An Examination of the Challenges of Capturing the Value of Adventurous Off-road Cycling: A Perspective from South West England

Submitted by Neil Stewart Ormerod to the University of Exeter

as a thesis for the degree of

Doctor of Philosophy in Management Studies

December 2013

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: ………………………………………………………

Abstract

Purpose-built off-road cycling infrastructure represents a relatively new form of tourism and recreation product. Over the last decade, widespread development of these facilities has taken place in the UK, primarily within forest and woodland areas. The justification for developing these sites has largely centred on their ability to generate positive economic benefits for the tourism and leisure economy. In contrast to the focus on growth and investment, relatively little attention has been paid to understanding the extent to which off-road cycling benefits the tourism and leisure economy. Furthermore, even less is known about the visitor dimension. Developing a better understanding of these interrelated aspects forms the basis of this research.

This study presents a dedicated method for critically examining the nexus between off-road cycling and the tourism and leisure economy. This relationship was investigated through the lens of the 1 South West Project, which has the purpose of developing the South West into a premier off-road cycling region. The research focuses on Haldon Forest Park located on the outskirts of Exeter, in Devon. The findings from the large scale questionnaire survey (n = 486) reveal that the off-road cycling facilities are valued highly by users and are regarded as an important regional asset for tourism and recreation. Furthermore, the site was found to attract a broad range of off-road cycling visitors, and have a significant interaction with the regional economy. Interviews conducted with off-road cyclists also identified an emotional connection between off-road cycling and the forest environment. Respondents also emphasised the importance of the informal and social aspects of the activity.

The approach taken by this study has enabled the intersection between visitor expenditure and consumer behaviour at purpose-built off-road cycling sites to be explored in detail. This aspect has been largely ignored within the off-road cycling literature, which has failed to look beyond basic economic transactions and acknowledge the presence of visitor sub-groups. Using Cluster Analysis to address these limitations, this study was able to identify behavioural and economic variations among visitors, and from this produce a detailed typology of users at Haldon Forest Park. This information provides important baseline data for the 1 South West Project, and has important practical implications for the future management of the off-road cycling infrastructure and onsite facilities. Furthermore, this study makes a methodological contribution to the literature through its innovative use of Cluster Analysis, as part of a dual approach to examining the economic contribution of off-road cycling.

Acknowledgements

Completing this research project would not have been possible without the fantastic support, provided by Professor Tim Coles, Professor Gareth Shaw and Paul Hawkins who formed my supervision team. Your help, encouragement, and guidance, was invaluable, and for this I would like to express my deep and sincere gratitude.

I would also like to say a big thank you to Joel and Jan Teague from Whackjob, who kindly supplied the prizes for my survey prize draw, your help and support enhanced this project enormously. I would also like to extend my thanks to David West, Toby Bowen-Scott, Gemma Ingall and Tim Powles at Forestry Commission Peninsula who supported my onsite survey and helped me erect the survey shelter in all weathers! Thank you also to Nicola Cave, Jon Fairhurst, and Angela Proctor at 1 South West Cycle Adventure for your help and encouragement throughout this project.

I also could not have completed this project without the support of my colleagues and friends in Exeter and Yorkshire. I would especially like to thank Fiona Hutchison, Parisa Nedjati-Gilani, Paul Cleeve, Adrian Bailey, Paul Barton, Man Cheng, Aaron Butt, Pete Edwards, Richard Tinsley, and Mark Garford for their friendship and support.

My final and special thanks go to Rita Sousa, my parents Eric and Lindsay Ormerod, and my sister, Kirsty Forder. Thank you for all your love and support throughout my PhD, I couldn’t have done it without you.

Table of Contents

List of Tables

List of Figures

List of Equations

List of Appendices

1 INTRODUCTION

1.1 Research Context

Defining tourism and its interaction both directly and indirectly within an economy has been the subject of considerable academic debate (Shaw and Williams, 2004: 8; Hall, 2000: 25). Much of this discourse has focused on how the economic benefits of tourism and recreation can be measured effectively. This ability is of interest to several parties who wish to understand the associated impact on the economy in question (Stynes, 2001: 4). Two main approaches to examining the economic benefits of tourism and recreation can be recognised. The first measures net economic change within an economy resulting from an action, program or project (Stynes, 2001: 1; Hudson, 2001: 20). This refers to the economic effects of expenditure flows within an economy as a result of tourism related transactions (Crompton, 2006: 67). The second attempts to measure the economic benefits of tourism by quantifying the value tourists place on their experience, and understanding why they choose to visit certain recreation or tourist resources (Crick-Furman and Prentice, 1999: 72).

Within these approaches, numerous methods can be identified, each of which has its limitations. Furthermore, such assessments have been identified within the literature as controversial with no consensus with regards to how it should be approached (Stynes, 1999: 1). The concept of economic assessment has also been criticised as being open to misuse and even abuse. This can occur when assessments are directed towards supporting predetermined positions, rather than the production of an objective economic estimate (Crompton, 2006: 67). Even when the technique is not abused, the results can often be misinterpreted, a view supported by Tyrell and Johnston (2006: 4) for whom ‘policy makers and the public are sometimes less interested in methodological details of impact analysis and more interested in final numbers that support a particular (often pre-selected perspective)'. Despite these drawbacks, economic assessment remains the preferred tool of UK policy makers for appraising new capital projects (HM Treasury, 2003: 3).

Over the last decade, significant investment in new purpose-built off-road cycling facilities has taken place. The growth of these sites reflects the growing popularity of cycling generally, and points to an emerging picture of increased participation. Evidence for this perceived increase in cycling can be found in greater media coverage relating to the popularity of cycling in the UK (*The Guardian,* 2012), national sporting success at the 2008 and 2012 Olympics, and consecutive wins at the 2012 and 2013 Tour De France by British cyclists Bradley Wiggins and Chris Froome respectively (BBC, 2013). Furthermore, reports such as the *'British Cycling Economy'* suggest that there was a net increase of 500,000 regular cyclists in 2010, with cycling being worth a total of £2.9 billion pounds to the UK economy in the same year (The British Cycling Economy, 2011). This focus on UK cycling is also reflected in the increased financial support provided by the UK government for cycling development. The most recent government intervention occurred in August 2013 when it was announced that £94 million would be invested for the purpose of cycling development within cities and national parks (*The Times*, 2013).

To date, investment in purpose-built off-road cycling facilities has largely been justified in its apparent ability to generate positive economic benefits for the host economy. Nevertheless, in contrast to the heightened profile of cycling and this significant investment in infrastructure, the economic benefits of off-road cycling developments on the tourism and leisure economy have received relatively little attention within the academic literature. Among the extant studies, notable works include those of Morey, Buchanan and Waldman (2002); Fix and Loomis (1998); and Siderelis and Moore (1995) (see Section 2.8). However, these works represent case studies from American cycling facilities and do not relate directly to the UK context.

Within the existing off-road cycling literature, evidence of the use of the two main approaches for examining the economic benefits of tourism and recreation can be identified. These include net economic change studies by Cope, Doxford and Hill, (1998); Mundet and Coenders, (2010); Lumsden, Downward and Cope, (2004); and Western Canada Mountain Bike Tourism Association, (2006). In contrast, economic value has been examined by Siderelis and Moore, (1995); Fix and Loomis, (1997); Chakraborty and Keith, (2000), Bennett, Tranter and Blaney, (2003) and Betz, Bergstrom and Bowker, 2003). However, only Carleyolsen et al (2005) and Bowker et al (2007) can be identified as having combined the two approaches. This technique has the advantage of linking net change to visitor behaviour, enabling the driving force behind observed expenditure patterns to be investigated.

Whilst these previous examples provide insights into the economic contribution of off-road cycling, they provide little information about off-road cyclist behaviour. This is a major limitation, because without these data, it is not possible to fully understand the observed economic transactions. A further consequence of this narrow focus is that it fails to consider the presence of different sub-groups, beyond arbitrary day and holiday visitor classifications. Furthermore, from a management perspective, these studies cannot be used to inform the future development of off-road cycling sites or tailor existing resources to better match the needs of different off-road cyclists.

In contrast, this study argues that economic transactions should not be divorced from the context of consumer behaviour. To examine this relationship, this thesis employs Cluster Analysis as part of an innovative combined approach to examining the expenditure and visitor characteristics of off-road cyclists. This technique also offers the potential for developing a typology of users based on these attributes. As such, the use of Cluster Analysis for this application represents a methodological advance from the previous studies, which have failed to acknowledge the relationship between expenditure and consumer behaviour. By adopting a comprehensive combined approach, this thesis aims to capture the economic benefits of adventurous off-road cycling, and provide a critical assessment of its contribution to the tourism and leisure economy.

1.2 Off-road Cycling and South West England

Due to the significant investment in new UK purpose-built off-road cycling facilities during the last decade, it would have been possible conduct the research at a number of different locations nationally. However, despite the availability of alternative locations, the South West of England was chosen because the region provided a unique opportunity to gather baseline data for a new regional off-road cycling development, termed the 1 South West Cycle Adventure project. As such the location provided an unrivalled laboratory for researching the economic contribution of off-road cycling to the visitor economy. The South West is also a significant location for this study with regards to its national importance as a tourism destination. In terms of domestic tourism trips, it is the most visited holiday region in the UK (Smith, 2010: 45). In 2012 the region was estimated to have received 19.7 million domestic tourism trips (GBTS, 2012: 5). Furthermore, the natural landscape of the South West is promoted heavily as a key tourism attractor, and the region is at the forefront in developing ‘green’ tourism opportunities which are designed to coexist with the natural environment (Visit South West, n.d.). Given the high profile of tourism in the South West, this study also provides an opportunity to examine how the introduction of a new tourism and recreation product impacts on the established regional tourism economy.

1.3 Tourism, Recreation, and the South West

1.3.1 Off-road cycling and the South West visitor economy

For the purposes of this research project, the 1 South West Project areas were used to delineate the South West regional boundary. This mirrors the regional parliamentary constituency boundary (see Section 3.3). The South West is the largest region by area in England and is home to over 5 million people (Smith, 2010: 43). Tourism accounts for around 11% of regional employment and generates an estimated £9.4 billion for the regional economy (SWTA, 2008). The region’s natural assets are primarily responsible for its popularity as a tourism destination (Tym et al, 2006: 3). The area contains two national parks, four world heritage sites, 13 Areas of Outstanding Natural Beauty (AONB), and the longest coastline of any English region (Smith, 2010: 43). In 2010 these natural assets attracted an estimated 19.2 million domestic tourists to the region (SWTA, 2012: 5). In addition to these natural assets, the region also features high quality paid attractions. In 2011, South West based attractions comprised 20% of the Visit England top 20 UK Paid attractions list (Visit England, 2011).

Given the abundance of natural assets, the South West has much to offer the active tourist and adventure activities feature heavily in its promotion. The Visit South West website, enthuses of the stunning and varied landscapes in which to have an adrenaline fuelled break. For the off-road cyclist, the protected landscape areas provide over 2000 kilometres of bridleways on the public rights of way (PROW) network. The region also features four well-known multi-use routes along disused railway lines. These comprise the Tarka Trail in Devon, The Camel and Mineral Tramways routes in Cornwall, and Drake’s Trail which links Tavistock to Plymouth. In total these routes provide around 175 kilometres of easily navigable gentle trails for off-road cycling. They are also very popular with visitors, with the Camel Trail receiving around 400,000 visits per year (Cornwall Council, 2013). At the other end of the off-road cycling spectrum, the region features several private off-road cycling sites such as the The Track and Gawton Gravity Hub in Cornwall, and UK Bike Park in Dorset. These sites cater for committed off-road cyclists who seek out challenging off-road cycling experiences. The region’s woodlands also provide opportunities for off-road cycling, with around 47% of woodland areas accessible to the public (Tym et al, 2006: 4). However, prior to 2009 the majority of this cycling activity took place informally at sites which were not generally promoted as cycling destinations.

1.4 Creating an off-road cycling region: the 1 South West Cycle Adventure Vision

1.4.1 Developing off-road cycling in woodlands across the South West

In 2005, woodlands were recognised as an underused resource and the potential for developing woodland areas for off-road cycling was identified. Concerns were also raised over the long-term viability of traditional forestry activities, and it was recognised that commercial forestry activities would need to be supplemented by other income streams in the form of a composite business model (Tym et al, 2006: 3). This led to the formation of an executive board comprising the Forestry Commission, Woodland Renaissance, South West Protected Landscapes Forum, and South West Tourism. Following the formation of this working group, the board commissioned a feasibility study to explore the economic potential for developing off-road cycling within the region's woodlands. The report identified that there was considerable demand for woodland cycling across the South West and that it was an economically significant activity (Tym et al, 2006: 44). The study also recognised that off-road cycling could play a role in protecting the high quality landscape of the South West, by diverting visitor pressure away from sensitive areas and into forests which have a much higher carrying capacity (Tym et al, 2006: 3). Informal leisure in woodlands at the time of study was found to be important for tourism and recreation and the study estimated that South West residents made 32 million trips to woodland areas each year, contributing £90 million to the regional economy.

Furthermore, holiday visitors were estimated to make around 10 million trips, equating to around £120 million per year in regional income (Tym et al, 2006: 4). These figures were derived from secondary data analysis of visitor number estimates from the UK division of the International Mountain Bike Association (IMBA), the Great Britain Day Visit Survey (GBDVS), and the UK Tourism Survey (UKTS) (Tym et al, 2006: 35). Expenditure estimates were then extrapolated from secondary data derived from the Sustrans National Cycle Network (Tym et al, 2006: 35). It should be noted that none of these secondary data relate directly to either the behaviour or expenditure patterns of off-road cyclists at purpose-built woodland cycling centres, and therefore the extent to which they represent the economic contribution of the activity is unknown. The study also outlined a preferred option for developing off-road cycling in the region. This option included the development of a flagship specialist centre offering way-marked trails and visitor facilities, the creation of ten smaller informal hub centres, and the formation of six member centres to serve the local off-road cycling enthusiast market. The study also recommended that there was a role for a South West ‘cycling brand’ to be developed to link and add value to the development option, and for the formation of networks to develop communication between different stakeholders (Tym et al, 2006: 75). In order to develop these facilities it was estimated that a total project budget of £3.8 million would be required (Tym et al, 2006: 77).

1.4.2 The 1 South West Cycle Adventure Project

Following the commissioning of the initial feasibility study, the project board secured initial funding from Sport England to support the appointment of a project officer and the development of a comprehensive funding bid for the 1 South West Cycle Adventure project. The vision for this project was to develop off-road cycling within the South West as an inclusive activity which would complement the region’s existing tourism and recreation facilities (1 South West, 2010). In 2009 the board submitted a £4.6 million application to the Rural Development Programme for England (RDPE) Sustainable Tourism Programme, which was then subsequently approved by the South West Regional Development Agency’s Board in late 2009 (1 South West, 2010). This £3.7 billion funding stream operates on a seven year cycle and is managed by the Department for Environment, Food and Rural Affairs (DEFRA).

The programme has the following four objectives:

- improving the competitiveness of agriculture and forestry
- improving the environment and the countryside
- improving the quality of life in rural areas and encouraging the rural economy to diversify
- increasing capacity for employment and diversification

(DEFRA, n.d. a)

Tourism development was also a key element of the bid, as the funding programme forms part of the 'Rural Tourism Action Plan 2010-2020' which aims to deliver 5% growth in the value of the English tourism market by 2020 (DEFRA, n.d. b). Furthermore, the project met many of the targets of 'Towards 2015', the Regional Tourism Strategy devised by South West Tourism prior to its abolition in March 2011 (1 South West, 2010). This regional strategy aimed to deliver sustainable tourism growth, primarily through the development of brand clusters, such as the 'it's adventure' cluster which had the aim of promoting adventure tourism opportunities within the region (South West Tourism, 2005). The project also provided South West Tourism with a competitive advantage in the form of the opportunity to promote a new tourism product during a time of economic recession, when funding for non-essential services was being questioned.

Figure 1.1 The 1 South West Off-road cycling region

Source: 1 South West Cycle Adventure

The 1 South West vision outlined in the funding application comprised a business plan to develop six new off-road cycling hub sites and four Start Pedalling centres to be spread across the South West (see Figure 1.1), representing a more focused offering than the originally proposed 17 off-road cycling sites outlined in the feasibility study. In order to deliver the business plan, the project embraced the recommendation that any future development should foster networking between stakeholders and cycling groups. To this end the project is overseen by a larger multi-agency executive group, which includes representatives from the Forestry Commission, Sport England, South West Tourism Alliance, Woodland Renaissance, CTC, IMBA, British Cycling, Devon County Council, Active Devon, South West Lakes Trust, the National Trust, and Bristol City Council. In addition to the development of physical cycling infrastructure, the project plan also included the development of a website to promote off-road cycling, and an interactive online map to help visitors plan their off-road cycling adventures within the region. These aspects are consistent with the feasibility study recommendation that a South West ‘cycling brand’ is developed as part of any future development. When the project is completed in December 2013, the region will feature hub sites in Cornwall, Devon, Somerset, Dorset, and Gloucestershire. At these hub sites, visitors will find a variety of way-marked off-road cycling trails and services such as cafés and bike hire facilities. The hub sites have been designed to have a ‘mass-market appeal’ and be novice and family friendly.

The four Start Pedalling centres (see Figure 1.1) are also spread across the region, split between two sites in Cornwall, and sites in Devon and Somerset. These trails are located at multi activity sites operated by South West Lakes Trust, and have been designed to provide a very easy introduction to off-road cycling. It is also hoped that these locations will act as feeder sites to the main off-road cycling hubs, allowing visitors to progress and develop their off-road cycling experience. Central to the 1 South West Development is the emphasis placed on creating facilities that are safe, enjoyable, welcoming and offer a high quality experience for all, regardless of cycling ability. As a tourism development, the off-road cycling region aims to attract new markets, retain existing visitors for longer, spread pressure away from the coast, and increase visits outside the peak tourism season.

By working in partnership with 1SW this study was able to contribute to the wider project, by capturing the economic and visitor dimensions present during the transitional development phase. Capturing data during this critical point enabled baseline data to be established which can now be used to inform the future management and development of off-road cycling within the region. These aspects represent the practical contributions made by the research. Furthermore, this study makes an academic contribution to the literature through its primary research into the nexus between expenditure and consumer behaviour. This aspect addresses the limitations of previous off-road cycling studies which have failed to acknowledge this relationship. The study has also investigated the value of the environment as a natural resource for tourism and recreation, and examined the economic return generated from developing off-road cycling as a tourism and recreation product. Whilst examining the return on investment (ROI) is an essential part of evaluating publicly-funded developments, the timing of the study added weight to this aspect, in that it sought to quantify the economic value of the environment as a public resource, at a time when governmental budgets for public services were being cut and spending decisions were scrutinised.

1.5 Research aims and objectives

This thesis seeks to explore the relationship between off-road cycling and the tourism and leisure economy; more specifically, the research investigates how an investment in off-road cycling infrastructure impacts on the tourism sector, and adds value as part of a regional tourism product. The research was conducted in collaboration with 1 South West Cycle Adventure (www.1sw.org.uk) through an Economic and Social Research Council (ESRC) CASE studentship. The aims and objectives of this project are shown in Figure 1.2.

Figure 1.2 Research aims and objectives

Title

An Examination of the Challenges of Capturing the Value of Adventurous Off-road Cycling: A Perspective from South West England

Aims

1. To develop a dedicated method for capturing the economic benefits of adventurous off-road cycling (AOC) at iconic purpose-built sites

2. To present a critical assessment of arguments surrounding purpose-built AOC sites as major contributors to the visitor economy

Objectives

1. Critically appraise the current range of economic assessment 'technologies' used in tourism and recreation research in the context of current government guidance on project appraisal and evaluation, with special reference to AOC

2. Develop and appraise a new dedicated survey instrument to capture the economic contribution of AOC in South West England

3. Produce an estimate of the current economic contribution of AOC at Haldon Forest Park

4. Examine variations among users in terms of their onsite behaviours, with special reference to their economic contributions

5. Revisit and reappraise the cases made for public funding and investment in purpose-built AOC sites (in the South West of England in light of new dedicated empirical evidence)

Source: Author

The research was directed by two specific aims. The first of which was ‘To develop a dedicated method for capturing the economic benefits of adventurous off-road cycling (AOC) at iconic purpose-built sites’; while the second was ‘To present a critical assessment of arguments surrounding purpose-built AOC sites as major contributors to the visitor economy’. These aims are underpinned by the five objectives shown in Figure 1.2.

The five objectives provide the structure for investigating the stated aims. Objective 1 focuses on critically appraising existing methodological approaches used to measure the economic contribution of tourism and recreation. More specifically, it examines the discourse surrounding their use as a means for providing reliable economic information to policy makers. Furthermore, this objective provides the academic rationale on which to develop and appraise a new dedicated survey instrument to capture the economic contribution of AOC in South West England (Objective 2).

This second objective has the purpose of addressing the challenges associated with applying the extant approaches to the research problem. This is important in order for the research to demonstrate that the chosen approach is a credible solution for measuring the economic contribution of AOC, an activity for which limited data exist. Specific challenges include designing a survey instrument which is capable of researching an activity which takes place at specific locations, but which is also characterised by its freedom and ability to permeate borders. Utilising the approach developed to address Objective 2, Objective 3 requires a detailed evaluation of the trip characteristics and visitor transactions associated with off-road cycling at Haldon Forest Park. This will enable the study to understand both the net economic value and the hidden economic value of the site to visitors. Together these aspects comprise the total economic contribution of the site. This interface represents an under researched area (Bowker et al, 2007: 258) and by addressing this objective the study will make a contribution to this body of knowledge. Objective 4 considers the wider visitor dimension; providing an insight into the behaviour and attitudes which drive the economic activity examined in Objective 3. This also represents a knowledge gap within the literature, as standard economic evaluation methods typically treat users as homogenous consumers, and fail to recognise their individual needs and demands. Developing a typology of users based on their observed characteristics also has potential benefits for the future management and promotion of AOC sites. For example, this information could be used to tailor the provision more effectively or target different visitor groups. In light of the new empirical evidence obtained through Objectives 2, 3 and 4, Objective 5, has the purpose of re-examining the economic arguments made for investing and developing new purpose-built off-road facilities in the South West of England. This aspect represents the final stage of the investigation and seeks to establish the economic case for the activity as a major contributor to the visitor economy.

1.6 Structure of the thesis

The thesis comprises six chapters inclusive of this introductory chapter. In the following chapters, the research objectives are addressed in the chronological order outlined in the previous section. Chapter 2 addresses Objective 1 and reviews the existing body of literature relating to economic assessment within the field of tourism and recreation research. This has the aim of identifying and critically evaluating the key arguments surrounding the measurement, analysis and reporting of economic data relating to the tourism and leisure economy. The chapter then examines the specific analytical techniques available for quantifying the economic contribution of off-road cycling. In the final part (Section 2.8.5) hybrid approaches are explored to see if the limitations of individual methods can be addressed through the use of a combined approach.

Chapter 3 justifies and presents the chosen methods used to investigate the economic contribution of adventurous off-road cycling. The chapter begins by examining a meta-analysis of the previous methods employed within off-road cycling studies for collecting data; this is used as a framework to ensure that the chosen survey methods are informed by the literature review conducted in Chapter 2. Following this analysis, the chapter describes the due diligence process used to select the appropriate survey methods and field site through which to investigate the economic contribution of off-road cycling in South West England. Throughout the chapter the chosen methods are discussed within the context of research objectives 2, 3, 4, and 5, and the overall sampling strategy (see Section 3.4.2). The chapter concludes with a discussion of the measures taken to improve the reliability and validity of the study.

Chapter 4 forms the first of two integrated analysis and discussion chapters and directly addresses the third research objective. The chapter tackles the fundamental issue of quantifying the economic case for developing off-road cycling for leisure and tourism applications. Throughout this chapter efforts have been made to present a detailed account of the economic analysis process used to quantify the economic significance and value resulting from off-road cycling at the field site. These aspects represent the directly measurable impact of visitor expenditure and the hidden economic value associated with visiting off-road cycling sites. The chapter begins by presenting a step by step guide to the travel cost calculation used to examine the distances travelled and the travel costs incurred by day visitors to the field site. This is followed by an analysis of visitor expenditure, which is assessed according to the conceptual model shown in Section 4.4. The first stage of this process involves calculating expenditure totals for each of the visitor subgroups (see Section 4.6). In the second stage, these expenditure totals are combined and then extrapolated to produce an annual economic significance figure for the field site (see Section 4.7). The chapter then closes by first discussing and then summarising the main results (see Sections 4.8 and 4.9).

In Chapter 5, the analysis and discussion looks beyond the expenditure totals calculated in Chapter 4, and examines consumer behaviour among off-road cyclists. This has the purpose of understanding how users interact with purpose-built off-road cycling sites, and how this interaction influences their onsite behaviour and expenditure patterns. This aspect addresses a shortage of information relating to the user dimension at off-road cycling sites and is used to address research objectives 4 and 5. The chapter first builds on the analysis presented in Chapter 4 by examining the key behaviour and expenditure characteristics of the individual visitor subgroups (see Sections 5.2 to 5.6). Following this initial examination of variations according to trip type, Cluster Analysis is introduced as a means of segmenting visitors according to their off-road cycling preferences and behaviour (see Section 5.7). Following this introduction, the clustering process is described in Section 5.7.4 before the profiling results are presented in Section 5.9. A final summary is then presented in Section 5.10, which brings together the results from the visitor trip type evaluation and Cluster Analysis. In this final section, the results are considered in relation to the management and future development of purpose-built off-road cycling sites.

The final chapter presents and discusses the key conclusions within the context of the research objectives. It first addresses the relationship between off-road cycling and tourism at the Case Study site (see Section 6.2.1). This is followed by a review of the estimated economic contribution generated by off-road cycling visitors, discussed within the context of the arguments made for investing in purpose-built off-road cycling sites as a public recreation and tourism resource (see Section 6.2.2). Section 6.2.3 then examines the current visitor profile and discusses the interactions between users and the off-road cycling facilities at the field site. This aspect specifically examines consumer behaviour, attitudes and the perceptions of users towards the onsite facilities. It also considers the current and potential future management and development needs of the site. The chapter then reviews the limitations of the conducted research (see Section 6.3.1), before finally outlining the opportunities for future research arising from this study.

2 THE TOURISM, RECREATION, AND ECONOMIC ASSESSMENT NEXUS

2.1 Introduction

This chapter reviews the economic impact and valuation assessment techniques used within the field of tourism and recreation research. Examining critically the body of relevant literature is a necessary first step in addressing the first two research objectives (see Figure 1.2) and forming an approach to capture the economic value of adventurous off-road cycling. Throughout the chapter published journal articles form the basis for this investigation, with additional exemplification provided by relevant book chapters and impact report case studies.

The chapter first explores how tourism and recreation impacts on economies before setting out the rationale for measuring these impacts. In Section 2.2 the discussion examines how economic impact assessment is applied to tourism and recreation research. Visitor expenditure is then introduced in Section 2.3 as the foundation for economic impact analysis. This section identifies such issues as how expenditure is measured and who should be counted, it also identifies criticisms and potential sources of error associated with collecting expenditure data. Sections 2.4 and 2.5 then critically review the standard methods used to analyse economic impacts resulting from changes in visitor expenditure. This is followed by a discussion regarding the role of politics within the field of economic assessment (see Section 2.6). The concept of economic value is then introduced in Section 2.7. This section critically examines the group of methods used to measure the economic value of tourism and recreation resources from the perspective of the user. Section 2.8 subsequently reviews the specific approaches used by previous studies to investigate the economic impact and value of off-road cycling. This section also considers the practical challenges associated with the data collection methods employed in previous studies. The chapter concludes by considering the findings of the review presented in Section 2.8, before examining the potential for combining different methods of evaluation with the purpose of providing a more comprehensive approach to the research problem.

2.1.1 How tourism and recreation impacts on economies

Economic impacts resulting from tourism and recreation facilities, events, and marketing campaigns can be defined as 'the net economic change in incomes of host residents that results from spending attributed to tourists' (Crompton, 2006: 67). Tourism and recreation are recognised as sectors of the economy which increase economic activity, and the promotion of this activity is generally considered desirable (Dwyer, Forsyth and Spurr, 2004: 308). Tourism, however, has not always been recognised as a mechanism for economic development. Vanhove (2005: 170) describes how the notion of using tourism to develop African Caribbean and Pacific (ACP) countries as part of the Lomé Convention in 1975, was initially rejected as it was thought that inflation, leakages and a lack of foreign exchange would result. By the fourth convention in 1990, attitudes had changed considerably and tourism was embraced as a vehicle for economic development. Vanhove (2005: 170) attributes the initial reluctance to accept tourism as a development tool to the negative view of tourism which was portrayed in publications at the time.

In the UK, tourism development can be identified as following a similar pattern of recognition, followed by a drive to promote economic development and job creation through tourism initiatives. The 1969 Development of Tourism Act formalised the relationship between UK public policy and tourism, and established three national tourist boards for

England, Scotland and Wales. These organisations were responsible for the strategic planning and implementation of central government tourism strategies, and were underpinned by regional tourist boards in England, regional councils in Wales, and local authorities in Scotland (Williams and Shaw, 1991: 213). Within this UK framework, Northern Ireland stands out as an exception, as the Northern Ireland Tourist Board had already been in existence since 1948. This board was created following the Development of Tourist Traffic Act (Northern Ireland) to address problems of economic decline and associated unemployment within traditional industries (Smyth, 1986: 120).

The economic contribution of tourism was given further political attention following a review of the Development of Tourism Act in 1974. This placed further emphasis on economic growth as the principle component of tourism public policy. Following a subsequent review in 1986, general economic growth was replaced by employment generation as the principle focus. This coincided with tourism policy being re-allocated from the Department of Trade and Industry to the Department of Employment. At this time, tourism was seen as 'one solution to the country's employment needs' (Williams and Shaw, 1991: 215). The re-focussing of tourism policy towards employment and private sector involvement reflects the political shift in the 1980s towards promoting enterprise and reducing state intervention driven by the Conservative Government of Margaret Thatcher. It also symbolises the wider debate in Western society about the role of the state in society (Hall and Jenkins, 1995: 36).
Williams and Shaw (1988: 81-93) in their article '*Tourism: candyfloss industry or job generator?'* investigated whether this political belief in tourism as a means of generating economic growth and employment was justified. They argued that whilst tourism had been championed as a general solution for economic growth and employment, relatively little was known about its potential for generating employment (Williams and Shaw, 1988: 81). This

high regard for tourism as a growth sector contrasts sharply with the negative light in which tourism employment was seen in comparison to other sectors at the time. Challenging the stereotype that tourism employment was less valuable than employment in other sectors, they argued that tourism employment is complex and has great variability between different destinations and different tourism sectors. The authors also focused on the difficulties associated with analysing and quantifying the complexities of tourism employment. These mainly related to the problem of how to quantify tourism employment in sectors which rely on transient seasonal and part-time jobs. Furthermore, the authors contend that under these conditions it is more difficult to predict future tourism employment trends.

In the early 1990s, a further attempt was made to re-define tourism policy. This realignment considered tourism within the wider context of globalisation, and focused on enterprise, economic development, and marketing tourism places and cultural heritage (Hall, 1998: 208). Despite a reduction in state intervention by central government during the 1980s and 1990s, the role of local government, by contrast, can be recognised as playing an increasingly important role in the economic development of tourism as a result of this transition. Much of this development focused on building partnerships between the public and private sectors to actively attract investment, develop employment opportunities, and generate income (Hall and Jenkins, 1995: 37). From 1997 through to 2012, these activities were the responsibility of regional development agencies (RDAs). Set up by the New Labour government in 1997, these agencies were intended to work alongside the existing tourist boards to deliver strategic regional economic development through partnerships at a regional and sub-regional scale. At this time, regional initiatives were considered to be the optimum spatial scale for delivering economic development (Fuller, Bennett and Ramsden, 2002: 421). Regionalism was also contextualised within the effort to bring greater autonomy to development through the ‘hollowing out’ of central government control. However, critics of this ‘New Regionalism’ argued that this re-structuring was a top-down orchestrated movement which retained central control, rather than a bottom up solution for regional development (Webb and Collis, 2000: 862).

This long-standing regional approach to economic development and tourism management came to an end in 2010 following the change in government from Labour to the current Conservative-Liberal Democrat coalition. In an attempt to reduce what was seen as unnecessary spending on administration and arm’s length governance, tourism policy was shifted from regional administration to local community development, which was seen as the frontline. These changes were set out in the government spending review of 2010 which identified that savings of £1.5 billion per year by 2014/15 could be achieved by abolishing RDAs (HM Treasury Spending Review, 2010: 52). RDAs ceased to exist in April 2012 and in their place, Local Enterprise Partnerships (LEPs) were formed to deliver economic development at the sub-regional scale. Whilst this large-scale reform reduced the complexity of central government support for tourism policy, the swift change brought considerable uncertainty to the sector (Coles, Dinan and Hutchison, 2012: 4a). In addition, the abolition of RDAs also marked the end of regional tourist boards, which had been progressively subsumed within RDAs prior to the reform. Furthermore, the change realigned tourism policy with the enterprise and competition policies of the 1980s, promoted by Margaret Thatcher’s Conservative government (Coles, Dinan and Hutchison, 2012: 4b).

Regardless of how this unprecedented change from regional to local policy affects tourism development moving forwards, economic development has remained at the heart of UK tourism policy since the introduction of the Development of Tourism Act in 1969. Following this formal recognition of tourism as a force for economic development, it is accepted that economic growth can be promoted by increasing either the quality and or quantity of tourism inputs into an economy (Tribe, 2005: 284), this overview builds on the argument made by Dwyer et al (2004: 308) that the pattern of economic activity within an economy, particularly at a local level, can be affected by special events, festivals, tax changes and transportation promotions among others. A further assessment is provided by Stynes (1999: 4) who describes how tourists contribute to the income of an area both directly and indirectly, and that these impacts may be in the form of sales, profits, taxes, and employment. Direct impacts can be easily seen within the primary tourism sectors such as accommodation and tourist attractions, but less visible indirect impacts also occur within the supply chain which supports the primary tourism industries. An example of this type of impact would be an accommodation provider increasing its spending with its food supplier, following an increase in the number of bookings.

Defining tourism and its interaction both directly and indirectly within an economy has been the subject of considerable academic debate (Shaw and Williams, 2004: 8; Song, Dwyer and ZhengCao, 2012: 1653). Hall (2000, 25) describes that under the economic tradition, tourism is recognised as an industry in its own right. Under this approach ‘attention is given to the means by which tourism can be defined as an industry in order that its economic contribution and production can be measured, and so the role of government regulation and support can be appraised.’ (Hall, 2000: 25). However, as Eadington and Redman (1991: 42) argue ‘tourism does not have a unique base as an industry, but encompasses widely disparate firms and organisations from many industries which serve customers with a variety of incomes, tastes, and objectives.’ Questioning the drive to define tourism as an industry, Smith (1998: 32-33) contends, that the definition has mostly served as an advocacy tool by presenting tourism as a cohesive entity. He also argues that a lack of credible tourism statistics and confusion over its measurement have been barriers to accepting tourism as an industry. Regardless of how tourism is presented, Cooper et al (2008: 129) postulate that tourist expenditure 'is as 'real' as any other form of consumption and international tourist expenditure represents an invisible export from the host country, whereas domestic tourism can be seen as an 'export' from the hosting region to the other local regions' (Cooper et al, 2008: 129). Whilst, defining tourism as an export industry serves a purpose at a national and international level, this narrow definition does not encompass non-economic interactions, (these intangible impacts are considered in further detail in Section 2.2.7).

Alternatively, tourism can be regarded as a composite product which includes economic, political, socio-cultural, and environmental aspects (Shaw and Williams, 2004: 9; Sinclair, 1998: 14). Sinclair and Stabler (1997: 58) describe these aspects as a collection of markets and industries. The linkages and transactions between these aspects can be considered in terms of a tourism production system (Shaw and Williams, 1994: 111). Sinclair and Stabler (1997: 58) highlight the complexity of the tourism product and production process stating:

> 'Principally it cannot be stored, cannot be examined prior to purchase, it is necessary to travel to consume it, heavy reliance is placed on both natural and human-made resources and a number of components are required, which may be separately or jointly purchased and which are consumed in sequence.'

Recognising that the boundaries of the tourism product are blurred, Shaw and Williams, (2004: 10) propose analysing tourism in terms of tourist and non-tourist relationships, stating that 'tourism is only one of the many flows through which communities and individuals are related, but a highly significant one'. It may be appropriate at a policy level to isolate economic impacts, and quantify the importance of tourism as an export in comparison to economic production in other sectors, but at a local level this one dimensional approach is likely to be inadequate as a method of analysing the full impact of a community's involvement in tourism.

Crompton (2006: 67) in one of several articles dedicated to the topic of economic impact assessment describes the process of net economic change as the 'virtuous circle of economic development'. This begins with local residents providing funds to the government through taxation, a proportion of which are then redistributed to support tourist facilities, promotion, and special events. This in turn attracts non-local visitors who spend money within the supported area, generating income and jobs for local residents. While this conceptual description of income flows generated by tourism can be applied to local, regional and national scales, the impacts and methods of quantifying them change with scale. Thus, when promoting tourism and recreation as a means of generating economic growth, the involvement of a local community or host area should be on the basis that, income generated by the activity will justify the costs of a community's involvement in tourism, and that impact analysis measures the benefits to the region and not those to visitors (Crompton 2006: 67; Stynes: 2001: 4).

The extent to which a community is affected by tourism development is determined by the relative importance of tourism to the local economy, the degree of local resident involvement, and the scale of development which takes place (Madrigal, 1995: 86). Community tourism is heavily influenced by these local factors, and it is recognised that the goodwill of the local community is essential for tourism development, operation and sustainability (Gursoy, Jurowski and Uysal, 2002: 79-80). This importance was also recognised by Hall (2000: 29), who contends that community impacts have been the subject of greater attention by policy makers and planners since the 1970s when there was increasing concern over the environmental and social impacts of tourism development (see Section 2.2.8). Results from the study conducted by Gursoy et al (2007: 98) imply that this increase in attention benefits both communities and developers. This is because local residents are more likely to be sympathetic towards development proposals if they believe that their concerns are being taken into account. Such observations exemplify the social and economic relationships within which tourism is constructed (Shaw and Williams, 2004: 18).

2.1.2 The rationale for measuring the economic impacts of tourism and recreation

Economic impact analysis measures the net economic change within an economy resulting from an action, program or project (Stynes, 2001: 1; Hudson 2001: 20). In tourism and recreation, such actions may include changes in the quantity or quality of a facility, or changes to destination marketing which may affect visitor expenditure. Quantifying these changes is of interest to a number of parties who wish to understand the associated impact on the economy in question (Stynes, 2001: 4).

Frechtling and Horváth (1999: 324) identify three groups interested in understanding the economic contributions generated by tourism. These are: private businesses, public agencies and individuals residing in tourist destinations. They also assert that understanding tourism's contribution to the economy is essential for businesses directly involved in tourism and for those indirectly involved through linkages, and that this knowledge is essential for informing private decision making and public policy development. A similar observation is made by Dwyer, et al (2004: 308) who identify policy makers, event promoters, government treasuries and local authorities as being interested in measuring economic impact. Whilst these simplified groupings do not convey the complex social and economic interactions between the numerous public, private and third sector actors involved in tourism development, they do provide a framework through which to investigate complex tourism relationships.

Tourism policy has a significant influence on the motivations of different parties to measure the economic impact of tourism. Shaw and Williams (2004: 209) contend that tourism policy is 'highly variable in focus across both time and space' and that the notion of government policy itself is often difficult to discern. Tourism activity predominantly occurs within the private sector, but increasingly government policy at all levels has engaged with tourism for reasons of economic development (Hall, 2000: 135). Government policy intervention typically involves the regulation or in some cases ownership of tourism infrastructure, and is generally focused on using tourism as an economic development tool (Shaw and Williams, 1994: 132). State involvement may be in the form of direct help for tourism initiatives and developments, or alternatively indirect assistance may be provided through infrastructure improvements which facilitate tourism projects, or subsidies to private developers (Shaw and Williams, 1994: 132). For sustainable tourism development to take place, governments must balance the positive effects of development against negative unwanted impacts, and this requires planning and regulation (Hall, 2000: 10). Dredge and Jenkins (2007: 19) identify six main drivers affecting tourism planning and policy. These are: economic, socio-cultural, environmental, public administration, political and technological. The importance of these drivers is determined by internal and external factors which seek to direct the political agenda. Governments must also balance the opportunity costs of any proposed tourism development. As Eadington and Redman (1991: 44) explain ‘policymakers must answer the questions of how much of government’s available resources should be allocated for tourism purposes versus all other competing uses, and then decide among which specific alternatives the allocated resources should be committed’.

Tourism planning is an important aspect as development often takes place rapidly and involves a number of sectors for which no single agency is responsible. Used effectively, planning can maximise economic benefits and minimise the unwanted effects of tourism development (Hall, 2000: 10). A useful insight into why certain parties may be motivated to measure economic impact is provided by Burgan and Mules (1992: 701). Regarding the promotion of sporting events in Australia, they describe how administrators involved in promoting an Australian tourism strategy titled ‘theme years’ were keen to bring the economic benefits of their events to the attention of government authorities, in the hope of securing funding for their campaign. This was based on the principle that the government would be more likely to provide grants if they were satisfied that the economic benefits to the local economy outweighed the costs of providing the investment.

2.2 Assessing the economic impact of tourism and recreation

2.2.1 Types of economic impact study within the tourism and recreation sector

Economic impact assessments within academic and practitioner literature can be broadly considered within the contexts of occasion, venue and time (Frechtling, 2006: 27). Occasion can refer to either short duration special events or longer length studies. Longer studies are typically annual in nature. Venue dictates the geographical scale of the study, for example a specific site or geographical region. Studies can also be categorised by time, depending on whether they are concerned with past or future impacts, (Frechtling, 2006: 29). Stynes (2001: 2) defines the impact time frame according to whether the analysis is *ex ante* or *ex post. Ex ante* studies are those which attempt to assess the impacts of a hypothetical or proposed action. Feasibility studies are examples of this type of assessment (Stynes 1999: 2). In contrast, *ex post* studies are concerned with the measurement of historical or current actions (Stynes, 2001: 2). Kasimati (2003: 438) highlights an interesting divide between *ex ante* and *ex post* studies in her review of economic impact analyses conducted at seven editions of the Summer Olympic Games. She found that of the seven studies reviewed, only one location had conducted an *ex post* economic impact investigation. For Kasimati (2003: 442) the lack of *ex post* studies indicates a bias towards promoting the economic benefits of hosting the games, as it is in the interests of the organisers to present favourable economic assessments (this aspect is considered further in Section 2.6.1). Furthermore, the lack of *ex post* studies means that these claims remain unverified.

Categorising impact studies in this manner identifies the type and temporal setting of the assessment, but it does not explain the specific type of economic analysis used to measure impact. Stynes (1999: 2) in a bulletin aimed at informing industry analysts and public officials on the subject of tourism's economic impacts, states that there are six types of economic analysis which can be applied to tourism policy and actions (See Table 2.1).

Table 2.1 Six types of economic analysis

	Type of Economic Analysis	***Analysis Description***
1	Fiscal Impact Analysis	Will government revenues from tourism activity from taxes, direct fees, and other sources cover the added costs for infrastructure and government sources?
2	Financial Analysis	Can we make a profit from this activity?
3	Demand Analysis	How will the number or types of tourists to the area change due to changes in prices, promotion, competition, quality and quantity of facilities, or other demand shifters?
4	Benefit Cost Analysis (B/C)	Which alternative policy will generate the highest net benefit to society over time?
5	Feasibility Study	Can/should this project or policy be undertaken?
6	Environmental Impact Analysis	What are the impacts of an action on the surrounding environment?

Source: Adapted from Stynes (1999: 2)

Whilst the overview above, helpfully shows the economic rationale behind the different methods, it presents an overly simplistic representation of the numerous approaches which can be taken to quantify the economic impact of tourism and recreation. It is therefore necessary to examine these in greater detail and gain an understanding of their development and application.

Economic analysis can be recognised as a fundamental aspect of the tourism and recreation paradigm. Following the recognition of tourism as a vehicle for economic development in the 1960s, tourism was accepted by economists as a worthwhile topic of investigation (Eadington and Redman, 1991: 41). It should be noted that economic analysis represents only one part of the epistemology of tourism, one which Tribe (1997: 638) categorises as the business of tourism, and therefore it ignores the non-business, historical and socio-cultural elements of tourism and recreation research. The prominence of economics within tourism research is due to its relevance as a decision making tool for policy makers (Eadington and Redman, 1991: 42). Prior to examining the various techniques for measuring the economic contribution of tourism and recreation, it is useful to understand how tourism can be examined through the lens of economics. Economics is typically comprised of two related fields of enquiry which operate at two different spatial scales. The first considers the 'micro' level and is concerned with the analysis of supply side input activities which facilitate consumption. The second examines the 'macro' level and focuses on production outputs and how the resource is consumed (Eadington and Redman, 1991: 43). Throughout the 50 year development of tourism economic analysis, macro level demand analysis can be identified as the dominant aspect of tourism economic studies (Song et al, 2012: 1673). This can be explained by the growth in worldwide tourism demand and the focus by policy makers on forecasting or measuring the economic impacts of a tourism or recreation development or event (Li, Song and Witt, 2005: 82; Song et al, 2012: 1664). In contrast, research into tourism supply has been more fragmented and concerned with understanding the complex market structure and industrial economic principles behind tourism firms, the supply chain and the tourism market. (Song et al, 2012: 1659). For the purposes of addressing the research objectives (see section 1.5), a macro level economic evaluation is required. Consequently, the following discussion will now concentrate solely on reviewing the macro approaches to forecasting and measuring tourism demand.

Forecasting models represent an *ex ante* approach to quantifying tourism demand and utilise large quantities of secondary data to forecast future tourism impacts. These data usually relate to tourist arrivals and / or tourist expenditure. Li et al (2005) identify that these measures of tourist demand dominated research studies between 1960 and 1990. Post 1990, they observe that demand measures had evolved to incorporate more detailed information relating to tourist markets, and specific tourism market segments. These newer methods attempt to capture the dynamism of tourism demand, which could not be addressed using the static single equation regression models. Recent developments include multiple equation modelling, causal and non-causal time-series analysis, and panel data analysis (Song et al, 2012). Whilst it is correctly observed that these newer models can deal more effectively with the complexities of tourism demand, their reliance on secondary tourist arrival and origin data restricts the geographical scale over which they can operate (Song and Li, 2008: 204). Alternatively, tourism demand can be examined from an *ex post* perspective. These techniques are categorised as economic impact approaches.

In contrast to the development of economic forecasting tools, there has been considerable development in impact analysis tools over the 50 year history of measuring tourism demand (Song et al, 2012: 1665). Tracing their development, the authors describe how the techniques have developed from multiplier and cost-benefit studies conducted in the early 1980s, through to Input-Output (I-O) analysis in the late 1980s, and social accounting (SAM models) in the 1990s. From 2000 onwards, computable general equilibrium (CGE) models were developed as evolutions of I-O and SAM as they could handle a greater number of variables. Recent advances include the development of time-series analysis to assess tourism impacts (Song et al, 2012: 1644). Despite these considerable developments, no consensus can be identified within the literature regarding the 'best' solution (Li et al (2005). This sentiment is summed up by Song et al (2012: 1673) ‘at the macro level, assessment of the economic impacts of tourism development continues to be a central focus, although it will take a long time for this field of research to reach its methodological maturity’. In the absence of a single accepted method, the following sections further examine the economic measures, impacts and best practice principles which will inform the selection of an appropriate method for investigating the economic value of adventurous off-road cycling.

2.2.2 Economic measures

Changes in economic activity can be measured in different ways. Of the methods used, changes in tourist expenditure, regional income (wages, salaries and profits of tourism businesses), and employment (jobs supported by tourism sales) are the most widely used. It should be noted that due to the prevalence of part-time and seasonal jobs within tourism employment, jobs are not typically reported as full time equivalents (Stynes, 2001: 1).

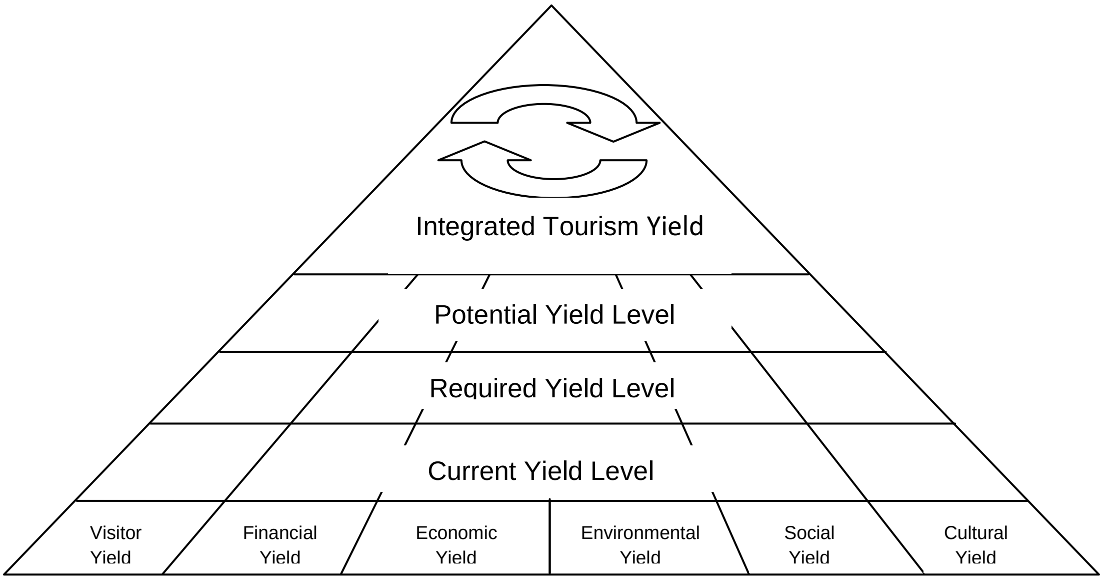
For Dywer and Forsyth (2008: 155), the common use of tourist expenditure as an economic measure presents several problems. Criticising gross expenditure as a unit of measurement, the authors argue that it does not provide a breakdown of the goods and services consumed and therefore spending cannot be allocated to individual sectors of the economy. It also provides no information for individual tourism operators. (Dwyer and Forsyth, 2008: 157). Proposing an alternative approach, the authors assert that more effective economic measures such as Gross Operating Surplus (GOS), Gross Domestic Product (GDP) and Employment can be used if the evaluation is conducted using a computable general equilibrium model (CGE) (see Section 2.5.6 for a detailed discussion of CGE). These measures are derived from the impacts of changes in tourist expenditure, rather than the change in expenditure itself.

GOS represents a measure of profitability which can be used to track performance over time. At a national or destination level, GDP can be used to value tourism goods and services produced within that economy. The final measure, employment generated, is typically measured as a ratio of the number of jobs created per x number of visitors or per x amount of tourist consumption.

The measures outlined above can also be described as forms of tourism ‘yield’. This term has traditionally been used to quantify the economic and financial gains (profits) resulting from changes in tourist activity (Northcote and Macbeth, 2005: 200). However, the term has also taken on a much wider meaning within the context of sustainability, where it has been redefined as ‘sustainable yield’. In this form, the economic, environmental and social impacts of tourism are evaluated together in an attempt to give a complete overview of how tourism impacts on destinations (Lundie and Dwyer, 2007: 504; O’Sullivan and Jackson, 2002: 326). The relationship between tourism and the environment can also be viewed from the perspective of the tourist, as Reynolds and Braithwaite (1997: 70) contend, tourists are ‘consumers of the environment’, and as such ‘the environment is a core feature of most tourism products, whether that is the natural or built environment or the cultural and heritage environment or some combination thereof’.

One way in which the relationship between the economic and non-economic impacts of tourism can be evaluated is through the ‘Integrated Tourism Yield’ conceptual model put forward by Northcote and Macbeth (2005: 199). The model provides a framework for evaluating the whole tourism system by identifying the inter-related costs and benefits of six key yield parameters, which the authors deemed to comprise the tourism system. These parameters are: visitor, financial, economic, environmental, social and cultural, and can be seen in Figure 2.1 (Northcote and Macbeth, 2005: 202).

Figure 2.1: Integrated Tourism Yield Conceptual Model



Source: Adapted from (Northcote and Macbeth, 2005: 203)

Within the model, each parameter is considered individually to gauge yield at three development levels. First, current yield is examined, second, the required yield to maintain the system at its current level is identified, and third, the maximum limit which can be sustained by the resources available is determined (Northcote and Macbeth, 2005: 202). Due to the inter-related nature of the parameters and yield levels, tourism development is constrained by relationships between the different model components. In practice each parameter is weighted to reflect the importance of that particular aspect in relation to the other parameters, with ratings weighted in order of increasing importance according to a five point scale ranging from zero to four. On this scale, zero indicates a low priority parameter and four represents a high priority parameter (Northcote and Macbeth, 2005: 205).

A key advantage of the matrix is that it can be used as a flexible planning tool, to examine the potential impacts on sustainability resulting from changes to the individual parameters. Conversely, this flexibility is also a weakness of the model as there is no definitive measurement system for yield. In this regard the model is open to interpretation by different users who will define costs and benefits differently, and will prioritise different parameters at the expense of others depending on their particular agenda (Northcote and Macbeth, 2005: 2005: 217). While the model only represents a preliminary exploration of how non-economic or intangible measures can be incorporated into tourism impact analyses, it does serve as a reminder 'that the totality of tourism is part of much broader systems that need to be understood in any assessment' (Northcote and Macbeth, 2005: 215).

2.2.3 Types of Impact

In section 2.1.1 it was discussed how tourism and recreation impacts on economies, and how these impacts operate both directly and indirectly on an economy. Direct, indirect and induced economic impacts, together with their inter-related intangible positive and negative impacts, will now be examined in greater detail. Understanding impact type is essential in order to properly assess the methods used to measure them. This is because visitor expenditure or consumption is much greater than the direct purchases made by visitors. Tourism consumption also includes associated expenditure on goods and services on behalf of visitors by other sectors, this is termed the 'visitor demand'. Therefore, the total economic impact of tourism can only be revealed by adding together the direct, indirect and induced impacts (Stynes, 1999: 5; Cooper et al, 2008: 137).

2.2.4 Direct economic impacts

Direct impacts are those immediately linked to changes in tourism expenditures, it is important to note that these changes may be positive or negative. An example of a direct impact would be an increase in hotel sales revenue following a rise in the number of tourists staying at a hotel. Increases in sales revenue may also impact directly on salaries, taxes and the services offered by the hotel (Stynes, 1999: 5).

2.2.5 Indirect economic impacts

Tourism businesses also need to purchase goods and services in order to service the needs of their tourist clients (Cooper et al, 2008: 137). Using the example outlined in the previous heading, indirect impacts associated with the increase in sales revenue would result from the hotel increasing its expenditure in other sectors through backward linkages, in order to meet the increase in demand. In this example, industries supplying goods and services to the hotel represent backward linkages (Stynes 1999: 5). Crompton (1995: 20) describes this indirect re-circulating of tourism expenditure through a supply chain as a ripple effect.

2.2.6 Induced economic impacts

Induced economic impacts result from the spending of income earned directly or indirectly as a result of tourism expenditure (Stynes, 1999: 6). This income represents recycled tourist expenditure, which will be partially retained within the local economy, through further rounds of economic activity (Cooper et al, 2008: 137). Using the example of the hotel, induced economic impacts would arise through hotel employees and those employed through backward linkages spending a proportion of their income within the local economy (Vanhove, 2005: 184). As a result, sales, income and employment within other sectors of the economy benefit, this is the induced impact. The induced impact can also be visualised as further ripple effects resulting from initial changes in tourism expenditure (Crompton, 1995: 20). As this example demonstrates, initial direct changes in tourism expenditure can impact almost all sectors of the economy when indirect and induced impacts are taken into account (Stynes, 1999: 6).

2.2.7 Intangible impacts

Economic impacts are most easily identified and quantified in their direct, indirect and induced forms. However, these represent only a proportion of the total impact which takes place within an economy following changes in tourism expenditure. Briassoulis (1991: 492) addresses this point in an article regarding the methodological issues of I-O analysis. For her, ‘tourism impacts not only on the economy of a region but also on its social and cultural structure as well as on its environment.’ Crick-Furman and Prentice (1999: 70) support this stance, observing that ‘while tourism may offer economic benefits to a community, its impacts on the social and physical fabric of the community are often perceived by residents to be adverse’. Social, cultural and environmental impacts are considered intangible, as they can be identified, but not readily quantified using monetary measures (Briassoulis, 1991: 492).

Despite the acknowledged difficulty in quantifying intangible impacts, failure to account for them remains one of the major criticisms of economic impact analysis within the academic literature (Wood, 2005: 38). Much of this criticism has been directed at I-O analysis, as the technique cannot incorporate impacts which may have a negative impact on the economy. In this respect, I-O presents an overly positive image of tourism’s impacts as it represents only part of the total economic value (Briassoulis, 1991: 492). Dwyer et al (2005: 353) highlight this point, stating that, impacts ignored by I-O may be operating in the opposite direction to the injection of tourist expenditure. Under these conditions, it is likely that I-O would overestimate the total impact of tourism activity because the costs associated with the negative impact cannot be accounted for within the I-O calculation.

While it is correct that I-O does not consider intangible impacts, and that alternative methods such as CGE may better account for negative impacts, the fact remains that intangible impacts are difficult to incorporate into standard economic assessment models, (Crompton, 1995: 33). It is also argued that incorporating costs changes the scope of a study from an economic impact analysis to a benefit-cost analysis. Crompton (1995: 33; 2006: 75) distinguishes between the two, arguing that benefit-cost analysis should be used to inform decision making regarding proposed and alternative development options, and that economic impact analysis should study the effects of additional visitor expenditure attributable to an action. In his 1995 paper he also argues that impacts generated by tourism expenditure should be compared against equivalent forms of economic stimulus in other sectors.

2.2.8 Negative impacts

Negative impacts can also be regarded as costs resulting from an increase in visitor expenditure which may or may not be quantifiable. Examples of negative impacts include traffic congestion, vandalism, environmental degradation, waste generation, increasing commodity prices and loss of access among others (Crompton, 1995:33; Burgan and Mules, 1992 708). Crompton, (2006: 75) is highly critical of economic impact reports which fail to acknowledge the costs associated with tourism actions. In his assessment, he contends that costs borne by the local community, opportunity costs, and displacement costs are often ignored (Crompton, 2006:75). However, in an earlier paper he had previously argued that incorporating costs changes the scope of a study from an economic impact analysis to a benefit-cost analysis (Crompton, 1995: 33). In his 2006 paper he attempts to clarify his stance by arguing that 'there is often an inadvertent or mischievous blurring of these distinctions' (Crompton, 2006: 75).

Displacement costs refer to the impact of visitors who are attracted by a new tourist facility, displacing tourists who already visit an area. In monetary terms, displacement represents 'the amount of current revenue that is displaced by a new development' (Cooper et al, 2008: 682). Displacement occurs because traditional visitors are discouraged to visit the area for reasons such as overcrowding, or because of difficulties in obtaining accommodation (Crompton, 2006: 76). If displacement is significant then no net benefit will occur as existing visitor expenditure is substituted for that of the new visitor (Crompton, 2006: 76). Hiller (1998: 47) questions whether the negative impacts of mega-events are too readily ignored or dismissed as special cases, 'legitimated by economic forecasts that enhance their desirability'. For Hiller (1998: 48) the fundamental problem with this approach is that negative impacts are often incorrectly regarded as having a lifespan equal to that of the event. In an effort to demonstrate that impacts can occur before, during and after the event, Hiller (1998: 47) puts forward a conceptual linkage model incorporating backward, forward and parallel linkages to demonstrate the relationship. Backward linkages encompass the factors which comprise the project background and influence its implementation and therefore its potential impacts. Forward linkages are effects which are caused by the event itself and are generally considered to be positive; an example of this would be an increase in visitor numbers or investment in tourism facilities (Hiller, 1998: 49). Parallel linkages refer to side-effects which occur as a result of the mega-event taking place. Depending on whether the effects are positive or negative, event organisers are likely to align or distance themselves accordingly (Hiller, 1998: 50). The extent to which negative impacts are ignored is largely dependent on mega-event organisers and their commitment to socially-responsible development, versus their desire to maximise economic returns at the expense of environmental and social costs (Hiller, 1998: 55).

Hughes (1994: 404) criticises the way in which capital expenditure is often misleadingly reported as a beneficial impact. In fact, it represents an investment which may or may not yield a return. This point refers to the opportunity cost of investing in a tourism program or facility. Opportunity costs are particularly important when public funds are invested in tourism projects and can be defined as the non-realised potential benefits, which could be achieved, if the same investment was redirected to other public services or retained by the tax payer (Crompton, 2006: 75; Hughes, 1994: 405; Hudson, 2001: 23). The opportunity cost relationship is perhaps best described by Archer (1977: 46 in Crompton, 2006: 75), who states that ‘any attempt to measure the benefits from particular economic activities requires some assessment of the real cost to society of devoting resources to that activity, and a comparison with the benefits to be obtained from the allocation of these resources to other activities’.

2.3 Visitor expenditure, the basis for economic impact analysis

2.3.1 The impact of expenditure

Visitor expenditure forms the basis for all economic impact analyses regardless of whether gross expenditure is used as a direct measure of tourism yield. As previously discussed, visitor expenditure permeates an economy via a cascade of economic transactions which drive direct, indirect and induced impacts (Crompton; 2006: 67; Cooper et al, 2008: 137). Furthermore, tourism and recreation expenditure can be viewed as discretionary spending, because ‘in the absence of a real increase in disposable income, any increase in sport and recreation spending should be interpreted as an expenditure transfer from one side of the economy to another rather than a real gain to the economy’ (Department of the Arts, Sport, the Environment, Tourism and Territories, 1993: 1). However, visitor spending on sport and recreation does represent a gain to a destination or tourism sector, even if it is effectively lost from an origin location or sector. In this respect domestic tourism can be seen as a redistributive process, where expenditure is transferred from one location or sector to another within a national economy. The exception to this is expenditure by non-domestic visitors which represents a genuine addition, as the income source originated outside the destination economy.

The process of identifying and reporting economic benefits resulting from direct and indirect expenditure has also been the subject of considerable academic debate. Within the literature, particular concern has been shown to the way in which special event expenditure has been reported. For Burgan and Mules (1992: 706) this issue stems from studies classifying all expenditures accruing from special events as being of economic benefit. In doing so, costs associated with organising the event are incorrectly attributed as benefits, resulting in an overestimation of the total economic impact (Li and Blake, 2009). This assessment is shared by Hughes (1994: 404) who argues that expenditures associated with the construction and operation of tourist or event facilities are investment costs, which may or may not yield a return, and therefore should not be reported as benefits. Furthermore, not all expenditure is retained within the host economy. Special events by nature are temporary and often use external resources. An example of this would be recruiting a catering business from outside the host economy to service the event. In this situation, visitor expenditure is lost when the business leaves the event. Leakages such as this can have a significant effect on the economic impact of special events, particularly in remote rural areas which do not have the resources to capture visitor expenditure. A further example is provided by Yu and Turco (2000: 147) who identified sizeable leakages from visitor transportation during their study of the Albuquerque International Balloon Festival. In order to reduce the impact of leakages they recommended that event planners 'should first examine the local economic resources before a staged tourism attraction is promoted as an income generator'. Taylor (2002), in his economic impact study of the Fort William round of the Mountain Bike World Cup, highlights the importance of identifying leakages even if it is not possible to quantify them. In his report, he concludes that it was not possible to quantify the proportion of trade stand expenditure which was retained in the local economy, and as a result this expenditure could not be included within the daily expenditure total (Taylor, 2002: 7).

2.3.2 Who should be counted? The basic principles of economic impact studies

Central to the debate surrounding economic impact assessment is the question of whose expenditure should be counted. Resident spending is typically excluded as it does not represent new expenditure; it is simply a recycling of money which already exists in the economy (Crompton, 1995: 26; Stynes, 2001: 5). Frechtling, (2006: 28) describes the exclusion of resident expenditure as the 'relevance principle of sound visitor-expenditure estimation'. This is based on the assumption that local resident expenditure is recycled within the local economy on other goods and services, regardless of the tourist facility or event (Crompton, Lee and Shuster, 2001: 81; Gelan, 2003: 409).

In principle this approach appears logical. However, defining local resident expenditure is less straightforward, and presents a number of issues. The first concerns whether a tourism event or product retains expenditure by keeping local money within the local economy (McHone and Rungeling, 2000: 301). Assuming resident expenditure is a finite resource, and that expenditure is displaced from one activity to another depending on choices made by visitors, resident expenditure may be lost or retained within the local economy depending on the nature of the tourist facility or event. Essentially, this depends on how the study area, activity and visitor are classified.

Determining the study area and cut-off boundary for local visitor expenditure is particularly important for economic assessments. This is because economic activity is a function of the size and structure of the host economy. For Watson et al (2007: 145) 'the importance and size choice is often overlooked in regional impact and contribution analysis', arguing that 'an analyst can manipulate results of these studies in numerous ways simply by changing the area of analysis'. A further consideration is whether a visitor is partaking in an activity for the first time. In this situation it could be argued that their expenditure is a new investment into that particular sector. However, due to that individual having a finite resource to spend on leisure activities, it may also represent a loss from a different economic sector resulting in no net change to the local economy. Conversely, new investment may also come from savings withheld from the local economy, or from retained visitor expenditure if a new tourism or recreation product reduces the need for residents to travel outside their local area to visit a similar amenity (Crompton, 2006: 72). This retention of expenditure or prevention of displacement is known as a deflected impact (Yu and Turco, 2000: 139). Thus, excluding local resident expenditure may not always be appropriate (Crompton (2006: 72). In an attempt to resolve the dialectic surrounding whose expenditure should be included Watson et al (2007: 143) contend that:

> ‘Figures that should be included in an economic impact should be limited to cases that constitute new dollars being brought into the region or dollars kept in the regional economy which would otherwise leak out. In short, economic impact is the best estimation at what economic activity would likely be lost from the local economy if the event, industry, or policy were removed’.

Whilst this definition provides an idealistic framework for measuring impact, it does not take into account the practical challenges of measuring the hypothetical impact of what visitors would have done in the absence of an event or tourism facility. This is acknowledged by Crompton (2006: 72) who contends that deflected impacts can be important, but argues that it is difficult to collect evidence of expenditure deflection, and that it is widely disregarded by economists who consider the impact to be minimal. One example of an attempt to measure the deflected impact is that of McHone and Rungeling (2000: 301). During their study of visitors to the Museum of Art in Orlando, Florida, visitors were asked whether they travelled to similar exhibitions in the past five years and if they would have travelled to another U.S city to view the exhibition. After analysing the results the authors concluded that the deflected impact was insignificant, and as a result removed local resident expenditure from their impact total.

For Gelan (2003: 409), even if it is decided that local resident expenditure should be excluded, the potential net impacts of local resident expenditure should be taken into account by researchers. This is because, resident expenditure that otherwise would have been retained in the economy may be lost through leakages such as event admission fees which do not benefit the local economy. It may also be appropriate to include resident expenditure if the purpose of an economic impact study is to assess the economic significance and not the economic impact of a tourist event or facility (Crompton, 2006: 72). Economic significance studies attempt to measure the size and nature of economic activity associated with tourism projects or programs, by including expenditure by all visitors (Stynes, 2001). A major criticism of this technique is that it cannot be used to inform decisions regarding the allocation of public funds in the same way as an economic impact study. This is because significance studies cannot be used to interpret the impact to an economy, in the event of tourism activity disappearing (Crompton, 2006: 72; Stynes, 2001: 2; Vanhove, 2005: 228). Were this to happen, the loss in expenditure would be more difficult to detect as local resident expenditure would be retained in other economic sectors (Crompton, 2006: 72). Crompton also criticises the way in which the differences between impact and significance studies are sometimes ignored, blurred or not made explicit. This sentiment is echoed by Watson et al (2007: 140) who call for a standardisation of terms within economic analyses to address problems of confusion caused by the inconsistent and interchangeable use of terms such as 'economic impact' and 'economic contribution' which are often applied incorrectly or even misused.

Inclusion of local resident expenditure is only one consideration when allocating items of expenditure. Burgan and Mules (1992: 704-703) identified considerable differences within the literature regarding the allocation of expenditure, and stated that 'there is no general agreement among economists on how best to model an economy'. Most of the differences identified by them were concerned with the act of expenditure switching. Relating their findings to special events, they recognised that spectator switching and switching of public capital were important factors when allocating expenditure (Burgan and Mules, 1992: 709). Switching by spectators refers to the inclusion of expenditure by visitors who would have visited the location at another point in time, but switch the time of their visit to coincide with a special event. Switching is also influenced by the availability of alternative and multiple destination experiences.

For Johnson and Moore (1993: 281) additional behavioural information beyond total trip expenditure is required to accurately estimate the economic impact of tourism and recreation. They argue that economic impact can be overestimated if the assessment does not take into account alternative recreation plans, and multiple destination behaviour. It should be noted however, that their study of white water rafting is influenced by specific environmental parameters such as water discharges from an upstream dam which affects the availability of the resource for tourism and recreation. Therefore, the relevance of their findings might not extend beyond their specific case study location or activity. In terms of switching by visitors it is the recommendation of several commentators that this type of expenditure should be excluded (Burgan and Mules, 1992: 704; Crompton, 1995: 27; Crompton, Lee and Shuster, 2001: 81; Crompton, 2006: 73; Gelan, 2003: 409). Yu and Turco (2000: 139) disagree with the complete exclusion of this type of secondary expenditure as some visitors for whom the event is not their primary reason for visiting will time their visit to coincide with the event. In this situation, they argue that their onsite spending should be included as it represents new expenditure which was planned and budgeted for by the visitor, and is not likely to reduce their expenditure in other local sectors (Yu and Turco, 2000: 139). Excluding 'time-switchers' is also disputed by Frechtling (2006: 29), who disagrees with the fundamental principle of attempting to identify time switching. He argues that in order to identify time switching, one is asking visitors to speculate on what they would have done if they had not visited the event or attraction. For Frechtling, this is a pointless exercise, and he contends that ‘there is no principle served by trying to identify time switchers’ (Frechtling, 2006: 29). It is also his view that serious issues of validity are raised by studies which either exclude time switchers or include retained resident spending, due to the inherent problem of relying on hypothetical rather than actual expenditure data (Frechtling, 2006: 33).

Within the literature, it is also recommended that expenditure by ‘casuals’ should be excluded from economic impact figures, (Crompton, 2006: 73; Crompton, Lee and Shuster, 2001: 81; Frechtling, 2006: 33). Casuals are classed as visitors who are already in a region for another purpose, but who chose to go to a special event or tourist attraction instead of doing some other activity (Crompton, 2006: 73). The rationale for excluding casual expenditure is similar to that for excluding the local resident contribution. This is because in the absence of the event, these visitors would have contributed a similar amount of money to the local economy, but it would be spent in a different sector (Crompton, 2006: 73).

