African Journal of Hospitality, Tourism and Leisure Vol. 4 (Special edition) - (2015) ISSN: 2223- 814X

CGE or SAM? Ensuring quality information for decision-making

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Abstract

The purpose of this paper is to conduct an economic assessment of the Aardklop National Arts Festival (hereafter referred to as Aardklop) by means of applying both the SAM and CGE methods, in order to ensure quality information for decision-taking. Data from a visitor survey conducted at Aardklop during 2010 was used for the analyses, which were executed using two regional (or place-specific) models (i.e. SAM and CGE models) constructed for South Africas North West Province. The results confirm that when these two economic impact assessment methods are applied to the same data-set of an event, the reported economic impact results differ significantly. This finding serves as a further warning to assessors that economic impact results can be misleading (if the underlying method and assumptions are not clearly stated and explained) and therefore their application should be handled with the utmost care as the results can readily be misinterpreted by stakeholders.

Keywords: Event tourism; Quality information, Economic impact; Aardklop National Arts Festival; Regional CGE modelling; Social accounting; Multiplier analysis; Potchefstroom.

Source: **http://www.southafrica.net/cache/ce_cache/made/389468e0daf8b02f/2971826634_0e85c6223b_b_640_426_80auto_s.jpg**

Introduction

Special events, such as arts festivals and sport competitions, date back several centuries (see e.g. Quinn, 2005; Jago & Dwyer 2006). Since then there has been a considerable increase in, specifically, the number of arts and cultural festivals that occur on a global scale. Schoombie (2003) highlights that by 2003, more than 1.2 million international arts and cultural festivals were listed on the Internet. Festivals that create platforms for celebrating the diverse preferences of visitors, such as different language and cultural opportunities, have therefore grown in popularity. This notion is most observable in the frequent media announcements of new festivals, some brand-named, in order to mandate recognition of the hosting region, community, or the main sponsor. The financing of such arts and cultural festivals is, however, a contentious issue in view of the encouraging community support, socio-economic impact and spin-offs that are generated through such events. In this regard, Saayman and Saayman (2012) state that few events would be able to continue in the absence of sponsorships.

However, sponsors also want to know how their money benefited communities. In fact, sponsors as well as event organisers, more than often have to demonstrate this impact. Hence quality information for decision-taking is important, and quality information is not always rated that important in the literature, since researchers have long been focused on the customer and staff, whilst very few studies attempt to address a level of quality assurance when it comes to making decisions. The ever growing demand on government budgets also make it difficult for government to continue to fund arts festivals and in the cases where they do, they are obligated to show how communities benefited from the support. For this reason, reliable impact assessments that provide quality information needs to be conducted (Van Wyk, 2011).

In this regard, Bowdin and Williams (2007) argue that event evaluation by means of conducting quantifiable economic impact studies have become a valuable tool to demonstrate the success and achievements of festivals. In recent years, several methods to conduct these economic impact assessments have been developed and applied in numerous international studies. Of these, the most prevalent methods utilised in surveys include the Input-Output (I-O), Social Accounting Matrix (SAM) and Computable General Equilibrium (CGE) methodologies.This paper provides an overview of two of the aforementioned methodologies, namely the SAM and CGE approaches, and demonstrates the differences which may be obtained in their results. Both methodologies are applied to a set of data collected from the Aardklop National Arts Festival (hereafter referred to as Aardklop) in order to compare the resulting assessments of the economic impact of an arts festival. This enables us to study a key question, namely: How do economic impact results compare when applying SAM and CGE to Aardklop data, and which model would offer organisers quality information for decision-taking?

Literature review

Given the heterogeneous nature of arts festivals, estimation of the value of visitors to a local area or region is considered to be time consuming, methodologically complex, and for some, such as Frechtling (1994), “arcane.” Therefore, the methods and models that are used to assess the economic impact

of festivals may have significant consequences. And so, it is imperative that serious consideration be given to the choice of method, as festivals can serve as a vehicle to achieve socio-economic objectives. Such goals may include creating infrastructure, providing jobs, generating revenue, attracting investment, growing the arts, promoting a region and building a better image (Gursoy, Kim & Uysal, 2004; Saayman & Rossouw, 2010).

A common approach in studies relating to the impact of arts or culture is the use of the sales (or transactions) multipliers where the original, direct festival attendee expenditure is linked to the final total business revenue in the economy (e.g. Myerscough, 1991). However, criticisms of the broad, aggregate approach of multipliers have led to the development of increasingly sophisticated models. I-O models, for instance, are based on dividing the economy of the area under study into sectors and the construction of a matrix (Bond, 2008). Each sector of the economy is shown in each column as a purchaser of goods and services from other sectors in the economy and in each row as a seller of output to each of the other sectors (Bond, 2008). Whilst I-O models provide a means of estimating the effect of additional exogenous expenditure on every sector of the economy, the initial extensive, additional data requirements are seen as prohibitive by some commentators. I-O models are criticised for the assumptions that underpin their utilisation. In particular, the models are based on a perfectly elastic supply of inputs and constant prices. In response, CGE models have been developed where production functions and prices are allowed to vary. Furthermore, whilst I-O analysis only provides an aggregated estimate of the additional income accruing to study area households, SAMs have been developed. Both CGE and SAM models are, however, more complex and necessitate more extensive data requirements than I-O models. Traditionally, they have been seen as more appropriate for the study of national economies or larger regions, rather than estimating the local effects of festivals. Economic impact assessment methods such as SAM have been applied by several researchers, for example, Wagner (1997), Edmiston and Thomas (2004), McIntyre (2004), Saayman, Rossouw and Saayman (2008), Rivera, Hara and Kock (2008), Saayman and Rossouw (2010), Kruger, Saayman, Saayman and Rossouw (2011), as well as Van Wyk (2011). The application of CGE for assessment purposes is further evident in studies done by various researchers, such as Adams and Parmenter (1995), Narayan (2004), URS Finance and Economics (2004), Blake (2005), PricewaterhouseCoopers (2005), Dwyer, Forsyth and Spurr (2006a and 2006b), Bohlmann and Van Heerden (2008), Saayman and Rossouw (2008) and Rossouw and Saayman (2011). When reviewing these studies, most researchers acknowledge that each model, that measures economic impact, has both advantages and disadvantages. The tendency in recent studies is to apply a combination of models, rather than favouring a specific one, is noted as a way of improving the acceptability and quality of the results and of reducing some of the shortcomings acknowledged (Van Wyk, 2011).

