-day conference industry. Selected literature on the conference industry is reviewed and the standing of South Africa's conference industry within the global context will be described.

2.2 THE ORIGINS AND DEVELOPMENT OF THE CONFERENCE INDUSTRY

The foundations for the modern industry were laid in the United States and Europe over the past two centuries (Spiller 2002:3). Industrialization triggered the growth of industry and commerce, and created a need for meetings between business people and others (Spiller 2002: 4). In addition to business professionals, there has been an increased need for meetings on political, religious, literary, recreational and many other grounds (Spiller 2002:4). An extensive

range of associations, requiring membership attendance at annual meetings, have all aided in facilitating the above-mentioned meetings (Spiller 2002:4).

Having a long distinguished democratic tradition, American culture promoted the establishment and membership of associations (Voso 1990). Business people in Detroit founded the first convention bureau in 1896 (Spiller 2002:4). Employing a full-time sales person, the objective of the bureau was to actively attract conference business to the area (Gartrell 1994). This practice proved to be highly successful and it spread quickly to other cities (Spiller 2002:4).

The situation in Europe differed from that in the United States during this period (Spiller 2002:4). The Congress of Vienna, held from September 1814 to June 1815, may be regarded as the first truly international conference held in Europe (Rogers 2008:3). The relatively few other political and scientific international conferences that took place during the remainder of the Nineteenth and the first half of the Twentieth centuries were infrequent and insignificant (Rogers 1998:2).

During this period, the management style of business organizations was not conducive to the organization of meetings for the specific reason of exchanging ideas (Rogers 1998:2). The development of the convention industry in Europe was also impeded by the two world wars during the first half of the Twentieth century (Spiller 2002:5).

The establishment of a proper 'conference industry' in Europe was only achieved during the middle to the latter part of the Twentieth century (Rogers 2008:4). The establishment of trade associations was at the forefront of the industry (Rogers 2008:4). These associations pursued objectives that grew the conference industry (Rogers 2008:279). They aspired to improve industry standards and develop a coherent vision for the development of the industry (Rogers 2008:279). A historical record of the establishment of selected major conference industry associations is shown in Table 2.1.

Table 2.1: Establishment of Conference Industry Associations

Conference Industry Association	Year of Establishment
International Association of Exhibitions and Events (IAEE)	1928
Professional Convention Management Association (PCMA)	1957
Association Internationale Des Palais de Congrès (AIPC)	1958
International Congress and Convention Association (ICCA)	1963
European Federation of Conference Towns (EFCT)	1964
International Association of Professional Congress Organizers (IAPCO)	1968
British Association of Conference Destinations (BACD)	1969
Meeting Professionals International (MPI)	1972
Meetings & Events Australia (MEA) (Originally Meetings Industry Association Of Australia-MIAA)	1975
Association of British Professional Conference Organizers (ABPCO)	1981
Southern African Association for the Conference Industry (SAACI)	1987
Meetings Industry Association (MIA) (UK)	1990

Source: Adapted from Rogers (2008:4)

The conference industry from the 1950s

Numerous factors on the demand and supply side have contributed to the growth of the conference industry since the 1950s: increased disposable income, the greater propensity to travel, increased leisure time and improvements in transportation and technology (Spiller 2002:5). The industry's potential economic benefits, together with the greater demand for conferences, resulted in increased infrastructural investment (Spiller 2000:6, Rogers 2008:5). During the 1990s and early 2000s there has been ongoing sustained investment in the conference industry all over the world, including South Africa (Rogers 2008:4-5). There have also been significant improvements in the industry's representation and coordination through international, national and regional associations (Lawson 2000).

2.3 THE DEFINITIONS

The definition of a conference varies between countries. South African Tourism employs the definition proposed by the International Association of Professional Congress Organizers (IAPCO) on their website (South African Tourism 2007). The IAPCO define a conference as a participatory meeting for discussion, fact finding, problem solving and consultation (South African Tourism 2007). As compared with a congress, a conference is normally smaller in scale and more select in character - features which tend to facilitate the exchange of information.

The term 'conference' carries no special connotation as to frequency. Though not inherently limited in time, conferences are usually of limited duration with specific objectives (South African Tourism 2007). The conference industry forms part of business tourism (Rogers 1998:19). In turn, business tourism is part of the overall tourism industry, encompassing both leisure and business tourism.

2.4 THE BENEFITS OF CONFERENCES

Both leisure tourism and business tourism depend on the same or similar infrastructures, viz. accommodation, transport, communication and entertainment (Rogers 2008:27). Business tourism and conference tourism have additional infrastructural needs; viz. appropriate venues, specialist contractors, and most importantly, well-trained staff capable of serving the needs of conference organizers and delegates (Rogers 2008:27). Even though, these two sub-sectors rely mostly on similar infrastructures, business tourism has a number of additional benefits over leisure tourism, increasing its attractiveness to host destinations (Rogers 2008:27). These benefits support the use of conferences as an instrument for regional economic development. The benefits are: greater profitability, all-year-round activity, future inward investment, professional development, green tourism and an improved quality of life.

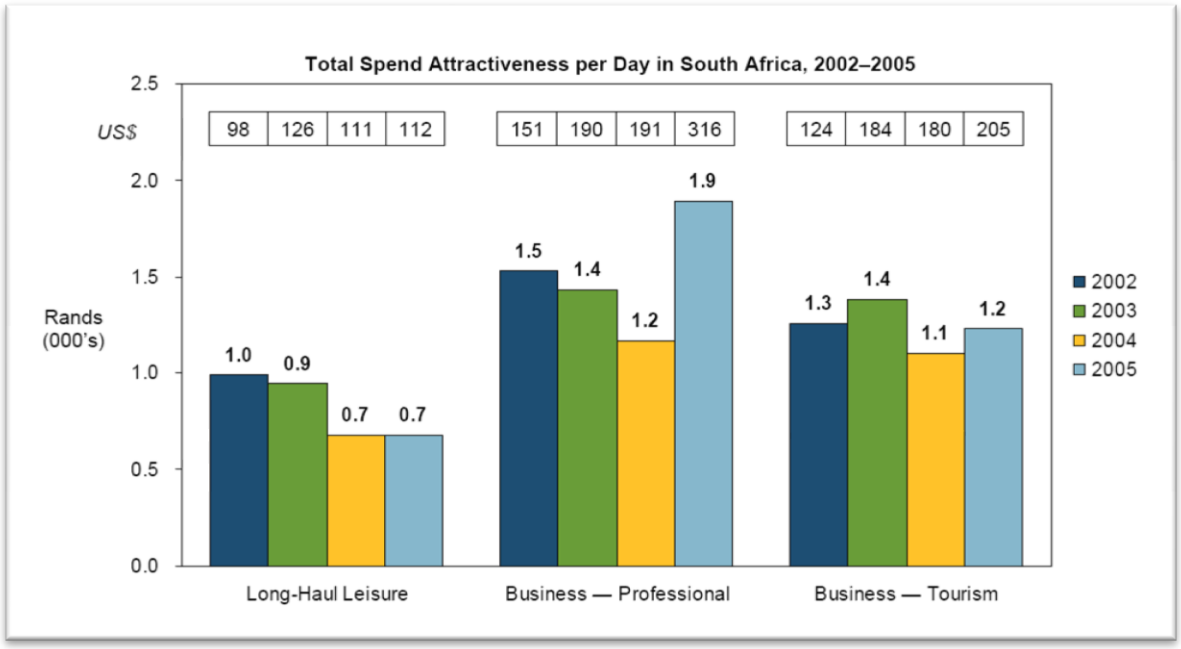
Greater profitability

Conference and business tourism both focus on the high quality, high cost and thus, the high end of the tourism market (Lee & Josiam 2004, Rogers 2008:27). Business tourists normally

have greater spending power and this can translate into increased economic benefits for host destinations, as well as a greater return on infrastructure investment and marketing (Lee & Josiam 2004, Rogers 2008:27, Spiller 2002:6). This greater spending power can be seen in Figure 2.1 below, where expenditure of leisure tourism is compared to business tourism expenditure in South Africa for the period 2002 to 2005.

Long-haul leisure is defined according to the distance travelled. If flights are of more than five hours, or countries do not have a direct connection to South Africa, then the visit is defined as being a long-haul one (South African Tourism 2007). In Figure 2.1, 'business-professional' refers to business travel, whereas 'business-tourism' refers to the conference industry.

Figure 2.1: Tourism Spend per day in South Africa, 2002-2005[11]



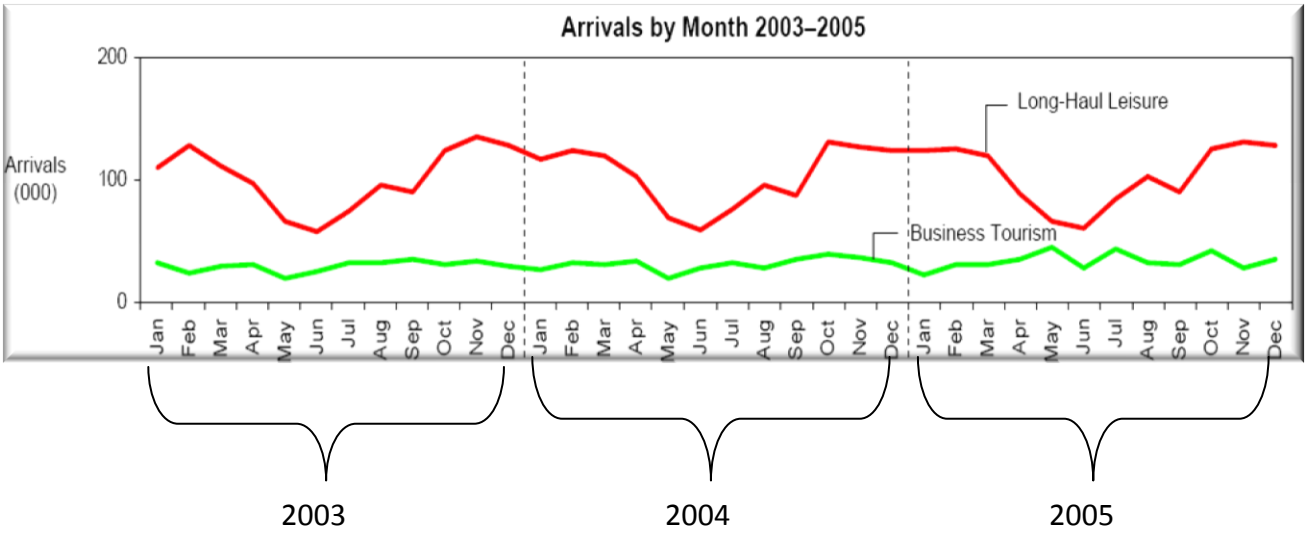
Source: South African Tourism (2007)

[11] These figures are based on South African Tourism departure surveys for the period 2003 to 2005. Total Spend Attractiveness to South Africa is determined from respondents reported spend in SA, less capital expenditure and 'other' expenditure. Exchange rates are calculated as the average spots on 1st January and 31st December.

All-year-round activity

Conferences do to not have the same seasonal element of leisure tourism (Lee & Josiam 2004). For this reason conferences and business tourism can lead to the creation of sustainable permanent jobs, as opposed to the seasonal and temporary jobs associated with leisure tourism (Rogers 2008:28). Due to the specific requirements of businesses and associations, conferences are also scheduled during the less-appealing seasons. A comparison of arrivals of leisure and business tourists to South Africa is shown in Figure 2.2 below. It is clear that business tourism arrivals are less affected by seasonality and tend to be more stable than arrivals of leisure tourists.

Figure 2.2: Comparison of Arrivals by Leisure and Business tourists in South Africa, 2003-2005[12]



Source: South African Tourism (2007)

[12] These figures are based on South African Tourism departure surveys for the period 2003 to 2005.

Future inward investment

Conference organizers can ensure a successful event by providing delegates with the opportunity for an enjoyable, constructive experience in the host destination (Rogers 2008:28). Delegates who enjoy their visit may return to the host destination for subsequent visits (Rogers 2008:28). These visits could be for leisure or to invest in the host destination, say by re-locating their businesses to the destination or starting a subsidiary operation (Rogers 2008:28). A successful conference, hosting influential business people, can often achieve far more in terms of good exposure for the host destination than other promotional activities by development agencies (Rogers 2008:28).

Professional development

Large meetings, like conferences, bring together specialists in a specific field enabling information sharing (Maple 2006). This, in turn, provides the scope for the advancement of local knowledge and skills. These possibilities are open to numerous professions and business sectors (Maple 2006). In this way conferences provide a platform for enhancing professional skills in a community (Maple 2006).

'Green' tourism

From an environmental viewpoint business and conference tourism both tend to have fewer negative environmental impacts than high volume leisure tourism (Rogers 2008:29). They involve fewer people, who spend much more per person (Rogers 2008:29). Delegates are mostly transported in groups within the destination, e.g. by bus (Rogers 2008:29). Group transportation minimizes emission pollution and traffic congestion (Rogers 2008:29). The group format of conferences enables effective communication to these "tourists" in regard to the host destination and its people, while at the same time reducing the disruption of local residents (Rogers 2008:29). This is more difficult to achieve with individual leisure tourists (Rogers 2008:28).

Improved quality of life

Conference centres may be used as a development tool, bringing in money from outside the host destination (Maple 2006). Attractive environments and cultural attributes are factors communities want to have, and the conference business thrives in these types of surroundings (Maple 2006).

2.5 FACTORS AFFECTING THE DEMAND FOR CONFERENCES

The demand for conferences will influence the effectiveness of conferences as an instrument for regional economic development. For this reason, factors influencing the demand for conferences will influence the effectiveness of conference-based economic development programmes. The four main factors affecting the demand for conferences are: economic cycles, emergency or crises situations, technology, and social and work related factors (Rogers 2008:83).

Economic cycles

National, as well international economies, are both affected by economic cycles of expansion and recession (Spiller 2002: 7). In times of recession, conferences may be cancelled or subject to lower budgets (Rogers 2008:83). Major international conferences usually have a big lead time, being planned two to four years in advance (Spiller 2002: 7). For this reason, the actual impact of an economic slowdown may not be observed for a couple of years (Spiller 2002: 7). A devaluation of the currency relative to other countries may attract more international conferences (Rogers 2008:83). Costs will be higher for domestic delegates travelling abroad as a result of the weaker currency (Rogers 2008:83).

Emergency or crisis situations

Acts of terrorism can have major impacts on global travel and conference business. A prime example is that of the September 11 attacks in the USA (Weber & Chon 2002:213). This event caused people to be fearful of travel and as a result numerous conferences were cancelled or

postponed. Crisis events, for example wars, epidemics and natural disasters can also reduce the demand for conferences in countries and regions in which they occur (Rogers 2008:84).

Crises, war and disaster situations can also create a demand for meetings and conferences, where the latter are designed to address the associated problems of such a crisis, war or disaster (Rogers 2008:84).

Technology

Improvements in communication technology may also affect the demand for conferences. The internet provides opportunities for web-conferencing, whereby a delegate can "attend" a conference by means of a webcam and computer (Rogers 2008:85). This technology will expand conference attendance by making conferences more affordable and accessible to a "global audience". More venues are investing in these types of technologies to gain access to the "virtual delegate" market (Rogers 2008:85).

Conference delegates are also demanding more technology services, for example, wireless connectivity at conference venues (Rogers 2008:85).

Social and work-related factors

Structural changes within a country can also affect the demand for conferences (Rogers 2008:85). For example, a reduction in trade union memberships may lead to the mergers between trade unions, which in turn, may reduce the number of trade union conferences, but increase the number of delegates at a given conference. Fluctuations in the demand for corporate sector conferences are greater than those in the association sector, due to the lead times of association conferences (Rogers 2008:85).

The shorter lead times of corporate conferences allow for a rapid response to changing economic conditions, whereas association conferences with longer lead times and larger delegate numbers do not allow for such a rapid or short-term type response (Rogers 2008:85).

2.6 THE SOUTH AFRICAN CONFERNCE INDUSTRY

Business tourism in South Africa is still in its infancy, but it is estimated to generate approximately 250 000 jobs in the South African economy. South Africa currently holds approximately one percent of the market share of the global business tourism industry (South African Tourism 2008). In terms of the African market, South Africa holds twenty-three percent of the market share (South African Tourism 2008). Cape Town is the most popular city conference destination in Africa, hosting approximately ten percent of all meetings in Africa (South African Tourism 2008).

The Southern African Association for the Conference Industry (SAACI) is the main industry association in Southern Africa. SAACI's main objectives are to ensure that the conference and events industry in Southern Africa maintains and improves its standards of efficiency and professionalism (SAACI 2008). The predecessor of South African Tourism, SATOUR, identified the need for such an organization (SAACI 2008). This resulted in the coming together of people involved in the South African conference industry to create a national organization representing the industry (SAACI 2008).

The SAACI was formally established in 1987 (SAACI 2008). The SAACI has a membership of over eight hundred members. The members include event organizers and service providers (SAACI 2008).

The International Congress and Convention Association (ICCA) and the Union of International Associations (UIA) are the two main sources of information on the industry. There is a difference in the criteria used for meetings to be included in their respective statistics. South Africa is currently ranked thirty-first in terms of global meeting destinations by the ICCA (South

African Tourism 2008). The focus of these statistics is on international association meetings. National meetings, corporate meetings and intergovernmental organisation meetings are not included in the ICCA statistics (South African Tourism 2007).

Data are gathered from associations within the ICCA database and from specific ICCA research projects (South African Tourism 2007). According to Tourism South Africa (2007), the ICCA records data on meetings which meet the following requirements:

- A minimum of fifty participants.
- Meetings must rotate between at least three different countries.
- Meetings need to be organised on a regular basis.

Based on the number of meetings hosted per year, South Africa is currently ranked in position twenty-eight by the UIA (South African Tourism 2008). The UIA records data on meetings which meet the following requirements:

- Minimum of three hundred participants.
- Minimum of 40% foreign participants.
- Minimum of 5 nationalities.
- At least 3 days duration.

Table 2.2 provides a comparison of association meetings by subject matter for South Africa and its main competitors. Conference-based economic development programmes will require knowledge of the competition in the global market. Knowledge of the competitor countries will facilitate strategies to gain a greater market share/attract more conferences. The share of each category (subject matter) is shown as a percentage of the total meetings for each country. The share of each category, across all countries in the world, is shown in the 'world' column. South Africa compares well in most of the meeting categories, particularly in technology, sport and law (South African Tourism 2007).