A further example of ‘expenditure switching’ is the reallocation of public capital expenditure from another sector to fund a new tourism project. The reporting of this form of public investment has been criticised by several commentators (Burgan and Mules, 1992: 704; Hughes, 1994: 404; Hudson, 2001: 23; Crompton, 2006: 75) who argue that the costs of such switching are often ignored, leading to a tendency to view this investment as an economic benefit. To illustrate this point, Burgan and Mules (1992: 706) describe a scenario where the building of a new stadium would provide no net benefit to an economy, because the source of funding had been diverted from another sector, in this case road building. Whilst this simple example illustrates the process of switching it does not acknowledge the complex opportunity-cost relationship between the two investment options. One issue is the scale at which the opportunity-cost is being measured. For example, if the two projects were located in the same economic region, the opportunity-cost of both projects could be evaluated in terms of economic benefits to that particular region. However, if the opportunity-costs relate to projects located in different economic regions the opportunity-costs are considerably more difficult calculate at the larger scale. Furthermore, in this situation the costs are effectively hidden from the region benefitting from the investment. For this reason it is advocated that this form of expenditure should be excluded when conducting economic impact assessments. For Crompton and McKay (1994: 42) this approach is still inadequate, arguing that cost-benefit assessments should be used by decision-makers in place of economic impact assessments when evaluating investments.

2.3.3 Methods of measuring visitor expenditure

Measuring visitor expenditure accurately presents a challenge to researchers, due to the fact that there is no simple or agreed measure of how much visitors spend (Wilton and Nickerson, 2006: 17). In order to estimate the economic impacts of tourism and recreation changes in visitor spending must be quantified. At a regional or local level this is typically estimated by measuring expenditure directly using visitor surveys, (Stynes, 2006: 8; Cooper et al, 2008: 139). At a national level, visitor spending can also be estimated using indirect techniques such as tourism satellite accounts (TSA’s) (Wilton and Nickerson, 2006: 17). Visitor surveys typically take the form of on-site or household surveys, and surveys may use interview or self-administered approaches, (Stynes, 2006: 8). In the case of special events, visitor expenditure can be collected by surveying either recipients of visitor expenditure (businesses) or the visitors themselves (Gelan 2003: 408). This is typically obtained via travel diaries, questionnaires and interviews (Walo, Bull and Breen, 1996: 98). Alternatively a combined approach which assesses visitor and business transactions may be employed (Wood, 2005: 40; O'Sullivan and Jackson, 2002: 331).

Gathering tourism statistics at a national level typically involves monitoring arrival and overnight stay data together with balance of payments information (Massieu, 2001: 10). Balance of payments information refers to an account of transactions between a country and the rest of the world (Tribe, 1995: 311). Expenditure data from and to a country are known as a travel account and forms the input for TSA analysis, which is used to estimate the economic significance of tourism to an economy (Cooper et al, 2008: 135; Smith, 1998: 39). A limitation of this approach is that it does not provide in-depth information to develop effective public policies and inform business decisions at a local or regional level. Furthermore, tourism statistics at a national level are often deficient, lacking information on the scale and significance of tourism activity. This can lead to proxy data from other sectors being substituted within travel account datasets reducing the accuracy of the assessment (Massieu, 2001: 10; Cooper et al, 2008: 136). The International Passenger Survey (IPS) has been used for this purpose in the UK since 1961. Conducted at airports, ferry terminals, Eurostar stations, and onboard Eurotunnel trains, this survey collects between 700,000 and 800,000 passenger interviews per annum. Of these interviews approximately 250,000 are used to produce overseas travel and tourism estimates (Office for National Statistics, n.d.). Despite the seemingly comprehensive approach taken by the IPS, Allnutt (2004: 7) in his review of UK tourism statistics identified fundamental deficiencies in the IPS survey, which support the critical view of national tourism statistics held by Massieu (2001: 10). Much of Allnutt's criticism is directed at the sampling frame which he deemed to be inadequate.

Furthermore, he criticises the survey instrument for providing insufficient information regarding visitor expenditure and accommodation information.

In addition to the IPS survey, tourism data within the UK are collected annually via four main surveys, these are: the Great Britain Tourism Survey (GBTS) (formerly the United Kingdom Tourism Survey), the Great Britain Day Visits Survey (GBDVS) (formerly the Leisure Day Visits Survey), the United Kingdom Occupancy Survey (UKOS), and the Survey of Visits to Visitor Attractions (SVVA). For the purposes of this thesis, the following discussion will focus on the evolution of the GBTS and the GBDVS as both of these surveys collect visitor expenditure directly. The UKTS (now the GBTS) represents the most comprehensive national measure of the volume and value of tourist trips (Ford and Wright, 2001: 283), and has been used to provide more detailed statistical information on tourism activity annually since 1989 (Hay and Rogers, 2001: 269).

In this survey, tourism activity is defined as a trip away from home for a minimum of one night for the purpose of holidaying, visiting friends and relatives (VFR), business trips and any other purpose. Tourism volume is measured in terms of the number of trips taken and nights spent away from home, and value is the measured expenditure which takes place during those trips (Hay and Rogers, 2001: 269). Between 1989 and 2011 the survey was sponsored by the four national tourism organisations (VisitBritain, VisitScotland, VisitWales and the Northern Ireland Tourist Board). In 2011 the survey was renamed the GBTS to reflect the fact that it no longer included data for Northern Ireland, as this would now be recorded independently by the Northern Ireland Statistics and Research Agency (NISRA) (Visit England, n.d).

Since its introduction in 1989 the survey has undergone a number of methodological changes (TNS 2013: 3a). In 2000 the survey switched from a questionnaire survey which had remained virtually unchanged since its introduction, to a telephone interview format. The main driver for this change was the discontinuation of an omnibus questionnaire which was the original vehicle for distributing the survey (Ford and Wright, 2001: 283-284). Up until 2000 the survey employed face-to-face interviewing with random samples of respondents at their homes. This was repeated monthly with a new representative sample (Hay and Rogers, 2001: 270). During the interview, respondents were asked to recall the details of trips taken in the previous two months. This included asking respondents to identify each tourism destination on a map and provide the name of the location (Hay and Rogers, 2001: 275). Following the introduction of telephone interviewing in 2000, efforts were made to preserve longitudinal records and ensure that the impacts of these changes were fully understood (Ford and Wright, 2001: 284). Contrary, to the positive views of the UKTS presented by Ford and Wright (2001) and Hay and Rogers (2001), Allnutt (2004: 6) is highly critical of the survey in his official review of UK tourism statistics for the Department for Culture, Media and Sport (DCMS). His report highlighted inadequate sample sizes and poor response rates as major failings. As a result of this review, the original method of conducting face-to-face interviews was reinstated in 2005. Furthermore, the post 2005 survey format was changed to incorporate a much larger sample size (100,000 respondents per annum), more than doubling that of the previous telephone interview method (TNS 2013:3b).

In contrast to the GBTS, the GBDVS forms a less comprehensive survey relating to the volume and value of UK day visits. The survey has been conducted intermittently in 1998, 2002 and 2005, and continuously since 2011. The revised post 2011 survey gathers information from 38,000 respondents annually and is conducted online on a weekly basis.

The survey is also informed by a programme of 6000 parallel in-home interviews which are used as a weighting tool to improve the design of the online survey instrument. In common with the GBTS, the revised survey was commissioned following the critical review by Allnutt (2004: 6-7) who described the LDVS as being unfit for purpose.

One issue of contention within the literature is the choice of average measurement for quantifying visitor expenditure. This issue arises from the inherent mixture of expenditure distributions exhibited by different visitor groups. Stynes and White (2006: 11) argue that expenditure data can be better visualised by separating out the different distributions before estimating the percentage of visitors in each group. This should be done to ensure that expenditure values reflect the distribution from which they originate. Spending distributions do not typically conform to a normal distribution, and as a result the mean value can be skewed by the presence of high expenditure values within the distribution. Stynes and White (2006: 11) observe that 'median spending in visitor surveys is typically less than half the average spending'. This is because median and mode values are less influenced by the presence of high values within the data. Whilst this observation suggests that the median or mode may be better measures for extrapolating expenditure data, the authors contend that for most situations the mean remains the appropriate average measure of expenditure, this is because the mean is better able to handle expenditure categories with low spending values than the mode or median. However, the median has been used by other studies.

One example is the economic impact study of a Grateful Dead music concert in Las Vegas by Gazel and Schwer (1997) who used the median to mitigate against the presence of high values within the dataset. As an alternative, the authors could have chosen to use a trimmed mean (typically 5%) to deal with the presence of outliers within the dataset. This removes 2.5% of the upper and lower cases from the distribution, negating the need to use alternatives such as the mode or median (Stynes and White, 2006: 12).

Frechtling (2006: 30) in his assessment of visitor expenditure methods and models also acknowledges difficulties in estimating mean expenditure. However, in his view, the problem is not related to the selection of average measure; instead, it concerns accurately recording expenditure figures in the first instance. Sun and Stynes disagree, (2006: 721-722) highlighting the importance of using the correct method for calculating mean visitor spending to prevent expenditure figures from being over-estimated. They argue that an inflated expenditure average can be produced if the mean is not calculated using the Ratio Estimator Method. Furthermore, they describe how it is easy to overestimate expenditure if a naive approach is taken to calculating the mean. This computes mean expenditure per night on a case by case basis for each trip, and then cumulatively calculates a total mean figure based on the total number of trips (i.e. mean of means). Conversely the ratio estimator method calculates the mean from the average spending of all trips and the average length of stay of all trips. Sun and Stynes (2006:721) contend that this distinction between the two methods is important because visitor expenditure per day/night is not perfectly correlated and declines as the length of stay increases, therefore it is correct to average expenditure over the total trip length and not calculate it cumulatively on a per night/day basis, this also reduces variance within the dataset, giving an artificial view of dispersion.

Accurately recording expenditure data also becomes problematic when one person is asked to quantify expenditure for the group in which they are travelling, this can often lead to an under-reporting of group expenditure (Frechtling, 2006: 30). Conversely, group expenditure may be exaggerated, due to the influences of peer pressure. This issue provided the focus for a study by Breen, Bull and Walo (2001: 473) who investigated the influence of peer pressure or 'social bravado' on the reporting of visitor expenditure at special events. This research found evidence of 'social bravado' affecting the reporting of expenditure by males, but that this was only in relation to food and drink expenditures (Breen et al, 2001: 475).

2.3.4 Data collection considerations and potential sources of error

In order to collect accurate average expenditure data, survey data must be reliable and from a representative sample of the population. Stynes and White (2006: 10), identify four sources of error namely: measurement error, errors resulting from unrepresentative samples, sampling errors, and errors in the analysis and reporting of data. Two common sources of measurement error within visitor expenditure studies are recall and telescoping errors. Recall errors occur when visitors are unable to remember what they have actually spent resulting in expenditure being under-reported. Wilton and Nickerson (2006: 18) in their review of expenditure collection methods conclude that 'the longer the length of time elapsed between the visit and when respondents were asked to recall trip expenditures, the more likely respondents underestimated their actual expenditures'. As a result, they advocate that visitor surveys should be conducted close to the time of actual spending taking place, and that precise questioning should be used to reduce recall and telescoping errors. Telescoping errors relate to the inclusion of expenditure from outside the study area or study timescale resulting in the over-reporting of visitor expenditure (Breen et al, 2001: 474).

Sampling errors can also be introduced through the use of non-representative samples (Morey and Waldman, 1998). This type of error can occur if particular visitor segments are sampled disproportionately, or when large differences in the response rates of spending groups are not addressed. However, this type of error can be difficult to detect and relies on the researcher knowing the study population, describing the sample and demonstrating that it is representative of the population (Hindsley, Landry and Gentner, 2011: 95). Errors can also occur during the analysis of expenditure data. Tyrell and Johnston (2001: 99) warn that 'mistakes made in the estimation of the initial round of event-related expenditures will carry through into subsequent applications of input-output or multiplier analysis'. Stynes and White (2006: 11) contend that the problem is much greater and argue that the handling and reporting of data within tourism and recreation surveys is generally inadequate, and cannot be used to assess the presence and magnitude of analysis errors. Many analysis errors occur as a result of mishandling missing data and a key consideration when analysing data is whether to treat fields left blank on visitor surveys as zeros or missing data. In this situation, Stynes and White recommend that blanks are generally treated as zero spending, unless other related sections are also left blank. They also suggest that researchers ask initially whether a respondent has spent any money during a trip, before requesting specific expenditure details.

2.4 Methods of quantifying the economic contribution of tourism and recreation

The problem of measuring the economic impact of tourism can be approached in many ways. Stynes (1999: 1) states that, 'a variety of methods, ranging from pure guesswork to complex mathematical models, are used to estimate tourism's economic impacts'. He observes that economic impact studies vary greatly in quality and accuracy, and criticises the use of technical jargon within impact reports which can confuse non-economists. Furthermore, decision-makers and the general public can gain a distorted or incomplete view of tourism's economic impacts, based on reports within the media which often misinterpret or oversimplify impact results, (Stynes, 1999: 1). A similar view is provided by Tyrell and Johnston (2006: 94), who assert that the technique can be an important tool for tourism planners, but one which can be subject to considerable misuse and misinterpretation.

It is important to establish at the outset that economic impact analysis is based on assumptions regarding tourist behaviour. Dwyer et al (2004: 313) contend that 'empirical and quantitative work in economics relies on underlying assumptions, even though this may not always be apparent'. Examples of assumptions include demand elasticities (the relationship between demand and variables affecting demand e.g. price or income) and tourism industry outputs (Crouch, 1995: 105; Berritella et al, 2006: 916). For Hudson (2001: 21) 'all assumptions are not created equal', arguing that many of the conducted impact studies have been justifiably criticised, for violating standard practices in impact analysis. Many of these assumptions have been described as unrealistic, leading to the production of unrealistic results (Cooper et al, 2008: 146). However; providing that these assumptions are not completely unrealistic, reasonable estimations of economic impacts can be made (Dwyer et al 2004: 313). During the 50 year development of *ex post* economic analysis methods (see section 2.2.1) economic models have evolved to be less restrictive, enabling more realistic assumptions to be incorporated (Li and Blake, 2009: 338). Identifying the number of assumptions within a particular technique is an important consideration when assessing the validity of economic impact studies. It must also be recognised that more complex estimation models and techniques require a greater number of assumptions to be made (Dwyer et al 2004: 313; Blake et al, 2006: 293). Whilst progress has been made to improve the accuracy of assumptions, economic models are still restricted in their ability to accurately model the dynamic nature of tourism activity. For Cooper et al (2008: 147) this represents the key barrier to improving the accuracy of economic estimates, as static models are unable to handle the dynamic changes between supply and demand within a tourism economy. As a result, most models only provide a snapshot of the host economy at one point in time. Although more complex CGE models have been developed to include dynamic assumptions (Song et al, 2012: 1665), these models remain limited by the sources and numbers of assumptions that can be incorporated into the model, and therefore only partially model dynamic transactions within an economy.

2.5 Economic impact analysis methods

2.5.1 Impact analysis methods

Estimating the economic impact of tourism is a complex task because impacts occur in more than one sector of the economy (Fletcher, 1989: 515). A number of methods for quantifying economic impact can be identified within the literature. However, as Fletcher contends, the final choice will be governed to a large extent by the research purpose, availability of resources, time constraints, and the nature of the economy being investigated.

2.5.2 Business case economic impact analysis

Business case analysis attempts to measure the economic impact of tourism by quantifying impact in terms of its effect on businesses within a survey area (Kottke, 1988: 123). In other words it is a supply-side measure of the direct impact of tourism on local businesses (see Section 2.2.1 for a discussion of supply-side analysis). The approach is commonly used in contract research, where business data are used as a proxy for visitor based surveys. In theory, business sales data should match what would have been reported by visitors themselves, if they had been surveyed.

Page and Connell (2005: 64) adopted this technique in their investigation of the 2003 World Medical and Health Games in Stirling, Scotland. Postal questionnaires were sent to all tourism-related businesses within the survey area which included: accommodation providers, visitor attractions, catering and retail businesses, and transport providers. The overall purpose of the survey was to identify the proportion of turnover which could be attributed to tourism (Page and Connell, 2005: 72). Business case analysis can also be used to validate visitor expenditure estimates (Stynes and White, 2006: 13) or form part of other more complex economic assessment methods such as multiplier, I-O and cost-benefit analysis (Slee, Farr and Snowdon, 1997; Parlett, Fletcher and Cooper, 1995; Felsenstein and Fleischer, 2003). Slee et al (1997: 183) used this approach to examine the economic impact of rural tourism Scotland. Their study combined business turnover with visitor expenditure data within a proportional multiplier assessment to estimate the direct, indirect and induced economic impacts of tourism in six rural areas. In contrast, Parlett et al (1995) relied solely on business expenditure data within their I-O study of tourism in Edinburgh, Scotland.

In an attempt to progress beyond multiplier estimates and examine the economic growth generated by local festivals, Felsenstein and Fleischer (2003: 385) incorporated a business case approach within a cost-benefit analysis to estimate the increase in private and public income growth accruing from two local festivals. Their study combined internal account data from the festival organisers with visitor expenditure data to evaluate the economic costs, benefits, displacement and expenditure switching scenarios in a cost-benefit analysis. Their visitor expenditure impacts calculation is expressed as:

Equation 2.1: Visitor expenditure impacts calculation

$$i = (n - m) + (r - p)$$

Where:

i	=	*Visitor expenditure impacts*
n	=	*New local expenditure by local residents (i.e., non-deadweight expenditure which would have taken place without the event)*
m	=	*Spending by local residents that in the alternative situation would not have been used on a similar event outside the region*
r	=	Local expenditure by non-local visitors
p	=	Local expenditure by non-local visitors that displaces existing demand (i.e., non-local visitors who would have visited in any event)

Source: Adapted from Felsenstein and Fleischer (2003: 388)

By using this technique the authors hoped to demonstrate a practical approach to estimating local economic growth, which addressed the limitations of the multiplier approach. However, their study adds considerable complexity and requires careful data filtering. It can also be argued that the validity of their survey might have been affected by the use of hypothetical questions to identify ‘time-switchers’ and ‘casuals’, which asked respondents what they would have done in the absence of the event. The feasibility of measuring and excluding this type of behaviour has been much debated within the literature (see Section 2.3.2). However, in common with Johnson and Moore (1993: 281) the authors believed that these problems could be overcome through careful questioning arguing that their study has ‘shown that it is possible to progress beyond the standard estimations of expenditure-induced income multipliers so prevalent in the professional literature' (Felsenstein and Fleischer, 2003: 391). Their findings also suggest that local festivals can signal to local businesses, visitors, and migrant workers that a destination is thriving and is able to offer cultural and quality of life benefits. Signalling is regarded as highly important by the authors and they argue that this effect may be of equal importance to other more commonly regarded economic impacts associated with festivals (Felsenstein and Fleischer, 2003: 391).

Alves, Cerro and Martins (2010) also acknowledge the heavy reliance on economic multipliers for estimating the impact of small scale local festivals, and address what they see as a one dimensional approach to event impact assessment. In their study of the economic and social impact of a cherry festival in Fundão (Portugal), they argue that many studies are limited by the use of a single method which typically only estimates economic impacts. For them, this approach fails to account for the combined effect of economic and social impacts. In an attempt to address this issue the authors put forward a multi-method business case approach which incorporates both quantitative and qualitative research methods. The use of both quantitative and qualitative research techniques is supported by Walle (1997: 524) who states 'an eclectic approach of choosing research methods is recommended in light of the fact that tourism scholars and practitioners deal with complex phenomena and, as a result, rigorous scientific approaches are not always appropriate for the problems encountered'.

More specifically, the authors used questionnaires and personal interviews to gather primary data which were supplemented with secondary sources in order to gain a complete picture of the festival from the perspectives of the organisers, suppliers and local residents (Alves, Cerro and Martins, 2010: 22). Overall they found that small events can produce a range of economic and social benefits, with social impacts being particularly valued as they were perceived to be greater than any economic impacts by residents and event suppliers (Alves, Cerro and Martins, 2010: 33). Their study also supports the idea that local events act as a signal, helping to promote the area and improve quality of life by building community pride (Alves, Cerro and Martins, 2010: 33).

2.5.3 Principal criticisms of business case economic analysis

Fletcher (1989: 515) describes business case economic impact analysis as a simple but crude method, which only provides a partial glimpse of the economic impact of tourism, and one which could lead policymakers to the wrong conclusions. The main criticisms associated with the method revolve around problems of identifying tourism-related businesses and the calculation of the proportion of turnover attributable to tourism. Both of these factors introduce subjectivity into the study, as it requires the researcher to identify tourist related businesses accurately and also requires those businesses to accurately report turnover attributable to tourism. Frechtling (2006: 31) criticises the technique for this very reason, stating that it might be possible for transportation businesses to segregate expenditure for local residents and tourists, but it is unlikely that smaller operators such as restaurants and other tourism facilities can distinguish between visitor and local resident receipts. He also identifies a further problem with the technique which is that many businesses are reluctant to divulge accurate turnover information.

The problems of accurately identifying business expenditure can be viewed in the same vein as memory recall problems which can affect the accurate attribution of reported visitor expenditure. For Tyrell and Johnston (2001: 98) the principal problem lies with the potential for expenditure to be double counted when business case data are combined with visitor expenditure. Felsenstein and Fleischer (2003: 391) note that it was possible to avoid double counting, or incorrectly attributing expenditure from their business survey by isolating event cost data, but they do not say what measures were taken to avoid the same problem when combining visitor and business data. This factor may make it difficult to accurately compare the two forms of expenditure data which should theoretically be identical. It is clear that this level of disaggregation of expenditure requires careful survey design and analysis in order to accurately estimate economic impacts.

2.5.4 Economic impact multipliers

Of all the methods used to estimate the economic impact of tourism, economic impact multipliers can be identified within the literature as being the most controversial (Yu and Turco, 2000: 139). Initial debate within the academic literature can be traced back to the early 1980s and the work of Brian Archer. Writing in 1982, Archer contends that 'there is perhaps more misunderstanding about multiplier analysis than almost any other aspect of tourism research' (Archer, 1982: 236; Fletcher, 1989: 526). In his critical review of the value of multipliers and their policy implications, Archer blames researchers, himself included, for the failure to explain multiplier analysis to non-economists. He also criticises the way in which different and conflicting multiplier concepts have been used, and the way in which the technique has been brought into disrepute by some researchers, 'leading to disastrous implications for policymaking' (Archer, 1982: 236). Fletcher (1989: 526) concurs with this assessment stating that 'abuse of multipliers has come from inexperienced or inappropriate application of multiplier analysis' and that 'much of the misunderstanding arises because of the variety of multipliers which can be calculated'. Hughes (1994: 403) echoes this earlier assessment by Archer and Fletcher, and observes that confusion still exists over different approaches to multiplier analysis. He also recognised that the technique has several shortcomings related to the use of data and the way in which data are attributed within the calculation. Furthermore, he argues that economic multipliers present a narrow perspective, which ignores social, cultural, environmental impacts, and that real relationships are obscured with mathematical precision (Hughes, 1994: 404).

In principle, economic multipliers are a straightforward concept. As Dwyer et al (2004: 308) explain, ‘a change in tourism spending will lead to additional activity in related industries, and the overall change in tourism spending will be greater than the initial boost in spending, hence there is a multiplier effect’. However, as Hughes (1982: 171), argued ‘it is the comparative size of the multiplier that is important, not simply the fact that a multiplier exists’. A more detailed definition is provided by Frechtling and Horváth (1999: 324) who contend that ‘tourism multipliers indicate the total increase in output, labour earnings, and employment through inter-industry linkages in a region as a result of tourism expenditures’.

The interrelationships between frontline tourism businesses and their supply structure were discussed in detail in Section 2.2, and it was stated that the total economic impact of tourism can only be revealed by adding together the direct, indirect and induced impacts (Stynes, 1999: 5). Hughes (1982: 171) explains that tourism ‘can only be linked to the economy through ‘backward linkage’ to the primary and secondary sectors and forward to final demand’. Cooper et al (2008: 140-141) identify five major types of multiplier which can be calculated using five different methodological approaches.

Transactions (or sales) multipliers measure the increase in revenue resulting from an increase in tourism expenditure. Output multipliers comprise the second type, and measure the increase in economic output resulting from an increase in tourism expenditure. In contrast to sales multipliers, output multipliers measure changes in economic production rather than sales volume and revenue. The third type are income multipliers which measure increases in income (wages, interest, profit etc.), resulting from increases in tourism expenditure. Employment multipliers represent the fourth type, and measure employment generated per unit of additional tourism expenditure, or the ratio of employment generated per unit of additional expenditure. The fifth are government revenue multipliers, which measure the impact of tourism on government revenue in either gross or net terms.

Of these five multipliers the most commonly used are output, income and employment (Wanhill, 1994: 281; Gelan, 2003: 410). The choice of multiplier is further complicated by the choice of methodological approach used to derive the multiplier value. Multipliers can be derived using base theory models, Keynesian multiplier models, ad hoc models, I-O analysis, and CGE models Cooper et al (2008: 141), they can also be derived from previous studies, (the standard multiplier) (Dwyer et al 2004). I-O and CGE multipliers represent evolutions of the multiplier concept and are discussed separately in sections 2.5.4 and 2.5.6, base theory, Keynesian and ad hoc multiplier models represent earlier iterations and are discussed here. Base theory models represent the earliest forms of multiplier analysis and present simplified relationships between exports and an increase in income, employment, consumption and investment (Archer, 1982: 238), this type of multiplier has since been superseded by more complex models and is generally no longer used (Cooper et al, 2008: 141). Keynesian multipliers represent a more complex form of general income multiplier, which sum 'the income created as the money people have earned from visitor spending' (Vaughan, Farr and

Slee, 2000: 97). However, they remain a general method which cannot provide detailed sector specific information. Their limitations lead Cooper et al (2008: 142) to conclude that ‘even the most complex and comprehensive Keynesian models developed for some studies are unable to provide the level of detail that is required for policy-making and planning’. Ad hoc models further the development of the Keynesian multiplier concept, as they are tailored to the needs of the individual research study and reduce some of the input variable subjectivity (Fletcher, 1989: 515). Whilst these models address some of the fundamental limitations associated with Keynesian multipliers and produce multiplier values which can be used by policymakers, they cannot compete with more complex I-O and CGE which can better model the complex tourism system (Cooper et al, 2008: 143).

One of the main reasons for the routine use of multiplier analysis within tourism studies is that it shows impacts in a positive light (Dwyer et al, 2004: 308). This is a desirable trait for those who wish to highlight the positive elements of a particular policy or project. This is also a major criticism, as the technique does not take into account any negative impacts associated with the increase in tourist expenditure. Dywer et al (2004: 308) remark that ‘just about any increase in tourism evaluated this way will look good, since even poor policies which have some positive impacts will lead to an increase in measured economic activity’. This assessment is supported by Felsenstein and Fleischer (2003: 385) who argue ‘invariably the results are favourable and are then used to bolster the demand for public support’. They also criticise the way in which multipliers have been used to make premature estimates of local economic impacts, without quantifying the impact on long-term economic growth.

2.5.5 Criticisms of the economic impact multiplier method

Archer (1982: 236) asked whether multiplier analysis is actually suitable for analysing the impact of tourism. Further to this fundamental question, he argues that ‘multiplier analysis provides little or no information about whether or not the use of these resources in tourism is economically efficient from the point of view of society as a whole in the economy concerned’ (Archer, 1982: 240). In total, he identified four problems with multiplier studies, which centre on the misuse of ratio multipliers within tourism studies (Archer, 1982: 238-239). Ratio multipliers are a refinement of the Keynesian multiplier and ‘express income as a ratio of total income generated by tourism to the direct income generated’ (Archer, 1982: 238).

For Archer, ratio multipliers are not tourism multipliers, arguing that to multiply them by tourism expenditure would be meaningless as they provide a misleading value based on the direct income and not total tourism expenditure. They are misleading because they do not take into account the amount of visitor expenditure which is lost from total tourist expenditure through leakages. However, they do provide a useful picture of the degree of internal linkage between direct and indirect tourism sectors. His second contention lies with the failure of studies to distinguish between income and sales multipliers, stating that it is hard to believe that the two have been mixed up, but infers that several researchers have made this mistake. The third problem relates to confusion between the multiplier and multiplicand. In other words, studies which have not properly accounted for costs and leakages before applying the multiplier value, leading to overestimation of tourist income. Archer’s final criticism bluntly targets negligent researchers, who he argues have discredited the technique as a policy and planning tool through careless work and misuse of the technique. Following this initial criticism of the technique, Archer (1984: 518) reiterates his criticism of the ratio multiplier in a 1984 paper, where he argues that it is hard to understand why the technique has gained such widespread usage within the tourism field, and calls for the approach to be abandoned.

Hughes (1994: 403) is also highly critical of the technique arguing that the ‘issues with multiplier analysis are of such significance that the use of this tool should be less frequent with less emphasis placed on its significance’ Central to his argument are the assumptions on which the multiplier technique is based. This point was earlier highlighted by Archer (1982: 239) who contended that it is usually necessary to make assumptions which may to some extent be unrealistic, and that this is well documented in the literature. For Hughes, the entire concept is based on two unrealistic assumptions. The first assumption is that the ‘ratio of tourist employment to total employment in any one sector of the economy is equal to that between tourist and total expenditure’, and second, that as a result of increases in tourist expenditure employment will increase in a linear fashion (Hughes, 1994: 404). Condemning it as a flawed technique, he argues that even if the associated shortcomings are addressed, the significance of multiplier values remains in doubt. Furthermore, he argues that it is probably sufficient to assess only the direct impacts of tourism, and or to trace expenditure flows through the economy without using an economic multiplier (Hughes, 1994: 405).

Tooman (1997: 921) identifies three further limitations. The first refers to the problem of obtaining sufficiently accurate input data from which to conduct the analysis. Second, he argues that even if accurate data are available, the analysis is too narrow in scope, therefore only being of use to selected tourism sectors. His final criticism relates to the influence of spatial scale on the multiplier value, which increases with the size of the study area.

Felsenstein and Fleischer (2003: 385) concur with the critical assessments of Archer, Tooman and Hughes, arguing that the technique is an inadequate measure of local economic gain because it fails to accurately account for festival costs and the distribution of local economic impacts. Moreover, multiplier analysis often fails to demonstrate the link between invested public funds and local income accruing from the event. A key point regarding the use of multipliers is that while many in the field acknowledge its limitations, few are prepared to abandon it. This is illustrated by Frechtling and Horváth (1999: 325) who acknowledge that I-O techniques have 'some serious conceptual and operational drawbacks when estimating the total economic contribution of visitor spending', but conclude that their study does not attempt to correct these. Justifying their decision, they cite that more work is needed to understand the limitations of multipliers and how they are applied for tourism policymaking purposes (Frechtling and Horváth, 1999: 331).

2.5.6 Input-output (I-O) economic impact analysis

I-O analysis uses a mathematical model to describe the flows of money between different sectors of an economy (Stynes, 1999: 6; Johansen et al 2001; 74). The technique gained prominence in the late 1980s and represents an evolution of the multiplier, as it addresses some of the subjectivity involved in the basic multiplier approach (Cooper et al, 2008: 143). Fletcher (1989: 528) can be identified as one of the earliest supporters of I-O, advocating that 'Input-output analysis is without question the most comprehensive method available for studying the economic impact of tourism. No other technique can offer the flexibility and level of detail which is provided by this technique'. This assertion is based on his reasoning that a general equilibrium approach is required, due to the complex nature and diversity of tourism related sectors (Fletcher, 1989: 515). Justifying his position, he argued that I-O is a flexible technique that enables the researcher to study the economic impact of tourism at its three levels; direct, indirect and induced. Furthermore, the technique treats each sector uniformly and can be tailored to suit different purposes. A further advantage is that impacts can be disaggregated, making the outputs useful to policymakers. Monetary flows within the economy are predicted by the model based on knowledge of what each sector must purchase from another to produce a specific volume of economic output (Stynes, 1999: 6). A key strength of I-O is its flexibility which enables it to be used to model complex economic relationships given sufficient data, time and resources (Cooper et al, 2008: 145). Furthermore, I-O provides information regarding the proportion of income which goes to wages and other outputs, and can also be used to develop multipliers based on the estimated recirculation of expenditure within a region (Stynes, 1999: 6). I-O is described as a general equilibrium approach, which refers to the fact that economies are considered to operate as an integrated system where the overall balance must be preserved (Cooper et al, 2008: 143). Within this system it is recognised that direct, indirect and feedback systems are important processes which affect the overall balance. A further strength of I-O is its ability to estimate income and employment generated by changes in tourism expenditure. A point illustrated by Vanhove (2005: 190) who contends that I-O represents the best method for estimating income and employment multipliers.

I-O models typically use national or regional tourism statistics together with a measure of final visitor demand (expenditure), and take the form of general or tailor-made models (Frechtling and Horváth, 1999: 325; Johnson and Moore, 1993: 280). These statistics are typically provided in the form of I-O account tables which are used to derive technical coefficients for use within the I-O model (Rickman and Schwer, 1995: 363). I-O tables graphically represent the economic structure of a particular destination, region or event, and the relationships between the different sectors which comprise the economic system. I-O tables consist of three sections or matrices which show the value of transactions between the sectors. The matrices relate to: the matrix of intermediate demand (production inputs), the matrix of primary inputs (wages and profits), and the matrix of final demand (consumption outputs) (Herrero et al, 2006: 45). Within the I-O tables, the rows represent sectors which consume outputs from the primary producing sectors (primary inputs), and the columns represent sectors which consume outputs from the intermediate sectors (intermediate inputs). The final matrix represents final demand, consisting of: consumption by consumers and exports, sales which do not go to other sectors, and primary inputs such as labour and imports (Kweka, Morrissey and Blake, 2003: 338). Put simply, I-O tables calculate technical coefficients which express the increase in production required to satisfy a unitary increase in the final demand of the consumed products (Herrero et al, 2006: 45). One example of this approach is the I-O study of the 2002 Fifa World Cup in South Korea by Choong-Ki and Taylor, (2005: 4). Here they used national I-O account tables supplied by The Bank of Korea (BOK) to derive tourism sector multiplier values.

As previously discussed, I-O models can be general or tailor-made (Johnson and Moore, 1993: 280). However, as Rickman and Schwer (1995: 363) explain, it was the development of general I-O models which has led to the dramatic increase in their use. Ready-made models have several advantages over their tailor-made counterparts, primarily in terms of the reduced cost and time required to conduct the technique. Of the generally available regional models, the authors identified IMPLAN, RIMS II and REMI as being the most widely used. Both IMPLAN and REMI represent dynamic models which can be used to model impacts over time, in contrast RIMS II is static and can only measure impacts at one point in time. In addition to the ability to model impacts over time, the models also differ slightly in their operation and source of data used to build the I-O tables. In an attempt to measure whether the inherent differences within the models lead to the production of varying multiplier values, Rickman and Schwer (1995) benchmarked all three models in a comparative test. Their findings revealed that whilst large differences in multipliers could be identified within the default models, once benchmarked (adjusted to control for the inherent differences between the models) all three models produced multipliers which were not statistically different. From this, the authors concluded that the results provided reassurance in the robustness of these widely used general models. However, they warn that researchers must select the most appropriate model based on its intended use. Furthermore, they contend that whilst multipliers may not vary between the models, multipliers can vary within a particular industry (Rickman and Schwer, 1995: 372).

2.5.7 Criticisms Input-Output (I-O) economic impact analysis

I-O addresses many of the limitations of the standard multiplier approach and is widely recognised as a valid tool for modelling the economic impacts of tourism related events, destinations and attractions. However, the technique does exhibit limitations. Kottke (1988: 123) contends that the I-O has three main drawbacks, the first relates to aggregation, where the results are based on the aggregated inputs of firms within an industry. His second concern is that the results can easily be misinterpreted and that recommendations often require additional qualification. Finally, he questions the suitability of I-O for analysing impacts at a local level. This relates to the availability of data at the sub-regional which may preclude the use of the technique (Andrew, 1997: 725; Robinson, 1997: 327; Saayman and Saayman, 2006).

Zhou et al (1997: 78) agree with this final observation arguing that 'to observe and measure the whole economy of a region, the researcher must expand the database to include not only industrial transactions of the economy but also household transactions for consumption and resource employment'. For Briassoulis (1991:488) aggregation is one of a number of substantive issues which also include structural change and prediction; and intangible impacts. She argues that the majority of the methodological issues arise from the fundamental assumptions which underpin the I-O model. With regard to aggregation, she contends that when impacts are aggregated within the total tourism impact calculation, the total does not take into account the individual opportunity costs of tourism within each sector. This factor can distort the output figure, as the impacts may operate at different economic scales.

The problem of aggregation is also recognised by Daniels, Norman and Henry (2004: 181), who argue that the use of I-O to measure the economic impacts of a sports event is limited because the technique does not provide sufficient information relating to the impact of tourism spending on the income of different household segments, and how wealth is distributed throughout an economy. Of the remaining substantive issues, the assumption of general equilibrium causes Briassoulis most concern as she questions whether general equilibrium can be assumed in a sector which is susceptible to political, social and economic change. For her, the tourism industry could at best be described as a 'dynamic, equilibrium state' (Briassoulis, 1991: 489). A further limitation of I-O is that it is only suitable for measuring the economic impacts of tourism in the short to medium term. Acknowledging this, Briassoulis (1991: 491) argues that long range predictions of economic impact would require more complex modelling techniques such as CGE models; it would also require some knowledge of future tourism policy to inform assumptions. Considering her final methodological issue, she reminds the reader that I-O can only provide a partial impact assessment, as it only models the positive economic impacts of a tourism economy, ignoring negative and intangible impacts (Briassoulis, 1991: 492).

For Dwyer et al (2004: 307) this aspect represents the most significant limitation, arguing that 'the fundamental problem with I-O is that it is incomplete; it ignores key aspects of the economy'. This is because it can only model the parts of the economy for which data are available. Furthermore, the technique only views the economy from the perspective of the industry which is directly affected and its immediate backward linkages. For them, this is a serious limitation as it ignores any negative impact or barriers to economic development within these parts of the economy, and fails to acknowledge wider interactions between different economies. As a consequence, they argue that in almost every example, the economic output from I-O is much greater than the observed net increase in the overall economy. In conclusion they contend that I-O represents a partial interim measure that has been superseded by methods such as CGE which can better handle complex economic interrelationships (Dwyer et al 2004: 309).

2.5.8 Computable General Equilibrium (CGE) impact analysis

CGE models advance the multiplier concept and represent a paradigm shift from I-O methods, as they incorporate fewer assumptions and generate more reliable results (Li and Blake, 2009: 338). The use of CGE to examine tourism impacts gained momentum in the mid 1990s with the advent of more powerful computing technology. However, its origins can be traced back to the early 1960s where it was used to simultaneously model market prices and production volumes (Zhou et al, 1997: 78). The model comprises of economic relationships presented in a series of Social Accounting Matrices (SAM) which model all elements and interactions of an economy, including linkages between industries, regions and markets (Berritella et al, 2006: 913-924). More specifically, it is a systematic way of representing ‘the economic and social structure of a country (region) at a particular time, by defining its representative economic agents and recording their transactions’ Sugiyarto et al (2003: 688). In addition, CGE models ‘are able to trace the effects of changes in non-tourism activities on tourism-related sectors, as well as the effects of changes in tourism on the remainder of the economy’ (Blake et al, 2006: 299). In contrast I-O is one-sided, modelling outputs only as a result of supply side changes (Cooper et al, 2008: 146). The model works through a system of ‘double-entry’ bookkeeping by modelling the inflow of income and outflow expenditure payments, which must be balanced (Zhou et al, 1997: 79).

Keen advocates of the approach Dwyer, Forsyth and Spurr (2004: 308) argue that CGE should be the preferred technique for modelling the economic impact of tourism, and contend that it has the potential to further research in this area. Furthermore, they see no reason why CGE should not replace I-O as the primary solution for analysing tourism’s economic impact, citing the ready availability and low cost of using the technique. Central to their argument is its rigorous analysis of impacts which typically produces more realistic impact estimations. In this respect CGE can be seen as being more ‘honest’ as it often produces results which users may not expect or even want (Dwyer, Forsyth and Spurr, 2004: 315). Despite their assertions that CGE has superseded techniques such as I-O and that it should be more widely adopted, they express condemnation that the technique has not gained widespread acceptance and criticise the tourism sector for its failure to embrace CGE, Describing it as ‘one of the few sectors in which there is still considerable reliance on superseded techniques of economic evaluation’ (Dwyer, Forsyth and Spurr, 2004: 310).

2.5.9 Criticisms of Computable General Equilibrium (CGE) impact analysis

The comprehensive nature of CGE, one of its principal strengths, is arguably also its main weakness. In order to create a realistic model of the economy, CGE requires large quantities of input data which ultimately results in a trade-off between accuracy and cost. Furthermore, Cooper et al (2008: 146) are critical of the claims that CGE has overcome the problems of restrictive assumptions. Whilst it is true that the increased capabilities of the model for processing data have enabled more realistic assumptions to be incorporated, they argue that 'CGE models have not been too successful in overcoming these weaknesses and limitations'. Examples include unrealistically treating economies as being in full equilibrium, and assuming sectors to be operating at full capacity, which is generally unrealistic given factors such as unemployment (Song et al, 2012: 1665). A further problem is that CGE models can only be used for applications where sufficient data exist, often restricting their use to developed market economies. Li and Blake (2009: 338) also warn of the importance of identifying the economic scale when CGE is used to estimate impacts at mega events. This is because it is often incorrectly assumed that an increase in scale will always bring about an increase in economic impact. This is not the case, as investment costs must be accounted for, and may result in an overall negative impact being observed. To address this problem the authors call for more research to be conducted to identify and define appropriate frameworks for measuring the economic scale at mega events which would improve the reliability of the CGE approach.

A further contention within the literature is the suitability of CGE for measuring the economic impact of small-scale special events. Burgan and Mules (1992: 703) question its suitability on the grounds of scale. For them, small-scale events are too transitory and too localised to have significant impacts on input costs in other sectors arguing that 'As the focus of study narrows, the less applicable are CGE models'. This aspect is also acknowledged by Dwyer et al (2004: 314), who despite their promotion of the technique concede that if local impacts of events are of interest, an economy wide CGE approach is not appropriate. This issue relates to the availability of input data at the local level, which may preclude CGE as a measurement tool. Furthermore, whilst CGE could be used to measure local event impacts, it would be unnecessary, invariably costly, and for these applications a local I-O analysis could be undertaken instead. Although the authors identify event studies as exceptions, the fact that CGE is not suitable for all applications provides an answer to their question of why it has not been more widely adopted.

The motivation for using CGE and I-O has also been called into question. These criticisms centre on the deliberate choice of methods to produce the economic output desired, and not on the basis of suitability for answering the research question. Crompton (2006: 68) supports this point and is blunt in his assessment, arguing that 'the motives of a study's sponsor invariably dictate the study's outcome'. Dwyer et al (2004: 315) contend that users familiar with I-O have become conditioned, and now expect large positive impacts to be derived from tourism shocks on an economy. Conversely CGE produces results which are more modest, and may even be negative, and this may not be what certain audiences want to hear. However, this type of behaviour compromises credibility, and the authors assert that decision-makers are becoming increasingly knowledgeable about modelling techniques, and as a result are far more sceptical of impact claims.

2.5.10 Social Accounting Matrix (SAM) economic impact analysis

Social accounting has been put forward by a number of authors (West, 1993; Wagner, 1997; Daniels, Norman and Henry, 2004) as an alternative approach to estimating the economic impacts of tourism. Social Accounting and the Social Accounting Matrix (SAM) or integrated modelling method, is an extension of I-O, and is seen as a way of increasing the effectiveness of I-O by addressing limitations associated with the technique (Roberts, 1997: 99). This is achieved by introducing a dynamic element to the model by incorporating data from cross-sectional and time-series econometric models to better reflect the nature of tourism impacts (West, 199: 4923). Hara (2008: 116) notes that the technique not only extends I-O, but that it also generates additional useful data which can be used to develop regional or national policy. This is possible because the SAM structure models the whole economy encompassing transactions between all goods and services and their corresponding monetary flows (Pyatt, 1988). The model also represents a stepping stone from I-O to CGE, as it introduces the concept of social accounting which is integral to CGE modelling.

Daniels, Norman and Henry (2004) in their study of economic impacts at sporting events, argue that I-O is limited because estimates derived from the model cannot be allocated according to income or occupational criteria for the host region. For West (1993: 490) social accounting is far superior than I-O, and contends that results derived from I-O are inadequate on the basis that the model only looks at relationships between producers, and ignores the presence of other institutions such as government agencies within an economy. A further criticism is that I-O is static and linear and therefore inappropriate for modelling a dynamic sector such as tourism (West, 1993: 491). In simple terms, the SAM method can be defined as an accountancy record for the whole economy (West, 1993: 492). A more detailed definition is provided by Wagner (1997: 592) who describes it as a 'systematic framework for synthesising and displaying data describing the structure of a region's economy'. For him, the method has three advantages. First, it can be used to describe the links between production, income distribution and demand within an economy. Second, SAM can synthesise and display economic data from different government agencies in a concise framework, and third the technique enables regional economic multipliers to be calculated for estimating impacts on production, income distribution and demand (Wagner, 1997: 593).

SAM operates in a similar manner to I-O input table matrices, with rows showing receipts and columns representing expenditure. As Pyatt, (1988: 329) explains, the matrix models the whole economy by allocating each transaction and corresponding factor e.g. value added through production and account, shown by a row and column within the table. In order to fully model an economy five accounts are needed. The first represents production factors e.g. value added, the second represents institutions (households companies, government), the third, production activities (agriculture, industry, services), the fourth, commodity accounts (agriculture, industry, services), and the fifth external activities (imports and exports). The matrix shows the two sides of these transactions, (input payments and output receipts) for the accounting period which must balance, with each receipt offset by a corresponding expenditure (Drudd, Grais and Pyatt, 1986: 115). Within the matrix, inputs are divided into economic transactions which flow through market structures such as sales and employment, and nominal economic flows which include income payment transfers to different economic sectors (Sugiyarto et al, 2003: 688).

In contrast I-O typically only records producer-producer economic activities, SAM captures production, factor (labour and capital), and institutional (households, businesses, governments) activities, providing a picture of the whole economy (West, 1993: 492; Madsen and Jenson-Butler, 2004: 474). A further advantage of SAM is that it can be used to measure the strength of forward and backward linkages between economic sectors which show how outputs are linked to the production process (Blake, 2008: 514).

As an extension to I-O, social accounting methods go some way to addressing the criticism that I-O is incomplete and that it ignores key aspects of the economy (Dwyer, Forsyth and Spurr, 2004: 307). However, other criticisms levelled at I-O such as its inability to account for negative and intangible impacts apply equally to social accounting (Dwyer, Forsyth and Spurr, 2004: 308; Wagner, 1997: 596). Furthermore, as Robison (1997: 330-331) contends, SAM requires large quantities of data, and the benefits of the more comprehensive SAM framework must be balanced against the costs of incorporating additional data required for the analysis. In common with all multiplier approaches SAM incorporates a number of assumptions which can affect the derived multiplier value. Roberts (2003: 100) identifies two situations where the model assumptions can lead to an underestimation of economic impact. The first assumption is that income within the SAM is independent of local economic activity; this may not be the case for business travellers, whose expenditure is a function of local business activity. Second, transactions from visiting friends and family (VFR) tourists are dependent on the number of households in an area. However, despite these identified limitations, she argues 'compared with the loss of information through restricting the analysis to an input-output model, or an even more aggregated equation economic base model, this limitation is of minor importance'.

2.6 The politics of economic impact assessments

2.6.1 Economic impact analysis: 'An obvious political mission?'

Crompton's numerous and critical contributions to economic impact literature have been described as unique in regards to their pointed critique of economic impact analysis (Tyrell and Johnston, 2006: 6).

Table 2.2 Crompton's Economic Impact Shenanigans

	Shenanigan	*Justification*
1	Including Local Residents: The Most Frequent Mischievous Procedure	Local resident expenditure should not be classed as an economic impact, as it does not represent new economic growth. It is a recycling of money that already existed within the economy. In this situation resident spending is switched with no net economic stimulus occurring (Crompton, 2006: 70)
2	Inappropriate Aggregation	This refers to the manipulation of the spatial context of an impact study in order to report an inflated impact figure. In altering the spatial limits the definition of visitors and local residents is also changed. For example, if two independent impact studies from two neighbouring sites were summated, visitor expenditure is effectively cancelled out as it now represents local expenditure. Only expenditure from outside both sites could be classed as new spending (Crompton, 2006: 73).
3	Inclusion of Time-Switchers and Casuals	Time switchers are visitors who would have visited at another point in time, but time their visit to coincide with an event or other tourism activity. It is likely that this expenditure would have occurred without the event and therefore should be excluded. Casual visitors are those who visit an event or other tourist attraction because they are already in the locality. Their expenditure can be regarded as switched, as it is likely that these visitors would have spent their money at a different venue in the local area in the absence of the event (Crompton, 2006: 73).
4	Abuse of Multipliers	Crompton divides the abuse of multipliers into four categories, these are: 'compounding the inclusion of local residents' errors, emphasising sales multipliers, mischievous use of employment multipliers, and failure to include capture rates' (Crompton, 2006: 73). See section 2.6.1 for a more detailed discussion regarding multipliers.
5	Ignoring Costs Borne by the Local Community	This refers to the failure by some studies to recognise that increases in economic impacts may have associated costs, which may or may not be quantifiable in economic terms (Crompton, 2006: 75).
6	Ignoring Opportunity Costs	Benefits which could have occurred if economic resources had not been spent on tourist related infrastructure, but instead had been redirected to other public services or retained by the tax payer (Crompton, 2006: 75).
7	Ignoring Displacement Costs	Displacement occurs when visitors attracted by an event or tourist attraction replace visitors who wish to visit for other reasons, but choose not to because of the event (Crompton, 2006: 76).
8	Expanding the Project Scope	This occurs when economic impact claims are based on speculative growth which may or not take place following an initial catalyst development, instead of on the actual activity (Crompton, 2006: 77).
9	Exaggerating Visitation Numbers	Accurate visitor figures are essential for calculating economic impact. Problems arise when accurate numbers cannot be obtained from counts or ticket sales, and are based on guesstimates instead (Crompton, 2006: 78).
10	Inclusion of Consumer Surplus	Consumer surplus refers to the hypothetical amount visitors would be willing to pay over what they have already spent for a tourist experience, before they would be discouraged from visiting (Crompton, 2006: 78)

Source: Adapted from Crompton (2006: 70-79)

In his highly critical 2006 article *Economic Impact Studies: Instruments for Political Shenanigans* he identifies ten common failings of economic impact studies (see Table 2.2). Whilst many of the identified issues have already been discussed in Section 2.5.10, namely the inclusion of local resident expenditure, inappropriate aggregation, inclusion of time-switchers and casuals, abuse of multipliers, and failure to assess opportunity costs; Table 2.2 reiterates the methodological challenges involved in quantifying the economic impact of tourism and recreation.

In addition to his critical assessment of methodological practices, Crompton (2006: 67) argues that 'most economic impact studies are commissioned to legitimise a political position rather than to search for economic truth'. As a result, he alleges that practitioners are drawn into using 'mischievous procedures' to produce large positive impact figures that support a sponsor's predetermined position. Summarising his view, Crompton (2006: 67) argues that 'economic impact analyses have an obvious political mission'. For him, the fact that many are commissioned by tourism organisations motivated to show the positive contribution their sponsors make, is proof that economic impact studies are inherently compromised in their integrity. His view is supported by Tyrell and Johnston (2006: 4) who observe that 'Policy makers and the public are sometimes less interested in methodological details of impact analysis and more interested in final numbers that support a particular (often pre-selected perspective)' (Tyrell and Johnston, 2006: 4). Despite these observed issues, Tyrell and Johnston (2006: 4) contend that it is the responsibility of conscientious researchers to ensure that integrity is at the centre of economic impact analysis. Placing the onus on the researcher, They argue that practitioners must identify the most appropriate methods, balance time, budget, and sponsor requirements and recognise both new and old approaches to impact measurement.

Whilst this advice is undoubtedly sensible, it assumes that researchers are free to make autonomous methodological choices. This may not be the case, as researchers may be constrained by government guidance regarding approved methodological approaches. O'Brien's (2010) review of approaches to measuring cultural value illustrates this point. Whilst his review outlines a range of methodological approaches for valuing cultural assets, the choice of method is dictated by its compatibility with the UK Government's *Green Book,* which provides guidance for public sector bodies on how to appraise proposals before committing funds to a policy, programme or project. This guidance is designed to ensure that all government decisions are informed by a cost-benefit analysis (CBA), which has the purpose of ensuring that public funds are spent in the most efficient way on activities that provide the greatest benefits to society. This dictates that the appraisal method must be compatible with this format, and be reported in economic terms 'which is the dominant language of government' (O'Brien, 2010: 8). Adopting a standardised approach with approved appraisal methods may help to ensure consistency, but it also restricts methodological choice. For example, researchers may have to reject an alternative method, not on methodological grounds, but on the basis that it is incompatible with the standardised approach.

2.7 Economic valuation of tourism

In Section 2.5 the principal methods used to analyse the economic impact of tourism activity were identified and critiqued. It was established that economic impact analysis measures the net economic change within an economy resulting from an action, program or project. In Section 2.2 it was also recognised that the total economic impact of tourism can only be revealed by adding together the direct, indirect and induced impacts (Stynes, 1999: 5). These methods measure market value transactions of tourism goods and services, but they do not necessarily quantify the value of those goods and services to the consumer. Therefore, impact analysis only considers part of the economic contribution of tourism and recreation as it ignores the additional ‘hidden’ value that the user places on the experience or activity. This is an important distinction, and one highlighted by Sinclair and Stabler (1997: 183) who state:

> ‘Except under specific conditions, economics accepts that the market price does not necessarily represent the value of a good or service and clearly for non-traded commodities, where no price exists, does not suggest a zero value.’

For goods, services, and resources which can be valued at market rates, the economic use value may not reflect the market value, due to the consumer valuing the commodity or service at a price above which it prevails in the market. This is termed consumer surplus and represents a use value, which is higher than the price the consumer has paid and above the quantity of goods they have purchased. In addition to a direct use value, many natural resources or national treasures have a non-use value due to their uniqueness which is above that of the consumer surplus value. This value recognises the degradation costs of using that resource, and the irreplaceable nature of the commodity. A recent development in the valuation of goods, services and natural resources is the National Ecosystems Assessment (NEA). Introduced in the UK in 2009 following the development of the UN Millennium Ecosystem Assessment (MA) in 2000, the assessment provides a conceptual framework which ‘links human societies and their well-being with the environment’ (UK NEA, 2011: 12). The assessment is designed to provide a comprehensive appraisal of past, present and possible future trends in ecosystem services and their values, by bringing together data from all elements of the ecosystem in order to model impacts (UK NEA, 2011: 2).

In the literature non-use values are divided into option and intrinsic values. Option value refers to the potential benefit which can derive from the use or consumption of a particular resource, and it can also be described as the price individuals are willing to pay to preserve the resource. Intrinsic value is the value attached to the existence of a resource and is unrelated to demand, whereby individuals are willing to pay to know that the resource is preserved even if they will never use or visit it. In order to quantify the total economic value of a resource it is necessary to incorporate all of these elements and according to Sinclair and Stabler (1997: 183) can be expressed as:

Equation 2.2 Total Economic Value calculation

Use Value + Non-use Value (Option Value + Existence Value) = Total Economic Value (TEV)

Source: Adapted from Sinclair and Stabler (1997: 183)

Generally the calculation of total economic value has been concerned with the valuation of natural resources or commodities which are intangible in nature. However, the technique can also be used to value tourism. Tourism activity can be evaluated in this manner due to its heavy reliance on the natural environment and cultural commodities, most of which are used as a free resource by commercial operators (Sinclair and Stabler, 1997: 185). A number of methods and hybrid derivatives can be used to estimate the total economic value of tourism. Direct methods value tourism by asking individuals if they would be willing to pay to improve a resource or alternatively if they are willing to accept compensation for any degradation in the amenity. Indirect methods use related pricing from similar markets as a proxy for valuing tourism resources (Sinclair and Stabler, 1997: 187).

The relationship between personal values and tourism has also been explored within the academic literature. Personal values relate to the value which users place on a destination, resource or activity. They also influence user motivations and attitudes towards tourism and recreation products (Crick-Furman and Prentice, 1999: 72). Following their review of tourism values, Crick-Furman and Prentice (1999: 88) criticise previous studies for considering personal values to be unaffected by their temporal and spatial contexts in which they occurred. They also question the view that values are divorced from context and situation, and instead argue that tourist behaviour is a combination of motives, values and situational factors. One problem when attempting to value tourism is that individuals may hold different values depending on whether the interaction is part of daily life or whether it occurs within the holiday context. Therefore, these values are not representative of an enduring belief but rather they are dynamic, and change depending on individual goals and circumstances (Crick-Furman and Prentice, 1999: 88). Tourists, have many, often conflicting values, which are moulded by environmental interactions and personal goals. However, for some tourists there will be little change between values assigned in daily life and those assigned when on holiday. For these individuals tourism is seen as a lifestyle choice which incorporates holidaying, recreation, and leisure activities (Crick-Furman and Prentice, 1999: 77). The following sections review the methods of economic valuation with the purpose of understanding the relationship between economic impact and economic valuation approaches.

2.7.1 Social Return On Investment analysis (SROI)

SROI represents a different approach to valuing social, economic and environmental outcomes. SROI has been developed from social accounting (See Section 2.5.8) and cost-benefit analysis, as a whole systems approach to quantifying impacts (Cabinet Office, 2009: 5). Developed in the late 1990s, ‘the SROI approach captures the economic value of social benefits by translating social objectives into financial measures of benefit (Wright et al, 2009: 463). In practice the technique is more akin to a formal business or environmental management system as it is a method of demonstrating the value of an organisation's activities. Depending on the application, SROI can evaluate retrospectively the actions of an organisation or alternatively, it can forecast the potential social value which could be derived from an organisation's activities. In order to value intangible outcomes such as social or environmental value, financial proxies are used to assign monetary values to outcomes (Cabinet Office, 2009: 9). Using this technique an organisation can express social outcomes which result from their activities as a ratio of the total benefits to total investments, For example organisation X generates £4.00 of social return for every £1.00 invested. Closely associating outcomes with investment may be desirable for stakeholders wishing to demonstrate the value of their investment, but concerns have been raised of its use as a selection tool for allocating funding and the dangers of using SROI to compare the performance of different organisations (Cabinet Office, 2009: 5). SROI valuation involves six stages of analysis; these can be seen in Table 2.3.

Table 2.3 The Social Return On Investment (SROI) process

	SROI Stage	***Description***
1	Scoping	Establish Scope and identify key stakeholders
2	Mapping	Develop an impact map to show the relationship between inputs, outputs and outcomes
3	Evidencing outcomes	Sourcing evidence to support outcomes and assigning a monetary value.
4	Establishing impact	Removal of factors which are not attributable to the impact
5	Calculating SROI Ratio	This involves generating an outcome value by adding the positive benefits and subtracting any negative outcomes. This ratio is then compared to the original investment
6	Reporting	Verification and dissemination of SROI report to stakeholders

Source: Adapted from Cabinet Office (2009: 8)

A limitation of SROI is that it can only be used to value outcomes from a single organisation and therefore cannot be used to value cumulative outcomes from multiple organisations. For this reason the technique has largely been restricted to valuing individual assets such as libraries or other cultural facilities (Aabo, 2009; Barrio, Devesa and Herrero, 2012). This limitation makes the technique unsuitable for evaluating whole tourism systems which are comprised of multiple producers and consumers. The problem of assessing the economic and social impacts of tourism has been widely discussed within the literature. Early attempts to resolve this problem include cost-benefit studies by Burt and Brewer (1971) and Duffield (1982). However, more recent studies have employed dynamic methods such as structural equation modelling techniques (Yoon, Gursoy and Chen, 2001; Gursoy and Rutherford, 2004; Patterson, et al 2004; Dyer et al, 2007; Tyrell, Paris and Biaett, 2013). These approaches have focused on modelling support for new tourism developments by taking into account economic, social, cultural and environmental impacts, to derive the total perceived tourism impact and quantify the level of support from the local population for tourism development. As such, they present hypothetical scenarios of tourism impacts which can be modelled over time. Both SROI and structural equation modelling provide useful ways of measuring intangible outcomes from proposed new tourism and recreation developments. However, they do not provide any information relating to how users value the resource, for this, a different form of valuation would be required such as contingent valuation which is considered next.

2.7.2 The Contingent Valuation Method (CVM)

Contingent valuation is recognised as being the most common measure of non-market resources (Carson, Flores and Meade, 2001: 173). CVM questions consumers on their willingness to pay (WTP) for an amenity or resource, or alternatively on their willingness to accept (WTA) compensation if that amenity or resource was lost or degraded (Sinclair and Stabler, 1997: 190; Mitchell and Carson, 1989: 30; Portney, 1994: 3). CVM received particular attention following the Exxon Valdez oil spill in 1989, where it was used to value the liability payment by the Exxon Corporation for the environmental cleanup (Boyle and Bergstrom, 1999: 183; Vatn and Bromley, 1994: 129; Portney, 2004: 7). CVM is particularly suited to valuing protected or sensitive areas where the economic market is not readily quantifiable or undeveloped (e.g. Samdin, 2008; Lee and Mjelde, 2007; Compos, Caparros and Oviedo, 2007).

CVM values non-market goods by creating hypothetical markets in which they can be consumed. The flexible nature of the method allows a wide variety of non-market goods to be assessed including resources that do not already exist (Carson, Flores and Meade, 2001: 173). These markets may be modelled on either existing private economic or political markets (Mitchell and Carson, 1989: 2-3). A key advantage of CVM is that it can be used to obtain use, non-use and existence values which comprise the total economic value of a resource (Sinclair and Stabler, 1997: 190). A further advantage is that it can value multiple destination and multiple purpose trips (Lee and Han, 2002: 533). WTP information is typically obtained via respondent surveys which often take the form of an interview either in person or via telephone (Tyrväinen and Väänänen, 1998: 106). Interviews are primarily chosen as they are perceived to be more a more reliable method for conducting contingent valuation than postal surveys or self-completion questionnaires, it is also recommended that convenience sampling is avoided and that interviews are conducted in locations where respondents feel comfortable and have time to reflect on the questions and their responses (Hanemann, 1994: 22; Portney, 1994: 9). The method relies on the following two key assumptions, first it is assumed that the respondent is able to value proposed changes to a resource, and second that their valuation can be obtained via direct questioning (Smith, 1995: 255). However, as Hanemann (1994: 20) argues, ‘answering surveys may be hypothetical, but no more than buying unfamiliar or infrequent commodities’.

The first stage of CVM is to develop a hypothetical reason why consumers would need to contribute or be compensated. Respondents are then informed how much a particular initiative would cost and how it would be paid for, they are then tested to determine their maximum WTP or their minimum WTA. The final stage of the technique involves the estimation of a bid curve, using regression analysis to determine how the different factors affect an individual’s WTP or WTA (Sinclair and Stabler, 1997: 190; Tyrväinen and Väänänen, 1998: 106). Providing that that the research is piloted and conducted well, the responses obtained should reflect a respondent’s WTP. A benefit of the method is that responses can be generalised to the wider population providing that the original sample was randomly selected and a sufficient response rate was obtained (Mitchell and Carson, 1989: 3).

One issue of contention identified within the literature is the choice of question type used to elicit responses during CVM surveys (Loomis, 1990: 78; Hanemann, 1994: 23). Early surveys used open-ended questions where respondents were asked questions in the form of ‘what is the maximum amount you would be willing to pay...?’ (Hanemann, 1994: 23). This question type is problematic as it is less realistic. In general, respondents are more able to state whether they could pay a certain amount for a resource or commodity; as opposed to the maximum amount they would be willing to pay (Hanemann, 1994: 23). For the reasons stated, closed questions or dichotomous choice (DC) type questions which are presented in the form of a referendum vote have now been adopted as the preferred choice for CVM (Loomis, 1990: 78; Hanemann, 1994: 23; Lee and Mjelde, 2007: 513).

Loomis (1990: 79) in his article *Comparative Reliability of the Dichotomous Choice and Open-Ended Contingent Valuation Techniques* identifies three key advantages of the DC CVM technique. First, DC questions place lower mental demands on respondents reducing question non-responses. Second, the question format is comparable to a market setting where an individual has to make choices regarding their decision to buy a commodity. Third, the technique is designed to encourage respondents to reveal their true preferences by creating a 'real' scenario where specific choices must be made regarding the provision of resources. The use of DC questions does have the disadvantage that the researcher is required to infer WTP from respondent answers, something that is not required with open-ended CVM where respondents directly state the amount they are willing to pay (Loomis, 1990: 79). A further issue with DC is identified by Hanemann (1994: 24) who states that the method requires researchers to carefully consider the most appropriate statistical method to analyse the willingness to pay distribution. In his article he explains that the use of the mean to summarise the distribution can be misleading as it is extremely sensitive to large WTP values, and in this occurrence it may be more appropriate to use the median which is less affected by large values.

Despite the apparent practical advantages of using DC questions for CVM surveys it has been found that both methods exhibit similar results when tested for comparative reliability. Results from the study by Loomis (1990: 84) show that public responses to both open-ended and DC questions provide reliable estimates of WTP, and that they remain consistent when re-tested. From this he concludes that both methods can be used, however, the DC method is still favoured due to its practical advantages with no apparent loss in reliability when compared to open-ended WTP approaches (Loomis, 1990: 84).

2.7.3 Criticisms of the Contingent Valuation Method (CVM)

Contingent valuation may be the most frequently used method of quantifying non-market resources but is not without its critics. Considerable debate persists over its reliability so much so that a number of industry groups have lobbied against its use, and even sponsored research aimed at discrediting the technique (Carson, Flores, and Meade, 2001: 173-174). CVM is not favoured by some economists as an economic measure because it does not infer values based on actual market behaviour, instead values are inferred from stated responses to hypothetical situations (Portney, 1994: 6).

In the literature much of the criticism of CVM centres on its hypothetical nature, where no transaction takes place (Boyle and Bergstrom, 1999: 185). The principal problem is determining whether respondents would respond to the hypothetical WTP question in the same manner if they were actually required to make a payment (Tribe, 1995: 392). Furthermore, respondents may not reveal their true WTP if they think that the information will inform future pricing structures for existing payments e.g. entrance fees. Lee and Han (2002: 534) attempted to address this problem by reassuring respondents that their WTP information would only be used for academic purposes and would not inform the pricing policy of a national park entrance fee. However, it is not possible to know how effective their intervention was in helping obtain genuine WTP values. A similar problem exists with the choice of payment vehicle, as it has been found that respondents respond differently to different payment formats. For example, respondents may object to mandatory payments such as taxes or entrance fees, but be amenable to donation schemes. In the literature it has been argued that voluntary donation payment vehicles are more useful than mandatory options (Lee and Mjelde, 2007: 513; Campos et al, 2007). Whilst this approach may be suitable for valuing undeveloped resources, it would be inappropriate and misleading for developed sites which were considering introducing a mandatory entrance fee.

A further problem is identified by Vatn and Bromley (1994: 130) who criticise CVM for condensing complex attributes into simple monetary units resulting in an important loss of information. Extending their argument the authors state that 'valuing (or pricing) of environmental goods and services is neither necessary nor sufficient for coherent and consistent choices about the environment' (Vatn and Bromley, 1994: 131). Central to their argument is the philosophical question of whether it is possible to value environmental goods in monetary terms; the counter argument is that it is necessary to value non-market goods in order for meaningful comparisons to be made and effective planning decisions to be taken. An alternative to public contingent valuation is the use of expert judgement to value the environment. This approach is contested by Hanemann (1994: 38) who makes the distinction between the important role experts play in costing for example, the cleanup of an oil spill, and the ability of an expert to value an undamaged landscape without resorting to some method of survey, which will most likely require public participation.

For Diamond and Hausman (1994: 46), the principal problem with CVM is that it fails to measure the preferences which it attempts to quantify. Portraying the technique as little more than an opinion poll to gauge public reaction to possible government actions, the authors contend that ‘these surveys do not have much information to contribute to informed decision making’. Highlighting inconsistencies between stated WTP and economic theory, they point to the ‘embedding effect’ where WTP responses have been found to be very similar across different surveys, despite very different situations being presented and the results being counter to economic theory. They argue that embedding results from nonexistent preferences for public goods and the failure of respondents to accurately consider their budget constraints (Diamond and Hausman, 1994: 46). The problem of embedding was also encountered by Tyrväinen and Väänänen (1998: 114) who observed that respondents stated different WTP values when presented with different payment formats for access fees to an urban forest. In this case it was found that respondents were willing to pay smaller fees more often in preference to larger fees less often, which the authors contend is a product of respondents not fully considering the payment timescale and being uncertain about future use of the resource.

Claims that CVM does not conform to economic theory, and that WTP does not change with scale can be recognised as key points of contention within the literature (Hanemann, 1994: 32). For Carson, Flores and Meade (2001: 181) these claims are unfounded; examining the controversies and evidence surrounding the technique they argue that CVM does conform to economic theory and cite two conformity tests. The first test is that economic theory dictates that the percentage of respondents willing to pay a particular price should decline with increasing cost, the authors argue that this is almost universally observed in CVM studies. Second, according to economic theory respondents should be willing to pay more as the scale of benefit in either quantity or quality increases, this is referred to as the scope test. Carson, Flores and Meade (2001: 183) assert that well conducted CVM surveys which supply the respondent with sufficient information to make an informed judgement do exhibit sensitivity to scope. Where this has not been shown, the authors believe that this is the result of poor survey design and execution. Portney (1994: 14) acknowledges the considerable debate and controversy over the application of the method in his article *The Contingent Valuation Debate: Why Economists Should Care*, but concludes that despite its limitations CVM represents the only method through which to quantify potentially important non-market values. Furthermore he argues that economists regardless of their standpoint should recognise that CVM is gaining prominence as a tool for public policy formulation and it is in their interest to engage in the debate.

2.7.4 The Travel Cost Method (TCM)

In contrast to CVM which focuses on the valuation of environmental resources which may or may not be used by the respondent, TCM is an indirect survey based technique designed to value sites which are directly used by respondents. TCM captures the positive non-market economic benefits of tourism and recreation products and estimates a statistical demand curve for site visits (Douglas and Johnson, 2004: 366). The technique is particularly relevant to tourism and recreation facilities and is derived from the principle of demand analysis where a site or experience is valued at the price users are willing to pay (Smith, 1995: 260). This price reflects 'human choices and aspirations, as consumers weigh one good against another, with incomes inadequate to buy everything they might desire' (Clawson and Knetsch, 1966: 216). A key difference between the two methods is that CVM is based on intended willingness to pay behaviour whereas TCM is derived from actual payment behaviour, therefore TCM cannot be criticised in the same manner as CVM for being based on hypothetical actions which may not reflect actual behaviour (Fix, Loomis and Eichorn, 2000: 1227).