Most CGE models typically describe relatively large geographical regions or countries and are therefore not able to capture the uniqueness of the cities and towns that comprise the region. Examples of such studies include Seung and Kraybill (2001) who examine the impact of public investment in the Ohio economy, Hoffmann, Robinson and

Subramanian (1996) investigate the role of Defence cuts in California, and finally Jones and Whalley (1989) construct a CGE covering most of Canada. In their comprehensive survey of CGE models, Partridge and Rickman (1998) mention that the slow start of regional CGE models is mainly due to the scarcity of regional data. However, nowadays high quality regional data exists and region-specific CGE models can be constructed for small areas. Unfortunately, authors such as Crompton (1999) and Saayman and Rossouw (2008) have found evidence that although many economic impact assessments are completed with integrity, many are not. This is evidenced by several examples of assessment studies where researchers and consultants adopted inappropriate procedures and assumptions in order to generate high economic impact results. In addition, erroneous assumptions were made during data collection practices that had a substantial impact on the results that subsequently led to stakeholders being misinformed. Consequently, criticism against the integrity of analyses and of the outcomes of economic impact studies is increasing. Studies that focused on assessing the economic impact of events after 2000 primarily used I-O and CGE models. The SAM model is generally viewed as an improvement of the I-O model. The aim of an I-O model is to analyse the interdependence of industries in an economy. Being regarded as a broader model, SAM models include both social and economic data of an economy and so present a way for the logical arrangement of statistical information in as far as income flows in a country's economy within a set time-frame, usually a period of 12 months, are concerned (Cameron, 2003). I-Os and SAMs serve as building blocks to develop CGE models. Positioning a SAM model within the conceptual framework of a CGE model (that contains behavioural and technical relationships between variables among sets of accounts) may prove to be very functional when evaluating economy-wide effects of event policy changes or other economic phenomena (White & Patriquin, 2003). Factors affecting the choice of approach or methodology include the size of the festival being assessed, the scope of the analysis, the duration of the festival, and the specific concerns of relevant decision makers. Ultimately, however, it is argued that accuracy and information are related to the budget available for the study, which is true of almost any study – that is, such research involves a trade-off between accuracy and cost. In summary, methodological approaches to the estimation of the value of visitors to festivals vary. For some, the analytical advantages of I-O or SAM models are seen to be vast and appear to be the most appropriate for most analyses of the economic impact of festivals or events. Furthermore, they appear to be the most widely used techniques reported in recent literature.

Methodology

During 1998, the town of Potchefstroom, situated in the North West Province, South Africa, hosted the first Aardklop National Arts Festival. The mission of the original organisers was to offer a cultural experience to all visitors, while simultaneously providing an opportunity for economic growth in the local community. Not only did the festival provide a platform for displaying the creativity and talent of South African artists, but it also initiated additional investment, spending and job opportunities in the local economic arena (Potchefstroom City Council, 2007). Since the initial festival in 1998, when a mere 25 000 tickets were sold for 45 productions (Kruger, Saayman, Saayman

& Oberholzer, 2009), ticket sales during the 2010 event reached almost 70 000 (Botha, Saayman, Saayman & Oberholzer, 2010). Sales for the 2007 festival peaked at a record 90 000 tickets sold. The questionnaires for this survey were developed in line with those previously used at various arts festivals in South Africa (see Botha *et al.*, 2010). The scope of 26 questions ranged from seeking demographic details of respondents, their behaviour during the festival, the duration of their stay at the festival and expenses incurred. Although 550 questionnaires were distributed during the festival (30 September to 4 October 2010), only the data of 516 could be used. The data was collected by trained fieldworkers who interviewed visitors and completed questionnaires using the recall method. The respondents were asked to indicate their spending during the festival. A destination-based survey was utilised and allowed for interviews to be conducted during the event. Different venues and sites were targeted to conduct interviews during the event in order to ensure that responses represented the diversity of visitors and their opinions.

SAM and CGE model comparison

The models applied are similar impact-type models, i.e. single-region multi-sectoral models. The purpose of describing them is to highlight the relative strengths and weaknesses of such models rather than to determine which models are "the best". Put simply, the best model is the smallest, simplest and most transparent model that sheds light on the link between the variables of most concern to the modellers (Denniss, 2012). Table 1 provides a summary of the main characteristics of each model.

