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Performance analysis in sport and leisure management

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**PERFORMANCE ANALYSIS IN SPORT AND LEISURE
MANAGEMENT**

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*Published works submitted in partial fulfilment of the requirements of
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basis of published work.*

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ABSTRACT

This commentary documents a programme of research conducted between 1995 and 2012 which, perhaps unconventionally, applied performance analysis techniques frequently used in the business context to evaluate and analyse performance, both financial and non-financial, in sport and leisure. Use of performance analysis in the sport and leisure sectors was found to be lacking by the Audit Commission and therefore provided considerable research opportunities. The research presented was carried out in: professional cricket; major sports events; elite sport development systems; and initiatives to stimulate demand in sport and leisure. The philosophical underpinnings of the research are influenced by critical realism and pragmatism. The former holds that we can have only a partial understanding of reality and that this is subject to revision. The latter focuses on the practical uses and successes of research rather than concern with grand theories and is based upon empirical evidence-based, rather than *a priori*, principles. In professional cricket, conventional ratio analysis found a seemingly healthy industry that was strategically vulnerable to fluctuations in the performance of the England team; and which was in urgent need of reform to become competitive. The establishment of UK Sport in 1997 created the opportunity for research into the economic and social impacts of major sports events; and, performance analysis in elite sport. Both of these areas of research are underpinned by an approach which devised methodologies for data collection; implemented standardisation techniques; and constructed predictive models which have been subsequently tested, refined and retested. In the context of stimulating demand for sport and cultural activities, price on its own is found to be a crude weapon particularly for generating market development effects. The coherence of this research is founded upon its commonality of method: in all four areas of research the subject organisations were in receipt of subsidy and the effective use of this subsidy has been examined by employing performance analysis techniques.

1. INTRODUCTION

The aim of this commentary is to demonstrate that over a seventeen year period the author has conducted a coherent body of research in sport management which is underpinned by the systematic application of performance analysis techniques. The rationale for the research is that performance analysis techniques are a valid portfolio of tools to address performance issues in the sport and leisure industries. Most of the research evaluated in this commentary originated from contract research [Refs 4-16] for organisations which require evidence-based advice that can be used to add value to their activities. In practice this means helping this type of organisation with planning, decision making and control such that their activities and interventions are delivered economically, efficiently, and effectively. All of the bodies for whom the research has been conducted are public bodies that must account for the use of their resources and the impact of their interventions. The works submitted demonstrate the use of performance analysis in terms of:

- performance put into context [e.g. Refs 3, 5, 6, 7, 8, 9 and 10];
- performance against expected norms [e.g. Refs: 1, 2, 12, 13, 14 and 16]; and
- performance compared with planned results [e.g. Refs: 4, 11 and 15].

As part of the process it has been necessary to devise new measures of performance, and to adapt and apply existing measures from other fields to the sport and leisure industry. For example, the Balanced Scorecard (Kaplan and Norton 1992) is 'borrowed' from the strategic management literature and subsequently applied to sport [Ref: 7]. Similarly, the concept of 'market share' is borrowed from marketing literature and applied to measuring nations' performance in elite sport competitions [Refs: 9, 10, 12, ,13 and 16].

The field of sport management is relatively new and has its origins in the enabling legislation of 1976 which permitted local authorities in England and Wales to provide sport and recreation facilities for local residents on a discretionary basis. Perhaps not surprisingly the initial focus of the industry was on operational, rather than performance, management. However, the status quo was disturbed by three significant research reports into sport and leisure written in the late 1980s and 1990s by the Audit Commission (Audit Commission, 1989, 1991a, 1991b). These painted a grim picture of performance analysis and management practices in the sport and leisure sectors, for example:

Authorities assume that low prices and blanket subsidies encourage use and help ensure social objectives are met.

Objectives are rarely quantified and success or failure in meeting objectives rarely measured or monitored.

[Source: Audit Commission 1989]

Managers are often not given clear objectives.

Greater effort should be made to quantify subsidies and to identify the eventual beneficiaries.

[Source: Audit Commission 1991a]

Museums services need to demonstrate that they are giving value for money.

Performance monitoring arrangements should be developed or improved.

[Source: Audit Commission 1991b]

The findings of the Audit Commission confirmed my own experience as a leisure facility manager in both the private and public sectors; and provided the inspiration for my research into performance analysis. The aim then of this commentary is to demonstrate the applicability and utility of performance analysis techniques to inform planning, decision making, and control in the context of sport and leisure, thereby adding value to current and future practices. This aim will be demonstrated empirically in the following four contexts:

1. Diagnosing the financial health of professional cricket in England and Wales;
2. Quantifying the impacts of major sports events;
3. Devising a measuring system for elite sport development systems; and
4. Evaluating the effectiveness of strategies to increase participation in sport and leisure.

These four contexts demonstrate four themes, which are made a coherent group by utilising a number of performance analysis techniques. Theme 1 concerns the application of financial and on-field performance analysis in first class and Test cricket. Theme 2 is concerned with the economic and wider benefits of major sports events. Theme 3 focuses on participants' performance analysis in elite sport. Finally, Theme 4 looks at strategies designed to understand and increase participation in sport and wider cultural activities, such as the arts and countryside recreation. Themes 2 and 3 are both related directly to the research agenda of UK Sport (major events and elite sport performance), and Theme 4 is closely linked to the participation agendas of Sport England, Arts Council England and Natural England. Prior to the review of these four themes, the works submitted are placed into a wider research context by examining their philosophical underpinnings so that readers can judge the works from a more informed and critical perspective.

2. RESEARCH UNDERPININGS

2.1 Ontology and epistemology

The purpose of this section is to place the body of work submitted into a wider philosophical context that demonstrates the ontological and epistemological assumptions that underpin it; thus justifying the theoretical perspective adopted, the methodological outlook, and the precise methods used. This philosophical context thus provides a conceptual basis for considering the submitted works and the research approach they demonstrate, as a coherent body. In the words of Grix (2002) it is important 'to understand, acknowledge and defend one's own ontological position' (p177).

From an ontological perspective, or 'what is reality?' (Finn et al (2000)) it is my belief that there is a real world 'out there' which exists independently of the human mind. This therefore makes my ontological stance one of 'realism':- I believe that it is possible to observe and record events occurring in the real world objectively. This view contrasts sharply with an alternative ontology, 'idealism', in which reality is believed to be a mental construct or somehow immaterial. The wider significance of a given ontological stance is that it has logical implications for the epistemology (theory of knowledge) that can be simultaneously held. That is, the type of knowledge that is possible, legitimate, and logically compatible with a given ontological position (Gill and Johnson 1991).

There are three broadly recognised epistemologies: objectivism; constructionism and subjectivism (Feast and Melles 2010). The objectivist epistemology is based on the belief that reality exists separately from human consciousness and experience and is therefore consistent with the ontology of realism. Objectivists believe that there is an 'objective truth' which researchers can uncover, provided they go about finding it in the correct manner. I am naturally receptive to the ethos of objectivism by virtue of my training in management accountancy, which is defined in Schwarz et al (2011) as:

The process of identification, measurement, accumulation, analysis, preparation, interpretation and communication of information used by management to plan, evaluate and control within an entity and to assure appropriate use of and accountability for its resources (p105).

Management accountancy's concern with measurement and information is clearly consistent with adopting a realist ontology and an objectivist epistemology.

At the other end of the epistemological continuum is the subjectivist stance, which holds the view that only an individual's perceptions are real, and that no conclusions about an objective 'out there' reality can be drawn from an individual's perceptions. Thus, the subjectivist holds there is no true reality existing outside an individual's perception. Sitting between the two epistemological extremes is constructivism which offers a compromise position between objectivism and subjectivism. Constructivists hold the view that truth and meaning are concepts that people 'construct' as a result of engaging their minds whether with the outside world or merely with sensed experiences. Thus it is possible for different people to construct meaning in different ways from the same observations.

2.2 Theoretical perspective

Our ontological and epistemological assumptions drive the theoretical perspective we adopt to research. Within realism and objectivism the dominant theoretical perspective has traditionally been positivism which contends that observations based on empirical data are the only source of authoritative knowledge. The burden of proof required with positivism and its reliance on scientific method does not make it entirely suitable for the social sciences. In particular, the belief that positivists should observe and not try to explain does not fit well when dealing with human beings and social situations. For this reason there has been an emergence of 'post positivism' approaches which soften the stance of pure positivism by acknowledging that a reality exists, but qualifying this by saying that we can only know this reality in part and on the basis of probability rather than certainty. Furthermore, post positivists accept that the influence of researchers through their knowledge, values and theories can influence what is observed and reported. It is quite likely for example that two researchers transcribing and interpreting the same interview might draw different conclusions from it. Whilst post positivists do not pursue universal truths, they do pursue objectivity by taking into account the potential impacts of biases. For the purposes of this commentary, two post positivism approaches are appropriate to the submitted works, namely critical realism and pragmatism.