Table 2.2: Meetings by subject matter for South Africa and its main competitors, 1996-2005

Subject	Australia	Brazil	South Korea	South Africa	World (All countries)
Medical Sciences	14.6%	23.6%	21.6%	20.1%	23.9%
Science	12.8%	12.1%	15.1%	12.9%	12.3%
Technology	5.5%	10.5%	8.0%	15.9%	11.1%
Industry	9.3%	5.9%	8.3%	7.0%	7.9%
Education	5.8%	5.5%	4.7%	3.7%	4.8%
Social Sciences	4.5%	3.5%	6.1%	3.0%	4.6%
Commerce	6.3%	4.5%	3.3%	4.4%	4.1%
Economics	4.0%	3.4%	5.0%	4.3%	4.1%
Agriculture	6.8%	4.9%	4.3%	2.0%	3.4%
Management	4.3%	3.9%	4.2%	2.8%	3.3%
Transport & Communication	4.3%	3.3%	3.6%	3.9%	2.8%
Culture & Ideas	5%	2.5%	1.7%	3.3%	2.4%
Arts	0.5%	2.2%	0.9%	1.7%	2.1%
Sport & Leisure	1.8%	2.9%	1.7%	3.0%	2.0%
Law	3.8%	2.1%	2.6%	3.0%	2.0%
Other	10.6%	9.1%	9.0%	9.1%	9.1%
Total Meetings	100%	100%	100%	100%	100%

Source: Adapted from South African Tourism (2007).
Note: ▭ High proportion of meetings relative to competitors.

2.7 CONCLUSION

The foundations for the conference industry were laid in the United States and Europe during the past two centuries, but only from the middle to the latter part of the Twentieth century has the industry taken off. The establishment of trade associations has been an important catalyst for the development of the industry (Rogers 2008:4). Conferences can yield substantial positive net economic impacts for the regions in which they are held.

Although conferences/business tourism and leisure tourism rely on similar infrastructures, conference tourism holds a number of additional advantages above leisure tourism: greater profitability, all-year-round activity, potential spur for inward investment, professional development, green tourism and improved quality of life (Rogers 2008:27-30). These benefits support the use of conferences as an instrument for regional economic development. The factors influencing the demand for conferences will influence the effectiveness of conference-based economic development programmes.

The main factors affecting the demand for conferences are: economic cycles, emergency or crisis situations, technology, and social and work related factors (Rogers 2008:83).

Southern Africa's main industry association, SAACI, was established in 1987. South Africa currently holds approximately one percent of the market share of the global business tourism industry (South African Tourism 2008). The International Congress and Convention Association (ICCA) and the Union of International Associations (UIA) are the two main sources of data on the industry. Knowledge of South Africa's competitor countries will facilitate effective strategies to gain a greater market share/attract more conferences. South Africa compares well in most of the association meeting categories, particularly in technology, sport and law (South African Tourism 2007).

Chapter 3: The Expenditure Multiplier

3.1 INTRODUCTION

Conferences have a financial impact in host regions. This impact stems from the cash injection into the host region of delegates' and organizers' expenditures. Potential host regions have an incentive to attract such events. Both public and private sector stakeholders need accurate information in terms of conferences' economic impacts to enable effective decision-making for resource allocation towards the funding of conferences (Dwyer 2002:21). Without proper data, host regions risk either under-allocating or over-allocating subsidies towards conferences (Dwyer 2002:22).

Before proceeding to a discussion of estimating conference multiplier impacts, the concept and origins of economic multipliers must be clarified. This chapter will consider the anatomy of multipliers used in economic impact analysis.

3.2 THE CONCEPT OF A MULTIPLIER

Kahn (1931) was the first to develop a detailed model of the multiplier. However, J.M. Keynes provided the critical link between Kahn's work and the present day advanced models (Archer 1982). For this reason, the modern concept of a multiplier is usually associated with J.M. Keynes (O'Connor & Henry 1975:41). Based on Keynesian theory, a multiplier measures the relationship between an increase in autonomous expenditure and the resultant change in income (Dornbusch, Fischer & Startz 2004:222).

Simplified, with an expenditure injection denoted by ΔE, the resultant change in income can be expressed as $K\Delta E$, where K is a coefficient representing the multiplier (Archer 1977:1). A multiplier shows the total increase in income that an initial increase in autonomous expenditure will stimulate (Nattrass, Wakeford & Muradzikwa 1997:42). Examples of such autonomous injections are increases in government expenditure and increases in exports.

An increase in conference/tourism expenditure may be thought of as a type of export income (Archer 1977:1). These types of expenditure injections provide a stimulus for the affected economy and, with sufficient resources being available, will create additional business turnover, household income and employment (Archer 1977:1).

3.3 DEFINING THE CONFERENCE MULTIPLIER

The study of multipliers is defined as impact analysis. The relationship between an initial amount of expenditure and the total effects of this expenditure for an economy are referred to as the multiplier effect/impact (O'Connor & Henry 1975:41). A multiplier can be defined as the ratio of the direct, indirect and induced impacts to the initial direct change itself (Archer 1976). Consider, for example, that the initial direct change is an increase in expenditure by conference delegates visiting a region.

This expenditure is referred to as the direct or primary expenditure (Archer 1976). For example, a R1000 cash injection of delegate expenditure forms a R1000 of direct revenue within the host region. However, not all of this expenditure will accrue to the resident population as income (Archer 1982). The hotels and businesses affected by the direct expenditure may have to pay some of their profits to people and organizations outside the host region (Archer 1982).

Furthermore, they will need to restock their inventories to provide for future sales (Archer 1982). A proportion of the new expenditure is spent on goods and services originating from outside the host region. New expenditure spent on imported goods will 'leak' income out of the host region's economy, reducing the multiplier effect (Dwyer 2002:33). For this reason, as businesses re-spend the money received from delegates, a portion of this direct revenue 'leaks' out of the host region (Archer 1976; Archer 1982).

However, not all of the direct expenditure is lost through leakage (Archer 1977:1). The direct revenue will also be used to pay wages and salaries to local workers and to replenish inventories by buying from local wholesalers and manufacturers (Archer 1977:1). For this

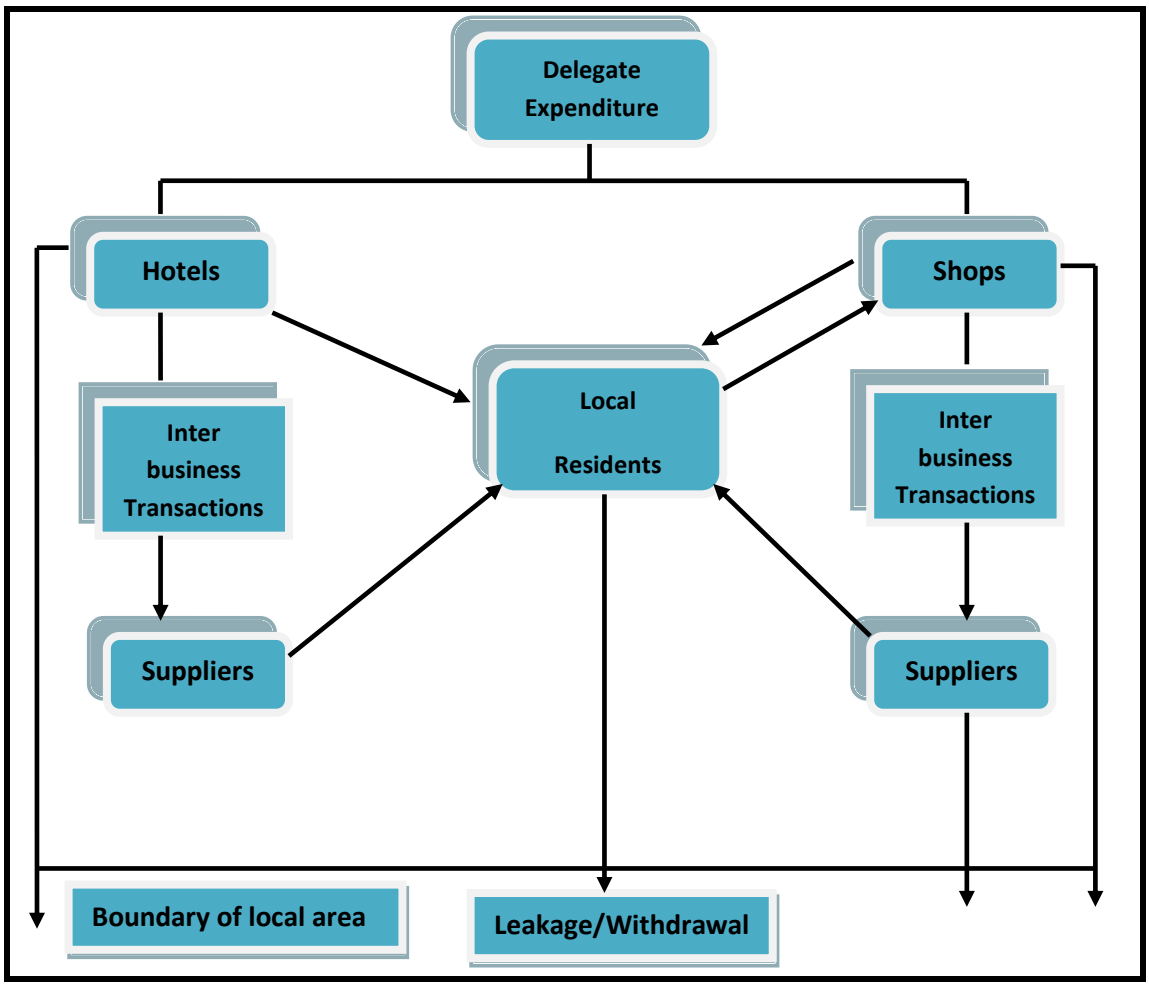
reason, the wholesalers and manufacturers will experience higher turnovers as a result of the initial direct expenditure.

The increased demand will require that extra employees be hired or higher wages be paid to the existing labour force to meet the higher output requirements (Archer 1982). The local suppliers are secondary recipients of the delegate expenditure and by re-spending this money they start a subsequent chain of expenditure (Archer 1982). These expenditures are the indirect effect which increases revenue, employment and income due to the increased demand created by the first round of expenditure (Archer 1977:2).

The extent of the indirect effect depends on the nature of the local economy and the propensity of consumers and firms to purchase locally produced goods and services (Archer 1977:2; Mathieson & Wall 1982; Murphy1985; Van der Borg 1991). The amount of leakage is typically higher for regions than for the nation because individual provinces or regions are less self-sufficient and need to import more goods and services (Dwyer 2002:33).

Rising salaries and wages within the host economy will create a rise in consumption expenditure. In turn, the higher consumption expenditure will increase revenue, employment and income even further. The latter is referred to as the induced impact (Archer 1977:2). A graphical representation of the multiplier process is shown in Figure 3.1 below.

Figure 3.1: The Multiplier Process



Source: Rogers (1998:83).

The cash injection that is multiplied by the multiplier is called the multiplicand (Archer 1982). A multiplier can be used to 'scale up' the initial direct expenditure (multiplicand) to a level that accounts for the flow-on effects generated (Roberts & McLeod 1989).

3.4 THE EVOLUTION OF MULTIPLIERS

Building on Kahn's (1931) work, Keynes developed the basic multiplier model which forms the basis of current day models (Archer 1982). The Keynesian multiplier model can be used to illustrate the multiplier's multiple rounds of expenditure. Consider a R1 increase in autonomous expenditure, creating an increase in output and income of R1. This initial increase in output and income will then generate further induced consumption (Dornbusch et al

2004:222). A fraction *c* of the initial R1 increase in income will be spent, referred to as the marginal propensity to consume (Dornbusch et al 2004:222). Production will increase to meet the induced expenditure, and consequently output and income increase by 1 + *c* (Dornbusch et al 2004:222).

Furthermore, the expansion of production and income by 1 + *c* will induce further spending. The process of multiple rounds of expenditure is shown in Table 3.1 below.

Table 3.1: The multiplier's multiple rounds of expenditure

Round	Increase in Demand per round	Increase in Production per round	Total accumulative increase in income (All rounds)
1	$\Delta\bar{A}$	$\Delta\bar{A}$	$\Delta\bar{A}$
2	$c\Delta\bar{A}$	$c\Delta\bar{A}$	$(1+c)\Delta\bar{A}$
3	$c^2\Delta\bar{A}$	$c^2\Delta\bar{A}$	$(1+c+c^2)\Delta\bar{A}$
4	$c^3\Delta\bar{A}$	$c^3\Delta\bar{A}$	$(1+c+c^2+c^3)\Delta\bar{A}$
...	...	...	...
...	...	...	...
...	...	...	$\frac{1}{1-c}\Delta\bar{A}$

Source: Dornbusch et al. (2004:223)

The first round of expenditure is the initial increase in autonomous expenditure, $\Delta\bar{A}$. In order to meet this increased demand, production will increase by $\Delta\bar{A}$ (Dornbusch et al. 2004:222). The increased production leads to an equal increase in income. Based on the marginal propensity to consume, *c*, the increase in income creates a second round of expenditure given by $c\Delta\bar{A}$ (Dornbusch et al. 2004:222).

The second round of expenditure requires a further expansion of production to meet the increased demand, the required increase in production is given by $c\Delta\bar{A}$ (Dornbusch et al. 2004:222). This produces a third round of expenditure based on the marginal propensity to consume times the increase in income, given as $c(c\Delta\bar{A}) = c^2\Delta\bar{A}$ (Dornbusch et al. 2004:222). The marginal propensity to consume, c, is less than 1 (Dornbusch et al. 2004:222). For this reason, the term c^2 is less than *c* and the induced expenditures of the third round are smaller than those of the second round (Dornbusch et al. 2004:222).

The total increase in income (ΔY) can be shown by writing out the successive rounds of spending, starting with an initial increase in autonomous expenditure ($\Delta\overline{A}$):

$$\Delta Y = \Delta\bar{A} + c\Delta\bar{A} + c^2\Delta\bar{A} + c^3\Delta\bar{A} + \cdots$$

$$= \Delta\bar{A}(1 + c + c^2 + c^3 + \cdots) \qquad : 0 < c < 1 \qquad (3.1)$$

Where $c < 1$, the consecutive terms in the series become increasingly smaller (Dornbusch et al. 2004:222). It is a geometric series[13], simplifying to:

$$\Delta Y = \frac{1}{1-c}\Delta\bar{A} \qquad (3.2)$$

[13] A geometric series can be shown as a sum of numbers in the form: $1 + x + x^2 + \ldots + x^n$, where x is a number greater or smaller than one, and x^n denotes x to the power n (Blanchard 2003). As n increases the sum can either reach a finite limit or explode (Blanchard 2003). The sum can be calculated as: $1 + x + x^2 + \ldots + x^n = \frac{1-x^{n+1}}{1-x}$ ***(A3)***. **Proof 1**: multiplying the sum by $(1 - x)$ gives: $1 + x + x^2 + \ldots + x^n(1 - x) = 1 - x^{n+1}$. If $x < 1$, the sum reaches a limit at $\frac{1}{1-x}$ as $n \to \infty$. If $x > 1$, the sum will explode as $n \to \infty$. **Proof 2**: If $x < 1$, x^n goes to zero as n gets large, from equation **A3** the sum goes to $\frac{1}{1-x}$. If $x > 1$, x^n becomes larger as n increases, $1 - x^n$ becomes a larger and larger negative number, and the ratio $\frac{1-x^n}{1-x}$ becomes a larger and larger positive number. For this reason, the sum will explode as n gets large (Blanchard 2003).

Equation 3.2 shows the total multiplier impact on income created by an initial increase in autonomous expenditure (Dornbusch et al. 2004:222). The Keynesian multiplier (K) is:

$$K = \frac{1}{1-c} \qquad (3.3)$$

The Keynesian model shows that the multiplier is calculated by dividing a unit of new expenditure by the proportion of it which 'leaks' out of the economic system (Archer 1982). The Keynesian multiplier model only provides an aggregated description of the possible economic impacts being estimated (Roberts & McLeod 1989).

Multiplier analysis evolved further from the 1960s with the introduction of input-output analysis, particularly with the work of Leontief[14] in the USA (Archer 1982). Input-output analysis forms the basis for most current day applications of multiplier analysis. It has been further extended with the introduction of Social Accounting Matrices. Input-output analysis can be used to derive multipliers for each industry represented in a specific input-output/SAM table (Roberts & McLeod 1989).

An industry-specific multiplier captures all the induced inputs required from other sectors to meet the change in output required by the sector directly affected by a cash injection (Roberts & McLeod 1989). The concept of leakage (1-*c*) provided by the Keynesian multiplier is the basis for input-output multipliers[15]. IO multipliers provide a significant extension to the basic Keynesian model, incorporating the inter-industry linkages in the economy (Roberts & McLeod 1989).

[14] Leontief, W. 1966 Input-Output Economics. New York: Oxford University Press.
[15] See Chapter Four, specifically Table 4.7 and Table 4.8.

3.5 INPUT-OUTPUT MULTIPLIERS

IO multipliers may be estimated from an input-output table. The cash injection (multiplicand) directly affecting a specific industry can be applied to the IO multiplier for that industry. IO multipliers can be used to determine the total effect on output (gross additional economic output), Gross Value Added (GVA), household income and employment (Dwyer 2002:31). These multiplier measures are intrinsically linked, relating an initial direct stimulus to the final "multiplied' impact generated (Archer 1982).

The various types of multipliers are shown in Table 3.2 below:

Table 3.2: The Different Types of Multipliers

Type of Multiplier	Description
Output Multiplier	The effect of an exogenous change in final demand on the output of industries in the economy.
GVA Multiplier (Value Added)	The value added at factor cost due to change in output.
Income Multiplier (households)	The income earned by households because of new outputs.
Employment Multiplier	The employment generated as a result of increased output.

Source: Adapted from Dwyer (2002:31)

Output multipliers have the problem of 'double counting' economic impacts (Dwyer 2002:31). Output multipliers account for changes in the outputs of final and intermediate goods. However, intermediate goods are used as inputs in final goods. This causes the change in output of intermediate goods to be counted twice. Consider, for example, the baking of bread using flour. Bread is the final good and flour the intermediate good. The output multiplier will count the increase in the production of flour, supplied to the baker, and the increase in bread

production. In this example, the flour would have been counted twice, once as the output of flour (intermediate good) and again as part of the bread that has been baked. An output multiplier should be supplemented or replaced by the use of GVA and income multipliers[16].