Use of TCM for valuing recreation can be traced back to the 1960s and the work of Clawson and Knetsch (1966) which advanced the earlier work of Clawson (1959) and Hotelling (1947). Early applications of TCM employed a zonal approach where individual trips were aggregated from defined zones such as counties or postal areas. The technique then examines the incurred travel cost, income and socio-economic variables within the zones to explain variations in visitor rates (Willis and Garrod, 1991: 33). However, more recent applications have shifted away from the Zonal Travel Cost Method (ZTCM) to focus on measuring individual recreation trips. This Individual Travel Cost Method (ITCM) estimates the number of annual or seasonal trips made by an individual (Hailu, Boxall and McFarlane, 2005: 582). It also addresses a number of problems with ZTCM, namely its unsuitability for measuring sites which are visited infrequently, and its inability to provide individual WTP information (Willis and Garrod, 1991: 33; Flemming and Cook, 2008: 1198). However, as Willis (1991: 64) contends, whilst the ITCM may be the preferred approach, ZTCM offers advantages for sites which receive high numbers of single trip visitors.

A variation on the ITCM is the Hedonic Travel Cost method (Vaughan and Russell, 1982: 450; Brown and Mendelsohn, 1984: 427). This method is presented as a more comprehensive valuation approach, in that it disaggregates value into predetermined site characteristics such as scenic quality or trail provision. Typically this type of study uses a two-step ITCM model which first accounts for visitor frequency and travel cost, before assessing the effects of different site characteristics. Vaughan and Russell (1982: 450) in their valuation of fishing trips classify variables into two distinct sets. The first incorporates individual travel costs and the socio-economic characteristics of the respondents, and the second accounts for the attractiveness of the individual site. Incorporating the latter variable enables comparisons between sites to made, this is important when attempting to quantify the effects of alternative or substitute sites. However, this approach introduces additional subjectivity as it requires users to value individual site characteristics on a Likert scale. Furthermore, this method adds complexity and requires additional assumptions to quantify each characteristic, which can introduce substantial measurement error (Brown and Mendelsohn, 1984: 431; Font, 2000: 99).

Both ZTCM and ITCM work on the premise that there is a relationship between an individual's travel costs and their valuation of the site, based on their expressed WTP the incurred visit costs (Sinclair and Stabler, 1997: 189; Tribe, 1995: 393). Therefore, costs are substituted as a proxy for the price of the tourism or recreation product. Costs include travel, entry fees, parking, and outlay on equipment (Flemming and Cook, 2008: 1198). Travel Cost theory assumes that travelling incurs costs and that these costs increase according to the distance travelled. From this it is assumed that visitation rates will decrease as travel distance and cost increase (Randall, 1994: 88). According to Fix, Loomis and Eichorn (2000: 1227) Travel Cost theory can be expressed as:

Equation 2.3 Travel Cost theory calculation

$$\text{Annual number of trips} = f\ (\text{travel cost, travel time, demographics, price of substitutes})$$

Source: Adapted from Fix, Loomis and Eichorn (2000: 1227)

Time can also be used as a proxy for valuing travel cost and this is seen as an implicit cost (Cesario, 1976; McConnell and Strand, 1981). For sites where no explicit costs are involved such as petrol or public transport fares, time is the only measure which can be used for valuation (Sinclair and Stabler, 1997: 189). Valuing time in this manner is not straightforward, MacConnell and Strand (1981: 153) state that while economists have recognised that the opportunity cost of time is important in influencing recreation decisions, there is no consensus on how time should be included and measured. The decision to measure time is in itself a point of contention, as it is arguable whether time spent travelling or participating in leisure activities is in fact a cost (Smith, 1995: 261). Cesario (1976: 34) defines the opportunity cost relationship between time and recreation as a reflection of the value the individual places on alternative uses of leisure time. Typically TCM involves conducting a regression analysis which looks at the relationship between site use and travel cost.

Several assumptions underpin TCM. The first is that expenditure relates to a single destination and is not incurred as part of a multiple destination trip (Flemming and Johnson, 2008: 1199). Second, that individuals exhibit the same behaviour towards the cost of travelling to a destination as they would to an entry fee of the same magnitude. Third, it is assumed that there is a linear association between the cost of travelling and the number of trips undertaken. A further assumption is that use levels are not constrained by external factors such as carrying capacity (Smith, 1995: 262). For unstructured sites with open boundaries this assumption may be acceptable. However, this is dependent on the characteristics of the tourism and recreation product, and for sites which are constrained in their capacity this assumption may not be valid. This aspect should therefore be a consideration prior to conducting the technique.

2.7.5 Criticisms of the Travel Cost Method (TCM)

TCM represents a convenient method for valuing single trip and single purpose visits particularly if the mode of travel is by car. Application of the technique becomes problematic when other modes of transport such as walking or cycling are used to access a site as they cannot be as readily quantified (Tribe, 1995: 393). Furthermore, as Douglas and Johnson (2004: 366) argue, TCM cannot be applied to undeveloped regions where transportation infrastructure may be less readily available. For Randall (1994: 88) the unobservable and subjective nature of measuring travel cost is a fundamental problem. He argues that many of the costs incurred are discretionary, and that the complex nature of an individual's travel cost raises questions over the use of average values. He also identifies that both the mode of transport and origin of the visitor may be influenced by the presence of a recreational site 'In such cases, recreational preferences would influence miles travelled and cost per mile, not just on recreation trips but year round' (Randall, 1994: 90).

A further problem is that time can also be seen as a function of travel cost which may need to be accounted for (Fleming and Cook, 2008: 1199; Smith and Kaoru: 271). Time however, is not readily quantifiable and it is arguable whether time is in fact a cost when applied to tourism and leisure settings see Smith (1995: 261) Section 2.7.4 of this chapter. If travel time is regarded as a cost, it then raises the question whether on-site time should also be quantified. This is a key consideration, as the valuation would then need to incorporate the opportunity cost of participating in that activity versus a loss of earnings or leisure time if the individual had chosen to do something else (Sinclair and Stabler, 1997: 189; Betz, Bergstrom and Bowker, 2003: 86). While the technique is most appropriate for valuing sites which are visited for a single purpose, it remains a possibility that individuals may combine their visit with activities at other destinations, this is difficult to disaggregate in terms of travel cost, although careful survey design may help to mitigate this problem (Tribe, 1995: 393; Smith, 1995: 261). Ensuring that reported travel costs only relate to single purpose trips represents a further problem (Fleming and Cook, 2008: 1199). For Font (2000: 98) this is one of the most important limitations of the method, and argues for the use of multiple site models to address the problem. The impact of substitute sites also concerns Willis and Garrod (1991: 36), who found that WTP reduced where substitute sites were available, during their study of forest recreation use. However, this was not found to be statistically significant. Travel cost is also site specific and cannot be readily generalised to other areas, this limits its usefulness when relating observed changes at recreational sites to national policy initiatives (Vaughan and Russell, 1982: 451).

2.8 Approaches to investigating the economic impact and value of off-road cycling

Krizek (2007: 220) in his highly critical review of 25 previous approaches to measuring the economic benefits of cycling facilities contends that cycling developments should be appraised in the same manner as any other publicly-funded project or transport infrastructure. Therefore, they should be evaluated using the same methods such as cost-benefit analysis, economic impact assessment and financial or risk analysis.

Within the literature, a variety of methods have been used to measure the economic benefits of off-road cycling, including: economic extrapolation (Cope, Doxford and Hill, 1998; Mundet and Coenders, 2010); multipliers (Lumsden, Downward and Cope, 2004); I-O (Western Canada Mountain Bike Tourism Association, 2006); TCM (Siderelis and Moore, 1995; Fix and Loomis, 1997; Chakraborty and Keith, 2000); and CVM (Bennett, Tranter and Blaney, 2003; Betz, Bergstrom and Bowker, 2003). Of these methods TCM and CVM have been the most widely used. Krizek (2007: 220) argues however, that many previous studies are problematic due to the ‘unreliable manner in which demand is estimated and benefit values are derived’. These problems stem from the fundamental problem of how to reliably quantify facilities which typically have no market value i.e. they are not bought or sold by the user. For Krizek (2007: 222), these problems are compounded by a lack of reliable data which he describes as the ‘black cloud’ which looms over walking and cycling research, and a lack of cumulative research which has precluded the development of a consistent framework for measuring the economic benefits of cycling. A further criticism is that the majority of previous work has been conducted for advocacy purposes and contains ambiguities relating to where and how these data were collected. Krizek’s stark assessment raises a number of questions for future studies, but crucially it highlights the importance of developing a rigorous method for estimating the economic value of adventurous off-road cycling as a tourism and recreation product. It also illustrates the value of this work in contributing to the research effort in this area.

2.8.1 Challenges to researching the economic contribution of off-road cycling

Within the literature, a number of difficulties can be identified regarding the collection of expenditure data from cyclists. This contrasts with the assertion by Krizek (2007: 219) that the main difficulties lie with the analysis of expenditure and not the initial collection of data. One immediate problem facing researchers who wish to conduct intercept surveys is how to survey a moving target. Fix and Loomis (1998: 228) minimised this problem by choosing to only survey at the trailhead after analysing the trail layout. However, this approach fails to capture riders who did not start from this location. The significance of this will depend upon the individual location and the nature of the entry and exit points. Conversely, Bennett et al (2003: 662) chose to affix questionnaires to car windscreens in addition to conducting an intercept survey to capture more respondents. Bowker, Bergstrom and Gill (2007: 247) chose exit surveys as a way to avoid surveying mid-trail where intercepts are more difficult. They also employed a two-stage intercept process, involving two researchers to screen users for their eligibility to participate in the survey. Furthermore, they identified the problem of ‘trap shyness’ where respondents deliberately avoided being surveyed. For intercept studies, this could be a significant problem as cyclists can more easily avoid a static surveyor.

Chakraborty and Keith (2000: 462) avoided onsite surveys altogether in their study of the total use value of mountain biking in Moab Utah. In contrast to the earlier study in the same area by Fix and Loomis (1998: 346), they chose to recruit respondents through a bike hire centre using a mail-back questionnaire approach. A key benefit of this technique highlighted by the authors is that it avoids the problem of endogenous stratification. This refers to the potential bias that arises from frequent visitors having a higher probability of being sampled than less frequent users. However, the approach taken by Chakraborty and Keith (2000: 462) is also problematic because it only captured users who visited the hire centre. Furthermore the use of a postal survey limited their study as it failed to generate a high response rate (19%). This contrasts sharply with the on-site study by Fix and Loomis (1997: 345-346) which generated a response rate of 90%. Acknowledging this, the authors concede that ‘on-site interviewing of the mountain bikers would provide a significant improvement on the response rate, although non-users would be absent from the data’ (Chakraborty and Keith, 2000: 467). Endogenous stratification was also recognised as a concern by Fix and Loomis (1998: 346) and Betz et al (2003: 85), both of whom applied corrections to their TCM models to adjust for this factor, which appears to be a more effective way of managing the problem.

A further problem is identifying when an onsite survey should take place, requiring the researcher to understand the patterns of use at the field site. This requires usage data, which may not be available (Carleyolsen et al, 2005: 11). Mundet and Coenders (2010: 661) addressed this problem by conducting their survey throughout a twelve month period, covering week days, weekends and holiday periods and different times of the day. In addition, they doubled their sample during holiday periods. However, they do not specify whether this was representative of the increased use during these periods. Siderelis and Moore (1995: 345) adopted a similar approach stratifying their survey to cover time of day, day of week, season of year, and trail section. In contrast, Lumsden et al (2004: 15) focused only on the months of June, July and August due to their specific aim of capturing holiday cyclists. Their study did incorporate automatic trail counter data which recorded usage however, they do not specify whether this was used to identify the survey months.

Clearly, surveying cyclists poses unique challenges to the collection of data which must be taken into account when designing a study. Equally important, is the choice of analysis. Within the literature the majority of studies have focused on understanding economic value from the perspective of the user, with most choosing either TCM or CVM as research approaches. Other methods such as multipliers, expenditure extrapolations and I-O have also been used to a lesser extent. The following sections focus on key studies within the field of off-road cycling research and describe the use of TCM, CVM and I-O to study the economic contribution of off-road cycling.

2.8.2 Valuing off-road cycling using the Travel Cost Method (TCM)

The economic value of mountain biking was first investigated by Fix and Loomis (1997: 342), although similar work on rail-trail cycling had been conducted two years earlier by Siderelis and Moore (1995: 344). Fix and Loomis (1997: 342) identified that it was important to research the economic benefits of mountain biking because the activity has the potential to conflict with other forms of recreation, resulting in increased land management costs, and because there is little information available to inform benefit-cost analysis of dedicated mountain bike projects. Chakraborty and Keith (2000, 461) in their TCM investigation into mountain biking in Moab, argue that mountain biking 'has a higher value than most other activities in the area and that public land managers should be aware of the relative value of mountain biking as they make allocation decisions'.

Building on this initial work, Fix, Loomis and Eichorn (2000: 1228) investigated the relationship between endogenous and exogenous costs incurred by mountain bikers when visiting recreational sites. Endogenous costs are those which the respondent chooses to incur above the minimum required to participate in the activity. Exogenous costs represent the minimum necessary for the respondent to participate in the trip. Their study focused on the town of Moab Utah which has gained a reputation as being a world famous mountain biking destination. Moab conforms to the prerequisites required for conducting TCM as it is a site of many single destination and single purpose trips, a necessary assumption of TCM. The site also receives visitors from across the US with varying travel times, distances and costs (Fix et al, 2000: 1228-1229).

A key problem identified by this study is the issue of how to deal with the possible overestimation of consumer surplus, which is determined by the relationship between endogenous and imposed exogenous costs. Understanding respondent behaviour in relation to imposed exogenous costs is important and poses the question: *do respondents substitute longer trips with consequently higher endogenous costs for less frequent visits?* The authors contend that this behaviour does exist and that the relationship is statistically significant. While it is possible to overestimate consumer surplus using TCM the authors suggest that this can be corrected by adjusting the TCM coefficient for endogeneity. Fix et al (2000:1231) assert that even when the TCM is adjusted, consumers gain large economic benefits from visiting Moab to mountain bike, although they acknowledge that the study provides no indication of the economic impacts to the local community. This supports the findings of their earlier study in which they argued 'devotees of mountain biking receive substantial benefit per-trip and it may be an economically competitive use of public recreation areas' (Fix and Loomis, 1997: 351).

One aspect of consumer behaviour which is identified by Siderelis and Moore (1995: 348) is the idea that consumers choose to visit particular rail-trails over others, even if they incur higher travelling costs to gain maximum personal satisfaction from visiting them, 'Individuals do not buy trips to a rail-trail unless they find it worth the price, as measured by their travel costs to that trail' (Siderelis and Moore, 1995: 348). Rail-trails have been heavily promoted by the *Rails to Trails Conservancy* in the US and provide opportunities for recreation on disused railway tracks. In common with the study conducted by Fix et al (2000: 1227) the authors investigate the inverse relationship between travel cost and the number of trips taken. Their research found that respondents surveyed at three different rail trails identified similar perceived benefits from rail-trails. Stated benefits included: health and fitness, appreciation of aesthetic beauty and the knowledge that rail-trails existed to preserve recreational access to the natural environment. Overall it was found that rail-trail users valued rural rail-trails more highly than urban trails, but that urban trails received a greater number of visits due to their accessibility (Siderelis and Moore, 1995: 355). In their conclusion Siderelis and Moore (1995: 357) highlight the high economic and welfare benefits that can be derived from rail-trails and the significance this has for public policy formulation, a point echoed by Fix et al (2000: 1227) in their study.

2.8.3 Valuing off-road cycling using the Contingent Valuation Method (CVM)

Contingent valuation has been used in several studies to estimate the economic value of mountain biking facilities to consumers (Betz et al, 2003; Fix and Loomis, 1998; Siderelis and Moore, 1995; Chakraborty and Keith, 2000; Morey, Buchanan and Waldman, 2002). Morey et al (2002: 412) used CVM to investigate whether proposed changes to mountain bike facilities such as the introduction of access fees, would result in more or less efficient land use. Their study also considered the benefits and costs to different user groups arising from these changes. Using a discrete-choice random utility model of mountain bike sites the authors predicted how changes to trail characteristics and the introduction of access fees affect consumer trail selection.

Discrete-choice random utility models are widely used to estimate the impact on consumer surplus resulting from changes to resource characteristics at public recreation sites (Morey, Shaw and Rowe, 1991: 181). Adopting the discrete-choice random utility model, Morey et al (2002: 412) identified relevant site and user characteristics through focus group discussions which were then used to create a set of 36 hypothetical mountain bike sites. Respondents were then asked to make five pair wise choices which were influenced by factors such as user characteristics, access fees, the presence of other users, and budget constraints. Respondent choice data revealed their stated preferences, which included price information in order to value the preference in economic terms (Morey et al, 2002: 413). Based on their results the authors concluded that WTP was linked to site investment and an individual's income and interest in the sport. Overall they found that significant numbers of mountain bikers were prepared to pay to use sites providing that the facilities justified their investment, or their investment resulted in improved conditions. They also found that the amount respondents are willing to pay is affected by the proximity and characteristics of alternative sites including the presence of access fees (Morey et al, 2002: 420).

2.8.4 Applying Input-Output (I-O) assessment to off-road cycling research

A study conducted by the Western Canada Mountain Bike Tourism Association provides an example of where I-O modelling has been successfully used to estimate the economic impact of mountain biking. This investigation used the STEAM-Pro I-O model to estimate the impact of mountain biking in the Sea to Sky Corridor area of British Columbia, which encompasses the settlements of North and West Vancouver, Squamish and Whistler. A three stage approach was used to collect data from respondents. First, interviews were conducted with mountain bikers at various trail entry points to directly establish their per trip expenditure. Second participants and visitors attending the Crankworx festival in Whistler and the Test of Metal Race in Squamish were interviewed. The final stage involved collecting supplementary data from bike shops in an attempt to understand intra-regional expenditure flows (Western Canada Mountain Bike Tourism Association, 2006: 5). A stratified random sampling frame which followed Canadian Government guidelines for measuring the economic impact of tourism at un-gated or open access events and festivals was used to guide the survey design. The survey also used automatic trail counters and surveyor count data to estimate rider volume at each of the sites (WCMBTA, 2006: 7). Using the STEAM-Pro model the Sea to Sky survey generated the following results:

> 'The trail systems of the North shore, Squamish and Whistler, are estimated to have collectively generated $10.3 million in spending from riders that live outside of the host community over the period from June 4 to September 17, 2006' (WCMBTA, 2006: 7).

From the report it is not possible to deconstruct the findings in detail as only an overview of the methodology and results were provided. However, some limitations and problems can be identified. The use of temporary surveyors proved problematic, and as a result the survey experienced a high turnover rate. This was mainly attributable to survey periods conflicting with other part-time work commitments and the distances involved in accessing some of the sites (WCMBTA, 2006: 6). A secondary issue associated with using temporary surveyors is that the data reliability may be compromised through the use of multiple surveyors with varying degrees of experience. In the report no details are provided regarding surveyor recruitment and training. Operational expenditures for running the two festivals have also been included as an economic benefit (WCMBTA, 2006: 15). In Section 2.1.2 this was identified as point of contention within the literature (Burgan and Mules, 1992: 706; (Hughes, 1994: 404). The main argument for excluding operational expenditures is that they represent costs of operating the event and to include them would overestimate the economic benefit. Further, these costs may also incorporate leakages if non-local suppliers are involved in operating the event. It should also be recognised that mountain biking in the Sea to Sky corridor is a seasonal activity and that the survey was conducted and reported for the peak months. It is not known how mountain biking expenditure during the summer compares with snow sports expenditure in the winter season. Comparing the two seasons would show the relative value and significance of mountain biking to the Sea to Sky corridor as a proportion of the total impact tourism has on the area.

2.8.5 Combined approaches to investigating economic impact and value

Within the literature examples can be found of studies which have combined methods to collect and / or analyse data. In all cases these hybrid methods have been adopted in an attempt to improve study validity. Lumsden et al (2004) utilised a triangulation approach in an attempt to validate their data collection methods. Their multiple method approach incorporated data from automatic counters, an intercept survey and travel diaries. Other authors such as Siderelis and Moore (1995) have combined onsite and mail-back questionnaires to increase the scope of their study.

Several authors have also employed hybrid valuation models which combine TCM and CVM approaches (Hanley, 1989; Betz, et al, 2003; Loomis, 2005). Betz et al (2003: 82) combined a standard TCM model with contingent behaviour questions to model demand for a potential rail-trail development in Georgia America, this model created a stated preference variant of the TCM method called the contingent trip model (CTM). This model operates on the assumption that ‘responses to anticipated trips or intended trips can be treated similarly to recalled trips in creating a travel cost demand function’ (Betz et al, 2003: 82). The authors argue that CTM has several advantages over TCM modelling using onsite surveys. The first advantage relates to the provision of demand and value information which is of greater use to planners than single variable data. Second, non-user and alternative user information is incorporated into the model which enables benefits to a range of users to be valued (Betz et al, 2003: 92). Combining CVM and TCM can be advantageous as the key benefits from each technique are incorporated. Advocating this approach, Cameron (1992: 68) contends that combining CVM and TCM is beneficial because 'the travel cost data capture current behaviour while the CVM information supplements our understanding of preferences by providing insights into the probable behaviour of respondents under conditions which are considerably removed from the existing market scenario'. A remaining problem for CTM is that it is still based on hypothetical intended behaviour data and therefore subject to the same criticisms levelled at the CVM technique (Betz, Bergstrom and Bowker, 2003: 92). However as the following comparison studies show, CVM and TCM estimates have been found to produce results which are not statistically different, and therefore the intended behaviour criticisms may be less valid.

Other studies have compared stated preference CVM type models with actual behaviour models such as TCM. Fix and Loomis (1998: 234) applied both methods in their economic valuation of mountain biking in Moab Utah before comparing the results. This study found that the economic benefits derived from both models were not statistically different, leading the authors to conclude that 'either TCM or CVM can be used to estimate the benefits to allow comparison to the management cost of mountain biking or acquisition of public areas for new trails' (Fix and Loomis, 1998: 235). Their findings may not transfer to other sites as it is acknowledged that Moab is a unique destination with little competition. Support for this conclusion can be found in the work by Hanley (1989: 58). His study into the non-market benefits of recreation at Queen Elizabeth Forest Park in Scotland indicated that the two methods produce similar consumer surplus valuations. He does note however, that CVM is not suitable for measuring non-use values, whereas TCM can take this into account (Hanley, 1989: 371). A similar comparative investigation by Loomis (2006: 46) attempted to quantify the magnitude of bias associated with the inclusion of multiple trip / destination data within the TCM method. While he found that substantial differences in per trip values could occur if this factor is ignored, his data identified that TCM and CVM are not statistically different and that there is considerable overlap between the methods (Loomis, 2006: 57). Carson et al (1996: 93) also identified that the two methods exhibit convergent validity supporting the theory that the methods are not statistically different. However, their meta-analysis of 83 non-cycling related studies did identify that the CVM estimates were typically smaller than those generated by TCM, although this was not true of every valuation.

Two combined impact and value studies offer final examples of this hybrid approach. First, Carleyolsen et al (2005) combined multiple methods in their study of the economic impact and value of parks, trails, and open space in Jefferson County, Wisconsin USA. Their study combined I-O, Hedonic Pricing and Economic Discounting methods, which the authors argued were necessary due to the varied nature of the parks, trails and open spaces which required specific research approaches. (Carleyolsen, 2005: 3). Each of the approaches were conducted independently using separate sources of data with I-O being used to estimate visitor spending, hedonic pricing to estimate indirect impacts, and economic discounting to non-use.

Bowker et al (2007) provide a second example of combined impact and value research. Their study combined I-O and TCM in an integrated framework to estimate the economic impact and value of the Virginia Creeper Rail Trail. This study used a common primary dataset consisting of onsite exit counts and user surveys, which collected both net economic value and economic impact data (Bowker et al, 258). Their rationale for combining these approaches was that by collecting both impact and value data the study would be able address a wider range policy and management questions arguing that 'economic efficiency, benefit-cost analysis and economic development questions and issues can all be addressed using consistently estimated value and impact measures' (Bowker et al, 2007: 258). Furthermore, they call for more studies to adopt the impact and value approach, as this would contribute to the knowledge of how impact and value varies spatially and would enable comparisons between the economic contribution of recreation and other land uses to be made. The use of hybrid models shown by these examples highlights the importance of adopting a research method which can address the specific research context. It also shows that a combination of methods may be required to research the economic value of adventurous off-road cycling.

2.9 Conclusion

In the chapter introduction it was stated that a critical review of the two perspectives presented by economic impact analysis and economic valuation, would address the needs of the first objective and inform an approach to researching the economic value of adventurous off-road cycling in South West England (Objective 2). The comprehensive appraisal of the available methods presented here satisfies the first objective, and lays the foundations for the development of an informed survey approach which will meet the needs of the second objective; this is examined in detail in the next chapter. The review has also shown that determining the economic contribution of tourism and recreation presents a significant challenge to researchers. Fletcher (1989: 515) described it as complex task due to the need to measure impacts in more than one sector of the economy.

The actual process of measuring economic impacts has been approached in numerous ways, ranging from pure guesswork to the use of complex computer modelling techniques (Stynes, 1999: 1). While it is generally accepted that economic impact assessment can be an important and valid tool for tourism planners and other interested parties, its use can be controversial. Problems of misuse, misinterpretation and questions over its integrity have been highlighted in this chapter (Stynes, 2001; Tyrell and Johnston, 2006; Crompton, 2006). The subject has also developed over time, as Vanhove (2005: 170) indicated; tourism has not always been considered a mechanism for economic development. While that particular view may have been dismissed, the debate has moved on to the issue of how to measure changes in expenditure and then how to analyse them.

In contrast, the methods of conducting economic impact analysis have not evolved greatly since the subject began to be studied more closely in the 1980s, when considerable debate took place regarding the use of economic multipliers for tourism research (Archer, 1982; Fletcher, 1989). Later debates have focused on the merits of using I-O techniques versus CGE models (Dwyer, Forsyth and Spurr, 2004), but to date it remains an unresolved issue, as there is still no single recognised solution to measuring tourism's economic impacts, let alone its associated social, environmental and cultural effects. In Section 2.8, this lack of consensus was also identified within the previous approaches used to quantify the economic contribution of off-road cycling. Here, studies were found to employ a variety of impact, valuation, and hybrid approaches to address the problem (Fix and Loomis, 1997; Siderelis and Moore, 1995; Chakraborty and Keith, 2000; Betz et al, 2003; Morey et al, 2002; WCMBTA, 2006).

Furthermore, economic impact analysis methods only measure the market value transactions of tourism goods and services, which may not reflect the value of those goods and services to the consumer. As such, impact analysis ignores the additional 'hidden' value that the user places on the experience or activity (Sinclair and Stabler, 1997: 183). This hidden value can be revealed through the use of economic valuation techniques which aim to understand how tourists value their experience and why they choose to visit certain recreation or tourist resources. This represents the key difference between the techniques as economic impact methods typically do not examine consumer behaviour beyond observed economic transactions. For this reason economic value should be recognised as being related to economic impact. Economic valuation also provides a mechanism for evaluating the associated social, environmental and cultural effects of tourism which cannot be easily measured using market value transactions. Moreover, even when goods, services, and resources can be valued at market rates, the economic use value may not reflect the market value, due to the consumer valuing the commodity or service at a price above which it prevails in the market (Sinclair and Stabler, 1997: 183).

Hybrid solutions were also identified within the literature relating to the economic contribution of off-road cycling. These approaches were focused on the use of multiple methods for collecting data (Lumsden et al, 2007; Siderelis and Moore, 1995), the application of hybrid valuation models (Hanley, 1989; Betz, et al, 2003; Loomis, 2005; Fix and Loomis, 1998: 234), and the use of combined impact and value assessment techniques (Carleyolsen et al, 2005; Bowker et al, 2007). In all of these examples, hybrid approaches were adopted in an attempt to improve the study validity. However, of the reviewed studies, only Carleyolsen et al (2005) and Bowker et al (2007) evaluated both economic impact and value as part of a combined approach. The use of both methods has the principal advantage of linking expenditure to visitor behaviour, providing a more comprehensive evaluation of this relationship. Furthermore, this interface represents an under-researched area, a point highlighted by (Bowker et al, 2007: 258) who call for more studies to adopt the impact and value approach, in order to better understand how impact and value varies spatially.

This chapter has reviewed the advantages and disadvantages of the principal methods used to conduct both economic impact analysis and economic valuation, from this it is clear that no single solution exists and therefore, it is the responsibility of the researcher to choose the most appropriate method for their study, taking account of that method's limitations. As Fletcher (1989: 515) has argued 'the final choice of methodology will, to a large extent, be determined by the purpose of the research, the resources available for the study, the time constraint imposed on the researchers and the structure of the economy in question'. However, this review of previous approaches to examining the economic contribution of off-road cycling has shown that a more comprehensive solution to this problem can be achieved by combining aspects of both economic valuation and economic impact assessment. Furthermore, this review has identified that the relationship between economic impact and value is currently under-researched, and therefore this study will make an important contribution to this body of knowledge. The next chapter develops this combined approach and justifies the specific methods chosen to investigate the economic contribution of off-road cycling within South West England, addressing the needs of research Objective 2 (see Figure 1.2).

3 METHODS

3.1 Introduction

In the previous chapter the principal economic impact and valuation techniques used to measure tourism and recreation were critiqued with the aim of understanding the key arguments surrounding their use. This chapter builds on the findings of this appraisal, but focuses more deeply on the practical collection of data and the analysis techniques required to investigate the economic impact and value of off-road cycling in South West England. Section 3.2 begins with a micro-level analysis of the advantages and disadvantages of the methodologies employed by previous studies to measure the economic impact and value of off-road cycling. It also considers other methods for collecting data which are not evident within the identified studies, but which may be suitable for researching the economic contribution of off-road cycling (see Section 2.8).

Based on this analysis of previously used methods and alternative approaches, a rationale is advanced for the methods chosen to address research objectives two, three and four (see Figure 1.2). The chapter discusses the selection of the individual pilot and main survey sites, before detailing the development of the self-completion questionnaire survey instrument, and non-probability quota sampling approach. In these sections the chosen methods are deconstructed to explain the individual steps taken to design the survey instrument, calculate the sample size, incentivise respondents and develop the sampling strategy. The chapter then focuses on the development of the qualitative interview schedule. This instrument was designed to complement the self-completion questionnaire survey by providing further insights into visitor behaviour. Both of these instruments were used to address the fourth research objective (examine variations among visitors). The chapter concludes with a discussion of the measures taken to improve reliability and validity within the survey design and during the collection of data. It is the overall intention of this chapter to demonstrate that the research methods have been selected through a rigorous and informed process, and that they meet the needs of the research objectives.

3.2 Methodological precedents for economic evaluation

This section critically reviews the methods employed by the 13 off-road cycling studies identified in Section 2.8 to collect and analyse data. In contrast to this earlier appraisal, the meta-analysis presented in Table 3.1 has the purpose of establishing the most appropriate methods with which to address research objectives three and four (see Figure 1.2). More specifically, Table 3.1 summarises these key studies and highlights their methods for collecting and analysing data, their sample characteristics, and their main themes and concepts. A proportional breakdown of the principal methods for collecting data is also presented in Figure 3.1.

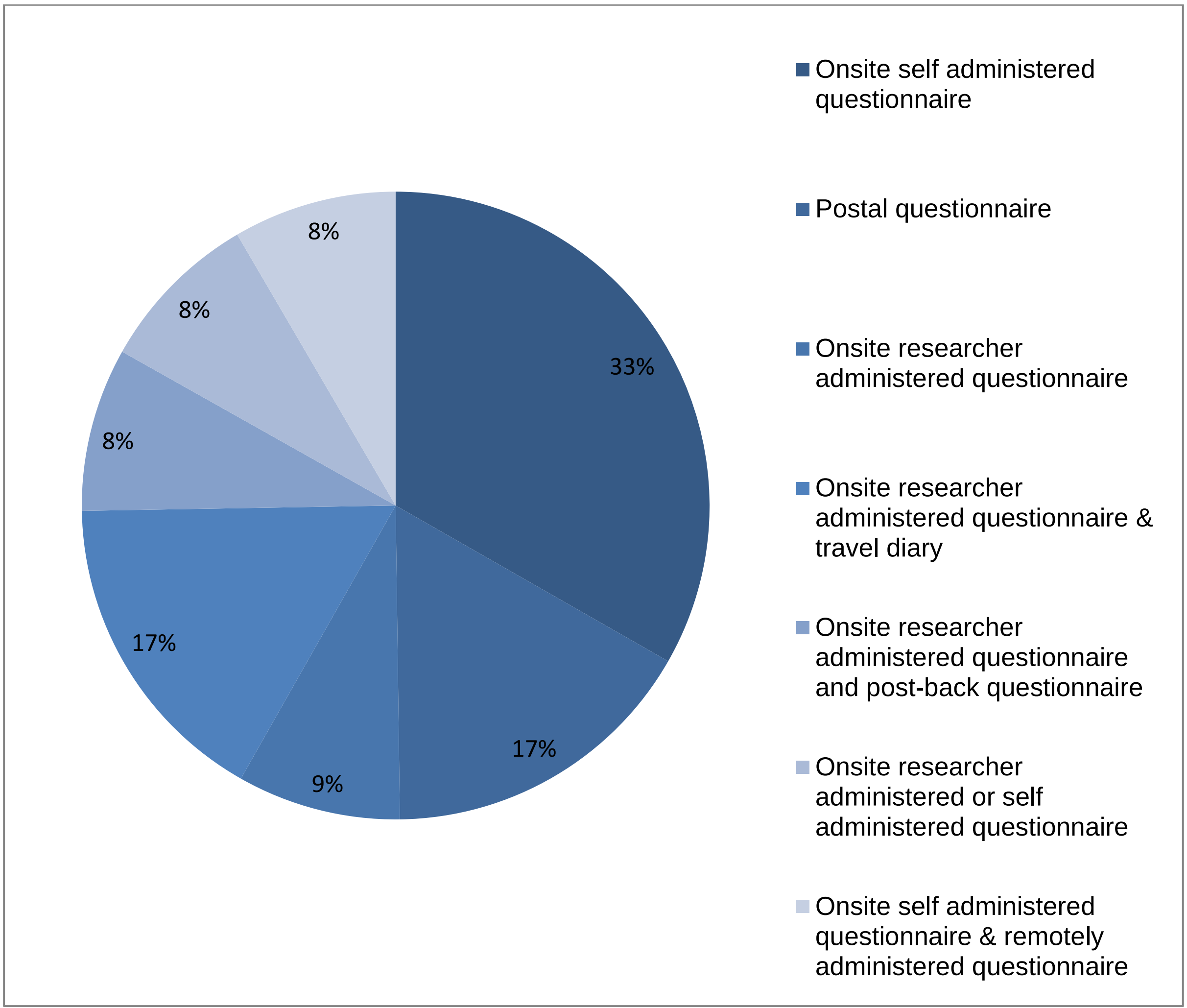
Table 3.1 Evaluation of previous approaches to off-road cycling research

	Sample Size / Response Rate	***Setting***	***Study Type***	***Data Collection Method(s)***	***Data Analysis Method(s)***	***Peer Reviewed***		***Main themes and concepts identified***
						Yes	***No***	
Bennett, Tranter, and Blaney (2003)	1525 Ridgeway users Response rate 43.8% Final sample 668	Ridgeway National Trail UK	Economic valuation study of users of the Ridgeway National Trail using Contingent Valuation (CVM)	Onsite self-administered questionnaire survey (1037) with some questionnaires 32% left under windscreens to be posted back (488) Convenience sampling approach.	Descriptive statistics plus Cameron Contingent Valuation CVM maximum likelihood WTP equation.	X		CVM produced a mean WTP that was comparable to other recreation studies. However, WTP should be treated with caution due to potential bias and the fact that it does not consider non-use.
Betz, Bergstrom, and Bowker (2003)	800 Residents Response rate 39% Final sample 268	Potential rail-trail site in north-east Georgia, USA	Rail-trail feasibility study conducted using Contingent Trip Model (CTM)	Postal questionnaire survey of residents within 75m radius of Rail-trail (approx. 1.5 hr drive) Simple random sampling approach.	Descriptive statistics plus Negative Binomial and Poisson Models	X		Use of CTM a stated preference alternative to the Travel Cost Method TCM.
Chakraborty and Keith (2000)	950 Mountain Bikers Response rate 19% Final sample 118	Moab, Utah, USA	Investigation into the economic value of mountain bikers visiting Moab Utah using Travel Cost Method (TCM)	Postal questionnaire survey of mountain bikers who had registered their names with a local bike rental store as part of a previous study. Convenience sampling approach.	Descriptive statistics plus Negative Binomial and Poisson Models	X		Results indicate that mountain bikers value the facilities at Moab highly and are willing to pay significant amounts to visit the site. This suggests that investment in improving facilities for mountain bikers may be economically justifiable.
Cope, Doxford, and Hill (1998)	500 users of the Sustrans C2C route in 1996 and 1997	Sustrans C2C cycle route from Whitehaven to Sunderland.	Investigation into the profile, spatial and temporal distribution and economic impacts of users on the C2C route.	Automatic counters, Field interviews of users conducted along C2C route in 1996 and 1997. In addition self-completion 'exit' questionnaires were distributed at the route terminal point in Sunderland. Telephone interviews with service providers were also conducted. Convenience sampling approach.	Descriptive statistics plus economic extrapolation from minimum and maximum user estimates. Descriptive statistics from provider interviews also provided	X		Economic estimates indicate the boost which cycle tourism can provide, but the research highlights the difficulty in predicting future growth due the lack of research into cycle tourism generally. Expenditure on tourism attractions along the route was also found to be low. The authors attribute this to the way in which the route was planned as a cycle network and not as integral part of the tourism offer.
Downward, Lumsden, and Weston (2009)	3104 travel diaries issued to users of 4 long-distance cycle route. Response rates 12%	Data from: The Coasts and Castles route, C2C, Hadrian's Wall and the Pennine Trail.	Travel cost Method using time as a variable. The study investigates the relationship between income, group size and duration of activity.	Intercept survey to assess group numbers and trip purpose and travel diaries to collect behaviour and expenditure data, conducted from Spring through to Autumn. Convenience sampling approach.	Descriptive statistics, Travel Cost Analysis (TCM) of time. Ordinary Least Squares (OLS) and Tobit Analysis.	X		Study identified that expenditure is determined by income, group size and durations of activity, which is supported by the literature. Research did also find that expenditure and duration is linked to an overall preference for longer trips, and that duration is not directly affected by the route characteristics or expenditure characteristics.
Fix and Loomis (1997)	310 Response rate 90% Single destination sample 238	Moab, Utah, USA Slickrock mountain bike trails	1996 study to investigate the economic benefits of single destination mountain bike trips to the popular Slickrock trails in Moab Utah	Onsite self-administered questionnaire survey Simple random sampling approach.	TCM using count data model incorporating Poisson equation	X		Demonstrates the suitability of (TCM) for estimating the economic value of mountain biking. Finds that mountain bike trails produce a high value of consumer surplus to users.
Fix and Loomis (1998)	345 Mountain bikers Moab Utah. Response rate 90%	Moab Utah USA, Slickrock mountain bike trails	Comparison study of TCM and CVM approaches to measuring the economic value of mountain biking.	Onsite self-administered questionnaire survey Simple random sampling approach.	Descriptive statistics plus TCM using Poisson Count data and Logit CVM analysis.	X		Paper contributes to literature comparing TCM and CVM. Both methods showed that mountain bikers receive large economic benefits from the field site. The authors conclude that either method is suitable for estimating value.

Lumsden, Downward, and Cope (2004)	Intercept survey 211 cyclists. Travel diaries issued to 183 respondents. Response 35%	North Sea Cycle Route. Study conducted in North East England at six field sites.	Study to measure the levels and patterns of use and determine the economic impact of the North Sea Cycle Route in the North East of England.	Triangulation study incorporating, automatic counter data, intercept questionnaire survey data and travel diaries. Convenience sampling approach.	Descriptive statistics and economic extrapolation of group spending data.	X		Several management implications for the route were identified. Findings indicate that marketing should be tailored to different visitor market segments. The study also highlights the importance of local users, stating that 'the internal regional market is key to the success of this type of route'.
Morey, Buchanan, and Waldman (2002)	326 Response rate 92% Final sample 289	Visitors to Portland Bicycle Show in 1995, Portland, USA	Contingent valuation study using choice experiments to estimate the benefits and costs of hypothetical changes in trail characteristics, site access, and access fees	Onsite self-administered questionnaire survey using choice questions derived from Interviews, focus groups and personal experience. Convenience sampling approach.	Descriptive statistics plus construction of a site choice model to reveal the impact of site characteristics on visitor site choice	X		Results suggest that overall mountain bikers are willing to pay an access fee for improved conditions. WTP was found to be a function of income and interest in mountain biking.
Mundet and Coenders (2010)	1261	Study of three Spanish greenways which link the Pyrenees with the Mediterranean.	Study to identify the user profiles of tourists and non-tourists, perceptions of the greenways and indirect and direct impacts of the greenways on the communities which they pass through.	Onsite questionnaire survey either researcher administered or self-administered (respondent choice). Data collection conducted over 12 months between October 2005 and September 2006. Systematic sampling approach.	Descriptive statistics. Cluster analysis conducted using Ward's method to identify variations among visitors. Economic extrapolation.	X		The economic value of greenways was found to be greater than the direct tourism activity generated. This demonstrates the importance of the infrastructure for local use. It was also found that greenways encouraged users to take part in physical activity and were used by of all age and gender groups. The study also identified the untapped potential to increase tourism trips along greenways.
Siderelis and Moore (1995)	2151 Response rate 79.3% Final sample 1705	Three rail-trails located in Iowa, Florida and California USA	1991 study to understand the net economic benefits of rail-trails using the individual travel cost method (TCM) at three geographically diverse sites	Short onsite interview with follow up detailed postal questionnaire. Convenience sampling stratified to assure coverage of time, day, season and section of trail.	Descriptive statistics, Travel Cost model using count data model incorporating regression analysis	X		Demand for rail-trails was found to be determined by: travel cost, recreation activities, and the sizing and group size and demographics, with more research needed to better measure variables
Taylor (2002)	927 Response rate 72% Final Sample 671	2002 Mountain Bike World Cup, Fort William, Scotland	Economic impact Study of 2002 Mountain Bike World Cup	Onsite self-administered questionnaire survey Convenience sampling.	Descriptive statistics		X	The study identified that the estimated impact of visitor expenditure to the local economy to be much higher than originally anticipated, despite the event making a loss.
Western Canada Mountain Bike Tourism Association (2006)	1,270 Response rate 88% Eligible sample 1,019	Sea to Sky Corridor, British Columbia, Canada	2006 Sea to sky Mountain Biking Economic Impact Study	Intercept, onsite researcher administered questionnaire interview Convenience sampling approach.	Descriptive statistics, plus STEAM Pro Input-output model analysis.		X	The study identified that the trail systems are not only significant in terms of attracting visitor expenditure, but that they were an important factor for individuals who decided to re-locate to the local area.

Source: Author

Figure 3.1 Methodology breakdown for studies identified in Table 3.1



Source: Author

From Figure 3.1, questionnaire surveys can be identified as the principal method for collecting data, with three types of questionnaire survey being represented within the table. The only questionnaire types which are not represented within Table 3.1 are online surveys and telephone surveys. All 13 studies shown in Table 3.1 elected to use questionnaires as either the main survey instrument or as part of a multi-mode collection approach. Figure 3.1 shows the breakdown of these approaches. Eleven opted to conduct the survey onsite, with the remaining two choosing to use a postal questionnaire survey instrument. Three studies elected to combine onsite questionnaires with post-back questionnaires or travel diaries forming a multi-mode collection approach. Of the single-mode onsite questionnaires, four studies used self-administered surveys, one used researcher administered surveys, and a further study combined a researcher intercept survey with a self-completion questionnaire. Of the remaining two studies, one gave respondents the choice of completing a researcher administered or self-completion questionnaire, and the other combined a researcher administered approach with remote administration by attaching questionnaires to car windscreens.

A variation in response rates between onsite and postal questionnaires can also be identified within Table 3.1. For the nine studies which published their response rates, onsite questionnaires produced a mean response rate of 59.5%, whereas postal questionnaires delivered a mean response rate of 29%. However, this observed variation reflects the differing nature of the two techniques. Postal questionnaires typically suffer from low response rates (Bryman, 2008: 220); this is a key disadvantage of the technique and one which must be taken into account at the design stage. This point is supported by Nachmias and Nachmias (1996: 226) who state that: ‘the typical response rate for a personal interview is about 95 percent, whereas the response rate for a mail survey without follow-up is between 20 and 40 percent’. While this point focuses on the differences in response rates between postal and interviewer surveys, onsite self-administered surveys achieve response rates which are similar to personal interview questionnaires because they are distributed by a surveyor who can explain the purpose of the survey, and ensure that the survey is collected once it is completed (Oppenheim, 1966: 103).

Whilst the response rates for the postal surveys by Betz et al (2003) and Chakraborty and Keith (2000) mirror the generally accepted low response trend for this type of survey, postal survey response rates can be improved through the use of a hybrid approach. Siderelis and Moore (1995) achieved an unusually high response rate of 79.3% for their postal questionnaire. A key factor which may explain the success of this study is the method of distribution. In this example, respondents were approached by a researcher and asked if they would be willing to participate in the survey, before being given a postal questionnaire form and pre-paid reply. This technique brings some of the advantages of an onsite questionnaire survey to the postal technique, and enables the researcher to build a rapport with the respondent and explain the purpose of the survey.

Postal questionnaires do exhibit some further disadvantages. In general, postal questionnaires are constrained by their design requirement to be easily understood without additional verbal explanation, this restricts the type and number of questions which can be asked. Furthermore, postal questionnaires do not provide an opportunity for the researcher to probe for additional information or to check that returned questionnaires have been fully completed. Unlike a researcher administered survey it is also impossible to control who fills out the questionnaire (Bryman, 2008: 218; Ruane, 2006: 141; Nachmias and Nachmias 1996: 226; Oppenheim, 1966: 103). Despite their limitations, postal questionnaires offer several advantages over interviewer administered or self-administered questionnaires. The main advantages of the technique include lower collection costs, reduced biasing error, and the means to reach respondents in geographically dispersed locations at low cost (Nachmias and Nachmias 1996: 226; Oppenheim, 1966: 102). It is also easier to administer a random probability survey of a population using a postal questionnaire in comparison to an onsite survey. This is because postal surveys are not affected by external factors such as refusal rates at the administration stage. Whilst this factor makes postal surveys better suited to random probability applications, the issues of non-response outlined earlier in this section impact negatively on postal surveys during the post-administration phase.

In contrast, the advantages and disadvantages of interviewer administered and self-completion questionnaires can be broadly seen as the opposite of those of postal questionnaires (Oppenheim, 1966:102). In general interviews and onsite self-completion questionnaires tend to achieve high response rates which can be monitored easily when collecting data. In both cases an interviewer is present to explain the purpose of the survey and to clarify any misunderstanding respondents may have. Researchers can also manage the quality of interview data and conduct quality control checks on the returned self-completion questionnaires (Nachmias and Nachmias 1996: 226; Oppenheim, 1966:102). Conversely, interviews and self-completion questionnaires are generally more expensive and time consuming to conduct than postal surveys. They are also more vulnerable to external factors such as adverse weather conditions, and can be subject to interviewer bias (Oppenheim, 1966:102; Nachmias and Nachmias 1996: 226).

Online questionnaires represent a further option to researchers. Whilst none of the identified studies have utilised this technology, this type of questionnaire survey could be used as a collection method to research the economic value of off-road cycling. Online questionnaires have a number of advantages. They can increase the reach of the survey without incurring any additional costs (Ruane, 2006: 143) and their electronic nature makes them cheaper to administer than equivalent postal surveys (Bryman, 2008: 653). A further advantage is the increased speed of response exhibited by online surveys. It has also been observed that online survey responses contain fewer missing data (Bryman, 2008: 653). Despite these advantages online questionnaires are still subject to the inherent weaknesses associated with all forms of the questionnaire technique (Ruane, 2006: 143). In addition, online questionnaires are often much shorter than paper based surveys which limits their ability to collect more detailed responses. Online surveys also suffer from low response rates, which are typically below that of an equivalent postal survey (Bryman, 2008: 653). Access is also limited to online populations only, (however, this may also be an advantage if the purpose is to research online populations only) (Bryman, 2008: 653). Further disadvantages include issues concerning security of data and respondent confidentiality and anonymity (Ruane, 2006:143), which may be harder to maintain if the survey is distributed by email. Finally, there is a greater risk of respondents completing the survey more than once, a problem which is less prevalent with traditional paper based approaches (Bryman, 2008: 653).

3.2.1 Other forms of data collection

Up to now this chapter has focused on the predominant use of questionnaire data within the published studies shown in Table 3.1, and the advantages and disadvantages associated with the questionnaire technique in its various forms. In this section other methods for collecting data are considered to highlight alternative methods by which the economic value of off-road cycling in the South West could be investigated.

Out of the 13 studies shown in Table 3.1, two studies employed a non-questionnaire based approach to capture expenditure data. These studies used a travel diary approach and were conducted by Lumsden et al (2004) and Downward et al (2009). This method can be seen as a more detailed form of the self-completion questionnaire and requires respondents to keep a diary of their expenditures; diaries are then collected by the researcher at the end of the survey. By asking respondents to record their expenditures as they occur, it is intended that the problems of inaccurate recall or prior estimation are minimised (Lumsden et al, 2004: 14). Expenditure diaries also have a number of disadvantages. First, the method requires the respondent to commit to recording all expenditures accurately and in real time. Over time respondents may be become tired of completing the diary leading to less diligent records being kept (Bryman, 2008: 228). Second, it relies on respondents returning the diary to the researcher; this is commonly done by post. Postal returns can be affected by the problems of low response rates which also affect postal questionnaires. They also require the researcher to follow up non-respondents by sending reminders. Whilst this is considered good practice for postal questionnaires where replacements may also be sent, this practice appears questionable for the diary method. This is because the purpose of the diary is to record expenditure in real-time, if this has not occurred it can be argued that there is little point in sending reminders.

Collecting economic data represents the common link between all of the studies shown in Table 3.1. This narrow focus is reflected in the dominant use of closed question type questionnaires which are suited to collecting large quantities of 'hard' economic data relating to specific circumstances or activities from large numbers of respondents. This factor offers the most likely explanation for why other methods for collecting data such as in-depth interviews and focus groups, which tend to be more qualitative in nature and typically employ smaller sample sizes, have not been used as a principle research method within the identified studies. Despite not being adopted as a principle survey technique, evidence of the value of these techniques can be found within Table 3.1. Morey, Buchanan and Waldman (2002) used interviews and focus groups to inform the design of their contingent valuation study into the willingness of mountain bikers to pay a trail access fee. Data collected during interviews and focus groups were used to design 36 hypothetical mountain bike sites. During the main study respondents were then asked to choose a preferred site from a series of paired choice sets contained within a self-completion questionnaire (Morey, Buchanan and Waldman, 2002: 413). Qualitative methods such as in-depth interviews and focus groups have the advantage of being able to open up discussion surrounding the wider issues which cannot be explored in detail using a predominantly closed-question survey. Their ability to open up discussion can also be a disadvantage as they can generate large quantities of data which can be time consuming to analyse (Bryman, 2008: 488).

The study by Morey, Buchanan and Waldman (2002) represents a form of mixed methods research and highlights one way in which qualitative and quantitative methods can be used to help uncover the economic value of off-road cycling. Alternatively, qualitative techniques such as focus groups and semi-structured interviews could be used alongside a predominantly quantitatively driven questionnaire survey to reveal more detailed information about respondent behaviour, and individual attitudes towards purpose built off-road cycling sites. This approach has not been taken by any of the identified studies and would enable this study to move beyond the primary objective of quantifying the economic value of off-road cycling in the South West.

3.2.2 Selection of research methods

In Section 2.9 it was identified that the interface between economic impact and economic evaluation represents a knowledge gap within the literature. For this reason it was decided that a combined approach encompassing both of these aspects should be adopted. This represents the first stage of the method selection. The second involved selecting an appropriate survey instrument which would satisfy these criteria and capture the data needed to address the research objectives (see Table 3.2).

Table 3.2 Research objectives and corresponding methods

	Research objective	***Chosen research method***		
		Literature Review	Self-Completion Questionnaire	Semi-structured Interview
1	Critically appraise the current range of economic assessment 'technologies' used in tourism and recreation in in the context of current government guidance on project appraisal and evaluation	X		
2	Develop and appraise a new dedicated survey instrument to capture the economic contribution of AOC in South West England	X		
3	Produce an estimate of the current economic contribution of AOC at Haldon Forest Park	x	X	
4	Examine variations among users in terms of their onsite behaviours, with special reference to their economic contributions	x	X	x
5	Revisit and reappraise the cases made for public funding and investment in purpose-built AOC sites (in the South West of England in light of new dedicated empirical evidence)	x	X	X

Source: Author

Objectives three, four and five are focused on quantifying the economic contribution of off-road cycling visitors at purpose built sites within the South West. The quantitative nature of these objectives clearly requires a quantitative solution. Furthermore, the 1SW developed off-road cycling facilities represent new infrastructure for which no visitor data existed apart from usage counts for two of the off-road cycling trails. For this reason a large-scale questionnaire survey was deemed appropriate to capture the great quantity of economic and visitor data required to address these objectives effectively. Furthermore, it was known from reviewing the previous studies shown in Table 3.1 that questionnaires represented a tried and tested method of gathering data from off-road cyclists. Having considered the advantages and disadvantages of the various questionnaire modes of delivery in Section 3.2, it was decided that a self-completion questionnaire design distributed by the researcher onsite would be the most efficient method to administer the survey to a large number of respondents, and collect their responses simultaneously. This method had the advantage of allowing the researcher to hand out multiple questionnaires to respondents at the same time, whilst being present to explain the questionnaire layout, field any questions respondents may have, and ensure that the questionnaires were returned (Oppenheim, 1966: 103).

In addition, the fourth objective is also focused on identifying non-economic variations among site visitors. To address this aspect, it was decided that there was a need to gather additional consumer behaviour data which would supplement the socio-demographic and behavioural data provided by the comprehensive questionnaire survey. Furthermore, these data also inform the fifth research objective by providing additional insight into the user value of off-road cycling sites. To gain this deeper understanding of visitor behaviour and to investigate how off-road cyclists interact with and value purpose built off-road cycling sites, a more qualitative approach was needed. Semi-structured interviews offered the closest (qualitative match) to the (predominantly quantitative) self-completion questionnaire technique selected to primarily address the economic components of the study. It was intended that these two techniques would be complementary, and that data derived from the self-completion questionnaire survey would be used to inform the development of the interview schedule. This also opened up the possibility of combining questionnaire and interview data to construct visitor group profiles based on individual responses. This could not be achieved using other potential methods such as focus groups, where group peer pressure may influence the discussion. Moreover, given the time and resources already allocated to conducting the large-scale questionnaire survey to address the economic aspects of the third and fourth objectives, it was considered unwise to conduct focus groups which are known to be time-consuming and resource intensive.

It is important to note that whilst the chosen survey instruments mirror the principal techniques employed by the 13 studies shown in Table 3.1, this study is unique in its recognition that economic transactions should not be divorced from the context of consumer behaviour. This aspect is ignored by all of the previous studies which provide little information about off-road cyclists beyond their economic transactions. Even the study by Mundet and Coenders (2010), which attempts to identify user profiles among tourists and non-tourists, only classifies visitors according to their use of the Greenway cycling infrastructure. In contrast, the dual approach taken by this study treats cyclists as consumers and not as a homogenous group, classified only by their trip-type characteristics. This is an important distinction, because it recognises that cyclists are individuals with different motivations, behaviours and spending patterns. By gaining a deeper understanding of this aspect, this study will provide a more detailed picture of off-road cycling use at purpose-built sites, enabling a more informed approach to be taken to the future management of these sites.

3.3 Research location selection

3.3.1 Selection of the main study and pilot sites

In the previous section, a large-scale questionnaire survey emerged as the most appropriate method to capture the large quantity of (mainly) economic data required to address the third and fourth objectives. In this section the process used to select the main study and pilot research sites is explained. Site choice selection for the large–scale questionnaire survey was restricted to purpose-built off-road cycling sites developed by research sponsor, 1SW. These are shown in Figure 1.1. This support provided straightforward and unfettered access to potential respondents who were effectively captive within the site boundaries. Furthermore, due to the circular nature of the 1SW purpose-built cycling trails, it was possible to setup a single onsite survey location within the main hub area at both the pilot and main study sites to intercept potential respondents as they started or finished their circuit. This simplified the onsite collection process as it was not necessary to collect data at multiple locations at each site.

The potential for a comparative study between two or more sites was originally considered, but was subsequently rejected due to the variety of provision provided by the different sites and the logistics involved with surveying at two locations. Furthermore, surveying in two locations would have increased the risk of obtaining smaller samples. It was also considered preferable to increase the breadth of the study by conducting one questionnaire and one interview study at a single location, rather than a single questionnaire survey in two locations. As a result it was decided that the main survey should be a detailed study of a single site which would allow a deeper inspection of group attributes, and that piloting should take place at a separate geographical location away from the main site where it would be less likely to capture respondents who would also be eligible to take part in the main study (Bryman, 2008: 248).

A three stage process was used to select the main study and pilot sites. First, a synthesis of all of the key features (e.g. trail and visitor facilities) of the different 1SW sites was conducted to identify key similarities and differences between the sites; this analysis can be seen in Appendix 1 and Appendix 2. Appendix 2 also shows the opening sequence of the facilities which were under construction during the study period, to a large extent this dictated when and where surveying could be conducted. It is a limitation of the study that not all of the sites were eligible to be selected during the research timescale; however, the sampling strategy developed for this study could form the basis of a follow-up post-development survey of all the 1SW sites, which would benefit from the tested approach developed here.

The second stage of the process involved developing a set of selection criteria to justify the choice of pilot and main study sites; these can be seen in Appendix 3. Selection criteria were derived by analysing the site typologies contained in Appendix 1 and identifying key factors which could be used to filter potential sites. A total of nine criteria were identified, these are labelled A - I in Appendix 3. Out of the nine identified criteria, the following were considered to be the most important aspects. Following the decision to concentrate on a single main study site, it was reasoned that the chosen site should reflect a broad range of off-road cycling experiences in terms of trail grades. 1SW trail grading follows the International Mountain Bike Association (IMBA) guidelines, which colour code trails in relation to their difficulty. Within this grading system, easy trails are coded green, moderate trails blue, difficult trails red, and extreme trails black. However, not all 1SW sites provide the full range of trail provision and therefore it was decided that this should be a criteria for assessing site suitability. It was also essential that the site had automatic LineTop cycle counters in place, as data from these devices would be used to determine the seasonal sample quotas. Finally, a pre-existing cycling demand was also considered important as it would enable the survey to investigate how cyclists viewed the newly-developed 1SW trails and how these trails fitted within the existing trail provision. This would not have been possible at sites where cycling was being actively promoted for the first time.

Appendix 4 shows the results of applying the site selection scoring criteria shown in Appendix 3 to the ten sites. The three highest-scoring sites are shown in blue; sites highlighted in red signify paired sites at one location. Haldon Forest Park and Moors Valley Country Park scored nine and eight respectively and it was clear that the sites (represented by numbers 1 and 2 in Figure 1.1) are closely matched in terms of their site characteristics and overall scores for the criteria shown in Appendix 3. Due to the similarities between these two sites, it would have been possible to conduct a comparative study between the sites and the two geographical locations. However, this was rejected for the reasons stated earlier in this section. The Forest of Dean was allocated a score of seven; this site is also a regional hub and has a similar profile to Haldon Forest Park and Moors Valley Country Park. These factors made the site stand out as an ideal pilot study location. Its location also favoured its use as a pilot site as it is located in a different geographical area, which minimises any potential respondent overlap with the main study site.

For the main study, Haldon Forest Park was selected on the grounds of being the highest scoring site based on the criteria shown in Appendix 3. Furthermore, the site offered the full range of cycling experiences in terms of trail grades. This meant that the study would reach off-road cyclists of all abilities. For the same reason, the Forest of Dean was selected as the pilot site over Moors Valley Country Park as its trail provision more closely matched that of Haldon Forest Park. It was also decided that Moors Valley Country Park should be kept as a reserve location should a second pilot study be required.

3.3.2 Haldon Forest Park: Field site overview

Haldon Forest Park is situated approximately nine miles South West of Exeter, adjacent to the A38 which links Exeter to Plymouth. The site is owned by Forestry Commission England and opened as a public recreation site in 2006 (Tym et al, 2006: 44). The site provides opportunities for a range of informal and organised recreational activities. Informal activities include recreational trails for walking, orienteering, cycling and horse riding. Formal recreational opportunities include archery, a Go Ape high wire course, and guided Segway tours. In addition, visitor facilities include a pay and display car park, toilet and shower facilities, children's play area, bike shop and hire facility, and a café (Forestry Commission, 2013).

In September 2010 the off-road cycling infrastructure was re-developed when it became a regional cycling hub as part of the 1SW initiative. This phase of development created the 12.3 km moderate (blue grade) Challenge Trail, and the 9 km difficult (red grade) Ridge Ride Trail. In addition, a skills-park and pump-track area were also constructed. The new Challenge and Ridge Ride Trails replaced and expanded provision of the same grade which had been developed as part of the first-round of development in 2006. These new facilities added to the pre-existing 2.5 km easy (green grade) Family trail, and the 1 km severe (black grade) Ridge Ride Extreme Trail. Post-redevelopment Haldon Forest Park now provides almost 25 km of off-road cycling trails. A map of the current provision is provided in Appendix 5.

3.4 Questionnaire survey design, strategy, definitions and piloting

3.4.1 Questionnaire design

In Section 3.2.2 it was determined that a large-scale questionnaire offered the most appropriate method of capturing the large quantity of economic and visitor data required to address the third and fourth research objectives. The resulting questionnaire comprised four A4 pages, of which three were printed double-sided with questions. In total, the questionnaire contained 51 questions, but due to question filtering most respondents completed around 78% of the questions. Based on this description the questionnaire may appear to be lengthy and time consuming, but from piloting it was known that the survey could be completed within five minutes. This was made possible by using predominantly closed-type questions and by ensuring the questionnaire had a clear, well-spaced question layout. In general, response rates for shorter questionnaires tend to be higher than for longer questionnaires. However, response rates are also influenced by factors such as the questionnaire topic, the presence of incentives and the questionnaire layout (Bryman, 2008: 221). Furthermore, 'respondents may be highly tolerant of questionnaires that contain many questions on topics that interest them' Bryman (2008: 221).

On the front page, the brands of the project sponsors: Defra, 1 South West and ESRC were displayed to authenticate the research and provide a professional introduction to the survey. The logos were followed by the survey title which clearly informed the respondent of the nature of the survey (see Appendix 6). Two introductory paragraphs followed the title, the first of which explained the nature and purpose of the survey in greater detail and instructed the respondent on how to complete the survey. The introductory paragraph also included a statement which clearly stated that respondent answers will be kept confidential and that respondents would not be identifiable from the information they provide, ‘introductions and cover letters should directly address the issues of confidentiality and anonymity’ (Ruane 2006: 134). This is important because the respondent must be clearly informed at the outset that the research is being conducted ethically. For a questionnaire to be successful it is essential that the respondent trusts that the survey is legitimate and that their information will not be used in an inappropriate manner or shared with third parties for other purposes (Bryman, 2008: 201).

The second paragraph introduced the opportunity for respondents to take part in a future follow-up interview about off-road cycling at Haldon Forest Park, and instructed interested respondents to add their first name and a contact number or e-mail address in the space provided at the end of the questionnaire. A further confidentiality statement relating to any future participation was included to reassure respondents that they would not be committed to taking part by opting in at this stage (see Appendix 6). The statement also stressed that any future participation would be voluntary, that respondent details would be kept private and confidential, and that their anonymity would be maintained in any research outputs. A final instruction was added after the second paragraph requesting respondents not to participate in the survey if they had already completed a questionnaire at the site, this was included to mitigate against double counting. Respondents were also asked not to complete the survey if they were under 16 years of age. For the purposes of the survey, respondents under the age of 16 were classified as children, and as such were not surveyed for ethical reasons. The statement also asked respondents to indicate by ticking a box if they had any involvement with any of the principal project partner organisations involved in the 1SW development and research project comprising of:

- 1 South West Cycle Adventure
- Economic and Social Research Council
- Forestry Commission
- National Trust
- University of Exeter

This was followed by a statement thanking respondents for their participation, and a reminder that they could ask the researcher if they had any questions regarding the survey. Following the introductory header, the questionnaire sheet was ordered into a series of 51 questions organised under the following four headings: Today's Visit, Your Cycling, Paying for Off-Road Cycling Facilities, and finally socio-demographic questions. Within these headings, responses were split between 38 closed and 13 open questions. Closed questions provide a predetermined set of responses for the respondent to select, whereas open questions allow the respondent freedom in devising unique answers to the question, (Ruane, 2006: 131). Questions were typed in bold and were followed by clear instructions on how the respondent should answer the question, for example *'(Please tick* <u>one</u> *box only)'*. Where filter questions were used, respondents were guided to the next relevant question by an instructional symbol, for example **(➔ Q5)**. Instructions and symbol meanings were described in greater detail in the questionnaire introduction and were also explained by the researcher at the point of distribution.

Primarily the questions were concerned with gathering ‘personal factual’ responses which would provide detailed visitor information through which to address research objective four (see Table 3.2); these comprised 45 out of the 51 questions. The remaining six questions were split between a single question requiring the respondent to rank their cycling frequency, seriousness towards cycling, and their cycling experience along an opposing scale; and five attitudinal questions.

Of these attitudinal questions, Question 30 (See Appendix 6) was designed as an indirect mechanism for revealing respondent preferences for off-road trails. This question was derived from work conducted by Cessford (1995) who investigated the riding preferences of 504 mountain bikers in Wellington, New Zealand. It should be noted that whilst the question records attitudes towards different trail features on a five point scale, the question is a non-Likert measure, as it does not follow the standard scale from ‘strongly agree to ‘strongly disagree’. The main alternative would have been to base the question around the standardised colour-coded IMBA trail grading system which represents trail severity, and ask respondents to indicate which colour trail they normally ride. However, this approach would have been problematic for a number of reasons. First, it relies on the respondent being familiar with the IMBA system, and second it is open to interpretation. Whilst the system does provide a good universal indication of difficulty, trails can vary considerably depending on their geographical location, underlying geology and the human influence of the trail designer and builder. A third problem of this approach is that respondents may be influenced by peer pressure and state that they ride the most technically difficult trails in order to gain respect from their peers.

Evidence for the influence of peer pressure among riders of purpose built trail centres can be identified within the literature, where certain groups of mountain bike enthusiasts have been described as ‘trail baggers’, riders who have all the latest kit, and are drawn to ride well known signature trails involving highly technical obstacles (Forestry Commission Scotland, 2005: 43). This group can be further characterised by their demographic profile, and research conducted at the Scottish 7 Stanes trail centres revealed that the participant profile comprised mainly of male users, in the age bracket of 20 to 45. These users were also found to be relatively affluent and belonging to higher social class groups, (Forestry Commission Scotland, 2005: 46). Participants within this group are able to affirm their identity within their chosen activity through having the latest kit, and by collecting experiences to achieve acceptance by the wider fraternity (Weed and Bull, 2004: 60). While the 1 South West trails at Haldon Forest differ significantly from those of the 7 Stanes in Scotland, it was nevertheless important to reflect upon in the design stage on how social factors can influence questionnaire responses and ultimately research outcomes.

A series of ten general attitudinal questions were asked in Question 37 (see Appendix 6). These were included for the purpose of addressing research objective four, and had the aim of capturing respondent attitudes towards off-road cycling provision within the South West. Five-point Likert scales were used in the survey (strongly agree to strongly disagree), these included a middle non-response option (don’t know). Ryan and Garland (1999) recommend that a non-response option is included when considering the attitudes of tourists, as not all respondents may feel they have sufficient knowledge to answer the question. Whilst the majority of the Likert statements included in Question 37 did not require in-depth prior knowledge in order to respond, it is possible that novice off-road cyclists who were visiting Haldon Forest for the first time may not have had sufficient knowledge to answer the statements. For this reason alone, the inclusion of a *'don't know'* response is justified. First time visitors to Haldon Forest may also have found it more difficult to answer certain questions if they took part in the survey prior to them experiencing the riding offer at Haldon Forest.

Due to the survey only focusing on off-road cyclists it was not possible to conduct an exit survey of visitors to the site, which may, in the case of new visitors, have enabled respondents to make a more informed judgement based on their experience. Also because the trails at Haldon Forest Park are circular, starting and ending at the central hub facilities, it was not possible to use the trail end point as a method of differentiating between respondents who were starting, or those who were finishing a trail circuit. These are limitations of the survey which must be taken into account. However, these limitations only apply to five out of the 51 questions as the remaining 46 questions are concerned with personal factual responses requiring no prior knowledge of the site. The remaining three attitudinal questions (Questions 40-42, see Appendix 6) were located in section three of the questionnaire, and were concerned with the issue of paying for off-road cycling facilities. Question 40 first asked respondents to indicate whether they consider the current car park charges at Haldon Forest Park to be: *Very Good Value, About Righ*t, *or Over-priced*. Question 41 then attempted to find out the maximum car park charge respondents would be willing to pay for the current facilities. These questions were designed to be a direct measure of the value respondents place on visiting Haldon Forest Park.

This is a form contingent valuation questioning where consumers are asked directly on their willingness to pay (WTP) for an amenity or resource, or alternatively on their willingness to accept (WTA) compensation if that amenity or resource was lost or degraded (Sinclair and Stabler, 1997: 190; Mitchell and Carson, 1989: 30; Portney, 1994: 3). Whilst the maximum willingness to pay amount is purely hypothetical and is typically applied to the valuation of sites where no access charge is in place, for this particular study, the figure can be said to be equal to or greater than the current car park charge which respondents were willing to pay. Prior to this question, a filter was used to ensure that the question was only answered by respondents who had paid to park at the field site. In order to investigate the reasons and circumstances under which respondents may be willing to pay more, Question 42, was designed to find out if there was a link between willingness to pay and hypothetical improvements to the trail network and visitor facilities at Haldon Forest Park, as has been found in previous studies of mountain bikers e.g. Morey, Buchanan and Waldman (2002).