The critical realist accepts that all observation is fallible and subject to error and that consequently 'truths' are subject to revision. That is to say, the critical realist is critical of humans' ability to know reality with any degree of certainty. Whilst positivists believed the purpose of science was to uncover the truth, the post positivist critical realist believes that "the goal of science is to hold steadfastly to the goal of getting it right about reality, even

though we can never achieve that goal!" (Trochim, 2000). As a result of all measurement being fallible, the critical realist focuses on the importance of numerous measures and observations to produce 'realist synthesis', and seeks to establish 'what works, for whom, how, in what circumstances and in what respects' (Pawson 2006 p73). Key to the approach of the critical realist is the acceptance of mixed methods research as a legitimate means of enquiry for example [Refs: 4, 8, 11, and 15].

[Ref 4] is an example of critical realism in practice. In 1992, the seminal work of Millward Brown found that customers of the high art forms of ballet and opera were willing to pay more for their tickets than the face value. This finding was the basis of an Arts Council proposition that arts organisations could increase their revenue by raising ticket prices in general rather than being increasingly reliant on public subsidy. The research in [Ref 4] found that for the art form of contemporary dance, this finding was not replicated and that willingness to pay more was heavily nuanced on the basis of gender, prior experience of the art form, and income. In other words, the proposition was not proven in a different context and was therefore subject to revision because it could not be generalised.

Whilst the submitted works are consistent with critical realism, I am also drawn to an alternative, but complementary, post positivist stance, namely pragmatism. Pragmatists hold the belief that if an assertion is true, then it must work satisfactorily. In other words, the pragmatist's view of research is to focus on its practical uses and successes rather than any higher level concern with representative accuracy of some underlying 'Truth'. For the pragmatist, Rorty (cited in Jenkins 1995) provides reassurance that the 'truth' (with a lower case 't') is:

"the name we give to whatever proves itself to be good in the way of belief, and good, too, for definitive, assignable reasons."

All of the works submitted except [Refs 1, 2, and 3] have been derived from contract research, where typically 'clients' have a research question to which they require an answer that will be of practical use. Research under these conditions is constrained by time, the resources available, the specifications of the client (including the methods to be used), and the skills' set of the researcher or research team. From this perspective it can be appreciated that the outputs will often be of limited scope that help to explain a given set of circumstances, but which do not constitute a 'grand theory'. Outputs can be said to be 'good' if they are useful,

help the client to make better decisions and have possible application to different but related needs of other clients.

To illustrate the applicability of pragmatism to the submitted works, I believe that 'market share' [Ref: 9, 10, and 12] is a good way to measure a nation's performance in an event like the Olympic Games. This is because market share addresses the logically proven weaknesses of existing methods and standardises data to enable meaningful time series comparisons. That the National Audit Office recommended the use of market share to the Department of Culture Media and Sport and its client UK Sport, because it provides a 'more rounded view' of performance, indicates to the pragmatist that such a belief is 'good too, for definitive, assignable reasons'. In a different context, that **sportscotland** should commission me to conduct similar research on four occasions by applying the same principles to recent editions of the Commonwealth Games, indicates that this approach to performance analysis is useful.

Both critical realism and pragmatism are consistent in the sense that they are both post positivist 'middle range' theories which use a mixed methods approach. What attracts me to pragmatism is that it operates on the basis of 'what works' and 'usefulness' unconstrained by the philosophical consequences of mixing methods from the different epistemological stances. This view is shared by Tashakkori and Teddlie (1998) who state that "for most researchers committed to the thorough study of a research problem, method is secondary to the research question itself, and the underlying worldview hardly enters the picture, except in the most abstract sense" (pp.21). This quotation is entirely consistent with my research. By contrast, critical realists such as Pawson (*op. cit.* 2006 p178) argue for their approach to be recognised as a new paradigm that "has firm roots in the philosophy of science and the social sciences and is confident, therefore, of its scientific credentials."

Pragmatism for me is much less ambitious and more accurately reflects the type of research from which the submitted works are drawn. Furthermore, the nature of client-driven research is such that its coherence, as a body of work, comes from the way it is approached rather than its detailed subject matter. Thus the submitted works are typified by being pragmatic in both the vernacular and philosophical senses of the word. With the exception of [Ref: 15] all of the submitted works have been subjected to an independent peer review process and have therefore passed a fundamental test of being deemed publishable contributions to knowledge.

2.3 Methodology and methods

For critical realists and pragmatists, the dominant methodology is empirical research whereby data are gathered by means of observation or experiment, which in turn shows consistency with an objectivist epistemology and a realist ontology. In the social sciences experimental research is unusual as it is often impossible and even unethical to replicate the protocols conducted in a laboratory in social situations. The actual methods used in empirical research in the social sciences include quantitative techniques such as surveying, sampling, and statistical analysis; as well as qualitative methods such as interviews, focus groups, and case studies. The choice of methodology and methods then raises the question of the quality of evidence gathered. In order to make judgements about the quality of evidence there are various hierarchies that can be used. In Table 1 below, an adapted version of the hierarchy of evidence used by the Centre for Evidence Based Management (CEBMA 2015) illustrates where the works submitted might be positioned in terms of their quality.

Table 1: Mapping the submitted works against a hierarchy of evidence

Purpose	Evidence Type	[Refs]	Narrative
Establish causality	Randomised controlled trials		It is shown that
	Controlled longitudinal studies		It is likely that
	Uncontrolled longitudinal studies	15,	
Form hypotheses	Cross-sectional studies and case studies	1,2,3,4,5,6,7,8,9,10,11,12,14,	There are signs that
	Expert opinion	13,16	Experts are of the view that

Table 1 makes it clear that despite the efforts to discover 'truths' in the pragmatism sense, most of the submitted works operate at a level that enables only tentative conclusions to be made: the evidence indicates that 'there are signs that' rather than the arguably higher quality narrative 'it is shown that'. It is therefore for readers to determine the extent to which they agree that the research submitted is consistent with the propositions offered.

2.4 Overview

The relationship and broad consistency between my ontological, epistemological and theoretical perspective, the methodology used and the detailed methods it leads to, can be

mapped onto an adapted¹ version of the Knowledge Framework proposed by Crotty (1998) as shown in Table 2.

Table 2: An overview of the philosophical underpinnings of the submitted works

Ontology	Epistemology	Theoretical Perspective	Methodology	Methods
Realism	Objectivism	Positivism Post-Positivism <i>Critical Realism</i> <i>Pragmatism</i>	Experimental research Empirical research	Sampling [Refs:4,6,8,11,12,15] Measurement / scaling [Refs:2,3,5,7,9,10,11,12,13,14,15,16] Statistical analysis [Refs:.,3,4,6,9,10,12,13,14,15,16] Questionnaires [Refs: 4,6,8,11,12,15] Focus group [Refs: 5 and 8]
	Constructionism	Interpretivism <i>Symbolic interactionism</i> <i>Phenemonology</i> <i>Hermeneutics</i> Critical Inquiry Feminism	Ethnography Grounded Theory Phenomenological enquiry Heuristic enquiry Action research Discourse analysis Feminist standpoint research	Qualitative interview [Ref: 1,4,8,15] Observation <i>Participant</i> <i>Non Participant</i> Case study [Ref: 5,15] Life history Narrative Theme identification
Idealism	Subjectivism	Postmodernism Structuralism Post-Structuralism	Discourse Theory Archaeology Geneology Deconstruction	Autoethnography Semiotics Literary analysis Pastiche Intertextuality

¹Crotty acknowledges his diagram omits ontology from the research process and merges it with epistemology claiming the two are mutually dependent and difficult to distinguish conceptually: "to talk about the construction of meaning [epistemology] is to talk about the construction of a meaningful reality [ontology]" (Crotty 1998, p10). Table 2 adapts Crotty's framework by adding in an ontology column.