The GVA multiplier[17] measures the contribution of the direct expenditure to GVA. GVA multipliers avoid double counting by considering only the value added at each stage of production. Consider again the example of baking bread, the GVA multiplier will measure the value of the intermediate good (flour) and the value added to this intermediate good in baking/selling the bread. For this reason, the flour was only counted once, and not again, as part of the bread. Value added in production (GVA) is measured by factor incomes in terms of the compensation of employees and the operating surpluses of firms.

The household income multiplier[18] measures the impact of direct expenditure on household incomes. This multiplier excludes the operating surpluses of firms and considers only the impact on overall household income, which is a broader concept than the compensation of employees, measured in the GVA multiplier (United Nations 1999). Household incomes involve a process of distribution and redistribution (United Nations 1999). In addition to the compensation of employees, the household sector will receive dividends, interest earnings and transfers from other sectors, i.e. government grants. The household sector will also pay income tax, interest on loans, fines and other types of transfers. The net of the income receipts represents the disposable income measured by the income multiplier (United Nations 1999).

GVA multipliers consider the addition to 'total' income in the economy by incorporating both households and firms. Household income multipliers incorporate only the incomes earned by households.

[16] Income multipliers can be considered to consist of GVA multipliers and household income multipliers. This analysis uses the term "income multiplier" to refer specifically to household income multipliers. GVA multipliers are simply referred to as such (GVA).
[17] See Chapter Four, equation 4.18.
[18] See endogenisation of the household sector in Chapter Four.

Employment multipliers give an indication of the total increase in employment in the affected sectors due to the increased direct expenditure (Roberts & McLeod 1989). Employment multipliers should be used and interpreted with caution because current employees are often asked to work overtime or temporary staff are hired rather than employing new full-time staff during the times of increased output (Dwyer 2002:31, Burgan & Mules 1992).

A constant proportional relationship between sales and employment is typically assumed in deriving employment multipliers (Dwyer 2002:32). In reality, the marginal propensity to employ labour in the face of increased sales varies between firms and industries (Dwyer 2002:32). The increased sales revenue will not simply translate into new jobs. Those currently employed may choose to work harder, e.g. by working overtime. For this reason employment multipliers are likely to overestimate the true employment impacts. Conversely, employment multipliers may underestimate the true employment impacts, where the marginal propensity to employ labour is higher than is assumed in the model.

Multipliers (Table 3.2) may be thought of as ranging between Type 1 or 2 multipliers (see Table 3.3).

Table 3.3: The Range of Multipliers

Type 1 multiplier = (direct + indirect effect)/direct effect
Type 2 multiplier = (direct + indirect + induced effect)/direct effect

Source: Roberts & McLeod (1989)

A Type 1 multiplier considers both the direct and indirect effects, while a Type 2 multiplier includes the induced component as well as direct and indirect effects (Roberts & McLeod 1989). A cash injection of new expenditure (direct effect) causes an increase in output by retailers. In turn, retailers spend more on production input from supplying industries, creating the indirect or production-induced effects.

The increased output (direct + indirect effects) causes an increase in income earned by the factors of production (capital and labour) which is distributed to households who then spend it again on goods and services. This expenditure causes the induced or consumption-induced effects (Van Seventer 2008). The difference between a Type 1 and Type 2 multiplier is that the former excludes the "household income and expenditure loop", whilst it is included in the latter (Van Seventer 2008).

Type 2 multipliers reflect the upper bound of the multiplier by including the induced impact component (Dwyer 2002:32). Type 1 multipliers reflect the lower bound of economic impacts by excluding the potential induced-impact component (Dwyer 2002:32). For this reason, the size of multipliers will differ. The true economic impact will probably be between these two 'boundaries' as the induced effect may not necessarily materialize (Van Seventer 2008). The extent of the induced effect will depend on who receives the additional income. Workers may not receive additional income from additional work. The increases in labour productivity may be seized by firms who may keep the extra receipts to save or to settle debt (Van Seventer 2008). For this reason the induced component could be much less than modelled by the Type 2 multipliers (Van Seventer 2008). As a sensitivity analysis, both Type 1 and 2 multipliers should be calculated.

Different input-output tables for different regions will also yield different multiplier values. As a result, the addition to output, GVA and household income in a particular region will vary according to the pattern of new expenditure by delegates and the distribution of these expenditures between industries (Dwyer 2002:32).

3.6 CONCLUSION

Increases in conference/tourism expenditure are one form of an autonomous injection, creating a multiplier effect in the economy. Such a direct expenditure injection will produce 'flow-on' effects, namely the indirect and induced impacts. A multiplier measures the relation between the total impacts to the initial direct impact. The scale of these impacts is influenced

by the extent of the inter-industry linkages in a specific economy and the extent of leakage associated with conference expenditures.

The individual work of Kahn and Keynes formed the basis for multiplier analysis. Leontief expanded upon these models by providing an industry-specific approach to multiplier analysis, by means of input-output tables.

There are four types of multiplier measures: output, GVA, household income and employment multipliers. Multipliers can either be a Type 1 or a Type 2 multiplier, depending on whether or not the household sector is included. As a sensitivity analysis, both types 1 and 2 multipliers should be calculated.

Chapter 4: The Methodology for Impact Assessment

4.1 INTRODUCTION

Input-output analysis can be used to model the economic impact of a specific conference. Dwyer (2002:23) identifies four steps in employing the input-output methodology. Firstly, the cash injection by conference delegates and their accompanying persons must be estimated, i.e. the demand-side expenditures of a conference. Secondly, an estimate must be made of the cash injection by the conference organizers and sponsors, i.e. the supply-side expenditures of a conference. Thirdly, an allocation must be made of the total cash injection to the relevant industries in the IO model.

Finally, industry-specific multipliers must be applied to the cash injection of new expenditures to derive an estimate of a conference's economic impact. Each step in this framework necessitates that certain assumptions and judgments be made (Dwyer 2002:24). This chapter describes the methodology for estimating the economic impact of a conference by means of an *ex-post* assessment.

4.2 DEMAND-SIDE EXPENDITURE

The discussion of demand-side expenditure is divided into several core determinants: the number of delegates and accompanying persons, types of delegates and types of conferences, duration of stay, costs at the host destination, and finally, additional considerations (Dwyer 2002:24).

The number of delegates and accompanying persons

There is a clear relationship between the number of visitors and their total injected expenditure. For a specific average daily expenditure, the greater the number of visitors, the greater the cash injection will be (Dwyer 2002:24). The number of accompanying persons, accompanying delegates to a conference can be sizeable. For example, in Singapore, delegates to association meetings have been found to have an "average" of 1.67 accompanying persons (Singapore Tourism Board 2000).

These persons add to the value of total conference related expenditure. Accompanying persons have been estimated to add approximately 15 to 20 percent to conference-related expenditure in Australia (Dwyer, Mellor, Mistilis & Mules 2000b).

Types of delegates and types of conferences

It has been found that conference delegates spend more per day than the "average" tourist (Dwyer 2002:25). However, many studies have overstated average daily expenditure of conference delegates by dividing average total delegate expenditure for the whole visit to the destination by the number of conference days only (Dwyer 2002:25). The proper method is to divide the average total delegate expenditure by all the days spent at the destination (Dwyer 2002:25).

Certain studies also find that different types of conferences produce different levels of average daily expenditure (Dwyer 2002:25). In a study undertaken by System Three (1998), four types of conferences were identified: corporate, association, academic and other. There also seems to be a relation between delegate expenditure patterns and delegate origin, i.e. international or national delegates (Dwyer 2002:25). Further research is needed to develop a suitable system of categorizing conferences, and aid in the forecasting of conference expenditure (Dwyer 2002:25).

Duration of stay

With a given level of average daily expenditure, the greater the duration of stay at the host destination, the greater the injected expenditure will be (Dwyer 2002:26). The duration of stay will be influenced by both the conference duration and the attractiveness of pre- and post-conference tour opportunities. Conference-related expenditure will be greater to the extent that delegates take pre- and post-conference tours (Dwyer 2002:26). Such pre- and post-conference tours/vacations hold the potential for dispersing the economic impacts more widely throughout the destination (Dwyer 2002:26).

Costs at the host destination

For a given conference, the higher the host destination prices, the higher the injected expenditure will be (Dwyer 2002:26). However, developing a reputation for high prices may curtail the destination's ability to attract conferences in the long run. Potential host destinations must maintain international price competitiveness[19]. Delegate expenditure surveys should include, not only the direct spending from the delegates themselves, but also the spending of accompanying persons, as well as any amounts paid before leaving the home country (Dwyer 2002:27).

Air tickets for international and domestic flights and prepaid package tours need special consideration when establishing the cash injection (Dwyer 2002:26). Only a portion of expenditure on these items flows to the host country/region. In terms of international airfare, the portion considered as a cash injection will depend on whether it is the host country's own airline or a foreign airline. Domestic airfare is also difficult to classify as a cash injection, as only a proportion will flow to any specific province (Dwyer 2002:27).

It is wrong to attribute airfares to a specific province within a country given the nature of domestic flight services. Domestic airfares for international and national delegates should not be included in expenditure estimates, as it is not known where the expenditure will flow to (Dwyer 2002:28).

Additional considerations

Residents in the city hosting the conference would most likely have spent the same amount on goods and services in the absence of the conference. The conference may induce a transfer of expenditure from one location to another and/or from one expenditure category to another (Dwyer 2002:29). For this reason, no new expenditure is created by city delegates themselves.

[19] For a discussion on host destination competitiveness see Lee & Josiam (2004).

4.2.1 ESTIMATING DEMAND-SIDE EXPENDITURE

The demand-side expenditure data can be obtained by means of a delegate expenditure questionnaire. A questionnaire can be designed by considering a framework for event evaluation, as proposed by Dwyer, Mellor, Mistilis and Mules (2000a). They proposed a questionnaire framework for event analysis distinguishing delegates according to their origin: international, national or local. The important questions to include are: the length of stay, the number of accompanying persons, their satisfaction with the service provision and the organization of the conference itself.

Delegate expenditure pertaining to the delegates and their accompanying persons can be elicited according to the category and timing of any particular expenditure. The following categories of possible expenditure are distinguished: accommodation, food and beverages, internal transport, shopping, organized tours, entertainment, and a category for other expenditures not listed (Dwyer et al. 2000a). Expenditure can occur either during an event or as pre- and post-event expenditures.

In order to be considered as an in-scope visitor, the conference must be the main reason for visiting the destination. The importance of the conference as a reason for visiting the destination can be elicited in the questionnaire by means of a percentage grading. This sample information can give an indication of the proportion of in-scope delegates present in the population. Once the number of in-scope delegates and their accompanying persons is estimated, the total cash injection can be calculated for each delegate group - international, national and local (Dwyer et al. 2000a). The calculation of an autonomous cash injection $(\overline{A})$ by delegates is shown in equation 4.1 below:

$$\overline{A} = N_v \times E_{ad} \times S_{al} \qquad (4.1)$$

Where N_v is the number of visitors; E_{ad} is the average daily expenditure and S_{al} is the average length of stay (in days).

4.2.2 TECHNICAL REQUIREMENTS FOR A SURVEY

Achieving a reliable estimate of the demand-side expenditure requires careful consideration of the required sample design. Before a survey is conducted, the minimum required sample size must be established by considering the relevant sampling theory and formulas. Delegates can be randomly surveyed at all the different parallel sessions of a conference.

Considerations for determining the sample size

When determining the appropriate sample size by means of a formula, the researcher must identify the questionnaire variables that are imperative to the study. Variables can either be categorical[20] or continuous[21] (Bartlett, Kotrlik & Higgins 2001). There are sample size formulas for each type of variable - categorical or continuous (Bartlett et al. 2001). The main variable of interest in terms of a conference is delegate expenditure. Israel (2003) provides two methods for determining the sample size for continuous data, such as delegate expenditure. The first method is to combine responses into two categories and use a sample size based on proportions/categorical data. The sample size can also be calculated based on a formula for the mean. The latter method requires a 'good' estimate of the population variance (Israel 2003).

Such an estimate is often not available. Furthermore, the sample size can also diverge from one attribute to another as each has a different variance (Israel 2003). Sample size determined on proportions is the preferred method (Israel 2003). Conference delegates fall into two categories/proportions - in-scope delegates and non-in-scope delegates. A sample size formula based on the proportions of these two groups was utilized.

Cochran (1977) developed a formula to produce a representative sample for proportions. Two central factors form the basis for Cochran's formula (Bartlett et al. 2001). The first factor is the risk, or margin of error the researcher is willing to accept in the research. The second factor is

[20] Categorical variables represent types of data which may be divided into groups, for example: race, sex, age group, and educational level (Tina 2003).
[21] Continuous data can be measured on a continuum or scale and divided into finer and finer increments, for example: time, money, temperature and weight (Yale 1997).

the alpha level, referred to as the level of acceptable risk. It is the risk the researcher is willing to accept where the true margin of error is greater than the acceptable margin of error.

Alpha level

Most educational research studies use an alpha level of either 0.05 or 0.01 (Ary, Jacobs & Razavieh 1996). Cochran's formula incorporates the alpha level by using the t-value (t distribution) for the alpha level selected (Bartlett et al. 2001). The t distribution should be used whenever the population standard deviation, and thus the population variance, is not known (Steinberg 2008:189).

Acceptable margin of error

A 5% margin of error for categorical data is regarded as acceptable in educational and social research (Krejcie & Morgan 1970). Assuming categorical data, a 5% margin of error would provide the researcher with confidence that the proportion of respondents who were in-scope delegates was within ± 5% of the proportion calculated from the research sample (Bartlett et al. 2001).

Calculating the sample size

One of the major challenges of any empirical research is the sample design. There are two important aspects – sample size and sample selection. There are many different criteria by which sample size may be determined, including the statistical estimation requirement and the degree of confidence in estimates. A popular reference on sample size determination is Cochran (1977).

Cochran's (1977) sample size formula for proportions is shown below:

$$n_o = \frac{(t)^2(p)(q)}{(d)^2} \qquad : 0 \leq p \leq 1 \qquad (4.2)$$

Where n_0 is the sample size and t is the t-table value for the selected alpha level in each tail. The estimated proportion (prevalence) of an attribute present in the population is given by p (in-scope delegates) and q (non-in-scope delegates), where $q = 1 - p$ (Israel 2003). An estimate of variance in the distribution of attributes in the population is given by $(p)(q)$ (Al-Subaihi 2003, Bartlett et al. 2001). When estimating the variance, $p = 0.5$ is recommended as an estimate of the population proportion (Al-Subaihi 2003, Israel 2003, Krejcie & Morgan 1970). The use of this proportion (0.5) will maximise the variance estimate[22] - $(p)(q)$ = 0.25. The level of variance in the population will influence the required sample size. The higher the variance, the higher the required sample size will be. For this reason, $p = 0.5$ will produce a more conservative (larger) sample size (Israel 2003). The acceptable margin of error for the proportion being estimated is denoted by d.

Finite population correction

Equation 4.2 is valid where the calculated sample size is less than or equal to five percent of the population ($\frac{n}{N} \leq 5\%$) (Bartlett et al. 2001, Daniel 1999). In cases where the calculated sample size is more than five percent of the population ($\frac{n}{N} > 5\%$), Cochran's finite population correction formula should be used (Bartlett et al. 2001, Cochran 1977, Daniel 1999). The correction formula is shown below:

$$n_1 = \frac{n_0}{\left(1+\frac{n_0}{N}\right)} \qquad (4.3)$$

Where n_1 is the required sample size using the correction formula, n_0 is the required sample size according to equation 4.2 and N is the population size.

[22]Subject to $0 \leq p \leq 1$, values of $p < 0.5 \; and \; p > 0.5$ will produce a lower variance estimate. For example, $p = 0.4$ will give $(p)(q) = 0.4 \times 0.6 = 0.24$ and $p = 0.6$ will produce a variance estimate of $(p)(q) = 0.6 \times 0.4 = 0.24$.

4.3 SUPPLY-SIDE EXPENDITURE

The expenditures by organizers and sponsors are also a form of cash injection (Dwyer 2002:29). These supply-side expenditures must be considered together with the demand-side expenditure. The supply-side expenditures are often omitted in impact studies, leading to an under-estimation of the event's economic impact (Dwyer 2002:29). Organizer expenditure is a function of the revenue that the conference organizers receive. This revenue can be classified according to its source: delegate registration fees, corporate sponsorship, government sponsorship and sponsorships from associations (Dwyer 2002:29). Organizers mostly use the delegate registration fees for hiring the conference venue, equipment, various business expenses, catering and social programmes (Dwyer 2002:29).

In some studies registration fees are treated as part of the delegate expenditure, while in others it is excluded (Dwyer 2002:29). Including it as part of the delegate expenditure can be double counting. It should only be treated as part of the organizer expenditure and not as both delegate and organizer expenditure.

Sponsorships sourced from within the host region, for instance from local government, are transfers and would most likely have been spent on other activities within the region had the conference not been held (Dwyer 2002:30). If the sponsorship is an injection of additional funds from the 'outside', then this injection of additional funds should be included.

4.3.1 ESTIMATING SUPPLY-SIDE EXPENDITURE

The cash injection of supply-side expenditure can be obtained through consultation with the conference organizers, by making reference to their financial statements. The sources of revenue used to fund the supply-side expenditure should be considered, identifying possible transfers of expenditure, such as government sponsorships. Expenditure should be classified according to type and destination. Expenditure on goods and services sourced from outside the host region should be excluded.

Dwyer, Mellor, Mistilis and Mules (2000a) propose a template for identifying the relevant revenues and expenditures of a conference organizer. This template is shown below:

Table 4.1: Determining Supply-side Expenditure

Organizer Revenue			
Type for Revenue	Origin of Revenue		
	Within Destination	Within Province	Outside Province
Registration Fees			
Corporate Sponsorship			
Government Sponsorship			
Association Sponsorship			
TOTAL			
↓	↓	↓	↓
Organizer Expenditure			
Allocated to Industry Segment	Gross Expenditure Allocated By Industry & By Destination		
	Within Destination	Within Province	Outside Province
Accommodation			
Food & Beverage			
Shopping			
Organized Tours			
Entertainment			
Other			
TOTAL			

Source: Adapted from Dwyer et al. (2000a)

4.4. ALLOCATION OF THE TOTAL CASH INJECTION

The total cash injection comprises the total of the direct cash injections by delegates and conference organizers/sponsors (Dwyer 2002:30). A conference's economic impact is greatly influenced by the pattern and volume of the above-mentioned expenditures (Dwyer 2002:30). Dwyer and Forsyth (1997) identify the following key types of conference-related expenditure: accommodation, transport, shopping, food and beverages, entertainment, and organized tours.