In the previous chapter the interface between economic impact and valuation was identified as an under-researched area. In an attempt to address this knowledge gap and satisfy research objective three, the survey was designed to obtain both direct expenditure data and economic value data from respondents by incorporating methodological aspects from both Contingent Valuation and Travel Cost analysis. Collecting economic value data helps to understand how tourists value their experience and why they choose to visit certain recreation or tourist resources. Previous economic valuation studies of mountain bike sites have used either the Travel Cost Method (Fix, Loomis and Eichorn, 2000: 127; Chakraborty and Keith, 2000: 461; Fix and Loomis, 1997: 342; Siderelis and Moore, 1995: 344), or Contingent Valuation questions (Betz, Bergstrom, and Bowker, 2003; Fix and Loomis, 1998; Morey, Buchanan and Waldman, 2002), to obtain the economic value that off-road cyclists place on cycling resources.

Off-road cycling sites represent an ideal resource through which to investigate the overlap between direct expenditure and the economic valuation from a user's perspective, (which may be much higher than the actual direct expenditure amount). For many public off-road cycling sites, car park charging represents the only means of generating income for maintaining and operating the site (Tym et al, 2006: 40) and may be the only direct expenditure income from site users. In addition, it may be the only mechanism through which to increase income generation in order to expand an off-road trail network or improve visitor facilities. However, car park charges represent only one aspect of a user's total trip expenditure as other costs such as fuel will have been incurred in reaching the site. The Travel Cost Method aims to reveal these hidden costs, and works on the premise that there is a relationship between an individual's travel costs and their valuation of the site, based on their willingness to pay the costs required to visit them (Sinclair and Stabler, 1997: 189; Tribe, 1995: 393). Respondents were asked in Question 15 to provide an estimate of their travel costs, and in Question 47 to provide the first five letters of their post code. By obtaining post code information, travel distances and costs can be derived and used to provide an indication of the hidden value which respondents place on the site.

3.4.2 Questionnaire survey strategy

A non-probability quota sampling approach was adopted for the survey as it was deemed to be the most efficient method for a lone researcher to administer the survey and collect responses simultaneously. This approach involved the researcher asking the next available potential respondent if they would participate in the survey. This process was repeated until the researcher had collected their target quota for that particular day. For each survey day, sample quotas were set based on seasonal trail count data from the Ridge Ride and Challenge Trails at Haldon Forest Park for the previous twelve months (see Section 3.5.3).

At the outset it was decided that surveying should not follow the format of a ‘clip-board surveyor’ stood at the start of the trail. This was informed by discussions with other off-road cyclists and the researcher’s personal belief that off-road cyclists would be very unwilling to stop at the start of the trail when they had probably just spent at least ten minutes removing their bike from their car and getting themselves ready to ride. This approach would also have introduced considerable health and safety concerns as it would create a real possibility for a collision between the researcher and an off-road cyclist. It was therefore decided that a survey station should be set-up in the main hub area near to where all the trails start and finish, close to the bike hire, cafe, toilet, and ranger facilities. 1SW kindly supplied a 3 x 3 metre custom printed instant shelter. This enhanced the professional look of the survey station and underlined the authenticity of the research. It also created a focal point, attracting potential respondents who were intrigued as to why a bright blue tent had been erected in the hub area! In general it was found that respondents resting in the hub area were happy to spend at least five minutes completing the survey, with many choosing to sit at the picnic tables opposite the survey station, so they could complete the survey and enjoy refreshments from the café at the same time. In this respect, the survey strategy engaged with off-road cyclists in an unobtrusive manner which helped reduce the number of refusals and increase the effective response rate. The instant shelter also gave the appearance of a commercial trade stand rather than a survey station which further dispelled the image of the clip-board surveyor administering a time-consuming questionnaire.

In order to avoid problems of double-counting items such as car park fees and travel costs, the questionnaire was designed to be completed by one respondent where families and groups of respondents who had travelled to the site together were encountered. This was managed by the researcher asking potential respondents if they had travelled to the site as a group, and then requesting that one member of the group completes the questionnaire. It was deemed unfeasible to manage which group member would complete the survey using filters such as the respondent whose birthday was next, as this would overcomplicate the survey process. In addition, it was decided that respondents must be over the age of 16 to participate to avoid ethical problems associated with surveying children. Most groups contained someone who was over the age of 16 so this was not generally a problem, although it was found that the offered water bottle incentive proved particularly attractive to younger cyclists! This was usually remedied by the eligible respondent giving the water bottle to the younger cyclist. In addition, the CTC, The UK's National Cyclists' Organisation supported the research by providing reflective slap-wrap arm-bands to give away, which kept younger cyclists amused whilst an eligible group member completed the survey.

3.4.3 Respondent Incentives

In general, respondent incentives are known to increase survey response rates, and this has been found to be particularly true when monetary incentives are offered (Bryman, 2008: 221; Ruane, 2006: 142). Nevertheless, within the published studies of off-road cyclists there is no reported use of monetary or other incentives to increase response rates. One explanation as to why incentives may not have been used is that high response rates of between 70-90% were documented by studies which used onsite self-completion questionnaire surveys (see Fix and Loomis (1997); Taylor (2002); WCMBTA (2006). One of the major arguments against the use of incentives is that they can introduce respondent bias by attracting respondents who are only participating in order to gain the incentive. This criticism could also apply to off-road cycling studies which haven't used incentives, as high response rates could be a result of cyclists who have an active interest in the sport being very willing to take part, resulting in sample bias towards that respondent subgroup. Based on the evidence from previous studies it would appear that incentives are not required in order to achieve high response rates. Despite this observation it was decided that every effort should be made to maximise the response rate and that respondents should be rewarded for taking the time to complete the survey. Initially, a prize draw was considered, where all respondents would be given the opportunity to win a bike. After discussing this idea among off-road cycling colleagues it became apparent that a small free gift may be more attractive as respondents would directly benefit from taking part rather than just being given the chance to potentially benefit. Water bottles were identified as an attractive and useful gift which could also be used to raise awareness of 1SW. To this end, 1SW kindly supplied 500 custom printed water bottles to use as incentives.

At around the same time an opportunity to collaborate with Devon-based mountain bike clothing supplier Whackjob presented itself. Whackjob supply certified ethically-sourced and environmentally-sustainable mountain bike clothing direct to consumers via their website www.whackjob.co.uk. This opportunity for collaboration occurred after the company made an initial approach to the Recreation Manager at Haldon Forest Park regarding the possibility of sponsoring off-road cycling events. As a spin-out of that initial enquiry, Whackjob were offered the chance to become involved with the research through an enhanced incentive scheme. This resurrected the original prize draw idea and provided Whackjob with associated marketing opportunities in return for a donation of product to the prize draw. The final prize fund consisted of a first prize of a £500 mountain bike kindly supplied by 1SW, and three clothing prizes donated by Whackjob. In addition, Whackjob also supplied 500 discount vouchers offering respondents 20% off their clothing range via a unique 1SW online discount code; these were affixed to each free water bottle. Full terms and conditions were produced for the prize draw and made available to respondents upon request (see Appendix 7). A poster was also designed to promote the prize draw, and this was displayed on the survey station.

From analysing the information provided by Whackjob it was apparent that their own principles were closely aligned to those of the University and that the proposed collaboration did not represent a conflict of interest or divergence of ethos which would prevent the collaboration from taking place. Furthermore, it was not felt that the additional sponsorship would impair the objectivity of the research. This aspect was monitored during piloting, where it was found that the focus of attention was on the purpose of the survey and not the incentives, although these were generally appreciated. It should also be noted that several respondents chose to participate in the survey but declined the incentive offer (see Section 3.4.6). Similar attitudes towards the incentives were also observed during the main study. However, it cannot be ruled out that some respondents may have chosen to participate for the sole purpose of obtaining the incentive.

Prior to collaborating with Whackjob as an external partner, a due diligence exercise was conducted to ensure that any involvement would not contravene the University's ethics policy surrounding external collaboration. External collaboration is covered under Section 8 of the University of Exeter's Ethics Policy which states: 'The University of Exeter believes that External Relations and Knowledge transfer, and the resulting collaborations with partners can be a key determinant of success in research and teaching'. This statement could be applied directly to this project as the response rate to the questionnaire survey could potentially be improved by offering an incentive. In addition, by collaborating with Whackjob the study could demonstrate that it had 'impact' beyond the University. A further benefit of working with a Devon-based company with strong ethical and environmental objectives, was that the collaboration met an ethical aim of the University set out in Section 8.3 of its Ethics Policy, that: ‘Regionally, the University acts to contribute positively to the social cohesion and sustainability of its local and regional community’.

3.4.4 Questionnaire survey sub-sample definitions

Identifying respondent sub-groups is an important first step in understanding the characteristics of site users and the economic impact they have on a site and the wider economy. In the previous chapter the economic impact of tourism was described as a net economic change in host resident income as a result of tourist expenditure (Crompton, 2006). It is clear from this statement that there is a need to isolate tourist expenditure and hence tourists as a sub-sample from the overall sample population. However, this is not straightforward, as we must first define who we regard to be a tourist before we can identify their expenditure. For the purposes of this study the United Nations World Tourism Organisation visitor classifications are used, these are stated as:

> *A visitor is a traveller taking a trip to a main destination outside his/her usual environment, for less than a year, for any main purpose (business, leisure or other personal purpose) other than to be employed by a resident entity in the country or place visited. A visitor (domestic, inbound or outbound) is classified as a tourist (or overnight visitor), if his/her trip includes an overnight stay, or as a same-day visitor (or excursionist) otherwise.*
>
> UNWTO (2008:100).

This UNWTO definition was incorporated into Question 1 of the survey to filter respondents into either the holiday visitor or day visitor sub-group, making it relatively easy to identify day visitor and holiday visitor expenditure within the dataset. Further sub-division is required to clearly identify day visitor expenditure within the dataset. This is because it is necessary to sub-divide this group into respondents who reside within the 'local area' and those who reside outside of it. This distinction is critically important as it directly impacts on the magnitude of expenditure which can be attributed to the day visitor sub-group. Defining whose expenditure should be counted is central to the debate surrounding economic impact assessment. Resident spending is typically excluded from economic impact analysis as it does not represent new expenditure; it is simply a recycling of money which already exists in the economy, (Crompton, 1995: 26; Stynes, 2001: 5). This is based on the assumption that local resident expenditure is already recycled within the local economy on other goods and services, regardless of the tourist facility or event (Crompton, Lee and Shuster, 2001: 81; Gelan, 2003: 409) see section 2.3.2.

However, whilst this principle is widely accepted, there is no defined method within the literature for distinguishing between local residents and day visitors. The UNWTO defines the distinction between local residents and day visitors in terms of their 'usual environment'. This is the geographical area within which an individual conducts his/her regular life routines (UNWTO, 2008: 100). More specifically, this includes an individual's usual home location, their workplace and any other place which they visit on a regular and frequent basis. This definition is not limited to a specific geographical area as it includes places which may be a large distance away from the home location (UNWTO, 2008: 100). This leaves the definition open to interpretation, and it cannot be easily used to identify the geographical boundary between local residents and day visitors.

It is also unclear what the terms regular and frequent mean within this context. Taking these identified problems into account it was decided that local resident expenditure would not be filtered out at the questionnaire stage, but would instead be segregated once all of the data had been collected. Question 47 of the survey was designed for this purpose (See Appendix 6), as it asked respondents to provide the first five characters of their postcode or their country of origin if they resided outside the UK. Using these postcode data, it was possible to map where respondents travelled from and identify perimeter zones of visitors spreading out from the recreation site (see Section 4.2). By mapping where visitors have travelled from, a more informed judgement could be made regarding where the geographical boundary between local respondents and day visitors should be set. Some previous studies have used arbitrary travel time and distance figures as an alternative method for distinguishing between local and day visitors (Forestry Commission, 2008: 39). However, these can vary widely depending on the mode of transport and the infrastructure provision. For the purposes of this study it was decided that the sub division of day visitors should be derived from the data, and not from arbitrary time or distance proxies, which were considered to be a less robust solution to the problem. In addition to examining variations among 'traditional' day and holiday visitor sub-groups, the research also employs Cluster Analysis to derive visitor sub-groups from reported cycling preferences and behavioural characteristics this is detailed in Section 5.7).

3.4.5 Questionnaire survey piloting

Initial testing of the questionnaire involved obtaining feedback from colleagues to fine tune the content and design. This revised questionnaire (see Appendix 8) was then piloted at the Forest of Dean on Sunday 27th November 2011 in unseasonably warm and sunny conditions; Figures 3.2 and 3.3 provide an insight into the pilot survey process.

Figure 3.2 Forest of Dean Pilot survey

Source: Author

Figure 3.3 Forest of Dean Pilot Survey

Source: Author

In total 48 questionnaires were completed during the pilot producing a response rate of 96%. A simple survey station consisting of a folding table and three 1SW logo boards was set up close to the Pedalabikeaway cafe and bike shop so that respondents could be approached as they were entering or leaving the hub area. The survey station attracted a lot of attention from off-road cyclists who were curious to find out why it was there. Once informed of its purpose, off-road cyclists were very keen to get involved and the survey proved so popular that the entire quota was completed within two hours. Two potential respondents even asked if they could complete a questionnaire as the survey station was being packed up! A small scale trial of the incentive scheme was also conducted as part of the pilot in preparation for the main study. This trial did not include the prize draw incentive of the main study, but pilot respondents were given a free water bottle and discount voucher entitling them to 20% off the Whackjob clothing range. This proved extremely popular, although several respondents did decline the incentive and complete the questionnaire regardless. Verbal feedback from the respondents returning the completed questionnaires was overwhelmingly positive with only two negative comments being received regarding the length of the questionnaire.

A questionnaire structure analysis was conducted following the pilot study to identify areas of strength and, more importantly, weakness within the questionnaire. This involved analysing the responses from all 48 questionnaires to check if they had been completed in accordance with the question response and filter instructions. This analysis was conducted in three stages focusing only on the questionnaire structure and not the actual response content. First, the questionnaires were examined to identify missing data. Each question was coded using a binary system, where the number 1 indicated that the question had been completed and blanks represented missing data. For example, if one question was identified as being left blank by all of the respondents, and this was not a result of question filtering, this suggested that the question wording was unclear and was classed as an area of weakness that would need to be revised before the main study. Second, the questionnaires were examined to identify questions that had been completed, but had not been completed according to the stated instructions; for instance, respondents who had ticked more than one box when the instructions stated (*Please tick one box only)*. Questions which had not been completed correctly are shown in red on the structure analysis table (See Appendix 9). Question 40 stood out within the structure analysis as a problematic question, where only one respondent completed the question correctly. Question 40 originally asked respondents to provide the age and gender details of their group, including their own details, and record this in a table format. From the responses it became apparent that many mistook the age categories to be group size categories and as a result completed the question incorrectly. This emphasised the importance of the piloting process, as this particular question had not been identified during the planning or internal piloting stage as problematic.

Finally, the questionnaires were checked to see if respondents had been able to follow the filtering instructions correctly, these are highlighted in blue in Appendix 8. From the table it can be seen that most respondents were able to follow the filtering instructions with the exception of eight respondents who did not follow the initial filter after Question 1. For the main study the filter symbol **(➔ Q7)** used in the pilot was replaced (see Appendix 8) with the expanded instruction **(➔ Go to Question 7)** for the first question (see Appendix 6), in attempt to make the filtering more obvious to respondents. In addition, piloting enabled the researcher to develop best practice for administering the questionnaire survey. As a result, it was recognised that additional verbal explanation, (for example, *'... follow the arrows when applicable, so you only complete the questions which apply to you'*) may also help respondents navigate the questionnaire more effectively. During the main study this was found to minimise the types of errors which were identified during piloting. Prior to the main study, problems identified through the questionnaire structure analysis were amended and site specific questions e.g. Question 13 (see Appendix 6) were adjusted to reflect the main study location. These revisions were then further tested at Haldon Forest Park by a small group of off-road cyclists (n = 5) who had not participated in the pilot. These respondents were also excluded from taking part in the main study, and their responses were only used to check the effectiveness of the amendments. The changes were found to have addressed the key problem associated with Question 40 and no other usability issues were identified by the respondents. As a result it was decided that the questionnaire was fit for purpose and the main survey could begin according to the schedule outlined in Appendix 10.

3.5 Questionnaire survey sampling strategy

In Section 3.4.2 it was noted that a non-probability quota sampling approach was adopted as it was deemed to be the most efficient method for a lone researcher to administer the survey and collect responses simultaneously. In this section, that overall approach is deconstructed and the individual steps taken to calculate the sample size and develop the sampling strategy are set out in detail. Whilst a non-probability convenience sampling approach was used to recruit respondents to complete the survey, this approach was not used to determine the sample size (n) or the timing of the survey. Sample size was derived from background population estimates of the total number of annual visitors to Haldon Forest Park using the sample size formula shown in Section 3.5.1. This provided the most accurate data source for calculating the sample size, as no specific data relating to the annual number of off-road cyclists were available. This annual figure for all users was then divided according to the volume of cyclists recorded within each season by LineTop automatic trail counters located on the Ridge Ride and Challenge Trails during the previous twelve months (see Section

3.5.2). LineTop trail counters measure trail usage by recording the number of passes over a pressure slab which is buried beneath the trail surface. Data from the pressure slab is then transmitted to a hidden electronic logger which stores the information (LineTop Ltd, n.d.). Seasonal sampling was adopted following an evaluation of monthly usage patterns, annual variations in use between weekdays and weekend days, and annual variations in use throughout the day.

It was considered important to survey within each season in order to comprehensively examine visitor behaviour and use throughout the year. For the purposes of determining sample size, annual visitor data were chosen in preference to trail count data. This was used because trail count data were only available for two out of the three official off-road trails, this meant that it would not take into account cyclists riding the Family Cycle Trail, skills-park, pump track and unofficial forest trails. Furthermore, trail counters only record the number of times a trail is ridden; therefore it was not possible to distinguish between multiple cyclists or a cyclist riding multiple laps. They also do not provide any information regarding cyclists riding multiple trails. However, trail count data provided an invaluable tool for allocating when sampling should take place. The analysis of annual trail usage patterns is a major strength of this survey, and without these data it would not have been possible to survey respondents proportionately, meaning that the survey would be unlikely to capture the seasonal patterns of trail use at the site.

Convenience sampling has been widely used within published studies of mountain bikers (Siderelis and Moore, 1995; Fix and Loomis, 1998; Chakraborty and Keith, 2000; Morey Buchanan and Waldman, 2002). A key difference between this study and previous published examples is that this study used secondary visitor number and automatic count data as a tool to improve the external validity of the adopted non-probability sampling approach. Furthermore, whilst previous studies by Cope et al (1998) and Lumsden et al (2004) have used automatic counters to obtain annual usage figures, neither example used count data as a tool for proportionally sampling respondents according to annual usage patterns.

3.5.1 Sample size calculation

Sample size is a function of the following factors: background population size, sampling error, the desired confidence level, the degree of variability, time, and cost (Israel, 1992, 2; Bryman, 2008 179-182). A number of approaches can be taken to determine the appropriate sample size in relation to the background population, these include conducting a census, using published tables, adopting sample sizes from similar studies, and using sample formulas (Israel, 1992, 2).

A simplified formula to calculate sample size as a proportion of the background population was chosen for this study. This approach was taken for the following reasons. First, annual visitor number estimates were available for the site. For the purposes of the calculation annual visitor number estimates were used as a proxy for the background population. It should be noted that these estimates relate to all site visitors and not just off-road cyclists, as the number of off-road cyclists was not known prior to the study. Second, the statistical convention of using the 95% confidence level was deemed suitable; and finally, population variability was accounted for by using the maximum proportion of variability within the formula. This was used because the distribution of off-road cyclists within the background population was unknown and therefore it decided that sample size should be based on the maximum variability which would produce a more conservative sample size estimate (Israel, 1992, 2). Sample size was calculated using Yamane's (1973: 727) simplified formula (See Equation 3.1).

Equation 3.1 Minimum sample size calculation

$$n = \frac{N}{1 + N(e)^2}$$

Where:
n = sample size
N = estimated number of annual visitors
e = the stated level of precision (maximum variability within population = .5)
(95% confidence levels are assumed for the stated equation)

In the equation below, N is replaced with the predicted number of annual visitors for 2011 / 12 (see Table 3.3). When calculated, the equation produces a minimum sample size figure of 399.1 (400).

$$n = \frac{182{,}707}{1 + 182{,}707(.05)^2} = \frac{182{,}707}{457.8} = 399.1$$

Source: Adapted from Yamane (1973: 727)

Visitor numbers are reported on a monthly basis by the site manager. These estimates are calculated according to a stated method within the Haldon Forest Centre Plan, which uses daily car park income data collected by the forest rangers to predict the annual number of visitors. Table 3.3 shows the predicted number of future visitors and corresponding car-park income. These figures are derived from observed longitudinal income patterns, and it is estimated by the site management that visitor numbers will increase by 10% for each subsequent financial year.

Table 3.3 Haldon Forest Park estimated income and visitor numbers 2010-2014

Financial Year	**Income £**	**Estimated Total Number of Visitors**
2010/11	89,300 (Actual)	166,089
2011/12	115,418 (Predicted)	182,707
2012/13	151,810 (Predicted)	200,967
2013/14	213,343 (Predicted)	221,064

Source: (S. Lees 2011, pers. comm., 25 Oct.).

This method estimates the total number of visitors by dividing estimated income by the average car park fee (£2), to derive the estimated number of paying cars. This figure is then multiplied by three to obtain the average number of visitors per car. It should be noted that this figure is based on ranger observations and not derived from an empirical traffic study at the site. A value of 14% is then added to this figure to account for the estimated number of discovery pass holders (annual parking permit holders). A further allowance of 10% is also added to account for the estimated number of non-paying visitors and visitors who may park at other car park locations around the forest (Mamhead, Harcombe and Gateways) where no charge is in effect. These additional allowances are derived from actual daily car park checks conducted by the site rangers. Whilst it was not possible to examine these assumptions during the study, the presented visitor estimates represented the only source of data on which to base the sample size calculation. Moreover, changes in the predicted number of visitors do not adversely affect the sample size formula once the population figure exceeds 50,000.

Therefore, the formula provides a margin of error for any inadequacies in the visitor number estimates.

To mitigate the possibility of the survey failing to meet the calculated minimum sample number required, it was decided that an additional 25% sample margin would be collected, thus giving a final sample size of 500. It is common practice for researchers to add 10% to minimum sample sizes to counter the possibility of not being able to collect sufficient responses within the time and resources available. For postal surveys it may be necessary to increase this to 30% in order to meet the required minimum number of responses (Israel, 1992: 5). During piloting the average daily target quota (20) was over-sampled by 150% in an attempt to highlight any potential issues of non-response and to check that it would be realistic to collect the target quotas within the available time. The pilot study achieved a response rate of 97% within 2 hours, and as a result of this testing it was decided that it would not be necessary to increase the contingency level above 25%. As a final safeguard, contingency provision was built into the survey schedule in the form of additional survey days which could be used if target quotas were not met. Further measures were also taken to make the survey schedule 'weather resistant', mitigating the possibility of scheduled surveying being cancelled due to environmental factors (see Section 3.5.9).

3.5.2 Sample quota allocation

The second stage of developing the survey schedule involved allocating the sample throughout the survey period. This involved analysing automatic trail count data to first examine seasonal and monthly usage patterns. This was used to select a survey month within each season; this process is described in Sections 3.5.3 and 3.5.4. Following, the selection of the survey month, annual usage variations between weekdays and weekend days were examined to determine the ratio of weekend to weekday surveys which should take place (Section 3.5.6). Finally, daily patterns of trail use were analysed for each season, this was used to identify the time window in which the survey should be conducted and is described in Section 3.5.8.

3.5.3 Seasonal sample quota breakdown

Seasonal sample quotas (see Table 3.4) were calculated by applying the trail usage proportions for each season (expressed as a percentage of total annual trail use), to the total survey sample size (n = 500) calculated in Section 3.5.1. Seasonal trail usage figures were obtained by combining automatic trail count data from the Ridge Ride and Challenge trails, and then identifying the proportions of use within each season.

Table 3.4 Seasonal usage proportions and seasonal sample quota breakdown

Seasons	Seasonal Totals	Percentage	Seasonal Sample Quotas
Winter 2010	8,879	13%	65*
Spring 2011	22,598	32%	160
Summer 2011	24,851	36%	180
Autumn 2010	13,426	19%	95
Annual	**69,754**	**100%**	**500**

*Note: to provide an even quota for each of the winter survey days, the sample quota was increased to 66 for the study (see Table 3.9)

Source: Author

For the purposes of allocating the sample the following assumption was made regarding trail use. Each recorded count on the two trails was taken to represent an individual riding the trail once. This represents the theoretical maximum number of off-road cyclists who could have ridden either the Ridge Ride or Challenge Trail within the time period. However, this is not a true representation, as the number of hits do not directly equate to the number of off-road cyclists riding the trails within each season. This is because the trail counters cannot distinguish between two riders riding a trail once or one rider riding a trail twice. Without these data it is very difficult to place a figure on the total annual number of cyclists who ride at Haldon Forest Park. Question 13 in the survey was designed to address this lack of data by recording which trails individuals ride and the number of times they ride them. In Section 4.5.1 these data are combined with automatic usage counts to produce an estimate of the total annual volume of trail use within the forest. A further justification for using the theoretical maximum is that the trail count data only accounts for two trails and does not include individuals who ride the Discovery Trail, Skills Park, Pump Track, or the bridleways and unofficial wild trails.

3.5.4 Monthly sample quota breakdown

Seasonal sample quotas were then broken down into monthly quota totals by analysing trail use for the months within each season to reveal any usage variations. Trail count data for each month were then calculated as a proportion of the total seasonal use, the calculated percentages were then applied to the seasonal sample total to derive the monthly sample quotas shown in Table 3.5.

Table 3.5 Monthly quota breakdown 2010/2011

Months	Trail Counts (Sensor Passes)	Percentage	Monthly Sample Quota
December	1398	15.7	10
January	3753	42.3	28
February	3728	42.0	27
Winter Total	**8879**	**100**	**65**
March	5531	24.5	39
April	8966	40.0	64
May	8101	35.8	57
Spring Total	**22,598**	**100**	**160**
June	6292	25.3	46
July	8214	33.0	59
August	10345	42.0	75
Summer Total	**24,851**	**100.3**	**180**
September	2802	20.9	20
October	6653	49.6	47
November	3971	29.6	28
Autumn Total	**13,426**	**100.0**	**95**

Source: Author

Through this process it was determined that it would not be practical to conduct surveying within each month due to the small samples generated when these data were reduced to a monthly level. The December quota illustrates this point, as it was apparent that it would not have been efficient to collect just 10 responses, and that it was unpractical to further stratify this number to attempt to identify intra-weekly variations. Instead the monthly quota breakdowns were used to inform the selection of a survey month for each season. From Table 3.5 it can be seen that trail usage is highest in the middle months of each season, with the exception of summer when August represents the highest trail use. For consistency it was decided that surveying should take place within the middle months of each season, regardless of the identified summer variation.

3.5.5 Week day / weekend trail usage split calculation

The next stage of analysis was designed to identify any overall variation between week and weekend trail use. This was an important consideration as it directly influenced when the survey would need to take place within each selected month in order for it to be representative of the daily usage patterns. Overall day of the week trail count data were used to calculate the daily usage splits; these are shown in Table 3.6. Annual data was used for this purpose as it was not possible to disaggregate the dataset to extract daily splits for each of the survey months. From Table 3.6 it was calculated that mean trail use was 11% for week days and 22% for weekends. This showed that there was a 2:1 usage split between weekends and week days, with twice as many cyclists visiting Haldon Forest Park on a weekend day than on a week day. The table also shows that usage does not vary greatly between week days or between weekend days.

Table 3.6 Annual (2010/2011) trail usage split by day of the week

Day	**Overall Day of the Week Totals (Sensor Passes)**	**Percentage**
Monday	7187	10.3
Tuesday	7979	11.4
Wednesday	7699	11.0
Thursday	7635	11.0
Friday	8833	12.7
Saturday	14,694	21.0
Sunday	15,727	22.6
Total	**69,754**	**100**

Source: Author analysis of LineTop trail usage counts

3.5.6 Seasonal week day / weekend sample quota split calculations

Using the mean overall weekend / weekday usage split figures calculated in Section 3.5.5, the weekend to week day split ratio was applied to the seasonal sample quotas (see Table 3.7). This specified the sample quota split between week days and weekends for each season. To calculate the estimated number of survey days required, the daily quota target was set at approximately 20 surveys per day (see Table 3.7). This target was informed by the response rate achieved during the pilot study (see Section 3.4.6) and the researcher's previous experience of conducting survey work in a consultancy capacity.

Table 3.7 Seasonal weekend / week day sample quota split

Season	Sample Quota	2:1 Split	Weekend Survey Days	Week Day Survey Days
Winter	65	52:26	2	1
Spring	160	132:66	5 (6)	3
Summer	180	72:36	6	3
Autumn	95	79:39	3	2

Source: Author calculations

3.5.7 Trail usage analysis for selected seasonal survey months

Having calculated the weekend / weekday usage split for the sample quotas, the combined monthly usage volumes for the Ridge Ride and Challenge Trails were analysed and plotted on bar graphs for the selected survey months, these are shown in Appendix 11. The graphs were used as a selection tool for allocating the survey days calculated in Section 3.5.6 within each month. It should be noted that the graphs only served as a guide for allocating the survey days as they only provided data for a single year, which was insufficient for determining any long-term usage patterns. However, they did serve to highlight spikes in the data and anomalies which required further investigation. For example, spikes were identified around school holidays which informed the allocation of survey days prior to and during these times. When choosing the survey days care was taken to ensure that the strategy incorporated every day of the week at least once. These were then plotted onto the survey schedule shown in Appendix 10.

3.5.8 Time of day trail usage analysis

The final stage of analysis involved understanding the daily patterns of trail use within each season. Hourly use data for the Ridge Ride and Challenge Trail were combined and analysed for each season to identify the optimum time frame for capturing data from off-road cyclists. For each season hourly totals were analysed to identify the proportion of visitors who visit the site during the official site opening times, this can be seen in Table 3.8.

Table 3.8 Percentage of trail use during car park opening hours, within each season

Season	**Month**	**Trail Counts (Sensor Passes %)**	**Time Window**
Winter 2010	December	93.9%	08.30 – 17.00
	January	90.2%	08.30 – 17.00
	February	89.6%	08.30 – 17.00
Spring 2011	March	86.1%	08.30 – 17.00
	April	95.1%	08.30 – 19.00
	May	93.8%	08.30 – 19.00
Summer 2011	June	90.1%	08.30 – 19.00
	July	84.9%	08.30 – 19.00
	August	90.9%	08.30 – 19.00
Autumn 2010	September	92.6%	08.30 – 19.00
	October	87.0%	08.30 – 17.00
	November	83.6%	08.30 – 17.00

Source: Author analysis of daily LineTop trail usage counts

This analysis was conducted because automatic count data for the Ridge Ride and Challenge trails showed that cyclists used the trails outside of the official opening hours. Therefore it was necessary to quantify this use, and understand the potential limitations associated with only conducting the survey when the site is officially open. However, it was found that site use remains relatively constant throughout the year and is not affected by factors such as an in increase in out of hours cycling during the summer months when there are more hours of daylight, or from individuals participating in night riding during the winter months. From *Table 3.8*Table 3.8 it can be calculated that, 88.4% of off-road cyclists visit the site during the official winter site opening hours of (08.30 – 17.00); and that 91.2% of off-road cyclists visit the site during the official summer opening hours of (08.30-19.00). Therefore by conducting the survey during these times it was known that the survey schedule would mirror when the majority of trail use takes place.

3.5.9 Questionnaire survey schedule

The survey schedule table is included in Appendix 10. The schedule details the allocated response quotas for each day within each season; these are shown as blue blocks within the schedule. Response rates were carefully monitored using this schedule to ensure that the target quotas were met. With the exception of reallocating surveying on the 14th July to the 28th July 2012, and conducting additional sampling on the 29th October 2012, the planned schedule was followed to the letter.

A key factor in the success of the survey schedule was that it was designed to be ‘weather resistant’. By weatherproofing the survey the allocated survey days were not dependant on favourable weather conditions and were considered fixed. The ability to survey in all weathers was considered essential, as site use is largely unaffected by weather conditions. The ninth of October 2012 was a case in point, whilst heavy rain and strong winds reduced visitor numbers dramatically; it was observed that organised school groups were still using the site for off-road cycling. Whilst only one response was obtained during the survey period and surveying was eventually abandoned, this use would not have been observed if surveying had been cancelled.

During the design of the sampling strategy it was decided that the non-probability sampling approach would adhere strictly to the calculated quotas and no over-sampling would be conducted onsite. Over sampling is sometimes incorporated into sampling strategies to ensure that sufficient useable data are collected in order to conduct meaningful statistical analysis. Whilst this can be a sensible approach it does not always represent an efficient use of resources. This is because additional time and resources are usually required to collect the additional data, and it may also be necessary to randomly discard surplus data in order to make the analysis manageable. Efficient resource use becomes even more important when the data are collected by a lone researcher. Furthermore, oversampling to mitigate against unusable data was not considered necessary because a sample buffer had already been included within the sample size calculation (see Section 3.5.1). Over-sampling beyond the quota cut-offs would also have distorted the proportional quota sampling approach taken,

3.5.10 Questionnaire survey sampling summary

Adopting a highly targeted approach proved extremely effective in maximising the quality of the collected data and ensuring that minimum survey quotas were exceeded. Table 3.9 summarises the seasonal survey quotas and valid responses for each season.

Table 3.9 Seasonal survey quota response rates

Season	Month	No. of survey days	Contingency Days Used	Min Quota	Max Quota	Actual	Valid	Valid Responses %
Winter 2012	*January*	*3*	*0*	*52*	*66*	66	64	97%
Spring 2012	*April*	*8*	*0*	*128*	*160*	151	151	94%
Summer 2012	*July*	*9*	*0*	*144*	*180*	186	176	95%
Autumn 2012	*October*	*5*	*1*	*76*	*95*	95	95	100%
Total		25	0	400	501	498	486	97%

Source: Author

Overall the survey attained valid responses equal to 97% of the total quota, and minimum sample quotas were exceeded for all seasons. Achieving responses above the minimum target also ensured that, when analysed, the dataset would exceed the minimum sample sizes required for the conducted statistical analyses.

3.6 Questionnaire data preparation: entry and quality assurance

In Section 3.2.2 the process of matching the methods of collecting data to the research objectives were described. During the design of the questionnaire the process was repeated to match the questions to the appropriate methods of analysis. As Bryman (2008: 314) contends ‘you cannot apply just any technique to any variable. Techniques must be matched to the types of variables you have created through your research’.

The survey instrument was split between, 38 closed and 13 open questions, almost entirely measured on nominal or ordinal scales. In general terms nominal and ordinal variables do not meet the criteria for analysis using parametric statistics (Wheater and Cook, 2000: 56; Field 2009: 133), for this reason non-parametric tests were used during analysis. Analysis was mainly conducted using the SPSS 18 (Statistical Package for Social Sciences) software program. However, other forms of analysis were also employed to address the stated research objectives. MapInfo GIS (Geographical Information Systems) software was used in conjunction with SPSS data to calculate the economic value associated with visiting the field site.

Analysis involved a range of statistics, but primarily focused on univariate and multivariate techniques which were specifically devised to address the research objectives. Due to this focused approach, exploratory testing such as searching for bivariate relationships was kept to a minimum. Univariate analysis typically focused on analysing frequencies and central tendency for aspects such as respondent expenditure, whilst multivariate analysis using cluster analysis was reserved for segmenting respondents according to their off-road cycling preferences and behaviour. Statistical significance for conducted tests was reported at 95% (0.05) and 99% (0.01) confidence levels where appropriate.

The high number of valid responses presented in Table 3.9 reflect the steps taken to assure the quality of the collected data, this reduced the time required to conduct quality checks, and simplified the coding process. Prior to analysis, a period of data preparation was performed. This broadly followed the format shown in Table 3.10.

Table 3.10 Data preparation considerations

	Data preparation Questions
1	Are non-response errors within acceptable limits?
2	Does the questionnaire meet the basic respondent requirements?
3	Are the responses in the questionnaire complete?
4	Are they consistent and clear?
5	Should low quality questionnaires be replaced or discarded?
6	How should the database be organised?
7	How are the questions coded?
8	How is the transcribing process organised?

Source: Adapted from Mazzochi (2008: 78)

The collected questionnaires were first checked by hand for completion. In order for these data to be included in the analysis each questionnaire had to meet the following criteria: First, the information had to be legible, second, the majority of each section had to be completed and lastly it had to contain key personal demographic information e.g. gender and age. The qualifying questionnaires were then entered manually into SPSS 18 using numeric codes for each variable and for specific circumstances such as filter questions, missing data and question errors. Question errors typically related to entering more than one answer within a single response question. In an attempt to reduce coding input errors, the author used coded transparencies instead of a separate codebook which were overlaid onto each questionnaire. After entering the data, cross-checking was conducted to identify errors. Particular attention was paid to ensuring missing data had been correctly coded and that valid results were returned for trial cross-tabulation and frequency tests. Some re-coding was also conducted; this was largely restricted to Q51 which was concerned with identifying the occupation of the main wage earner. This question was re-coded to reflect National Readership Survey (NRS) socio-economic grades for occupation (National Readership Survey, n.d.).

Data analysis was broadly conducted in order of the stated objectives; this order also reflects the sequence of interaction between the respondent and the site. The first stage of analysis involved using MapInfo GIS to create a regional map showing the home location of the surveyed respondents. Straight-line and road distances were then measured from each respondent postcode centroid to the field site. A proxy value was then used to calculate the cost of the site visit. The second stage of analysis involved analysing expenditure for the different visitor groups. This was conducted using SPSS and was combined with the travel cost data to produce total expenditure estimates for different visitor groups, addressing objective three. These are discussed in Chapter 4.

In contrast, the fourth research objective (see Section 3.2.2) is focused on identifying variations among the surveyed respondents. Cluster Analysis was identified as an appropriate method for investigating this aspect as its purpose closely matches that of objective four. Cluster Analysis refers to a flexible series of multivariate techniques which are concerned with classifying data into groups (Norušis, 2012: 375). Cluster Analysis has the primary purpose of grouping articles based on their individual characteristics (Hair et al et al, 1998: 473). The overall aim of the clustering process is to produce clusters which are very similar internally (high internal homogeneity), whilst being very different externally (high external heterogeneity) (Hair et al, 1998: 473). It is these two drivers which determine the formation of the cluster groups.

Furthermore, it was identified in Section 3.2.2 that none of the previous off-road cycling studies (see Section 3.2) have used the technique to comprehensively examine the consumer behaviour of off-road cyclists. However, it is important to note that whilst this study does not represent the first application of the technique within an off-road cycling context. The sole previous example (Mundet and Coenders, 2010), only used the technique to classify visitors according to their use of cycling infrastructure and made no attempt to identify different user groups based on their consumer behaviour or expenditure. Therefore, the unique application of the technique within this study represents a methodological advance within the context of off-road cycling research. Chapter 5 provides a detailed discussion of how the technique was applied to the dataset together with the cluster results.

3.7 Using interviews to investigate the role of purpose-built off-road cycling sites

3.7.1 Selecting the interview approach

In Section 3.2.2 it was explained that the large-scale questionnaire survey used as the primary method for collecting data, would be complemented by a smaller qualitative survey to gain a deeper understanding of visitor behaviour and address research objectives four and five (see Table 3.2). The semi-structured interview was chosen as the appropriate qualitative method to gain this deeper understanding of visitor behaviour, and to investigate how off-road cyclists interact with, and value purpose built off-road cycling sites.

3.7.2 Interview survey design and piloting

The interview survey was designed according to a ‘qualitative follows quantitative’ mixed methods approach, whereby the qualitative instrument is informed by the preceding quantitative survey, thus enabling the qualitative study to capitalise on the existing quantitative data (Barbour, 2008: 156). For this study, the questionnaire instrument was also used as a recruitment tool for the interview survey. This approach utilised an ‘opt-in box’ at the end of the questionnaire to ask respondents if they would be willing to participate in a future follow-up interview. Interested respondents were then asked to leave their name and a contact e-mail address or phone number in a space provided (see Appendix 6). A confidentiality statement was also included to inform respondents that any future participation would be voluntary, their details would be kept private and confidential, and that their anonymity would be maintained in the final report.

The interview schedule (see Appendix 12) was formed around four key topic areas contained within the questionnaire instrument. These were: ‘Your off-road cycling experience’, ‘Purpose-built off-road cycle trails as public recreation facilities’, ‘Haldon Forest Park off-road cycling provision’, and ‘Your visit to the South West’ (holiday visitors only). These broad headings provided the starting point for the development of the interview questions. The decision to use the same topic headings as those contained within the questionnaire, was driven by a desire to maintain consistency between the questionnaire and interview schedule. This was considered important, as the interview data were intended to complement the comprehensive visitor behaviour data obtained from the questionnaire survey. More specifically this dual approach was identified as being the most appropriate method for addressing the fourth and fifth research objectives (see Section 3.2.2). Following initial drafting of the interview questions, the survey schedule was further revised through internal piloting and consultation with colleagues, which helped improve the question wording. The final schedule (see Appendix 12) was then submitted and subsequently granted ethical approval for use by the university’s ethics officer.

3.7.3 Interview sampling strategy

Initially a purposive sampling approach of visitor groups derived from Cluster Analysis data (see Section 5.7) was considered. Purposive sampling selects respondents according to observed characteristics which may influence their perceptions and experience (Barbour, 2008: 52). Whilst this approach would have enabled the study to examine specific cluster traits in greater detail, the method was rejected on the grounds that it would not have been possible within the project timescale to interview more than two members from each cluster, which was considered insufficient to identify meaningful differences both within and between the cluster groups. Due to the limitations in recruiting respondents based on their off-road cycling characteristics, it was decided that survey should instead attempt to recruit respondents from within each of the gender and age categories. This simplified approach was identified as the most efficient way of selecting respondents to obtain a range of views within the project timescale.

Respondents who expressed an interest in taking part in a follow-up interview were selected by randomly sorting their cases according to their age category using the random number generator function within Microsoft Excel. Once sorted, male and female respondents from the six age categories were then selected in sequential order from the newly compiled lists and invited to take part in either a face to face or telephone interview. The invitation reminded respondents of the purpose of the research and stated that they were being contacted following their participation in the Haldon Forest Park off-road cyclist questionnaire survey. During this initial invitation all potential interviewees were also advised that the interviews would last approximately 30 minutes and that participation was voluntary. Upon receiving a response from a respondent, consenting participants (informed consent was provided by e-mail in all cases) were provided with further information regarding the interview process. This information explained that the interview would be recorded, but that individual anonymity would be preserved by the use of pseudonyms within the research findings and that all recordings would be transcribed by the author and would be stored on a password protected computer. Respondents were also informed that they could withdraw from the interview at anytime for whatever reason and that they would not receive any financial payment for their participation.

In total 227 from the 486 (47%) respondents expressed an interest in taking part in a follow-up interview. It was the intention to obtain approximately two interviews from each age group, equating to around twelve interviews in total. This sample size was considered sufficiently large enough to obtain a range of views within the project timescale. Moreover, the interview questions were closely linked to the comprehensive large-scale questionnaire, which had already provided considerable insight into respondent behaviour. For this reason it was considered appropriate to employ a smaller-scale interview approach which would complement the quantitative dataset. Appropriate sample sizes for qualitative research are largely determined by the concept of theoretical saturation, the point at which no new or relevant data are generated from the survey process (Bryman, 2008: 416; Flick, 1998: 66; Creswell, 1998: 56). From the outset it was impossible to know how many interviews would be required to achieve saturation; moreover the concept of saturation is also subjective, as it is always possible to find new aspects of enquiry (Strauss and Corbin, 1998: 136). In an attempt to answer the question of how many interviews are needed? Kvale and Brinkmann (2009: 113) state that 'In common interview studies the number of interviews tends to be around 15±10.' The authors hypothesise that this range may reflect general time and resource constraints for conducting research and also the law of diminishing returns with regards to new knowledge generation. Previous studies have also shown that saturation can be achieved with samples as small as twelve, although this is dependent on the extent of sample homogeneity and scope of the study (Bryman, 2008: 462).

Given the high response rate and levels of interest exhibited by respondents during the questionnaire survey, it was decided first of all that respondents would be contacted in batches in case a similarly high response rate was observed. Invitations were initially sent to male and female respondents from each age category in two batches. Respondents were given seven days to respond to the invite and after 50 invitations only three respondents had replied. Of these respondents only two agreed to participate. For the participating respondents, one interview was conducted face-to-face at the Ridge Café at Haldon Forest Park and the other via telephone, both interviews lasted approximately 20 minutes. The low response rate to these initial invitations contrasted sharply with the high response rate to the questionnaire survey. Whilst it may have been possible to achieve the sample quota by continuing to contact potential interviewees; time constraints meant that this approach may not guarantee a sufficient response rate within the remaining timeframe. Furthermore, the approach failed to recruit respondents from all age categories. For example, the 65+ category contained only two potential respondents, both of whom did not respond to the interview invitation.

To address this significant problem, the decision was taken to abandon selecting respondents from each of the gender and age categories, and instead take a more direct approach by attempting to conduct a series of interviews at Haldon Forest Park using a convenience sampling frame, in the manner of the original survey. Whilst onsite surveying offered a direct means of accessing potential respondents, the approach presented some practical challenges. First, conducting interviews outside in a public place raised issues regarding respondent privacy, and how this could be maintained when conducting interviews. Second, inclement weather conditions and background noise had the potential to adversely affect the ability of the researcher to conduct and record the interviews. The majority of the identified problems were mitigated by erecting the survey tent described in Section 3.4.3, to provide weatherproofing and a degree of privacy to respondents.

Onsite interviewing was conducted on Sunday 3rd February 2013 in cold dry conditions during the winter site opening times (08.30-17.00). Conducting the onsite interviews, despite the identified potential limitations proved straightforward. Good weather conditions meant that the interviews were not confined to the survey tent and most respondents were happy to discuss their views whilst sat at the picnic tables outside the Ridge Café. Despite conducting the interviews in the busy hub area, the interview recordings were not adversely affected by background noise. However, the field interviews were generally shorter than the two previously conducted interviews, with the majority lasting between 5-10 minutes. This was largely due to the cold weather conditions, which understandably made respondents less inclined to talk at length about their off-road cycling experiences.

Due to the short nature of the interviews, it was decided that respondent validation sometimes termed 'member checking' was not required. Respondent validation is a process by which respondents can comment on the transcribed interview data; it also demonstrates good correspondence between the researcher and respondent (Bryman, 2008: 377). Whilst respondent validation was not used in this case, respondents were informed of the research purpose and that the interview would be recorded. All interviewees gave their verbal consent and no respondents expressed any concerns regarding the recording of their responses. Due to the short, instant nature of the interviews, written consent was not sought from respondents as this would have involved obtaining further information about them, such as their name. This would have required further assurances to be given that the information would not be used for other purposes and would be kept separate from their responses. Furthermore, it would have increased the length of the research encounter which may have dissuaded individuals from participating.

Table 3.11 Demographic characteristics of interview respondents

Code	Age	Gender	Interview type
Respondent A	45-54	Female	Purposive face-to-face
Respondent B	45-54	Male	Purposive telephone
Respondent C	35-44	Male	Convenience onsite
Respondent D	35-44	Male	Convenience onsite
Respondent E	55-64	Male	Convenience onsite
Respondent F	45-54	Male	Convenience onsite
Respondent G	35-44	Male	Convenience onsite
Respondents H	35-44	Male	Convenience onsite
Respondent I	25-34	Female	Convenience onsite
Respondents J	55-64	Female	Convenience onsite
Respondent K	25-34	Male	Convenience onsite

Source: Author

Combining the convenience onsite interviews with the two purposive interviews produced an overall sample size of eleven. For the purposive interviews, age information was obtained from the questionnaire data, and for the onsite interviews, age categories were estimated by the author. The demographic characteristics of the interview respondents can be seen in Table 3.11.

Table 3.12 presents the age demographics for both the questionnaire and interview surveys. Overall, the interview response rate was found to broadly reflect the male/female (80/20) response split observed during the questionnaire survey. Age distribution was found to be between 4-5% of the questionnaire figures for the 25-34, 35-44 and 45-54 categories. The 55-64 age category stands out as an exception with a percentage almost five times higher than the questionnaire survey. The interviews also failed to capture any responses from individuals belonging to the 16-24 and 65+ age categories. However, the comparisons presented in Table 3.12 only provide a superficial point of reference due to the unknown demographic composition of the background population and the differences in sample size and strategy.

Table 3.12 Age demographics for questionnaire and interview surveys

Age Category	**Questionnaire Proportion of respondents (%)**	**Interview Proportion of respondents (%)**
16-24	7.7	0
25-34	23.7	18.2
35-44	40.7	36.4
45-54	23.3	27.3
55-64	3.7	18.2
65+	0.9	0

Source: Author

Given the change from purposive to convenience sampling, the relatively small final sample size, and the single time reference for the onsite interviews, the responses cannot be considered to be representative of all off-road cyclists at Haldon Forest Park. Moreover, the interview schedule cannot pretend to encompass every factor which influences off-road cycling behaviour, or how an individual values their experience. Despite these limitations, the interviews provide a valuable insight into the visitor experience which is difficult to obtain through the questionnaire study. Overall, it is believed that the conducted interviews animate the research and provide a ‘snapshot’ of the off-road cycling experience at Haldon Forest Park from a variety of perspectives. Furthermore, the interviews were designed to build on the knowledge obtained from questionnaire survey and not be exhaustive in their own (exclusive) rights. Key Findings from the interviews are presented and discussed in chapters five, and six.

3.7.4 Methods of data analysis: interview data

Selecting an appropriate method for analysing qualitative data requires careful consideration. Qualitative research typically generates large quantities of unstructured data which can prove time consuming and difficult to analyse. Moreover, in contrast to the analysis of quantitative data, there are no rigid conventions governing how qualitative data should be analysed (Bryman, 2008: 538). Instead analysis of qualitative data relies on the researcher attaining a deep understanding of the available methods, and developing what Silverman (2011: 274) describes as ‘a qualitative analytic attitude’.

Due to the relatively short nature of the collected interviews, all recordings were transcribed in full by the author prior to analysis. These were then analysed using a form of thematic analysis termed Framework Analysis. Framework Analysis is a widely used technique developed by the National Centre for Social Research in the 1980s (National Centre for Social Research, n.d.). The technique provides a systematic method for organising qualitative data using a matrix grid system to identify patterns (Barbour, 2008: 216).

In contrast to other qualitative research methods such as Grounded Theory, Framework Analysis places emphasis on summarising the data into themes rather than breaking the data down into a series of codes (National Centre for Social Research, n.d.). Using this method, a matrix grid of cases and themes is constructed in a manner similar to a crosstabulation output in SPSS (Bryman, 2008: 554). Here primary themes were constructed around the four key topic areas contained within the interview schedule: 'Your off-road cycling experience', 'Purpose-built off-road cycle trails as public recreation facilities', 'Haldon Forest Park off-road cycling provision', and 'Your visit to the South West' (holiday visitors only) (see Appendix 6). For the purposes of this study, thematic analysis was considered to be the most appropriate method for interpreting and relating the interview data back to the findings from the questionnaire survey. The main advantage of this approach over coding alternatives was that it enabled identified themes to be readily organised within the questionnaire headings, providing a consistent link between the interview schedule and questionnaire instrument. This consistency was identified as being important for ensuring that both instruments could be used to address research objectives four and five (see Section 3.7.2).

During analysis each transcript was read and then re-read carefully within the context of the each primary theme. These provided a starting point for comparing and contrasting the transcriptions. Annotations were used to highlight similarities and differences between the cases and to identify sub-themes which emerged from the transcripts. The concept of constant comparison is central to all qualitative analysis methods, and describes the process of systematically examining and re-examining the content and context of what has been said (Barbour, 2008: 217). By constantly comparing the transcripts, occurrences within the data were assigned into themes and sub-themes within the Framework Analysis matrix. The completed matrix shown in Appendix 13 provides a visual representation of the dataset, and highlights the reoccurring theme patterns identified.

For the purposes of this study, it was decided that detailed enumerative analysis would not be conducted due to the limited number of interview transcripts contained within the sample. Analysing word and phrase frequencies in this manner assumes a relationship between these data and the importance assigned to them by the interviewee. Critics of this type of 'quantitization' point out that it blurs the boundaries between qualitative and quantitative research, and that the results are imprecise (Bryman, 2008: 598) and potentially fallacious. Despite these drawbacks, identifying the frequency of occurrences within the data can be a useful tool for synthesising transcripts and allocating the data into themes, particularly when dealing with large numbers of transcripts.

The use of computer assisted (CAQDAS) analysis programs such as NVivo, which feature advanced search functions for qualitative coding and identifying transcript themes was also rejected on the grounds of sample size. Instead, the Framework Analysis matrix was constructed by manually allocating extracts from each case into theme boxes within a Microsoft Word table. A key advantage of using Framework Analysis was that it helped maintain the context of the interview content. This is because larger extracts are used to illustrate themes, minimising the fragmentation of the data which can adversely affect other coding methods (Bryman. 2008: 553).

3.8 Reliability and validity

Reliability and validity constitute the principal criteria for critically evaluating research studies. The concepts of reliability and validity apply equally to quantitative and qualitative research, although inherent differences between the two methods require reliability and validity to be judged within the context of the individual method. In general terms, reliability refers to whether the results of a conducted study can be repeated, whereas validity is concerned with the extent to which the methods are appropriate for investigating the identified phenomenon (Bryman, 2008: 31-32).

Throughout the study, efforts were made to ensure that the research was designed and administered to maximise the reliability and validity of the collected data. Content validity was addressed prior to fieldwork commencing. This was done by ensuring that the survey instruments were appropriate to the project aims and objectives, and that they were informed by the existing body of literature. The identification of potential sources of error (see Section 2.7.2) relating to the collection of average expenditure data is one example, of how the literature review directly influenced how the questionnaire instrument was developed and administered.

Face and content validity were also addressed by internal pre-testing and external piloting of the questionnaire and interview schedule prior to commencing the main study. Face validity refers to the process of establishing at a superficial level whether a question or survey instrument measures the concept in question (Bryman, 2008: 152). This testing revealed that the questionnaire and onsite interviews resonated with off-road cyclists and as a result required very few changes to be made post-piloting. Furthermore, measures were taken to ensure that respondents were able to complete the survey instruments as intended (see Section 3.4.6). By testing the usability of the survey instrument it was hoped that the quality of the data could be improved and unusable responses minimised. Inter-observer consistency (a measure of reliability) was also maintained throughout the research, by the author administering all aspects of the questionnaire and interview surveys. An added advantage of this approach was that the author was present at all times to field any respondent questions regarding the research.

Secondary LineTop trail count data were also used to allocate the sample, this approach was adopted to improve the external validity of the non-probability sampling approach. External validity refers to the extent to which the results can be generalised (Bryman, 2008: 33). By analysing trail usage volumes the survey was able to capture the seasonal patterns of trail use at the site. Furthermore, the LineTop data showed the temporal usage of the site, enabling the survey to target the period of time when 90% of the trail use occurred. Efforts were also made to weatherproof the survey schedule. This also helped ensure consistency and improve external validity, as the allocated survey days were not dependant on favourable weather conditions and were fixed within the schedule.

The research presented within this body of work is also replicable. In addition to reliability and validity, replicability is also important for evaluating the research process. Efforts have been made to ensure that the presented methods and analyses are transparent and unambiguous, and therefore could be replicated in the future. A final consideration is that of ecological validity. This term refers to the extent to which the conducted research findings are representative of everyday interactions which take place within natural social settings (Bryman, 2008: 33). This study can clearly demonstrate that ecological validity was satisfied, as the collected data were obtained from the field site under normal operational conditions and in a manner which was designed to minimise intrusion on the activities of the surveyed respondents. This factor also helped improve external validity by reducing the number of survey refusals, thereby increasing the effective response rate.

3.9 Summary of research methods

This chapter has documented the development of the research rationale, having first reviewed the principal impact and valuation techniques used to measure the economic contribution of off-road cycling (see Section 3.2). From this review, it was recognised that all of the previous studies ignored the fundamental relationship between consumer behaviour and the economic contributions made by off-road cyclists. As a result, these studies provide very little information about off-road cyclists beyond measured expenditure values. In contrast, the dual approach presented within this chapter addresses both of these aspects by combining a large-scale questionnaire with a smaller interview survey, to collect a comprehensive dataset through which to address the economic and non-economic components of the third and fourth research objectives (see Section 3.2.2).

The large-scale questionnaire survey approach was chosen as the primary method for investigating the economic impact and value of off-road cycling in the South West, directly addressing research objectives three and four (see Section 3.2.2). This decision was informed by the lack of information relating to purpose-built off-road cycling sites in the UK within the published literature (see Section 3.1). Following a successful pilot study at the Forest Of Dean, 25 days of surveying were completed at Haldon Forest Park during 2012. These survey days were allocated according to seasonal usage data obtained from automatic trail counters on the two main off-road cycling trails (the Challenge and Ridge Ride trails). Whilst other studies have used trail count data to provide total usage figures (see Section 3.5), this study is unique in its approach of using trail count data to proportionally allocate sample quotas according to annual trail use. Furthermore, the survey engaged with respondents enabling minimum sample quotas to be exceeded for all survey seasons. The approach was also consistent with all surveying being conducted by the author, during the same time period on each of the survey days, and in the same onsite location.

Whilst the approach provided a robust method for surveying off-road cyclists, it is acknowledged that the approach has a number of limitations. First, the survey was only conducted during the official site opening hours. This restriction prevented the survey from capturing information from individuals who visit the site outside of these times. Second, a convenience approach was used to recruit respondents. This means that although quotas were calculated from proportional site usage figures the survey might not have captured the cross-section of off-road cyclists at the site, due to the non-random selection of respondents. Whilst this is a limitation, it should be noted that at the time of the survey no background population data existed beyond estimates of the total number of annual visitors to the park (which include all users and not just off-road cyclists). In the absence of reliable background population data to inform the survey, the approach taken by this study was considered to be the most appropriate and robust method for capturing off-road cycling use at the site.

The large-scale survey was complimented by a smaller qualitative survey, according to a 'qualitative follows quantitative' mixed methods approach. This combined approach was designed to address the fourth research objective. The semi-structured interview was chosen as the appropriate qualitative method to gain a deeper understanding of visitor behaviour, and to investigate how off-road cyclists interact with, and value purpose built off-road cycling sites. Whilst other forms of qualitative survey such as travel diaries and focus groups could have been used, semi-structured interviews were identified as being the most compatible with the predominantly quantitative self-completion questionnaire instrument. Moreover, significant time and resources had already been invested in developing and administering the large-scale questionnaire survey, and it was decided that these resource intensive techniques were beyond the scope of the smaller qualitative study. In contrast to the questionnaire survey, recruiting sufficient interview respondents proved problematic and it is acknowledged that this was a major limitation to this aspect of the research. As a result of this problem, nine onsite convenience interviews were undertaken which proved more successful in engaging respondents. However, these interviews only represent the views of respondents surveyed on a single day in winter. A further limitation is that the interviews were generally short in duration (between 5-10 minutes), primarily due to the fact that they were conducted outside in cold weather conditions. Despite these observed limitations, the conducted interviews captured a range of views which provide additional insights, which could not have been obtained from the questionnaire data alone.

Throughout this chapter efforts have been made to present a transparent account of the research methods, and demonstrate the due diligence process used to ensure reliability and validity within the research strategy. The following three chapters describe the methods used to analyse the collected data and present the research findings. Chapter 4 examines the economic contribution resulting from off-road cycling at Haldon Forest Park. This analysis addresses the needs of research Objective 3, by first examining the costs incurred in reaching the site and second by analysing the direct impact of visitor spending at the site. Chapter 5 addresses research Objective 4 and focuses on understanding the characteristics, behaviour, and attitudes of site users. This is primarily discussed within the context of the conducted cluster analysis used to identify variations among site users. Within both chapters, the results of the questionnaire and interview surveys are presented together. Chapter 6 first sets the findings from Chapters 4 and 5 within the context of countryside management, and considers how existing off-road cycling sites can be developed and managed in the future. This section considers the ability of existing sites to retain and meet current user expectations, before examining their ability and potential to attract new users. The chapter then discusses the findings within the wider context of policy-related research, and focuses on how the current study can inform future research into establishing the economic case for countryside tourism and recreation developments.

4 THE ECONOMIC CONTRIBUTION OF HALDON FOREST PARK

4.1 Introduction

The rapid growth of purpose built off-road cycling developments throughout the UK within the last decade is illustrative of their popularity as public recreation resources. Investment in these facilities has, to date, largely been justified on their ability to generate positive economic benefits to the host economy. Tourism generation has been the predominant focus of this justification, yet the impacts of these developments, as has been discussed throughout this thesis, have received very little attention within the academic literature.

This chapter addresses the fundamental issue of evaluating the economic case for developing off-road cycling for leisure and tourism, and focuses on the post-development consequences of the 1SW project at Haldon Forest Park. The analysis presented in this chapter addresses research Objectives 3 and 5, and informs the economic aspect of Objective 4 (see Section 3.2.2). Objective 3 encompasses the directly measurable impact of visitor expenditure and the hidden economic value associated with visiting off-road cycling sites. By considering both of these aspects, a more detailed assessment of the economic contribution of off-road cycling can be made than has hitherto been presented in the literature. The chapter draws on data derived from the large-scale questionnaire and smaller interview survey conducted with off-road cyclists at the case-study site. As documented in the previous chapter, these surveys have yielded a large quantity of information relating to the behaviour, attitudes, socio-economic, and demographic characteristics of off-road cyclists.

In order to meet the stated research objectives, economic value was quantified using MapInfo GIS to measure travel distances between respondent postcodes and the field site. Travel costs were then examined for these journeys to quantify economic value. Economic impact was quantified by analysing the direct onsite and offsite expenditure data to calculate the actual direct economic contribution attributable to the 1 South West Cycle Adventure Trails at Haldon Forest Park.

Prior to Haldon Forest Park receiving investment in its off-road cycling facilities as part of the wider 1 South West project, Roger Tym & Partners and Total Marketing Solutions were commissioned in 2006 to conduct a feasibility study into the opportunities for developing off-road cycling within the region (see Section 1.4.1). As part of this pre-development study, the local economic significance of Haldon Forest Park was examined. It is therefore helpful, and indeed unavoidable that comparisons will be drawn between the pre-development and this post-development study. However, it is important that these comparisons are not taken out of context, as the studies were conducted over vastly different timescales and differ significantly in their approach. As such, the two studies must be viewed as complimentary contributions to the understanding of the economic case for off-road cycling. In the following chapters, reference is made to the pre-study where appropriate, but the reported findings are based solely on the research conducted as part of this investigation. Further consideration is given to the 'before and after' picture provided by the two studies in Chapter 6, when the potential future development and management challenges are discussed.

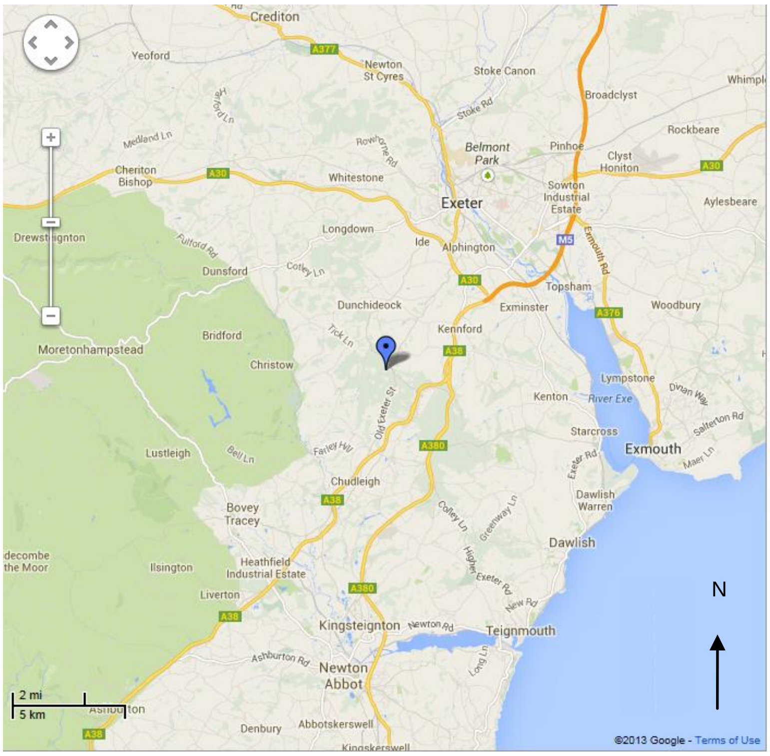
The following sections have been structured to guide the reader through the methods of analysis and presented calculations. As with the previous chapter, efforts have been made to present a transparent account of the methods of analysis used. Throughout the chapter, a range of techniques are utilised to present the study results and, where appropriate, these are supported by extracts from the in-depth interviews which draw attention to particular issues or aspects of off-road cycling experiences. A discussion of the key economic findings is also provided in Section 4.8 prior to a summary of the main results in Section 4.9. This discussion first focuses on specific parameters and limitations of the calculation, before re-appraising the case for off-road cycling investment in the South West (Objective 5).

4.2 Methods of data analysis: Travel Cost Analysis

Travel cost analysis (see Section 2.7.4) is an indirect valuation technique which is based on the assumption that travelling incurs costs and that these costs increase according to the distance travelled, from this it is assumed that visitation rates will decrease as travel distance and cost increase (Randall, 1994: 88). Whilst travel cost can be treated as an independent measure of the value of a tourism or recreation site; it is clear that travel cost and direct visitor expenditure can be regarded as interrelated opposites of the ‘economic analysis coin’ with regards to quantifying the total economic value of tourism and leisure facilities. From the outset it was not the intention of this study to conduct a full travel cost analysis according to the accepted methodology described in Section 2.7.4. Conducting such a survey would have been extremely time consuming and would have prevented other aspects from being investigated and was beyond the scope of this study. In place of a full travel cost study, a simplified method of quantifying the travel cost of visiting Haldon Forest Park was developed to meet the needs of Objective 3.

This simplified model employed MapInfo GIS software to measure travel distances between respondent postcodes and Haldon Forest Park. Travel costs were then derived using secondary fuel price and vehicle running cost data. This analysis was devised to investigate the underlying relationship between respondent travel costs and their valuation of the field site. A key requirement for travel cost analysis is that the measured costs relate to single purpose trips which are usually taken by car. Application of the technique becomes problematic, when other modes such as walking and cycling are involved, as they are more difficult to quantify (Tribe, 1995: 393). Haldon Forest Park is particularly suited to this form of valuation as 95% of visitors arrive by car (S. Lees 2011, pers. comm., 25 Oct.). This statistic reflects the geographical location of the park (see Figure 4.1) which is situated approximately nine miles South West of Exeter, adjacent to the A38 which links Exeter to Plymouth.

Figure 4.1 Location of Haldon Forest Park



Source: Google Maps

Whilst it is possible to access the site by bike or public transport, the options are limited. The Dartline 360 bus service operates Monday to Saturday between Exeter and the site, but has no provision for transporting bikes, making it unviable for bike owners. Cycling to the site is possible from Exeter via the National Cycle Network. However, the roundtrip journey of almost 20 miles which involves ascending Telegraph Hill to access the site appears unattractive for the majority of site visitors.

To ensure that the travel cost analysis was derived from single destination and single purpose trips, holiday and external day visitors were removed from the analysis. The 1 South West project boundary (which mirrors the regional parliamentary constituency boundary), was used to identify visitors from outside the region (external visitors). Internal holiday visitors were identified from responses to Q1 which classified visitors according to their trip type. Internal day visitor postcodes were then grouped according to their postcode areas (polygons). Postcode centroids (the centre point of each postcode polygon) were used in place of the individual postcodes to provide a standardised point of measurement between the postcode origin and the field site. It should be noted that the use of standardised measurement points in place of individual postcodes reduces the accuracy of the distance measures. However, this approach provided the most efficient method for synthesising the 430 valid postcodes for the analysis. Straight-line and road distances from each postcode centroid to the field site were then measured manually using the MapInfo measurement tool.

To maintain a consistent approach, it was specified that road distance measurement starting at the centroid, would follow the axial lines of a compass to the nearest road, before following the most direct road route to the destination. Where two viable road routes could be identified, each was measured and the shortest distance was recorded. Once all the distances had been recorded the mean round trip distance was calculated. This was then multiplied by a proxy running cost figure to calculate the mean cost of visiting the site. The proxy value was derived from the AA (Automobile Association) fuel price reports for 2012 and vehicle running cost calculations (AA, 2013). Running cost calculations were conservatively based on the lowest running cost figures. For petrol running costs, the figures relate to cars with a maximum new purchase value of £14,000, and for diesel costs the figures relate to vehicles with a maximum new purchase value of £16,000. Adjustments to the running costs were made to reflect the average fuel prices for petrol and diesel during the survey period (see Table 4.1).

Table 4.1 Collated UK average monthly fuel price data for 2012

Month	**Petrol Price (Pence/litre)**	**Diesel Price (Pence/litre)**
Jan	133.5	141.9
Feb	135.0	142.8
Mar	138.5	145.5
Apr	142.5	147.9
May	138.4	144.3
Jun	133.8	139.3
Jul	132.2	137.3
Aug	135.5	140.4
Sep	140.2	144.6
Oct	138.9	143.7
Nov	135.1	141.9
Dec	132.3	140.4
Mean	**136.3**	**142.5**

Source: Adapted from AA fuel price data for 2012, Automobile Association (2012)

In an attempt to account for the differences between petrol and diesel running costs and provide a single proxy figure, the figures were combined and the mean was used as the proxy value, as shown in Table 4.2.

Table 4.2 AA Running cost calculation

Running cost items	**Petrol (Pence/mile)**	**Diesel (Pence/mile)**
Fuel	13.33*	10.65**
Tyres	1.03	1.15
Service labour costs	3.68	3.29
Replacement parts	2.27	2.60
Total	**20.31**	**17.69**
Combined Petrol / Diesel mean cost (pence/mile)	**19.00**	

*Fuel costs calculated at 136.3 Pence per litre
**Fuel costs calculated at 142.5 Pence per litre
Source: Adapted from AA Running cost tables, Automobile Association (2012)

In preparation for calculating the combined value and impact figure, mean round trip per person values were also calculated by dividing the mean round trip car cost by the average number of passengers per car. This can be seen in Table 4.3.