All of the submitted works can be mapped against the perspectives, methodologies and methods commonly used in realism and objectivism. There is also some overlap with constructionism, notably my research based on qualitative interviews and case studies [Ref: 1, 4, 8, 15]. To position my research and its philosophical underpinnings more clearly within the adapted Knowledge Framework, grey highlighting has been used to pick out its nature and location. The various boxes in Table 2 are not necessarily hermetically sealed, and consistent with critical realism and pragmatism there can be overlaps. For this reason the internal lines of the boxes in Table 2 are broken rather than solid to show that my philosophical stance allows a degree of permeability between concepts. I would argue that the overlap with constructionism is actually greater than implied in Table 2 because even the results of quantitative research are subject to interpretation. For example, if a survey revealed that 80% of respondents were satisfied with a sport centre's customer service, one researcher might focus on 80% being a positive score, whilst another might concentrate on the 20% dissatisfaction score. There is also evidence of a 'mixed methods' approach as some papers are mapped to more than one method, for example [Ref 15] features in five of the six methods highlighted. What Table 2 demonstrates is that the programme of research can be said to be epistemologically consistent. In summary my submitted works can be characterised as being:

- realist;
- objectivist with some straying into the constructivist domain;
- post-positivist and closely aligned with critical realism and pragmatism but also straying into interpretivism;
- primarily empirical in approach;
- reliant on the methods consistently used in objectivism which are primarily, but not exclusively, quantitative in nature; and
- accepting of a mixed methods approach.

This positioning and analysis should be borne in mind by readers as they form their own views as to the quality, value and contribution to knowledge of the works presented in the rest of this commentary.

3. THE SUBMITTED WORKS

3.1 Financial and on field performance analysis in professional cricket

Professional sport has been a popular area for research amongst academics notably economists since the 1960s, for example Neale 1964. Whilst measures such as competitive balance and uncertainty of outcome have featured regularly, the financial analysis of teams' performance has been less well analysed by academics. In English football Touche Ross (1992) conducted the first systematic analysis of financial performance and this study has evolved into the highly successful Deloitte Annual Review of Football Finance. As a teacher of finance to postgraduate students, I was interested in applying a similar approach to a different context and in greater depth, which led to the choice of English cricket. The 18 first class counties provided a manageable population, they represented a culturally important national sport, and their annual reports and financial statements were publically available.

If there is a criticism to be made of the first Touche Ross reports, it is that the financial analysis is relatively superficial and focuses on three variables: turnover, profit before tax; and net assets (or capital). Subsequent versions have provided more financial detail, but none have been sufficiently detailed to enable the structured ratio analysis outlined by Wilkinson-Riddle and Barker (1988) in which the key components of the income and expenditure statement and the balance sheet are analysed to compute measures such as profitability; growth, liquidity, defensive position; owners' return on investment; and efficiency. These measures were applied to the population of 18 sets of first class cricket club accounts [Ref 2].

After considering a portfolio of financial performance measures, our interpretation was that the professional cricket industry in England was on the surface profitable with comfortable levels of liquidity and low levels of debt. However, underlying this positive first impression were 18 businesses dependent upon a central 'grant' from the sport's governing body (at that time the Test and County Cricket Board (TCCB)) which averaged 34% of the industry's entire turnover. What this research suggested to us, via performance analysis and a degree of interpretation, was that there 'were signs that' (see Table 1) the county cricket clubs were highly dependent upon a single funding source over which they had little or no control. The situation could also be interpreted as a case of mutual dependency with the TCCB being equally reliant upon the Counties. This is because it could be argued that the counties produced the players for the England team which in turn generated revenue for the TCCB. The 'mutual dependency' argument is not logically inconsistent with the 'strategic

vulnerability' argument, and there is obviously a symbiotic relationship between the TCCB and the Counties. However, the Counties were the subject of the research, not the TCCB, and against a real background of reducing Test Match attendances, the vulnerability of the Counties to TCCB revenue reductions was neither well understood nor appreciated. Thus, the findings of the research were useful, even if not all-encompassing of all possible other conclusions.

Interestingly, the dependency of the TCCB on the proficiency of County players was partially the subject of the follow up paper [Ref 3]. A numerically based indicator of proficiency was developed to quantify the competitiveness of the England team's performances: 'the Equivalent Proficiency Indicator² (EPI)'. The EPI analysis confirmed appearances that the England cricket team was indeed competitive in limited overs cricket, as its EPI of 53 was close to the point of optimum uncertainty of outcome (50). The same however was not true of the England team's recent performances in Test Match cricket (Win % = 36, in matches that ended in a win or a loss, that is, excluding draws). In looking for an explanation as to why a team could be competitive in one form of the game against the same opponents, but not in another, we logically excluded a variety of populist theories (e.g. pitch preparation and climatic conditions) and focused on the means of preparing players for international cricket.

For this part of the research, we used standardised measures of performance influenced by numerical analysis, such as game duration statistics, to provide insights into the extent to which the preparation arena of county cricket adequately replicated Test match conditions. The first class cricket clubs were funded by the TCCB to provide a cadre of players capable of being competitive in international cricket. However, in our view they were failing in the Test match format because the system of preparation was deficient. We found that the Australian system had match duration of 343 overs which compared favourably with Test matches (355). By contrast in England, county cricket championship matches typically lasted 310 overs, which we interpreted as the England team being conditioned not to be sufficiently prepared for the rigours of Tests. Furthermore, we found that there was little reward for success and no sanction for failure in the county championship. In short, the county cricket clubs were jeopardising the funding source on which they were dependent, and over which

²The Equivalent Proficiency Indicator was a performance indicator that standardised the England's win, loss, draw, and tie records into a measure that enabled like for like comparisons between opponents and across formats of the game (limited overs and Test matches). It is in effect an adapted form of a win ratio.

they had no direct control, by failing to carry out effectively the precise purpose for which their grant was provided.

Both research papers [Ref 2 and 3] were sent to Lord MacLaurin the then chair of the England and Wales Cricket Board (ECB, the successor to TCCB), who in turn circulated them to the 18 counties, as their implications were consistent with his own agenda for reform. The fact that such a high ranking administrator used the research in this way, signals two key points. First, its usefulness in the pragmatism sense; and, second, its originality because despite the huge consultation exercise that was being undertaken at the time (the MacLaurin Report) there had been no previous analysis of financial and playing performance that demonstrated the link between the two. Whilst we cannot take credit for the subsequent reform of the county championship into two divisions with promotion and relegation; or for the policy to award central contracts to England players; we can claim that these initiatives were consistent with our analysis of financial and on field performance and certain of our recommendations. The impacts of these reforms and the positive change in fortune of England's Test match performances are well documented in the subsequent research of my colleagues Bullough et al (2013).

The research was based on analysis of historical data, which enables an interpretation of past performance to be made. However, the predictive ability of historical data must be acknowledged as being uncertain. Statutory financial data is published six to nine months after a financial year has ended and there can be many events in the interim that affect the usefulness of this data. Equally, analysis of historical on-field data cannot predict what will happen in future competitions. What can be argued is that the weight and direction of the evidence presented was consistent with a line of thinking which rejected the *status quo* and looked to bring about change.

At this point my career began to change from conducting my own applied research funded by small grants to enhance teaching, to a more dedicated professional research capability, based on the needs of external clients who were prepared to commission research projects. The next two sections reflect on the research for one such client, UK Sport, on applied research related to major sports events and elite sport.

3.2 The impacts of major sports events

The creation of UK Sport in 1997, a UK-wide organisation with responsibility for elite sport, proved to be a major research opportunity as demonstrated by the quotation below from UK Sport's Royal Charter.

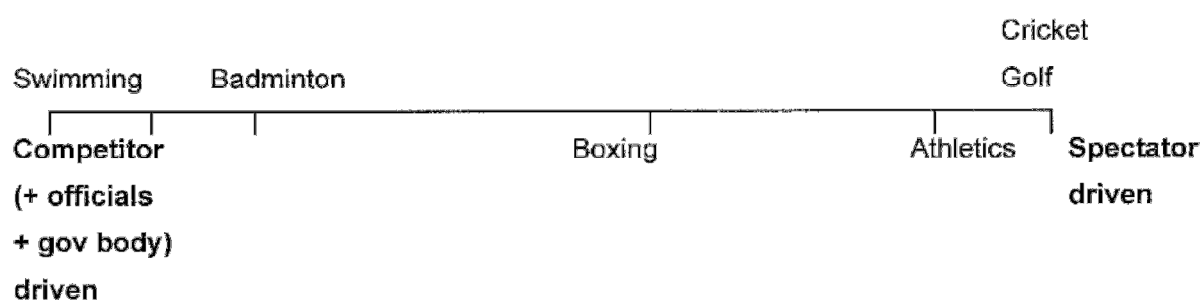
(h) (i) to carry out itself, or to encourage and support other persons or bodies in carrying out research or studies into matters concerning sport and physical recreation intended to be of benefit to Our United Kingdom as a whole; and to disseminate knowledge and advice on these matters.