Table 1: Comparison of characteristics of SAM and CGE models

Model	Level of effects on a local economy	Shocks that can be analysed	Results	Strengths	Boundaries
SAM	Indirect and induced effects on output, income and employment; by disaggregated households, firms and other institutions, products, types of demand and other elements	Changes in consumption by product or industry; changes in policy: tax rates, government spending, price inflation,	Regional output, income, employment, production; product prices, wage rates; broken down by type of household, labour and capital source	Disaggregates households, firms and other institutions, products, types of demand and other elements of the economy according to analytical needs and data resources	No standard methodology or presentation; same boundaries as I-O model
CGE	Indirect and induced effects on output, income and employment; prices and wage rates by industry	Changes in consumption by product or industry; changes in policy: tax rates, government spending, price inflation,	Regional output, income, employment, production; product prices, wage rates; broken down by type of household, labour and capital source	Allows factor of production prices to vary; effects of resource constraints covered; all markets clear	No standard methodology or presentation; posited relationship equations, parameters, elasticities seldom made public; heavily dependent on assumptions requires massive input data that is seldom current; require validation against the actual economy

Note: Characteristics are not necessarily mutually exclusive or exhaustive
Source: Adapted from Frechtling (2011:13)

It is important to note that one cannot simply compare SAM and CGE models as if they are inherently different and that it is an either or situation. That is wrong. CGEs are more advanced (later generation) SAM-based models as they use SAMs as their database. SAM-based models only focus on the linear relationships based on the Leontief inverse, while CGEs do so as well, but expand it to also include constant-elasticity-of-substitution (CES)-based and non-linear relationships. The application of SAM-Leontief models and that of CGEs are, however, exactly the same. CGEs, as mentioned above, are, however, more advanced and therefore provide a more sophisticated analysis. CGEs can also be dynamic taking into account time, whereas SAM-Leontief and static CGEs do not.

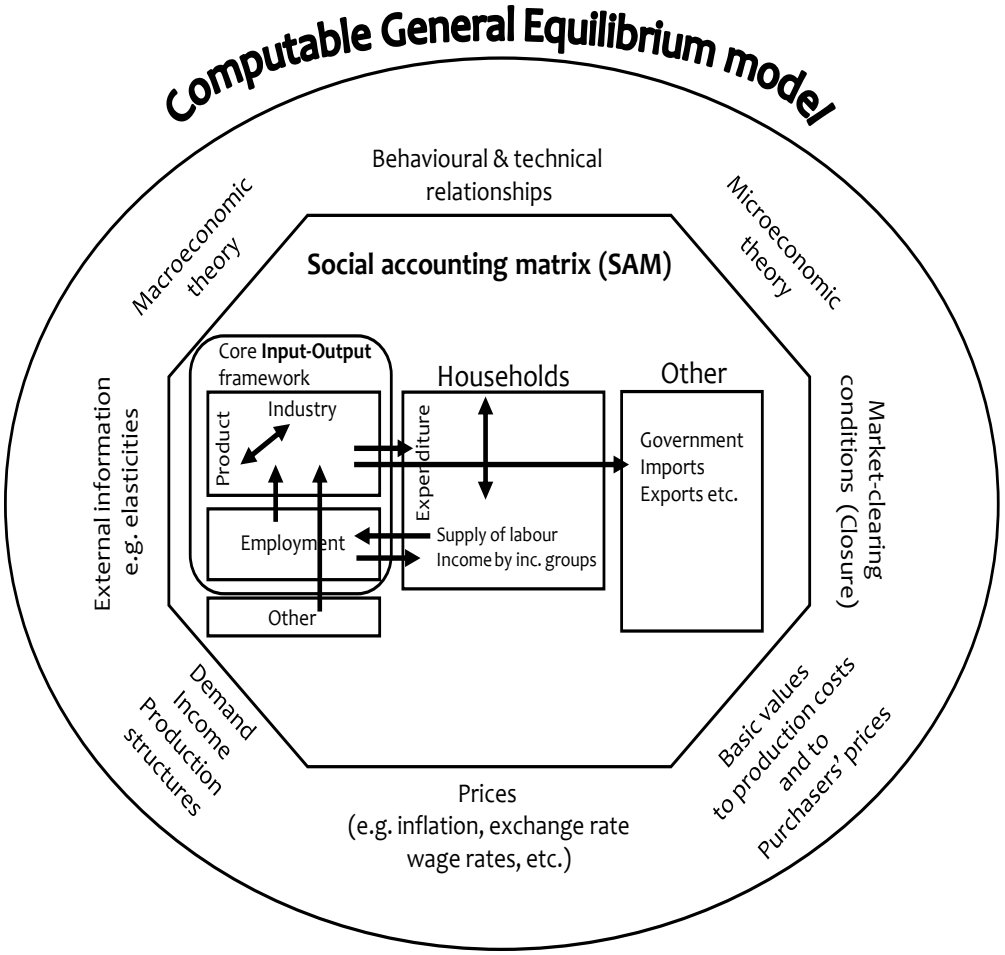

Figure 1: Simplified relationship between an I-O, SAM and CGE model
Source: Adopted from Cameron (2003:2)

Figure 1 illustrates the simplified relationship between an I-O table, SAM and CGE model.

One can therefore summarise the relationship and context between SAMs and CGE models as follows (Cameron, 2003):

a) A SAM comes from I-O tables, national income statistics, and household income and expenditure statistics. Therefore, a SAM is

broader than an I-O table and typical national accounts, showing more detail about all kinds of transactions within an economy.

b) A CGE model comes from a SAM, coupled with a conceptual framework that contains the behavioural and technical relationships among variables within and among sets of accounts. The aim of CGE modelling is to convert the abstract representation of an economy into realistic, solvable models of actual economies. In brief one can therefore state that a CGE model has the benefit that it can therefore be used for a more detailed and realistic evaluation of the economy wide effects of policy changes or other economic impacts than either an I-O analysis or SAM.

SAM model

A SAM is a data system, including both social and economic data for an economy. The data sources for a SAM come from I-O tables, national income statistics, and household income and expenditure statistics (Cameron, 2003). Therefore, a SAM is broader than an I-O table and typical national accounts, showing more detail about all kinds of transactions within an economy. However, an I-O table records economic transactions irrespective of the social background of the transactors. A SAM, contrary to national accounts ...attempts to classify various institutions to their socio-economic backgrounds instead of their economic or functional activities (Chowdhury and Kirkpatrick, 1994).