Table 4.3 Mean roundtrip travel cost calculation

	Straight Line Distance (Miles)	**Road Distance (Miles)**
Mean round trip distance	49.4 (50)	67.6 (68)
	Travel Cost (£)	**Travel Cost (£)**
Mean round trip cost per car	9.39* (9.50)	12.84* (12.92)
Mean round trip value per person	**3.41** (3.45)**	**4.67**(4.70)**

*Average cost per mile proxy £0.19
**Mean round trip value per person derived from 2.75 passengers per car
Source: Author

4.3 Travel cost analysis

4.3.1 Step 1: Mean travel distance calculation

Table 4.4 shows the mean straight line and road distance travelled to the field site. Distances were derived by measuring the mileage between each postcode centroid and the field site. The 159 postcode centroids represent the 430 valid individual postcodes, which account for 99% of all day visitors. It should be noted that due to variations in routes taken and the types of roads used to access the site, it was not possible to calculate the average travel time to the site from the average travel distance. This is a limitation of the GIS measurement method. However, it was considered to be a more consistent approach than asking respondents to state travel times and distances for their journey to Haldon Forest Park.

Table 4.4 Mean travel distances from South West postcodes to Haldon Forest Park

	Straight Line Distance (Miles)	**Road Distance (Miles)**
Mean distance to site	24.7 (25)	33.8 (34)
Mean round trip distance	49.4 (50)	67.6 (68)
Valid postcodes	n = 434	
Postcode centroids	n = 159	

Source: Author

4.3.2 Step 2: Running cost analysis

Having established the mean straight line and road trip distances in Step 1, the next stage of the analysis involved calculating an accurate proxy travel cost which could be applied to the calculated mean trip distance.

*Table 4.1*Table 4.1 shows average monthly fuel prices for the survey period. Fuel price accounts for the largest proportion of vehicle running costs, and price fluctuations were adjusted for within the running cost calculation shown in Table 4.2. To account for variations in fuel price and hence travel costs, mean fuel prices for both petrol and diesel were calculated for the survey period. These mean prices were then used as input variables within the running cost calculation shown in Table 4.2. In an attempt to reconcile the differences between petrol and diesel running costs and provide a single proxy figure, the mean of the two running cost totals was calculated to produce the final proxy value. It should also be noted that a 'parking and toll' cost component of two pence per mile was removed from the original AA running cost calculation. This adjustment was made because Haldon Forest Park operates a pay and display car park, and this cost component is quantified separately within the onsite expenditure analysis described later in this chapter. To include an allowance for parking fees within the travel cost calculation would result in the parking component being overstated within the final combined value and impact economic analysis.

4.3.3 Step 3: Mean roundtrip cost calculation

The final stage of the travel cost calculation involved multiplying the mean straight line and road roundtrip distances by the calculated proxy running cost value, the resulting travel cost values are shown in Table 4.3. To convert the mean vehicle running costs to per person travel values, the mean roundtrip costs were divided by a proxy figure for car occupancy. For this purpose a figure of 2.75 people per car was used. This figure was derived from an evaluation of car occupancy figures for ten Forestry Commission cycling sites (P. Hawkins 2012, pers. comm., 09 Dec.). It should be noted that this estimate differs from the value of 3.0 presented in Section 3.5.1. This is because the figure of 3.0 represents an estimate of car occupancy for all visitors to Haldon Forest Park and not just off-road cyclists. Furthermore, this value was based on car park checks and not an empirical study. For the purposes of calculating the mean cost per person for off-road cyclists, it was decided that mean car occupancy should be informed by estimates for other off-road cycling sites and not rely on the mean estimate for all users at Haldon Forest Park. It is a limitation of the research that car occupancy was not measured directly by this study, and as such represents an area for future research, this is discussed in more detail in Section 6.3.1.

4.3.4 Summary of travel cost analysis

At the beginning of this chapter, travel cost and direct visitor expenditure were described as interrelated opposites of the ‘economic analysis coin’, which comprise the total economic value of tourism and leisure facilities. As has already been discussed, travel costs make up an unavoidable expense for 95% of visitors to Haldon Forest Park. However, travel costs represent only one part of the total visitor valuation of the site. In order to calculate the total visitor valuation, onsite obligatory and non-obligatory expenditure must be taken into account. Onsite expenditure represents the second economic component of the site visit and can be divided into obligatory and non-obligatory purchases. Parking fees can be considered an obligatory purchase as pay and display parking is in operation at the main hub site. Non-obligatory purchases include café, bike shop and other onsite purchases. Therefore, it can be said that the total visitor valuation of the site is greater than the cost of travelling to the site. This is because (as a minimum) visitors are willing to pay the obligatory parking cost on top of their incurred travel costs. In the next section, onsite expenditure is analysed to understand the total visitor valuation of Haldon Forest Park.

4.4 Conceptual framework for analysing expenditure

Determining who should be counted within an economic impact analysis can be identified as a central debate within the academic literature (see Section 2.3.2). The principal discourse focuses on the argument that local resident spending should be excluded from economic impact analysis as it does not represent new expenditure; it is simply a recycling of money which already exists in the economy, (Crompton, 1995: 26; Stynes, 2001: 5). However, this distinction between local resident and other expenditure, does not provide any guidance as to what constitutes local expenditure or how it should be measured.

It was also discussed in Section 2.3.2 that excluding local resident expenditure may not always be appropriate. Crompton (2006: 72) in his highly critical review of economic impact studies identified two situations when it may be appropriate to include expenditure by local residents. The first relates to the retention of expenditure within a local economy, defined as the deflected impact, which can be regarded as the reverse of displacement. The second relates to a situation where the purpose of economic analysis is to assess the economic significance and not the economic impact of a tourist event or facility. In this calculation local resident expenditure is included, as the purpose of the analysis is to measure the size and nature of the economic activity associated with tourism projects or programs (Stynes, 2001).

The issue of who should be counted was further discussed in Section 3.4.5, where it was decided that local resident expenditure should not be filtered out at the survey stage through the questionnaire. In order to achieve this, it would have been necessary to set an arbitrary boundary based on postcode data to separate local residents from day visitors. This would have involved asking respondents to provide this information prior to issuing them with the relevant questionnaire for their visitor category. Arbitrary boundaries are typically subjective, or relate to economic scales; for example the purpose of the analysis may be to examine the impact of a site or activity at the local, county, or regional economic scale; therefore elements of expenditure may be excluded depending on whether they originate from inside or outside of the boundary. The off-road cycle trails at Haldon Forest Park represent new infrastructure for which no previous visitor origin information exists. Therefore, it was deemed inappropriate for the study to define an arbitrary boundary to separate local visitors from day visitors, in the absence of these data.

To address this problem, a post-survey analysis of visitor origin data was identified as a possible tool to specify boundary cut-offs. This approach was intended to identify geographical breakpoints for day visitors based on their postcode information. However, in practice this method proved problematic for two interrelated reasons. The first relates to spatial scale, which is dependent upon where the boundary is drawn. This is known as the Modifiable Areal Unit Problem (MAUP) which ‘arises from the fact that areal units are usually arbitrarily determined and "modifiable"’ (Jelinski and Wu, 1996: 130). By changing the spatial measurement, economic impacts are increased or decreased, as expenditure is added or lost, depending on where the boundary is specified. The second relates to displacement and impact scale. Postcode analysis identified that respondents originated from 36 postcode areas. However, only five postcode areas recorded frequencies in double figures, accounting for 87% of all visitors; these are shown in Table 4.5.

Table 4.5 Respondent postcode analysis

Postcode	**Frequency**	**Percentage**
BS	13	3.6%
EX	153	42.2%
PL	48	13.2%
TA	33	9.0%
TQ	72	19.8%
Total	**319**	**87.8%**

Source: Author

In total, postcodes within the South West region accounted for 92% of the total sample. For example, if EX and TQ postcodes (which represent the two highest frequencies) were to be classified as local visitors and omitted from the analysis, 62% of the dataset would be eliminated. Whilst the analysis presented in Table 4.5 only considers the macro and not the micro postcode levels, it does demonstrate how sample sizes can be drastically reduced according to arbitrary expenditure cut-offs. Furthermore, due to the low frequencies observed for some postcode areas it would not be meaningful to examine them at the sub-area level.

The second interrelated problem relates to impact scale and displacement. Haldon Forest Park is part of the wider 1SW network of off-road cycling sites (see Section 3.3.1), which is due for completion in December 2013. Whilst quantifying the impact of the completed network was beyond the scope of this study, it cannot be ignored that the visitor patterns and economic interactions identified at the time of the study are likely to change once all the sites are operational at the end of 2013. This is because these newly created hub developments may displace expenditure from Haldon Forest Park. Therefore, segregating expenditure on the basis of arbitrary boundaries becomes meaningless, when the product is in a transitional phase; as the approach would not reflect the contextual conditions under which the data were collected. For example, if EX visitor spending was excluded as local expenditure for the purposes of analysis, there would be no record of the amount of expenditure which could potentially be displaced from Haldon Forest Park, as a result of individuals from EX postcodes choosing to visit other 1SW sites which have opened in the post-survey period.

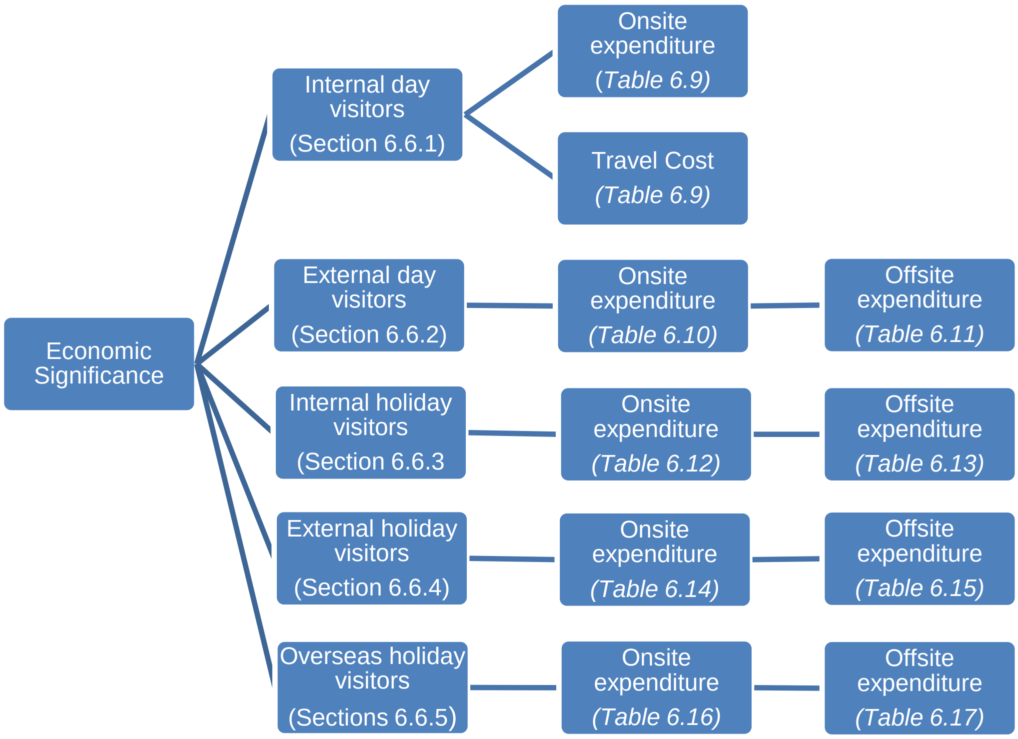
Whilst it is accepted that this study can only provide a 'snapshot' of the economic contribution of off-road cycling at Haldon Forest Park during 2012 and that it is not possible to draw long-term inferences from the analysis. The dynamic nature of the project should be taken into account, and as such the economic contribution of Haldon Forest Park should be considered within the wider development context of the 1SW network. It therefore seems appropriate to apply a dynamic approach to measuring the economic impact of the site, which is sensitive to the life stage of the product. This is in preference to imposing intra-regional boundaries which would only serve to quantify impact within one arbitrary area, which may then be subsequently lost to a neighbouring area, once the network is completed.

The issues encountered in this study highlight the complexities involved in conducting economic impact investigations. Initial analysis of the data revealed that it is not straightforward, nor always desirable to omit local resident expenditure. It has also been shown that the product life stage has an impact on the type of analysis which can be used. This complex view of economic impact analysis is shared by Shaw and Williams (2004: 10) who discuss how it may be appropriate at a policy level to isolate economic impacts, and quantify the importance of tourism as an export in comparison to other sectors, but at a local level this one dimensional approach is likely to be inadequate as a method of analysing the full impact of a community's involvement in tourism.

In reviewing these issues, the original purpose of quantifying the economic impact of developing off-road cycling facilities must be revisited, together with the choice of economic analysis. In this instance it was deemed appropriate to measure the size and nature of all economic activity resulting from the redevelopment of the off-road cycling facilities at Haldon Forest Park. By definition, the inclusion of all visitor expenditure changes the economic assessment from an economic impact study to an economic significance study (see section 2.3.2).

This change suits the dynamic and changing environment in which the data collection and economic assessment took place. By quantifying the economic significance of off-road cycling during the survey period, the study provides a reliable 'snapshot' of the size of the economic activity at Haldon Forest Park during the development of the 1 South West Project. In the next section, visitor expenditure is analysed according to the conceptual model shown in Figure 4.2. This model shows the breakdown of the different expenditure components for the four different visitor classifications shown. Individual expenditure figures for each visitor component were analysed prior to the calculation of the overall economic significance of the site which was derived by combining the results of the expenditure and travel cost analyses.

Figure 4.2 Economic significance conceptual model



Source: Author

4.5 Methods of data analysis: Expenditure

Visitor expenditure was collected for five onsite and eight offsite spending categories. The conceptual model shown in Figure 4.2 shows the breakdown of these different expenditure components for the four different visitor classifications. In the previous section it was stated that economic significance studies include expenditure from all visitor types. Whilst this is true, it does not mean that all expenditure categories should be included in the analysis for each visitor type. This is because the purpose of the analysis is to quantify the amount of expenditure which is directly attributable to the off-road cycling trails at Haldon Forest Park.

The analysis also observed standard economic conventions such as excluding offsite expenditure for internal day visitors, on the basis that this spending was not attributable to the trails and did not represent new spending within the regional economy. Where applicable the calculated expenditure was also apportioned according to the mean motivation factor for visiting Haldon Forest Park. This had the aim of ensuring that expenditure was attributable to cycling and not other reasons.

The first stage of calculating the annual expenditure figures involved producing an estimate for the annual number of off-road cyclists at Haldon Forest Park. This information was unknown at the time of the survey design, and for this reason the sample size calculation presented in Section 3.5.1 used background population estimates derived from car park income data. However, these data related to the total number of annual visitors to Haldon Forest Park which were inclusive of off-road cyclists. Sample quotas were then weighted according to the volume of cyclists recorded within each season by automatic trail counters located on the Ridge Ride and Challenge Trails during the previous twelve months (see Sections 3.3.2 and 3.5.2). The combined counts provide the theoretical maximum number of off-road cyclists, i.e. every count represents one user. However, these raw counts do not account for users riding multiple laps or combinations of the trails. Question 13 of the questionnaire (see Appendix 6) was designed to gather information relating to these variables, enabling the annual number of off-road cyclists to be estimated from the total count data. Using SPSS logic commands it was possible to calculate the average number of laps for each trail and the combined trail use, including multiple laps for both trails. These proportions were then applied to the total number of counts to derive the estimate for the annual number of off-road cyclists.

Estimating the annual expenditure of off-road cyclists from the survey data and the LineTop automatic cycle counter was the most accurate method for quantifying the economic contribution of off-road cyclists (see Section 3.5). The key strength of this approach is that it links actual expenditure to recorded trail use. However, the method relies on the assumption that the survey data can be extrapolated to provide an annual estimate. This extrapolation was considered appropriate because the sample quotas were collected proportionally according to site usage patterns. Furthermore, the survey covered a twelve month period and was designed to take into account monthly, weekly and daily variations in site usage. Having adopted this highly targeted approach it was considered appropriate to extrapolate from the sample to the derived background population.

4.5.1 Annual visitor calculation

The annual visitor calculation is set out below in Table 4.6. The calculation is derived from the total automatic trail counts recorded for the Ridge Ride and Challenge trails in 2010 / 2011.

Table 4.6 Annual visitor extrapolation

		Users of the Ridge Ride Trail only	**Users of the Ridge Ride + Challenge Trail**	**Users of the Challenge Trail only**
1	Combined Ridge Ride and Challenge Trail Counts 2010 / 2011 (LineTop data)		69,754	
2	Proportional usage split (Sample %)	11	73	16
3	Trail usage split derived from sample proportions (inclusive of multiple laps)	7,672.9	50,920.0	11,160.6
4	Mean number of laps ridden (Sample Mean)	1.49	2.64	1.28
5	Number of trail users calculation	7,672.9 /1.49 = 5,149.6	50,920.0 / 2.64 = 19,287.9	11,160.6 / 1.28 = 8,719.2
6	**Estimated number of annual trail users**		**33,156.7 (33,157)**	

Source: Author

The combined figure (Step 1: Table 4.6) represents the theoretical maximum number of riders within that period (69,754). This figure includes multiple laps and individuals riding both trails, masking the true visitor figure for that period. In order to account for these variables, sample data from Question 13 (See Appendix 6) were analysed to identify the proportional usage split between the trail options, and the number of times each option was ridden (see Steps 1 and 2: Table 4.7).

Table 4.7 Trail usage analysis (sample)

		Users of the Ridge Ride Trail only	**Users of the Ridge Ride + Challenge Trails**	**Users of the Challenge Trail only**
1	Questionnaire count data (Inclusive of multiple laps) (n = 986)	113	719	154
2	Proportional usage split (%)	11	73	16
3	Mean number of laps ridden	1.49	2.64	1.28
4	Number of trail users calculation	113 /1.49 = 76	719 / 2.64 = 272	154 / 1.28 = 120
5	**Derived total number of trail users**		**468**	

Source: Author

To adjust for riders riding the trails multiple times, the mean number of laps was calculated for the three trail combinations (see Step 3: Table 4.7). The gross trail hits for each combination were then divided by the mean lap figure to show the actual respondent split for each trail (see Step 4 Table 4.7). The percentages and mean number of laps for each trail combination derived from the sample data were then applied to the theoretical maximum number of annual off-road cyclists (see Steps 2, 3 and 4: Table 4.6). This enabled an estimate to be produced for the actual number of off-road cyclists recorded on the Ridge Ride and Challenge trails in 2011. It should be noted that the remaining 18 respondents from the sample total indicated that they rode neither the Ridge Ride or the Challenge trail. This remaining proportion of 3% could not be analysed in detail due to no trail count information being available for the Discovery trail, pump track or skills park, which comprise the remaining official off-road cycling provision. Due to their nature, these facilities cannot be easily analysed using the LineTop counters. The Discovery trail is an easy grade route which is shared with pedestrians, which prevents cycle use from being accurately recorded. Similarly, the pump track and skills park form small areas which are ridden in a freestyle manner making accurately counting respondents extremely difficult. It is acknowledged that these factors, together with the unknown use of the 'off-piste', unofficial trails are limiting factors with regards to the survey accuracy. Whilst it is a limitation of the research that not all use can be measured directly. It was decided that the analysis should focus only on the two measurable trails which comprise 97% of the sample total. This decision was taken to ensure that the expenditure analysis (see Section 4.6) was based on recorded trail use figures only.

4.5.2 Haldon Forest Park visitor profile

Respondents were categorised according to whether they were on a day or holiday trip, and whether they resided inside or outside of the South West postcode boundary. The proportional breakdown of visitors by type for the survey is shown in Table 4.8.

Table 4.8 Visitor profile, sample and annual visitor number extrapolation

Visitor type	Sample	Annual visitor estimate
Internal day visitors	430 (89%)	29,509.7** (89%)
External day visitors	5 (1%)	331.6** (1%)
Internal holiday visitors	26 (5%)	1,657.9** (5%)
External holiday visitors	18 (4%)	1,326.3** (4%)
Overseas visitors	3 (1%)	331.6 (1%)
Total	482 (100%)	33,157.00* (100%)

*Total estimated annual visitors derived from LineTop total trail counts (33,157)
** Visitor numbers extrapolated from sample proportions
Source: Author

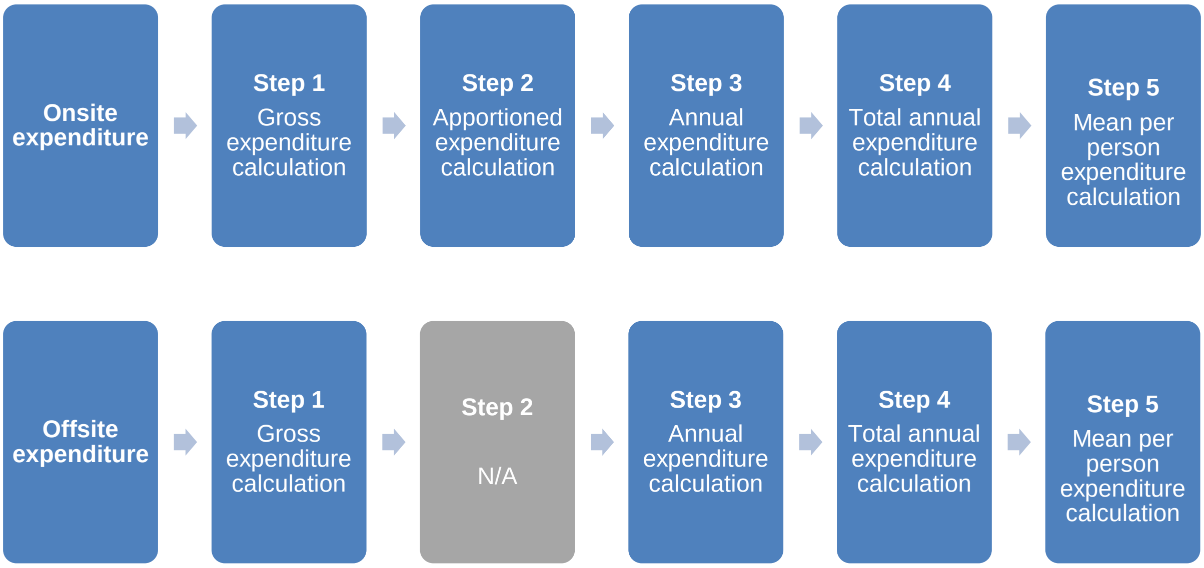
The sample breakdown shown in Table 4.8 highlights the importance of internal visitors which comprise 95% of the total sample. This observation adds weight to the assessment that it is appropriate to include 'local' visitors within the analysis at this stage in the product lifecycle. Extrapolations to produce an annual breakdown of visitors to the site are also presented within Table 4.8.

In the next section the different expenditure components for each of the four different visitor classifications are quantified. It is important to highlight that the extrapolations shown in Table 4.8 for external day visitors and overseas visitors, and to a lesser extent internal and external holiday visitors, are based on very small sample sizes. However, this limitation only affects 10% of the total sample; the remaining 90% of the total expenditure extrapolation is based on a robust sample size of 430 visitors. Small sample sizes particularly affect sub-regional economic data, as there are generally fewer data available for key economic factors (South West RDA, 2011: 19).

4.6 Expenditure Analysis

Visitor expenditure was collected for five onsite and eight offsite spending categories. Sections 4.6.2 to 4.6.5 present the tabulated onsite and offsite expenditure results for each of the day and holiday visitor sub-groups. The presented expenditure totals were derived in five steps for onsite expenditure, and four steps for offsite expenditure. These steps are shown in Figure 4.3 and correspond to the labelled steps within the expenditure tables.

Figure 4.3 Calculation process for onsite and offsite visitor expenditure



Source: Author

Step 1 sums the total expenditure for each visitor subgroup, and calculates the mean expenditure values for each onsite and offsite expenditure category. The mean was chosen as the most suitable average measure of expenditure after reviewing the limitations of the different average measures (see Section 2.3.3). To mitigate against the problem of extreme values skewing the mean, the expenditure distribution for each category was examined for outliers which did not represent valid expenditure values. Outliers can distort the mean, and can be defined as visitor spending that is three or four standard deviations above or below the mean (Stynes and White 2006: 11). Where outliers were identified, a 5% trimmed mean value was used in place of the gross mean value. Trimmed means are denoted by four asterisks within the presented tables. The 5% trimmed mean provides a more robust representation of the sample as it excludes 2.5% of the cases at the upper and lower extremes of the distribution (Stynes and White, 2006: 12).

In the second step, apportioned expenditure totals were calculated from the gross onsite expenditure values. This was conducted to segregate the proportion of expenditure that could be directly attributed to off-road cycling at Haldon Forest Park. Due to the site specific nature of the calculation, this step was only conducted for the onsite expenditure categories. This was achieved by adjusting the expenditure totals to reflect respondent motivations for visiting Haldon Forest Park. The mean motivation factor was derived from data provided in Question 8 (see Appendix 6) of the questionnaire survey. This question asked respondents to indicate on a scale between zero and ten, the extent to which their site visit was motivated by the purpose of going off-road cycling. This motivation factor was then converted into a percentage and applied to the gross expenditure totals. For example, if a sub-group was calculated as having a mean motivation factor of 9.5, it can be said that their decision to visit Haldon Forest Park was 95% motivated by off-road cycling. Therefore 95% of that group's expenditure can be attributed to off-road cycling. Haldon Forest Park has many recreational facilities and it was considered important that only expenditure attributable to the off-road cycling trails was included within the analysis.

Step 3 involved calculating the annual onsite and offsite expenditure totals for each category within the visitor subgroups. This was produced by multiplying the annual visitor estimates presented in Table 4.8, by the 'valid mean' (either the apportioned or gross mean value) for each expenditure category. In Step 4, the annual onsite and offsite expenditure totals for each category were added together to produce total annual values for onsite and offsite expenditure. It should be noted that offsite expenditure for all holiday visitor categories was calculated as being the total daily expenditure associated with a respondent's visit to Haldon Forest Park. In effect this method attributes the total daily expenditure from one holiday day to Haldon Forest Park. Step 5 formed the final step, and divides the total annual expenditure values calculated in step four by the corresponding annual visitor estimate presented in Table 4.8, to produce a mean value per person for onsite and offsite expenditure.

4.6.1 Internal day visitor expenditure

Expenditure from this visitor group (see Table 4.9) is attributed to respondents who travelled to Haldon Forest Park for a day visit from a postcode origin which is within the South West postcode boundary. For this group it is appropriate to include apportioned onsite expenditures and travel costs within the site valuation (see Figure 4.2). Off-site expenditure was excluded from the analysis as it cannot be attributed to the off-road cycling trails, and it was assumed that internal visitors would spend this money within the South West irrespective of their visit to Haldon Forest Park. Conversely, travel cost expenditure is included within the expenditure calculation as it can be directly attributed to Haldon Forest Park.

Table 4.9 Internal day visitor onsite expenditure

Step	Expenditure	Total (£)	Mean (£)
1	Parking expenditure	738.50	1.72
2	Apportioned parking expenditure	708.96*	1.65
3	Annual Parking expenditure	48,691.01**	
1	Bike hire expenditure	1091	2.54
3	Annual bike hire expenditure	74,954.64**	
1	Go Ape expenditure	_	_
2	Apportioned Go Ape expenditure	_	_
3	Annual Go Ape Expenditure	_	
1	Café expenditure	1474	3.43
2	Apportioned café expenditure	1415.04*	3.29
3	Annual Café expenditure	97,086.91**	
1	Other expenditure	406.80	0.95
2	Apportioned other expenditure	390.53*	0.91
3	Annual other expenditure	26,853.83**	
4	**Total annual expenditure**	**£247,586.39**	
5	**Mean per person onsite expenditure**	**£8.39**	
Annual Travel cost expenditure		**£137,810.29*** **	
Mean road travel cost per person		**£4.67**	

*Apportioned expenditure is derived from mean motivation factor for cycling at Haldon 9.6 e.g. 96% of expenditure **Estimated annual internal day visitor expenditure = 29,509.7 * Valid mean for each category***Estimated travel cost = 29,509.7 * £4.67 (mean roundtrip road travel cost)
Source: Author

4.6.2 External day visitor expenditure

External day visitor expenditure (see Tables 4.10 and 4.11) is attributed to respondents who travelled to Haldon Forest Park for a day visit from a postcode origin which is outside the South West postcode boundary. For this group it is appropriate to include apportioned onsite expenditures and offsite expenditures within the site valuation (see Figure 4.2). Off-site expenditure is included as it can be attributed to the off-road cycling trails and it represents an inflow of expenditure from outside the South West.

Table 4.10 External day visitor onsite expenditure

Step	Expenditure	Total (£)	Mean (£)
1	Parking expenditure	13.00	2.60
2	Apportioned parking expenditure	12.74*	2.55
3	Annual Parking expenditure	845.58**	
1	Bike hire expenditure	_	_
3	Annual bike hire expenditure	_	
1	Go Ape Expenditure	_	_
2	Apportioned Go Ape Expenditure	_	_
3	Annual Go Ape Expenditure	_	
1	Café expenditure	16.00	3.20
2	Apportioned café expenditure	15.68*	3.14
3	Annual Café expenditure	1041.22**	
1	Other expenditure	_	_
2	Apportioned other expenditure	_	_
3	Annual other expenditure	_	
4	**Total annual expenditure**	**£1,886.80**	
5	**Mean per person onsite expenditure**	**£5.69**	

*Apportioned expenditure is derived from mean motivation factor for cycling at Haldon 9.8 e.g. 98% of expenditure;
**Estimated annual external day visitor expenditure = 331.6 * valid mean for each category
Source: Author

Table 4.11 External day visitor offsite expenditure

Step	Expenditure	Total (£)	Mean (£)
1	Travel & transport expenditure	190.00	38.00
3	Annual travel & transport expenditure	12,600.80**	
1	Eating & drinking out expenditure	155.00	31.00
3	Annual eating & drinking out expenditure	10,279.60**	
1	Entertainment expenditure	10.00	2.00
3	Annual entertainment expenditure	663.20**	
1	Non-essential shopping expenditure	50.00	8.33****
3	Annual non-essential shopping expenditure	2,762.23**	
1	Groceries expenditure	_	_
3	Annual groceries expenditure	_	_
1	Bike shop products / services expenditure	25.00	5.00
3	Annual bike shop expenditure	1,658.00**	
1	Off-road cycle coaching or guiding services expenditure	_	_
3	Annual coaching / guiding expenditure	_	
4	**Total annual expenditure**	**£27,963.83**	
5	**Mean per person per day offsite expenditure**	**£84.33**	

**Estimated annual external day visitor offsite expenditure = 331.6 * mean for each category
**** Trimmed mean value
Source: Author

4.6.3 Internal holiday visitor expenditure

Internal holiday visitor expenditure (see Tables 4.12 and 4.13) is attributed to South West residents on holiday away from their normal home location within the region. For this group it is appropriate to include apportioned onsite and offsite expenditures (see Figure 4.2). Offsite expenditures are included as they represent a retention of expenditure within the region. It is assumed that if the respondent had not chosen to go on holiday within the region expenditure would have been lost to another area, or would have remained within the area if the respondent had stayed at home. For the purposes of the analysis, internal holiday visitors are treated the same as external holiday visitors.

Table 4.12 Internal holiday visitor onsite expenditure

Step	Expenditure	Total (£)	Mean (£)
1	Parking expenditure	73.50	2.83
2	Apportioned parking expenditure	66.89*	2.57
3	Annual Parking expenditure	4,260.80**	
1	Bike hire expenditure	139.00	5.35
3	Annual bike hire expenditure	8,869.77**	
1	Go Ape expenditure	_	_
2	Apportioned Go Ape expenditure	_	_
3	Annual Go Ape Expenditure	_	
1	Café expenditure	159.85	4.50****
2	Apportioned café expenditure	106.60*	4.10
3	Annual Café expenditure	6,797.39**	
1	Other expenditure	2.00	0.77
2	Apportioned other expenditure	1.82	0.07
3	Annual other expenditure	116.05**	
4	**Total annual expenditure**	**£20,044.01**	
5	**Mean per person expenditure**	**£12.09**	

*Apportioned expenditure is derived from mean motivation factor for cycling at Haldon 9.1 e.g. 91% of expenditure **Estimated annual internal holiday visitor expenditure = 1657.9 * valid mean for each category****Trimmed mean value

Source: Author

Table 4.13 Internal holiday visitor offsite expenditure

Step	Expenditure	Total (£)	Mean (£)
1	Accommodation expenditure	712.00	16.96****
3	Annual accommodation expenditure	28,117.98**	
1	Travel & transport expenditure	517.00	15.04****
3	Annual travel & transport expenditure	24,934.82**	
1	Eating and drinking out expenditure	505.00	19.42
3	Annual eating & drinking out expenditure	32,196.42**	
1	Entertainment expenditure	70.00	2.69
3	Annual entertainment expenditure	4,459.75**	
1	Non-essential shopping expenditure	222.00	4.57****
3	Annual non-essential shopping expenditure	7,576.60**	
1	Groceries expenditure	160.00	4.44****
3	Annual groceries expenditure	7,361.08**	
1	Bike shop products / services expenditure	75.00	1.09****
3	Annual bike shop expenditure	1807.11**	
1	Off-road cycle coaching or guiding services expenditure	_	_
3	Annual cycle coaching / guiding expenditure	_	
4	**Total annual expenditure**	**£106,435.76**	
5	**Mean per person per day offsite expenditure**	**£64.20**	

**Estimated annual internal holiday visitor offsite expenditure = 1657.9 * mean for each category

****Trimmed mean value

Source: Author

4.6.4 External holiday visitor expenditure

External holiday visitor expenditure (see Tables 4.14 and 4.15) is attributed to respondents who have travelled from another UK location to the South West for holidaying purposes. In common with the internal holiday visitor category it is appropriate to include apportioned onsite and offsite expenditures within the analysis (see Figure 4.2).

Table 4.14 External holiday visitor onsite expenditure

Step	Expenditure	Total (£)	Mean (£)
1	Parking expenditure	66.00	3.67
2	Apportioned parking expenditure	60.06*	3.34
3	Annual Parking expenditure	4,429.84**	
1	Bike hire expenditure	178.00	9.89
3	Annual bike hire expenditure	13,117.11**	
1	Go Ape Expenditure	_	_
2	Apportioned Go Ape expenditure	_	_
3	Annual Go Ape expenditure	_	
1	Café expenditure	107.21	5.96
2	Apportioned café expenditure	97.56*	5.42
3	Annual Café expenditure	7,188.55**	
1	Other expenditure	_	_
2	Apportioned other expenditure	_	_
3	Annual other expenditure	_	
4	**Total annual expenditure**	**£24,735.50**	
5	**Mean per person expenditure**	**£18.65**	

*Apportioned expenditure is derived from mean motivation factor for cycling at Haldon 9.1 e.g. 91% of expenditure
**Estimated annual external holiday visitor expenditure = 1326.3 * valid mean for each category
Source: Author

Table 4.15 External holiday visitor offsite expenditure

Step	Expenditure	Total (£)	Mean (£)
1	Accommodation expenditure	300.00	16.66
3	Annual accommodation expenditure	22,096.16**	
1	Travel & transport expenditure	291.00	12.40****
3	Annual travel & transport expenditure	16,446.12**	
1	Eating and drinking out expenditure	517	18.02****
3	Annual eating & drinking out expenditure	23,899.93**	
1	Entertainment expenditure	45.00	2.50
3	Annual entertainment expenditure	3,315.75**	
1	Non-essential shopping expenditure	130.00	2.47****
3	Annual non-essential shopping expenditure	3,275.96**	
1	Groceries expenditure	249.00	9.81****
3	Annual groceries expenditure	13,011.00**	
1	Bike shop products / services expenditure	40.00	0.80****
3	Annual bike shop expenditure	1,061.04**	
1	Off-road cycle coaching or guiding services expenditure	–	–
3	Annual cycle coaching / guiding expenditure	_	
4	**Total annual expenditure**	**£83,105.96***	
5	**Mean per person per day offsite expenditure**	**£62.66**	

**Estimated annual external day visitor offsite expenditure = 1326.3 * mean for each category

****Trimmed mean value

Source: Author

4.6.5 Overseas holiday visitor expenditure

Overseas holiday visitor expenditure (see Tables 4.16 and 4.17) is attributed to respondents who have travelled from outside the UK to the South West for holidaying purposes. Expenditure for this category includes the same components as the internal and external holiday visitor classifications (see Figure 4.2).

Table 4.16 Overseas holiday visitor onsite expenditure

Step	Expenditure	Total (£)	Mean (£)
1	Parking expenditure	7.00	2.33
2	Apportioned parking expenditure	7.00*	2.33
3	Annual Parking expenditure	772.63**	
1	Bike hire expenditure	40.00	13.33
3	Annual bike hire expenditure	4,420.23**	
1	Go Ape Expenditure	_	_
2	Apportioned Go Ape expenditure	_	_
3	Annual Go Ape expenditure	_	
1	Café expenditure	40.00	13.33
2	Apportioned café expenditure	40.00*	13.33
3	Annual Café expenditure	4,420.23**	
1	Other expenditure	_	_
2	Apportioned other expenditure	_	_
3	Annual other expenditure	_	
4	**Total annual expenditure**	**£9,613.09**	
5	**Mean per person expenditure**	**£28.99**	

*Apportioned parking expenditure is derived from mean motivation factor for cycling at Haldon 10.00 e.g. 100% of expenditure

**Estimated annual overseas holiday visitor expenditure = 331.6* valid mean for each category

Source: Author

Table 4.17 Overseas holiday visitor offsite expenditure

Step	Expenditure	Total (£)	Mean (£)
1	Accommodation expenditure	200.00	66.67
3	Annual accommodation expenditure	22,107.77**	
1	Travel & transport expenditure	20.00	6.67
3	Annual travel & transport expenditure	2,211.77**	
1	Eating and drinking out expenditure	135.00	45.00
3	Annual eating & drinking out expenditure	14,922.00**	
1	Entertainment expenditure	20.00	6.67
3	Annual entertainment expenditure	2,211.77**	
1	Non-essential shopping expenditure	20.00	6.67
3	Annual non-essential shopping expenditure	2,211.77**	
1	Groceries expenditure	15.00	5.00
3	Annual groceries expenditure	1,658.00**	
1	Bike shop products / services expenditure	_	_
3	Annual bike shop expenditure	_	
1	Off-road cycle coaching or guiding services expenditure	_	_
3	Annual cycle coaching / guiding expenditure	_	
4	**Total annual expenditure**	**£45,323.08**	
5	**Mean per person per day offsite expenditure**	**£136.68**	

**Estimated annual overseas holiday visitor offsite expenditure = 331.6 * mean for each category

Source: Author

4.7 Economic significance analysis

Calculating the total economic significance of expenditure associated with visiting Haldon Forest Park for the purpose of off-road cycling, forms the final stage of the analysis process shown in Figure 4.2. Economic significance was calculated by adding together the annual onsite and offsite expenditure totals (see step four Figure 4.3) for each visitor subgroup, producing a total annual expenditure figure of £0.7 million per annum (see Table 4.18). Mean per person expenditure totals are also presented within Table 4.18, these were derived in a similar manner by combining the annual mean onsite and offsite expenditure figures for each subgroup (see step five Figure 4.3).

Table 4.18 Economic significance of expenditure associated with Haldon Forest Park

	Travel Cost £	**Onsite expenditure £**	**Offsite expenditure £**	**Mean expenditure per person £**
Internal day visitor	137,810.29	247,586.39	_	13.06
External day visitor	_	1,886.80	27,963.83	90.02
Internal holiday visitor	_	20,044.01	106,435.76	76.29
External holiday visitor	_	24,735.50	83,105.96	81.31
Overseas visitor	_	9,613.09	45,323.08	165.67
Total	137,810.29	303,865,79	262,828.63	_
Annual economic significance of expenditure associated with Haldon Forest Park £704,504.71 (£0.7 million)				

Source: Author

Whilst it was not the aim of this study to conduct a detailed cost-benefit analysis of the trail facilities, it is important to consider the economic significance figure within the context of the investment which has taken place at the site. This aspect relates directly to the fifth research objective (see Figure 1.2), and is especially important given that the principal justification for developing purpose-built sites is their ability to deliver long-term economic benefits to the tourism and leisure economy (see Section 1.1). Haldon Forest Park has undergone several phases of development, the largest of which took place in 2006 at a cost of 1.2 million (Tym et al, 2006: 51). Comparing the investment costs to the estimated overall economic activity generated by off-road cycling (economic significance), reveals that the investment cost is matched by the economic significance generated in less than two years. Furthermore, onsite expenditure alone can match the investment cost in less than four years. These observed rates of return therefore support the argument that off-road cycling makes a positive contribution to the tourism and leisure economy, and demonstrate that an economic return can be achieved in as little as two years.

Whilst these payback comparisons only consider the economic significance associated with off-road cycling at Haldon Forest Park, and do not take into account the costs involved in operating and maintaining the site for all visitors, they do highlight the speed of return and provide a useful tool for contextualising the observed significance value. Furthermore, the dynamic dual approach taken by this study has enabled the overall size and scale of the economic contribution made by off-road cyclists to be captured at a time when the 1SW off-road cycling region was still being developed. Whilst the future usage volumes and ongoing costs of maintaining this regional asset are unknown, this study has shown that it is possible to adopt a flexible approach to economic assessment which is sensitive to the product life-stage. This is in preference to imposing rigid economic assessment practices and conventions which have been the focus of considerable academic debate (see Section 2.3.2).

One further aspect of the analysis which has not yet been discussed is the issue of primary and non-primary purpose visitors. Expenditure by primary and non-primary purpose visitors was not identified within the analysis because the total expenditure was derived from trail count data which included both visitor types. Primary-purpose visitors can be defined as individuals who are visiting the South West primarily to go off-road cycling. For non-primary purpose visitors, off-road cycling is not the primary reason for visiting the South West, but it forms part of their holiday experience. Whilst it was not necessary to distinguish between the two visitor types for the purposes of calculating the total economic significance, it should be recognised that the results contain both primary and non-primary purpose visitor data. To identify between these two visitor types, respondents were asked when they intended to return to Haldon Forest Park in Question 19 of the survey. Respondents who stated that they would return during their holiday were classed as primary purpose visitors. These repeat visitors account for 7.7% of the internal holiday visitor sample and 11% of the external holiday visitor sample, equating to 273 repeat holiday visitors per annum. In the next section, the economic significance of expenditure associated with Haldon Forest Park onsite is examined in more detail.

4.8 Discussion

The described method for estimating the annual expenditure of off-road cyclists from the survey data and from the LineTop automatic cycle counter was considered to be the most accurate method for quantifying the economic contribution of off-road cyclists. The key strength of the method is that it links actual expenditure to recorded trail use. Furthermore, the method attempts to capture the value of the site through quantifying the hidden travel costs incurred by day visitors. However, it is acknowledged that the method relies on the assumption that the survey data can be extrapolated to provide an annual estimate. This extrapolation was considered appropriate because respondents were sampled in proportion to site usage patterns. A further identified limitation is the problem of extrapolating expenditure from small subsample sizes which may not be representative of the background population (Stynes and White (2006: 12). However, this limitation is constrained to 10% of the survey sample, and could not be addressed during the sample design, due to no information being available regarding the proportional distribution of the visitor sub-groups.

It is also acknowledged that there are other intangible variables which affect the validity of the final significance value. For example, the travel cost calculation relates to all day visitors, and does not take into account the small number of visitors who may not use a car to access the site. At present there are no reliable data for these users; Forestry Commission data based on car park checks at Haldon Forest Park, estimate that non-car visitors and non-paying car visitors account for 5% of the total number of visitors to the site (see Section 4.2). Although this variable would reduce the economic estimate, visits by car account for more than 95% of all trips, and therefore this would not severely affect the estimate. Furthermore, because no segmented data were available for the number of non-car trips made by off-road cycling visitors and their individual subgroups, it was considered appropriate to include all day visitors within the analysis.

Comparing the results of this study to those of the feasibility study reveals a number of interesting results. First, it was originally estimated that within the first year of operation in 2010 Haldon Forest Park would attract 50,000 visitors, of which 32,500 would be cyclists. This figure is broadly comparable to the estimate produced by this study (33,157). Second, the feasibility study predicted the total expenditure for day visitors to be £375,500, based on visitors spending an arbitrary average of £12 per visit (Tym et al, 2006: 36). It should be noted that the estimate by Tym et al (2006: 36) includes travel costs, and refers to all day visitors and not just internal day visitors. In comparison, this study estimates that the total annual expenditure for internal day visitors is £385,398.68 (this represents 99% of all day visitors). When broken down, this figure produces an average individual spend of £13.06. The feasibility study also used an arbitrary figure to calculate the economic contribution of holiday visitors (£45). Comparing this figure to the combined sample mean for internal and external holiday visitors reveals a positive difference of £33.80 (see Table 4.18). However, the studies differ significantly in their scale and approach to calculating visitor expenditure.

A major limitation of the feasibility study estimates is that they were not derived from an empirical survey of off-road cyclists at Haldon Forest Park. Instead, the study used arbitrary expenditure figures from the National Cycle Network (Tym et al, 2006: 35) which do not provide a sound basis for extrapolation. This is because the National Cycle Network represents a different form of cycling infrastructure. The National Cycle Network is composed of a mixture of quiet roads and smooth surfaced paths which cyclists share with pedestrians for travel and recreation purposes (Sustrans, n.d.). In contrast, purpose-built off-road cycling sites are a self-contained purely recreational product for cyclists, featuring dedicated visitor facilities and routes with surfaces and obstacles graded according to their technical difficulty (see Appendix 5). By using arbitrary figures from a different form of cycling infrastructure, the feasibility study fails to acknowledge the different use and expenditure contexts of these contrasting forms of provision. This is an important distinction. Whilst the two studies present broadly comparable findings for the day visitor category, the feasibility study estimates do not represent a reliable measure of the economic contribution of off-road cycling at Haldon Forest Park, due to the flawed application of arbitrary figures in comparison to the visitor based values produced by this study.

4.9 Summary of main results

The analysis presented in this chapter addresses the fundamental issue of quantifying the economic case for developing off-road cycling for leisure and tourism. In the chapter introduction it was stated that the justification for investment in off-road cycling infrastructure was primarily based on its ability to generate positive economic benefits to the host economy. These benefits had also been cited within the original feasibility study which underpins the 1SW project. This previous research identified that off-road cycling is an economically significant activity, and that developing it has the potential to bring economic benefits to the region (Tym et al, 2006: 1).

In order to determine the economic benefits of developing off-road cycling within the South West and test the previous economic assessment, this chapter has analysed both the directly measurable impact of visitor expenditure and the hidden economic value associated with visiting Haldon Forest Park. By considering both of these aspects a detailed picture of the economic contribution of off-road cycling could be formed. This assessment was designed to meet the needs of research objectives 3, 4 and 5 (see Figure 1.2).

The first stage of this analysis involved conducting a simplified travel cost analysis. This technique is an indirect valuation approach used to place an economic value on existing tourism and leisure facilities. In contrast to the standard travel cost methodology described in Section 2.7.4, this approach estimated travel costs independently using MapInfo GIS, removing the onus from the respondent to recall incurred travel costs and distances. This approach enabled a standardised method of measuring distances from postcode origins to be adopted. Travel distances between respondent postcodes and the field site were measured using MapInfo GIS. In total, travel distance was measured from 159 postcode centroids to the site representing 430 valid respondent postcodes. This analysis revealed that the mean roundtrip road distance travelled to the site was 68 miles. Travel costs for these journeys were also derived independently using AA fuel price and running cost tables (see Section 4.2). The economic value of the mean roundtrip distances was found to be £12.92.

Onsite expenditure formed the second economic analysis component (see Section 4.4). This section began by focussing on the key discourses surrounding the measurement of visitor expenditure. Following a review of the central issue surrounding who should be counted, it was decided that the original aim of quantifying the economic impact of developing off-road cycling facilities must be revisited, together with the choice of economic analysis. Furthermore, it was identified that a dynamic approach to expenditure analysis was required in order to take into account the life-stage of the product. This is because it is very difficult to discern the economic scale at which each site operates at this stage in the product lifecycle, and therefore it is inappropriate to impose rigid economic assessment practices and conventions which would prevent the overall economic contribution from being observed (see Section 4.7). Moreover, the field site forms part of a wider regional product which is still developing. It was therefore decided that an economic significance analysis, was more appropriate than the originally proposed economic impact study. This change suits the dynamic and changing environment under which the collection of data and economic assessment took place. By quantifying the economic significance of off-road cycling during the survey period, the study provides a reliable ‘snapshot’ of the size of the economic activity at Haldon Forest Park during the development of the 1SW Project.

In order to address the third research objective, a two stage process was used to calculate the economic significance of off-road cycling at Haldon Forest Park. First, an estimate of the total number of off-road cycling visitors was derived using LineTop trail count data and trail information from the questionnaire survey. Second, visitor expenditure was collected for five onsite and eight offsite spending categories according to the conceptual model shown in Figure 4.2. The total value was calculated by combining all of the valid annual expenditure categories for each visitor type and extrapolating them according to the seasonal usage proportions, effectively linking expenditure to recorded trail use. This is a major strength of the approach (see Section 3.5) and was considered to be the most accurate method for quantifying the economic contribution of off-road cyclists.

The annual expenditure categories included both onsite and offsite expenditure. Offsite expenditure was included where it represented spending which was necessary for the trip to take place. In total, the economic significance of visitor expenditure associated with Haldon Forest Park was estimated to be £0.7 million per annum this is shown in Table 4.18. Comparing this figure to the investment costs of developing the off-road cycling infrastructure at Haldon Forest Park (see Section 4.7), revealed that the economic significance generated could match the investment cost in as little as two years. These findings demonstrate that off-road cycling developments can contribute quickly and positively to the tourism and leisure economy. However, in order for the economic benefits of these sites to be sustained into the future it is essential to understand the motivations, behaviours and needs of off-road cycling consumers. This aspect is ignored by the off-road cycling studies reviewed in Section 3.2.2, and therefore these studies provide little information about off-road cyclists beyond their economic transactions.

In the following chapter this weakness is addressed within the context of Objective 4, which has the purpose of examining closely the characteristics, behaviour and attitudes of site users. In contrast to the rigid geographical and trip type subgroup analysis conducted within this chapter, Chapter 5 seeks to identify variations which are independent of respondent origin and trip characteristic. This is primarily discussed within the context of the conducted Cluster Analysis which was used to identify variations among site users and group respondents into distinct visitor segments.

5 ANALYSIS OF VISITOR CHARACTERISTICS

5.1 Introduction

To this point, the analysis has focused on addressing the needs of research Objective 3 by quantifying the economic significance associated with off-road cycling at Haldon Forest Park. As such, the analysis presented in Chapter 4 mirrored the predominantly economic research conducted by the previous studies reviewed in Section 3.2. However, these examples do not consider the presence of different sub-groups beyond arbitrary day and holiday visitor classifications. This narrow view represents a fundamental limitation within the literature, because it regards off-road cyclists as a homogenous group, and not as individual consumers. Furthermore, this view is static as it does not consider the resilience of off-road cycling sites and the possibility that consumer behaviour and demand may change over time. This is an important aspect given the rapid and largely uncoordinated growth of purpose-built sites over the last decade.

Furthermore, the management of users at a facility level is predominantly focused on user ability. User ability is typically accommodated by providing trails with varying degrees of difficulty which are graded according to the standardised International Mountain Bike Association (IMBA) grading system. The popularity of purpose-built off-road cycling trails suggests that the concept is well founded and meets the needs of many off-road cyclists. However, for the product to develop in the future there is a need to gain a deeper understanding of the current user base beyond arbitrary geographical and trip type visitor distinctions. This involves examining, and grouping visitors based on their preferences and behaviours. This information has important practical applications as it would enable sites to cater more effectively for the needs of their visitor groups. Furthermore, by identifying the spending patterns of different visitor subgroups, sites may be able to tailor their facilities in order to maximise the economic contributions from these groups. This study therefore represents one of the first attempts to differentiate between users on the basis of their off-road cycling characteristics and behaviour. It also creates an opportunity to examine the spending patterns of different off-road cyclists outside of arbitrary visitor classifications.

In the previous chapter, understanding the expenditure characteristics of the day and holiday visitor subgroups formed the analysis framework. This chapter begins in a similar manner and investigates expenditure, site usage, and user behaviour in terms of day and holiday visitor site use. This section builds on the data presented in Chapter 4 and examines whether any differences exist between day and holiday visitors with regards to their use of off-road cycling facilities. This information is also used to help explain the Cluster Analysis results presented in Section 5.7. One example of this is cluster expenditure, which is affected by the number of day and holiday visitors contained within the cluster groups.

The second part of this chapter focuses on developing a typology of all users according to their off-road cycling preferences and behaviour. In contrast to the previous chapter which looked at site level impacts, this second part focuses on the individual, and investigates how users experience, interact, and value purpose-built off-road cycling facilities. These aspects address research Objective 4, which has the purpose of examining variations among site users.

To meet this objective, the study examined the dataset using Cluster Analysis, a multivariate technique designed to identify variations among respondents based on their characteristics.

Section 5.7 outlines this approach prior to the presentation of the derived cluster groups in Section 5.8. The process and results of cluster profiling are then presented in Section 5.9. Interview extracts are also used throughout the chapter; these provide a valuable insight into the purpose-built off-road cycling experience from the user's perspective. In the final part of this chapter (Section 5.10) the tourism and leisure patterns identified are summarised, and a user profile for the case-study site is presented.

5.2 Expenditure characteristics of off-road cycling day and holiday visitors

In Section 4.6 the economic significance of Haldon Forest Park was derived from the expenditure data for the five visitor sub-groups. However, the analysis did not examine whether the observed positive differences between day and holiday visitor expenditure were statistically significant. In contrast to Sections 5.3 to 5.6 which examine variations between the individual day and holiday visitor sub-groups, this section only examines the macro variations between day and holiday visitor expenditure. This analysis was conducted to understand the overall relationship between the economic contributions of the two visitor groups. Understanding the economic contribution of holiday visitors is particularly important because it is their investment which drives the economic growth of off-road cycling as a tourism activity. Table 5.1 presents the bivariate Mann Whitney *U* analysis of onsite and offsite expenditure for the macro day and holiday visitor groups.

Table 5.1 Day / holiday visitor onsite and offsite expenditure bivariate analysis (n = 482)

Onsite Expenditure (£)	**Day Visitor**	**Holiday Visitor**	**Mann-Whitney *U***	**Asymptotic Sig. (2-sided)**
Parking fees	1.74	3.12	14,238.50	.000**
Bike hire	2.49	7.60	12,974.50	.000**
Go Ape	0.11	1.28	10,489.00	.053*
Café / Refreshment kiosks	3.43	6.53	12,988.50	.002**
Other	0.93	0.04	9,924.50	.280
Total	**8.70**	**18.57**		
Offsite Expenditure	**Day Visitor**	**Holiday Visitor**	**Mann-Whitney *U***	**Asymptotic Sig. (2-sided)**
Accommodation	0.00	25.79	14,926.00	.000**
Travel and transport	6.44	17.62	13,929.50	.000**
Eating and drinking out	6.09	24.62	14,836.50	.000**
Entertainment	0.92	2.87	11,218.50	.009**
Non-essential shopping	0.85	7.91	12,057.50	.000**
Groceries	5.93	9.02	13,113.00	.000**
Bike shop products /services	1.84	2.45	10,852.50	.214
Off-road cycling coaching or guiding services	0.98	0.00	10,128.50	.351
Total	**23.05**	**90.28**		

Mann-Whitney Test, *U*, 1df, *Significant at – p ≤ .05, **Significant at p ≤ .01
Source: Author

From Table 5.1 it can be seen that statistically significant differences between day and holiday visitors were identified for four out the five onsite expenditure categories, three of which were recorded at the 99% confidence level. A similar pattern can also be observed for offsite expenditure with six out of the eight categories recording significant differences at the 99% confidence level. These results confirm that holiday visitors spend significantly more than day visitors both onsite and offsite. However, these results must be considered within the context of the overall distribution of day and holiday visitors at Haldon Forest Park. In Section 4.5.2 it was identified that holiday visitors comprised only 10% of visitors to Haldon Forest Park. Furthermore, their expenditure accounts for just 18% of the onsite expenditure total (see Section 4.7). This observation highlights the gap between day and holiday visitation at the site, and indicates that further promotion of the site to attract holiday visitors will be required in the future if this gap is to be addressed, and the increased economic contribution of holiday visitors is to be maximised.

Holiday visitor expenditure is also affected by the number of visitors who stay with friends and relatives during their visit as it reduces the accommodation expenditure component. Approximately half (51.1%) of all internal and external holiday visitors sampled stated that they were staying with friends or relatives for all or part of their holiday trip. To evaluate whether respondent spending patterns differed depending on whether they were staying with friends or relatives (VFR) or private accommodation providers; bivariate analysis using the Mann-Whitney test was conducted to compare onsite and offsite expenditure. No significant differences in onsite expenditure were observed between VFR and non-VFR respondents. However, for offsite expenditure (excluding accommodation) the Mann-Whitney test was significant (U = 203.50 $p < .05$) for the non-essential shopping category, where VFR respondents (n = 24; *Mean £14.58*) were found to spend more than non-VFR respondents (n = 23; *Mean £0.96*). These results indicate that expenditure (with the exception of accommodation and non-essential shopping) does not appear to vary significantly between VFR and non-VFR respondents. For the non-essential shopping category, a medium effect size *(r = - 0.31)* was calculated. However, this result should be treated with caution, due to the small sample size.

5.3 Demographic characteristics of off-road cycling day and holiday visitors

This section presents key demographic and socio-economic information relating to the different day and holiday visitor groups identified in the previous chapter. In order to present a detailed picture off-road cycling at Haldon Forest Park, it is necessary to look beyond economic transactions and identify the demographic and socio-economic characteristics of the different user groups. Section 5.3.1 first examines the demographic characteristics of gender and age for the 482 valid respondents, before moving on to describe the socio-economic characteristics relating to employment and NRS (National Readership Survey) social classification.

5.3.1 Gender profile of off-road cycling day and holiday visitors

Table 5.2 shows the gender profile for the different off-road cycling visitor groups. From the presented data, an imbalance between male (80.5%) and female (19.5%) respondents can be seen within the overall sample.

Table 5.2 Gender profile for off-road cycling day and holiday visitors (n = 482)

Visitor type	**Gender**			
	Male	**%**	**Female**	**%**
Internal day visitor	345	80.2	85	19.8
External day visitor	5	100	-	-
Internal holiday visitor	18	69.2	8	30.8
External holiday visitor	18	100	-	-
Overseas holiday visitor	2	66.7	1	33.3
Total	388	80.5	94	19.5

Source: Author

This imbalance skews the dataset towards male respondents who comprise the largest proportion of respondents within all categories. Among internal day visitors, the gender profile was split between male visitors (80.2%) and female visitors (19.8%). Similar ratios were observed for the internal and overseas holiday visitor categories. Here, male respondents accounted for 69.2% of respondents, with female visitors comprising 30.8% of the internal holiday visitor sample. For the overseas holiday visitor category, male respondents accounted for 66.7% and female visitors comprised 33.3% of the total. The remaining external day and external holiday visitor categories are composed entirely of male visitors. However, the underrepresentation of female respondents within these categories is most likely due to the small sample sizes obtained. Given a larger sample it is likely that these categories would show similar male to female ratios as the internal day and overseas holiday visitor groups.

For the purposes of assessing the reliability of the observed gender ratio, it would have been desirable to compare the result to that of the original feasibility study. However, this was not possible as gender data were not provided by the earlier study. Comparing the results to other published cycling studies reveals that the observed ratio is consistent with other UK cycling studies. Research conducted at the 7 Stanes off-road cycling centres in Southern Scotland, revealed a male to female ratio of 84:16 (7 Stanes Phase 2 Evaluation, 2007: 18). A similar gender ratio (73:27) was also observed on the National Cycle Network Coast to Coast route (Cope, Doxford and Hill, 1998: 217). Further evidence is provided by Lumsden, Downward and Cope (2004: 19), who identified a (72:28) male to female split on the National Cycle Network North Sea Cycle Route. From these examples it is clear that the observed result is broadly consistent with other UK studies. However, this evidence does highlight the gender imbalance present at cycling facilities. Understanding this wider imbalance is beyond the scope of this study, but the detailed user data provided could be utilised for promoting the site to females and other underrepresented groups. This aspect is discussed further in Chapter 6. The topic of gender was raised by two female respondents during the onsite interviews.

However, their views suggested there was no obvious perceived gender imbalance at the site. Female Respondent J stated:

> *'...it doesn't matter if you're riding with females or males, it doesn't matter, you're just mountain bikers so I love that bit of it...'*

In contrast Female Respondent A discussed gender within the context of skill development and the suitability of certain trails:

> *'Say like in the skills area you have a log to ride along, they could have something like that out on the trail, not that I would want to ride along a log [laughs] but you know, something like that I could think maybe one day I could do that, but not the black run. I'm too scared for that! I know I'm not particularly the niche audience for that anyway. I mean there are other women who come out, and [they] might not feel the same way I do about that. So something like that, to improve skills, or occasional led rides, they do do them but I don't fancy those as I think they would be too easy or too difficult. I mean if I go out with the guys it will be too difficult and if I go out with the women it will be too easy.'*

No evidence of site specific issues relating to the observed gender imbalance could be identified during the onsite interviews. Furthermore, two of the interviewees stated that they were visiting the site with their partners. This suggests that the observed gender imbalance at Haldon Forest Park is a function of the wider gender imbalance within cycling.

5.3.2 Age profile of off-road cycling day and holiday visitors

The overall mean age for the sample was calculated to be 39 years old, with the mean age for the different user groups ranging between 38 and 46 years old, see Table 5.3.

Table 5.3 Age profile for off-road cycling day and holiday visitors (n = 482)

Visitor type	**Age**						
	16 - 24	**25 - 34**	**35 - 44**	**45 - 54**	**55 - 64**	**65+**	**Mean**
Internal day visitor	33	102	175	100	16	4	39
(%)	(7.7)	(23.7)	(40.7)	(23.3)	(3.7)	(0.9)	
External day visitor	1	-	3	1	**-**	**-**	38
(%)	(20)	-	(60)	(20)	-	-	
Internal holiday visitor	2	10	5	8	-	1	38
(%)	(7.7)	(38.5)	(19.2)	(30.8)	-	(3.8)	
External holiday visitor	1	3	9	5	**-**	**-**	40
(%)	(5.6)	(16.7)	(50.0)	(27.8)	**-**	**-**	
Overseas holiday visitor	-	1	-	1	1		46
(%)	-	(33.3	-	(33.3)	(33.3)		
Total	37	116	192	115	17	**5**	39
(%)	(7.7)	(24.1)	(39.8)	(23.9)	(3.5)	(1.0)	

Source: Author

The table also shows that site usage is dominated by visitors belonging to the 25-34, 35-44 and 45-54 age categories. Visitors belonging to the remaining 16-24, 55-64 and 65+ categories are less well represented within the table. Visitors under the age of 16 are not included in the tabulated data as they were not surveyed for ethical reasons. To circumvent this issue, Q45 was designed to measure the group composition by recording the number of group members over and under 16 years of age. Group composition was split between adult only groups (71.4%), and adult and under 16 groups (28.6%). Group composition is discussed further in section 5.5.5.

The age profiles observed at Haldon Forest Park are similar to those recorded at the 7 Stanes off-road cycling facilities in Scotland. Data from the 7 Stanes Phase 2 evaluation identified that 88% of visitors belonged to either the 18-30 or 31-45 age groups (7 Stanes Phase 2 Evaluation, 2007: 18). These categories sit within the three key categories identified by this study, which suggests that the age profile observed at Haldon Forest Park is consistent with other off-road cycling sites. The observed profile is also consistent with data from the National Cycle Network C2C route. Research conducted by Cope, Doxford and Hill (1998: 217) identified a broadening in the age profile of respondents in the year following the opening of the Coast to Coast route. Their study identified that in the first year of the route opening 50% of users were between 26 and 40 years of age. In the following year, this proportion reduced to 34%, due to an increase in respondents in the 41-55 age bracket. This evidence suggests that age profiles at off-road cycling sites can change over time. The 1SW trails at Haldon Forest Park represent new infrastructure and therefore it is possible that the age structure observed may be representative of this early stage in the product lifecycle. Evidence from the National Cycle Network North Sea Cycle Route is also consistent with the study findings. This route was identified as being primarily popular with cyclists aged between 30 and 50 years old (Lumsden, Downward and Cope, 2004: 19).

5.3.3 Ethnic group profile of off-road cycling day and holiday visitors

Ethnic group data were collected during the study to help compile a highly detailed picture of the respondents who were using the off-road cycling trails. At the outset a ‘census type’ approach to collecting demographic information was considered necessary due to the lack of previous academic research into off-road cycling facilities. Table 5.4 shows the ethnic group profile for day and holiday visitors.

Table 5.4 Ethnic group profile for off-road cycling day / holiday visitors (n = 429)

Visitor type	Ethnic group					
	White	Black / Black British	Asian / Asian British	Mixed	Chinese	Other
Internal day visitor	419	2	-	5	1	2
(%)	(97.7)	(0.5)	-	(1.2)	(0.2)	(0.5)
External day visitor	5	-	-	-	-	-
(%)	(100)	-	-	-	-	-
Internal holiday visitor	25	-	-	-	-	1
(%)	(96.2)	-	-	-	-	(3.8)
External holiday visitor	16	1	-	-	1	-
(%)	(88.9)	(5.6)	-	-	(5.6)	-
Overseas holiday visitor	3	-	-	-	-	-
(%)	(100)	-	-	-	-	-
Total	468	3	-	5	1	2
(%)	(97.7)	(0.6%)	-	(1.1)	(0.2)	(0.4)

Source: Author

The table highlights the narrow ethnic group profile observed at the site. Overall, white ethnic groups account for 97.7% of site visitors. Due to a lack of data it is not possible to compare these results to the previous feasibility study or to research conducted at the 7 Stanes off-road cycling centres in Scotland. Comparing the results for the internal day visitor category to the 2007 Census data for Exeter reveals that the narrow ethnic profile observed is in line with Census proportions (Devon County Council, n.d.: 2.). However, a slightly higher percentage of white visitors were recorded compared to the Exeter average (97.7% compared to 93.0%). All other ethnic groups with the exception of Asian groups were observed to be slightly below the Exeter average. Asian groups are not represented within the sample, and stand out as being underrepresented when compared to the Exeter average (1.13%). Asian groups account for the second highest proportion after white groups within the Census data, so their omission from the sample data is notable.

5.4 Socio-economic characteristics of off-road cycling day and holiday visitor

In the following tables, the socio-economic characteristics of the different day and holiday visitor sub-groups are examined. Specifically the section examines employment, household income and socio-economic class for the different day and holiday visitor groups.

5.4.1 Employment characteristics of off-road cycling day and holiday visitors

Table 5.5 shows that the majority of respondents within each category are employed full-time, representing at least 80% of the proportion within each category. This profile fits with the age demographics identified. The majority of respondents are of working age, occupying the age categories between the general education and retirement life stages. This profile also matches the findings from the 7 Stanes study which identified that the majority of visitors were male and in full-time employment (7 Stanes Phase 2 Evaluation, 2007: 18).

Table 5.5 Employment profile for off-road cycling day and holiday visitors (n = 477)

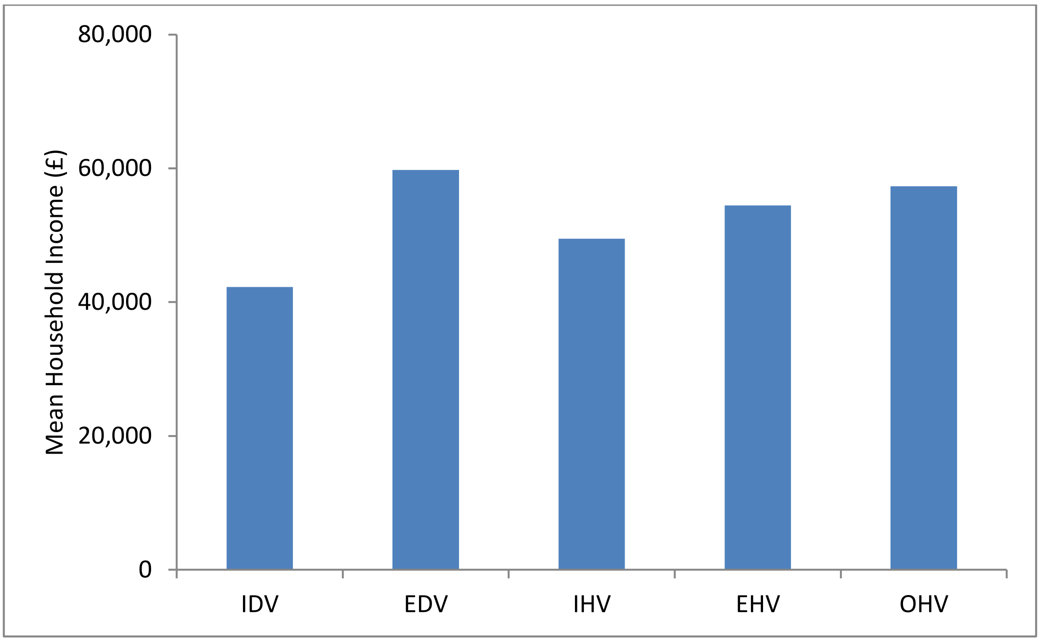
	Employed full time	**Employed part time**	**In full-time education**	**Looking after home / family**	**Retired**	**Unemployed**
Internal day visitor	349	38	12	15	10	2
(%)	(81.9)	(8.9)	(2.8)	(3.5)	(2.3)	(0.5)
External day visitor	4	-	1	-	-	-
(%)	(80.0)	-	(20.0)	-	-	-
Internal holiday visitor	21	2	1	-	1	-
(%)	(84.0)	(8.0)	(4.0)	-	(4.0)	-
External holiday visitor	17	-	1	-	-	-
(%)	(94.4)	-	(5.6)	-	-	-
Overseas holiday visitor	3	-	-	-	-	-
(%)	(100)	-	-	-	-	-
Total	394	40	15	15	11	2
(%)	(82.7)	(8.4)	(3.1)	(3.1)	(2.3)	(0.4)

Source: Author

5.4.2 Household income characteristics of off-road cycling day / holiday visitors

Mean annual household income was calculated for all day and holiday visitor sub-groups; this can be seen in Figure 5.1. Comparing the results of the study to the average household income for England, shows that all visitor groups record household incomes above the national average (£36,972) (Income and source of income by UK Countries and regions, 2009-2011). This result is consistent with the results for socio-economic grade which showed that the majority of respondents belonged to socio economic class A or B. This is discussed further in the following section. Due to a lack of data it was not possible to compare the income results from this study with other off-road cycling sites.