[Source: UK Sport 1996]

UK Sport has responsibility for major sports events, the development and delivery of an elite sport development plan and international relations. In the first instance its research agenda focused on major sports events. The biggest sport event hosted in the UK since the 1966 FIFA World Cup was the Euro '96 football championship; for which the planning stages were more focused upon fears of disorder than positive economic impacts and future legacy. Despite its best efforts, the then Leisure Industries Research Centre (LIRC) at Sheffield Hallam University was unable to raise any funding to conduct an economic impact study of Euro '96. Consequently, it funded the study itself (LIRC 1996) using a methodology influenced by Crompton's seminal paper of 1995. The design of a research instrument capable of delivering a credible estimate of an event's economic impact, whilst addressing Crompton's 'eleven sources of misapplication' was an initial original contribution which was subsequently published in its own right (UK Sport 1999a). The LIRC report on the event proved to be both high profile and highly influential. UK Sport had agreed to invest in a portfolio of six major sports events in 1997 and turned to LIRC to apply its Euro '96 methodology and expertise to these six events. A descriptive meta-analysis of these events was published by UK Sport (UK Sport 1999b) which in turn provided the raw material for [Ref: 6] - a paper which even at the present time remains one of the journal *Managing Leisure's* most read and cited papers. The strength of this paper was that having used the same methodology at all six events it was possible to make like for like comparisons across the portfolio. This was original in a UK context and developed the work of Mules and Faulkner (1996) who conducted similar analysis on four events in Australia over a nine year period. The key finding from the analysis was the variability in the scale of economic impacts delivered by events and the variability in how any such benefits are delivered. An Ashes Test Match Cricket event at Edgbaston which lasted five days was found to have the highest economic impact (£5.5m); whereas a half-day athletics meeting at Sheffield's Don

Valley Stadium had the lowest (£0.18m). On this basis we were able to conclude that whilst elite sport events were undoubtedly 'major' in sporting terms, this did not imply that such events would have major economic impacts. This difference in the absolute value of the economic impact of events was a particularly important finding, because at the time it was becoming increasingly common for the towns and cities hosting major events to underwrite them with public money or value in kind. Whether this investment made economic sense depended crucially on the economic impact received in return.

A further significant finding was that the economic impact generated varied by event on two levels. First the 'drivers' of economic impact varied along a continuum of 'spectator driven' to 'internally driven' as shown in the original continuum model from [Ref 6]



Within the sample, the professional spectator sports of cricket, golf and athletics tended to be spectator driven, whereas the routinely less high profile sports of amateur boxing, badminton and swimming were more reliant on the internal participants in the event, rather than spectators, to generate economic impact. The competitor driven nature of the swimming and boxing events also provided evidence that elite sports events for junior athletes did not generate significant public interest; consequently not only was the economic impact internally driven, it was also modest in absolute terms. Second, it was found that what visitors to the six events spent their money on varied considerably. In the case of the swimming event, 82% of the economic impact was spent on accommodation, primarily by those involved with the event. By contrast, for the athletics (a half day event) only 21% of the economic impact was spent on accommodation, with the majority (54%) spent on food and drink, programmes and merchandise, and shopping. The important message for policy makers and funders of events was that generating economic impact in absolute terms was heavily dependent upon the volume of overnight stays.

A major benefit of having sets of data compiled using the same methodology was that it presented the opportunity for the next major development, which was to use them and the

increased understanding of the nature of events, to estimate the economic impact of future events. Using existing data from the six 1997 studies and the 'case file' for the 1998 European Short Course Swimming Championships (LIRC 1999), I was commissioned by UK Sport to carry out a forecast of its economic impact. This forecast was £250,000 and the figure found from primary research was £315,000, an accuracy of 79% which was viewed by UK Sport as being a highly encouraging forecast. Pre-event forecasting became standard practice for UK Sport and is reviewed for twelve events in UK Sport's *Measuring Success* series (UK Sport 2004, 2007).

The accuracy or otherwise of economic impact studies relies on the quality of statistical sampling undertaken which enables the statistics from the sample to be aggregated into the parameters of the population. From the purist's perspective, this implies random sampling which delivers a representative sample that can be used to describe the population. Fieldwork at major sports events does not lend itself to random sampling. More often than not the precise population is unknown and there is no basis on which to calibrate the sample against the population. In short we can never be confident that our sampling is representative. There are operational techniques used to reduce bias such as interviewing every n^{th} person in a block of seats; and data processing techniques such as performing statistical 'trims' to reduce the impact of outliers. The best that can be said about my economic impact work is that the end results are estimates and are subject to an unquantifiable margin of error. That it is possible to compare actual results with pre-event forecasts and to conduct variance analysis to explain discrepancies provides a degree of assurance about the usefulness of the data.

Although our early event appraisals for UK Sport focused on economic impact (UK Sport 1999b), there was a growing awareness that economic impact was not necessarily the only output that major sports events could deliver. Many major sports events also achieved considerable media coverage, notably on television, which was important to UK Sport as one of its priority criteria at the time was the 'public profile' achieved by an event. One of the clearest and most powerful methods of demonstrating public profile was via the volume of television coverage achieved and the size of the audience watching the coverage. By using BARB³ data and Eurodata equivalents, my research was able to calculate the coverage and reach of the television transmissions of the 1998 European Short Course Swimming Championships as shown in Table 3 [Ref: 5].

³BARB stands for Broadcasters' Audience Research Board

Table 3: Television coverage of 1998 European Short Course Swimming Championships

Indicator	United Kingdom	Other European	Total
Number of Programmes	6	12	18
Total Duration (Minutes)	369	718	1,087
Cumulative Audience (000s)	5,451	2,522	7,973
Highest Share Achieved	23.0%	9.8%	23.0%
Highest TVR ¹ Achieved	4.9%	9.0%	9.0%

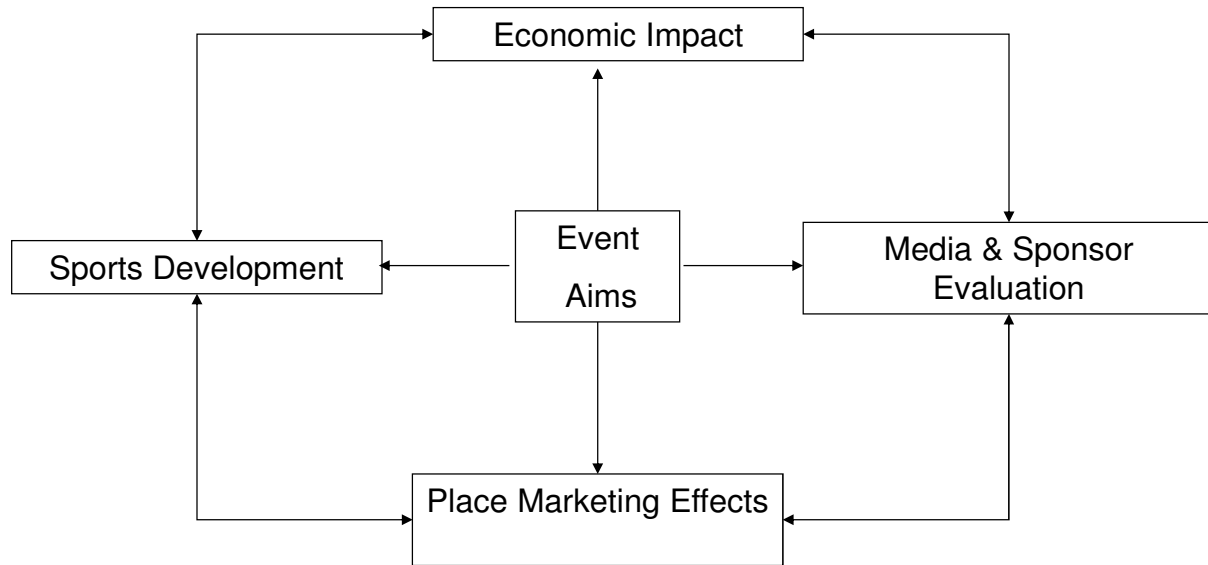
¹ TVR = Television Rating = the percentage of all the people in a country with access to a television actually watching the programme in question

It was a positive surprise for UK Sport and the national governing body for swimming (ASFGB at the time) that the European Short Course Swimming Championships event was watched by 4.9% of the UK population and that at its peak 23% of the population watching television (market share) were actually watching the swimming event. This finding confirmed that minority sports, in media coverage terms, could have a measurable and significant media profile. As a consequence of the output of television coverage, the sponsorship industry was extending the measurement of media monitoring. This was achieved by measuring the impact of such coverage for sponsors via the measurement of how long a sponsor's logo was on show for, and what the advertising value equivalent (AVE) of this coverage was worth. Furthermore, along with economic impact data, our research was showing UK Sport, national governing bodies of sport and local authorities, what the 'property rights' of events were worth. This new knowledge enabled:

- UK Sport to fund events at a level that represented good value for money;
- national governing bodies to sell their property rights at a fair price; and,
- local authorities to make an informed decision on which events to support.