A SAM is a way of logical arrangement of statistical information, concerning income flows in a country's economy within a particular time period (usually a year). It can provide a conceptual basis to analyse both distributional and growth issues within a single framework (Statistics South Africa, 1998). For instance, a SAM shows the distribution of factor incomes of both domestic and foreign origin, over institutional classes and re-distribution of income over these classes. In addition, it shows the expenditure of these classes on consumption, investment and savings made by them. King (2003) points out that a SAM has two main objectives: first, organising information about the economic and social structure of a country over a period of time and second, providing statistical basis for the creation of a plausible model capable of presenting a static image of the economy along with simulating the effects of policy interventions in the economy or other economic impacts. For the current analysis a SAM for the North West Province, as developed by Conningarth Economists (2006), was used. This model makes use of a consistent and comprehensive data set in terms of all manual transactions among productive and institutional sectors of the provinces economy. Using 2006 prices as a base, it distinguishes 46 sectors, 12 household types and 4 ethnic groups. With the application of multipliers according to the SAM for the North West province, the direct spending of visitors at Aardklop is converted into the linked increases in production, income and jobs in the region, represented by the indirect and induced impacts.

Finally, a SAM coupled with a conceptual framework that contains the behavioural and technical relationships among variables within and among sets of accounts, can be used for the evaluation of the economy wide effects of policy changes or other economic impacts rather than only for purely diagnostic purposes (Pyatt, 1988). The conceptual framework is supplied in the form of a CGE model.

CGE model

The aim of CGE modelling is to convert the abstract representation of an economy into realistic, solvable models of actual economies. In the CGE framework the main focus of analysis is quantitative and is based on the empirical data from a particular country being investigated. One of the major features of CGE modelling is its attempt to combine theory and policy in such a way that the analytic foundations of policy evaluation work are improved (Cameron, 2003). A CGE model can accordingly briefly be described as an economy-wide model that includes feedback between demand, income and production structure, and where all prices adjust until decisions made in production are consistent with decisions made in demand (Dervis, De Melo & Robinson, 1982:132).

The main equations of these models are derived from the constrained optimisation of neoclassical production and utility functions. Producers choose inputs to minimise costs of a given output subject to non-increasing returns to scale industry functions. Consumers are assumed to choose their purchases to maximise utility functions subject to budget constraints. Production factors are paid according to their marginal productivity. The government sector is included and imperfect competition can be introduced via price fixing, rationing and quantitative restrictions. At the equilibrium level these models solutions provide a set of prices that clear all commodity and factor markets and make all individual agents optimisations feasible and mutually consistent (Cameron, 2003). Unlike the SAM model, the CGE model is an optimisation model, i.e. it provides the optimal solution mix of endogenous variables in response to an exogenous shock. Also, the CGE model contains explicit supply constraints, usually embedded in a neoclassical framework. Finally, unlike the SAM model, which achieves equilibrium in supply and demand quantities only, the solution to the CGE model is given through both quantities and prices (Dervis *et al*., 1982). The CGE model used in this study is elaborated by the Centre of Policy Studies at Monash University in Australia (see TPMH0060: http://www.monash.edu.au/policy/archivep.htm). It is a static model developed for use with a regional SAM and data. This basic model was taken and adapted with data from the North West Province SAM. The resulting model is a conventional Johansen-type model (see, for example, Dixon, Parameter, Powell & Wilcoxen, 1992) with Keynesian-type closure. Cobb-Douglas-type functions are used. While the import levels are endogenously determined, the import and export prices are assumed as given (i.e. the small country assumption). Other final demand (excluding household consumption) quantities are exogenously set. The specification is designed to fit as closely as possible to the SAM model, with the only real difference being the forced market clearing closure mechanism and the form of the production functions.

SAM and CGE model empirical comparison

The next step is to commence with an empirical comparison of the SAM and CGE models. First, multipliers are derived and compared and then a study of the impact of visitor expenditures at Aardklop on the local and regional economy is described. Please note that the following results should not be regarded as showing definitive differences between the SAM and CGE models but, instead, are indicative of the general differences which may be observed. Of course, different model structures and assumptions, and different

applications would produce a different set of results.

Multipliers

The value-added, income (wages and salaries) and employment multipliers for each model are presented in Table 2. These multipliers represent the change in value-added, income (wages and salaries) and employment per million-rand increase in final demand expenditure of the sector in question. An index is calculated for each multiplier category with the SAM average multipliers as base. The multipliers (see Table 2) are derived from two models which include: (a) a SAM (type III) model; and (b) a CGE model under a short-term closure scenario (the closure scenario for the CGE model holds capital supply fixed which represents a standard short-run assumption.

Table 2: Value-added, income (wages and salaries) and employment (per million ZAR) multipliers

	SAM			CGE		
	Type III			Short-term		
Category	**Value-added**	**Income**	**Employment**	**Value-added**	**Income**	**Employment**
Agriculture	0.737 (6)	0.267 (9)	23.462 (1)	0.213 (7)	0.200 (7)	1.590 (4)
Mining	0.913 (2)	0.473 (2)	7.452 (6)	0.717 (1)	0.065 (8)	2.640 (3)
Manufacturing	0.616 (9)	0.295 (8)	7.962 (5)	0.567 (4)	0.722 (3)	6.652 (1)
Electricity and water	0.729 (7)	0.310 (7)	4.664 (7)	0.203 (8)	1.830 (1)	0.880 (9)
Construction	0.644 (8)	0.314 (6)	9.807 (2)	0.601 (2)	0.700 (4)	0.955 (7)
Trade and accomm.	0.822 (4)	0.387 (4)	8.662 (3)	0.467 (5)	0.060 (9)	3.310 (2)
Transport and comms.	0.756 (5)	0.326 (5)	3.060 (9)	0.199 (9)	0.585 (5)	0.890 (8)
Fin. and business services	0.903 (3)	0.390 (3)	4.323 (8)	0.250 (6)	0.400 (6)	1.400 (6)
Community services	0.953 (1)	0.613 (1)	8.281 (4)	0.573 (3)	0.900 (2)	1.560 (5)
Mean	**0.786**	**0.375**	**8.630**	**0.455**	**0.607**	**2.209**
Index	**1.000**	**1.000**	**1.000**	**0.579**	**1.618**	**0.256**
Coefficient variation	**0.014**	**0.012**	**36.079**	**0.049**	**0.301**	**3.459**

Notes: Numbers in parentheses denote the rank.