Figure 5.1 Day and Holiday visitor mean household income



IDV Internal Day Visitor
EDV External Day Visitor
IHV Internal Holiday Visitor
OHV Overseas Holiday Visitor
Source: Author

5.4.3 Socio-economic characteristics of off-road cycling day and holiday visitors

For the purposes of identifying the socio-economic classifications of respondents, occupation data relating to the main wage earner (Q51) were re-coded to reflect the standard socio-economic classifications used by the National Readership Survey (NRS). Capturing this information was considered important, because social inclusion had been identified as a significant issue by the earlier feasibility study (Tym et al, 2006: 5). The NRS classification was chosen in preference to the more complex National Statistics Socio-Economic Classification System (NS-SEC), because it provided a more efficient method of classifying respondents. It should be noted that the NS-SEC system mirrors the NRS system when the occupation categories are condensed into the core occupation categories. Using the NRS system, the occupation data for the main wage earner was re-coded into the standard NRS social grades which range from A-E. For the purposes of this study, state pensioners and students were separated from the main categories. Students are normally categorised as 'Not graded' and state pensioners are normally classified as belonging to Grade E. By separating these groups comparisons can be more readily made between the socio-demographic characteristics outlined in this chapter.

The socio-economic classifications for all visitor groups can be seen in Table 5.6. The majority of respondents within each category stated that the occupation of the main wage earner in the household was of a 'Higher managerial, administrative or professional' nature. This corresponds to socio-economic class A, which represents the highest social grade classification. Social class B is the second highest classification for all visitor groups. The third highest group within the sample is socio-economic grade C2 which relates to skilled manual occupations. Kruskall-Wallis analysis of the groups found no statistical relationship between visitor type and socio-economic grade.

Table 5.6 Socio-economic profile for off-road cycling day / holiday visitors (n = 378)

Visitor type	NRS(National Readership Survey) socio-economic grades							
	A	B	C1	C2	D	E	NG*	Pen**	*H* 0.152
Internal day visitor	127	91	36	60	11	2	5	4	
(%)	(37.8)	(27.1)	(10.7)	(17.9)	(3.3)	(0.6)	(1.5)	(1.2)	
External day visitor	3	1	-	-	-	-	1	-	
(%)	(60.0)	(20.0)	-	-	-	-	(20.0)	-	
Internal holiday visitor	9	6	-	2	-	-	-	1	
(%)	(50.0)	(33.3)	-	(11.1)	-	-	-	(5.6)	
External holiday visitor	7	6	1	2	-	-	-	-	
(%)	(43.8)	(37.5)	(6.3)	(12.5)	-	-	-	-	
Overseas holiday visitor	3	-	-	-	-	-	-	-	
(%)	(100)	-	-	-	-	-	-	-	
Total	149	104	37	64	11	2	6	5	
(%)	(39.4)	(27.5)	(9.9)	(16.9)	(2.9)	(0.5)	(1.6)	(1.3)	

*NG = Not graded (Student classification)
**Pen = State Pensioner classification
Source: Author

The observed socio-economic classifications are consistent with those identified at the 7 Stanes off-road cycling centres where the most common social class grades were AB followed by C1 and C2 (7 Stanes Phase 2 Evaluation, 2007: 37). The observations are also broadly in line with Cameo socio-economic analysis conducted as part of the feasibility study. This analysis used multiple socio-demographic variables derived from census data to identify the socio-economic background of site visitors. Whilst the regional Cameo dataset does not solely focus on social grade, the study identified four key groups which account for 70% of the total cyclists interviewed. These groups are listed below:

- Affluent Home Owning Couples and Families in Large Houses
- Suburban Home Owners in Smaller Private Family Homes
- Less Affluent Family Neighbourhoods
- Less Affluent Singles & Students in Urban Areas

(Tym et al, 2006: 16)

Due to the dominance of these groups within the profile, the study identified social inclusion as a significant issue as it found that 83% of the base population of the South West were underrepresented within the sample. The results of the current study support the assessment that the site attracts visitors from a narrow socio-economic profile, as the site is predominantly used by visitors belonging to the two highest socio-economic groups (A and B). The underrepresentation of lower socio-economic grades within the visitor profile could be a focus for developing the park in the future; this is discussed further in Chapter 6.

5.5 Haldon Forest Park: off-road cycling visit characteristics

This section has the aim of understanding the visit dimensions of both day and holiday visitors to Haldon Forest Park. The first aspect to consider is whether the respondents surveyed had previously visited the site, this provides important information about the proportion of new visitors within the different day and holiday visitor sub-groups. The section then examines the seasonal patterns of visitation, visitation frequency, visit duration, and group composition for day and holiday off-road cyclists.

5.5.1 Previous visits to Haldon Forest Park

Table 5.7 shows the percentage of respondents within the day and holiday visitor sub-groups who had previously visited Haldon Forest Park.

Table 5.7 Comparison of previous and new day and holiday visits to Haldon Forest Park

Visitor type	Previous Visitors	New Visitors
Internal day visitor (n = 430)	392	38
(%)	(91.2)	(8.8)
External day visitor (n = 5)	2	3
(%)	(40.0)	(60.0)
Internal holiday visitor (n = 26)	8	18
(%)	(30.8)	(69.2)
External holiday visitor (n = 18)	8	10
(%)	(44.4)	(55.6)
Overseas holiday visitor (n = 2)	1	1
(%)	(50.0)	(50.0)
Total (n = 481)	411	70
(%)	(85.4)	(14.6)

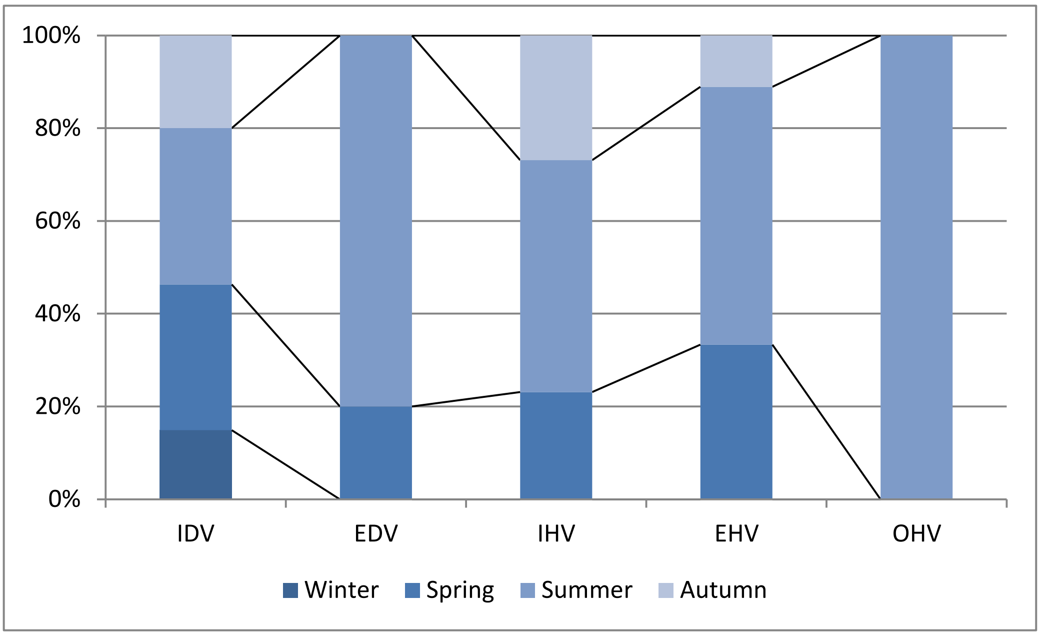
Source: Author

The internal day visitor category shows the smallest percentage of new visitors (8.8%). This is unsurprising given the park's close proximity to Exeter, ease of access from the A38, and its prominence as a local recreation facility. However, it is important to note that this category is still growing, as new internal day visitors discover the park for the first time. The external day visitor category shows a more even split albeit with a slight bias towards new visitors, with 60.0% of visitors stating that they had not previously visited the site. Whilst the sample size for this category is very small, the result does indicate that Haldon Forest Park is recognised as a facility that is worth travelling to from outside the South West region for a day visit. The internal holiday visitor category reveals an even higher proportion of new visitors (69.2%). This result highlights the opportunity for promoting the site and the wider 1SW trail network to South West residents. This would also help retain expenditure within the region. The external holiday visitor category is almost evenly split between new and previous visitors. This category has the potential to be developed through the promotion of the region as a cycling destination and through promotion of individual sites to non-primary purpose visitors who may want to experience off-road cycling as part of a general holiday trip. This aspect is discussed further in Chapter 6. The overseas holiday visitor category is more difficult to draw inferences from due to the very small sample sizes obtained. However, this visitor segment could be grown though the promotion of the sites to the general holiday market which would potentially capture overseas visitors staying within the area. The Cycle West project offers further opportunities for promoting off-road cycling to overseas visitors. This project aims to link French cycling routes in Brittany and Normandy with cycling routes in the South West (Cycle West, 2011). Chapter 6 considers the opportunities for developing the tourist offer in greater detail.

5.5.2 Haldon Forest Park seasonal visit patterns for day and holiday visitors

Understanding the seasonal use of the site by different groups has important implications for managing and promoting the site as a recreation destination. Figure 5.2 shows the proportions of visitors surveyed within the different seasons. Internal day visitors represent the only visitor sub-group to be identified throughout the year. Of these visitors, 60% were surveyed during spring and summer.

Figure 5.2 Day and holiday visitor seasonal site usage



IDV Internal Day Visitor
EDV External Day Visitor
IHV Internal Holiday Visitor
OHV Overseas Holiday Visitor

Source: Author

From Figure 5.2 it can be seen that the distribution of visitors within these seasons is almost even. This pattern is also broadly observed for the autumn and winter months. For internal day visitors, the site is a year round destination which exhibits an increase in visitors during the spring and summer months. This fits with the notion that ‘fair weather’ cyclists swell the visitor proportion during these months. External day visitors were identified during the spring and summer months. Weather conditions are also likely to be responsible for the presence of external day visitors at these times. It is likely that favourable weather conditions encouraged respondents to travel for longer to visit the site from outside the South West. Internal holiday visitors were identified in three out of the four seasons, the exception being winter. Almost 60% of visitors were identified during the summer months; the remaining visitors were split almost evenly between spring and autumn. The presence of internal holiday visitors in three out of the four seasons mirrors key school holiday periods, Easter, summer and October half term. This result has important implications for tourism promotion as it demonstrates that site use begins before, and extends beyond the summer tourism season. A similar three season pattern is observed for the external holiday visitor category. However, the pattern of use does differ from the internal holiday visitor category, with site usage skewed towards the spring and summer seasons. Overseas holiday visitors were only identified during the summer season; this observation fits with the idea that these respondents were visiting the UK for a summer holiday.

5.5.3 Visit duration of off-road cycling day and holiday visitors

Visit duration is an important consideration as it provides an indication of how the site is being used; importantly it is also related to expenditure. Parking fees at Haldon Forest Park are broken down into two time periods, up to two hours and over two hours. From Table 5.8 it can be seen that the mean onsite dwell time for all visitor subgroups was above the two hour cut-off.

Table 5.8 Day and holiday visitor site dwell time (mean hours)

Visitor type	Mean dwell time (Hours)
Internal day visitor	3.1
External day visitor	3.9
Internal holiday visitor	3.1
External holiday visitor	3.5
Overseas holiday visitor	3.7

Source: Author

Importantly onsite dwell time does not appear to be directly related to the time required to ride any of the off-road cycling trails. According to the official trail map (see Appendix 5), the blue graded Challenge trail (the longest trail) will take a maximum of 1.5 hours to complete. Personal experience of leading novice cycling groups at a steady pace around this trail, confirms that this timescale is realistic and indeed generous. Given that dwell time does not appear to be a direct function of individual trail length, it can be said that off-road cyclists are choosing to stay onsite longer than the maximum length of time needed to ride the longest trail. Internal day and holiday visitors were calculated to have the shortest mean dwell time of 3.1 hours. This was followed by the external holiday visitor category, which recorded a dwell time of 3.5 hours. Overseas holiday visitors and external day visitors recorded the longest dwell times of 3.7 and 3.9 hours respectively. The observed longer dwell time for external day visitors in comparison to internal day visitors is most likely due to the increased travel distances involved in reaching the site. The rationale for this is that external day visitors will choose to spend longer onsite in order to make the longer journey worthwhile. For internal day visitors who can access the site more quickly this factor is not as important. The observed difference in dwell time between internal and external holiday visitors is more difficult to explain as it is less likely to be linked to travel time, as both groups are staying in the area on holiday. Overseas holiday visitors were found to stay onsite for broadly the same length of time as external holiday visitors.

In summary, it appears that dwell time is not simply related to the length of time needed to ride the longest trail at Haldon Forest Park. This is an important distinction as it indicates that respondents are riding multiple laps, and or multiple trails. This observation is supported by the trail usage analysis shown in Section 4.5.1, where it was identified that 73% of users rode both the Ridge Ride (Red graded) and Challenge (Blue graded) trails during their visit.

Whilst dwell time cannot be seen purely as riding time, as it will also invariably include additional time associated with unloading and loading bikes from cars, rest stops and other non-riding time factors. The observation that the majority of visitors ride the Ridge Ride and Challenge Trails also indicates that their cycling ability is sufficient to ride both trails and that they are not restricted in their trail choice. Overall, these results suggest that whilst the individual trails at Haldon Forest Park are relatively short in nature, the maximum being six miles in length; the combination of the provided trails and facilities provide sufficient opportunity and interest to keep visitors onsite for between three and four hours.

5.5.4 Visitation frequency of off-road cycling day and holiday visitors

Question 18 of the survey instrument asked respondents if they would come back and ride the trails at Haldon Forest Park again. This represents a measure of respondent satisfaction in relation to the off-road cycling facilities provided. The responses to Question 18 are shown in Table 5.9.

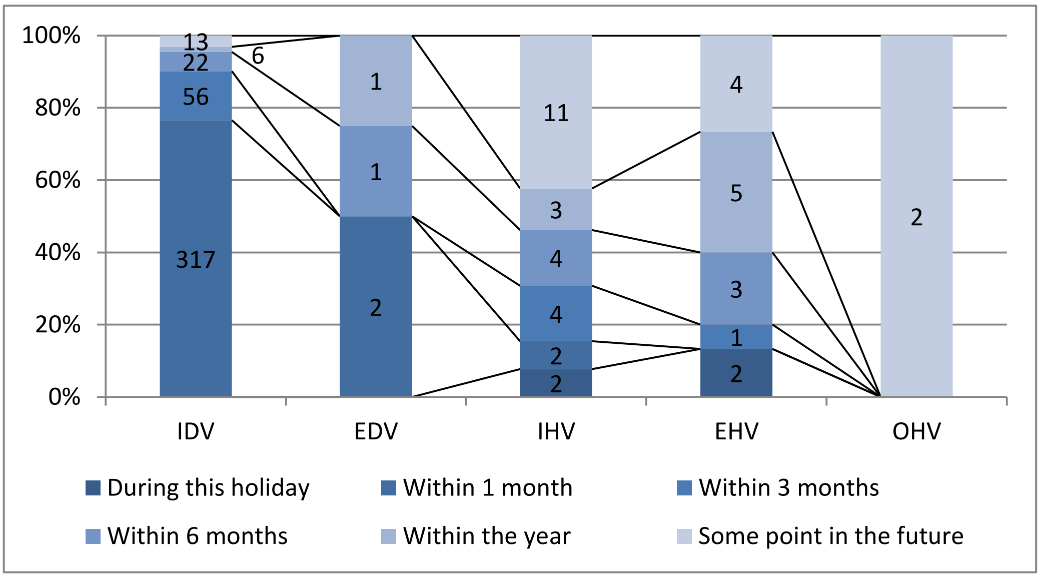
Table 5.9 Day and holiday visitor intention to return to Haldon Forest Park

Visitor type	**Intention to return**	
	Yes	**No**
Internal day visitor (n = 430)	428	2
(%)	(99.5)	(0.5)
External day visitor (n = 5)	5	0
(%)	(100)	
Internal holiday visitor (n = 26)	26	0
(%)	(100)	
External holiday visitor (n = 18)	16	2
(%)	(88.9)	(11.1)
Overseas holiday visitor (n = 3)	2	1
(%)	(66.7)	(33.3)
Total (n = 482)	477	5
(%)	(99.0)	(1.0)

Source: Author

Overall the question responses present a very positive picture, with 99.5% of internal day visitors stating that they would come back and ride the trails. The results from the external day visitor group show that all respondents would visit the site again; this indicates strongly that these visitors considered the site visit to be worth the additional travel time incurred in visiting the site. Internal holiday visitors were also unanimous in their response that they would return to the site. For the external holiday category 88.9% of visitors stated that they would return to the site, again indicating a highly positive experience at the site. A return rate of 66.7% was observed for overseas visitors. Whilst this represents the lowest return rate of all visitor groups, a lower return rate for this category is not unexpected given the additional time and cost involved in returning to the site. Building on the previous discussion concerning the overall intention to return expressed by respondents, Figure 5.3 presents the return timescale expressed by respondents. This provides a more detailed picture of the site's importance and the frequency of visits made by different user groups.

Figure 5.3 Day and holiday visitor return timescale



IDV Internal Day Visitor EDVExternal Day Visitor
IHV Internal Holiday Visitor
OHV Overseas Holiday Visitor

Source: Author

Figure 5.3 shows that 76.6% of internal day visitors stated that they intended to return to the site within one month. A further 13.5% stated that they would return within three months. This high frequency of return indicates the importance of the site to this visitor group and demonstrates that the site is a regular feature of their off-road cycling routine. Overall, external day visitors visit the site less frequently; this observation fits with the group profile as they have to travel from outside the South West to visit the site. However, 50.0% of the respondents stated that they would visit the site again within one month indicating that travel distance may not be a factor for some external day visitors. The remaining external day visitors stated that they intended to return within six months (25.0%) or within the year (25.0%). However, these observations should be treated with caution due to the small sample sizes obtained from this visitor subgroup.

Return rates for the internal holiday visitor subgroup exhibited an overall split between visitors with return rates less than a year (57.7%) and those that would return at some point in the future (42.3%). It was also observed that 7.7% of internal day visitors stated that they would return to the site within their holiday period. A further 7.7% indicated that they would return within one month. However, it should be remembered that return visits may be as a day trip and not as a subsequent holiday, as the question only focuses on when respondents intend on returning and not the type of return trip.

External holiday visitor return rates were split between five of the six categories, the exception being the return within one month option. Of these respondents 13.3% stated that they intended to return within their holiday period, which highlights the importance of the trails for these visitors. A further 20.0% of visitors stated that they would return within six months which suggests that off-road cycling in the South West may form a semi-regular pattern for these visitors. The largest proportion (33.3%) stated that they would return within the year, and 26.7% of visitors stated that they would return at some point in the future. The combined overall observation that 73.3% of respondents will return within the year is likely to be related to respondent social links to the South West. In Section 4.8 it was identified that 51.1% of all holiday visitors stated that they were staying with friends or relatives during their visit. This is an important factor, as these respondents can be identified as semi-regular visitors to Haldon Forest Park. For the valid overseas respondents, both stated that they intended to return at some point in the future. This can be regarded as a positive observation for this group as it is less likely that these respondents would return on a frequent basis. However, it is acknowledged that the observation originates from a very small sample.

5.5.5 Group composition of off-road cycling day and holiday visitors

Group composition is an important explanatory factor in understanding the visitor profile at the site. Question 45 asked respondents to state the number of people under 16, and the number of people (including themselves) who were over 16 years of age in their group. This question enabled the study to indirectly measure site use by individuals under the age of 16. As stated in Section 5.3.2 visitors under the age of 16 were not directly surveyed for ethical reasons. The overall sample was split between adult only groups (71.4%), and adult and under 16 groups (28.6%).

Table 5.10 provides a more detailed breakdown of group composition by visitor type. The internal day visitor category mirrors the overall split between adult only groups and those comprising of adults and individuals under the age of 16. The external day visitor sample was found to contain no individuals under the age of 16. However, this is unlikely to be representative of all external day visitors due to the small sample size collected. The internal holiday visitor category also broadly mirrors the overall group composition distribution. Given that Haldon Forest Park is predominantly promoted as a family orientated recreation facility, the observed skew towards adult only groups is notable. However, this observation refers only to off-road cycling groups and may not reflect the general visitor trend for other activities at Haldon Forest Park. In contrast to the internal holiday visitor sub-group, the external holiday visitor group exhibits a balanced group composition split. The group composition split for overseas visitors was found to broadly reflect the observed overall distribution pattern.

Table 5.10 Day and holiday visitor group composition

Visitor type	**Group composition**	
	Adult only group	**Adult and under 16 group**
Internal day visitor (n = 430)	308	122
(%)	(71.6)	(28.4)
External day visitor (n = 5)	5	0
(%)	(100)	
Internal holiday visitor (n = 26)	20	6
(%)	(76.9)	(23.1)
External holiday visitor (n = 18)	9	9
(%)	(50.0)	(50.0)
Overseas holiday visitor (n = 3)	2	1
(%)	(66.7)	(33.3)
Total (n = 482)	344	138
(%)	(71.4)	(28.6)

Source: Author

Having considered the overall distribution between adult only and groups containing adults and under 16's, the following tables look more closely at the group structure. Table 5.11

shows the group size breakdown for the adult and under 16 category. Internal day visitors were calculated to have the largest mean group size comprising of three under 16's and two adults, giving a total mean group size of five. The internal and external holiday visitor categories exhibit similar group compositions, consisting broadly of two under 16's and two adults. Overseas visitors had the lowest group size of two. However this based on a very small sample size.

Table 5.11 Group composition of adult and under 16 visitors

	Group composition adult and under 16 visitors		
Visitor Group	**Number under 16 (mean)**	**Number over 16 (mean)**	**Total group size (mean)**
Internal day visitors	3.0	2.1	5.1
External day visitors	-	-	-
Internal holiday visitors	2.0	1.5	3.5
External holiday visitors	1.9	1.9	3.8
Overseas holiday visitors	1.0	1.0	2.0

Source: Author

For the adult only group, the overall group size was found to be generally smaller than the adult and under 16 group, this is shown in Table 5.12. With the exception of the external day visitor category, the remaining sub-groups were found to have a consistent group size of approximately three people. For the external day visitor category the mean group size comprised of two people.

Table 5.12 Group composition of adult only visitors

Visitor group	Adult only visitor group size (mean)
Internal day visitors	2.6
External day visitors	1.8
Internal holiday visitors	2.5
External holiday visitors	3.0
Overseas holiday visitors	2.5

Source: Author

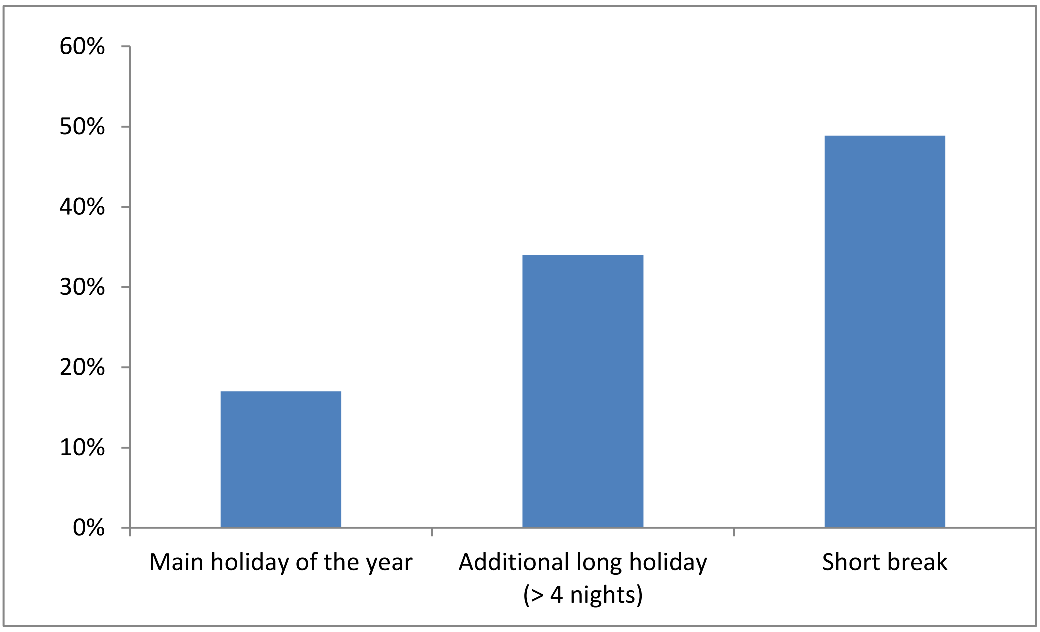
5.6 Holiday visitor trip characteristics

Throughout the first half of this chapter the analysis has focused on the visit characteristics of the different day and holiday visitor sub-groups. In contrast, this section focuses on three key characteristics which are specific to the holiday visitor sub-groups. The following sub-sections examine the holiday type and length of stay, and accommodation characteristics for visitors who are not staying with friends or relatives during their visit.

5.6.1 Holiday type and nights away from home

Respondents were asked to indicate whether their holiday to the South West was their main holiday of the year, an additional long holiday or a short break. The overall breakdown of visit types for all holiday visitors is shown in Figure 5.4.

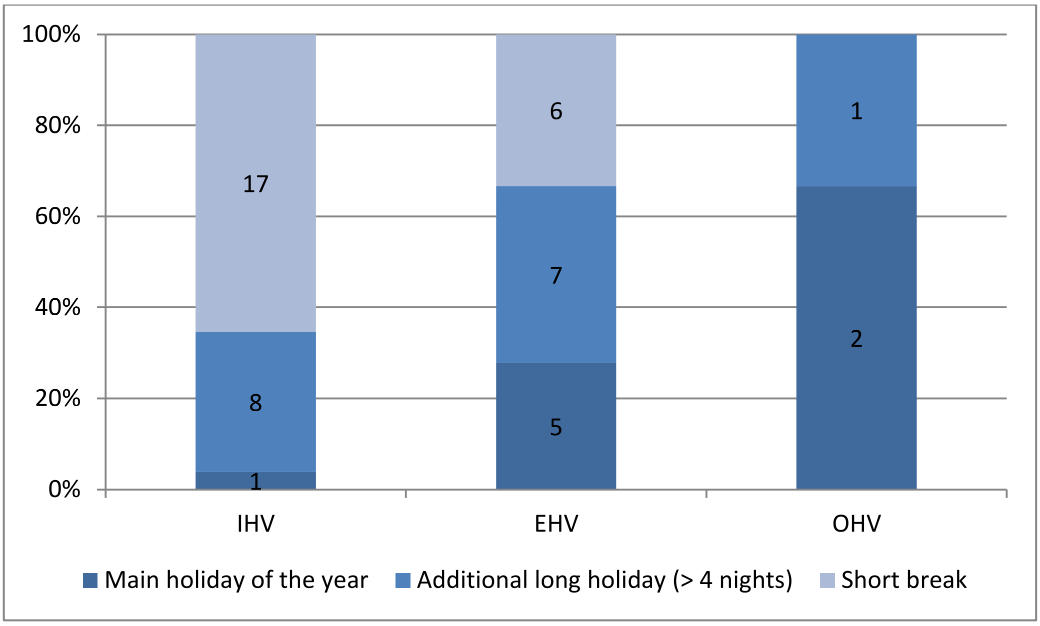
Figure 5.4 Overall distribution of visit types by holiday visitors



Source: Author

Nearly half of all respondents were recorded as being on a short break (48.9%), a further 34.0% of visitors stated that their trip was an additional long holiday, and 17.1% stated that their trip was their main holiday of the year. Figure 5.5 presents a more detailed breakdown of the types of holiday taken by the different visitor sub-groups. Internal holiday visitors recorded the lowest proportion of main holiday visitors (3.8%), but accounted for the highest proportion of short break visitors (65.4%). This trend fits with the visitor profile, as their visit took place within their home region. In contrast the external holiday visitor category reveals an almost even distribution between the three categories. For overseas visitors, a 2:1 split was observed between the main holiday and additional long holiday categories.

Figure 5.5 Type of holiday by holiday visitor sub-group



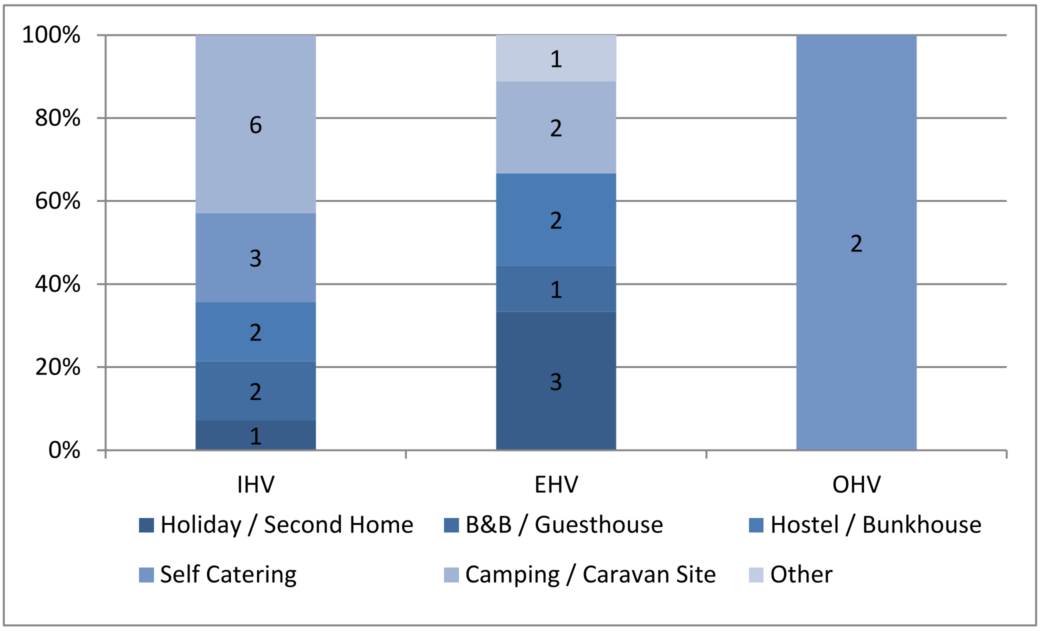
IHV Internal Holiday Visitor
EHV External Holiday Visitor
OHV Overseas Holiday Visitor
Source: Author

5.6.2 Accommodation type (Non VFR holiday visitors)

Around half of all holiday visitors stated that they were staying in private accommodation and not with friends or relatives during their visit. Figure 5.6 shows the proportional breakdown of accommodation chosen by the different holiday visitor sub-groups. Accommodation is a key expenditure component which varies by type. By identifying the type of accommodation used, a more detailed picture of the spending patterns and behaviour of the different holiday visitor sub-groups can be formed. From the breakdown shown in Figure 5.6, a broad distribution of accommodation types can be identified for the internal and external holiday visitor categories. In contrast, self-catering accommodation was chosen by all of the overseas holiday visitors sampled. However, due to the limited sample size this observation should be treated with caution. For the internal holiday visitor sub-group, camping / caravan sites represent the most popular accommodation type, accounting for

42.9% of the sample. Self-catering accommodation shows the second highest proportion (21.4%) and hostel and B&B accommodation each account for 14.3% of the total. Second homes occupy the smallest proportion of respondent accommodation (7.1%). In contrast, second homes account for a third of all external holiday visitor accommodation, representing the largest single proportion within the visitor sub-group. Camping and hostel accommodation comprise the second most popular accommodation types each accounting for 22.2% of the total. The remaining sample is split evenly between B&B and other accommodation. For the respondent who stated 'other' as the accommodation type, their accommodation was identified as being a campervan.

Figure 5.6 Non-VFR holiday visitor accommodation



EHV External holiday Visitor
IHV Internal Holiday Visitor
OHV Overseas Holiday Visitor

Source: Author

5.7 Haldon Forest Park visitor segmentation

The analysis so far has focused on examining the socio-economic differences between day and holiday visitors. In this second part, a more detailed typology of all users is developed according to their off-road cycling preferences and behaviour. This aspect was analysed using cluster analysis, a multivariate technique designed to identify variations among respondents based on their characteristics. Multivariate analysis techniques require multiple input variables, which when computed, normally result in the formation of multiple outcome variables (Field, 2009: 790). Cluster analysis was introduced as an analysis technique in Section 3.6 where it was stated that the technique was well matched to address the needs of Objective 4. This objective is focused on identifying variations among the surveyed respondents in terms of their onsite behaviours and has the purpose of identifying different groups of off-road cyclists and understanding how they interact with the off-road cycling facilities at Haldon Forest Park. This analysis builds on the previous examination of geographical and trip type variations examined in the beginning of this chapter.

5.7.1 Background to the cluster analysis method

As previously discussed, cluster analysis is concerned with classifying data into different groups and was identified as being an appropriate method through which to examine variations among users. As with all research methods, it is necessary to understand the limitations of the technique before conducting the analysis. Whilst cluster analysis is a useful technique with many advantages, the technique does exhibit some important differences to other multivariate methods. Cluster analysis is unique amongst multivariate techniques in that the group of input variables, termed the input variate, are specified by the researcher and not calculated empirically. In order to obtain a valid result, cluster analysis requires good researcher judgement to specify the input variate as it ultimately determines the cluster characteristics (Hair et al, 1998: 473).

This unique attribute is also recognised as a weakness of the method as it provides no statistical basis upon which to derive inferences from a sample to a population (Hair et al, 1998: 474). A further limitation is that cluster analysis will always create clusters even when there is no underlying relationship. The solutions created are also non-unique as multiple cluster results can be formed by varying the input and procedural elements of the process (Hair et al, 1998: 474). For the reasons stated above, cluster analysis is typically used as an exploratory method through which to identify possible natural underlying relationships within a dataset.

For the purposes of addressing the research objective, cluster analysis offered an appropriate technique through which to identify different off-road cycling user groups at the study location. Furthermore, the technique had not previously been used within the context of purpose-built off-road cycling infrastructure and therefore the inability to generalise from the sample was not considered a limitation. Having established the suitability of the technique for addressing the research objective, the next stage of the process involved specifying the cluster variate and selecting an appropriate clustering algorithm to group articles within the dataset.

5.7.2 Input variable selection

Prior to selecting an appropriate cluster variate, it is important to understand how input variables influence cluster segmentation. General guidelines for selecting variables include minimising the number of variables used; this reduces the negative impact of high multicollinearity between variables (Mooi and Sarstedt, 2011: 242. Multicollinearity refers to the level of interrelationship between variables contained in the cluster variate. A high level of multicollinearity makes it difficult to single out the effect of an individual variable on the cluster solution (Hair et al, 1998: 471). To address this problem, where similar variable measures were identified within the questionnaire, correlation analysis was conducted to test for statistical relationships.

Sample size is also a consideration, not only in the choice of clustering algorithm, but also in terms of the ratio of cluster variables to cluster cases. As a guide it has been suggested that minimum sample sizes should be of a magnitude of 2 to the power of the number of variables contained within the cluster variate (Mooi and Sarstedt, 2011: 242). Whilst care should be taken to select variables based on the principles of best practice, the unique subjective nature of cluster analysis means that the researcher must also justify variable selection on the basis of its practical application; this is of particular importance when the analysis will be used to inform future marketing strategies (Mooi and Sarstedt, 2011: 243).

Cluster (input) variables can be classified as being general (independent) or specific (dependent), and observable or unobservable (Mooi and Sarstedt, 2011: 241). Observable general variables include measurable demographic and socio-economic information, whereas unobservable general variables include psychographic or personality information. Specific observable variables are those which directly relate the respondent to a particular variable, for example, frequency of use or brand loyalty. Specific unobservable variables are those which are inferred, and include perceptions, attitudes and user preferences (Mooi and Sarstedt, 2011: 241). It is generally accepted that specific unobservable variables usually result in clusters with greater homogeneity than those created using generally observable variables. However, for marketing purposes, generally observable variables such as demographic information may be favoured as they allow specific demographic groups to be more readily targeted (Mooi and Sarstedt, 2011: 241). In many cases both variable types are used, allowing the benefits of both general and specific variables to be combined.

Appropriate input variables were selected through a systematic process of elimination. This approach had the aim of segregating possible cluster variables from associated profiling variables. Profiling variables were defined as being unsuitable for clustering purposes, but important for defining the characteristics of the identified clusters. Examples of profiling variables included open economic information relating to direct visitor expenditure, and visitor demographics. Demographic variables were rejected for the purposes of clustering, on the grounds that the narrow demographic profile observed in Section 5.3 would make it more difficult to identify variations among visitors. Economic spend was also rejected as an input variable for the following reasons. First, onsite expenditure is comprised of obligatory and discretionary spending (see Section 4.3.4). Due to this distinction, variations in discretionary spending would be restricted to the ‘café’ and ‘other’ expenditure categories. This is because Go Ape spending was not identified during the analysis of day and holiday visitors (see Section 4.6), and parking fees for the purposes of this study were considered to be an obligatory purchase. Moreover, parking fees relate to two time boundaries (see Section 5.5.3) and as a result, expenditure would also be split, therefore restricting the number of differences which could be identified. Bike hire expenditure presents a similar problem, as expenditure would be limited to those visitors who hired a bike. Offsite expenditure was also identified as being an unsuitable cluster input variable. This is because offsite expenditure was only recorded for visitors who were classed as holiday visitors, and therefore this classification would not be applicable to day visitors (the largest visitor group see Section 4.5.2). For these reasons, it was decided that ‘open’ clustering variables should be identified. Variables with open characteristics were defined as being applicable to all visitors regardless of whether they were classified as a day or holiday visitor. For example, variables which followed a filter question were classed as being ‘closed’ because they related to specific groups within the sample.

After careful consideration and some exploratory cluster analysis testing, the decision was made not to use attitudinal variables for the purposes of clustering the dataset. Despite meeting the open variable criteria, attitudinal variables were rejected after preliminary testing, as it was not possible to identify a meaningful cluster solution due to the increased number of input variables. The use of a large number of input variables also increased the potential of multicollinearity between variables (Mooi and Sarstedt, 2011: 242). Furthermore, the attitudinal questions presented in Q38 (see Appendix 6) were found to be too narrow in focus, to identify a distinct cluster solution. It was also reasoned that visitor variations should be identified on the basis of neutral personal factual responses about their visit rather than attitudinal variables relating to their opinion of the site. This would enable the attitudinal information to be used more effectively at the profiling stage, where variations in visitor attitudes could be used to help explain visitor behaviour. This approach would also enable the analysis to test the hypothesis that site interactions and economic transactions are dictated by cycling preferences and behaviour. Therefore, it was appropriate that these variables were used to test the cluster solution during the profiling stage, in preference to their use as input variables.

After excluding attitudinal, expenditure and demographic variables, the remaining variables were categorical and primarily related to personal factual information about cycling preferences, behaviours and visit specific information. The decision to cluster the dataset using categorical input variables had the associated impact of indirectly selecting the clustering algorithm. This is because the choice of algorithm is largely dictated by the type of input variable. As a result, a hybrid algorithm was selected as being the most appropriate method for analysing the categorical input data (see Section 5.7.3).

After taking the decision to use categorical input variables, the remaining variables were assessed for their suitability. This step was conducted to reduce the impact of multicollinearity between clustering variables. The use of closely associated input variables has the negative effect of biasing the cluster solution in favour of a particular attribute group (Mooi and Sarstedt, 2011: 242). Under perfect conditions all variables will be equally important in the formation of the cluster analysis. The following example illustrates this point. Variables relating to off-road cycling experience and grade of trail ridden (Questions 27 and 28, see Appendix 6) were identified as potentially being closely related. This was based on the hypothesis that the grade of trail ridden was related to off-road cycling experience, i.e. more experienced riders would ride more technically difficult trails. To test this hypothesis, a Spearman's correlation test was conducted to measure the linear relationship between the two variables. This test found that there was a statistically significant relationship between the variables at the ($p < .01$; 1-tailed) confidence level ($r_s = .606$). Therefore, it would be inappropriate to use both input variables within the cluster variate. Each of the remaining variables were checked and eliminated in this manner until the final cluster input variables were derived, as shown below:

Q16: Did you bring your own bike with you for this visit?

Q25: Where do you prefer to cycle? (6 response options)

Q27: How long have you been cycling off-road?

Q34: Last year did you ride at any other purpose built off-road cycling sites in the UK?

The four questions comprising the cluster variate represent key neutral attributes which were used to identify variations among off-road cyclists. The use of neutral attributes was important in the selection process; site specific variables were not included, as their use would prevent a comparative study from being conducted in the future. The input variables included a mix of specific observable and unobservable values, which relate to the following four attribute themes: commitment, cycling preferences, cycling experience, and mobility. Bike ownership was selected as it provides an indication of cycling commitment and is directly related to hire bike use. Cycling preferences were identified as a good input variable as they relate directly to the different disciplines and infrastructure which characterise the activity. Segmenting the dataset by preference also has practical merit, as the information has the potential to be used to inform the management of existing sites as well as the development requirements of future cycling infrastructure. Off-road cycling experience was identified as an important input variable for identifying variations between off-road cycling visitors. Question 27 was selected over Question 28 (see Appendix 6) for this purpose as it provided a less subjective measure of experience. Question 28 used a self-ranked measure of experience, requiring respondents to indicate whether they were a beginner, intermediate, advanced, or expert off-road cyclist. During surveying it was observed that this question occasionally became a point of discussion between respondents who were unsure as to where to rank their experience. In light of this, it was felt that peer group pressure could have influenced the response, and for this reason Question 28 was rejected.

The final input attribute provides an indication of mobility between different off-road cycling sites. This behavioural attribute had the purpose of investigating visitor variations based on their desire to seek out new off-road cycling experiences. Understanding respondent mobility also has significant practical value for market segmentation purposes, the information can be used to target and promote different cycling experiences to different user groups through tailored marketing strategies. Furthermore, this variable relates to cycling commitment and indirectly expenditure, based on the hypothesis that more frequent visitors to off-road cycling sites will incur higher travel costs. In addition, it can be hypothesised that these visitors are also more likely to spend more on other related items due their increased engagement with the activity, and its importance as a leisure time commitment.

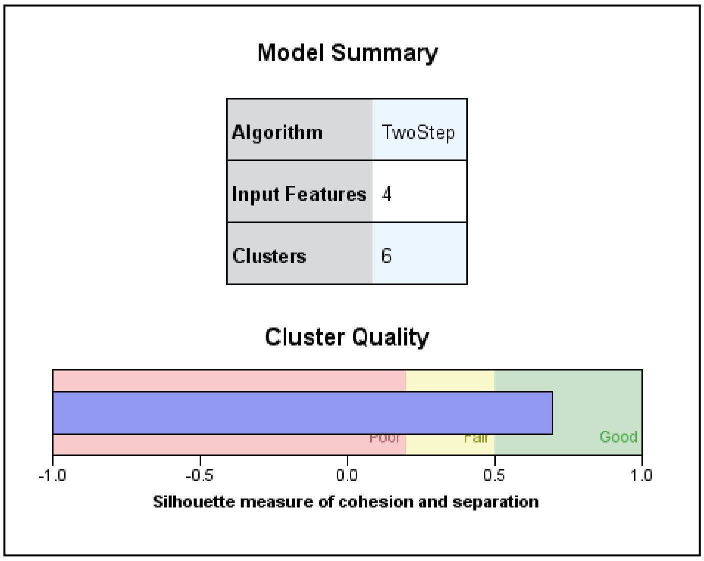
5.7.3 Method of cluster analysis

Whilst clustering can be conducted using hierarchical, non-hierarchical or hybrid algorithms (Hair et al, 1998: 492), the choice of algorithm is largely dependent on the variable type or types used to form the cluster variate. In the previous section it was stated that a hybrid algorithm would be required to analyse the dataset due to the selection of categorical input variables. For this purpose, SPSS TwoStep, a hybrid two-stage hierarchical algorithm (Mazzocchi, 2008:271) was chosen. The technique is suitable for use with mixed and or categorical variables and is capable of handling large datasets (several millions of cases) (Bacher, Wenzig and Vogler, 2004: 21).

5.7.4 Cluster Solution

An automatic six cluster solution was derived using the SPSS TwoStep algorithm from the cluster variate. This solution produced a log-likelihood silhouette coefficient of 0.7 which is shown in Figure 5.7). The silhouette coefficient is a distance measure of cohesion and separation between the clusters. Using this measure, cluster quality is measured on a scale from -1 to +1. A value of +1 indicates the highest quality solution where the internal distance between cases is small and the distance between clusters is large (Norušis, 2012: 397). The observed value of 0.7 falls within the 0.5 - 1.0 range, which is indicative of a good quality cluster solution (Norušis, 2012: 382).

Figure 5.7 Model Summary: Six cluster solution



Source: Author

The next stage of the analysis involved interrogating the automatically derived six cluster solution in a series of repeat tests to extract different cluster solutions using user specified cluster parameters. These tests revealed no improvement in cluster quality and did not identify any additional cluster groups. It was therefore decided that the automatic cluster solution should be accepted, a decision which also reduced the level of user subjectivity involved in the analysis. Cluster analysis is heavily reliant on good researcher judgement for specifying the input variate (Hair et al 1998: 473) and it was therefore considered more objective to accept a solution which had not required any additional user interference.

The six derived clusters, together with key additional explanatory demographic profiling variables, are presented in Table 5.13. It should be noted that the presented cluster solution represents 71.2% of the overall sample; therefore 28.8% of the cases were eliminated by the algorithm from the final cluster solution. When this observation was explored, it was identified that these cases related to input variable Q25 (see Appendix 6). This variable required a single response answer to the question: *Where do you prefer to cycle?* However, it was found that 138 cases contained multiple answers which meant that they were ineligible for inclusion within the analysis. Whilst it is a limitation that these cases could not be incorporated within the analysis, the proportion of valid cases (343) was considered to be of sufficient magnitude to enable meaningful results to be obtained. Furthermore, this limitation was restricted to one variable within the cluster variate, and this question had not been previously identified as problematic during the structure analysis of the pilot questionnaire instrument (see Section 3.4.6). For these reasons it was considered appropriate to accept this limitation and conduct the analysis using only the valid cases.

Each cluster was also assigned a name which typified their off-road cycling characteristics in relation to the four cluster variate attribute themes: commitment, cycling preferences, cycling experience, and mobility. Within the table the overall and internal variable importance figures are also presented. Choice of cycling location represents the most important variable, followed by bike ownership, length of off-road cycling experience and visitation to other off-road cycling sites. Under perfect conditions all variables should be of equal importance within the overall solution (see Section 5.7.2). In practice, this is difficult to achieve due to variations in the number and characteristics of the input variables used (Norušis, 2012: 38). However, as Table 5.13 shows, in addition to the overall distribution, variable importance also affects the variable distribution within the clusters, this is discussed in greater detail in Section 5.8.

Within the overall solution, clusters 1 and 6 comprise the largest groups containing 91 and 116 cases respectively. Cluster 3 forms the next smallest group containing 48 cases, the remaining three clusters (clusters 2, 4, and 5) are broadly even in size and comprise 32, 29, and 27 cases respectively. The ratio of cluster variables to cluster cases was highlighted in Section 5.7.2, where it was suggested that minimum cluster sizes should be of a magnitude of two to the power of the number of variables contained within the cluster variate (Mooi and Sarstedt, 2011: 242). For the cluster solution shown this would mean that a minimum cluster size of 16 should be observed for each cluster group. From Table 5.13 it can be seen that all of the clusters exceed this measure, this provides further evidence that an appropriate solution has been derived.

Table 5.13 Cluster solution

Cluster Number	**1**	**2**	**3**	**4**	**5**	**6**
Cluster size	91 Cases (26.5%)	32 Cases (9.3%)	48 Cases (14.0%)	29 Cases (8.5%)	27 Cases (7.9%)	116 Cases (33.8%)
Valid Cases	343					
Question / Input variable						
Q25 Where do you prefer to cycle? *(Variable importance: 1.00)*	Off-road cycling sites (100%) ***I.V.I = 2**	Off-road cycling sites (56.2%) ***I.V.I = 3**	Public rights of way (62.5%) ***I.V.I = 1**	Cycle paths (89.7%) ***I.V.I = 1**	Off-road cycling sites (100%) ***I.V.I = 4**	Off-road cycling sites (100%) ***I.V.I = 2**
Q16: *Did you bring your own bike?* *(Variable importance: 0.62)*	Yes (100%) ***I.V.I = 4**	No (100%) ***I.V.I = 1**	Yes (100%) ***I.V.I = 3**	Yes (100.0%) ***I.V.I = 2**	Yes (100%) ***I.V.I = 3**	Yes (100%) ***I.V.I = 4**
Q27: *How long have you been cycling off-road?* *(Variable importance: 0.55)*	More than a year (100%) ***I.V.I = 3**	More than a year (62.5%) ***I.V.I = 2**	More than a year (100%) ***I.V.I = 2**	More than a year (79.3%) ***I.V.I = 4**	Less than a year (96.3%) ***I.V.I = 1**	More than a year (100%) ***I.V.I = 3**
Q34: *Last year did you ride at any other trail centre sites in the UK?* *(Variable importance: 0.45)*	Yes (100%) ***I.V.I = 1**	No (65.6%) ***I.V.I = 4**	Yes (52.1%) ***I.V.I = 4**	No (69.0%) ***I.V.I = 3**	No (96.3%) ***I.V.I = 2**	No (100%) ***I.V.I = 1**

*Internal Variable Importance (I.V.I)
Source: Author

Table 5.14 Key Cluster Characteristics

Cluster Number	**1**	**2**	**3**	**4**	**5**	**6**	***H***
Label	***Active trail centre explorers***	***Non bike-owners***	***Active off-road explorers***	***Cycle path adventurers***	***New trail centre riders***	***Active trail centre riders***	
Cluster size	91 Cases (26.5%)	32 Cases (9.3%)	48 Cases (14.0%)	29 Cases (8.5%)	27 Cases (7.9%)	116 Cases (33.8%)	
Valid Cases	343						
Demographic characteristics							
Gender							37.40**
Male	85 (93.4%)	19 (59.4%)	46 (95.8%)	17 (58.6%)	23 (85.2%)	94 (81.0%)	
Female	6 (6.6%)	13 (40.6%)	2 (4.2%)	12 (41.4%)	4 (14.8%)	22 (19.0%)	
Mean Age	39	37	42	40	34	38	20.45**
Visit Characteristics							
Trip Type							42.13**
Day visitors	78 (85.7%)	19 (59.4%)	46 (95.8%)	26 (89.7%)	27 (100%)	111 (95.7%)	
Holiday visitors	13 (14.3%)	13 (40.6%)	2 (4.2%)	3 (10.3%)	0. n (0%)	5 (4.3%)	
Adult only group	74 (81.3%)	20 (62.5%)	36 (75%)	15 (51.7%)	22 (81.5%)	85 (73.3%)	
Adult and under 16 Group	17 (18.7%)	12 (37.5%)	12 (25%)	14 (48.3%)	5 (18.5%)	31 (26.7%)	12.80*
Years of off-road cycling experience (mean)	12	11	12	13	0.n	10	
Onsite expenditure (Mean £)	7.24	34.72	9.54	6.01	5.96	6.67	
Offsite expenditure (Mean £)	46.73	43.99	19.11	22.55	20.84	29.18	
Visit duration (Mean hours)	3.5	3.8	2.9	2.8	3.2	2.9	32.69**
Visits to Haldon Forest Park in last 12 months (Mean)	32.8	9.8	17.1	9.9	9.3	22.7	34.93**
Cycling characteristics							
What kind of cyclist are you? (Frequency)							40.91**

Occasional	3 (3.5%)	6 (18.8%)	0 (0%)	6 (3.6%)	7 (25.9%)	12 (10.3%)	
Neither frequent nor occasional	11 (12.8%)	4 (12.5%)	4 (8.7%)	10 (35.7%)	8 (29.6%)	23 (19.8%)	
Frequent	72 (83.7%)	22 (68.7%)	42 (91.3%)	12 (42.9%)	12 (44.5%)	81 (69.8%)	
What kind of cyclist are you? (Seriousness)							50.63**
Casual	3 (3.4%)	7 (21.8%)	5 (11.1%)	12 (46.2%)	10 (38.5%)	11 (10.2%)	
Neither serious nor casual	21 (24.2%)	12 (37.5%)	7 (15.6)	7 (26.9%)	9 (34.6%)	41 (38.0%)	
Serious	63 (72.4%)	13 (40.6%)	33 (73.3%)	7 (26.9%)	7 (26.9%)	56 (51.9%)	
What kind of cyclist are you? (Experience)							70.64**
Inexperienced	3 (3.6%)	5 (15.6%)	0 (0%)	8 (30.8%)	5 (19.2%)	4 (3.6%)	
Neither inexperienced nor experienced	16 (18.8%)	12 (37.5%)	5 (10.9%)	12 (46.2%)	16 (61.5%)	37 (33.6%)	
Experienced	66 (77.6%)	15 (46.9%)	41 (89.1%)	6 (23.0%)	5 (19.2%)	69 (62.7%)	
Off-road cycling ability							76.50**
Beginner	0 (0%)	3 (11.5%)	0 (0%)	7 (25.0%)	4 (16.0%)	1 (0.9%)	
Intermediate	23 (25.3%)	15 (57.7%)	16 (34.0%)	17 (60.7%)	19 (76.0%)	63 (54.8%)	
Advanced	59 (64.8%)	8 (30.8%)	29 (61.7%)	4 (14.3%)	2 (8.0%)	47 (40.9%)	
Expert / Professional	9 (9.9%)	0 (0%)	2 (4.3%)	0 (0%)	0 (0%)	4 (3.5%)	
What grade of trail do you typically ride?							60.22**
Easy	0 (0%)	4 (14.3%)	0 (0%)	3 (10.7%)	0 (0%)	4 (2.9%)	
Moderate	13 (14.3%)	11 (39.3%)	11 (23.4%)	18 (64.3%)	18 (72.0%)	57 (40.7%)	
Difficult	64 (70.3%)	12 (42.9%)	32 (68.1%)	6 (21.4%)	7 (28.0%)	75 (53.6%)	
Severe	14 (15.4%)	1 (3.6%)	4 (8.5%)	1 (3.6%)	0 (0%)	4 (2.9%)	

** Significant at p≤.01

Source: Author

5.8 Basic cluster descriptions

The following sections describe the six cluster groups with regards to the key attributes shown in Table 5.13 and Table 5.14. The cluster labels were derived from the internal variable importance (I.V.I) scores shown in Table 5.13. These were used to identify the most important cluster variate attributes within each of the cluster groups. Once labelled, the groups were further examined in relation to the key profiling variables shown in Table 5.14. These variables were identified as statistically significant during cluster profiling (see Section 5.9). Onsite and offsite expenditure figures for the cluster groups are also provided within Table 5.14. It should be noted that these figures cannot be directly compared to the expenditure figures calculated in Section 4.6, as it was not possible to segment cluster expenditure into the individual day and holiday visitor sub-groups, due to sample size restrictions when apportioned to this level. However, the figures do provide a general overview of the expenditure variations within the cluster groups. This aspect is discussed in more detail in Section 5.10.2. Kruskall-Wallis test statistics are also included within Table 5.14 to highlight statistically significant variable differences between the cluster groups. These further characterise the cluster groups and provide a framework for the more detailed profile analyses presented in Section 5.10.

5.8.1 Cluster 1: Active trail centre explorers

Cluster 1 is the second largest segment containing 91 respondents of which 93.4% were male. The I.V.I results (see Table 5.13) show that the most important characteristic for the cluster is the observation that all respondents stated that they had ridden at another UK purpose built cycling site during the previous year. For this reason, the group can be described as ‘explorers’ as they are known to travel to other sites. The second most important attribute is their choice of off-road cycling infrastructure, with 100% of respondents stating that they preferred to only ride at purpose built off-road cycling facilities. The third most important attribute is the observation that all respondents had more than one year's off-road cycling experience. The mean number of years' experience for this group was found to be 12 years. Their experience is also reflected in the profiling results for general and off-road cycling experience (see Table 5.14). For general cycling experience, 77.6% of the respondents described themselves as 'Experienced'. Furthermore, 64.8% of respondents described themselves as cyclists with 'Advanced' off-road cycling ability. This observation also matches the trail grade profile for the group with 70.3% of respondents stating that they typically rode technically difficult trails. The group can also be categorised as frequent off-road cyclists with 83.7% of respondents stating that they cycled 'frequently' or 'very frequently' (see Table 5.14). This is also reflected in the mean number of visits the group made to Haldon Forest Park in the previous twelve months (32.8). For these reasons the cluster was also labelled as 'active'. The cluster also records the second highest expenditure value for offsite expenditure after the 'Non-bike owner' cluster (£46.73). This figure reflects the high proportion of holiday visitors (14.3%) within the cluster which incur higher offsite costs (see Section 5.10.2). Average onsite expenditure for the cluster was calculated to be £7.24 which represents the second highest onsite expenditure value of the 'active' clusters.

5.8.2 Cluster 2: Non-bike owners

Cluster 2 contains 9.3% of respondents and exhibits a more even gender mix (60:40) which distinguishes it from clusters 1, 3, 5 and 6. I.V.I scores for the cluster show that the main distinguishing attribute is their non-bike owner status (100% of all respondents). Bike ownership status is also directly related to the use of onsite bike hire facility as 95.8% (see Appendix 14) of non-bike owners stated that they had hired a bike from Forest Cycle Hire.

The second most important attribute is their length of cycling experience, with 62.5% of respondents stating that they had at least one year's off-road cycling experience. Of these more experienced respondents, the average experience period was 11 years. Further evidence for the range of cycling experience observed within this category can be seen in Table 5.14 where it is shown that 15.6% of respondents were inexperienced cyclists, 37.5% neither inexperienced nor experienced, and 46.9% experienced. For self-ranked off-road cycling experience a similar mix of experience can be seen, where it is shown that 11.5% of respondents were beginners, 57.7% intermediate cyclists and 30.8% advanced. These observations show that the bike hire facility is used by cyclists of different abilities. This is also reflected in the stated trail grade split, with 42.9% respondents stating that they typically rode 'difficult' trails, and 39.3% of respondents stating that they rode 'moderate' trails.

The third most important attribute is the choice of cycling infrastructure, with 56.2% of respondents stating that they preferred to ride at purpose-built sites. However, this result is likely to be influenced by the group's need for a bike hire facility to be present at their chosen destination. The group is not labelled as 'explorers' as 65.6% of respondents stated that they had not visited another purpose-built site in the previous twelve months. The decision was also made not to label the group as 'active'. This is despite the observation that 68.7% of respondents described themselves as 'frequent' or 'very frequent' cyclists. This decision was taken in light of the lower mean number of visits to Haldon Forest Park in the last twelve months (9.8). Onsite and offsite expenditure values for the cluster show that the group records the highest level of onsite and offsite expenditure of all cluster groups (£34.72 and £43.99) respectively. These figures reflect the expenditure associated with hiring a bike onsite, and additional expenditure made by cluster holiday visitors which comprise 40.6% of the sample. The breakdown of expenditure for both onsite and offsite categories is presented in Section 5.10.2.

5.8.3 Cluster 3: Active off-road explorers

Cluster 3 represents the third largest group and contains 48 respondents, of which 96% were male. I.V.I scores for the cluster reveal that it is defined by its strong preference (62.5%) for riding on the public rights of way (PROW) network. For this reason the group was labelled ‘off-road’ to distinguish it from the ‘trail centre’ labels allocated to clusters 1, 5 and 6. The second most important attribute is off-road cycling experience, which showed that all respondents had more than one year’s off-road cycling experience. The mean number of years’ experience for this group was found to be the same as Cluster 1 (twelve years). This high level of experience is also reflected in the profiling results for general and off-road cycling experience (see Table 5.14). For general cycling experience, 89.1% of the respondents described themselves as ‘Experienced’. Furthermore, 61.7% of respondents described themselves as ‘Advanced’ off-road cyclists. Trail grade information for the group is also consistent with the identified experience levels with 68.1% of respondents stating that they typically rode difficult trails.

The group can also be categorised as frequent off-road cyclists with 91.3% of respondents stating that they cycled ‘frequently’ or ‘very frequently’ (see Table 5.14). For this reason the cluster was also labelled as ‘active’. The group was also given the ‘explorer’ label because 52.1% of respondents stated that they had ridden at another UK purpose-built cycling site during the previous year. Furthermore this is also reflected in the mean number of visits the group made to Haldon Forest Park in the previous twelve months (17.1). This combination of labels demonstrates that the group's off-road cycling routines involve cycling on the PROW network and at purpose-built sites. Expenditure analysis for Cluster 3 reveals that the group records the second highest level of onsite expenditure of all cluster groups (£9.54) and the lowest offsite expenditure of all cluster groups (£19.11). The lower offsite expenditure value is consistent with the observation that holiday visitors comprise just 4.2% of the group (see Table 5.14).

5.8.4 Cluster 4: Cycle path adventurers

Cluster 4 contains 29 respondents and represents the fifth largest cluster group. The group also displays a more even gender distribution which is similar to the non-bike owner cluster. In common with Cluster three, this group is characterised by its preferred choice of cycling infrastructure (cycle paths 89.7%). The second most important attribute is that all respondents brought their own bike to the site. The third I.V.I attribute informed the decision not to label the group as 'Explorers'. This is because 69% of respondents stated that they had not visited another purpose-built off-road cycling site in the previous year. However, the group are termed 'adventurers', due to the fact that their cycling routine involves purpose-built off-road cycling sites in addition to their preference for riding cycle paths. This is evidenced by the mean number of visits made by the group to Haldon Forest Park in the last twelve months (9.9). Furthermore, it can be seen that the majority of this group prefers to ride moderate trails (64.3%), this observation fits with the group's off-road cycling routine which mixes cycle paths with visits to purpose-built off-road cycling sites. This is also reflected in the group's off-road cycling ability, with the majority of respondents describing themselves as intermediate off-road cyclists.

In terms of off-road cycling experience, 79% of respondents stated that they had been off-road cycling for more than a year. Of this experienced proportion, the mean number of years of cycling experience was 13, broadly in line with clusters 1 and 3. Onsite expenditure for Cluster 4 was found to be £6.01 which is within the £5- £7 range also identified for clusters 5 and 6. Offsite expenditure for the group was found to be the second lowest of all cluster groups (£20.84), which is consistent with the observation that the group contains a lower proportion of holiday visitors (10.3%) compared to Clusters 1 and 2 which contain the highest proportions (14.3% and 40.6% respectively). Full expenditure breakdowns for both of these categories can be seen in Section 5.10.2.

5.8.5 Cluster 5: New trail centre riders

Cluster 5 is the smallest segment containing 27 respondents, of which 85% are male. The group also records the lowest mean age for respondents of all cluster groups (34). I.V.I scores for the group reveal that the group is characterised by the observation that 96.3% of respondents have less than one year's off-road cycling experience (see Table 5.13). This attribute gives the group its 'new' label. This is also reflected in the general cycling experience levels, with 61.5% of respondents stating that they were neither inexperienced nor experienced. Off-road cycling ability for the group is also consistent with this observation with 76.0% of respondents stating that they were intermediate off-road cyclists. This is consistent with the trail grade information, with 72.0% of respondents stating that they typically rode 'moderate' trails. The second I.V.I attribute confirms that the group cannot be described as 'explorers' due to the fact that 96.3% of the group had not visited another purpose-built site in the UK. In common with clusters, 1, 3, 4 and 6 all respondents are bike owners. The fourth I.V.I score identifies that all respondents stated that they prefer to ride at purpose-built off-road cycling sites. For this reason, the group is given the 'trail centre' label.

The group also does not qualify for the ‘active’ label, because only 44.5% of respondents stated that they were ‘frequent’ or ‘very frequent’ cyclists. The group also records a lower mean number of visits to Haldon Forest Park in the last twelve months (9.3), in comparison to the ‘active’ clusters. The onsite expenditure for Cluster 5 was calculated to be £5.96 which is in comparable to Clusters 4 and 6. The group also records the second lowest offsite expenditure of all cluster groups (£20.84). This value is consistent with the observation that the group contains no holiday visitors. This relationship between expenditure and visitor type is examined in further detail in Section 5.10.2.

5.8.6 Cluster 6: Active trail centre riders

Cluster 6 contains 116 respondents and represents the largest cluster group. The group is heavily skewed towards male respondents (81%), but in contrast to active clusters 1 and 3, a greater proportion of female respondents can be identified within the group. The most important I.V.I attribute (see Table 5.13) showed that the group does not meet the ‘Explorer’ criteria, as all respondents stated that they had not visited another purpose-built off-road cycling site in the previous year. This distinction differentiates the group from Cluster 1. The second I.V.I attribute classifies the group as ‘trail centre’ riders because of their stated preference for purpose-built off-road cycling sites (100%). In common with Cluster 1, all respondents are bike owners (I.V.I 4) and have a minimum of one year’s off-road cycling experience (I.V.I 3). The group is also allocated the ‘active’ label as 70% of respondents stated that they are frequent cyclists. This is reflected in the mean number of trips to Haldon Forest Park in the previous twelve months (22.7). General cycling experience within the group is high with 62.7% of respondents stating that they were ‘experienced’ cyclists. Off-road ability was found to be split between ‘intermediate’ (54.8%) and ‘advanced’ (40.9%) off-road cycling ability. This is consistent with the trail grade data for the group with 40.7%

and 53.6% of respondents stating that they preferred ‘moderate’ and ‘difficult’ trails respectively. It should be noted that the group contains the lowest proportion of ‘advanced’ cyclists in comparison to the other ‘active’ clusters. The group also records the lowest number of years’ experience (10) of all cluster groups. Onsite expenditure for Cluster 6 was found to be £6.67 which is the lowest of the three ‘active’ clusters. In contrast the group records the second highest offsite expenditure of the ‘active’ group (29.18). The full breakdown of offsite and onsite expenditure can be seen in Section 5.10.2.

5.9 Cluster profiling

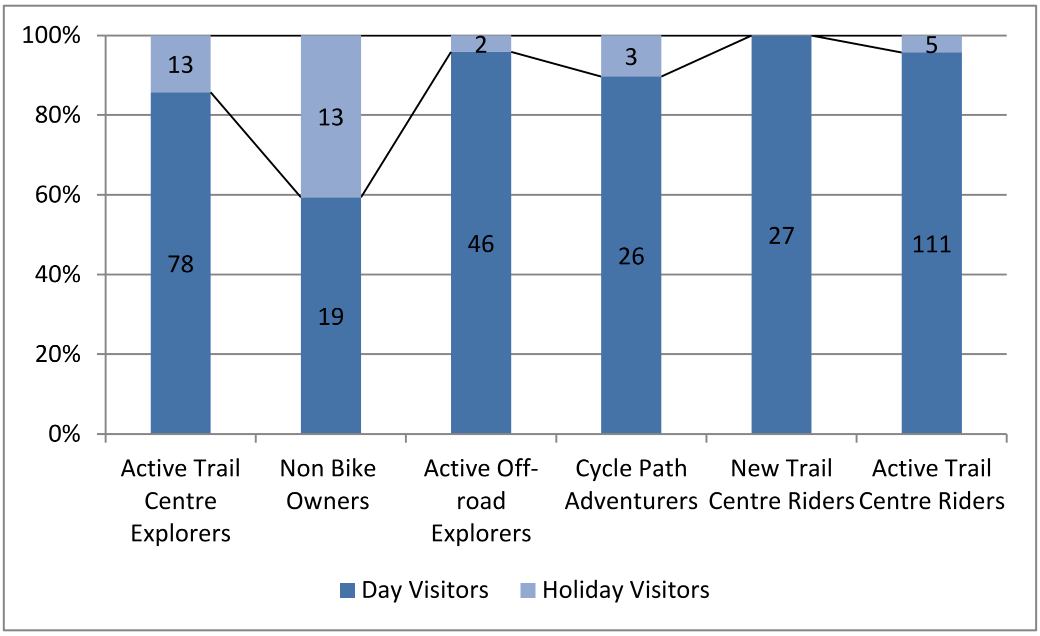
This section examines the variables which were not used to form the cluster variate shown in Table 5.13. Cluster profiling represents the final step in the clustering process and has the purpose of validating the solution, enabling a more detailed picture of the individual clusters to be developed. Providing that the original cluster input variate is well defined and appropriate to the dataset, profiling should theoretically highlight any inherent heterogeneity between the clusters and homogeneity within the clusters. The profiling tables in Appendix 14 present the variable frequencies for each cluster group, together with the percentage of valid responses for each variable. Profiling is also important for identifying practical differences between the clusters and for verifying the theoretical grounding of the cluster solution (Hair, 1998: 515). To further verify the derived cluster solution, post-hoc, non-parametric testing was conducted using the Kruskall-Wallis one-way analysis of variance test. This was used to identify statistically significant differences between the six clusters. Where a statistically significant result occurs within the dataset it is reported within the tables at either the 95% or 99% significance level.

Prior to conducting the analysis a systematic process of elimination was used to segregate the cluster input variables from the associated profiling variables; this is described in Section 5.7.3. Profiling variables were defined as being unsuitable for clustering purposes, but important for defining the characteristics of the identified clusters (Norušis, 2012: 402). The process also helps validate the cluster solution as cluster input variables can be cross-checked against related profiling variables. If the cluster solution is valid, profiling should reinforce the identities of the individual cluster groups. The following sections analyse the remaining variables and profile the clusters in terms of visit type, expenditure and cycling characteristics.

5.9.1 Visit characteristics

Figure 5.8 shows the split between day and holiday visitors within the six cluster groups. It should be noted that the day and holiday visitor cluster groups represent 70.5% and 76.5% of their respective samples. Therefore, both groups are relatively evenly represented within the cluster profile. Statistical testing using Kruskall-Wallis analysis identified that there was a significant difference between the clusters at the 99% (0.01) confidence level in terms of visit type. The largest proportion of holiday visitors are contained within clusters 1 and 2, where holiday visitors account for 14% of the *Active Trail Centre Explorers* and 40% of the *Non-bike Owner cluster groups.* The high frequency of holiday visitors within the non-bike owner category highlights the importance of the bike hire facility at Haldon Forest Park in enabling holiday visitors to enjoy the off-road cycling trails. Furthermore, the observed result for the *Active Trail Centre Explorer* group validates the group profile, demonstrating that these respondents do explore new trail centres. The absence of holiday visitors within the *New Trail Centre Riders* group raises the possibility that that this group could be a target market for new holiday visitors.

Figure 5.8 Cluster group visit characteristics



Source: Author

In Section 5.4.3 visit duration was identified as an important factor in understanding how the site is being used. Its importance in relation to parking expenditure was also highlighted as the parking fees at Haldon Forest Park are broken down into two time periods, up to two hours and over two hours. In common with the onsite dwell time identified for day and holiday visitors, the mean onsite dwell time for all cluster groups was found to be over two hours. During the analysis in Section 5.4.3 it was established that dwell time did not appear to be a direct function of individual trail length, meaning that visitors were choosing to stay onsite longer than the maximum length of time needed to ride the longest trail.

Statistical testing using Kruskall-Wallis analysis identified significant differences between the clusters for visit duration at the 99% (0.01) confidence level. From Table 5.15 Clusters 3, 4, 5 and 6 can be identified as having the shortest dwell times of around three hours. Clusters 1 and 2 have the longest dwell times (3.5 and 3.8 hours respectively). The observed longer dwell time for the *Non-bike Owner* cluster in comparison to the other cluster groups is probably due to the fact this group have chosen to hire a bike for the whole day and want to make the most of it.