It rapidly became clear from performance analysis techniques that economic impact and media coverage were not the only potential benefits of hosting and supporting major sports events. Taking the lead from Kaplan and Norton (1992 *op. cit.*), I applied their concept of the Balanced Scorecard to the case of major sports events [Ref 7] to illustrate that these events had the potential to deliver a variety of potential benefits to a variety of different stakeholders. The adapted Balanced Scorecard is shown in Figure 1.

Figure 1: The Balanced Scorecard applied to major sports events



The wider use of Figure 1 is that it formed the basis for an event evaluation framework www.eventIMPACTS.com which is an online resource designed to help those who stage events to measure the impacts of such events. The eventIMPACTS.com website was commissioned by UK Sport in collaboration with six other public sector bodies to be a conceptually robust yet practical tool that would provide: 'a credible *at least* estimate of the impact of an event that could be supported by a transparent audit trail of supporting evidence'. The words in inverted commas are my words taken from a confidential proposal to the eventIMPACTS consortium to carry out the research which underpins the model. These words neatly sum up my outlook on research and are entirely consistent with practical applications and usefulness as prized by the philosophy of pragmatism. From UK Sport's perspective the model in Figure 1 was underdeveloped because it did not consider the elite sport consequences of major sports events, notably the impact of home advantage on host nation performance. This and other aspects of performance analysis concerning elite sport are covered in the following section.

3.3 Performance analysis in elite sport

UK Sport began to invest in elite sport in 1997 prior to the 2000 Olympic Games held in Sydney, Australia. During this event the Great Britain and Northern Ireland (Team GB) team won 11 gold medals, 28 medals in total and improved its medal table ranking from 36th in Atlanta 1996 to 10th. Whilst this was hailed as a spectacularly successful performance and a ringing endorsement of the investment in an elite sport development system, it was also the case that five European nations, Russia, Germany, France, Italy and perhaps surprisingly the Netherlands, had all finished above Great Britain in the medals' table. UK Sport wanted to know why these nations had performed better than Great Britain and commissioned me to find out. The ensuing report *European Sporting Success* (UK Sport 2003) revealed two major gaps in knowledge which subsequently paved the way for a programme of research that still continues. First, the measure of performance adopted (medals' table ranking) was rather simplistically based on lexicographic ordering of nations on the basis of descending order of gold, then silver then bronze medals. As can be seen in the quotation below from the International Olympic Committee (IOC) it did not regard the medals' table to be an order of merit.

"The International Olympic Committee (IOC) does not recognise global ranking per country; the medal tables are displayed for information only." (IOC cited in UK Sport 2003 *op. cit.*)

Second, there was very little literature on elite sport policy development undertaken at national level. There had been plenty of research into the economic determinants of Olympic success since the 1950s (for example: Jokl et al., 1956; Jokl, 1964; Shaw & Pooley, 1976; Colwell, 1982; Baimbridge 1998; and Johnson & Ali, 2002). These researchers were primarily concerned with quantifying how many medals nations would reasonably be expected to win given their resources such as population, wealth and other variables such as climate, religion and type of government. Invariably these were retrospective studies using known performance results from previous Olympic Games. My papers submitted for this theme can be divided into three sub themes:

- measuring performance beyond the medals' table [Refs 9 and 12];
- applying the same principles to another multi-sport event [Ref 10]; and
- using knowledge about elite sport development success to forecast performance [Refs 13 and 16].

These sub themes are explored in turn throughout the rest of section 3.3.

3.3.1 Beyond the medals' table

In [Ref 12] it was demonstrated that the five nations in the *European Sporting Success* report achieved success in different sports, with different policies towards prioritisation and diversification, and with different contributions to success from men and women. Applying the concept of market concentration to the five sample nations it was found that 44% to 61% of all medals they had won since 1948 had been won in their top three sports. In the case of gender it was found that France, Italy and the UK were traditionally reliant on men for their Olympic success, whereas in the case of Germany and the Netherlands it was women who contributed the majority of success. All of this analysis, which was relevant for UK policy purposes, was masked by the aggregated IOC medals' table. Thus the first key contribution to knowledge is this systematic examination of nations' performance in the Olympic Games at a much more granular level than ever conducted before. In addition, ranking in the medals' table was shown to be a non-controllable measure that did not necessarily reflect the impact of policy. For example, it is mathematically possible for a nation's medal table ranking to improve from one edition of the Olympic Games to the next simply by rival nations deteriorating or by dominant nations becoming even more dominant. What was required was a measurement system that would monitor performance in a manner which could be attributable to the impact of policy. As demonstrated in [Ref 12], the number of events contested in the Olympic Games had increased from 136 in 1948 to 300 in 2000 which also presented challenges for consistent measurement over time. The challenge can be summarised as finding a performance measurement system that was attributable to policy and which was comparable on a consistent basis over time. The solution was 'market share' [Refs 9 and 12] which captured the totality of achievement by taking into account all medals won and applying a weighting to compute a 'points' score. This points' score was subsequently converted into a measure of market share, by expressing it as a percentage of the total number of points awarded. A worked example for Great Britain in Sydney 2000 is shown in Table 4.

Table 4: Demonstrating market share

Data	Gold (3)	Silver (2)	Bronze (1)	Medals / Points
Sydney 2000	300	300	327	927
Medal Points	900	600	327	1,827
Great Britain 2000	11	10	7	28
Medal Points	33	20	7	60
GBR Market Share % ¹				3.28%

¹Market share = ((60 / 1,827) x 100) = 3.28%

Market share can be considered to be a technique that standardises performance data in order to make meaningful comparisons and to compare performance on a time series basis. Its application to the Olympic Games proved to be particularly insightful in 2004 after the Athens Olympic Games at which Great Britain was again ranked tenth in the medals' table as shown in Table 5.

Table 5: Great Britain's performance in Athens v Sydney

Method	2000	2004	Diagnosis
Medals' table ranking	10 th	10 th	Same
Total medals	28	30	Better
Points	60	57	Worse
Market share %	3.28%	3.11%	Worse

Of the four measures presented in Table 5 it was concluded that market share was the best performance measure for assessing the impact of policy because: it was the only standardised measure; and the means by which it could be influenced were more attributable to policy factors than was the case for the other measures. The National Audit Office (2008) in its review of UK Sport's preparations for London 2012 commissioned me to contribute to its report, and on the basis of my input gave the Department for Culture Media and Sport and UK Sport the advice shown in the quotation below.

The Department and UK Sport should supplement the target for medal table position, which depends only on the number of gold medals won, with measures which reflect wider aspects of performance at the Games, such as the total number of medals won. For example, they should consider introducing a measure of 'market share' to reflect the Great Britain team's percentage share of all the medals available at the Games, possibly based on a weighted value for each position on the podium. This would provide a more rounded measure of performance which could be compared between Games.

[Source: National Audit Office, March 2008]

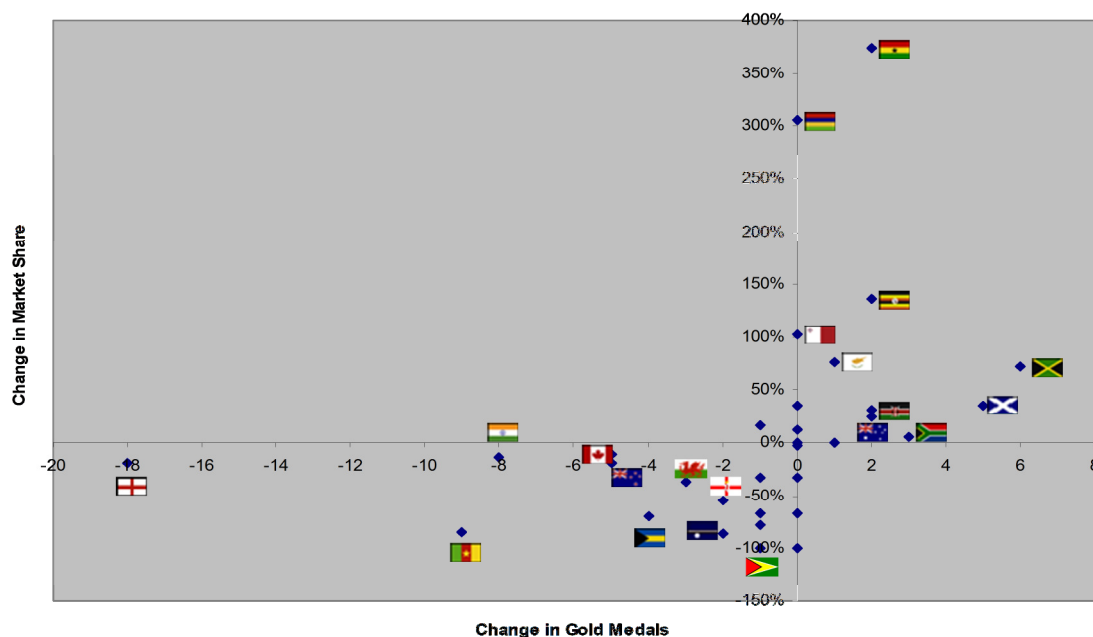
Whilst market share may have been a significant improvement on medals' table ranking as a measure of the impact of policy, it is not without its limitations. As the IOC has sought to limit the dominance of some nations and to spread medal winning success more widely, rule changes have compromised the validity of the raw form of market share. One such rule change has been to limit the number of medals that athletes from an individual nation can contest. A good example is track cycling and the case of Great Britain. Great Britain dominated the track cycling events in Beijing 2008 winning the maximum of two medals in four different events. For London 2012 the rules were changed such that each nation could contest only one medal per event. Making a standard market share comparison between Great Britain's performance in track cycling in 2012 and 2008 would lead to the conclusion that performance had deteriorated. However, if the calculation was adjusted to be 'like for