Conference organizers allocate a large proportion of their expenditure on business services, such as event-organizing companies, technical services and advertising (Dwyer 2002:30).

The total cash injection of new expenditures (demand and supply-side) that have been classified by the type of expenditure must be allocated to the most relevant/related industry sectors represented in the input-output table/SAM that is used.

4.5 DERIVATION AND APPLICATION OF MULTIPLIERS

The final step in the impact assessment methodology is to derive and apply input-output multipliers for the industries affected by the total cash injection of a conference. A detailed discussion of input-output analysis is required to clarify this step.

4.5.1 INPUT-OUTPUT ANALYSIS

Wassily Leontief pioneered the development of input-output (IO) tables and models in the late 1930's (Leontief 1986). The basis of IO analysis is the input-output table (matrix) which summarizes all transactions that take place between producers and 'users' of production in an economy (Davies 2007, Martins & Van Aardt 2004). These transactions are divided into the main sectors/industries of the economy (Martins & Van Aardt 2004). Input-output tables are integrated with the system of national accounts of a country, reconciling the national accounts into the different sectors of the economy (Martins & Van Aardt 2004, United Nations 1999).

The output of one industry can be used as an input for production in another (or the same) industry. Such output is referred to as intermediate output (Jacques 2003). Output not used as an intermediate input is referred to as 'final output'.

Two main types of transactions take place: the purchase of intermediate and primary inputs, and the supply of intermediate and final outputs (Martins & Van Aardt 2004). Industries are shown as users of output in the columns and as suppliers of output in the rows of the matrix

(Davies 2007). The input-output table (IOT) shows the relationship between industries through the production and use of products (Davies 2007).

Firms have a demand for intermediate inputs (intermediate demand), while private consumers, government and international markets demand final outputs (final demand) (Martins & Van Aardt 2004). Inputs consist of either primary or intermediate inputs, while outputs are either intermediate or final. A schematic input-output table (matrix) is shown in Table 4.2 below:

Table 4.2: A Schematic Input-Output Table

	Intermediate demand	Final demand	Total production
Intermediate inputs	***Quadrant 1*** Intermediate inputs and outputs	***Quadrant 2*** Final demand	Total intermediate inputs
Primary inputs	***Quadrant 3*** Primary inputs	***Quadrant 4*** Primary inputs that are part of final demand	Total primary inputs
Total production	Total intermediate demand	Total final demand	

Source: Laubser (2002); Heaps (2004)

An IOT is divided into four quadrants based on the type of transaction (Martins & Van Aardt 2004). Quadrant 1 details the transfer of goods and services between industries for the purpose of production, including both intermediate inputs and outputs. Quadrant 2 contains the different components of final demand consisting of: private consumption expenditure, government expenditure, gross domestic fixed investment, change in inventories and total exports (Martins & Van Aardt 2004). Quadrant 3 details the industrial sector's demand for primary inputs. Primary inputs consist of: compensation of employees, the gross operating surplus, net indirect taxes and the demand for intermediate imports (Martins & Van Aardt 2004). The component of primary inputs forming part of final demand is shown in quadrant 4.

Every industrial sector uses primary and intermediate inputs from a range of industries to produce outputs. The total demand for these inputs for each sector is calculated by adding the intermediate inputs of each sector to the primary inputs of each sector (Heaps 2004). Total production/input used in the economy is given by adding the total intermediate inputs from all sectors to the total primary inputs (Martins & Van Aardt 2004). The total production/output in the economy is obtained by adding up the total output for intermediate consumption of total final demand (Martins & Van Aardt 2004).

An increase in final demand for the output of a specific industry will cause an increase in demand for the intermediate inputs used in producing the output of the affected industry (Heaps 2004). For example, an increase in demand for goods from industry A will cause an increase in demand for the intermediate outputs of industry B used in the production of industry A's output. In terms of a conference, for example, increased delegate accommodation spending will in turn cause accommodation establishments to increase their consumption of intermediate inputs used to provide accommodation services.

An increase in final demand causes a multiplier effect, because industries are connected to each other by inter-industry linkages. The above principles are used as a basis to construct a multiplier model to derive industry-specific multipliers.

4.5.2 THE MULTIPLIER MODEL

The development of a multiplier model will be illustrated by means of simplified examples. A simplified IOT is shown in Table 4.3 below:

Table 4.3: A Simplified Input-Output Table

	Intermediate demand		Final Demand (Purchases by Consumers)	Gross Output
	Manufacturing	Agriculture		
Manufacturing	150($\mathbf{Z_{11}}$)	500($\mathbf{Z_{12}}$)	250($\mathbf{F_1}$)	900($\mathbf{X_1}$)
Agriculture	200($\mathbf{Z_{21}}$)	100($\mathbf{Z_{22}}$)	700($\mathbf{F_2}$)	1000($\mathbf{X_2}$)
Value Added	550($\mathbf{V_1}$)	400($\mathbf{V_2}$)		950
Total Cost	900($\mathbf{C_1}$)	1000($\mathbf{C_2}$)	950	

Source: Davies (2007)

The above IOT distinguishes between two industries: manufacturing and agriculture. The transactions between the two industries (highlighted in grey) represent the transfer of goods and services for the purpose of production, including both intermediate inputs and outputs (quadrant 1 in Table 4.2). Primary inputs are represented by value added (V_1 and V_2) - quadrant 3 in Table 4.2. The components of final demand (F_1 and F_2) represent quadrant 2 in Table 4.2.

Wassily Leontief developed input-analysis into an economic model by introducing the assumption of fixed-coefficient linear production functions (United Nations 1999). Such a production function relates the inputs used by an industry along each column to its output. For one unit of agricultural output a fixed amount of input of each kind (agriculture and manufacturing) is needed (United Nations 1999). The production functions for the gross output of manufacturing (X_1) and the gross output of agriculture (X_2) are shown below (Davies 2007):

$$X_1 = F\ (Z_{11}, Z_{21}, V_1) \qquad (4.4)$$

$$X_2 = G\ (Z_{12}, Z_{22}, V_2) \qquad (4.5)$$

The above IOT represents a specific economy; GVA can be calculated using the income, output or expenditure method (Davies 2007). Using the income method, GVA is obtained by adding up the value added figures for each industry (V_1 and V_2). Using the output method, GVA is obtained by adding up the gross outputs for both industries (X_1 and X_2) and subtracting the sum of the intermediate outputs (Z_{11}, Z_{12}, Z_{21}, and Z_{22}). Using the expenditure method, GVA is obtained by adding together the expenditure of final demands (F_1 and F_2). These approaches are summarized in Table 4.4 below:

Table 4.4: Calculating GVA

Method	Formula	Calculation	GVA
Income	$V_1 + V_2$	550+400	950
Output	$(X_1 + X_2) - (Z_{11}+Z_{12}+ Z_{21}+Z_{22})$	(1900) – (950)	950
Expenditure	$F_1 + F_2$	250 + 700	950

The fixed-coefficient linear production functions show what proportion of the total cost of production each input contributes (Table 4.5).

Table 4.5: Input-Output Coefficient Table

	Manufacturing	Agriculture
Manufacturing	150/900=**0.17**	500/1000=**0.50**
Agriculture	200/900=**0.22**	100/1000=**0.10**
Value Added	550/900=**0.61**	400/1000=**0.40**
Total Cost	**1.00**	**1.00**

Source: Davies (2007)

The coefficients in Table 4.5 are obtained by dividing the entries in Table 4.3 by the total input of the consuming industry (United Nations 1999). From Table 4.5, for example, one unit of manufacturing output requires 0.17 units of input from manufacturing, 0.22 units of input from agriculture and generates 0.61 units of value added in terms of the compensation of employees and company profits. Similarly, one unit of agricultural output requires 0.50 units of agricultural input, 0.10 units of manufacturing input and generates 0.40 units of value added.

The total amount of manufacturing output used for intermediate consumption (IC) is shown in equation 4.6 below:

$$0.17X_1 + 0.50X_2 = IC \quad (4.6)$$

Where $0.17X_1$ represents the amount of manufacturing output used as intermediate input to produce gross manufacturing output (X_1) and $0.50X_2$ represents the amount of manufacturing output used as intermediate input to produce gross agricultural output (X_2). By adding the value of manufacturing output left for final demand, F_1, the total output of the manufacturing industry (X_1) is obtained in equation 4.7 below (United Nations 1999):

$$0.17X_1 + 0.50X_2 + 250 = X_1 \quad (4.7)$$

$$0.17(900) + 0.50(1000) + 250 = 900$$

The utilization of agricultural products as intermediate inputs for production can be calculated in a similar way (United Nations 1999).

A production function shows the ratio of physical inputs to outputs, referred to as "technical coefficients" (Davies 2007). The IOT shows values and not quantities (Davies 2007). If it is assumed that relative prices are fixed and that prices are equal to one, then prices can be ignored as prices and quantities then become the same (Davies 2007). These assumptions allow the 'recovery' of technical coefficients so that each coefficient in Table 4.4 represents the direct inputs required to produce R1 of outputs (Davies 2007).

The technical coefficients can be used to establish the direct input requirements of an increase in demand for an industry's output. For example, the impact of a R10 rise in demand for agriculture products can be established by looking at the technical coefficients (Table 4.3) for the agricultural sector (Davies 2007). If R1 of agricultural output requires 50 cents of

manufacturing input, R10 of agricultural output will require R5 of manufacturing input (Davies 2007). Similarly, R1 of agriculture and R4 of value added will be needed to produce the R10 of agricultural output. The technical coefficients show the direct input requirement (5+4+1=10). The multiplier or knock-on effects are determined by means of the Leontief inverse matrix, which is derived from the basic input-output system of equations.

Input-output system of equations

The coefficient matrix is shown in more general terms in Table 4.6 below:

Table 4.6: Input-Output Coefficient Table in General Terms

	Intermediate demand		Final demand	Gross Output
	Manufacturing	Agriculture		
Manufacturing	a_{11}	a_{12}	F_1	X_1
Agriculture	a_{21}	a_{22}	F_2	X_2
Value Added	V_1	V_2		

Source: United Nations (1999); Davies (2007)

The relationships in equations 4.6 and 4.7 using the general terms of Table 4.6 can be written as:

$$a_{11}X_1 + a_{12}X_2 + F_1 = X_1 \qquad (4.8)$$

$$a_{21}X_1 + a_{22}X_2 + F_2 = X_2 \qquad (4.9)$$

In matrix form:

$$\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \times \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} F_1 \\ F_2 \end{bmatrix} = \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} \qquad (4.10)$$

Equation 4.10 can also be written as:

$$AX + F = X \qquad (4.11)$$

Equation 4.11 is the basis of the input-output system of equations used for model-building. Matrix A is the input-output coefficient matrix, vector X is the vector of output and vector F is the vector of final demand (United Nations 1999).

Determining the Leontief Inverse matrix

When the coefficent matrix (A) and final demand vector (F) are known, the level of output (X) needed from all industries to satisfy the specific level of final demand can be derived using equation 4.11 (Chang 2001, Davies 2007, Jacques 2003, United Nations 1999). Solving for X in equation 4.11 can be done by calculating the Leontief inverse matrix:

$$X - AX = F$$

$$(I - A)X = F$$

$$X = (I - A)^{-1}F \qquad (4.12)$$

In equation 4.12 I stands for the identity matrix. It is a square matrix where all the diagonal elements are equal to one and all the other elements are equal to zero (United Nations 1999). On condition that $(I - A)$ is a square matrix which can be inverted, the Leontief inverse matrix is shown by: $(I - A)^{-1}$ (Wikipedia 2007).

Interpreting the Leontief Inverse matrix

Producing manufacturing output requires specific inputs. These inputs also need to be produced, requiring their own set of inputs. Producing an output creates the need for direct inputs which consequently create the need for a chain of indirect inputs (United Nations 1999). The cycle of input requirements continues to infinity (United Nations 1999). The coefficient matrix (A) only shows the direct requirements, i.e. the amount and type of input needed to

produce one unit of a specific industry's output. The sum of all the 'input requirements', direct and indirect, is obtained from the Leontief inverse matrix (United Nations 1999).

Input-output analysis assumes that the first exogenous shock initiating the cycle or chain of 'input-requirements' is caused by an exogenous increase in final demand (United Nations 1999). An exogenous shock (increase in final demand) of R1000 for manufacturing output is assumed in Table 4.7 below:

Table 4.7: Direct and Indirect Inputs

	Initial increase in Final demand	Direct input	Indirect inputs					Total Output
		Round 1	Round 2	Round 3	Round 4	....	Round n	
Formula	ΔF	$A\Delta F$	$A^2\Delta F$	$A^3\Delta F$	$A^4\Delta F$	....	$A^n\Delta F$	$\sum_{i}^{n} A^i \Delta F: n \to \infty$
Manufacturing	1000	170	140	54	28	....		1410
Agriculture	0	220	60	37	16	....		350

Source: United Nations (1999)

An exogenous shock, in the form of a R1000 increase in final demand for manufactured goods, will cause an indirect increase in output. The chain of incremental output required as inputs is represented as rounds of incremental output (United Nations 1999). The first round ($A\Delta F$) represents the incremental output needed to meet the increase in final demand. The second round ($A^2\Delta F$) represents the incremental output needed to meet the input required for production to meet the increase in final demand (United Nations 1999). The third round ($A^3\Delta F$) is the incremental output required as input to meet the incremental output of the second round (United Nations 1999). This chain of 'input requirements' continues to infinity.

The coefficient matrix (A) describes the input required to meet any increase in output, the chain of 'input requirements' (shown in Table 4.7) can be calculated as shown in Table 4.8 below (United Nations 1999):

Table 4.8: Calculating the Direct and Indirect Inputs

	Formula Element	Application (A X Formula Element)		Result
Exogenous Shock		ΔF	=	ΔF
First round	ΔF	$A \times \Delta F$	=	$A\Delta F$
Second round	$A\Delta F$	$A \times A\Delta F$	=	$A^2\Delta F$
Third round	$A^2\Delta F$	$A \times A^2\Delta F$	=	$A^3\Delta F$
....	...	...		...
n^{th} round	$A^{n-1}\Delta F$	$A \times A^{n-1}\Delta F$	=	$A^n\Delta F$
Total Impact				$\sum_{i}^{n} A^i \Delta F: n \to \infty$

Source: Adapted from United Nations (1999), Davies (2007)

Based on Table 4.8, the calculation of the total impact (change in gross output) generated by an exogenous shock can be written as (United Nations 1999):

$$\Delta X = \Delta F + A\Delta F + A^2\Delta F + A^3\Delta F + \cdots + A^n\Delta F$$

$$= (I + A + A^2 + A^3 + \cdots + A^n)\Delta F \qquad (4.13)$$

Table 4.7 show the values of each round of the multiplier effect (direct and indirect). These values can be calculated using the matrix operations from Table 4.8:

$$\Delta F = \begin{bmatrix} 100 \\ 0 \end{bmatrix}$$

$$\Delta AF = \begin{bmatrix} 0.17 & 0.50 \\ 0.22 & 0.10 \end{bmatrix} \times \begin{bmatrix} 100 \\ 0 \end{bmatrix} = \begin{bmatrix} 170 \\ 220 \end{bmatrix}$$

$$\Delta A^2F = \begin{bmatrix} 0.17 & 0.50 \\ 0.22 & 0.10 \end{bmatrix} \times \begin{bmatrix} 170 \\ 220 \end{bmatrix} = \begin{bmatrix} 140 \\ 60 \end{bmatrix}$$

These calculations become tedious as n approaches infinity. Considering equation 4.12, this can be mathematically simplified (United Nations 1999):

$$I + A + A^2 + A^3 + \cdots + A^n = (I - A)^{-1} \qquad (4.14)$$

The above equivalence will hold good provided that the structure of $(I - A)$ meets certain requirements; viz. $(I - A)$ is a square matrix and $|I - A| \neq 0$, then $(I - A)^{-1}$ exists and can be calculated (United Nations 1999, Miller & Blair 1985:15). Equation 4.14 shows that the Leontief inverse matrix captures both the direct and indirect input requirements, i.e. ΔX, of an exogenous change in final demand (ΔF). The Leontief inverse matrix can be calculated for any input-output table, using Excel and the matrix formulas discussed in this chapter. A Leontief inverse for the technical coefficients (Table 4.5) is shown in Table 4.9 below:

Table 4.9: The Leontief Inverse

	Manufacturing	Agriculture
Manufacturing	1.41	0.78
Agriculture	0.35	1.30

Source: Davies (2007)

Each column in the Leontief inverse is a vector showing the total increases in Gross Output needed directly and indirectly to meet a one unit increase in final demand for the industry represented by that column (Davies 2007). Considering the same example, as illustrated in Table 4.7, the Leontief inverse can be used to model the direct and indirect impact on output resulting from a R1000 increase in final demand for manufactured goods. This change in gross output can be calculated as follows:

$$\Delta X = (I - A)^{-1}\,\Delta F \qquad \text{Where: } \Delta F = \Delta R1000\ in\ Manufactures = \begin{bmatrix} 1000 \\ 0 \end{bmatrix}$$

$$\Delta X = \begin{bmatrix} 1.41 & 0.78 \\ 0.35 & 1.30 \end{bmatrix} \begin{bmatrix} 1000 \\ 0 \end{bmatrix} = \begin{bmatrix} 1410 \\ 350 \end{bmatrix} \qquad (4.15)$$

From equation 4.15, it is deduced that a R1000 increase in final demand for manufactured goods will require a R1410 increase in manufacturing output and a R350 increase in agricultural output. With the input-output table in money terms, the entries in the Leontief inverse can be summed up to give the value of total output, across all industries, due to a one unit change in final demand for the specific industry (Davies 2007).

Accordingly, total gross output across both industries must change by R1760 (R1410+350). The sectoral output multiplier (M) can be represented as the sum of the changes in X over the change in F:

$$M = \frac{\sum_i \Delta X_i}{\Delta F_j} \qquad (4.16)$$

In this case it is:

$$M = \frac{1760}{1000} = 1{,}76$$

Other Impact Measures

Besides the impact on gross output, other impacts can also be measured. For example, the impact on GVA (value added) can be calculated. A value-added vector will be required to determine the GVA impact of an exogenous change in final demand (Davies 2007). A value-added vector (V), incorporating the value added that is generated by each unit of output, can be defined from the coefficient matrix (Table 4.5), as shown below:

$$V = [V_1 \quad V_2] = [0.61 \quad 0.40] \qquad (4.17)$$

By incorporating the value added vector with the Leontief Inverse, the impact on GVA caused by an exogenous change in final demand can be shown as:

$$\Delta V = V\Delta X$$

$$\Delta V = V(I - A)^{-1}\,\Delta F \qquad (4.18)$$

Endogenisation of the Household Sector - Type 2 Multipliers

In the preceding discussion of IO analysis, the household sector was exogenous, i.e. only Type 1 (direct and indirect) effects were measured. The model depends on the existence of an exogenous sector, i.e. an exogenous change in final demand (Miller & Blair 1985:25). The exogenous sector is disconnected ('exogenous') from the interrelated productive sectors where the final demand for outputs originates. Basic transactions of the exogenous sector are household consumption expenditure, government expenditure, gross private investment and exports (Miller & Blair 1985:25).