Table 5.15 Cluster group site dwell time (mean hours)

	Cluster group	Mean dwell time (Hours)
1	**Active Trail Centre Explorers**	3.5
2	**Non Bike Owners**	3.8
3	**Active Off-road Explorers**	2.9
4	**Cycle Path Adventurers**	2.8
5	**New Trail Centre Riders**	3.2
6	**Active Trail Centre Riders**	2.9

Source: Author

Table 5.16 shows the mean number of visits made to Haldon Forest Park in the last twelve months by the six cluster groups.

Table 5.16 Cluster group visits in last 12 months

	Cluster group	Cluster group visits in last 12 months (Mean)
1	**Active Trail Centre Explorers**	32.8
2	**Non Bike Owners**	9.8
3	**Active Off-road Explorers**	17.1
4	**Cycle Path Adventurers**	9.9
5	**New Trail Centre Riders**	9.3
6	**Active Trail Centre Riders**	22.7

Source: Author

Kruskall-Wallis analysis identified significant differences between the clusters for visits within the last 12 months at the 99% (0.01) confidence level. Overall the 'Actively' labelled groups can be seen to visit the site more frequently than the less active groups. The *Active Trail Centre Explorer* group visited the site 32.8 times on average, equating to around 3 trips per month. The second highest number of trips was made by the *Active Trail Centre Riders* group with 22.7 visits in the last 12 months, and the *Active Off-road Explorer* group visited 17.1 times on average.

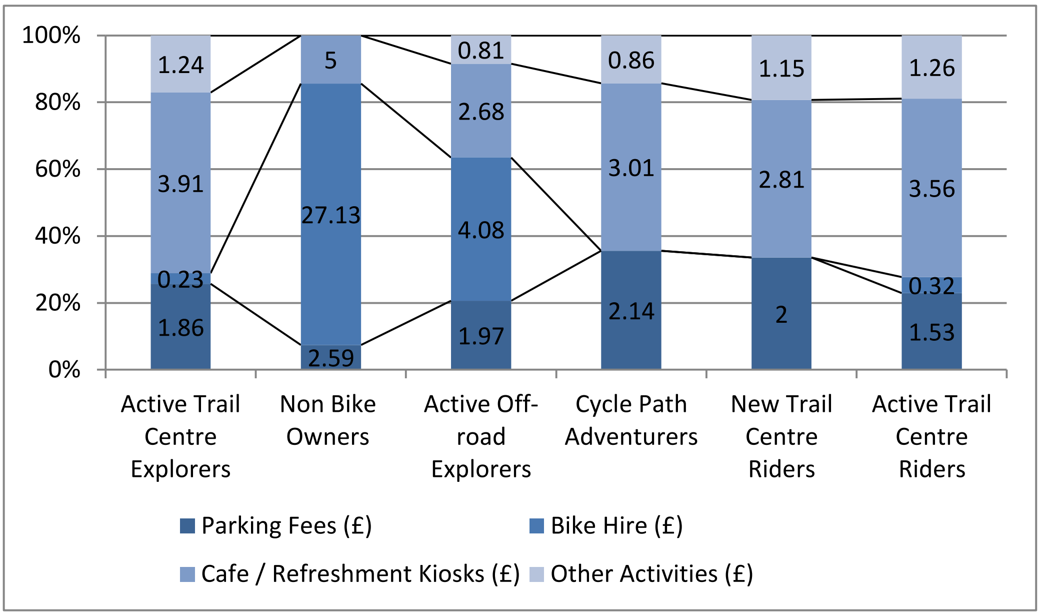
This observed pattern fits with the general characteristics of these cluster groups. From Figure 5.10 it can be seen that 83.8% of *Active Trail Centre Explorer*s stated that they were frequent or very frequent cyclists, this compares to 69.8% of the *Active Trail Centre Riders* group. The observation that the *Active Off-road Explorer* group visits less frequently, supports the observation that their preference is for riding on the PROW network and that trail centres form a smaller part of their off-road cycling behaviour. The remaining three clusters show an even number of visits in the last twelve months, equating to less than one visit per month. Again, this observation can be explained by their cluster characteristics. The *New Trail Centre Riders* are less active cyclists who have been riding for less than one year; therefore it is unlikely that this group would record a high number of visits. In common with the *Active Off-Road Explorers*, the *Cycle Path Adventurers* incorporate off-road cycling sites like Haldon Forest Park within their cycling behaviour but they prefer to ride at places other than trail centres. The observed visitation frequency supports this assessment. The observation that the *Non-bike Owner group* visits the site on average the same number of times as the two previously described bike owning groups, is most likely due to the inclusion of respondents who make use of the bike hire facility when leading groups in a professional capacity. During surveying, one respondent also told the author that they did not own a car and therefore could not bring their bike to Haldon Forest Park. Their solution was to visit the site every 2-3 months and hire a bike.

5.9.2 Expenditure characteristics

Due to the complexities associated with calculating day and holiday visitor expenditure described in Chapter 4, it is not possible to directly compare the expenditure characteristics of the cluster groups to the previously calculated mean expenditure figures for day and holiday visitors. This limitation arises due to the problem of apportioning day and holiday visitor expenditure at the sub-cluster level. At this level of disaggregation the sample sizes become too small to produce meaningful results. Whilst expenditure can be examined at the macro cluster level, the derived figures present a distorted view. This is because expenditure categories that are only related to holiday visitors (such as accommodation) are concealed within an overall figure for the cluster group.

For onsite expenditure this poses less of a problem, because this type of expenditure is not specific to the trip type. Providing that these limitations are acknowledged, the mean figures shown in Figure 5.9 and Figure 5.10 still provide a useful metric for comparing the cluster groups. However, they cannot be used as a weighting tool to produce annual expenditure figures for the cluster groups. For this to be achieved, a larger-scale survey would be needed to produce the sample sizes necessary for analysis at the sub-cluster scale.

Figure 5.9 Mean Cluster group onsite expenditure

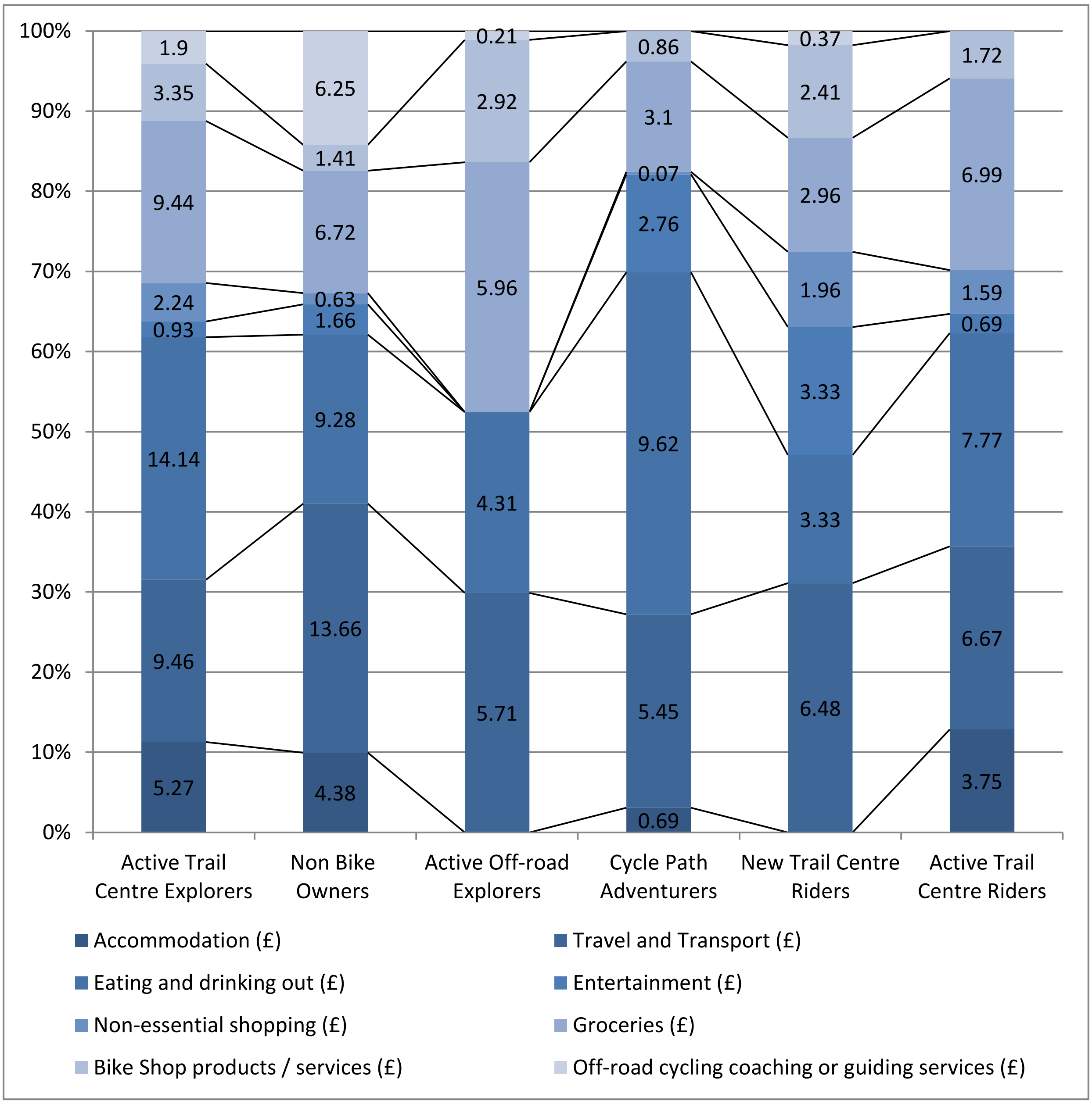


Source: Author

Statistically significant differences between the clusters at the 99% (0.01) confidence level were identified for parking, café, and bike hire expenditure categories. *Non-bike Owners* represent the highest spending group, due to their expenditure on bike hire. Stripping this expenditure out reveals that their expenditure is broadly in line with Clusters 1, 4, 5 and 6. It should be noted that bike hire expenditure is also included in Clusters 1, 3 and 6 even though they are categorised as bike owners. This anomaly represents expenditure which took place at the bike hire facility but which was not for the purpose of hiring bikes. The hire facility also operates bike servicing and sales functions which distorts the categories. The *Active off-road Explorers* category represents the second highest expenditure group which can be attributed to their spending at the bike hire facility. Clusters 1, 4, 5 and 6 all display similar expenditure patterns. For these visitors café expenditure can be identified as representing the highest expenditure category with respondents spending between 3-4 pounds per visit. Other activities expenditure was not found to be statistically significant, and represents small expenditure on items such as the bike jet wash. It should also be noted that all clusters include obligatory and non-obligatory onsite spending demonstrating that all groups contribute to the economic viability of the businesses onsite.

The offsite expenditure patterns shown in Figure 5.10 broadly reflect the distribution of day and holiday visitors within the cluster groups. It is not possible to provide a breakdown of expenditure by visitor type within each cluster as the resulting sample size would be too small. Furthermore, holiday visitor expenditure is also affected by the number of visitors staying with friends and relatives (see Section 5.7). However, it can be identified that the highest spending clusters correspond to the cluster groups which contain the largest number of holiday visitors. Overall spending by clusters 1 and 2 is broadly double that of clusters containing low numbers of holiday visitors. Kruskall-Wallis analysis confirms this observation, as significant differences between the clusters for accommodation expenditure were identified at the 99% (0.01) confidence level. Travel and transport expenditure was also found to be significant at the same confidence level. From Figure 5.9 it can be seen that the highest spending travel and transport clusters are also those containing the highest proportion of holiday visitors. Expenditure for the remaining categories was not found to be statistically significant.

Figure 5.10 Cluster group offsite expenditure



Source: Author

5.9.3 Cycling characteristics

This section evaluates the cycling characteristics of the six cluster groups with regards to nine key variables derived from the 'Your Cycling' section of the questionnaire survey instrument.

5.9.3.1 Seasonal variations in cluster cycling patterns

Figure 5.11 considers whether there are any identifiable differences in the seasonal cycling patterns of the six cluster groups. Understanding the seasonal cycling patterns of the different cluster groups has important implications for the site management and onsite businesses. Seasonal cycling patterns also provide a good indication as to the commitment levels of the different cycling clusters by highlighting the presence of 'fair weather cyclists'. For all groups, cycling frequency declines during the winter months, this observation was found to be statistically significant at the 99% confidence level. The three 'active' groups demonstrate the greatest commitment to cycling in winter with over 80% of respondents stating that they ride during the winter months. Despite the observed decline in cycling during the winter months, it should be noted that the remaining groups all record frequencies of between 70 and 80%. The relatively high level of winter use for the *Non-bike Owner* cluster can be attributed to the use of the site by organised school, and outdoor adventure groups, who use Haldon Forest Park as a poor weather option; this was explained to the researcher by one of the owners of Forest Cycle Hire who also stated that these groups enabled the business to operate all year round (P. Turner 2012, pers. comm., 27 Jan.).

Environmental factors were also identified as a sub-theme within the interview data (see Appendix 13). A key aspect of this sub-theme was found to relate to the use of the site during the winter months, with respondents highlighting the importance of purpose-built sites as a weatherproof off-road cycling option. Some visitors also highlighted their awareness of the associated environmental issues of erosion or trail degradation which can take place during the winter months on un-surfaced trails. The following quotes illustrate these views:

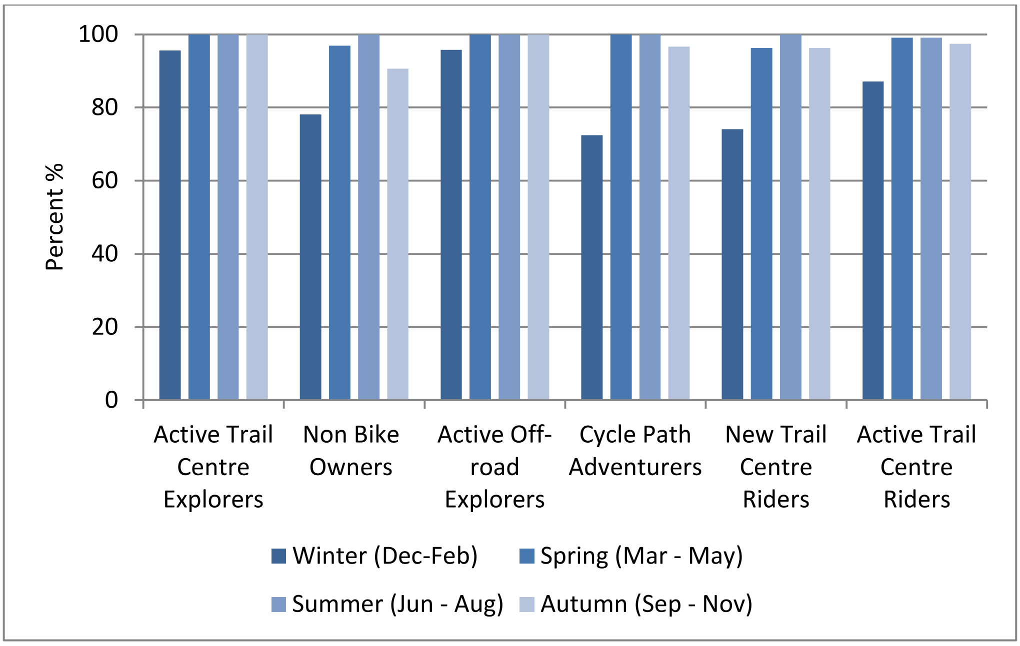
Interviewer: 'And how important is it to you to have places like Haldon to go riding?'

Male Respondent F: *'It is very important really, especially at this time of the year. As I said we ride it in the winter time, purely and simply because you can ride it all year round. You know like, some of the natural trails, you struggle at this time of the year really.'*

Male respondent G: *'Massively, because it's such a well-drained area, where other places such as Lustleigh Cleave are out of bounds. It's accessible all year round [pause] it's really good without causing so much erosion.'*

Riding frequency during the summer months was found to be consistent across the cluster groups with all respondents stating that they ride in summer. This also suggests that off-road cycling is not substituted during the summer months for leisure activities such as surfing. The *Active Trail Centre Explorer* group and the *Active Off-road Explorers* display identical cycling patterns for spring and autumn with all respondents stating that they ride in both seasons. The *Active Trail Centre Riders* and *Cycle Path Adventurer* groups show identical patterns for spring but record small declines of around (3-4%) in the frequency of respondents who ride during autumn. *The Non-bike Owners* and *New Trail Centre Riders* are the only groups which record a lower cycling proportion for spring, declines of 3.1% and 3.7% respectively.

Figure 5.11 Cluster group seasonal cycling patterns



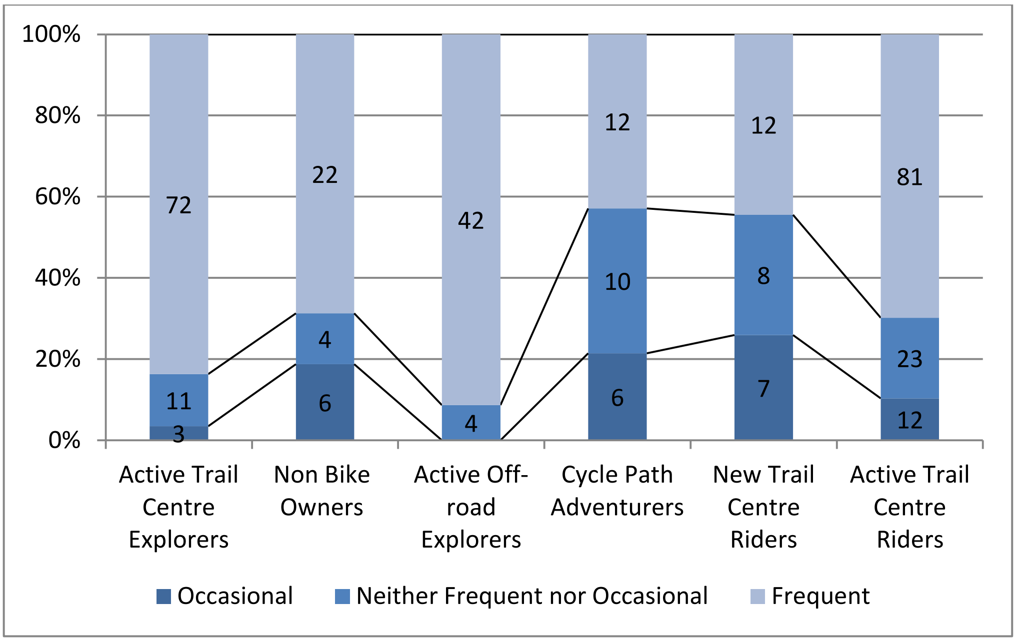
Source: Author

5.9.3.2 Cluster cycling characteristics: frequency, seriousness and experience

The following three figures examine key aspects relating to the general cycling behaviour of the six cluster groups. These aspects relate to cycling frequency, seriousness and experience. Post-hoc Kruskall-Wallis analysis found all three aspects to be statistically significant at the 99% confidence levels. Cycling frequency data presented in Table 5.14 have already been used to define 'Active' clusters within the dataset. For the less active clusters, the *Cycle path Adventurers* and *New Trail Centre Riders* show an almost identical three-way split between the frequency categories. This frequency distribution supports the visit frequency data also presented in Section 5.9.1 which identified that these clusters made fewer trips to Haldon Forest Park than the 'active' groups in the last twelve months. In contrast, the *Non-bike Owner* cluster contains a higher proportion of respondents who cycle frequently despite recording a similar number of mean visits to Haldon Forest Park as the *Cycle Path*

Adventurers and the *New Trail Centre Riders.* This anomaly is due to the fact that the *Non-bike Owner* cluster contains respondents who cycle in a professional capacity, and therefore cycle more frequently.

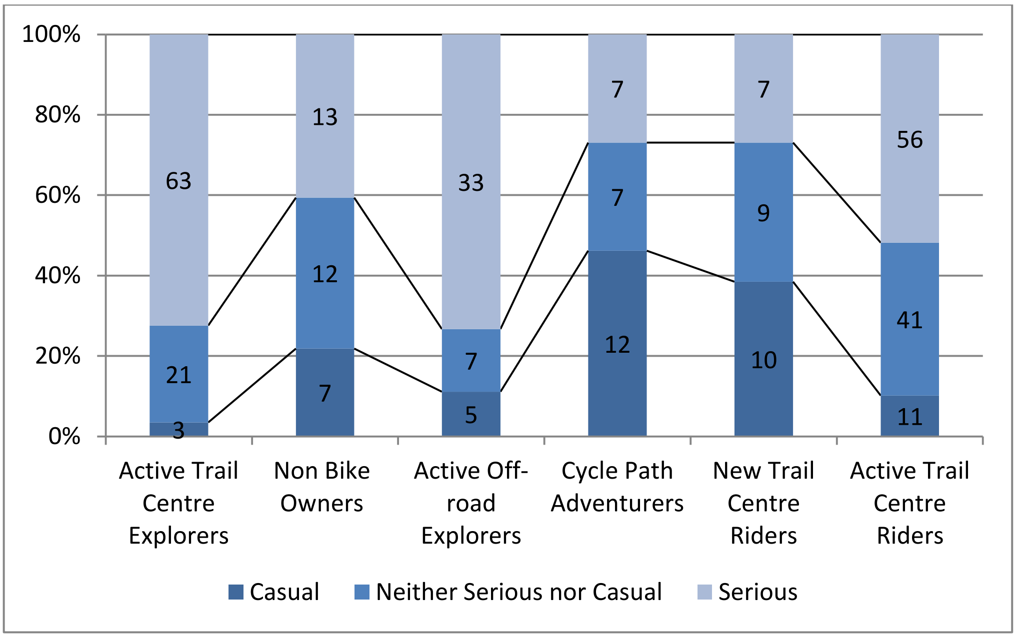
Figure 5.12 Cluster group frequency of cycling activity



Source: Author

Cycling frequency (see Figure 5.12) provides an indication of the level of commitment each cluster group has to the activity. So far commitment has been measured in terms of seasonal patterns of use, based on the rationale that cyclists with a greater commitment to the activity will ride in all seasons. This proxy of commitment identified that the three actively labelled clusters were more committed than the non-actively labelled clusters, and that there was a statistically significant difference for this variable. A similar overall pattern can be observed for cycling seriousness (see Figure 5.13). There is however, a split within the 'active' clusters between the two explorer clusters and the *Active Trail Centre Riders cluster* which contains fewer serious respondents (51.8% versus 72.4%). The observed lower level of commitment exhibited by this group may explain why no respondents within the cluster had visited any other UK off-road cycling site during the previous year. Both the *Cycle Path Adventurer* and the *New Trail Centre Rider* cluster display similar patterns of commitment to cycling. This observation mirrors the seasonality profile identified previously. For both categories the majority of respondents stated that they were casual cyclists (46.1% and 38.5% respectively). The *Non-bike Owner* cluster contains a higher proportion of serious cyclists compared to the other non-active groups (40.7%). This observation can also be attributed to the presence of highly experienced and committed cyclists within the category.

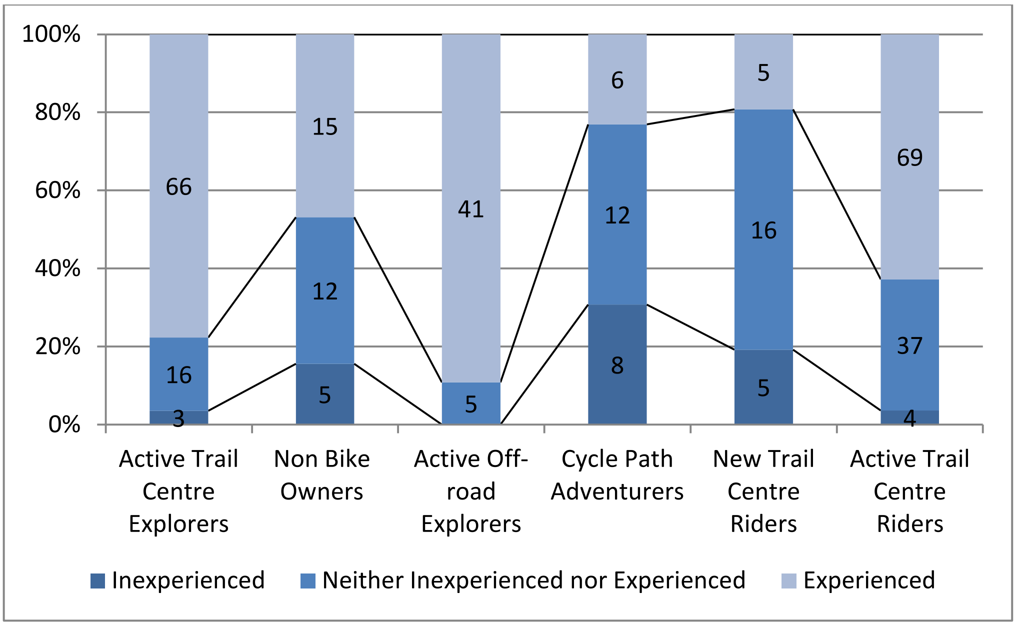
Figure 5.13 Cluster group seriousness of cycling activity



Source: Author

For the formation of the cluster groups, experience was measured as a function of the length of time respondents had been participating in off-road cycling as it was felt that this was less likely to be affected by bias than a self-ranked measure of experience. Question 23 (see Appendix 6) was designed as a further measure of general cycling experience, and asked respondents to indicate their level of experience on a five point Likert scale. Figure 5.14 presents the self-ranked experience profiles for the cluster groups.

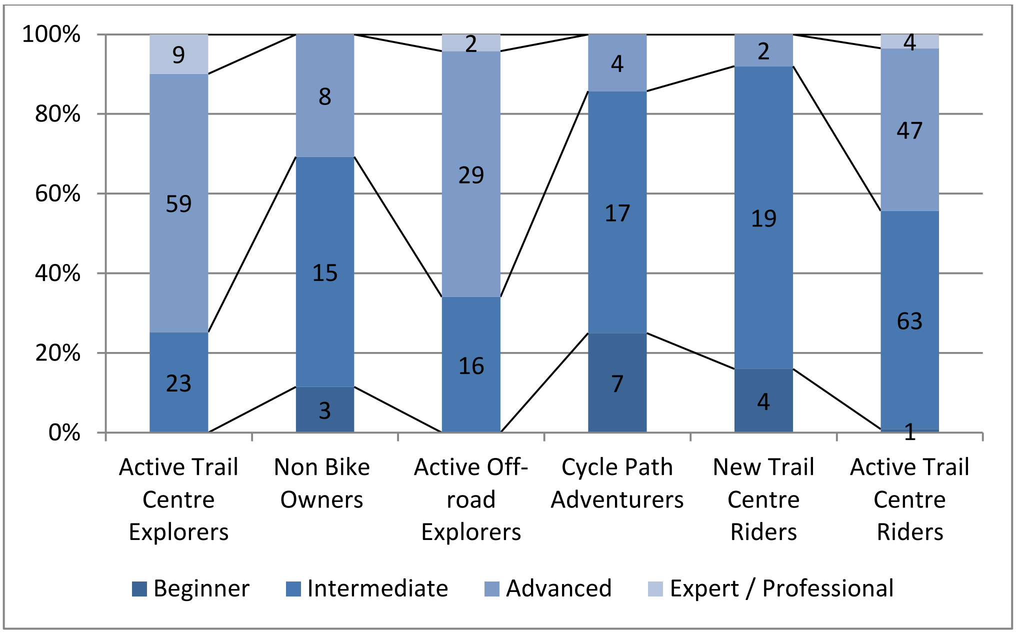
Figure 5.14 Cluster group general cycling experience



Source: Author

Overall, a similar distribution to both frequency and seriousness was observed for experience, with the 'active' labelled clusters recording the highest proportions of experienced respondents. This observation reinforces the assessment that these groups contain frequent, committed, and experienced off-road cyclists. The *Active Off-road Explorer* category can also be identified as containing no inexperienced respondents. Given the group's inclination for riding away from purpose-built off-road sites, this observation is consistent with the rationale that a higher level of experience is required for riding on the PROW network. The experience profile of the *New Trail Centre Rider* cluster can also be identified as being consistent with the cluster description. This is evidenced by 62.7% of respondents ranking themselves as neither inexperienced nor experienced, matching the description that these respondents are relatively new to the activity. The *Cycle Path Adventurer* cluster does not however conform to the rationale that cycling experience is directly proportional to off-road cycling experience. Whilst this group was found to have the highest number of years off-road cycling experience (13), only 23.0% of respondents described themselves as experienced. This result can possibly be attributed to respondents linking the question to off-road cycling sites and possibly ability, rather than general levels of cycling experience. This explanation is supported by the data shown in Figure 5.14 which shows that this variable exhibits an almost identical distribution to that of the general cycling experience variable. The *Non-bike Owner* cluster contains the fourth highest proportion of experienced cyclists, further highlighting the presence of experienced respondents who cycle in a professional capacity within the group (46%). Off-road cycling experience broadly mirrors the trend identified for general cycling experience but provides further sub-division of the cluster groups (see Figure 5.15).

Figure 5.15 Cluster group off-road cycling experience

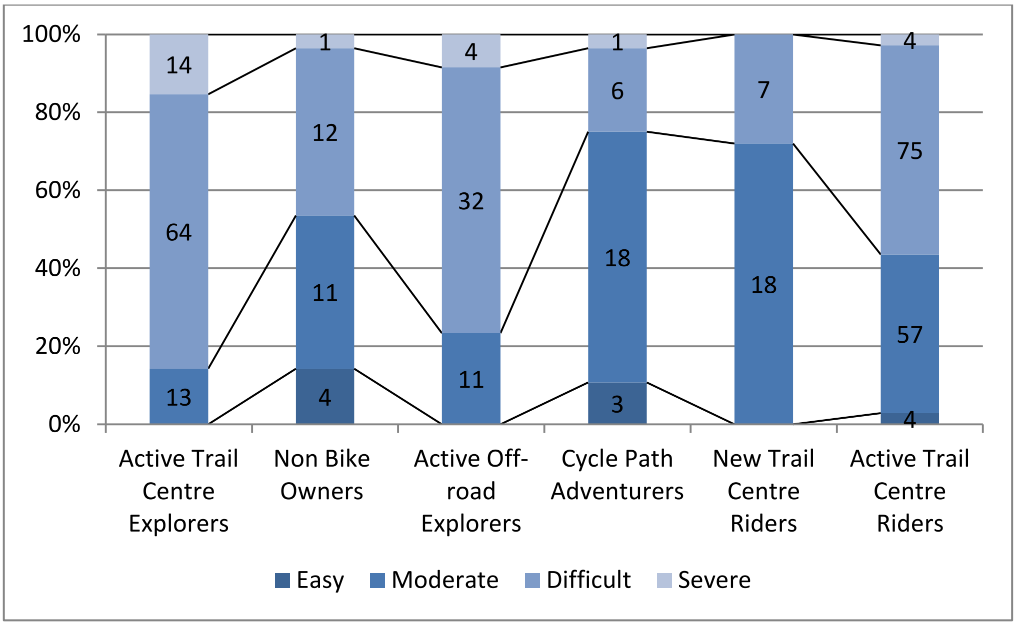


Source: Author

As with the previous variable, the ‘active’ clusters contain the highest proportions of experienced respondents. These clusters are also unique in containing respondents who stated that they possessed expert or professional levels of experience. The high level of overall experience is also demonstrated by the absence of ‘beginners’ within the explorer clusters. The *Active Trail Centre Rider* cluster is the exception to this trend as it contains one respondent classified as a beginner. The experience profile of the *New Trail Centre Rider* cluster fits the overall cluster description and that of the previous general cycling experience measure, with 76.0% of respondents stating that they are intermediate off-road cyclists. The absence of expert / professional cyclists within the *Non-bike Owner* cluster appears at odds with the known presence of respondents within the group who cycle in a professional capacity. One possible explanation may be that respondents interpreted the question in terms of off-road cycling ability rather than in terms of wider experience. For example, technical ability forms only one aspect of experience and is treated as such within the mountain bike leader qualification structure. As a result, professional leaders at different qualification levels will possess differing levels of off-road cycling skills. A further point is that respondents may have answered the question within the context of their personal cycling experience and not within the context of their professional capacity, which may only account for a small proportion of their overall cycling activity.

Trail grade profiling provides an indication of trail preferences and technical ability exhibited by the cluster groups. It is also related to the previous variable, off-road cycling experience. This relationship is confirmed by the similar distribution shown within Figures 5.15 and 5.16. Post-hoc Kruskall-Wallis analysis found trail grade preference to be statistically significant at the 99% confidence levels.

Figure 5.16 Cluster group trail grade preferences



Source: Author

From Figure 5.16 it can be seen that difficult grade trails are favoured by all of the ‘Active’ cluster groups. Easy trails are not stated as a preference for two out of the three ‘Active’ clusters, the exception being the *Active Trail Centre Rider* Cluster where 2.9% of respondents stated that they preferred easy trails. At the other end of the trail grading system, respondents with preferences for severe trails can be found within five of the six cluster groups. Unsurprisingly the two most experienced clusters (Clusters 1 and 3) exhibit the highest proportions of respondents who favour severe trails, 15.4% and 8.5% respectively. The *Non-bike Owners* and *Cycle Path Adventurers* also exhibit similar proportions, with around 3% of respondents stating a preference for severe trails. The *New Trail Centre Rider* cluster stands out as it only contains two trail grading preferences, moderate and difficult. This observation matches the cluster profile and further defines the characteristics of this group. Overall, easy trails were least favoured by all respondents, difficult trails were favoured by four out the six clusters and moderate trails were favoured by two out of the six clusters. It should be noted that the proportions of respondents who prefer moderate and difficult trails within *Non-Bike Owner* cluster is almost even. Taking this factor into consideration it is likely that there the true split observes a 50:50 distribution between the two most popular trail grades.

Trail grading was also highlighted during the interviews when respondents were discussing possible improvements to the trail facilities at Haldon Forest Park. The majority of this discussion was found to relate to the black graded Ridge Ride Extreme trail (graded severe) at Haldon Forest Park. In the following extracts, the contrasting views regarding this trail are presented:

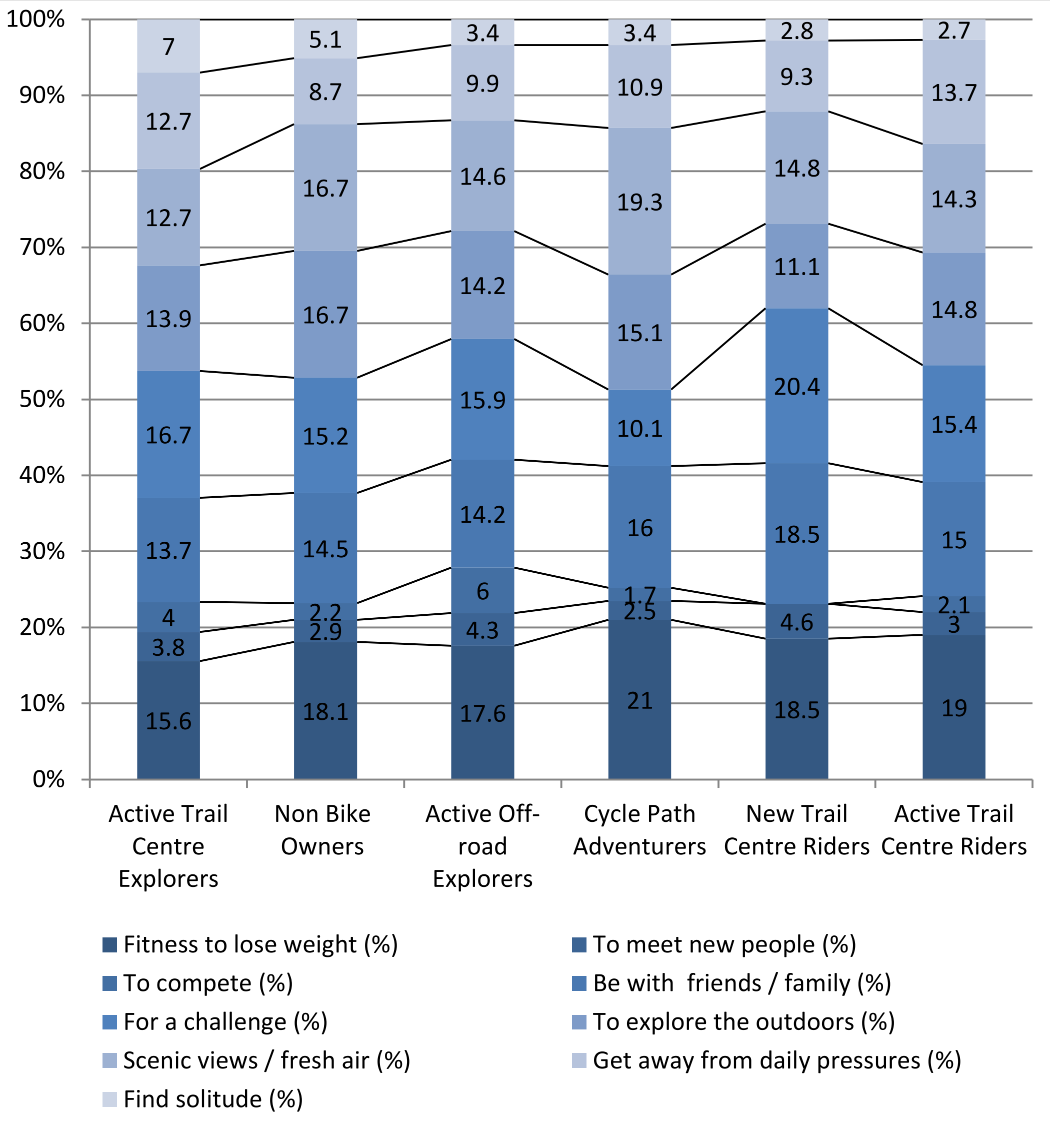
> Interviewer: What if anything would improve the experience at Haldon?
>
> Male Respondent B: *With the black route, [pause] I like the black route but I don't like the very first stony bit, you know the bit you go down off. [Pause] I mean I can do it, I do sometimes do it but it's kind of slightly scary, 'cause if you come off there you're going to get hurt or scratch your bike quite badly. I know it sounds quite wimpy but it's quite difficult that first bit.'*
>
> Male Respondent D: *'I'd like to see them concentrate on some more off-piste trails, something a lot more challenging. Because the black run they have here is not challenging by any stretch of the imagination, so you could really do with putting in a lot more steeper sections, maybe some jumps, more bermed corners, that sort of thing'.*

Male Respondent K: *'More black sections I think, because you only have a short section at the moment there, so a little bit more technical stuff would be good. [Pause] Just to challenge riders, it doesn't have to be a completely separate trail. I think you can have sections where you have red and you have black which run simultaneously, so if you're riding with friends who can't ride the black sections you can still kind of ride the same trail, but you've got options to ride [pause]I think it's a good way to go about it.'*

5.9.4 Cluster motivations for off-road cycling

Question 24 of the survey (see Appendix 6) was designed to capture the key reasons which underpin why people go off-road cycling. The question was structured in a multiple response format, the results of which are shown in Figure 5.17. From the nine listed reasons, around two thirds can be identified as being important to all cluster groups. These reasons include: 'Fitness / to lose weight', 'Be with friends / family', 'For a challenge', 'To explore the outdoors', 'Scenic views / fresh air', and 'To get away from daily pressures'. Statistically significant differences between the clusters were identified at the 99% confidence level for the following variables: 'To compete', 'For a challenge', 'Get away from daily pressures' and 'To find solitude'.

Figure 5.17 Cluster group reasons for cycling



Source: Author

From Figure 5.17, it can be seen 'Finding solitude' is more important to the 'Active Trail Centre Explorer' and 'Non-bike owner' groups. Furthermore, the *Cycle Path Adventurer* group record the smallest proportion of respondents who cite 'For a challenge' as a reason for going off-road cycling. This fits with the assessment that this group enjoys a more relaxed form of off-road cycling, and matches the previously identified characteristics for trail grade and seriousness. Competitive reasons can be identified as being of greatest importance to the two explorer clusters. In contrast, competitive reasons are not cited by any of the *New Trail Centre Riders.* This observation fits with the description that these respondents have a lower level of engagement with the activity, and is consistent with their profile for cycling frequency and seriousness. The variable 'Meeting new people' appears to polarise the clusters. Of the six cluster groups the variable is of greatest importance to the *New Trail Centre Riders, Active Off-road Explorers,* and *Active Trail Centre Explorer* categories. For the variable, 'Get away from daily pressures' the distribution is more uniform. However, the 'Non-bike owner category' can be identified as containing the smallest proportion of respondents who state this reason. This result matches the general characteristics of the cluster group, as it stands to reason that if getting away from daily pressures was important for these cyclists, then it is logical to assume this would be reflected in their commitment to the activity. Whilst bike ownership is not wholly representative of cycling commitment it does provide a good indication as to the level of engagement shown by respondents.

Framework Analysis of interview data identified five themes relating to: fitness, social, environmental, physical, and emotional motivations (see Table 5.17). These correspond closely to the key cluster motivations identified previously in Figure 5.17 ('Fitness / to lose weight', 'Be with friends / family', 'For a challenge', 'To explore the outdoors', 'Scenic views / fresh air', and 'To get away from daily pressures').

Table 5.17 Framework Analysis motivation themes

Motivations for going off-road cycling					
Theme	**Fitness**	**Environmental**	**Social**	**Physical**	**Emotional**
Frequency	7	5	4	3	9
(%)	63.6	45.6	36.6	27.3	81.8%

Source: Author

The following extracts and commentary illustrate some of the key motivations identified within Table 5.17. Whilst fitness was cited by 63.6% of interviewees as a reason for going off-road cycling, only one respondent described her off-road cycling routine as being the equivalent of going to the gym:

> Female Respondent A: *'I compare that to going to the gym. I think if I was going to the gym, [pause] and say people go to the gym three or four times a week, that's about how often you should go, so this is like me going to the gym. Even if it's repetitive, it's actually nicer than going to the gym that many times a week'.*

Other respondents were found to refer to fitness as a motivation in a less direct manner, often in conjunction with emotional, social and environmental reasons:

> Male Respondent C: *'[Laughs], I don't know, I just love it! [Laughs] Just getting out in the countryside for some exercise really.'*

Male Respondent D: *'Err, the fitness aspect, and plus there's so many likeminded people out there. You know, if you get in trouble, people will help you, and I'd like to think that I do the same'.*

Male Respondent E: *'Fitness, exhilaration, sort of like a bit of a buzz.'*

Emotional and social motivations were cited by 81.8% and 36.6% of respondents respectively (see Table 5.18). For respondents A and H, the importance of emotion as a motivator can be seen:

Female Respondent A: *'Well it's because, it's the adrenaline, and it's addictive, I just find it really exciting, I'm a bit hooked on that.'*

Male respondent H: *'I think just for fun, that's it really, fun.'*

Social motivations are illustrated by Respondents F and J who describe off-road cycling as socially constructed activity:

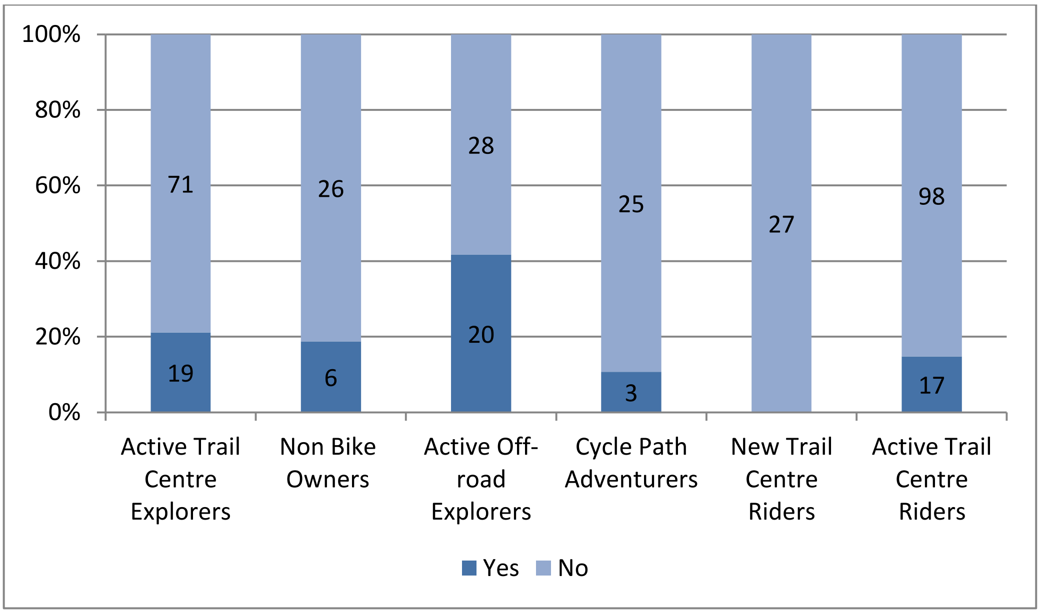
Male Respondent F: *'Well it's the camaraderie really. There's a few of us who ride normally, a few of us do a bit of racing now as well. So practice comes into it, but we all go out together, and although it's not a race, it becomes a race at the end of the day [laughs]'.*

Female Respondent J: *'For one, most people who mountain bike are really really friendly and nice. Umm [pause] it's just good fun, it's exhilarating, it tests you, it challenges you, your bravery, you do things that you never thought you would and you can. [Pause] Umm, it's good for meeting people and getting to know people, it doesn't matter if you're riding with females or males, it doesn't matter you're just mountain bikers so I love that bit of it.*

5.9.5 Engagement with external cycling organisations and businesses

Membership rates for off-road cycling clubs, associations and governing bodies were analysed for the six cluster groups; this can be seen in Figure 5.18.

Figure 5.18 Cluster group membership of cycling clubs, associations or governing bodies



Source: Author

This variable provides a good indicator of the level of engagement each cluster has with more formalised off-road cycling activities. Overall the level of engagement with cycling organisations was found to be low, with five out of six categories containing membership levels of 20% or less. The one exception to this distribution is the *Active Off-road Explorer* category where 41.7% of respondents stated that they were involved with a cycling club, association or governing body. By contrast the *New Trail Centre Rider* cluster shows no association with any cycling organisations. This is important as it indicates that these new riders were not introduced to the activity through organised cycling channels. Framework Analysis of the conducted interviews identified that ten out of the eleven respondents interviewed were introduced to the sport through informal channels (see Appendix 13). The majority of these respondents stated an external trigger factor as a reason for starting off-road cycling.

> Interviewer: Can you tell me how you started off-road cycling?
>
> Male Respondent D: *'Umm, basically some friends invited me out for a local ride and I got hooked on it that was it'.*
>
> Male Respondent E: *'My friends started coming up here [Haldon Forest Park], about 8 months ago, and said I don't know if you fancy going biking, keeping fit sort of thing? I said yeah, and I've been coming here ever since, Tuesday, Thursday, every other Saturday and Sunday'.*
>
> Female Respondent I: *'Umm, it was through my boyfriend actually. [Pause] So, because I used to live in Exeter, so I used to walk up here, then I moved to London and met him. So he got me into mountain biking because I was getting back on the road because I hadn't ridden since I was 17'.*

Other reasons identified from the interview analysis included reactionary factors where respondents took up off-road cycling following a particular event, some of which involved personal tragedy:

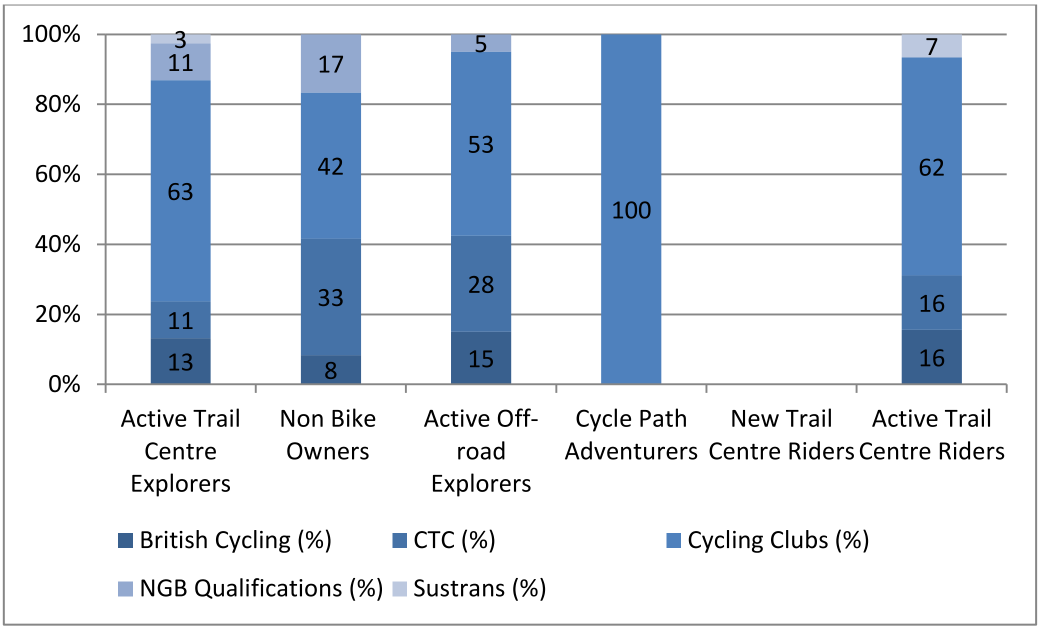
Male Respondent B: *'Um I've been into cycling for about 10 years. [Pause] I used to be into cycling when I was at School, you know time trialling, and when I was a student, and then I got back into cycling about 10 years ago with triathlon. Then I did a couple of years' time trialling and decided to give it up after there had been quite a few fatalities with time trialling [pause] including a club mate. [Pause] So I decided to have a go at mountain bike racing about two and a half [pause] three years ago maybe'.*

Male Respondent C: *'[Laughs], the stables where I used to ride horses in Hertfordshire closed where I used to live, and I still wanted to get out in the countryside. So I had to find a different way out there, so I used a bike'.*

Female Respondent J: *'Ooh, umm, I started years ago, [then] gave it up [pause]. I started because my sister was doing it, and then my brother-in-law, then I sort of gave it up. Then I got back into it because I lost my husband [pause] so it was the one thing I could sort of get out and do without thinking, well I had to think, but not about what I didn't want to think about if you see [pause] because you have to concentrate so much, and just fresh air and that kind of thing. So that's why, so a couple of years ago, yeah two years ago I got back into it'.*

From these interview extracts, off-road cycling can be identified as being a largely informal and social activity. Membership of cycling clubs was highlighted by two respondents, but only one stated that competitive off-road cycling was their principal reason for engaging in the activity. The breakdown of the different types of cycling organisations represented within the clusters is shown in Figure 5.19. From these data the following five categories of cycling organisation were identified, CTC, British Cycling, Sustrans and National Governing Body (NGB) Qualifications.

Figure 5.19 Profile of cycling organisation membership



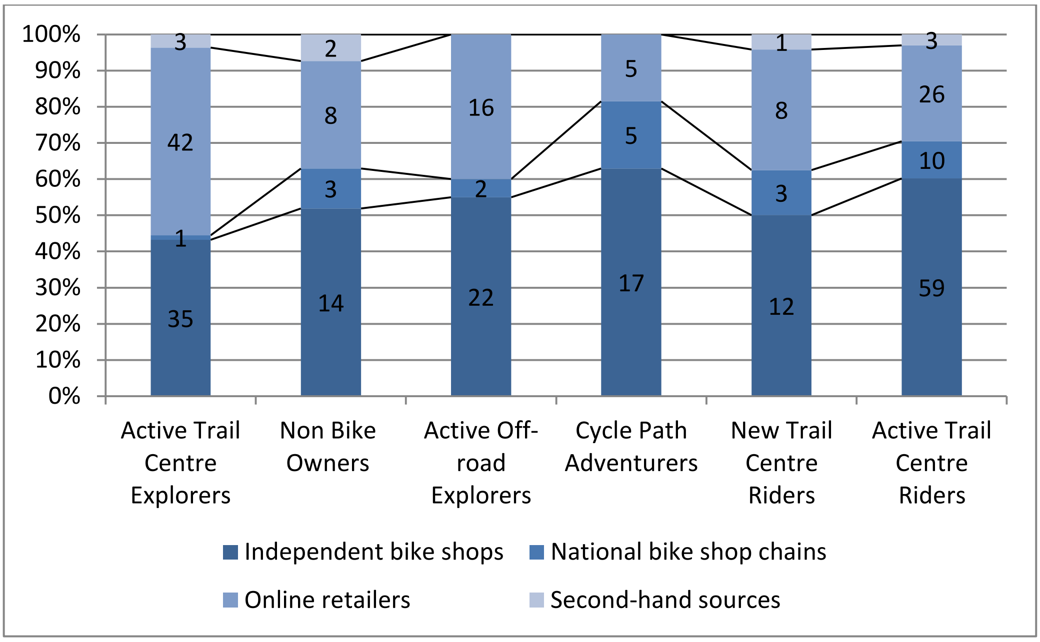
Source: Author

For all cluster groups, cycling clubs account for the largest membership proportion. With the exception of the *Cycle Path Adventurer* cluster, the remaining four clusters contain at least four out of the five organisational categories. The *Active Trail Centre Explorer* category is the only cluster to have representation in all five categories. The *Non Bike Owner Cluster* can be identified as having the highest proportion of NGB qualifications which further confirms the presence of qualified off-road cycle leaders within the cluster. The presence of Sustrans membership within the *Active Trail Centre Explorer* and *Active Trail Centre Rider* groups may indicate that these clusters contain respondents who possess a wider interest in cycling as a form transport and not solely as a leisure pursuit. British Cycling membership is generally associated with competitive cycling, and its absence from the *Cycle Path Adventurer* cluster is consistent with evidence from Figure 5.16 that this group is less interested in competitive cycling.

The purchasing behaviour of off-road cyclists was also analysed to examine the relationship between the choice of retailer and the characteristics of the off-road cycling clusters. One aspect of interest is the relationship between purchasing behaviour and consumer knowledge. This is based on the rationale that more experienced cyclists will opt for more specialist cycle retailers or will bypass high street shops in favour of online retailers. The opposite can be hypothesised that less experienced cyclists require a more personal shopping experience where they can benefit from expert advice.

The results from the analysis of cluster shopping behaviour are presented in Figure 5.20. Overall the clusters display a broadly uniform distribution of shopping behaviour. This observation was confirmed by the results of the Kruskall-Wallis analysis, which identified no statistically significant differences between the cluster groups.

Figure 5.20 Cluster group cycling equipment purchasing behaviour



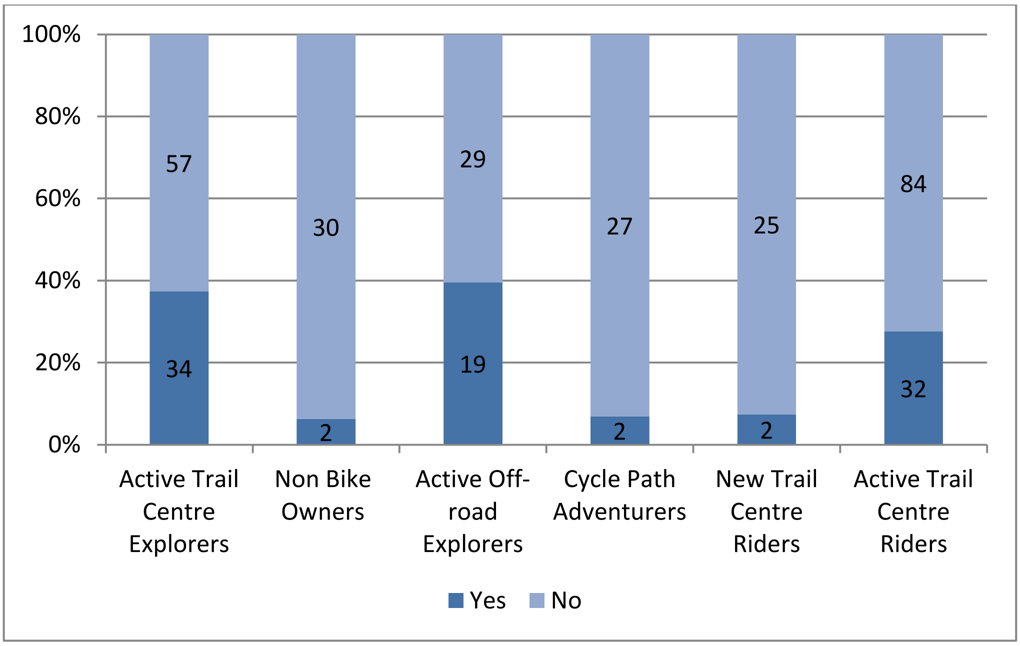
Source: Author

Whilst no statistically significant differences were found, some differences can be identified within the cluster groups. With the exception of the *Active Trail Centre Explorer* group, independent bike shops can be identified as being the most popular choice for the cluster groups. This represents good news for independent bike shops facing competition from online retailers. However, online retailers can be identified as the preferred choice for the *Active Trail Centre Explorer* cluster, and the second most popular choice for all clusters except the *Cycle Path Adventurer* group. For the *Cycle Path Adventurer* group, an even split between online retailers and national bike shop chains (e.g. Halfords) can be identified. The cluster also contains the highest proportion of respondents who shop in national bike shop chains compared to the other cluster groups. National bike shop chains are least favoured by the two explorer clusters, this supports the rationale that these more experienced groups choose more specialised cycle retailers. Second-hand sources account for the lowest proportion of respondent shopping choices and are represented in four out of the six clusters.

The highest proportion (7.4%) of second-hand purchasing is represented by the *Non Bike Owner* cluster. Second-hand purchasing is not represented in either the *Active Off-road Explorer* or the *Cycle Path Adventurer* clusters.

Question 31 of the survey instrument (see Appendix 6) asked respondents if they had heard of 1 South West Cycle Adventure before the survey. This question was devised to gauge the level of awareness for the project among respondents. In common with the variable relating to membership of cycling organisations, Question 31 also provides an indication of how engaged respondents are with off-road cycling and how important it is to them. It would therefore be expected that the 'actively' labelled clusters would have a greater awareness of the project in comparison to the less active clusters. Figure 5.21 shows this assumption to be true.

Figure 5.21 Cluster group awareness of 1 South West project

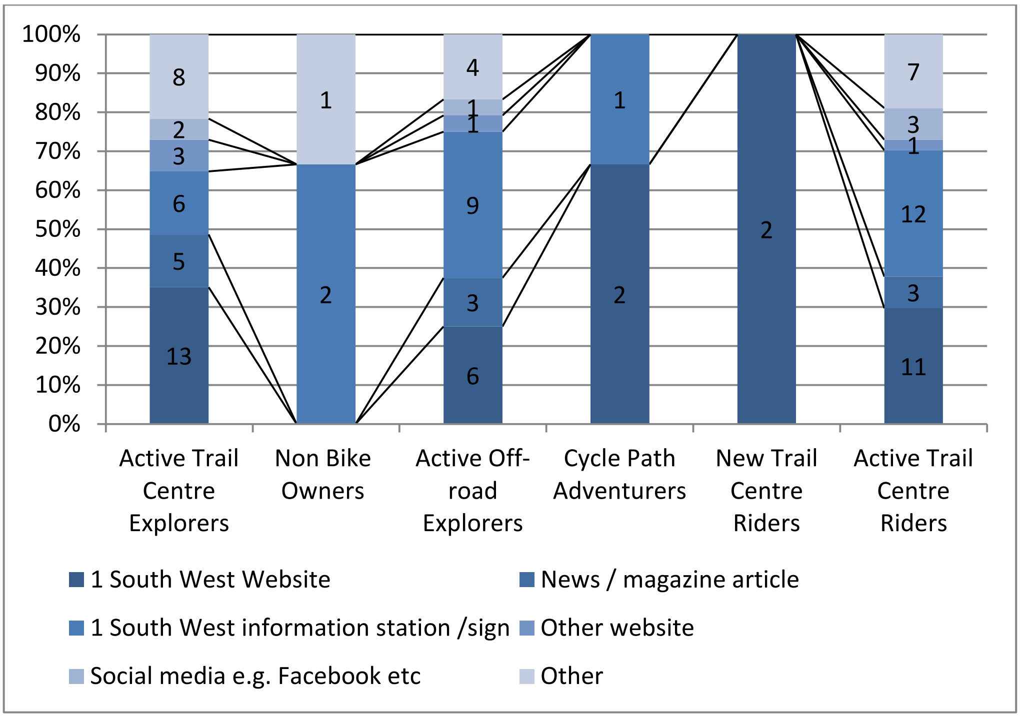


Source: Author

Follow-up Kruskall-Wallis analysis, confirms that significant differences exist between the cluster groups at the 99% confidence level. Within the 'active' clusters, awareness can be seen to be highest among the *Active Trail Centre Explorer* and *Active Off-road Explorer* groups, with 37.4% and 39.6% of respondents respectively stating that they were aware of the initiative. This provides further evidence that these clusters have a high level of engagement with off-road cycling and suggests that these groups may have visited or at least be aware of other 1 South West off-road cycling sites. The *Active Trail Centre Rider* cluster shows a lower level of awareness (27.6%) which suggests that many regular visitors may be unaware that the off-road cycling trails at Haldon Forest Park form part of a wider regional network of off-road cycling facilities.

For the remaining three less active clusters, it can be seen that levels of awareness were found to be consistently low, with only 6% of respondents stating that they had heard of 1SW. In many ways, this observation is consistent with the groups' lower level of engagement with off-road cycling and Haldon Forest Park. Given the strong focus of the project to introduce and encourage more people to go off-road cycling, these results suggest that more emphasis is needed on raising awareness within less active off-road cycling groups. For the proportions of respondents who were aware of the project, the source of awareness was also analysed, this can be seen in Figure 5.22.

Figure 5.22 Cluster group sources of awareness of 1 South West project



Source: Author

Within Figure 5.22, the 'active' clusters stand out as having gained awareness of the project from all six listed sources. With the exception of the *Active Trail Centre Explorer* cluster, the highest proportion of awareness for the two remaining 'active' cluster groups came from 1SW branded information points or signs. Information stations and signs can also be identified as the main source of awareness for the *Non Bike Owner* cluster. For the *Active Trail Centre Explorer* group, the main source of awareness was the 1SW website. The *Cycle Path Adventurer* group also cites the 1SW Website as the main source of awareness, followed by information stations and signs. Overall, the results from the analysis highlight the importance of the onsite information points and 1SW website. To a certain extent these two sources are linked as the 1SW signs all carry the web address, therefore driving traffic towards the website and vice versa. Social media sources were only cited by the 'active' clusters and account for between 3-5% of respondents. News / magazine articles were also only cited by the 'active' clusters further demonstrating that these groups take a more active interest in off-road cycling through the cycling media. Other sources of awareness were cited by four out of the six clusters. For these groups, word of mouth was found to be the most frequent source of awareness.

5.9.6 Cluster profiling: Attitudes towards off-road cycling provision

The preceding analysis has so far focused on respondent behaviour. In this next section respondent attitudes are assessed in terms of responses to the series of nine attitudinal statements presented in Table 5.18.

Table 5.18 General attitudes towards off-road cycling and the South West

		Active Trail Centre Explorers (91 Cases: 26.5%)	**Non Bike Owners** (32 Cases; 9.3%)	**Active Off-road Explorers** (48 Cases: 14%)	**Cycle Path Adventurers** (29 Cases: 8.5%)	**New Trail Centre Riders** (27 Cases: 7.9%)	**Active Trail Centre Riders** (116 Cases: 33.8%)	***H***
1	I am now inspired to visit other off-road sites in the South West	3.4	3.2	3.1	3.2	3.5	3.3	12.09*
2	The South west needs more off-road cycling facilities	3.7	3.5	3.5	3.4	3.7	3.6	8.50
3	The South West is not a premium destination for off-road cycling	2.8	1.9	2.7	2.4	2.8	2.3	22.03**
4	Haldon Forest Park is a valuable public recreation facility	3.8	3.8	3.8	3.7	3.7	3.8	4.91
5	The off-road trails at Haldon Forest park are inspiring	3.4	3.6	3.3	3.6	3.6	3.4	9.57
6	Haldon Forest Park only caters for novice cyclists	2.2	2.1	2.2	2.0	2.0	2.0	4.46
7	Purpose built trails offer more exciting riding than public rights of way	3.3	3.5	2.8	3.2	3.7	3.4	22.99**
8	I prefer riding in rural environments than towns and cities	3.5	3.5	3.5	3.6	3.6	3.6	0.72
9	I prefer cycling off-road where I can follow a clearly signposted route	3.1	3.0	2.5	3.4	3.5	3.1	31.97**

Kruskall-Wallis Test, *H*, 5df, *Significant at - p≤.05,**Significant at - p≤.001,
4 point Likert scale where 1 = strongly disagree, 4 = strongly agree

Source: Author

These statements were designed to gauge respondent attitudes towards off-road cycling at purpose-built sites, the off-road trails at Haldon Forest Park, and off-road cycling within the South West region. Extracts from the onsite qualitative interviews are also used where appropriate to support the tabulated findings. Within Table 5.18 the mean responses to the numbered attitude statements are presented together with the results of the conducted Kruskall-Wallis analysis.

The first attitudinal statement gauges whether respondents felt inspired to visit other off-road cycling sites in the South west as a result of their visit to Haldon Forest Park. A statistically significant difference between the clusters was identified at the 95% confidence level. Mean results for this statement show that all cluster groups agreed that they felt inspired. Of the six clusters the *New Trail Centre Riders* and *Active Trail Centre Explorers* record the highest mean values indicating a greater feeling of inspiration. The observation that new riders felt particularly inspired stands out, as it represents an endorsement of the 1SW trail product and facilities at Haldon Forest Park.

The second statement refers to whether respondents felt that the South West needed more off-road cycling facilities. All clusters were unanimous in stating that they agreed that the South West did need more off-road cycling facilities. In terms of the Likert scale, all cluster groups can be identified as scoring a mean value of 3.4 or above. The observation that off-road cyclists stated that the South West needed more off-road cycling sites is perhaps unsurprising given the survey links to the 1SW development project. However, the results do show a consistency in opinion across the cluster groups regardless of cycling frequency and commitment. The third statement was designed to stimulate a response regarding the quality of the South West as an off-road cycling region. A statistically significant difference between the clusters was identified for this statement at the 99% confidence level. The Likert scale results show a 50:50 split in terms of respondents who can be identified as disagreeing with the statement and those who show agreement towards the statement. Of the six groups the two explorer clusters plus the *New Trail Centre Rider* cluster can be identified as containing respondents with mean values which indicate a level of agreement with the statement. For the explorer clusters, the result may reflect the fact that these groups have visited other off-road cycling destinations outside the South West (see Table 5.14) and therefore their attitudes may be based on comparisons between the South West and sites in other UK locations.

The fourth statement assesses the value assigned to Haldon Forest Park by the different cluster groups. In Section 5.5.4, return rates for the different visitor groups were used to assess the value of visiting Haldon Forest Park. This analysis revealed that 99.5% of Internal Day Visitors, 100% of Internal Holiday Visitors, and 88.9% of External Holiday Visitors would return to the site. From these high return rates it appears that that the majority of visitors had a positive experience. The following analysis examines the extent to which this observation is reflected in the valuation of Haldon Forest Park by the cluster groups. From Table 5.18 it can be seen that all cluster groups agreed that Haldon Forest Park is a valuable public recreation facility. This consistency is confirmed by Kruskall-Wallis analysis which identified no statistically significant differences between the groups. The high mean score values of 3.7 and 3.8 across the cluster groups show the strength of agreement within the cluster groups; this supports the assessment that Haldon Forest Park is highly valued by off-road cyclists.

Statement 5 further considers the value of Haldon Forest Park to the cluster groups. The statement considers the ability of the off-road trails at Haldon Forest Park to inspire visitors and as such is linked to Statement 1 which asked respondents to what extent they were inspired to visit other sites as a result of their visit to the site. Overall, all cluster groups were in agreement that the off-road cycling trails at Haldon Forest Park are inspiring. In common with Statement 4, no statistically significant differences could be found between the clusters for this variable. Within this consensus of agreement, slightly higher mean scores can be identified for the less active groups, suggesting that the trails are less inspiring for more experienced cyclists. However, this difference was not found to be statistically significant.

The balance of trail provision at Haldon Forest Park for off-road cyclists of different abilities is assessed in Statement 6. All cluster groups disagreed with the statement that Haldon Forest Park only caters for novice cyclists. From a management perspective, this demonstrates that the current trail provision at Haldon Forest Park appeals to a broad range of off-road cyclists. It also suggests that the trail offer conforms to the 'ladder of progression' model promoted by 1SW for their off-road cycling trails (1 South West, 2010). This broad appeal was also identified by interview respondents and is contextualised within the following extracts:

> Male Respondent B: *'The main thing with Haldon is that it's interesting, it's well built, it's fairly much all weather in terms of it's not a mud bath there. Umm, it's well thought out, [pause] I can take my kids there. I can take my boys there and you're not going to get silly, you know silly obstacles there. It's kind of like, [pause] it's interesting, well built, challenging enough, it's good for my training and it's got a café. You know it's a good destination really.'*

Male Respondent E: *'I bring the grandson up here as well. I bought him a bike and he comes up here as well, so a real family thing.'*

Male Respondent F: '*I can't see [pause] they've done a lot already. They've spent a lot of money as it stands, a lot of people would like to see more natural trails, but at the moment as it stands, it's ideal for everybody. [Pause] You know, if you start putting in too many natural trails, you start getting people injured and you get problems. I think it's ok as it is really, it's got something for everybody at the moment.'*

Female Respondent J: *'I think it's really good to get people into mountain biking as well, but then you're also on trails that you know [pause] even if they are going to be challenging you. [Pause] You know they're not going to be silly; you've got your choices so [pause] and it's a really good skill thing I think. So developing those skills [pause] and then you can take off to more dangerous areas I guess. So [pause] just having somewhere to park, and yeah have a cup of tea'.*

Male respondent K: *'I don't know if it's cycle, [pause] like on the cycle scheme thing [Government cycle to work scheme] so there's more people getting bikes. [Pause] Or the popularity of cycling generally because of the Olympic Games, the Tour De France and the coverage it's getting, and also places like this are fairly easy to ride. [Pause] Where, [pause] when I used to take people riding on the natural stuff it's immediately very very hard, whereas you can bring people to places like this and it's* *relatively easy to get started into it. So yeah [it's] definitely got more popular in the last few years'.*

Whilst respondents on the whole were found to express extremely positive opinions of the off-road cycling facilities at Haldon Forest Park, safety at the site and off-road cycling sites more generally was raised as a theme by 27.3% of interviewees (see Appendix 13). This issue was found to primarily relate to trail conflict between cyclists and other users. The following extracts present a range of viewpoints relating to this issue:

Female respondent A: *'In terms of improving things it would be better if pedestrians, [pause] people couldn't walk on the red or blue route. There are no entry signs but they come up the back, and if the rangers were to actually say, look we don't want people walking on them, because it's not clear. It's a bit like, the people on their bikes get a bit annoyed, but people walking also get annoyed, [because] they've got people whizzing along these paths. That would be a big improvement, if it was signed better, because they do have shared areas like on the blue and green which confuses things'.*

In contrast to the viewpoint shared above, the following respondent presents a more positive experience of user interaction at Haldon Forest Park:

Female Respondent I: *'Umm, Haldon Forest Park is way better than Epping Forest, 'cause Epping Forest is just, it's just a bit too. [Pause] You've got the horse riders, and you've got walkers and cyclists on the same path, but it seems to become about,* *they don't have that. [Pause] You know, when skiers and snowboarders hate each other [pause] that kind of reaction; it just seems some people are like that up and around Epping Forest. Whereas around here it's just a bit, it's friendlier and I think it's just watch out for. [Pause] You know, you've got bits where you can have walks with your family, and you're not. [Pause] It's wide enough for cyclists and whatever, and then if you want to go off-road you're not likely to see walkers around, so it's kind of nice that it's almost separate. So it's better overall, that's why I like it'.*

This more balanced view is also supported by Male Respondent H who identifies himself as a cyclist and a walker:

Interviewer: How important is it to you to have places like Haldon to go riding?