like' using a more sophisticated measure such as 'contestable market share' then the opposite would be shown to be true. The value of the technique in its adapted form would be upheld, at least to the pragmatist, as being satisfactory and useful.

3.3.2 Applying the principles to a different context

When I made the presentation referred to in [Ref 9], in the audience was a senior member of staff from **sportscotland**, the sport development agency for Scotland, who asked if similar analysis could be undertaken for the Commonwealth Games. This research was commissioned and applied to Scotland's performance in the Commonwealth Games 1950-2002 (Shibli and Wilson 2004) and has subsequently been replicated in 2006, 2010 and 2014 implying at least, its usefulness. The 2006 report [Ref 10] is included in this commentary because it marks a development in the analysis of performance to include variance analysis between consecutive editions of an event. This was first demonstrated at national level by computing the differences between gold medals won and market share and then plotting this on a graph as shown in Figure 2.

Figure 2: Variance analysis applied to the Commonwealth Games 2006 v 2002



In Figure 2 Scotland's flag, the Saltire, is in the top right hand quadrant because its athletes won five more gold medals and increased Scotland's market share by 34% in 2006 compared with 2002. Rather than the ambiguous way in which Table 5 above could be interpreted, Figure 2 represents an easily understood and objective assessment of performance. At the same time it compares nations against each other such that we can see that in terms of

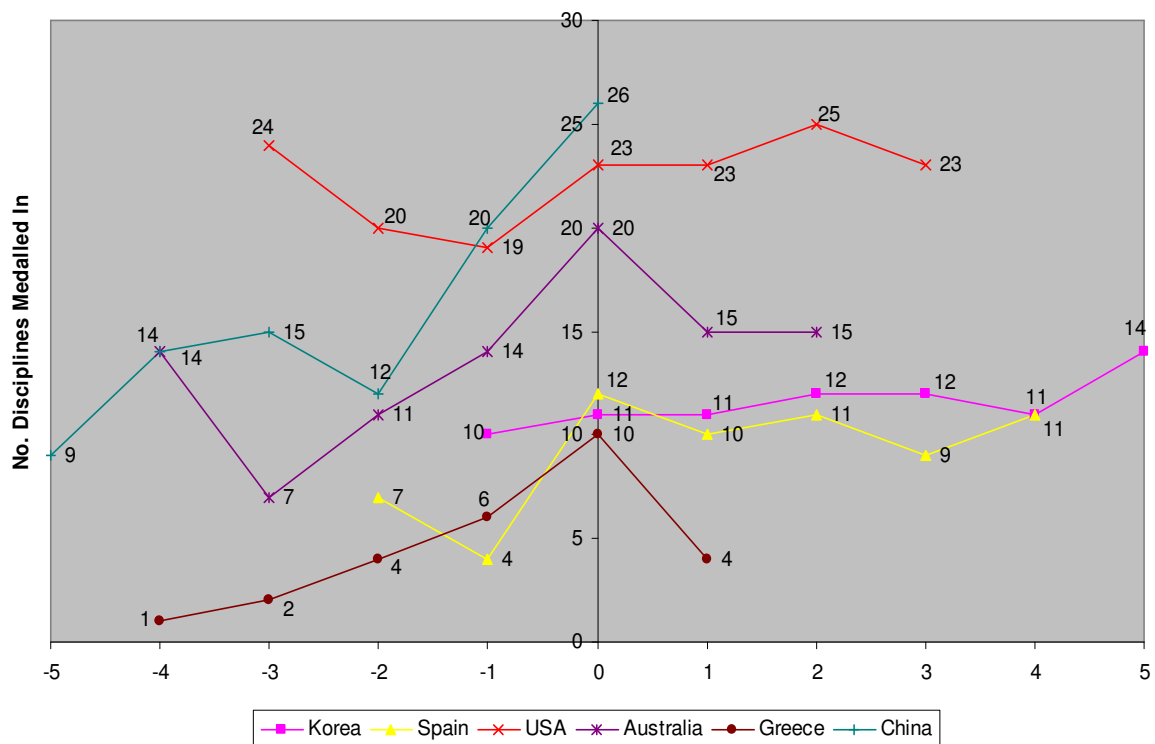
increased gold medals won, Scotland was second only to Jamaica. Equally revealing is that with a loss of 18 gold medals, 2006 was less successful for England compared with its host edition in 2002. This same analysis was applied to the variances in the medals won by sport and by gender for Scotland and also to China and the Olympic Games [Ref 13]. The contribution of this work is that it presents elite sport performance data in a context that is appropriate for policymakers in a conceptually sound yet readily accessible manner, enabling them to use measures such as return on investment. Furthermore, the concepts detailed in 3.3.1 are shown to be transferable to another context. The limitation of the analysis is that it quantifies by 'how much' performance has changed but does not explain 'why'. Elite sport policymakers in Scotland were no doubt pleased that their athletes performed better in 2006 compared with 2002, but the research does not deal with attribution, that is: what caused the improvement?

3.3.3 Forecasting elite sport performance

In much the same way that reviewing the economic impact of a variety of major events led to forecasting the impact of future events; so too, the reviewing of elite performance has developed into forecasting future performance, notably for host nations. In the post 1988 era of the Olympic Games, all host nations have increased their number of gold medals won and improved their medals' table ranking. It was also clear that in the lead in to Beijing 2008 China was on an upward trend of achievement in the Olympic Games which showed a near perfect trend line of progression ($r^2 = 0.94$) against time [Ref 13] and it also appeared that there was a quantifiable 'home nation' effect. Home nation effect has previously been identified as having a positive effect on a nation's performance (Balmer et al 2001 and 2003; Bernard and Busse 2000 and 2004) but it had only featured as a dummy variable ('yes' or 'no') in their multiple regression models. A preliminary analysis of the data I was building up indicated that the impact of the host nation effect could be developed into a quantifiable measure using a simpler and more direct approach than multiple regression techniques on panel data. Applying simple linear regression of performance over time indicated that if China continued along the same improvement path then it would be expected to win 39 gold medals at Beijing 2008. Using an assumption based on historical average, the home nation effect was found to be worth a further seven gold medals giving an overall forecast of 46 gold medals for China in 2008. I had tested my technique retrospectively [Ref 13] and found that it was typically a more accurate measure than Bernard and Busse (2000, 2004) who were taking the lead in publishing forecasted medal tallies in advance of the Olympic Games. In

reality China won 51 gold medals at Beijing 2008, six more than my forecast, which was nonetheless closer than any other forecasts (e.g. Johnson and Ali (2008) 44; Bernard (2008) 38; and Barra (cited in Williams 2008) 37). Following the perceived 'success' of the Beijing forecast I repeated the exercise for Great Britain in the Olympic Games of London 2012 and refined the model. The technical weakness with the original model was that it was based on the average increase in gold medals won rather than the share of medals won which corrects for variations in the number of events between editions of the Olympic Games. Had this approach been used for the Beijing 2008 forecast, the original forecast of 46 would have increased to 48, a differential of just three from the actual total of 51. There was also a similar, but less pronounced, effect on total medals and also on the number of sports and disciplines in which the host nation enjoyed medal-winning success. In the case of the latter point, Figure 3 shows how all host nations between 1988 and 2008 increased the number of disciplines in which they won medals compared with the pre-hosting edition (t-0 compared with t-1). Whilst various forecasts of gold medals and total medals have been made in recent editions of the Olympic Games, no previous attempts have been made to forecast the number of sports and disciplines in which a nation might win medals and therefore the analysis of these variables in Figure 3 is original.