The exogenous treatment of households conflicts with economic theory (Miller & Blair 1985:25). Households earn incomes by providing labour inputs to production. As consumers, they spend their income in patterned ways (Miller & Blair 1985:25). For this reason an increase in the labour inputs needed to meet an increase in output will increase the expenditure pattern of households as a group of consumers, i.e. induced expenditure (Miller & Blair 1985:25).

To incorporate the induced expenditures, the household sector can be moved from the final demand column and placed inside the technically interrelated matrix A, making households part of the endogenous sectors (Miller & Blair 1985:25). This is referred to as a closed model[23], i.e. closing the model in terms of households (Miller & Blair 1985:25). A closed model requires a row and column for the new household sector (Miller & Blair 1985:25). The row indicates how the household sector's output (labour services) is used as input by the other sectors, and the column indicates the structure of household purchases (consumption) from the other

[23] The Type 1 model with households exogenous is referred to as an open model.

sectors (Miller & Blair 1985:25). The technical coefficients of the new household sector are determined in the same manner as they would be for any other sector in the coefficient matrix (Miller & Blair 1985:26). Furthermore, the household sector can be disaggregated according to income classes (Miller & Blair 1985:30).

A Social Accounting Matrix (SAM) can be used to endogenise the household sector (Reinert & Roland-Holst 1997:96). Because a closed SAM[24] includes the household sector (induced expenditure), the outputs of the original sectors are larger than when consumer spending is ignored (Miller & Blair 1985:29). For this reason, the closed model multipliers will measure Type 2 (direct, indirect and induced) impacts. When using a closed model, the change in income received by households, which produce the induced expenditures, can be estimated from the household sector included in the Leontief Inverse.

4.6 A CRITIQUE OF MULTIPLIER/IO ANALYIS

IO multiplier models are based on a number of simplifying assumptions (Johnson 1999). Supply is assumed to be elastic in all sectors of the economy (Archer 1982, Hunn & Mangan 1999). Based on this assumption, any increase in demand can be met by an unconstrained supply of output from all industries. However, with a large enough demand stimulus, supply will be constrained and will require resources to be diverted from other uses to meet the increased demand. The multiplier is not intended to measure a demand shock of this nature (Archer 1982).

The multiplier cannot measure the economic efficiency of such a resource re-allocation for society in the region concerned, i.e. the opportunity cost involved (Archer 1977:45). A supplier's inability to meet an increase in demand or changes in technology can change the relationship between suppliers within the economy (Archer 1982). Multipliers fail to account for this by assuming that the relationship between sectoral inputs and outputs remains fixed (Hunn & Mangan 1999).

[24] A SAM model can be specified with households as endogenous or exogenous.

All the factors of production are treated as having a zero opportunity cost to society in terms of any alternative uses. For this reason, the suitability of multiplier analysis for use in tourism impact studies have been criticized (Archer 1982).

A cash injection together with supply constraints may produce higher prices (Johnson 1999). The IO model fails to account for price changes by assuming that relative prices are fixed (Archer 1977:36). Input-output tables represent a specific base year. For this reason, the data for such a model can only be used for a maximum of five years, after which the relationships within the model will no longer be reliable (Archer 1977:37). Acknowledging its limitations, multiplier analysis is still a realistic economic method for assessing the economic impacts of conferences (Archer 1976).

4.7 CONCLUSION

A conference's demand-side expenditure is estimated by means of a delegate expenditure questionnaire. Cochran's sample size formula is used to calculate the minimum sample size required to obtain a reliable estimate of demand-side expenditure. The supply-side expenditure is obtained through consultation with the conference organizers using the expenditure template proposed by Dwyer, Mellor, Mistilis and Mules (2000a). After identifying the relevant demand and supply-side expenditure, the expenditure should be allocated to the most relevant/corresponding industries represented in the IO model.

Multipliers for the industries affected by the conference expenditure can then be derived from the Leontief Inverse. The multiplier model can be specified as either an open (Type 1) model with households exogenous, or as a closed (Type 2) model with the households as an endogenous sector. The multiplier/IO methodology has been criticised for its simplifying assumptions. Regardless of its limitations, multiplier analysis is still regarded as an informative economic method for assessing the economic impacts of conferences (Archer 1976).

Chapter 5: Applying the Impact Assessment Methodology

5.1 INTRODUCTION

The *ex-post* impact assessment framework outlined in Chapter Four was used to estimate the economic impact of the 2007 SCB conference. After determining the demand-side expenditures, the expenditures were allocated to IO industries. Secondly, the supply-side expenditures were determined and allocated to IO industries. The economic impact was estimated in terms of the demand and supply-side impacts. These impacts were combined to establish the total economic impact. This chapter outlines the *ex-post* impact assessment.

5.2. ESTIMATING DEMAND-SIDE EXPENDITURE: QUESTIONNAIRE DESIGN

A delegate expenditure questionnaire was used to estimate delegate expenditure. The questionnaire was designed by considering the basic structure proposed by Dwyer, Mellor, Mistilis & Mules (2000a). A copy of the questionnaire administered is to be found in the Appendix A. The delegates were asked to answer the following items relating to the conference: delegate origin and category, length of stay, number of accompanying persons, a breakdown of expenditure pertaining to the delegates and their accompanying persons, satisfaction with the service provision and the organization of the conference itself.

In order to be considered as an in-scope visitor, the conference must be the main reason for visiting the destination. Delegates were asked whether the conference was the main reason for their visit by means of a percentage grading, reflecting the level of importance attributed to the conference; this is shown in Table 5.1 below:

Table 5.1: Importance of Conference for Visiting the Destination

	IMPORTANCE OF CONFERENCE FOR VISIT
YES	100%
NOT THE ONLY REASON	90%
	80%
	70%
	60%
	50%
	40%
	30%
	20%
	10%
NO	0%

The breakdown of expenditure pertaining to the delegates and their accompanying persons was obtained by asking delegates to give their expected expenditure (in Rands) in terms of timing and the location of expenditure, as shown in Table 5.2 below.

Table 5.2: Expected Expenditure of Delegates and Accompanying Persons

INDUSTRY SEGMENT	TIMING OF EXPENDITURE			
	DURING EVENT	PRE/POST EVENT		
		IN PORT ELIZABETH	ELSEWHERE IN EASTERN CAPE	OUTSIDE EASTERN CAPE IN SOUTH AFRICA
ACCOMMODATION				
AIR TRAVEL AND TRANSPORT TO AIRPORT				
TRANSPORT (WITHIN SOUTH AFRICA)				
SHOPPING				
ORGANISED TOURS				
ENTERTAINMENT				
OTHER (Please specify)				

5.2.1 DETAILS OF THE SURVEY

The main objective of the survey was to estimate the cash injection of demand-side expenditures. Achieving a reliable estimate requires careful consideration of the required sample size that will be representative of the population being studied. Before the survey was conducted, the minimum required sample size was established by considering the relevant sampling theory and formulas. Delegates were randomly surveyed at all the different parallel sessions of the event, as well as the morning plenary sessions.

Determining the sample size

The conference delegates were considered to fall into two categories/proportions, i.e. in-scope delegates and non-in-scope delegates. Thus, delegate expenditure can either be from the in-scope group or the non-in-scope group. Considering these two possible groups, Cochran's (1977) sample size formula for proportions was then used:

$$n_o = \frac{(t)^2(p)(q)}{(d)^2} \qquad : 0 \leq p \leq 1 \qquad (5.1)$$

Where n_o is the sample size and t is the t-table value for the selected alpha level in each tail. The estimated proportion (prevalence) of an attribute present in the population is given by p (in-scope delegates) and q (non-in-scope delegates), where $q = 1 - p$ (Israel 2003). An estimate of variance in the distribution of attributes in the population is given by $(p)(q)$ (Al-Subaihi 2003, Bartlett et al. 2001).

The acceptable margin of error for the proportion being estimated is denoted by d. Using equation 5.1, the required sample size was estimated as shown below:

$$n_o = \frac{(t)^2(p)(q)}{(d)^2} = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = 384$$

The generally acceptable alpha level (5%) and margin of error (d = 5%) were used. The alpha level of 0.05 gave the t table value of 1.96 (0.25 in each tail, t =1.96). Maximum variability in proportions was assumed giving p = 0.5, with $q = 1 - p$ = 0.5. The required sample size was estimated at 384. The number of delegates that were expected to attend the conference was 1600, i.e. the estimated delegate population. Accordingly, the sample would represent 24% of the population (384/1600 =24%). When a sample size is expected to exceed 5% of the population, Cochran's finite population correction formula should be used to determine the sample size actually used (Bartlett et al. 2001, Cochran 1977, Daniel 1999).

The correction formula is shown below:

$$n_1 = \frac{n_0}{\left(1+\frac{n_0}{N}\right)} = \frac{(384)}{\left(1+\frac{384}{1600}\right)} = 310 \qquad (5.2)$$

Where n_1 is the required sample size using the correction formula, n_0 is the required sample size according to equation 5.1 and N is the population size. Based on Cochran's finite population correction formula, the minimum sample size needed was estimated at 310 completed surveys.

Details of the sample and population

The estimate of 310 completed surveys was the minimum number of surveys needed. The aim of the researcher was to obtain the maximum number of surveys. A total of 432 completed surveys were collected during the conference. After the conference, the true delegate attendance figures could be established from the organizers' registration database. From this data, the conference delegate population amounted to 1555. The delegate population can be partitioned according to their origin, as shown in Table 5.3 below:

Table 5.3: Details of the Delegate Population

Delegate Origin	Number Of Delegates
International Delegates (from outside South Africa)	1047
National Delegates (From South Africa, but not Eastern Cape)	422
Local Delegates (From Eastern Cape, but not Port Elizabeth)	26
City Delegates (From Port Elizabeth)	60
Total	**1555**

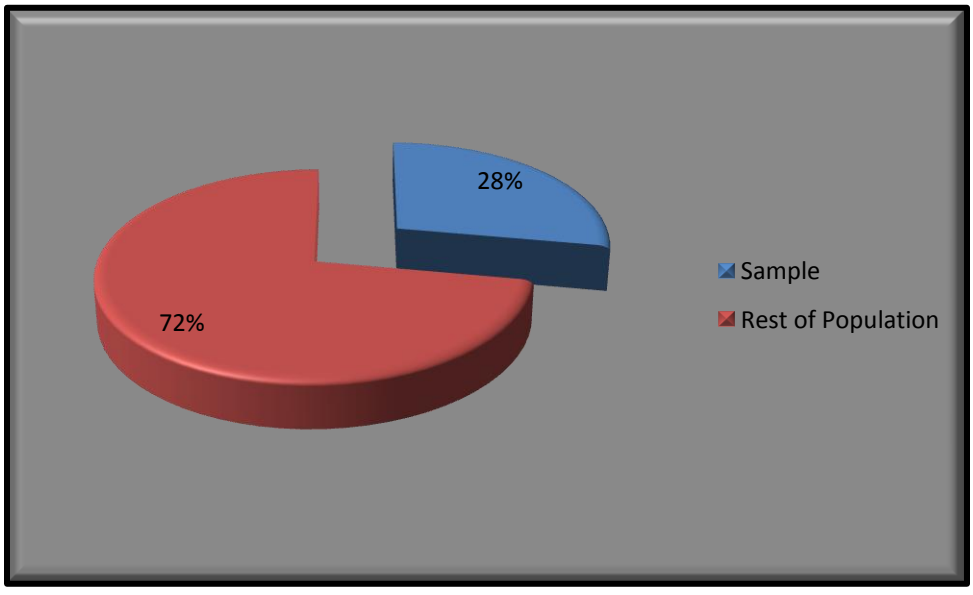
The delegate sample of 432 delegates can be partitioned according to their origin, as shown in Table 5.4 below:

Table 5.4: Details of the Sample

Delegate Origin	Number Of Delegates
International Delegates (from outside South Africa)	279
National Delegates (From South Africa, but not Eastern Cape)	135
Local Delegates (From Eastern Cape, but not Port Elizabeth)	15
City Delegates (From Port Elizabeth)	3
Total	**432**

City delegates were excluded from the analysis, as they are not in-scope visitors. Local delegates travelling from within the Eastern Cape to Port Elizabeth were included in the analysis. Their travel to Port Elizabeth was mainly to attend the conference. The sample represents 28% of the population (432/1555). This can be seen in Figure 5.1 below:

Figure 5.1: Percentage of Population Represented by the Sample



The sample's partition of delegates according to their origin closely resembles that for the population as a whole. This can be seen by comparing Figures 5.2 and 5.3 below:

Figure 5.2: Delegate Origin (Population)

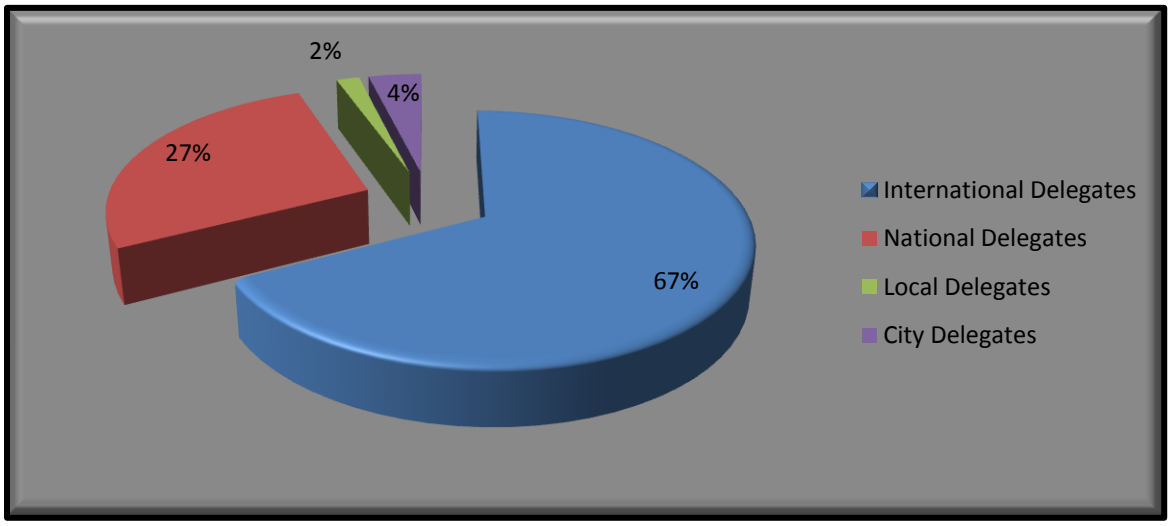
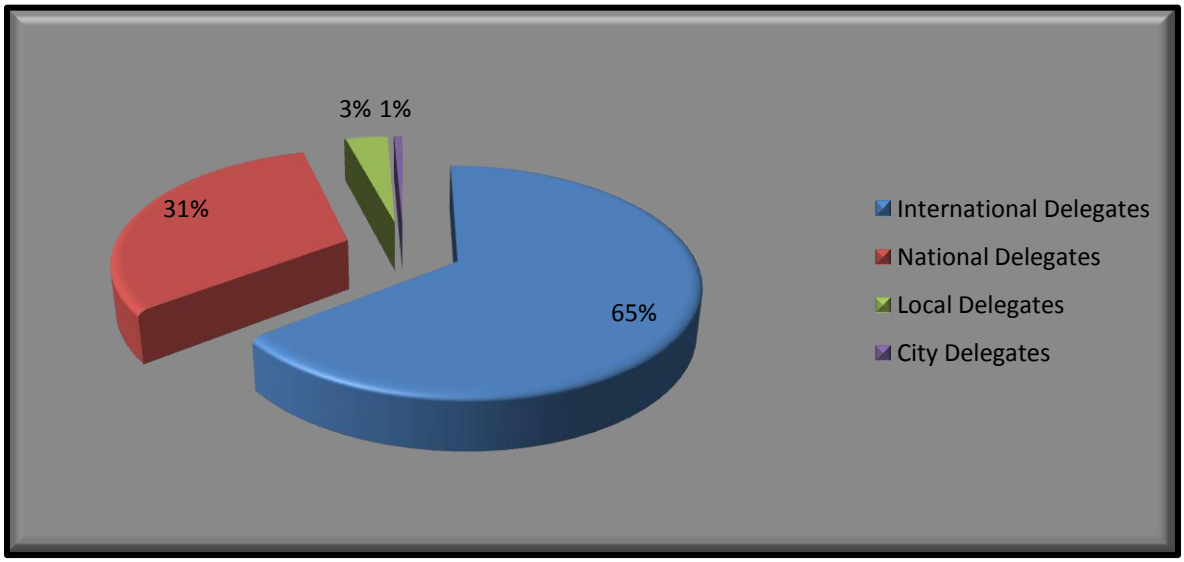


Figure 5.3: Delegate Origin (Sample)



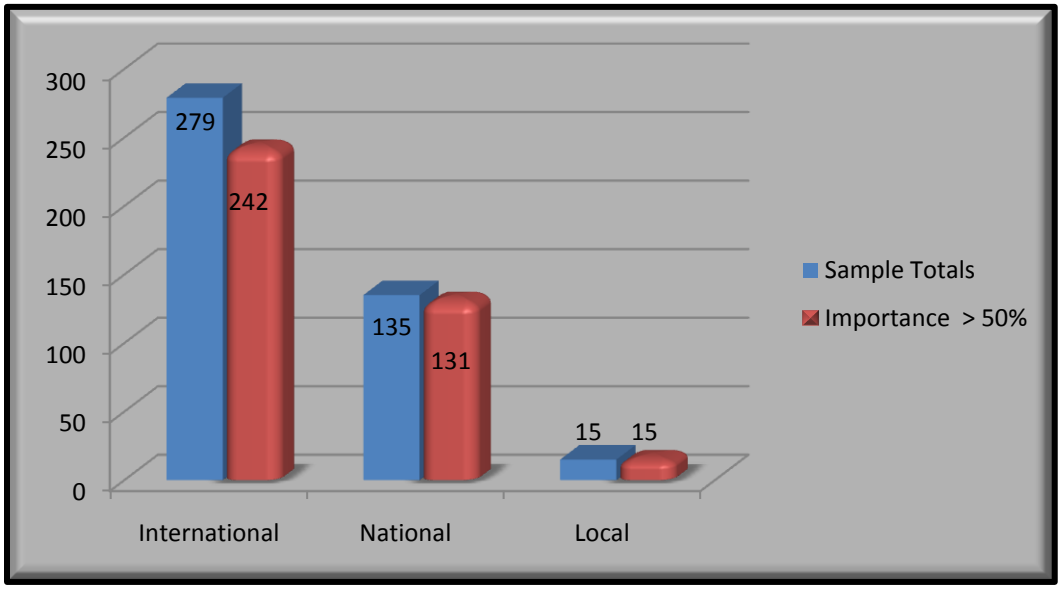
5.2.2 THE SURVEY RESULTS

The data obtained from the questionnaire were used to estimate the average daily delegate expenditure, according to delegate origin and per expenditure category. The number of days each delegate spent in the Eastern Cape was used in these calculations. The correct statistic to use is the average total delegate expenditure over all days spent at the destination (Eastern Cape) (Dwyer 2002). Expenditures did not only take place during the five days of the conference activity, but also before and after the conference. For this reason, all days spent in the Eastern Cape were considered.