With regards to the value-added multipliers in Table 2, the SAM model produces the largest multipliers, with an average value of 0.786, because of the additional induced demographic effects. Similarly, the short-term CGE model produces the smallest multipliers, with an average value of 0.455 (or 57.9% of the average SAM multiplier), as a result of the constraints on capital supply. One would also expect the SAM model to produce smaller multipliers than the short-term CGE model, because of the marginal rather than average household-induced relationships, and because supply restrictions are relaxed. When observing the multipliers in Table 2 these expected differences are observed. However, there are also some significant differences in the distributions of the multipliers for each model. For example, the largest SAM multiplier is 0.953 in community services, whereas the largest CGE multiplier occurs in mining, with a

value of 0.717 in the short-term. The overall spread of values from the CGE model is also greater, as a result of the additional limited resource factor. Sectors which have limited access to capital will experience additional dampening effects, while sectors which can easily draw capital from other sectors will show relatively larger multiplier effects.

In terms of relative sizes of the income and employment multipliers, the same general conclusions can be reached as for the production multipliers (also shown in Table 2), except for greater variation in the SAM model. The CGE model gives marginally greater relative multiplier values, as a result of the Keynesian-type closure. While the multipliers form one basis for a comparison between these models, they can be misleading in some ways, if taken as a general guide to the relative differences in any given application.

The reason is that impact situations are usually more complex, involving multiple changes across a range of sectors. In the following section, a case study is used to highlight further the differences between the models. These results should be viewed in the context of the festival under review. In view of the above methodological and multiplier exposition on SAM and CGE models, Aardklop revealed the following results.

Model results

Aardklop comparative results

The impact scenario chosen for this study is the impact of expenditures by visitors who attended Aardklop in Potchefstroom in 2010 on the North West economy. This application presents as near as possible a valid comparison of the two models, since visitor expenditures can be classified as final demand (final consumption expenditure of visitors) in all the models. As proposed by Stynes and White (2006), a segmentation strategy was followed where the expenditure data were split according to the origin of the visitors. Three groups were identified, namely (i) visitors from the North West in which the festival is held, (ii) visitors from the rest of South Africa, and (iii) foreign visitors. By splitting the respondents into various groups, a more accurate value of spending can be determined. It is often argued that spending by locals (in this instance, visitors from North West) should be excluded, since it only represents a shift in expenditure patterns and not new money that flows into the region. However, Crompton (2006) indicates that there are two circumstances when local spending can be included; (i) when the existence of the festival caused the residents to stay at home rather than take a trip elsewhere, referred to as the “deflected impact”, and (ii) when a study of the significance of the festival is made, i.e. the size and nature of the influence that the festival has on local economic activity. Since visitors travel within the province to visit the festival, it implies that they would travel to another province if the festival took place elsewhere. Therefore there is a strong case that option (i) mentioned above is true and the spending by visitors from the North West is therefore included in the analysis. The contribution is, however, always listed separately in the analysis to allow economic impact estimation with and without locals spending. The questionnaire is used to gather expenditure information from visitors, but some visitors travel with fellow visitors (i.e. in groups).

The spending per group thus includes spending by visitors and fellow visitors. To determine the spending per visitor, spending on entrance fees was used. Given the amount spent on entrance fees to the festival, North West visitors travel

in visitor groups of 2.10, other South African visitors in visitor groups of 2.06 and foreign visitors in visitor groups of 2.88. The magnitude of spending for each category was therefore divided by the number of visitors in the group, in order to derive the value of spending per visitor. Table 3 indicates this spending per visitor based on the survey results (columns 2, 4, 6 and 8) as well as the visitors per group and indicates how the classification by commodity was mapped to the SAM and CGE sectors. Note that this spending includes the accompanying persons for whom the visitor is financially responsible. Table 3 also shows the total visitor expenditure per origin in the festival area (columns 3, 5, 7 and 9), derived from the total visitor numbers.

Table 3: Estimated per visitor and total visitor spending by visitor origin (in ZAR) and mapping/classification of expenditure by commodity to SAM and CGE sectors