Figure 3: Host nation performance: Disciplines in which medals were won



A summary of the forecasts made for Great Britain in [Ref 16] along with the actual performance and variance analysis is shown in Table 6.

Table 6: London 2012 forecasts and actual performance

Measure	Forecast	Actual	Variance	Accuracy
Gold medals	27	29	-2	93%
Total medals	56	65	-9	86%
Sports	15	16	-1	94%
Disciplines	18	21	-3	86%

Again in 2012 the predictions' accuracy compared very favourably with other forecasters. Notably, the new approach to gold medal forecasting - based on increase in percentage share rather than average - which produced a variance of -2, was bettered only by Goldman Sachs (2012) who predicted Great Britain would win 30 gold medals (a variance of +1). Forecasts are of course built on assumptions which have their own uncertainties and there is no guarantee that the past is a good predictor of the future. Nonetheless, as a set of tools that can help to evaluate public investment in elite sport and provide tests of reasonableness as to what might be achieved, my work to date [Refs 13 and 16] shows that there are patterns in the data that have tended to replicate themselves since 1988. Having identified the patterns, the added value is using them to evaluate what has happened in the past, to make forecasts of what might happen next, and to evaluate the effectiveness of expenditure by publicly funded bodies. This type of analysis is not necessarily applicable in all circumstances and I do not claim that it is a 'grand theory'. For example, Bangladesh has never won an Olympic medal and if it was to host the Olympic Games it is highly unlikely that it would be appropriate to apply host nation effects of the same magnitude and based on the same rationale as those used for China and Great Britain. Both of these nations have highly advanced elite sport development systems whereas Bangladesh does not. Being host nation does not necessarily cause an increase in medals won *per se*; what is more likely is that host nation status is one of numerous variables which might contribute positively to the likelihood of winning more medals. The apparent 'accuracy' then of the 2008 and 2012 forecasts could, at the ultimate logical level, be coincidences. However, the model devised worked satisfactorily when it was used and the critical realist and the pragmatist ask no more of their theories than that.

3.4 The demand for sport and leisure

Sections 3.2 and 3.3 have documented a programme of work built around the policy agenda of UK Sport since its inception in 1997. Sport England was established in 1996 and it has a

brief to increase participation in sport; similarly in the arts, Arts Council England also pursues a participation agenda as does Natural England in countryside recreation. This final theme looks at the application of performance analysis techniques to the demand for sport and leisure. If an organisation such as Sport England has responsibility for increasing participation amongst the general public, this can be restated as 'stimulating demand'. Sport and leisure economists such as Gratton and Taylor (2002) and Cooke (1994) have argued that in simple terms the determinants of demand for sport and leisure are: price; income; the price and availability of alternatives; and individual tastes and preferences. The purpose of this section is to illustrate the use of performance analysis techniques to evaluate programmes designed to stimulate demand.

The business strategy of achieving growth by increasing demand is clearly illustrated by Ansoff (1957) via the Ansoff Matrix which has been applied to both the arts [Ref 11, chamber music] and sport [Ref 15, swimming] in this commentary. In both cases the desired outcome (or objective) was to achieve a market development effect, that is, new customers for existing products. The research projects were concerned with identifying the critical success factors that bring about the desired outcomes so that they might be generalised and used more widely. The research is consistent in ambition with Pawson's 'what works' question (Pawson 2000 *op. cit.* p73) and is also relevant to [Ref 8] which examined young people's expressed and latent demand for countryside recreation.

In both the chamber music and swimming, a key finding was that the intended market development effects were at best modest. The chamber music research revealed that 3.7% of respondents to the survey were first time attenders to a chamber music event; and in the *Everyday Swim* evaluation only one local authority out of nine achieved a statistically significant increase in participation despite an investment of £300,000 each. What the evaluations indicated was that in the first instance although the desired outcome was market development, any actual outcome was more likely to have been market penetration, that is, existing customers making more intensive use of existing products. The first time attenders to chamber music concerts were for the most part sourced from the mailing lists of other art forms notably classical music; and in the swimming intervention new customers proved very difficult to attract often because they were unable to swim. Furthermore, reviews of initiatives within the *Everyday Swim* intervention where swimming had been made available

free of charge showed no evidence of success. This finding was replicated at national level in the £70m *Free Swimming* initiative (DCMS 2010).

If demand could not be stimulated when the product was given away (swimming and contemporary dance) or had no cost attached to it anyway (countryside recreation), then clearly these aspects of the sport and leisure industry defied conventional economic theory. In the case of children's countryside recreation, although there was, in principle, latent demand for more participation, other factors prevented this from being realised. The impact of competing products and services meant that even if the young people in the sample had more time, they would rather have spent it playing sport, going to the cinema or watching television. This finding led to the conclusion that for a product like countryside recreation, participation was a function of individual tastes and preferences and the impact of competing products and services. By contrast, price and proxies for income, such as socioeconomic status, proved to be weak determinants of demand.

Having identified the existence of latent demand in principle, the key contribution was being able to make a more informed assessment, based on recognised economic theory, of whether any such latent demand was realisable. In the case of swimming, the rationale for the *Everyday Swim* programme was that there was latent demand amongst 13% of the adult population for swimming. However, nearly half of this latent demand was amongst people who were already active and meeting Sport England's participation targets. It was also found that 20% of all adults could not swim and that this statistic increased with age such that for the national *Free Swimming* initiative, nearly 50% of the target group (60+) were in effect excluded from taking up the offer because they could not swim.

To compound this problem, latent demand for swimming was also found to decrease with age; meaning fewer older people actually wanted to swim relative to younger adults. The one local authority which had recorded a significant increase in swimming participation, Islington, built its success around broadening the base of swimming participation by advertising to all households in the borough and putting on subsidised swimming lessons for adults who could not swim. From the perspectives of business development and useful research it was clear [Refs 8, 11 and 15] that different strategies were required to deliver market development and market penetration. This point is highlighted further in [Ref 4] which revealed that even

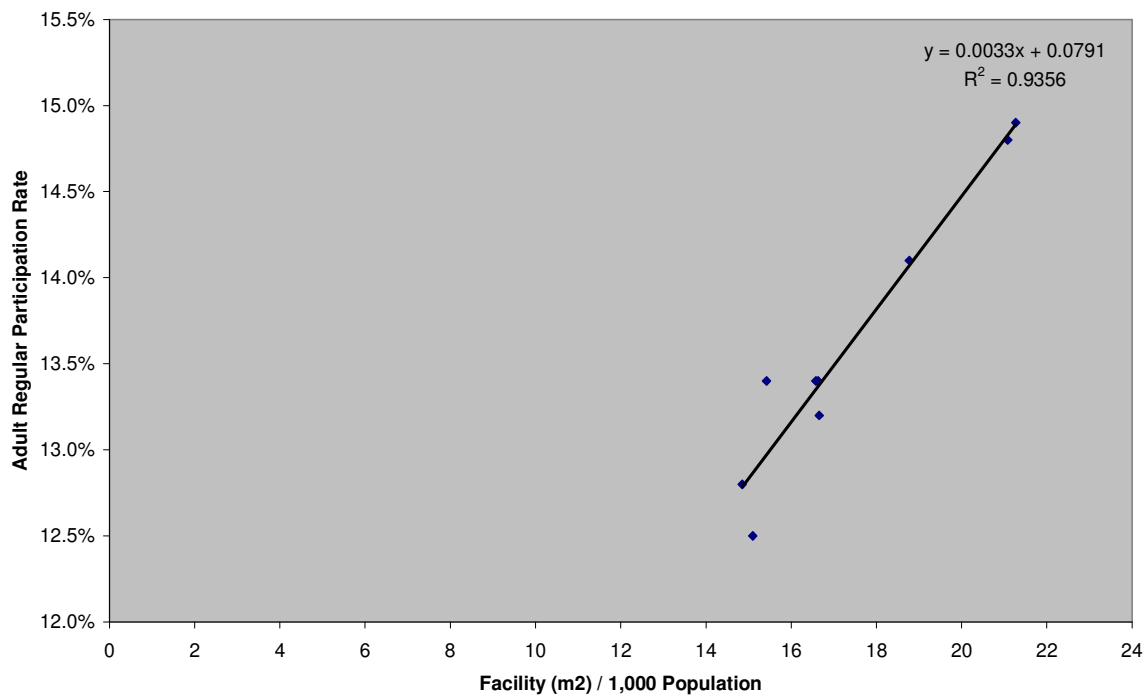
when tickets for contemporary dance performances in a theatre were given to potential customers, only a minority actually used them to attend the performance.