Estimation of delegate expenditure

Two central factors influenced the amount on the demand-side expenditure, namely the number of in-scope delegates and the number of accompanying persons. Firstly, delegates were asked to rank the importance of the conference as a reason for their visit in terms of a percentage grading. Those who indicated a ranking of greater than 50% were considered as in-scope delegates, i.e. the conference was the main reason for their visit. From the survey 87% of international delegates, 97% of national delegates and 100% of local delegates indicated the conference as being the main reason (>50%) for their visit to the Eastern Cape (see Figure 5.4 below).

Figure 5.4: Conference Importance Exceeding 50% per Delegate Category



These percentages were regarded as an indication of the in-scope population. The sample's proportion of in-scope delegates in each category was applied to the population totals for each category (see Tables 5.5 and 5.6 below).

Table 5.5: Conference Importance Rating in terms of Percentages

Sample Category	Number of Respondents: >50% Importance Rating	Total Sample	% of Sample
International	242	279	87%
National	131	135	97%
Local	15	15	100%
Total	**388**	**429**	

Table 5.6: Estimation of total In-scope Delegates according to Category

Population Category	Assumed % of Population: >50% Importance Rating	Total Population	Number of In-scope Delegates
International	87%	1047	911
National	97%	422	409
Local	100%	26	26
Total		**1495**	**1336**

Secondly, delegates were asked to report the number of accompanying persons and the expenditure pertaining to the delegate and his/her accompanying persons. The accompanying persons of in-scope delegates are also in-scope visitors. For this reason, an estimate of the average number of accompanying persons was needed. Based on the survey results, the average number of accompanying persons was estimated, per delegate category. The average number of accompanying persons and the average number of days spent in the Eastern Cape, per delegate category, is shown in Table 5.7 below:

Table 5.7: Length of Stay and Number of Accompanying Persons.

Delegate Category	Average number of Days Spent in the Eastern Cape	Average number of Accompanying persons
International	9	0.49
National	7	0.46
Local	5	0.13

After considering the number of accompanying persons and the length of stay, the average daily expenditure per person was calculated for each delegate category, as shown in Table 5.8 below:

Table 5.8: Average daily Expenditure

Spending Category	International (Rands)	National (Rands)	Local (Rands)
Accommodation	346	245	230
Transport	88	75	107
Shopping	81	41	87
Organized Tours	45	4	0
Entertainment	39	42	24
Other: Food	17	16	0
Total: Average Daily Expenditure	**616**	**423**	**448**

Note: Aeroplane transport costs have been excluded.

According to *a-priori* expectations, international delegates had the highest amount of daily expenditure. In contrast to expectations, local delegates spent more than national delegates. A possible explanation is delegate expenditure on transport, i.e. aeroplane transport costs were excluded in the above estimates. It is difficult to establish the specific amount of aeroplane transport costs that would potentially flow to the Eastern Cape. Land-based transport costs that were incurred within the Eastern Cape were more likely to be retained in the Eastern Cape. For this reason these costs were included in the above expenditure estimates.

The autonomous cash injection $(\overline{A})$ by delegates (total expenditure by delegates) was calculated using equation 5.3 below:

$$\overline{A} = N_v \times E_{ad} \times S_{al} \quad (5.3)$$

Where N_v is the number of visitors; E_{ad} is the average daily expenditure and S_{al} is the average length of stay (in days). The data from Tables 5.6 (N_v), 5.7 (S_{al}) and 5.8 (E_{ad}) were used as inputs in equation 5.3. The results of this calculation are shown in Table 5.9 below:

Table 5.9: Total Expenditure by Delegates

Spending Category	International (R million)	National (R million)	Local (R million)
Accommodation	2.836854	0.70144	0.0299
Transport	0.721512	0.21473	0.01391
Shopping	0.664119	0.11738	0.01131
Organized tours	0.368955	0.01145	0
Entertainment	0.319761	0.12025	0.00312
Other: Food	0.139383	0.04581	0
Total	**5.050584**	**1.21105**	**0.05824**

Note: Excludes accompanying persons.

The total number of accompanying persons was calculated from the average number of accompanying persons (Table 5.7) and the total number of in-scope delegates (Table 5.6). The results of this calculation are shown in Table 5.10 below:

Table 5.10: Total number of Accompanying Persons

Delegate Category	Average Number of Accompanying persons	Number of in-scope Delegates	Total Accompanying persons
International	0.491736	911	448
National	0.461538	409	189
Local	0.133333	26	3
Total			**640**

Only one local delegate responded that he had brought along an accompanying person, but this person was excluded from the analysis (not an injection). The autonomous cash injection $(\overline{A})$ by delegates' accompanying persons was also calculated using equation 5.3. The data from Tables 5.7(S_{al}), 5.8 (E_{ad}) and 5.10 (N_v) were used as inputs in equation 5.3. The results of this calculation are shown in Table 5.11 below:

Table 5.11: Total Expenditure by Accompanying Persons

Spending Category	International (R million)	National (R million)
Accommodation	1.395072	0.324135
Transport	0.354816	0.099225
Shopping	0.326592	0.054243
Organized tours	0.18144	0.005292
Entertainment	0.157248	0.055566
Other: Food	0.068544	0.021168
Total	**2.483712**	**0.559629**

The total demand-side expenditure is the sum of expenditures by both delegates and their accompanying persons. The total demand-side expenditure is shown in Table 5.12 below:

Table 5.12: Total Demand-side Expenditure

Expenditure Category	Total in-scope Expenditure (R million)
Accommodation	5.287396
Transport	1.404188
Shopping	1.173647
Organized tours	0.567139
Entertainment	0.655941
Other: Food	0.274903
Total	**9.363214**

The expenditures in Table 5.12 were allocated to the most relevant/corresponding industries (step 3) represented in the SAM for the Eastern Cape[25]. Expenditure on accommodation was the largest expenditure item and expenditure on food the lowest. The allocation to specific industries is shown in Table 5.13 below:

Table 5.13: Industry Allocation of Demand-side Expenditure

Industry Classification	Expenditure (R million)
Accommodation	5.287396
Transport service industries	1.404188
Handcrafts & curios - Informal	1.173647
Activities/services	0.567139
Trade, accommodation & entertainment - Informal	0.655941
Other food products	0.274903
TOTAL	**9.363214**

Note: The highest expenditure item.

The lowest expenditure item.

5.3 SUPPLY-SIDE EXPENDITURE

The expenditure by the SCB local organizing committee was considered as the supply-side expenditure of the conference. The supply-side expenditures were obtained through consultation with the conference organizers using the expenditure template proposed by Dwyer, Mellor, Mistilis and Mules (2000a). Certain expenditures, which did not result in a cash injection for the Eastern Cape, were excluded from the analysis. For example, the conference bags were purchased from producers in Kwazulu-Natal; therefore this expenditure did not flow to the Eastern Cape and was excluded. Similarly, travel awards to speakers travelling from abroad were excluded.

[25] The disaggregation of the SAM for the Eastern Cape can be seen under Appendix B.

Based on the nature of the expenditure, the expenditures were allocated (step 3) to specific industries represented in the SAM for the Eastern Cape. The expenditures and their associated industries are shown in Table 5.14 below:

Table 5.14: Industry Allocation of Supply-side Expenditure

Industry Classification	Expenditure (R million)
Accommodation	0.1432992
Business service industries	0.38521072
Publishing & printing industries	0.18928313
Activities/services	0.28215728
Electrical machinery & apparatus industries	0.0549524
Beverages & tobacco industries	0.007904
Other food products	1.22332713
Trade, accommodation & entertainment - Informal	0.027354
Transport service industries	0.44178394
Handcrafts & curios - Informal	0.02
Electricity industries	0.0016811
Paper & paper product industries	0.00124465
TOTAL	**2.77819755**

Note: The highest expenditure item.

The lowest expenditure item.

The expenditures considered as cash injections (new expenditure) were considerably lower than the total organizer expenditures. Expenditure on catering services (other food products) was the highest expenditure item and expenditure on paper products (paper & paper product industries) was the lowest. The Nelson Mandela Bay Municipality sponsored R300 000 for the hosting of a beach party for the delegates. This expenditure was funded by local government and accordingly it was a transfer rather than an injection of new income into the region. For this reason it was excluded from the organizer expenditures.

Delegates could contribute towards a carbon sequestration project to offset their contribution to carbon emissions caused by attending the conference. The organizers administered this project. The funds were donated for use in the Baviaanskloof conservation area through the auspices of the Eastern Cape Parks Board. The organizers collected the 'carbon tax' from delegates[26] on a voluntary basis. It amounted to R20409.27. The conference produced temporary employment for five individuals working on the organization of the conference. Their compensation amounted to R535 588.91. The expenditure on the carbon sequestration project and organizer salaries was not used in the impact calculations. It was not possible to allocate these expenditures to specific industries. These impacts are considered but not quantified in terms of multiplier effects. The positions and duration of employment created are shown in Table 5.15 below:

Table 5.15: Employment of Conference Organizers

Position	Duration of Employment
Project Manager	2 years
Assistant	6 months
Assistant	3 months
Intern	1 year
Intern	6 months

5.4. DERIVATION AND APPLICATION OF MULTIPLIERS

The final step in the impact assessment framework, the derivation and application of multipliers, was completed using a SAM for the Eastern Cape as the underlying database. An IO multiplier model was used to estimate the multiplier impact of the conference.

5.4.1 THE MODEL

The cash injection of conference expenditures had a multiplier effect within the host city, Port Elizabeth, and accordingly also within the Eastern Cape. Port Elizabeth sources many of its inputs from within the Eastern Cape. Furthermore, there is no IOT or SAM available for the

[26] This expenditure was not included as part of the delegate expenditure estimates used for the impact calculations.

Port Elizabeth region. For these reasons the impact assessment focused on the Eastern Cape region as a whole. The cash injection, generated by the conference, represents an increase in final demand for the industries directly affected by these expenditures. The SAM for the Eastern Cape is the underlying data base for a simple fixed coefficient model presented as:

$$X = AX + F = (I - A)^{-1}F \qquad (5.4)$$

Where X is a column vector of output (endogenous variables), F a column vector of final demand (exogenous variables[27]), I an identity matrix of appropriate size and A a matrix of technical coefficients (McCord & Van Seventer 2004). Based on the identity of equation 5.4, a model can be set up to evaluate the impact of a change in final demand ΔF (exogenous variables) in terms of a change in gross output ΔX (endogenous variables). This model is shown in equation 5.5 below:

$$\Delta X = (I - A)^{-1}\Delta F \qquad (5.5)$$

Considering the problem of over-estimation produced by employment multipliers, the use of overtime or temporary staff by businesses, together with the relatively short duration of the conference, employment multiplier impacts were not considered in this analysis. The impact measures used were gross output, GVA[28] and household income.

Firstly, the demand-side impacts were calculated by specifying an open model to estimate Type 1 output and GVA multiplier impacts. A closed model was then used to estimate Type 2 output and GVA multiplier impacts. In addition, the closed model allowed for the estimation of income

[27] Basic transactions of the exogenous sector are household consumption expenditure, government expenditure, gross private investment and exports (Miller & Blair 1985:25). However, households are endogenized for the determination of Type 2 multipliers.

[28] GVA (value added) comprises factor incomes, i.e. the compensation of employees and the gross operating surplus of firms. Indirect production taxes are not included. These taxes will flow to national government and accordingly do not affect the Eastern Cape directly.

multipliers from the Leontief Inverse. The same process was then repeated to determine the supply-side impacts. The Type 1 and Type 2 impact estimates are regarded as the upper and lower limit impact estimates respectively. The demand and supply-side results are discussed individually and are combined to give the total impact.

The Conningarth SAM of the Eastern Cape is one of nine provincial SAMs that have been compiled as part of a provincial SAMs project (Conningarth 2007). The project is jointly funded by the respective provincial Governments, the Development Bank of Southern Africa (DBSA) and the Department of Provincial and Local Government (DPLG). The SAM was developed to provide the government and private sector with a tool to assess the impact of economic development programmes (Conningarth 2007).

The Eastern Cape SAM is summarized by means of a national accounting matrix (NAM), shown under Appendix B1. It is a highly aggregated version of the SAM that was used, distinguishing between the different accounts contained in the SAM (Conningarth 2007). The accounts can be disaggregated, as shown in Appendix B3-B5. The SAM summarizes the structure of the Eastern Cape economy into fifty one industries and shows the inter-industry linkages between these industries. Following the logic outlined in Chapter four, the basic SAM can be transformed into a Leontief Inverse. It is this Leontief Inverse that represents the industry specific multipliers used for impact assessment.

The Eastern Cape SAM was used as the underlying database to construct an open and closed Leontief Inverse. A vector of final demand was constructed for each of the affected industries and multiplied with the open and closed Leontief Inverses to determine the Type 1 and 2 multiplier impacts. The Type 2 Leontief Inverse included factor incomes and accordingly GVA multipliers. The Type 1 Leontief Inverse excluded factor incomes and accordingly GVA multipliers. For this reason, the type 1 model required the use of a value-added vector to determine Type 1 GVA impacts, as shown below:

$$\Delta V = V\Delta X$$

$$\Delta V = V(I - A)^{-1}\,\Delta F \qquad (5.6)$$

5.4.2 DEMAND-SIDE IMPACTS

The industry specific demand-side expenditures, as allocated in Table 5.13, were specified as vectors of final demand and multiplied with the open and closed Leontief Inverses respectively. These results are shown according to gross output, GVA and household income in Tables 5.16, 5.17 and 5.18 below:

Table 5.16: Demand-side Gross Output Multipliers

DEMAND-SIDE		Gross Output			
		Type 1		Type 2	
Industry Classification	Expenditures (R million)	Multiplier	Impact (R million)	Multiplier	Impact (R million)
Accommodation	5.287396	1.25	6.630158	1.49	7.901427
Transport service industries	1.404188	1.58	2.217702	1.94	2.721457
Handcrafts & curios - Informal	1.173647	0.45	0.524042	0.51	0.601061
Activities/services	0.567139	1.25	0.708468	1.53	0.86935
Trade, accommodation & entertainment - Informal	0.655941	1.97	1.290543	2.50	1.637438
Other food industries	0.274903	1.91	0.525564	2.26	0.620622
TOTAL (Rounded)	**9.363**	**N/A**	**11.896**	**N/A**	**14.351**

Source: Own calculations based on the Eastern Cape SAM

The elements of the respective Leontief Inverses (open and closed models), calculated from the basic Eastern Cape SAM, represent the industry specific multipliers. The multipliers shown above are the total sectoral multipliers for each industry. The cash injection of R9.363 million resulted in an R11.896 million increase in gross output (Type 1 multiplier). The Type 2 multiplier estimated a larger impact, amounting to a R14.351 million increase in gross output. In total, the estimated impact based on Type 2 multipliers is R2.445 million greater than the Type 1 multiplier estimate. Accordingly, the induced impact is estimated at R2.445 million, i.e. the difference between the Type 1 and 2 impact estimates. The industry multiplier for

handcrafts and curios (informal) was less than one, producing an impact smaller than the original cash injection. The low multiplier value suggests that this informal industry has very little forward or backward linkages with industries in the Eastern Cape and is subject to a high rate of leakage.

Table 5.17: Demand-side GVA Multipliers

DEMAND-SIDE		GVA (value added)			
		Type 1		Type 2	
Industry Classification	Expenditures (R million)	Multiplier	Impact (R million)	Multiplier	Impact (R million)
Accommodation	5.287396	0.47	2.505172	0.56	2.975923
Transport service industries	1.404188	0.62	0.867126	0.75	1.053385
Handcrafts & curios - Informal	1.173647	0.10	0.11948	0.13	0.147795
Activities/services	0.567139	0.48	0.274075	0.59	0.333866
Trade, accommodation & entertainment - Informal	0.655941	0.82	0.536509	1.01	0.664636
Other food industries	0.274903	0.63	0.172132	0.75	0.207244
TOTAL (Rounded)	**9.363**	**N/A**	**4.474**	**N/A**	**5.383**

Source: Own calculations based on the Eastern Cape SAM

The cash injection of R9.363 million contributed R4.474 million to GVA (Type 1 multiplier). The Type 2 multiplier estimated a greater impact, amounting to a R5.383 million increase in GVA. The GVA impact measure is significantly lower than the gross output estimates, as GVA multipliers only consider the value added in production (factor costs). The induced impact on GVA amounts to R0.909 million.

Table 5.18: Demand-side Household Income Multipliers

DEMAND-SIDE		Household Income TYPE 2	
Industry Classification	Expenditures (R million)	Multiplier	Impact (R million)
Accommodation	5.287396	0.24	1.2719
Transport service industries	1.404188	0.36	0.501907
Handcrafts & curios - Informal	1.173647	0.07	0.076407
Activities/services	0.567139	0.29	0.165356
Trade, accommodation & entertainment - Informal	0.655941	0.53	0.348556
Other food industries	0.274903	0.34	0.094548
TOTAL (Rounded)	**9.363**	**N/A**	**2.459**

Source: Own calculations based on the Eastern Cape SAM

Household incomes were increased by R2.459 million as a result of the R9.363 million cash injection (Type 2 multiplier). This increased income produced an induced impact as measured in the Type 2 output and GVA multipliers. Households are exogenous in the Type 1 multiplier model, excluding the household income and expenditure loop. For this reason the impact on household incomes where only estimated for the Type 2 multiplier model. The household income multipliers are less than one, given that only a proportion of the new expenditure flows to households as income.