Spending item	Foreign	Total Foreign	North West	Total North West	Rest of SA	Total Rest of SA	Total per visitor spending	Total visitors spending
Entrance fees	47	62,213	46	1,036,222	51	1,940,655	145	3,039,090
Accommodation	628	824,754	49	1,105,570	238	8,987,535	916	10,917,859
Food and Restaurants	144	188,512	96	2,156,413	177	6,672,708	580	9,017,632
Liquor	53	69,348	101	2,261,652	150	5,659,410	304	7,990,411
Soft drinks	87	114,153	59	1,314,641	70	2,658,505	216	4,087,298
Performances	58	76,197	21	460,119	33	1,228,912	741	1,765,228
Retailers	91	119,860	58	1,306,650	91	3,424,356	240	4,850,866
Curios & Memorabilia	36	47,259	8	182,291	14	512,475	962	742,025
Transport to Aardklop	287	376,704	25	557,808	107	4,020,833	837	4,955,345
Transport at Aardklop	49	64,496	11	251,193	52	1,976,841	113	2,292,531
Parking	16	20,833	10	215,007	21	780,263	46	1,016,103
Other	-	-	35	785,371	66	2,489,558	101	3,274,930
Number of visitors (#)	*1,313*	*1,313*	*22,414*	*22,414*	*37,742*	*37,742*	*61,469*	*61,469*
Total (in ZAR)	**1,496**	**1,964,330**	**519**	**11,632,936**	**1,069**	**40,352,051**	**5,200**	**53,949,317**
Mapping/classification of expenditure by commodity to SAM and CGE sectors								
SAM/CGE sectors								
Trade	**-**	453,917	**-**	6,184,834	**-**	16,985,386	**-**	23,624,137
Accommodation	**-**	886,967	**-**	2,141,792	**-**	10,928,190	**-**	13,956,949
Transport services	**-**	441,201	**-**	809,001	**-**	5,997,674	**-**	7,247,875
Business activities	**-**	161,412	**-**	1,496,931	**-**	3,170,980	**-**	4,829,323
Activities/services	-	20,833	-	1,000,378	-	3,269,821	-	4,291,032
Total (in ZAR)	**-**	**1,964,330**	**-**	**11,632,936**	**-**	**40,352,051**	**-**	**53,949,317**

Source of data: authors own calculations based on survey results

Table 3 presents a breakdown of the activity sectors where expenditure was incurred. The total direct spending that takes place in the North West economy amounts to R83.9 million, of which R11.6 million is contributed by local visitors and R40.4 and R2.0 million by visitors from the rest of South Africa and abroad respectively. The estimated spending allows adjustments to exclude direct spending that took place outside the North West province. Such exclusions encompassed the remuneration paid to the majority of artists residing outside Potchefstroom, Production Tax paid to SARS in Pretoria, and commissions payable to Computicket in Johannesburg. The total spending by visitors from different origins was allocated to the categories of the North West SAM. Since a multiplier approach is followed, distinct multipliers for each expenditure-related economic activity are applied. The subsequent change in commodity demand is therefore translated into a change in economic activity by using the SAM calculated multipliers – the so-called "corrected" direct impact of the festival. The multipliers then convert the spending into the associated increase in production, income and employment opportunities due to the circulation of the additional spending through the local economy. The expenditure data by visitors have been deflated to 2006 values, allocated to industry sectors and converted to producers values, as shown in Table 3, to be compatible with the SAM and CGE data. All results are expressed in 2006 values. The implementation of the impact analyses in all the models is similar, in that the visitor expenditures are incorporated into the models as final demand shocks. The results pertaining to the impact scenario on value-added, income and employment are given in Tables 4, 5 and 6 respectively. They show the value impact of visitor expenditure over the industrial sectors of the total impact on the North West economy. Across industries and in contrast with a priori expectations, the total impacts derived from the type III SAM model are greater than those from the short-term static CGE model, and those obtained from the CGE model are also the smallest. It can be expected that the impacts from the SAM model will be the largest, because of the additional induced demographic effects.

Table 4: Distribution of value-added impacts (in ZAR millions, 2006 prices)

	SAM				CGE			
	Type III				Short-term			
Category	**Foreign**	**North West**	**Rest of SA**	**Total**	**Foreign**	**North West**	**Rest of SA**	**Total**
Agriculture	0.124 (7)	0.533 (7)	0.036 (7)	0.693 (7)	-0.003 (10)	0.139 (10)	-0.003 (10)	0.142 (10)
Mining	0.065 (9)	0.234 (10)	0.012 (10)	0.310 (10)	0.290 (8)	1.071 (8)	0.063 (8)	1.437 (8)
Manufacturing	1.073 (6)	4.220 (6)	0.246 (5)	5.539 (6)	2.073 (6)	7.645 (6)	0.418 (6)	10.179 (6)
Electricity and water	0.061 (10)	0.237 (9)	0.014 (9)	0.311 (9)	0.263 (9)	1.053 (9)	0.055 (9)	1.380 (9)
Construction	0.115 (8)	0.363 (8)	0.016 (8)	0.494 (8)	0.814 (7)	2.911 (7)	0.160 (7)	3.901 (7)
Trade and accomm.	16.754 (2)	55.621 (2)	2.592 (2)	74.967 (2)	3.554 (4)	14.166 (4)	0.890 (4)	18.668 (4)
Transport and comms.	3.517 (4)	16.900 (3)	1.015 (3)	21.432 (3)	5.347 (3)	20.147 (3)	1.121 (3)	26.708 (3)
Fin. and business	4.403 (3)	11.964	0.569 (4)	16.935	6.181 (2)	20.684	1.125 (2)	28.098

serv.		(4)		(4)		(2)		(2)
Community services	2.968 (5)	9.855 (5)	0.219 (6)	13.042 (5)	2.754 (5)	10.012 (5)	0.610 (5)	13.365 (5)
Total (in ZAR million)	**29.080**	**99.927**	**4.719**	**133.723**	**21.274**	**77.830**	**4.440**	**103.878**

Notes: Numbers in parentheses denote the rank.

In terms of the aggregate impacts, the estimated value-added (Table 4) from the SAM model is R133.72 million, while the short-term CGE model produces the lowest estimate of R103.88 million, or only 78% of the SAM models value. The corresponding multipliers are 0.403 and 0.519 respectively.