For both the contemporary dance and the swimming research, it could be concluded that price on its own is a rather crude weapon for trying to stimulate demand. In essence, the strategy required is to wean people off what they do now (competing products and services) and to alter their tastes and preferences such that they value new activities, like swimming, more than their present ones. In terms of basic economics it can be argued that the focus for stimulating demand has been on the wrong determinant of demand, namely price, rather than influencing individual tastes and preferences. As a stark example, the *Free Swimming* intervention had not been cost effective at £535 per new swimmer, which is why the 2010 Conservative government stopped the programme.

A cheaper more sustainable approach was found in Islington by providing swimming lessons in a context sensitive manner, such as lessons for adults only that were not overlooked by the public. This approach dealt with barriers such as inability to swim and fear of ridicule; as well as introducing positives such as learning with similar adults who formed their own support group, which in turn encouraged adherence to the programme. The Islington example demonstrates a far more sophisticated approach to targeted market development than opening the doors and letting all comers use the facility at no cost.

Less well researched than demand, is the significance of supply which is tested in [Ref 14] to establish whether there was any relationship between swimming participation rates (demand) and the availability of swimming opportunities (supply). Figure 4 shows proxies taken for demand (adult swimming participation rate from the Active People Survey) and supply (metres squared of swimming space per 1,000 head of population, taken from the Active Places database).

Figure 4: Swimming: The relationship between supply and demand



The regression in Figure 4 shows a very strong ($r^2 = 0.94$) correlation between the demand for swimming and the availability of supply. However with basic statistics like correlations the direction of the relationship is not confirmed and the relationship itself might even be a coincidence. It is just as plausible to conclude that high levels of supply cause high levels of demand as it is to conclude that high levels of demand lead to relatively high levels of supply. It would have been an easy recommendation to make that swimming participation could be increased by building more swimming pools.

However, in this case my advice was not to build more pools but to adopt a much more low risk strategy of bringing into public use pools which were located on sites such as schools, colleges and universities so that the availability of supply could be increased in the short term, without the need for major capital investment. That is to say, more effective use of existing assets as a pragmatic test of concept. In the meantime, the search for causation of how demand for sport and culture can be stimulated continues, so that interventions can be targeted effectively to address known inequalities and to improve the quality of people's lives. In the concluding section, the contribution to knowledge and the coherence of the set of submitted works is presented.

4. CONTRIBUTIONS TO KNOWLEDGE AND COHERENCE

This final section reviews the contribution to knowledge of the submitted works and their coherence as a whole.

4.1 Professional cricket in England

The diagnosis of the financial health of English cricket was the first of its type conducted on an entire professional sport industry in the UK using a suite of recognised financial analysis techniques. This found an industry which, when taken at face value, met conventional financial norms; but which when scrutinised more deeply revealed a potential strategic vulnerability. Conducting an analysis of on-field performance using the specially devised Equivalent Proficiency Indicator it was found that although the England team was competitive in One Day International Matches it was less so in Test Match cricket. The only logical explanation was that county cricket was not preparing players for the rigours of Test cricket. This view was consistent with changes taking place in the game at the time.

4.2 The impacts of major sports events

After devising a research instrument that was conceptually robust and addressed the known weaknesses of previous instruments, a programme of standardised research was conducted at six major sports events. Meta-analysis of the data revealed that the economic impact of major events could be quantified and varied considerably according to their duration, scale, level of public interest, and the spending patterns of those involved with the event. The learning from this exercise led to the devising and testing of a predictive model which was tested and subjected to variance analysis to reconcile actual with predicted outcomes. The evaluation of events was subsequently broadened to include measures such as media coverage which are antecedents to further measures such as the value of place marketing effects and sponsors' return on investment. A significant practical application of the event evaluation techniques has been the creation of the www.eventIMFACTS.com website which provides academics and practitioners with a 'how to' guide to evaluation. It enables the quantification of economic, environmental, media, and social impacts at varying levels of complexity depending on the needs of the user. In the 2014 Research Excellence Framework, a case study written by me on the economic and social impacts of major events and festivals based on this research was singled out by the panel and 'was judged to be outstanding'. This can be taken to mean 4* or world leading research.

4.3 Elite sport

The initial contribution of this work was to devise a measurement system (market share) which overcame the logical deficiencies of other measures of nations' performance in the Olympic Games, such as medals' table ranking. Market share provides policymakers with a system that is suitable for measuring the impact of policy. The system was subsequently picked up by the National Audit Office and recommended to UK Sport. The system has proved to be useful in another multi-sport context, the Commonwealth Games. The 'feel' for data derived in this way led to the development and demonstration on two occasions of a forecasting model designed to predict the performance of the host nation in the Olympic Games. These forecasts achieved usefully accurate results and were subsequently developed to estimate the number of sports and disciplines in which the host nation would win medals. This latter development is unique.

4.4 Demand and pricing

Applying the Ansoff Matrix for business growth strategies, it was found that two interventions designed to stimulate demand for sport and culture achieved an effect different from that intended. Instead of market development (new customers for existing products) the interventions actually increased market penetration (existing customers making more intensive use of existing products). Price on its own was found to be an ineffective way to stimulate demand and tended to lead to market penetration effects. Market development requires different strategies as demonstrated by the failure of the *Free Swimming* initiative, which found that nearly half of the target population could not access the offer as they were unable to swim. The key to stimulating demand appears to be altering people's tastes and preferences so that they value new activities more than the ones they take part in currently.

4.5 Coherence

Whilst seemingly disparate areas of research, all four themes share a common feature which provides an initial overarching coherence. That is, in every case there is evidence of the activities under review being in receipt of financial subsidies, while the normal business measurements of profit and loss do not readily apply. The first class county cricket clubs received subsidies from the revenues generated by the England cricket team; and major sports events, elite sport initiatives and participation initiatives received subsidies from the Exchequer, the National Lottery and local authorities amongst others. At this point it is worth revisiting the words of the Audit Commission.

Authorities assume that low prices and blanket subsidies encourage use and help ensure social objectives are met.

Objectives are rarely quantified and success or failure in meeting objectives rarely measured or monitored.

[Source: Audit Commission 1989 op. cit.]

It is not just local authorities to whom these observations are apposite and there is evidence in all four themes of the need for more rigorous performance analysis techniques to be used. The providers of funds need to see that value for money is being delivered and that programmes are delivering the outputs and outcomes required of them. In addition, there is a need to understand the factors that help to explain 'what works' so that future strategies can be implemented that are effective and efficient. This stance justifies the need for robust performance analysis in sport and leisure.

As a final demonstration of coherence, there are clear parallels in the major event papers [Refs: 5, 6, 7] and all of the elite sport papers [Refs: 9, 10, 12, 13, 16]. In both cases the research was conducted in a previously under-researched area to obtain initial insight, which was in turn developed by repeating the research in different contexts and applying standardisation principles to make like for like comparisons across cases. As the knowledge base grew, the data in the two areas have been used to produce predictive models, which have subsequently been tested, refined and retested. This is consistent with the approach of the critical realist and the pragmatist who accept that we can only have a partial understanding of reality and therefore all knowledge is subject to revision.

Simon Shibli

12th August 2015

CLARIFICATIONS AND ERRORS

1. It was pointed out that in Table 5 of [Ref 3] the data presented was not the same as the Equivalent Proficiency Indicator (EPI) demonstrated in Tables 1, 2 and 3. This observation is correct. However, what Table 5 illustrates is the Win % for all Test Matches that England played between 1986 and 1997. Against Australia for example 31 matches had been played of which 21 resulted in either a win or a loss. Of these, England won 5 matches or 24% (5/21). The EPI for matches over this period was 38 which factors in matches that ended in a draw. The long term EPI against Australia is shown in Figure 2 and was around 45 over the period 1946/7 to 1993. With an EPI of 38 over the period 1986-1997 it can be appreciated that recent performances had been worse than the long term average. The Win % of 36 shown at the bottom of Table 5 refers solely to matches in which the outcome was a win or a loss.

2. In [Ref 14] it was pointed out that the assertion that supply was a fifth determinant of demand was erroneous. This point is accepted and exposes my rudimentary grasp of basic economics. There is always the temptation with contract research to offer explanations for findings which leads to the danger that critical realism 'drifts beyond the boundary that separates scientific knowledge from speculative theory when making recommendations about the best course of action to follow' (McEvoy and Richards 2003).

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