5.4.3 SUPPLY-SIDE IMPACTS

The industry specific supply side-expenditures, as allocated in Table 5.14, were specified as vectors of final demand and multiplied with the open and closed Leontief Inverses respectively. These results are shown according to gross output, GVA and household income in Tables 5.19, 5.20 and 5.21 below:

Table 5.19: Supply-side Gross Output Multipliers

SUPPLY-SIDE IMPACTS		Gross Output			
		Type 1		Type 2	
Industry Classification	Expenditures (R million)	Multiplier	Impact (R million)	Multiplier	Impact (R million)
Accommodation	0.1432992	1.25	0.179690797	1.49	0.21414477
Business service industries	0.38521072	1.90	0.733290855	2.32	0.8944672
Publishing & printing industries	0.18928313	0.73	0.137403147	0.92	0.17351616
Activities/services	0.28215728	1.25	0.352469929	1.53	0.43251026
Electrical machinery & apparatus industries	0.0549524	1.60	0.087879499	1.87	0.10284354
Beverages & tobacco industries	0.007904	1.56	0.012296245	1.82	0.01438141
Other food industries	1.22332713	1.91	2.338775543	2.26	2.76178745
Trade, accommodation & entertainment - Informal	0.027354	1.97	0.053818141	2.50	0.06828429
Transport service industries	0.44178394	1.58	0.697730853	1.94	0.8562214
Handcrafts & curios - Informal	0.02	0.45	0.008930154	0.51	0.01024261
Electricity industries	0.0016811	1.09	0.001828554	1.38	0.00231357
Paper & paper product industries	0.00124465	1.50	0.001869297	1.78	0.00221558
TOTAL (Rounded)	**2.778**	**N/A**	**4.606**	**N/A**	**5.533**

Source: Own calculations based on the Eastern Cape SAM

The cash injection of R2.778 million resulted in a R4.606 million increase in gross output (Type 1 multiplier). The Type 2 multiplier estimated a greater impact, amounting to a R5.533 million increase in gross output. The induced impact on output amounts to R0.927 million.

Table 5.20: Supply-side GVA Multipliers

SUPPLY-SIDE IMPACTS		GVA			
		Type 1		Type 2	
Industry Classification	Expenditures (R million)	Multiplier	Impact (R million)	Multiplier	Impact (R million)
Accommodation	0.1432992	0.47	0.067895272	0.56	0.08065358
Business service industries	0.38521072	0.71	0.272853118	0.86	0.33270791
Publishing & printing industries	0.18928313	0.26	0.048628384	0.33	0.06199323
Activities/services	0.28215728	0.48	0.136355004	0.59	0.16610155
Electrical machinery & apparatus industries	0.0549524	0.43	0.023451063	0.53	0.02899884
Beverages & tobacco industries	0.007904	0.54	0.004298855	0.64	0.00506831
Other food industries	1.22332713	0.63	0.765994038	0.75	0.92224071
Trade, accommodation & entertainment - Informal	0.027354	0.82	0.022373442	1.01	0.02771658
Transport service industries	0.44178394	0.62	0.272814183	0.75	0.33141469
Handcrafts & curios - Informal	0.02	0.10	0.002036043	0.13	0.00251855
Electricity industries	0.0016811	0.51	0.000863613	0.62	0.00104236
Paper & paper product industries	0.00124465	0.49	0.000606961	0.59	0.000735
TOTAL	**2.778**	**N/A**	**1.618**	**N/A**	**1.961**

The cash injection of 2.778 million contributed 1.618 million to GVA (Type 1 multiplier). The Type 2 multiplier estimated a greater impact, amounting to a R1.961 million increase in GVA. The induced impact on GVA amounts to R0.343 million.

Table 5.21: Supply-side Household Income Multipliers

SUPPLY-SIDE IMPACTS		Household income Type 2	
Industry Classification	Expenditures (R million)	Multiplier	Impact (R million)
Accommodation	0.1432992	0.24	0.03447109
Business service industries	0.38521072	0.42	0.16115856
Publishing & printing industries	0.18928313	0.19	0.03563015
Activities/services	0.28215728	0.29	0.08226628
Electrical machinery & apparatus industries	0.0549524	0.27	0.01484302
Beverages & tobacco industries	0.007904	0.26	0.00208081
Other food industries	1.22332713	0.34	0.42074217
Trade, accommodation & entertainment - Informal	0.027354	0.53	0.01453545
Transport service industries	0.44178394	0.36	0.15790953
Handcrafts & curios - Informal	0.02	0.07	0.00130204
Electricity industries	0.0016811	0.29	0.0004844
Paper & paper product industries	0.00124465	0.28	0.00034436
TOTAL (Rounded)	**2.778**	**N/A**	**0.926**

Household incomes were increased by R0.926 million as a result of the R2.778 million cash injection.

5.4.4 TOTAL IMPACT

The total economic impact of the SCB conference is the sum of the demand and supply-side impacts. The total impact is summarized in Table 5.22 below:

Table 5.22: Total Impact

Category	Expenditures (R million)	TYPE 1 (R million)	TYPE 2 (R million)
Gross Output Multiplier Impact			
Demand-Side	9.363214	11.89648	14.35135
Supply-Side	2.77819755	4.605983	5.532928
Total	**12.141**	**16.502**	**19.884**
GVA Multiplier Impact			
Demand-Side	9.363214	4.474494	5.382848
Supply-Side	2.77819755	1.61817	1.961191
Total	**12.141**	**6.093**	**7.344**
Household Income Multiplier Impact			
Demand-Side	9.363214	N/A	2.458675
Supply-Side	2.77819755	N/A	0.925768
Total	**12.141**	**N/A**	**3.384**

Source: Own calculations based on the Eastern Cape SAM

The 2007 SCB conference generated a total cash injection of R12.141 million throughout various sectors in the Eastern Cape economy. There is a significant multiplier impact over and above the initial direct stimulus provided by the conference. The demand-side expenditures represented the greatest proportion (77%) of the total cash injection over the relatively smaller contribution associated with the supply side (23%).

The direct stimulus resulted in a R16.502 million increase in gross output (Type 1 multiplier). The Type 2 multiplier yielded a greater impact, amounting to a R19.884 million increase in gross output. The induced impact on output amounts to R3.382 million. The total cash injection of R12.141 million contributed R6.093 million to GVA (Type 1 multiplier). The Type 2 multiplier estimated a greater impact, amounting to a R7.344 million increase in GVA. The induced

impact on GVA amounts to R1.251 million. Household incomes in the Eastern Cape were increased by R3.384 million.

5.5 CONCLUSION

A questionnaire framework for event analysis, proposed by Dwyer, Mellor, Mistilis & Mules (2000a), was used in designing the research questionnaire for this impact assessment. Consideration of the relevant sampling theory and the use of Cochran's (1977) sample size formulas ensured that a sufficiently large sample size was drawn. The sample's partition of delegates according to their origin closely resembled that for the population as a whole. For these reasons, the delegate sample was deduced to represent of the delegate population.

The average number of days spent in the Eastern Cape, the average number of accompanying persons and the average daily expenditure per person were used to calculate the total demand-side expenditures of the conference. These data were allocated to specific industries represented in the SAM for the Eastern Cape. They were used as input in the calculation of the demand side-multiplier impact.

The supply-side expenditures were obtained through consultation with the conference organizers using the expenditure template proposed by Dwyer, Mellor, Mistilis and Mules (2000a). The supply-side expenditures were allocated to specific industries in the SAM for the Eastern Cape. These data were used as input in the calculation of the supply-side multiplier impact.

The SAM for the Eastern Cape formed the basis of the impact assessment. An IO multiplier model was used to estimate the conference's multiplier impacts by means of Type 1 and 2 multipliers. The impact was estimated in terms of three impact measures, namely: gross output, GVA and household income.

The SCB conference created a significant and positive net impact for the Eastern Cape economy. The direct cash injection provided a further stimulus for the economy (multiplier effect) producing a positive impact in terms of output, GVA and household incomes. Both Types 1 and 2 models produced substantial economic impacts for the Eastern Cape. The demand-side expenditures represented the greatest proportion (77%) of the cash injection over the relatively smaller contribution associated with the supply side (23%).

Chapter 6: The Spill-Over Benefit and Cost Impacts

6.1 INTRODUCTION

The SCB conference produced spill-over benefits and costs. The spill-over benefits of a conference may be: increased future tourism inflows due to the goodwill created; increased local human capital formation due to skills/knowledge transfer through the conference; and the availability of conference organizational and equipment capacity for hosting such events in the future. A spill-over cost impact is the environmental cost of the conference in the form of carbon pollution. A video conference would have been a substitute, but such a conference would not have generated the networking potential created by the face to face interaction. The spill-over impacts of the conference have been noted (but cannot be quantified).

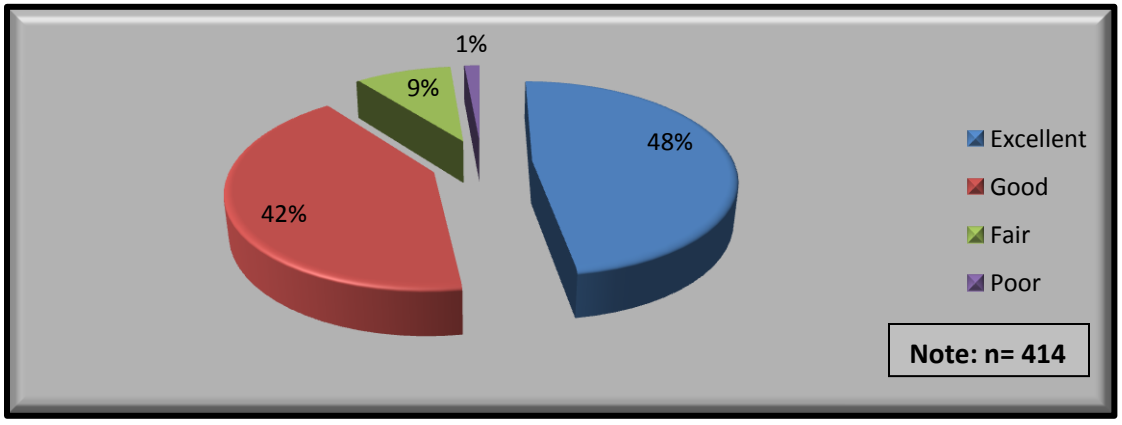
6.2 THE SPILL-OVER BENEFIT AND COST IMPACTS

The spill-over benefits were measured by the delegates' opinions of service provision in Port Elizabeth and the organization of the conference itself. The spill-over costs were measured by considering the delegates' trade off-of carbon pollution versus increased networking opportunities.

Service levels

Delegates were asked to rate the level of service provision by accommodation and transport providers in Port Elizabeth. The options were excellent, good, fair or poor. The majority of delegates sampled regarded service levels as excellent or good. Nine percent regarded them as fair and one percent regarded them as poor. These results are shown in Figure 6.1 below:

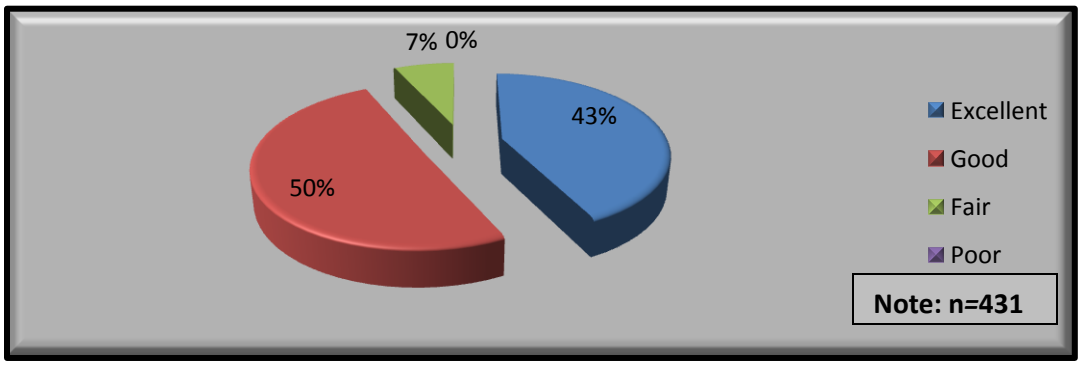
Figure 6.1: Service Provision by Accommodation and Transport Providers



Organization of the conference

Delegates were asked to rate the organization of the conference. The options were excellent, good, fair or poor. The majority of the delegates sampled regarded the conference's organization as either excellent or good. Only seven percent regarded it as fair and none regarded it as poor. These results are shown in Figure 6.2 below:

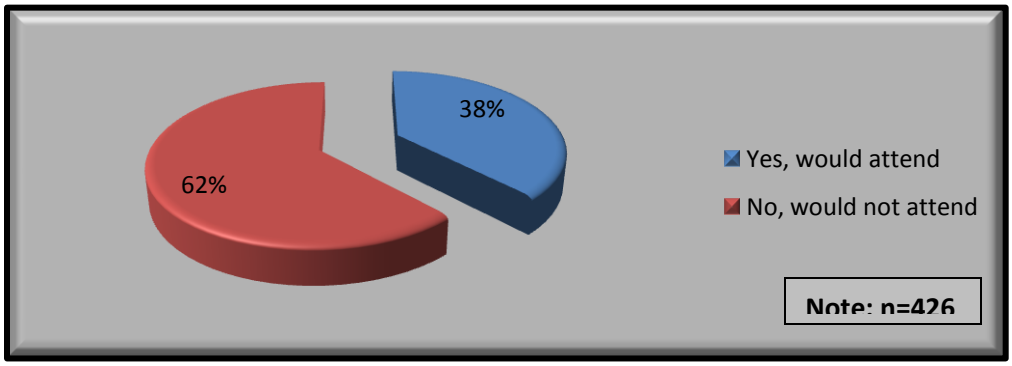
Figure 6.2: Organization of the Conference



Video conferencing

The majority of delegates (62%) responded that they would not have 'attended' the conference had it been done via video conferencing. The main reason given was the lack of networking opportunities and face-to-face interaction; these are lost with an 'electronic conference'. Delegates who would have participated in a video-type conference still expected potential gains, even if not on the same scale as a 'normal' conference. These results are shown in Figure 6.3 below:

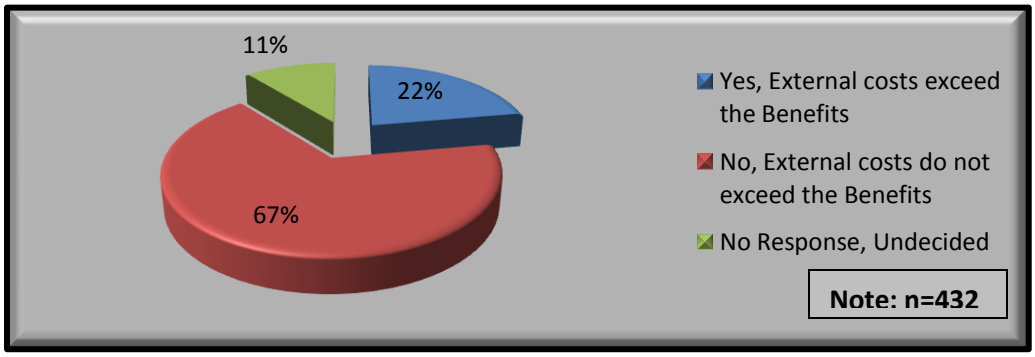
Figure 6.3: Video Conference



External environmental costs

The majority of delegates (67%) did not regard the external environmental costs (carbon pollution) as exceeding the benefits (networking) gained from attending the conference. Twenty-two percent of the delegates regarded the costs as exceeding the benefits, while eleven percent were undecided. These results are shown in Figure 6.4 below:

Figure 6.4: External Environmental Costs versus the Benefits



6.3 CONCLUSION

The majority of delegates were satisfied with the organization of the conference, as well as the service levels of accommodation and transport providers. The deduction is that positive goodwill was created. For this reason, future tourism inflows are expected to increase. Most delegates prefer a 'normal' conference as opposed to a 'video' conference. The main reason is the networking opportunities and the benefits of face-to-face interaction. The majority of delegates (67%) did not regard the external environmental costs (carbon pollution) as exceeding the benefits (networking) gained from attending the conference. For these reasons, video conferencing is not yet a viable alternative (threat) to the 'normal' type of conference.

Chapter 7: Conclusion

Port Elizabeth Coastline

7.1 CONCLUSION

The 2007 SCB conference was the society's first annual conference hosted on the African continent. It was one of the largest international conferences ever held in the Port Elizabeth area. The local organizing committee were interested in the economic impacts associated with the conference and approached the NMMU Economics Department to conduct an economic impact assessment of the conference.

Besides the usefulness delegates derive from attending conferences, conferences may also yield a substantial positive net economic impact within the host region. The injection of new expenditure, originating from outside the host region, can be viewed as an injection of demand into the host economy. The increased demand stems from two sources:

- The demand-side expenditures of the event, viz. the spending by the delegates and accompanying persons.
- The supply-side expenditures of the event, viz. expenditures by the conference organizers and sponsors.

Industries are connected by forward and backward linkages. An increase in the demand for one industry's output will create additional demand for the outputs of its supplying industries. The increase in demand can give rise to a multiplier impact, in terms of increased output, income and employment. The economic impact of conferences comprises direct, indirect and induced effects. The aim of this research was to estimate the economic impact of the 2007 SCB conference for the Eastern Cape. The following objectives were established at the start of this research:

- To review the impact of conferences.
- To conduct an *Ex-Post* conference-impact assessment.

7.1.1 THE IMPACT OF CONFERENCES

The first objective was achieved by reviewing the conference industry, the components of an impact assessment and the concept of an expenditure multiplier.

The conference industry

Conferences can be used as an instrument for regional economic development. For this reason, the research considered:

- The foundations and historic development of the modern day conference industry.
- The benefits of conferences.
- The factors affecting the demand for conferences.
- The standing of South Africa's conference industry within the global context.

The foundations for the conference industry were laid in the United States and Europe during the past two centuries, but only from the middle to latter part of the Twentieth century did the industry take off. The establishment of trade associations was an important catalyst for the development of the industry (Rogers 2008:4). Conference tourism holds a number of advantages over leisure tourism: greater profitability, all-year-round activity, future inward investment, professional development, green tourism and improved quality of life (Lee & Josiam 2004, Maple 2006, Rogers 2008, Spiller 2002).