Table 5: Distribution of household income impacts (in ZAR millions, 2006 prices)

	SAM				CGE			
	Type III				Short-term			
Category	**Foreign**	**North West**	**Rest of SA**	**Total**	**Foreign**	**North West**	**Rest of SA**	**Total**
Agriculture	0.009 (7)	0.033 (8)	0.142 (7)	0.185 (7)	0.020 (9)	0.101 (9)	0.362 (9)	0.485 (9)
Mining	0.004 (10)	0.024 (9)	0.087 (9)	0.115 (9)	0.532 (2)	2.662 (2)	9.596 (2)	12.836 (2)
Manufacturing	0.069 (6)	0.302 (6)	1.187 (6)	1.558 (6)	0.104 (7)	0.518 (7)	1.867 (7)	2.498 (7)
Electricity and water	0.005 (9)	0.021 (10)	0.084 (10)	0.110 (10)	0.014 (10)	0.072 (10)	0.258 (10)	0.345 (10)
Construction	0.005 (8)	0.036 (7)	0.112 (8)	0.153 (8)	0.038 (8)	0.188 (8)	0.678 (8)	0.907 (8)
Trade and accomm.	1.059 (2)	6.848 (2)	22.735 (2)	30.643 (2)	0.188 (5)	0.939 (5)	3.386 (5)	4.529 (5)
Transport and comms.	0.332 (3)	1.150 (5)	5.525 (4)	7.007 (4)	0.192 (4)	0.962 (4)	3.466 (4)	4.637 (4)
Fin. and business serv.	0.232 (4)	1.798 (4)	4.885 (5)	6.915 (5)	0.157 (6)	0.786 (6)	2.832 (6)	3.788 (6)
Community services	0.137 (5)	1.860 (3)	6.174 (3)	8.171 (3)	0.281 (3)	1.403 (3)	5.058 (3)	6.766 (3)
Total (in ZAR million)	**1.935**	**11.929**	**40.992**	**54.856**	**1.526**	**7.631**	**27.504**	**36.791**

Notes: Numbers in parentheses denote the rank.

Table 6: Distribution of employment impacts (# employed)

	SAM				CGE			
	Type III				Short-term			
Category	**Foreign**	**North West**	**Rest of SA**	**Total**	**Foreign**	**North West**	**Rest of SA**	**Total**
Agriculture	3 (7)	11 (7)	1 (7)	14 (7)	-3 (9)	-13 (9)	-44 (9)	-59 (9)
Mining	0 (9)	1 (9)	0 (9)	1 (9)	-6 (10)	-30 (10)	-108 (10)	-144 (10)
Manufacturing	4 (6)	14 (6)	1 (6)	18 (6)	0 (7)	-2 (7)	-6 (7)	-8 (7)
Electricity and water	0 (10)	1 (10)	0 (10)	1 (10)	0 (6)	0 (6)	12 (6)	14 (6)
Construction	1 (8)	2 (8)	0 (8)	3 (8)	-1 (8)	-3 (8)	-11 (8)	-15 (8)
Trade and accomm.	95 (2)	314 (2)	15 (2)	424 (2)	9 (3)	18 (4)	107 (3)	134 (3)
Transport and comms.	5 (5)	25 (4)	1 (3)	31 (5)	2 (5)	8 (5)	36 (5)	46 (5)

Fin. and business serv.	9 (4)	23 (5)	1 (5)	33 (4)	5 (4)	28 (2)	86 (4)	120 (4)
Community services	15 (3)	51 (3)	1 (4)	68 (3)	17 (2)	27 (3)	120 (2)	152 (2)
Total (in ZAR million)	**131**	**442**	**20**	**593**	**24**	**33**	**193**	**238**

Notes: Numbers in parentheses denote the rank.

This last point is brought out in Tables 5 and 6, which show that the income and employment flow-ons for the CGE are much smaller relative to the SAM model than those for value-added, indicating the greater role played by marginal labour productivity changes. For example, the short-term CGE model produces only 67.1% of the household income impact and 40.1% of the employment impact of the SAM model (see e.g. Sun and Wong (2010) for a more detailed exposition of the overestimation of employment effects of short-run events). The length of the festival should also be kept in mind when measuring economy-wide impacts of such events. In this case Aardklop takes place over a period of 5 days. Therefore, even if 70,000 tickets were sold in 2010, the festival is estimated to generate an extra 593 and 238 jobs (according to the SAM and CGE respectively). The SAM model is an annual snapshot of the economy. There may be an extra 593 and 238 employed for 5 days but averaged over the year, the employment impact is negligible. Further, other research among business owners suggests that at festival time, they do employ more people but may extend the hours of existing employees or work the existing employees harder. In fact only 19% of businesses in the survey state they employed more staff during the event (5 days).

Findings and implications

This article explored the possible variance of results, in order to improve the quality of information for decision-taking, when the SAM and CGE methodologies were employed to measure the economic impact of Aardklop. The following emerged from this research:

Firstly, this article confirms previous findings that when different measuring tools are applied to the same data (of the same event, in this instance Aardklop), it is likely that very different results will be obtained (Van Wyk, 2011). It is therefore critically important for economic assessors to pay serious attention to the purpose, scope and characteristics of models that measure economic impact results before interpreting them. Ignoring the purpose and intention of each model applied may lead to misinterpretation and inaccurate conclusions that can mislead stakeholders, which can also lead to bad decisions. Therefore the more accurate the model, the better quality of information and results are available.

Secondly, based on the modelling results, the general distributions of the impacts across the industrial sectors agree more or less with expectations. The largest effects occur in those sectors directly affected by visitor expenditure, i.e. trade and accommodation, and transport and communication. With income (wages and salaries) and employment, the rankings differ marginally but, overall, the distributions are much the same. Obviously, labour has a greater impact on labour-intensive industries (such as service industries) and less impact on manufacturing and other more capital-intensive industries.