Four main factors affecting the demand for conferences are: economic cycles, emergency or crises situations, technology, and social and work-related factors (Rogers 2008, Spiller 2002, Weber & Chon 2002). Southern Africa's main industry association, SAACI, was established in 1987. South Africa currently holds approximately one percent of the market share of the global business tourism industry (South African Tourism 2008).

The International Congress and Convention Association (ICCA) and the Union of International Associations (UIA) are the two main sources of data on the industry.

The components of an impact assessment

Delegates and accompanying persons who would not have come to the destination, had the conference not taken place, are referred to as "in-scope visitors" (Dwyer 2002:24). In order to be considered as an in-scope visitor, the conference must be the main reason for visiting the destination. Only new expenditure by the in-scope visitors is relevant in estimating a conference's net (real) economic impacts (Dwyer 2002:24). In economic impact assessment perspective is important (Burns and Mules 1986). As the size of the focus area decreases, the number of delegates that will be considered as "visitors" to the region will increase, and the greater will be the amount of new expenditure (cash injection).

Along with a decrease in focus area, the leakage of new expenditure out of the host destination will be greater and the level of the expenditure multiplier will be smaller (Burns & Mules 1986). An economic impact assessment can be conducted according to three geographic zones – national, provincial or local. An impact assessment must clearly specify the geographic zone for which the assessment is made. The deduction is that the multiplier impact may be greater or lesser for more narrowly defined geographic areas. The result depends upon which of the two effects is greater – the scale of injection or the rate of leakage.

The expenditure multiplier

Increases in conference/tourism expenditure are one form of an autonomous injection, creating a multiplier effect in the economy. Such a direct expenditure injection will produce 'flow-on' effects, namely the indirect and induced impacts. A multiplier measures the relation between the total impacts to the initial direct impact. The individual work of Kahn and Keynes formed the basis for multiplier analysis. Leontief expanded upon these models by providing an industry-specific approach to multiplier analysis, by means of input-output tables.

7.1.2 ECONOMIC IMPACT ASSESSMENT OF THE SCB CONFERENCE

The second objective was to conduct an *Ex-Post* conference-impact assessment. Previous research on the economic impact of conferences, for example the WSSD and AAG studies used Input-Output analysis to estimate the economic impacts of conferences.

This objective was achieved by following the steps outlined in the problem statement:

- Estimate the direct cash injection provided by delegate and organizer expenditures.
- Allocate the total injection of new expenditure to the relevant industries.
- Derive and apply the relevant multipliers (Type 1 and Type 2) to the total injection of new expenditure to estimate the total economic impact.

The cash injection by conference delegates was estimated from the delegate expenditure questionnaire conducted during the conference. The cash injection by the conference organizers was obtained in consultation with the conference organizers using the expenditure template proposed by Dwyer, Mellor, Mistilis and Mules (2000a).

The Conningarth SAM of the Eastern Cape formed the basis of the SCB impact assessment. The total cash injection of new expenditures was allocated to the affected industries represented in the SAM. The SAM was used to calculate open and closed Leontief Inverses. The elements of each Leontief Inverse represent the industry specific multipliers for the open and closed multiplier models. The multipliers where then applied to the cash injections for the affected industries.

The 2007 SCB conference yielded a positive net economic impact for the Eastern Cape economy. The total direct injection of R12.141 million is a substantial impact for a single conference; it is even greater when the multiplier effects are taken into account. The direct stimulus resulted in a R16.502 million increase in gross output (Type 1 multiplier). The Type 2 multiplier yielded a greater impact, amounting to a R19.884 million increase in gross output. The induced impact on output amounts to R3.382 million. The total cash injection of R12.141 million contributed R6.093 million to GVA (Type 1 multiplier). The Type 2 multiplier estimated a

greater impact, amounting to a R7.344 million increase in GVA. The induced impact on GVA amounts to R1.251 million. Household incomes in the Eastern Cape were increased by R3.384 million as a result of the R12.141 million direct cash injection. This addition to household income would not have occurred in the absence of the conference.

The Types 1 and 2 multipliers represent the lower and upper bound impact estimates respectively. The total economic impact potentially falls between these two 'boundaries'. Such an 'intermediate' impact estimate will still indicate a positive net economic impact. The impacts created by the employment of conference organizers and the expenditure on the carbon offset project were not substantiated.

The knock-on effect produced by hosting the conference (supply-side) is even greater when considering the impacts produced by delegates (demand-side) attending the conference. The composition of goods and services purchased by organizers and delegates will influence the development potential of a conference. A 'basket' containing mostly locally produced/sourced goods and services will create a much more significant impact than a 'basket' containing mostly 'externally' sourced goods and services.

Conferences are a more effective tool, when the majority of expenditures are on domestically produced/sourced goods and services. Conferences attracting a largely foreign delegate population are more likely to produce a large amount of new expenditure, i.e. originating from outside the host region.

The spill-over benefit and cost impacts

In addition to the secondary (indirect and induced) benefits, the SCB conference produced spill-over benefits. The spill-over benefits of a conference may be: increased future tourism inflows due to the goodwill created, increased local human capital formation due to skills/knowledge transfer through the conference, and the availability of conference organizational and equipment capacity for hosting such events in the future.

A spill-over cost impact is the environmental cost of the conference in the form of carbon pollution. A video conference would have been a substitute, but such a conference would not have generated the networking potential created by the face-to-face interaction. The spill-over benefits were measured by the delegates' opinions of service provision in Port Elizabeth and the organization of the conference itself. The spill-over costs were measured by considering delegate's trade off of carbon pollution versus increased networking opportunities.

Based on the survey results, the majority of delegates were satisfied with the levels of service and the conference organization. The deduction is that positive goodwill was created. The majority of delegates preferred the 'traditional type' of conference rather than attending an electronic conference. The delegates derived benefits in terms of networking opportunities and face-to-face interaction with other delegates. Based on the delegate survey results, the general delegate opinion was that the benefits derived by attending the conference exceeded the environmental costs. The payment of a carbon tax helped to offset carbon emissions and reduce the conference's carbon footprint. The LOC were committed to minimising the environmental impact of the conference by using recyclable products as far as possible.

Policy Implications

This research finds that conferences do promote regional economic development, and concludes that government should promote and support the holding of locally, by supporting the building of dedicated conference centres and subsidies.

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Appendix A: The Survey Instrument

ECONOMIC IMPACT ASSESSMENT OF 2007 SCB CONFERENCE

DELEGATE EXPENDITURE QUESTIONNAIRE

ADMINISTERED BY NELSON MANDELA METROPOLITAN UNIVERSITY

BACKGROUND:

The evaluation of the economic benefit of events is a relatively new field, especially in South Africa. The local economic impact of conferences is often overlooked. Money is invested in organizing and hosting conferences and is spent by delegates attending such conferences. These expenditures are often funded by the governments and the private sector in the form of sponsorships. But, how much does society gain from the conferences? Do the benefits derived from conferences justify these expenditures? This research will attempt to address these questions, using the 2007 SCB conference as a case study.

This project has the strong support of the conference organizers. My name is Requier Wait (requier.wait@gmail.com), and I am undertaking this economic impact assessment for my masters degree in Economics[29]. Please assist me by spending a few minutes of your time to complete the following questionnaire.

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[29] Supervised by Prof S.G. Hosking (stephen.hosking@nmmu.ac.za)

INSTRUCTIONS FOR COMPLETING THE QUESTIONNAIRE

PLEASE TICK THE APPROPRIATE BLOCKS OR FILL IN THE ANSWERS

1. Delegate origin

INTERNATIONAL DELEGATE (FROM OUTSIDE SOUTH AFRICA)	1
NATIONAL DELEGATE (FROM SOUTH AFRICA, BUT NOT EASTERN CAPE)	2
LOCAL DELEGATE (FROM EASTERN CAPE BUT NOT PORT ELIZABETH)	3
CITY DELEGATE (FROM PORT ELIZABETH)	4

2. Delegate category

STUDENT	1	
ACADEMIC	2	
OTHER	3	PLEASE SPECIFY:

3. If not from Port Elizabeth, state the number of days spent in Port Elizabeth on this visit.

……..

4. Number of days spent in Eastern Cape, excluding days in Port Elizabeth (question 3 above)

……..

5 Number of people accompanying you on your visit, besides other delegates to the conference

…….

6. Delegate's expected expenditure in Rands pertaining to you and non delegate / and family members accompanying you. According to categories below, please fill in the expected values in Rand.

INDUSTRY SEGMENT		TIMING OF EXPENDITURE			
		DURING EVENT	PRE/POST EVENT[2]		
			IN PORT ELIZABETH	ELSEWHERE IN EASTERN CAPE	OUTSIDE EASTERN CAPE IN SOUTH AFRICA
ACCOMMODATION					
AIR TRAVEL AND TRANSPORT TO AIRPORT					
TRANSPORT (WITHIN SOUTH AFRICA)					
SHOPPING					
ORGANISED TOURS					
ENTERTAINMENT					
OTHER (Please specify)					

[2]**Pre/Post refers to expenditure before and after the event.**

7. Is the conference the main reason for your visit? Please circle the appropriate percentage.

	IMPORTANCE OF CONFERENCE FOR VISIT
YES	**100%**
NOT THE ONLY REASON	**90%**
	80%
	70%
	60%
	50%
	40%
	30%
	20%
	10%
NO	**0%**

8. Rate the following by circling your choice

A) Organization of this conference

EXCELLENT	1
GOOD	2
FAIR	3
POOR	4

B) Service provision by accommodation and transport providers in Port Elizabeth

EXCELLENT	1
GOOD	2
FAIR	3
POOR	4

9 Would you still have participated in this conference if it had been electronically set up (video conferencing)?

YES	1
NO	2
REASON FOR ANSWER:	

10. Do you believe that the external environmental costs of attending the conference (additional aeroplane and vehicle emissions) outweighs the benefit of face to face interaction achieved by attending the conference?

YES	1
NO	2
REASON FOR ANSWER:	

☺ **Thank you for your participation** ☺

Appendix B: Disaggregation of a 2004 SAM for the Eastern Cape

B1: Eastern Cape SAM framework

Expenditures / Receipts		Activities	Commodities	Factors payments		Enterprises	Households	Government	Capital Account	RoW	Total
				Labour	Capital						
		1	2	3	4	5	6	7	8	9	
Activities	1	-	P	-	-	-	-	-	-	-	G
Commodities	2	X	-	-	-	-	C	G	I	E	Q
Factor Payments - Labour	3	Wa	-	-	-	-	-	Wg	-	We	e_L
Factor Payments - Capital	4	Fa	-	-	-	-	-	Fg	-	Fe	e_c
Enterprises	5	-	-	-	Q_e	-	-	Trg_E	-	-	Z_u
Households	6	-	-	L	-	Qv	Trh_H^1	Trg_H^1	-	Trr_H	Z_H
Government	7	Ti	Ta	-	Tf	Tu	Td	Trg_G	-	Trr_G	Z_G
Capital Account	8	-	-	-	-	Quv	Sh	Sg	-	-	Z_C
RoW	9	-	M	W_I	Q_r	-	Trh_H^2	Trg_H^2	Sa	-	Z_A
Total		g	q	e_L	e_c	Z_U	Z_H	Z_G	Z_C	Z_A	

Source: (Conningarth Economists 2007)

B2: Glossary of SAM framework terms

Columns	Description of each matrix/vector
Column 1: Activities Account (Production)	X: Intermediate consumption; commodities required by activities as inputs. Wa: Remuneration of Labour. Fa: Remuneration of Capital. Ti: Indirect Taxes raised on Activities
Column 2: Commodities Account (Goods and Services)	P: Production of commodities by each activity. Ta: Indirect taxes on products (VAT). M: Imports from the a) Rest of RSA b) RoW
Columns 3 & 4: Factor Account – Labour and Capital (GOS)	Q: Dividends and interests to enterprise in the EC. L: Salaries and wages to Households in the EC. Tf Indirect taxes (tax on Capital and Labour) to Government. Wl: Salaries and wages to Households in the a) Rest of RSA b) RoW Qr: Dividends and interest to enterprises from the a) Rest of RSA b) RoW
Column 5: Enterprises (Institutional Account)	Qv: Profits distributed to Households. Tu: Enterprise taxes Quv: Undistributed Profits
Column 6: Households (Institutional Account)	C: Private consumption expenditure by Households. TrhH1: Transfers between Households. Td: Direct taxes and transfers paid to the Government. Sh: Household savings. TrhH2: Transfers from Households to Households in the a) Rest of RSA b) RoW
Column 7: Government (Institutional Account)	G: Government consumption expenditure Wg: Remuneration of government employees. Fg: Remuneration of government capital. TRgE: Transfers to Enterprises. TRgH1: Transfers to Households in the EC. TRgG: Transfers to Government. Sg: Government savings TRgH2: Transfers to households in the a) Rest of RSA b) RoW
Column 8: Capital Account	I: Gross investment Sa: Capital flow from/to a) Rest of RSA b) RoW
Column 9: RoW (Trade Account)	E: Exports from the EC to a) Rest of RSA b) RoW W_e & F_e: Factor payments from the EC to the a) Rest of RSA b) RoW Trr_H: Transfers from households in the EC to households in the a) Rest of RSA b) RoW Trr_G: Transfers from the government in the EC to the a) Rest of RSA b) RoW

Source: (Conningarth Economists 2007)

B3: Commodities and activities

1	*Citrus farming*	26	*Other fabricated metal industries*
2	*Sub-tropical fruit farming*	27	*Machinery & equipment industries*
3	*Livestock farming*	28	*Electrical machinery & apparatus industries*
4	*Dairy farming*	29	*Communication, medical & other electronic equipment industries*
5	*Game farming*	30	*Transport equipment industries*
6	*Forestry (Plantations)*	31	*Handcrafts & curios - Informal*
7	*Other agriculture*	32	*Other manufacturing & recycling industries*
8	*Agriculture - Subsistence*	33	*Other manufacturing - Informal*
9	*Mining*	34	*Electricity industries*
10	*Meat, fish, fruit, vegetables, oils & fat industries*	35	*Water industries*
11	*Dairy industries*	36	*Building industries*
12	*Grain mill, bakery & animal feed industries*	37	*Other construction industries*
13	*Other food industries*	38	*Construction - Informal*
14	*Beverages & tobacco industries*	39	*Trade*
15	*Textiles, clothing, leather products & footwear industries*	40	*Accommodation*
16	*Wood & wood product industries*	41	*Trade, accommodation & entertainment - Informal*
17	*Furniture industries*	42	*Transport service industries*
18	*Paper & paper product industries*	43	*Transport - Combi-taxi*
19	*Publishing & printing industries*	44	*Communication industries*
20	*Petroleum industries*	45	*Insurance industries*
21	*Chemical & chemical product industries (incl Plastic Products)*	46	*Real estate industires*
22	*Rubber industries*	47	*Business service industries*
23	*Non-metallic mineral industries*	48	*General Government*
24	*Basic Metal industries*	49	*Health and social work*
25	*Structural metal industries*	50	*Activities/services*
		51	*Other services - Informal*

B4: Labour categories

1	*Africans - Legislators, senior officials and managers*
2	*Africans - Professionals*
3	*Africans - Technical & associate professionals*
4	*Africans - Clerks*
5	*Africans - Service workers, shop & market sales workers*
6	*Africans - Skilled agric. and fishery workers*
7	*Africans - Craft and related traders workers*
8	*Africans - Plant and machine operators & assemblers*
9	*Africans - Elementary occupations*
10	*Africans - Domestic workers*
11	*Coloureds - Legislators, senior officials and managers*
12	*Coloureds - Professionals*
13	*Coloureds - Technical & associate professionals*
14	*Coloureds - Clerks*
15	*Coloureds - Service workers, shop & market sales workers*
16	*Coloureds - Skilled agric. and fishery workers*
17	*Coloureds - Craft and related traders workers*
18	*Coloureds - Plant and machine operators & assemblers*
19	*Coloureds - Elementary occupations*
20	*Coloureds - Domestic workers*
21	*Asians/Indians - Legislators, senior officials and managers*
22	*Asians/Indians - Professionals*
23	*Asians/Indians - Technical & associate professionals*
24	*Asians/Indians - Clerks*
25	*Asians/Indians - Service workers, shop & market sales workers*
26	*Asians/Indians - Skilled agric. and fishery workers*
27	*Asians/Indians - Craft and related traders workers*
28	*Asians/Indians - Plant and machine operators & assemblers*
29	*Asians/Indians - Elementary occupations*
30	*Asians/Indians - Domestic workers*
31	*Whites - Legislators, senior officials and managers*
32	*Whites - Professionals*
33	*Whites - Technical & associate professionals*
34	*Whites - Clerks*
35	*Whites - Service workers, shop & market sales workers*
36	*Whites - Skilled agric. and fishery workers*
37	*Whites - Craft and related traders workers*
38	*Whites - Plant and machine operators & assemblers*
39	*Whites - Elementary occupations*
40	*Whites - Domestic workers*

B5: Household income classes

1	*Blacks - P1*	25	*Asians/Indians - P1*
2	*Blacks - P2*	26	*Asians/Indians - P2*
3	*Blacks - P3*	27	*Asians/Indians - P3*
4	*Blacks - P4*	28	*Asians/Indians - P4*
5	*Blacks - P5*	29	*Asians/Indians - P5*
6	*Blacks - P6*	30	*Asians/Indians - P6*
7	*Blacks - P7*	31	*Asians/Indians - P7*
8	*Blacks - P8*	32	*Asians/Indians - P8*
9	*Blacks - P9*	33	*Asians/Indians - P9*
10	*Blacks - P10*	34	*Asians/Indians - P10*
11	*Blacks - P11*	35	*Asians/Indians - P11*
12	*Blacks - P12*	36	*Asians/Indians - P12*
13	*Coloureds - P1*	37	*Whites - P1*
14	*Coloureds - P2*	38	*Whites - P2*
15	*Coloureds - P3*	39	*Whites - P3*
16	*Coloureds - P4*	40	*Whites - P4*
17	*Coloureds - P5*	41	*Whites - P5*
18	*Coloureds - P6*	42	*Whites - P6*
19	*Coloureds - P7*	43	*Whites - P7*
20	*Coloureds - P8*	44	*Whites - P8*
21	*Coloureds - P9*	45	*Whites - P9*
22	*Coloureds - P10*	46	*Whites - P10*
23	*Coloureds - P11*	47	*Whites - P11*
24	*Coloureds - P12*	48	*Whites - P12*