Generally speaking, the SAM model produces relatively larger impacts in the

manufacturing sectors and smaller impacts in the service sectors, particularly with respect to wages and employment. In other words, the service-type industries are better able to support the increase in tourist activity largely within existing resources, whereas manufacturing-type industries, which have more rigid value-added structures, respond in a manner closer to that of the Leontief value-added system. Yet, the CGE model results in a much larger redistribution of resources among all the sectors in the economy; in particular, from agriculture, mining, metal products, manufacturing and construction (which all experience negative flow-on effects) to the sectors most affected by the boost in tourist activity, i.e. trade and accommodation, and transport and communication, financial and business services, and community services. This occurs as capital is drawn away from those sectors with more abundant and less efficient usage, going to those sectors in greater need in the short term. In terms of additional job opportunities resulting from Aardklop, the SAM model indicates a much more optimistic amount of additional positions created, recording 593 compared to the 238 jobs measured by the CGE model.

Thirdly, a previous study conducted on the economic impact assessment of the Klein Karoo National Arts Festival in South Africa, suggests that the local community supports the festival more than foreign visitors and visitors from the rest of South Africa do. Fifty-eight percent (58%) of visitors who attended the festival originated from the local Western Cape Province (Erasmus, Slabbert, Saayman,, Saayman & Oberholzer, 2010). However, by contrast, in this study of the economic impact assessment of Aardklop, visitors from the rest of South Africa support the festival significantly more than local visitors do. This may be ascribed to the geographical location of the hosting community. The fact that Aardklop (Potchefstroom) is located closely to the densely populated Gauteng Province may be a reason why the festival is considerably better supported by visitors from the rest of South Africa, than it is by locals. Botha *et al*. (2010) report that 62% of visitors who attended the 2010 Aardklop were from provinces other than North West. Gauteng visitors were estimated at 39% of the total visitors. The obvious positive impact that the geographical location of an event may have, provides an opportunity for organisers to explore expansion opportunities, such as possible commuting facilities and packages, to further increase visitor attendance.

Fourthly, this article, confirms that the difference in measured economic impact, when applying various assessment tools to the same event, may be ascribed to the characteristics of the specific model used and therefore careful consideration of the conditions, context and main aim for conducting an economic assessment must be made, since this will provide better quality results and information. SAM models, based on I-O models, are regarded as fairly simple, quick, reliable, effective, efficient and flexible, making use of readily available data. In contrast, CGE models are known for making use of detailed and informative economic modelling techniques. Such models are normally utilised to address specific what-if economy-wide scenarios used in surveys where a large shock is to be applied to a complex economy. Perhaps because of their accuracy (quality) and flexibility, CGE models seem to be the preferred tools to measure economic impact as they may overcome many of the limitations experienced with SAM models, including supply constraints and price movements. Consequently, these models are often applied during

economic impact studies at national level, but have limited use during lower level surveys.

The fifth finding indicates that the methodological application of assessment models is not without limitations. Despite the development of SAM models (based on I-O models) with multiplier effects, certain methodological problems may persist, such as outdated data that are used in order to publish tables, published tables that are not applicable to the level or region they are being applied to, trusting in recommendations made by inexperienced analysts, etc.

Finally, this article confirms that the interpretation of economic impact results obtained from applying various measuring tools such as SAM and CGE models may have unintended consequences for the various stakeholders involved, such as event organisers, visitors, the hosting community and academic scholars. The results obtained in this study confirm that the utmost caution should be taken when decisions are to be made based on the results, that quality information is paramount. Not only may the (inappropriate) results have an adverse effect on all stakeholders, but they may even jeopardise the existence of the event itself.

Conclusions

The aim of this article was to interrogate and illustrate the findings of previous studies that applied different measuring tools to an event in order to assess the resulting economic impact, in order to produce quality information for decision-taking. The discussion in this article therefore articulates the assessment of the economic impact of Aardklop when applying SAM and CGE models.

This article confirms the finding of previous studies indicating the variance in measured economic impact results. This is emphasised by an even larger difference in results when Aardklop data were assessed. Due to the variance in the measured results that different models produce, very serious and deliberate consideration should be given to the preferred model that is utilised. A hasty approach to the choice, interpretation and application of assessment models must be avoided as inappropriate result information may adversely influence decision-taking and have serious consequences for all stakeholders depending on the sustainability of an event. For this reason quality management is not always about the level of service one renders or the quality of products one uses, but also quality information for decision-taking.

The literature study and an even larger difference in the economic impact as measured by SAM and CGE for Aardklop confirms that CGE assesses economic impact more conservatively.

This article provides an important contribution to the discussion of which assessment tools should be chosen as the tool to measure the economic impact of a specific event, in order to make a contribution to improving the quality of decision-taking. To date, only limited studies have been conducted within the South African context where different models that measure economic impact have been applied to a chosen event. Furthermore, this article affirms that, regardless of the assessment method or measuring tool that is applied, popular national events will, doubtless, have a variable impact on the economy. Further research will have to be conducted as only two models, namely SAM and CGE, were applied to measure the economic

impact of Aardklop. The remainder of the three most popular models, an I-O model, was excluded from this study. Literature studies show that I-O models to measure economic impact of event are frequently applied, especially to evaluate the impact of smaller events. When a regional town hosts a local event, the event will attract visitors from surrounding areas bringing new expenditure to the town, although perhaps very little to the province as a whole. Therefore, a significant economic impact may be measured by the town but the impact on the economy of the province may be hardly noticeable. Regional models should aim to measure the money flow and impact on the local economy due to hosting an event, and therefore results should be more accurate and relevant than when applying models that were developed for provincial or national levels. An economic assessment that includes an I-O model may provide an even broader platform to assess the economic impact of events. For future research, it is suggested that an economic assessment should be conducted on the same set of Aardklop data, but applying an I-O model. The outcome thereof may confirm or contradict the assumption that various models of economic assessments produce different outcomes.

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