Male Respondent H: More important for others I think who are more serious about off-roading, but it is important to have it around here, as well as the walking. You know people [walkers] have to have their tracks, as well as the cyclists having their tracks. It's important to have both. I come up here as a walker as well'.

Statement 7 examined whether the cluster groups felt that purpose-built trails offered a more exciting riding experience in comparison to the public rights of way network (PROW). This statement was designed to further investigate the relationship between trail type and trail preference. With the exception of the *Active Off-road Explorer* group, the cluster groups were found to be in agreement. Kruskall-Wallis analysis confirmed that the observed difference in attitude for the *Active Off-road Explorer* cluster was statistically significant at the 99%

confidence level. The observed disagreement shown by the *Active Off-road Explorer* cluster reflects the group's stated preference for riding on the PROW network. Within the groups showing agreement to the statement, the *New Trail Centre Rider* cluster and *Non Bike Owner* cluster can be identified as recording the highest mean scores for agreement. Given the relatively limited off-road cycling experience of the *New Trail Centre Riders*, and a proportion of respondents within the *Non-bike Owner* cluster, the observation may indicate that their attitudes are based on perception rather than on personal experience of both forms off-road cycling provision. Physical challenge was identified as a sub-theme within the Framework Analysis (27.3% of respondents, see Appendix 13). This is illustrated by the following quote from Male Respondent B, who stated that he was riding his local PROW network less because it lacked the technical challenge necessary for his training:

> Interviewer: Can you tell me about your typical off-road cycling routine?
>
> Male Respondent B: '*I'm quite lucky, as I say it's quite hilly, there's lots of bridleways you can use to go off-road, and potentially I can go off-road for hours without going on road at all. I'm quite lucky where I live here, [pause] but I tend not to do it so much recently because it doesn't have that technical challenge, for my training. You know, [I] go out on the road if it's a fitness training event, but I go to forestry places for my mountain biking, as in training for racing'.*

Whilst the switch from PROW to purpose-built centres for this user satisfies a particular need, it does highlight some of the differences between the two forms of provision and why certain groups may choose to only ride certain types of facility.

A consensus of agreement can be identified between the clusters for Statement 8, with all cluster groups stating that they prefer riding in rural environments than towns and cities. This consistency is confirmed by Kruskall-Wallis analysis which identified no statistically significant differences between the groups. Furthermore, the observed result demonstrates that purpose-built trails are still strongly connected to the rural environment, and that the environment forms an important part of the overall riding experience. The environment was also identified as a sub-theme within the interview analysis, with 45.5% of respondents making reference to the environment during their interview (see Appendix 13). This connection was particularly expressed by the female respondents interviewed:

> Female Respondent A: *'I love being outside, I like the fresh air, so it's the whole lot together, it's so compulsive. If I can't go I actually get grumpy. I get twitchy and get cross with myself'.*

> Female Respondent I: '*I think it's just nice having the forest there in a way, you can just get away from. [Pause] Especially for me in London it's just nice to go somewhere else, somewhere different where you can just get out off-road on the bike in the forest [Laughs]'.*

Statement 9 examines the relationship between navigation demands and off-road cycling. As such, the statement attempts to gain a deeper insight into whether respondents choose purpose-built sites because they offer clearly signposted routes that are more easily navigable than other forms of off-road cycling provision, such as the PROW network. With the exception of the *Active Off-road Explorer* group, the cluster groups were found to prefer riding where they can follow a clearly signposted route. Kruskall-Wallis analysis confirmed that the observed difference in attitude for the *Active Off-road Explorer* cluster was statistically significant at the 99% confidence level. The observed disagreement shown by the *Active Off-road Explorer* cluster is consistent with the group's stated preference for riding on the PROW network, where navigation is user led. It should be noted that whilst the variable does not specifically measure the navigational skills of the different cluster groups, which may or may not confine respondents to signed routes. The results show that the majority of cluster groups prefer riding where they can follow a clearly signposted route. This has important implications for any attempt to promote the wider rights of way network to these users or integrate purpose-built sites into the network. As it stands, purpose-built sites can be visualised as islands within the wider network where off-road cyclists can navigate the countryside easily by following signs. It is likely that any such links would need to be made convenient and explicit if these groups were to be encouraged to venture beyond the boundaries of purpose-built sites. Predictability (27.3%) and convenience (18.2%) were also identified as sub-themes within the interview analysis (see Appendix 13). The issue of getting lost was also brought up by one female respondent who stated that she currently only rode at Haldon Forest Park:

> Interviewer: Have you considered going riding anywhere else?

> Female Respondent A: *'Yeah, I have considered it, but I haven't done it, but I want to. That's my intention to go to other places, but I haven't. [Pause] It's not necessarily that I want to go with someone else, but I haven't quite got it together, and they say Cardinham Woods [also part of the 1SW network] isn't finished and*

[pause]. I'm worried about getting lost on Dartmoor or Woodbury Common. So that's why I come up here and it's a proper trail'.

The online interactive map developed as part of the 1SW project is an example of an initiative designed to help off-road cyclists explore beyond the confines of purpose-built sites like Haldon. This map was designed to further develop the regional off-road cycling product, by increasing the geographical and associated economic impact of the project beyond the trail hubs. This map provides users with detailed information about individual PROW trails and visitor facilities in the South West. The trails have also been graded according to the standardised IMBA trail grading system used at the trail hubs. In addition, the map also contains videos and photographs of the trails. All of these measures have been developed to make exploring the wider PROW network more accessible. However, the map stops short of promoting specific routes and the trails do not feature any additional 1SW signage, meaning users still require a map and the ability to use it in order to navigate the trails. Investigating whether the map bridges the gap between signed purpose-built sites and the wider PROW network for visitors who prefer signed routes is beyond the scope of this study. However, this research does highlight that signed routes are highly important to the majority of users at Haldon Forest Park, and that without this level of intervention users may not venture beyond the boundaries of purpose-built sites.

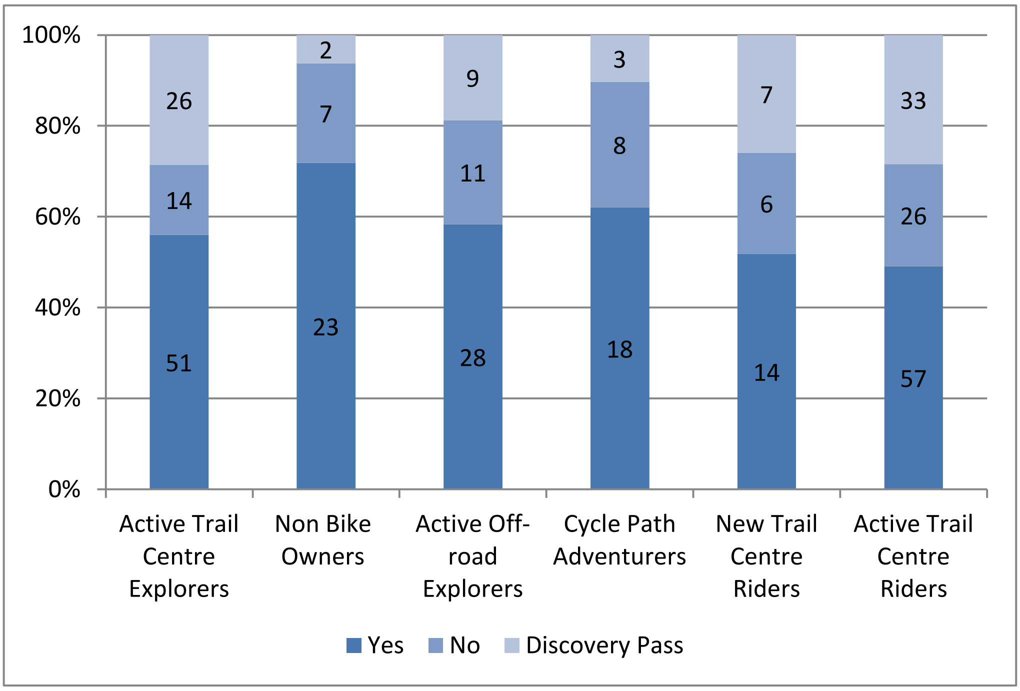
5.9.7 Cluster profiling: Paying for off-road cycling facilities

Section three of the questionnaire survey (see Appendix 6) had the aim of understanding respondent attitudes towards paying for off-road cycling facilities. For public recreation sites with open boundaries, car park charging offers the most convenient method of generating income to support the development and maintenance of off-road cycling trails. Whilst it is difficult to place accurate figures on the ongoing maintenance costs, data from the 7 Stanes off-road cycling centres in Scotland suggests that maintenance costs can be as much as £20,000 per annum (Tym et al, 2006: 40). It should be noted that other payment schemes do exist, but these are mostly limited to private off-road cycling sites which operate a membership system or a pay to ride scheme. Whilst access charges can be a contentious issue, particularly for publicly owned sites, approximately 90% of all visitors to Haldon Forest Park are willing to pay the car park fee (including Discovery Pass holders) (S. Lees 2011, pers. comm., 25 Oct). It should be noted that all of the revenue generated by the parking charges at Haldon Forest Park is reinvested back into the onsite facilities; the observed high level of compliance may reflect this fact. This aspect was examined during the survey by asking respondents whether they would be willing to pay more in return for additional investment in the off-road cycling facilities. The results of this investigation are presented in Table 5.20 and discussed in full at the end of this section.

It is also important to note that, whilst a parking charge is levied at Haldon Forest Park, at the time of the survey it was not legally-enforced. Instead, monitoring consisted of daily checks by the ranger team and the issuing of reminder letters for cars not displaying a valid ticket. In an attempt to avoid paying the car park charge some visitors choose to park on the access roads leading to the site, and then access the site by bike or on foot. On the main access road, this problem has been mitigated by the creation of earth and rock embankments which have been installed to prevent cars from parking on the road verges. However, this type of intervention is extremely expensive, and therefore other deterrents such as reminder notices and face to face conversations are also used to mitigate this issue. Whilst the overall cost of constructing and maintaining the embankment parking deterrents is unknown, it is important to note that this type of intervention represents an additional maintenance cost which must be met by the car park revenue stream and site budget.

Willingness to pay for the facilities can be regarded as a measure of the value of the site to the individual and also their awareness of the costs involved in maintaining the facility. Questions 38 and 39 of the questionnaire (see Appendix 6) examined the payment honesty rate for off-road cycling visitors and investigated whether respondents researched the cost of parking before their visit. This second variable had the purpose of identifying whether the parking charges were an important consideration for respondents before visiting. Figure 5.23 shows the car park payment characteristics of the six cluster groups. This question asked respondents whether they had paid to park or whether they possessed a discovery pass.

Figure 5.23 Cluster group car park payment characteristics

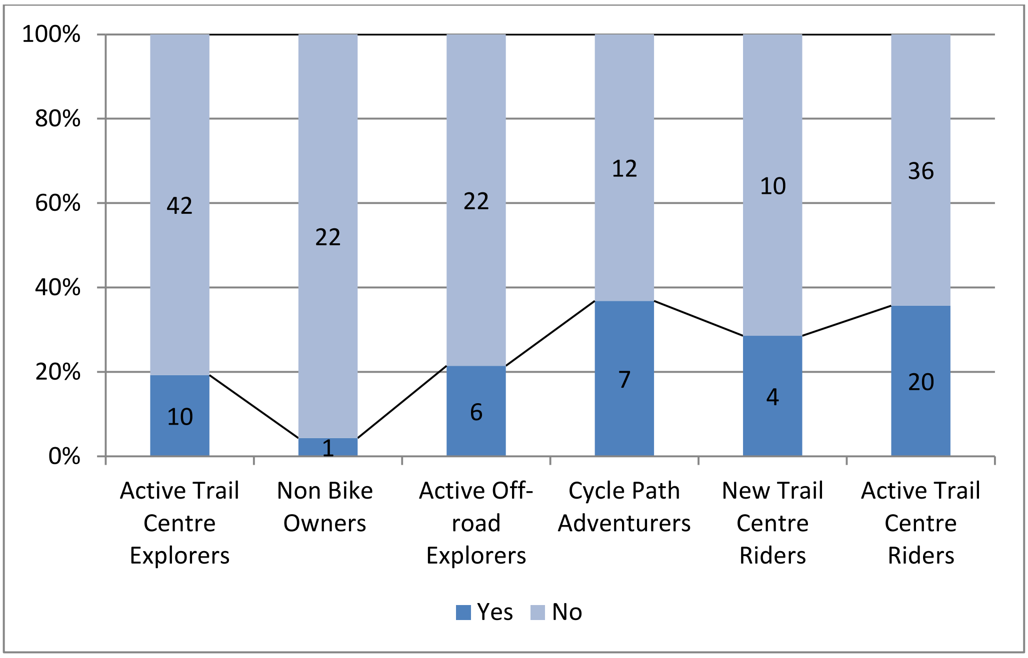


Source: Author

In contrast to the payment rate figure stated for all visitors to Haldon Forest Park (90%) all cluster groups record lower payment rates of between 70-85% (including Discovery Pass holders). This consistency is confirmed by Kruskall-Wallis analysis which identified no statistically significant differences between the groups. Whilst this result suggests that off-road cyclists are less compliant in paying the parking charge, it is important to note that the stated Forestry Commission payment rate refers to all visitors and not just off-road cyclists. Therefore, it is not possible to directly compare the two compliance figures. Of the cluster groups, Discovery Pass ownership is highest within the ‘active’ and *New Trail Centre Rider* clusters. This observation is consistent with the high frequency of visitation by these groups.

In comparison *Cycle Path Adventurers* visit the site less frequently but stand out as recording the highest rate of non-payment (27.6%). This observation most likely reflects the lower level of engagement which these visitors have with the site. The difference between payment rates for all visitors and the payment rates for off-road cyclists identified by this study raises some important questions. First, the observed results show that non-payment is consistent across the cluster groups, and not a function of the cluster characteristics. Second, this result indicates that off-road cyclists may be less compliant than other user groups. The following results for questions 39-42 further investigate the attitudes of the cluster groups towards paying for the off-road cycling facilities at Haldon Forest Park. To investigate whether car park charges are taken into consideration by respondents when deciding to visit the site, respondents were asked if they had found out how much it would cost to park before travelling (See Figure 5.24).

Figure 5.24 Cluster group awareness of car park costs before visiting

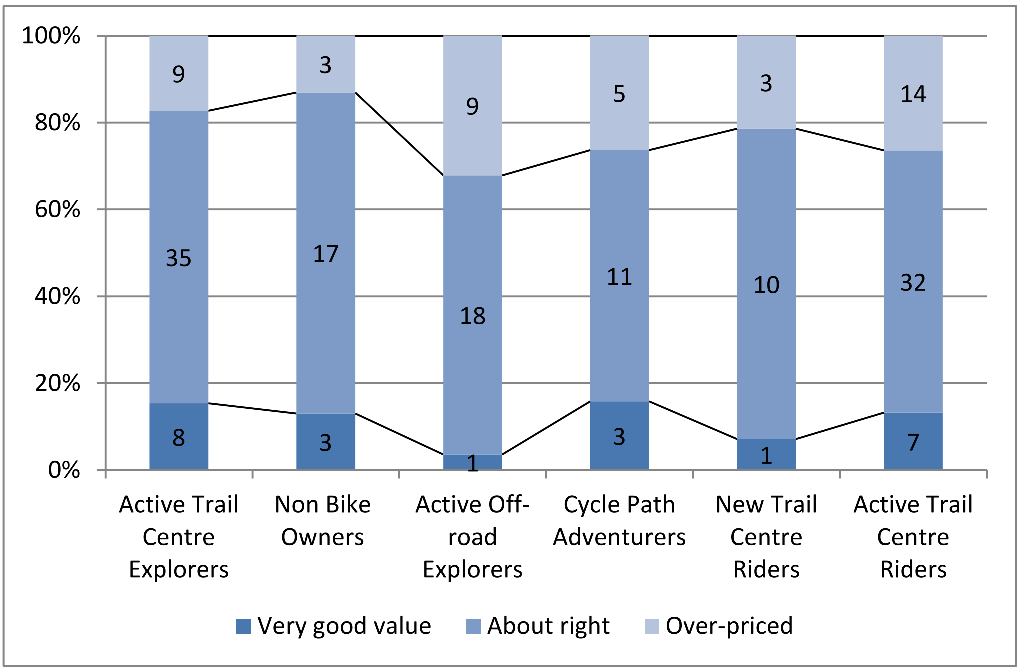


Source: Author

This aspect examines the relationship between the value respondents place on the site and their knowledge of the visit costs. To establish whether a statistical relationship existed between awareness of costs and non-payment of parking fees, a Spearman's correlation test was conducted for the two variables. This test found that there was no association between the two variables (r_s = -.079; one tailed). Whilst no relationship was found between awareness and non-compliance, Kruskall-Wallis analysis identified a statistical difference between the clusters at the 95% confidence level for awareness of the parking charges. Of the cluster groups, the *Cycle Path Adventurer* cluster records the greatest awareness of the parking costs (36.8%). However, this cluster also recorded the highest level of non-compliance. Whilst no relationship between awareness and compliance was found for the overall sample, it was not possible to test the individual cluster group due to the small sub-sample sizes involved. The A*ctive Trail Centre Rider* cluster exhibits the second highest level of awareness of the parking costs (35.7%). This observation is consistent with their 'Haldon centric' off-road cycling routine. The cycling activities of the *New Trail Centre Rider* cluster are also centred on the trails at Haldon Forest Park, and this is reflected in their awareness of the parking charges (28.6%). Awareness of the parking charges was found to be lowest within the *Non Bike Owner* cluster. Despite this low awareness, this group contains the highest proportion of paying visitors (excluding Discovery Pass owners). It is not known whether respondents researched the bike hire facilities prior to their visit. However, the result shows that additional charges such as parking were not taken into consideration by 95.7% of respondents before visiting.

In order to gain a deeper understanding of the relationship between the site value and the current parking charges at Haldon Forest Park. Respondents were asked to state whether they considered the parking charges to be: 'Very good value', About right', or 'Overpriced'. Figure 5.25 shows the breakdown of opinions for the cluster groups.

Figure 5.25 Cluster group opinion of current car park costs



Source: Author

Attitudes towards the current parking charges were found to be consistent across the cluster groups. This consistency is confirmed by Kruskall-Wallis analysis which identified no statistically significant differences between the groups. For all cluster groups the majority of respondents stated that they considered the current charges to be ‘About right’. It should be noted that during the survey period a new tiered parking charge was implemented. This charge replaced the original flat rate fee, and was introduced after the second survey period. In the tiered system, the original flat rate fee now applied to visitors parking for up to two hours, and a new charge was introduced for visitors staying over two hours. As a result of the change, the parking fee increased for the average off-road cyclist, as the mean length of stay for all cluster groups exceeds the lower parking fee threshold.

To examine whether there was a general change in respondent attitudes following the increase, a Spearman’s correlation test was conducted. This test found that there was no association between attitude and when respondents were surveyed (r_s = .075; 2 tailed). Furthermore, no association between survey season and payment compliance was found for respondents (r_{s} = 0.43; (2 tailed). The willingness of respondents to accept this new charge suggests that the parking charge did not increase beyond their willingness to pay (WTP) threshold. In an attempt to identify the maximum car park charge threshold, Question 41 (see Appendix 6) asked respondents to state the car park fee which would make them turn around and drive out of the car park. As previously discussed, car park charging offers the most convenient method of generating income for public recreation sites. By identifying the upper value limit, it is possible to identify the maximum value of the site to the individual, and also the hypothetical maximum car park income which could be derived for the current facilities.

Table 5.19 presents the mean and modal maximum car park charge thresholds for the cluster groups. In common with the previous variable, no statistically significant differences between the clusters were identified for the maximum charge threshold. The consistency across the clusters is demonstrated by the identical modal value stated by the cluster groups. Whilst the variable only measures intended behaviour, the results do support the assessment that respondents were willing to accept the new tiered charge because it did not increase beyond their WTP threshold. For four out of the six clusters, the mean value corresponds closely with the modal value. This is not observed for the *Non bike Owner* cluster, which records a mean value which is almost double that of the modal value. This higher threshold value reflects the fact that this 95.8% of this group paid to hire a bike from the onsite facility (see Appendix 14). Therefore visitors from this group made their visit in the knowledge that costs will be incurred at the site, and that they are willing to pay for the facilities. The *Active Trail Centre Rider* cluster also exhibits a higher mean value in comparison to the other 'active' clusters. This observation reflects the high level of engagement between the site and the cluster group, as the facilities form the mainstay of the group's cycling routine.

Table 5.19 Cluster group maximum car park charge threshold

	Active Trail Centre Explorers 91 Cases (26.5%)	**Non Bike Owners** 32 Cases (9.3%)	**Active Off-road Explorers** 48 Cases (14%)	**Cycle Path Adventurers** 29 Cases (8.5%)	**New Trail Centre Riders** 27 Cases (7.9%)	**Active Trail Centre Riders** 116 Cases (33.8%)
Mean (£)	5.86	9.48	5.56	5.94	5.60	6.48
Mode (£)	5.00	5.00	5.00	5.00	5.00	5.00

Source: Author

In the previous discussion, it was established that the majority of respondents within all cluster groups considered the current parking fees to be ‘About right’. It was also found that these charges are below the maximum WTP threshold for all cluster groups. The following discussion examines the circumstances under which respondents would be willing to pay more than the current parking levy. Question 42 (see Appendix 6) presented respondents with four attitudinal statements; these can be seen in Table 5.20.

Table 5.20 Cluster group attitudes towards paying for off-road cycling facilities

		Active Trail Centre Explorers (91 Cases: 26.5%)	**Non Bike Owners** (32 Cases; 9.3%)	**Active Off-road Explorers** (48 Cases: 14%)	**Cycle Path Adventurers** (29 Cases: 8.5%)	**New Trail Centre Riders** (27 Cases: 7.9%)	**Active Trail Centre Riders** (116 Cases: 33.8%)	***H***
1	I would not pay more to fund the development of new trails	2.2	2.2	2.1	2.3	2.2	2.2	1.28
2	I would pay more if the money was used for additional trail maintenance	3.3	3.1	3.1	3.0	3.1	3.0	10.50
3	I would pay more if the additional money provided better facilities	3.2	3.0	2.8	2.8	3.1	2.9	12.90 *
4	Trail maintenance should be exclusively funded by off-road cyclists	2.2	2.0	2.0	2.0	2.0	2.1	4.13

Kruskall-Wallis Test, *H*, 5df, *Significant at - p≤.05,**Significant at - p≤.01,
4 point Likert scale where 1 = strongly disagree, 4 = strongly agree

Source: Author

Statements one to three focus on whether respondents would be willing to pay more in return for investment in new trails, additional trail maintenance, and onsite facilities. The fourth statement was designed to examine the link between the amount respondents pay and the cost of maintaining the trail network. In response to the first statement, all cluster groups agreed that they would be willing to pay more to fund the development of new trails. The cluster groups were also consistent in their attitude towards the second statement, indicating that they would pay more to fund additional trail maintenance. In contrast Statement three divided opinion. This was confirmed by follow-up Kruskall-Wallis analysis, which identified a statistically significant difference in opinion between the clusters at the 95% confidence level. From Table 5.20 it can be seen that the *Active Trail Centre Explorer*, *Non Bike Owner*, and *New Trail Centre Rider* clusters would be willing to pay more. This view was not shared by the *Active Off-road Explorers*, *Cycle Path Adventurers*, and *Active Trail Centre Rider clusters*. From analysing these statements it is apparent that the maintenance and development of the trail network is prioritised by all groups over the development of the onsite facilities. This also suggests that most respondents are happy with the current onsite facilities.

The observed willingness of respondents to pay more in return for investment in the trail network, presents an opportunity for new ways of support to be adopted to develop and maintain the trails into the future. This targeted support is not possible through car park charging, as the income generated benefits the whole park, of which the off-road trails are just one aspect. One solution may be to combine the current parking charges with a voluntary trail support donation system. This type of system has the advantage that users would be able to 'give back' in the knowledge that their additional investment would directly benefit their trail experience. Trail donation could also complement the activities of the existing volunteer trail building and repair group, as it would provide an alternative way for riders to show their support for the trails if they are unable to volunteer their time. Statement four was designed to explore the connection between trail use and user responsibility for maintaining the trail network. All cluster groups disagreed with the presented assertion that trail maintenance should be exclusively funded by off-road cyclists. Whilst this observation appears to contradict statements one and two, the result may reflect an awareness of the costs of maintaining the trail network, and a concern that if off-road cyclists were wholly responsible for maintaining the network the cost of using the site would increase.

Overall, the current parking charges appear to be proportionate to the facilities provided. This is supported by evidence that cluster attitude did not change following the introduction of a tiered parking charge, midway through the survey schedule. This observation confirms that the majority of respondents are happy to pay the parking charge as long as it remains within their maximum threshold value. It was also found that all cluster groups would pay more in return for additional investment in the trail network. This further supports the assessment that the value of the site to respondents is greater than the current costs of using the site.

5.10 Summary of main results

A fundamental limitation of the previous off-road cycling studies reviewed in Section 3.2 is that they do not consider the presence of different sub-groups beyond arbitrary day and holiday visitor classifications. This narrow view disassociates expenditure from consumer behaviour by treating visitors as a homogenous group and not as individual consumers. As a consequence, these studies fail to provide detailed visitor information which can be used to inform the future management and development of off-road cycling facilities. This chapter has addressed these limitations by examining the motivations and behaviours which drive the observed expenditure figures. As such, this approach represents a first attempt at classifying visitors according to their off-road cycling characteristics.

This chapter examined the visitor characteristics of off-road cyclists at Haldon Forest Park within the context of research Objective 4 (see Figure 1.2). In order to address this objective, visitor variations were investigated in two ways. First, visitor characteristics were analysed in relation to their trip type designation e.g. day or holiday visit. This was a necessary first step, as this information is essential in order to fully explain the cluster results. This is especially true of the cluster expenditure variable (see Section 5.9.2). Second, Cluster Analysis was used to identify broader variations in the preferences, behaviour and economic characteristics of visitors to Haldon Forest Park. From this analysis, a typology of users at Haldon Forest Park was developed; this is shown in Table 5.14. In the following sections the key findings from these analyses are summarised.

5.10.1 Trip type visitor analysis

Demographic analysis of day and holiday visitors to the site revealed a narrow profile of users across the visitor subgroups. Male respondents were found to comprise the largest proportion of respondents within all categories (see Section 5.3.1). The observed gender imbalance was also found to be consistent with other UK studies. No evidence of site specific issues relating to the observed gender imbalance could be identified during the onsite interviews. This suggests that the observed imbalance at Haldon Forest Park is a function of the wider gender imbalance within cycling, and not as a result of any site specific factors.

Mean age for respondents for the different user groups was found to range between 38 and 46 years old, see Table 5.3. The age profiles observed at Haldon Forest Park are similar to those recorded at the 7 Stanes off-road cycling facilities in Scotland (7 Stanes Phase 2 Evaluation, 2007: 18) and the National Cycle Network C2C route (Cope, Doxford and Hill, 1998: 217). The ethnic profile of the different user groups was also found to be narrow. For all visitor categories, white ethnic groups account for at least 89% of site visitors. The majority of respondents were identified as being of working age, occupying the age categories between the general education and retirement life stages. This profile was found to match the findings from the 7 Stanes off-road cycling facilities which identified that the majority of visitors were male and in full-time employment (7 Stanes Phase 2 Evaluation, 2007: 18).

Household income for the groups was found to be above the national average, this was also reflected in their socio-economic grade data, which showed that the majority of visitors belonged to socio-economic class A or B. The observed socio-economic classifications were found to be consistent with those identified at the 7 Stanes off-road cycling centres (7 Stanes Phase 2 Evaluation, 2007: 18). The results of the current study also support the Cameo socio-economic analysis conducted as part of the feasibility study, which identified social inclusion as a significant issue due to the narrow socio-economic profile observed at the site (Tym et al 2006: 18). The underrepresentation of lower socio-economic grades within the visitor profile has not changed since this initial study, and social inclusion still represents an ongoing challenge if the site is to be beneficial to a wider cross-section of society in the future.

Whilst the site currently attracts visitors from a narrow socio-demographic profile, new visitors to the site were identified within all visitor groups. This observation highlights the potential for promoting the site to visitors both within and beyond the South West. The site was also found to be used all year round by internal day visitors and in three out of the four seasons by holiday visitors. This observation has important implications for tourism promotion as it demonstrates that site use begins before, and extends beyond the summer tourism season.

5.10.2 Cluster Analysis visitor segmentation

Section 5.7 used cluster analysis as a segmentation tool to develop a typology of users at Haldon Forest Park. Table 5.14 presents the key cluster characteristics where statistically significant differences were found between the cluster groups. These differences can be divided between cycling characteristics and trip characteristics which define the variations between the cluster groups. Statistically significant variations in the trip characteristics of the cluster groups were found for trip type, visit duration, and the number of visits made to Haldon Forest Park in the last twelve months. Variations in cycling characteristics were found to be statistically significant for cycling frequency, cycling seriousness, cycling experience, trail grade, and off-road cycling ability. Furthermore, statistically significant differences were found between the clusters for gender, mean age and groups containing adults and individuals under the age of 16.

In total, the analysis identified six cluster groups with distinct visit and cycling characteristics highlighting the broad appeal of Haldon Forest Park as an off-road cycling destination. Of the cluster groups half can be identified as active, frequent and experienced off-road cyclists. These are the *Active trail centre explorer*, *Active off-road explorer, and Active trail centre rider* clusters. The remaining cluster groups were found to contain *Non-bike owners* (Cluster

2), *Cycle path adventurers* (Cluster 4), and *New Trail Centre Riders* (Cluster 5). In addition to cycling frequency, cycling mobility was also found to be a key distinguishing attribute between the cluster groups. This was used to assess whether visitors to Haldon Forest Park also visited other purpose-built off-road cycling sites. Groups which were found to contain respondents who had visited another UK purpose-built site were labelled as 'explorers' (see Table 5.14).

The split between the active and less active clusters is also reflected in the trip characteristics of the visitor groups. For example, trip duration and the number of visits made to Haldon Forest Park in the last twelve months were found to be related to cycling frequency and seriousness. Visit duration was found to be between three to four hours on average for all visitor groups. These results demonstrate that whilst the individual trails at Haldon Forest Park are relatively short in nature, onsite dwell time is not a function of trail length. The number of visits made by the cluster groups to Haldon Forest Park within the last twelve months was also found to vary significantly. Overall visit frequency was found to relate to general cycling frequency as the 'Active' labelled groups were found to visit the site more frequently than the less active groups (see Table 5.14). Furthermore, the 'Active' labelled clusters were found to be more committed (serious) about their cycling activity than the non-actively labelled clusters. This is reflected in the statistically significant differences between the clusters for these variables. A similar result was also observed for cycling experience, with the 'active' labelled clusters recording the highest proportions of experienced respondents. These observations reinforce the assessment that the 'Active' groups contain frequent, committed, and experienced off-road cyclists.

Trail preferences for the cluster groups were also found to mirror the cluster split between experienced and less experienced off-road cyclists. Easy trails were least favoured by the cluster groups and a 50:50 distribution was observed between moderate and difficult trails. This result highlights the importance of providing trails for both of these groups at Haldon Forest Park. Providing for this middle ground also means that the site provides a degree of progression for cyclists looking to develop their skills.

Trip type was also found to vary between the cluster groups. Analysis of this variable revealed that the highest proportions of holiday visitors were found within the *Non-bike owner* and *Active trail centre explorer* clusters (40.6% and 14.3% respectively). The high frequency of holiday visitors within the non-bike owner category highlights the importance of the bike hire facility at Haldon Forest Park in enabling holiday visitors to enjoy the off-road cycling trails. Furthermore, the observed result for the *Active trail centre explorer* group, demonstrates that the site also attracts respondents who are known to travel to different off-road cycling sites.

Differences in the expenditure characteristics of the cluster groups were also examined (see Appendix 14). This revealed that whilst all groups were found to contribute to the economic viability of the onsite businesses, statistically significant differences were observed between the clusters for car park, bike hire and café expenditure. Of the clusters, the *Non-bike Owner* group was found to have the highest expenditure within these three categories. This observation is important because this group was also found to contain the highest proportion of holiday visitors of all cluster groups. These factors confirm the importance of this group for the purpose of tourism promotion and income generation at the site.

Whilst these expenditure data provide valuable insights into the spending behaviour of the cluster groups, it is important to highlight that it was not possible to compare the expenditure characteristics of the clusters to the previously calculated mean expenditure figures for day and holiday visitors (see Section 4.7). This problem was highlighted in Section 5.9.2 where it was determined that day and holiday visitor expenditure could not be apportioned at the sub-cluster level, because the resulting sample sizes become too small to produce meaningful results. This limitation also prevents these data from being used as a weighting tool to produce annual expenditure figures for the cluster groups. This is because the macro figures incorporate spending by both visitor types. By incorporating day and holiday visitor spending within the overall figure, expenditure items which are specific to holiday visitors (such as accommodation) become concealed, resulting in a distortion of the mean expenditure value.

Despite these limitations, the approach taken by this study has addressed the needs of Objective 4 by successfully developing a typology of site users. Furthermore, this chapter has identified important differences between users at Haldon Forest Park. These present challenges for the future management of the site, as it has been shown that off-road cyclists are consumers with different needs, behaviours and spending patterns. Whilst the use of Cluster Analysis is not without its problems, the technique has proven to be a credible tool for identifying variations among off-road cycling visitors. However, more work is needed in order for it to maximise its usefulness as a visitor analysis technique.

6 CONCLUSION

6.1 Introduction

The research presented in this thesis was driven by two aims and five objectives (see Figure 1.2). The first aim set out to develop a dedicated method for capturing the economic benefits of adventurous off-road cycling at iconic purpose-built sites. The second had the purpose of presenting a critical assessment of the arguments surrounding purpose-built adventurous off-road cycling sites as major contributors to the visitor economy. The first aim was addressed in two stages. First a critical appraisal of the current range of economic assessment technologies was conducted (Objective 1) (see Chapter 2). Second, a meta-analysis of the previously employed approaches (see Chapter 3), was then used to develop a dedicated survey instrument which would capture the economic contribution of adventurous off-road cycling in South West England (Objective 2).

From the review of previously conducted studies it was identified that the economic contribution of off-road cycling could be addressed in a more comprehensive manner by combining aspects of economic valuation and economic impact assessment (see Section 2.9). Furthermore, this review identified that the relationship between economic impact and value was currently under-researched, and that further academic investigation into this interface would contribute to this body of knowledge (Bowker et al, 2007: 258). Following the appraisal of the available methods for collecting data from off-road cyclists in Chapter 3, it was determined that a large-scale onsite questionnaire survey combined with a series of follow-up interviews would provide the most appropriate survey instruments to research the economic contribution of off-road cyclists at Haldon Forest Park (research Objective 2). The study was conducted over a period of 25 days with surveying taking place within each of the four seasons. This comprehensive approach was adopted in an attempt to ensure that the survey captured seasonal variations in visitation. The survey also employed an innovative solution to allocating the survey quotas. This method used automatic trail counter data (see Section 3.5) to proportionately allocate the survey quotas according to the volume of trail use within each season. Whilst cycle counter data has been employed by previous studies (see Table 3.1) none of the reviewed studies were found to have used the technique to develop the survey schedule.

Furthermore, this chapter has identified important differences between users at Haldon Forest Park. These present challenges for the future management of the site, as it has been shown that off-road cyclists are consumers with different needs, behaviours and spending patterns. Whilst the use of Cluster Analysis is not without its problems, the technique has proven to be a credible tool for identifying variations among off-road cycling visitors. However, more work is needed in order for it to maximise its usefulness as a visitor analysis technique.

In the following section, the key conclusions are presented. These conclusions address the second research aim and the needs of remaining research objectives (objectives 3, 4 and 5 see Figure 1.2). Section 6.2.1 first sets out the main findings arising from the analysis conducted in Chapters 4 and 5. This section focuses on the observed relationship between off-road cycling and tourism at Haldon Forest Park. Section 6.2.2 then considers the role of the 1SW off-road cycling product within the regional tourism economy. These aspects are central to addressing research Objectives 3 and 5. Within Section 6.2.2 the economic significance of off-road cycling at Haldon Forest is first presented and then discussed within the context of managing, marketing, and developing the 1SW off-road cycling region. Section 6.2.3

addresses the fourth research objective by presenting the current profile of visitors at Haldon Forest Park and discusses the management and policy implications arising from analysing user interactions at the site. The chapter then concludes by identifying the limitations of the research and outlining opportunities for future research arising from this study (see Section 6.3.1).

6.2 Summary of main findings

6.2.1 Developing off-road cycling in the South West as a tourism product

In Section 5.1 it was stated that tourism and off-road cycling are inextricably linked due to the predominant rationale that investment will generate positive economic benefits for the host economy. Yet the impacts of these developments, as has been discussed throughout this thesis, have received very little attention within the academic literature. The scale of these economic benefits at the regional level is largely measured by the ability of the area to attract tourists from outside the region, and the length of time that they stay within the South West. Realising the opportunity to attract tourists to the region requires the product to be promoted effectively to the tourist market. At the time of the study, the sites were not heavily promoted due the incomplete nature of the regional product. During this time, site promotion and project updates were mainly conveyed via the 1SW website. Moving forwards, a long-term approach will be needed to market the product to visitors.

In Section 5.2 the visitor profile at Haldon Forest was presented. This classified visitors according to whether they had travelled from locations inside or outside the South West regional boundary, and whether they were on a day or holiday trip, additionally overseas visitors were also recorded. This analysis identified that internal visitors accounted for 94.0%

of the sample. Of these visitors, day visitors were found to be the predominant group (89.0%). External visitors were split between day visitors (1.0%) and holiday visitors (4.0%), overseas visitors accounted for the remaining 1.0% of the sample. This tourism baseline broadly reflects the visitor profile presented by the 2006 feasibility study, which identified that 3.7% of visitors were on a holiday trip. In comparison, the current study identified a higher proportion of holiday visitors (10.0%) which may indicate growth within this group. However, this result should be treated with caution as the two studies differ significantly in their approach and scale. The consistency between the two studies reflects the low level promotion of the site that has occurred since the original study was conducted. However, the observed levels of external holiday visitors at the site do not reflect the potential for future tourism growth.

Importantly, holiday visitors were identified in three out of the four seasons, the exception being winter (see Section 5.5.2). This observation has important implications for tourism promotion as it demonstrates that site use begins before, and extends beyond the summer tourism season. This observation presents an opportunity for promoting off-road cycling as a holiday activity outside of the peak holiday periods. Furthermore, the site was found to attract new visitors within all visitor categories. This highlights the potential for marketing the site to visitors both within and beyond the South West. The study also portrays the broad appeal of the site, which opens up opportunities for promoting the site to a range of holiday visitors and not just committed off-road cyclists. This observation is underpinned by the return rates for the different visitor groups which revealed that 99.5% of Internal Day Visitors, 100% of Internal Holiday Visitors, and 88.9% of External Holiday Visitors would return to the site. These high intended rates of return indicate that that the majority of visitors had a positive experience. This assessment is supported by the cluster profile results presented in Section 5.8.3, where it was found that all cluster groups agreed that Haldon Forest Park is a valuable public recreation facility (see Table 5.19).

Furthermore, no evidence was found of cycling rates declining in the summer months which may have indicated respondents switching to other activities such as surfing. This observation is important because it shows that off-road cycling coexists with other forms of recreation, and therefore can be promoted as a year round activity that complements other tourism and recreation opportunities within the South West. Holiday type and length of stay were also analysed for the relevant user groups, this revealed that the majority of visitors were on a short break or additional long holiday. The analysis also identified the visiting friends and relatives (VFR) holiday market as being an important tourism segment, accounting for 51.1% of all holiday visitors surveyed. It is likely that these social links underlie the corresponding observations that 25.0% of respondents stated that they will return within six months and 25.0% within the year. This is an important factor, as these respondents can be classified as semi-regular visitors to Haldon Forest Park. The presence of high proportions of internal visitors at the site also has important implications for the regional tourism economy. This is because the sites may retain expenditure which may otherwise have been lost to neighbouring off-road sites located in South Wales. However, this picture is far from certain, as both geographical areas have invested heavily in off-road cycling provision and the visitation flows between them is unknown. Furthermore, it is likely that intra-regional visitor flows will change once all of the 1SW sites are operational. Whilst this aspect may not affect the regional picture, at a local level it is possible that Haldon Forest Park may experience a decline in visitor numbers due to users trying out newly created sites, or having the option of visiting a site which is located closer to where they live.

In summary, this study has identified that the off-road cycling trails at Haldon Forest Park are an important regional asset for tourism and recreation. Once completed, (see Section 1.4.2) the sites will require effective promotion to maximise the potential for tourism development. The broad appeal and high quality of experience provided by the site presents an ideal marketing opportunity for tourism and leisure purposes. The regional and branded nature of the 1SW product also creates an opportunity for marketing the sites as a collective whole. This is an important consideration as the product consists of varied sites managed by a number of partner organisations. Developing an overall marketing strategy would ensure that the sites are promoted in a cohesive way to maximise the opportunity for tourism growth across the region. This collective approach is consistent with the proposal outlined in the original feasibility study which stated 'Developing a coordinated approach to the way that these geographic hubs are marketed and promoted would allow for consistency and greater impact.'(Tym et al, 2006: 53). Maintaining a collective presence would also enable the product to be more easily integrated with other tourism businesses and initiatives. If a fragmented approach is taken, where each site is promoted individually, the tourism benefits may become localised around particular sites and the regional benefits may not be realised, limiting the tourism potential provided by this initiative.

In the following section the economic case for developing and promoting off-road cycling within the South West is reviewed. Whilst this analysis is only representative of the case study site, the results highlight the scale and nature of the economic activity attributable to off-road cycling, and as such provide an indication of the potential wider regional benefits.

6.2.2 The economic significance of developing off-road cycling

In the previous section, it was discussed that the 1SW off-road cycling region will require an effective marketing strategy in order to maximise the economic benefits to the tourism economy. This section reviews the economic significance of off-road cycling at Haldon Forest Park and discusses the complexities of capturing the economic contribution of a transitional tourism product. Consideration is also given to the wider economic benefits that may be realised once the product is completed.

In order to produce an estimate of the current economic contribution of off-road cycling at Haldon Forest Park (Objective 3), the study adopted an innovative two-stage approach to measuring the economic significance of visitor expenditure. During the first stage, the hidden value of visiting the site was uncovered by analysing the travel costs of the internal day visitor sub-group. In the second step, the total economic significance of the site was calculated by combining all of the valid annual expenditure categories for each visitor type and extrapolating them according to the seasonal usage proportions, effectively linking expenditure to recorded trail use (see Section 5.6). This dynamic approach enabled the study to take into account the life stage of the product and address the fundamental problem of defining the types of expenditure which should be included in the analysis (this aspect is discussed extensively in Section 4.4. Furthermore, the study makes an important contribution to the body of literature, through its research design (see Section 6.1). The method employed by this study represents a replicable approach (see Chapter 3) which could be adopted by other off-road cycling sites. This is made possible by the widespread use of trail counters at purpose-built sites which enable expenditure to be directly linked to trail use; this approach has not previously been used for this application, and offers a reliable way forward for assessing the economic contribution of off-road cycling.

The difficulties encountered in quantifying visitor expenditure highlight the complexities of conducting economic impact investigations accurately (see Section 4.1). Furthermore, it underlines the importance of tailoring the analysis to the specific circumstances of the research problem. This study rejects the blanket approach of excluding local resident expenditure discussed in Section 2.3.2 and has shown that a more finessed approach is required to investigate the tourism and recreation products (Shaw and Williams, 2004:10). The devised method was robust yet sympathetic to the dynamic and changing environment in which the collection of data and economic assessment took place. As such, the study represents a reliable ‘snapshot’ of the size of the economic activity at Haldon Forest Park during the development of the 1SW Project.

In order to appraise the economic case for developing purpose-built off-road cycling infrastructure in South west England (Objective 5), the economic contribution of off-road cycling at Haldon Forest Park was calculated and discussed in Section 4.8. This revealed that the overall economic significance of visitor expenditure associated with Haldon Forest Park was estimated to be £0.7 million per annum (see Table 4.18). This result exceeds the original estimate produced by the feasibility study (£0.4 million) (see Section 4.8). However, it is important to note that the two studies differ significantly in their scope and approach. As such, the current study represents a far more extensive evaluation of the economic significance of Haldon Forest Park. In contrast to the previous evaluation produced by the feasibility study (Tym et al 2006: 36); the current estimate was derived from actual recorded expenditure at the site and not from secondary proxy values for the visitor subgroups (see Section 4.4). Furthermore, the current estimate reflects the increase in the annual number of off-road cyclists identified by this study (see Section 4.8).

Onsite expenditure analysis for the six cluster groups (see Section 5.8.2) revealed that whilst all groups were found to contribute to the economic viability of the onsite businesses, statistically significant differences were observed between the clusters for car park, bike hire and café expenditure. Of the clusters, the *Non-bike Owner* group was found to have the highest expenditure within these three categories. This observation is important because this group was also found to contain the highest proportion of holiday visitors of all cluster groups. These factors confirm the importance of this group for the purpose of tourism promotion and income generation at the site. This finding highlights the importance of balancing the different needs of the cluster groups and ensuring that any future developments cater for the broad spectrum of users at the site. Whilst new visitors were identified in all visitor categories (see Section 6.2.1), and holiday visitor expenditure can be regarded as being an important source of income, these results must be viewed within the context of the observed visitor volumes for these subgroups (see Section 6.2.1). Against this context, the dominance of the *Internal day visitor* category cannot be ignored, and as such this category represents the most important visitor group in terms of the economic investment in the site. The challenge for the future development of the site as a tourism destination, is to increase the proportion of staying visitors (high spending visitors) using the site. Whilst this study identified an increase in the number of holiday visitors compared to the feasibility study (10% versus 3.7% see Section 5.11.1), further promotion of the site as discussed in Section 6.2.1 will be required to broaden the visitor demographic, this would enable the site to benefit from the higher economic contribution provided by these visitors.

In order to further contextualise the economic significance identified, Section 4.7 reviewed the economic contribution identified in relation to the costs involved in developing and maintaining the facilities. Whilst it was not the aim of this study to conduct a detailed cost-benefit analysis of the trail facilities, it is important to consider the economic significance figure within the context of the investment which has taken place at the site. Haldon Forest Park has undergone several phases of development, the largest of which took place in 2006 at a cost of 1.2 million (Tym et al, 2006: 51). Comparing the investment costs to the estimated overall economic activity generated by off-road cycling (economic significance), reveals that the investment cost is matched by the economic significance generated in less than two years. Furthermore, onsite expenditure alone can match the investment cost in less than four years. Whilst these payback comparisons only consider the economic significance associated with off-road cycling at Haldon Forest Park, and do not take into account the costs involved in operating and maintaining the site for all visitors, they do demonstrate that off-road cycling developments can contribute quickly and positively to the tourism and leisure economy. These short return periods reflect the high level of use at the site and the value placed on the site by off-road cyclists. This can be seen in the high rates of intended return for the different visitor types (see Chapter 4); and the consensus of agreement shown by the clusters to the statement ‘Haldon Forest Park is a valuable public recreation facility’ (see Section 5.8.3).

Maintaining the high quality of provision at the sites can be seen as essential for the long-term sustainable growth of the off-road cycling product and visitor retention. It is also essential for the brand integrity that the sites are maintained to a high standard. Whilst it is difficult to place accurate figures on the ongoing maintenance costs (see Section 5.10.7), data from the 7 Stanes centres in Scotland suggests that maintenance costs can be as much as £20,000 per annum (Tym et al, 2006: 40). Maintenance costs at Haldon Forest Park are currently met through income raised from the onsite car park charges (see Section 5.10.7). Overall it was found that the parking charges were proportionate to the facilities provided. This was demonstrated by the willingness of off-road cyclists to pay these charges, and the observation that the majority users within each cluster group stated that they considered the current charges to be ‘About right’. The study also examined conditions under which respondents would be prepared to pay more. All cluster groups were found to agree that they would be willing to pay more to fund the development of new trails and additional maintenance. This observation further supports the assessment that the value of the site to respondents is greater than the current costs of using the site.

The observed willingness of respondents to pay more in return for investment in the trail network, presents an opportunity for new ways of support to be adopted to develop and maintain the trails into the future. One solution would be to combine the current parking charges with a voluntary trail support donation system. This type of system has the advantage that users would be able to ‘give back’ in the knowledge that their additional investment would directly benefit their trail experience. A similar donation scheme has been set up to support the 7 Stanes centres in Scotland (7 Stanes Donations, n.d.). However, this system addresses the marketing and promotion of the sites and not the development and maintenance of the trails.

In conclusion, this study has shown that the off-road trails at Haldon Forest Park have a broad appeal and that they are valued highly by all users. Whilst this study only considers the economic contribution of off-road cyclists at one site, and cannot be considered to be representative of the 1SW off-road cycling region. The research has demonstrated that off-road cycling is an economically significant activity, which has a beneficial effect on the host economy. It has also shown that the economic activity associated with off-road cycling quickly matches that of the original investment in terms of economic payback. For the 1SW off-road cycling region, the methods and findings presented by this study provide an indication of the potential economic benefits for the wider regional economy and a replicable model for monitoring the economic contribution in the future. The study has also identified that users are willing to invest in the product in return for developments to the trail network. This finding opens up the potential for new innovative ways of engaging with users and ensuring the long term sustainability and development of the sites in the future. However, it was also found that the majority of this expenditure is currently derived from internal day visitors. This observation has important implications for the promotion of the site as a tourism destination as further promotion of the site will be required in order for the site to fulfil its potential as a tourism resource.

6.2.3 Providing for off-road cyclists at Haldon Forest Park

Research Objective 4 (see Figure 1.2) had the purpose of identifying and segmenting visitors according to their characteristics and interactions with the off-road cycling facilities at Haldon Forest Park. These aspects were evaluated in order to better understand the important relationship between visitor behaviour and economic expenditure which was identified in Section 2.9. The economic contribution of the cluster groups was discussed in the previous section, where it was found that all groups contributed to the economic sustainability of the site. Furthermore, the site has a broad appeal and is valued highly by its users (see Section 6.2.2). Understanding how users interact with the site has important implications for the management and development of existing sites as well as the development of future facilities. The importance of understanding these characteristics was highlighted in Chapter 3 where it was found that, previous studies provided relatively little information about site users beyond their expenditure patterns. The narrow view presented by these studies disassociates expenditure from consumer behaviour, and fails to consider the presence of different sub-groups beyond arbitrary day and holiday visitor classifications.

It was also identified that the management of users at a site level is predominantly focused on user ability and did not consider the wider characteristics and needs of off-road cyclists. To address the fundamental limitations of the previous studies a two-stage approach to analysing visitor characteristics was undertaken. The first stage involved analysing the demographic and socio-economic characteristics of the different day and holiday visitor sub-groups (see Section 5.3). In the second stage, cluster analysis was undertaken to identify variations among all respondents regardless of whether they were on a day visit or holiday trip (see Section 5.7). These variations were then analysed to produce a typology of users at Haldon Forest Park (see Table 5.14).

Demographic analysis of day and holiday visitors revealed a narrow profile of users across the visitor subgroups. However, the observed profile of users was found to be broadly consistent with that of other cycling facilities and studies, indicating that the results were not a function of site specific factors (see Section 5.3). The results also highlight the underrepresentation of lower socio-economic grades within the visitor profile. This represents a consistent trend which has not changed since the issue was raised in the feasibility study (Tym et al, 2006: 18). As a result, social inclusion still poses an ongoing challenge if the site is to be beneficial to a wider cross-section of society in the future.

As previously stated, within the narrow demographic identified, the off-road trail facilities at Haldon Forest Park have a broad appeal. This is reflected in the number of market segments which emerged from the cluster analysis; in total six distinct clusters groups were identified (see Table 5.13). Of the cluster groups, half can be identified as active, frequent and experienced off-road cyclists. The remaining three clusters encompass new off-road cyclists, non-bike owners and less serious off-road cyclists. It was also found that these distinct cluster groups use the site in different ways, and that site use is related to other forms of off-road cycling provision. For the *'Active Off-road Explorer Cluster'* purpose-built sites were found to form an integral part of their winter cycling routine. While this cluster visits Haldon Forest Park regularly, their main off-road cycling preference is for riding on the PROW network. This change in routine from PROW to purpose-built sites was found to be driven partly by an environmental awareness of the sensitive nature of many PROW routes during the winter months, and by a preference for riding all weather trails during bad weather. A similar pattern was observed for the *Cycle Path Adventurer* cluster whose cycling routine encompasses purpose-built trails within their predominantly cycle path orientated cycling behaviour. Both of these examples highlight the interrelationship between different forms of cycling provision. This has important implications for the future management of cycling facilities as it shows that purpose-built sites cannot be treated as separate entities, and must be considered within the wider context of off-road cycling provision.

Trail preferences were also examined to establish whether the current facilities match the visitor profile observed at the site. Demand for different trail types was found to mirror the cluster split between experienced and less experienced off-road cyclists. Easy trails were least favoured by the cluster groups and a 50:50 distribution was observed between moderate and difficult trails. Whilst both moderate and difficult trails are provided at the site, the result highlights the importance of ensuring that the future provision meets the needs of both of these groups. Providing for this middle ground also means that the site provides a degree of progression for cyclists looking to develop their skills.

The ability of the off-road cycling facilities at Haldon Forest Park to inspire respondents was also highlighted during the study. Respondents were asked if they considered the off-road trails at Haldon Forest Park to be inspirational, and whether, as a result of their visit they felt inspired to visit other sites in the South West. From these questions it was revealed that all cluster groups found the trails inspiring, and as a result were now encouraged to visit other off-road sites in the South West. Of these cluster groups it was identified that the *New Trail Centre Rider* cluster felt particularly inspired to visit other locations. This observation is very encouraging as it shows that the trail product meets the needs of new off-road cyclists, and as such, endorses the 1SW trail product and facilities at Haldon Forest Park.

In order to further understand the off-road cycling market and inform the promotion of the 1SW cycling facilities, respondents were asked to state why they go off-road cycling and explain how they became involved in the activity. Respondent motivations for off-road cycling were found to focus on health, environmental, social, physical, and emotional reasons. During the onsite interviews, respondents particularly emphasised the importance of social interaction and emotional connection with the environment. When asked how they began off-road cycling, the majority of respondents stated informal social triggers. The importance placed on informal and social factors by respondents, suggests that off-road cycling sites should be promoted as fun, informal and social destinations rather than as serious, physically demanding and exclusive facilities. The cluster groups also showed a strong preference for riding in rural environments rather than towns and cities. This observation is consistent with the strong emotional connection to the environment identified during the onsite interviews, and highlights the importance of a natural or semi-natural environment within the overall off-road cycling experience.

6.3 Research limitations and potential future research

6.3.1 Research limitations

Throughout this study every effort was taken to ensure that the research design was fully informed by the literature and that a robust method was developed to meet the research objectives. The validity and reliability of the research approach was also discussed in detail in Section 3.8. Despite these efforts it is a reality that limitations exist in all research endeavours. One of the main challenges faced by the researcher was the selection of the case study site. The concurrent development of potential survey sites during the research timeframe meant that site selection was restricted to completed locations (see Section 3.3). Whilst it is believed that the final case study location provided the most appropriate location to conduct the research, it is an accepted limitation that it may not be representative of the alternative 1SW off-road cycling sites, or of other off-road cycling locations in the South West.

During the research design the potential for a comparative study between two or more sites was also considered (see Section 3.3.1). Adopting such an approach would have broadened the regional scope of the study and would have enabled the research to be more readily generalised. However, increasing the scale of the study would have required additional time and resources which were not available at the time of the study. Limitations can also be identified within the sampling strategy. Whilst this approach enabled the researcher to identify when the surveys needed to take place, it was not possible to ensure that the questionnaires were completed by all respondents after they had completed their ride at Haldon Forest Park. This issue refers to the problem that new visitors to the site may not have been able to make informed responses to some of the more site specific aspects of the questionnaire, if they completed the survey prior to experiencing the site facilities. This problem was also a function of the circular trail design common to purpose-built sites, where the trails start and end at the central hub facilities, making it impossible to use the trail end point as a method of differentiating between respondents who were starting, or those who were finishing a trail circuit. However, these limitations only apply to five out of the 51 questions as the remaining 46 questions are concerned with personal factual responses requiring no prior knowledge of the site.

Due to the researcher administered approach to questionnaire surveying it was generally practicable to monitor who completed the survey. This was particularly important to avoid the double-counting of expenditure for groups who had travelled together. However, despite this careful approach it is unlikely that double counting was entirely eradicated, due to the self-completion format of the questionnaires and open setting in which the research was conducted. The study also relies on the assumption that survey data can be extrapolated to provide an annual estimate based on site usage (see Section 4.5). This extrapolation was considered appropriate due to the adoption of a highly targeted sampling approach which was informed by secondary trail use data. Whilst this assumption is a limitation of the research, it was not possible to weight or adjust for this factor because no background population data relating to off-road cyclists were available for the site.

During the travel cost analysis (see Section 4.3) a limitation was identified regarding the availability and accuracy of the car occupancy figures for off-road cyclists. For the purpose of conducting the travel cost calculation, a proxy figure was derived from visitor data relating to all visitors at Haldon Forest Park and data from other off-road cycling sites. In hindsight this issue could have been addressed by the inclusion of a car occupancy question within the questionnaire survey. Whilst the survey did collect data relating to group size, this does not translate directly into car occupancy rates because groups may have travelled to the site in more than one vehicle. Furthermore, car occupancy is likely to be different for off-road cyclists due to many respondents transporting their bikes to the site inside their car which generally reduces passenger space. In light of these observations, there is an identified need for further collection of data to specifically record car occupancy rates for off-road cyclists.

Limitations were also identified within the conducted Cluster Analysis (see Section 5.9.2). This problem related to the apportioning of day and holiday visitor expenditure at the sub-cluster level, which disaggregated these data to a level where meaningful sample sizes could not be obtained. As a result, it was not possible to use these data as a weighting tool to produce annual expenditure figures for the cluster groups. However, this calculation may be possible given a sufficiently large sample size. This aspect could be investigated in a future study, by examining the minimum sample sizes needed for different cluster solutions. In this regard, this study has laid the foundations for the future application of the technique for off-road cycling research, as the technique has been proven to be a credible tool for identifying variations among visitors. However, more work is needed in order for it to maximise its usefulness as a visitor analysis technique.

The research also encountered difficulties recruiting participants for the follow-up interviews; this is documented in Section 3.7.2. This problem led to a switch from purposively interviewing respondents who had already completed a questionnaire survey, to conducting shorter convenience interviews in the field. Whilst qualitative data obtained from these interviews have undoubtedly enriched the comprehensive quantitative dataset, the change in methodology limited the depth of data which could be collected from the respondent interviews. It is likely that a more in-depth qualitative analysis would have revealed more information regarding respondent behaviour and attitudes towards off-road cycling. If a repeat study were to be conducted, a greater emphasis should be placed on recruiting interview participants from the cluster groups and generating a larger quantity of qualitative data to complement the comprehensive quantitative survey.

A final aspect relating to the limitations of the research is the unknown effect of conducting the survey concurrently with the development and promotion of the 1SW off-road cycling region. The simultaneous timing of the two projects may have had an impact on visitor numbers or on visitor behaviour. This aspect was unavoidable, and given the unknown visitor flows between the 1SW off-road cycling sites, it is likely that similar limitations would be encountered by future studies.

6.3.2 Potential future research

In order to capitalise on the opportunity to examine the development of a new off-road cycling initiative and develop baseline data, the research attempted to capture the broad picture of off-road cycling in South West England. As such, this study represents a first attempt at addressing the research deficit relating to the development of purpose-built off-road cycling sites in the UK. Furthermore, the study makes a contribution to the literature through its application of Cluster-Analysis as part of a combined approach to examining the expenditure and visitor characteristics of off-road cyclists at Haldon Forest Park. This represents a methodological advance from the previous off-road cycling studies identified in Chapter 3, which do not acknowledge the relationship between expenditure and consumer behaviour.

There remain many opportunities for further research in this area and for future research relating to the 1SW off-road cycling region. As discussed in the previous section, the current study was limited to one case study location which may not be representative of the whole region, or indeed other UK or overseas cycling destinations. Furthermore, the study reflects the transitional conditions under which it was conducted and not the completed regional product. Given these limitations, there is a strong case for developing a follow-up study which would examine the regional impact of the finished product, and attempt to identify visitor flows between the sites. This would provide a comprehensive dataset which would track the project from the feasibility study, through the transitional development period, and into the post completion phase.

A further avenue for extending the current work would be to repeat the study in another geographical location. This would be particularly interesting as no consistent national data exist for off-road cycling sites. Conducting a repeat study in a different location would also open up the possibility of developing a standardised method for measuring the economic significance of off-road cycling at a national level. Repeating the visitor segmentation analysis in a different location would also examine whether the market segments identified in the South West, are region or site specific, or whether they are representative of user groups at purpose-built off-road cycling sites in other geographical areas.

The identified interaction between purpose-built off-road cycling sites and other forms of off-road cycling provision such as the PROW network and cycle paths also warrants further investigation. This appears to be a complex issue; on one level, purpose-built sites can be identified as being connected to other forms of provision through cyclists who use purpose-built sites but have a preference for alternative off-road cycling infrastructure. At another level, purpose-built sites can be visualised as islands within the wider network, which for some users have no association with other forms of cycling provision. This interaction is particularly important in terms of the future management and promotion of the PROW network. If these other forms of provision were to be promoted to off-road cyclists who only ride at purpose-built sites, this study has shown that any such links would need to be made convenient and explicit if these groups were to be encouraged to venture beyond the boundaries of purpose-built sites. Furthermore, any such initiative would most likely require some form of infrastructure development to bridge the gap between controlled signed routes found at purpose-built sites, and the generally less structured format of the PROW network. One way of researching this issue would be to use a Case Study approach to investigate the relationship between the different forms of provision. The aim of such a study would be to examine the presence and strength of the linkages identified within the conducted Cluster Analysis, with a view to making recommendations on how different forms of infrastructure could be better integrated and promoted to maximise the economic benefits of cycling.

More work could also be done to investigate the motivations of off-road cyclists. This study has only scratched the surface regarding this aspect, and it is recommended that this work should include additional qualitative data to look at this topic in-depth. In addition, future work could examine cycling through the life-course to identify the needs of users at different life stages. Health and well-being aspects were also not examined in any detail by the current study and represent a key direction for future research in this area. This aspect would also enhance the depth of the economic analysis conducted in this study, as the health benefits from off-road cycling could be quantified in terms of health care system savings. This could potentially employ tools such as the World Health Organisation Health Economic Assessment Tool (HEAT) for cycling and walking. This online tool is designed to estimate the economic savings arising from reductions in mortality rates, as a result of participation in regular walking and cycling activities (WHO, 2013).

A further strand of research would be to investigate under-represented visitor groups and / or non-visitors to Haldon Forest Park. For example, the current study identified that holiday visitors comprised just 10% of all off-road cycling visitors. Therefore, there is an opportunity to examine how the site integrates with the wider outdoor tourism offer within the South West. The natural landscape of the South West is promoted heavily as a key tourism attractor, and is described as ‘heaven for anyone who loves the outdoors’ (Visit South West, n.d.). Given the importance of the outdoor environment and outdoor activities for tourism promotion, future research could examine ways of increasing visitor numbers through more effective or targeted marketing strategies. It could also investigate how the network of 1SW off-road cycling sites could be promoted as a cohesive holiday experience, in the form of a tourism circuit which could be enjoyed over a number of days. Furthermore, the sites could be promoted as part of a wider tourism package or circuit involving other compatible tourist activities or attractions.

REFERENCES

1 South West Cycle Adventure (2010) *About 1 South West,* [Online], Available: http://www.1sw.org.uk/about-1sw/ [09 Apr 2013]

7 Stanes Phase 2 Evaluation Report for Forestry Commission Scotland (2007) [Online], Available: http://www.imba.com/sites/default/files/7StanesPhase2FinalReport.pdf [17 Mar 2013]

7 Stanes Donations (n.d.), [Online], Available: http://www.7stanesmountainbiking.com/Shop/Donation [29 Apr 2013]

AA (2013) *Car Running Costs*, [Online], Available: http://www.theaa.com/motoring_advice/running_costs/index.html [10 Sep 2013]

Aabø, S. (2009) 'Libraries and return on investment (ROI): a meta-analysis', *New Library World*, 110, no. 7/8, pp. 311-324.

Allnutt, D. (2004) *A Review of Tourism Statistics*, [Online], Available: http://www.ons.gov.uk/ons/search/index.html?pageSize=50&sortBy=none&sortDirection=none&newquery=The+Allnutt+Review+of+Tourism+Statistics [07 Aug 2013]

Alves, H.M.B., Cerro, A.M.C., and Martins, A.V.F. (2010) 'Impacts of Small Tourism Events on rural Places' *Journal of place Management and Development,* vol. 3, no.1, pp. 22-37.

Andrew, B.P. (1997) 'Tourism and the Economic Development of Cornwall', *Annals of Tourism Research*, vol. 24, no. 3, pp. 721-735.

Archer, B. (1977) 'Tourism Multipliers: The State of the Art', in Crompton, J.L. (2006) 'Economic Impact Studies: Instruments for Political Shenanigans?', *Journal of Travel Research*, vol. 45. August, pp. 67-82.

Archer, B. (1982) 'The value of multipliers and their policy implications', *Tourism Management*, vol.3, no. 4, pp. 236-241.

Archer, B. (1984) ‘Economic Impact: Misleading Multiplier’, *Annals of Tourism Research*, vol.11, no. 3, pp. 517-518.

Bacher, J., Wenzig, K. and Vogler, M. (2004) *SPSS TwoStep a First Evaluation*, [Online], Available: http://opus4.kobv.de/opus4-fau/frontdoor/index/index/docId/74 [04 Oct 13].

Barbour, R. (2008) *Introducing Qualitative Research*, London: SAGE Publications Ltd.

Barrio, M.J. Devesa, M. and Herrero, L.C. (2012) ‘Evaluating intangible cultural heritage: The case of cultural festivals’, *City, Culture and Society,* vol. 3, pp. 235-244.

BBC (2013), *Cycling gets £94m push in England,* [Online], Available: http://www.bbc.co.uk/news/uk-23657010 [14 Oct 2013].

Bennett, R.M., Tranter, R.B. and Blaney, J.P. (2003) ‘The Value of Countryside Access: A Contingent Valuation Survey of Visitors to the Ridgeway National Trail in the United Kingdom’, *Journal of Environmental Planning and Management,* vol. 46, no. 5, pp. 659-671.

Berrittella, M., Bigano, A., Roson, R. and Tol, R.S.J. (2006) ‘A general equilibrium analysis of climate change impacts on tourism’, *Tourism Management,* vol. 27. pp. 913-924.

Betz, C.J., Bergstrom, J.C. and Bowker, J.M. (2003) ‘A Contingent Trip Model for Estimating Rail-Trail Demand’, *Journal of Environmental Planning and Management*, vol. 46, no. 1, pp.79-96.

Blake, A. (2008) ‘Tourism and Income Distribution in East Africa’, *International Journal of Tourism Research,* vol. 10, pp. 511-524.

Blake, A., Durbarry, R., Eugenio-Martin, J.L., Gooroochurn, N., Hay, B., Lennon, J., Sinclair, M.T., Sugiyarto, G. and Yeoman, I. (2006) ‘Integrating forecasting and CGE models: The case of tourism in Scotland’, *Tourism Management,* vol. 27, pp. 292-305.

Boyle, K.J. and Bergstrom, J.C. (1999) ‘Doubt, Doubts, and Doubters: The Genesis of a New Research Agenda?’, in Bateman, I.J. and Willis, K.G. (ed.) *Valuing Environmental Preferences*, Oxford: Oxford University Press.

Bowker, J.M. Bergstrom, J.C. and Gill, J. (2007) 'Estimating the economic value and impacts of recreational trails: a case study of the Virginia Creeper Rail Trail', *Tourism Economics,* vol. 13, no.2, pp. 241-260.

Breen, H., Bull, A. and Walo, M. (2001) 'A comparison of survey methods to estimate visitor expenditure at a local event', *Tourism Management*, vol. 22, pp. 473-479.

Briassoulis, H. (1991) 'Methodological Issues Tourism Input-Output Analysis', *Annals of Tourism Research*, vol. 18, pp. 485-495.

Brown, G. and Mendelsohn, R. (1984) 'The Hedonic Travel Cost Method', *The Review of Economics and Statistics,* vol. 66, no. 3, pp. 427-433.

Bryman, A. (2008) *Social Research Methods*, 3rd edition, Oxford: Oxford University Press.

Burgan, B. and Mules, T. (1992) 'Economic Impacts of Sporting Events', *Annals of Tourism Research*, vol. 19, pp. 700-710.

Burt, O.R. and Brewer, D. (1971) 'Estimation of net Social Benefits from Outdoor Recreation', *Econometrica*, vol. 39, no. 5, pp. 813-827.

Cabinet Office – Office of The Third Sector, (2009) *Social Return On Investment (SROI): An Introduction,* [Online], Available: http://www.gaugeni.co.uk/downloads/SROI-Supplement_into_for_web.pdf [27 May 2011].

Carleyolsen, S., Meyer, T., Rude, J. and Scott, I. *Measuring the Economic Impact and Value of Parks, Trails and Open Space in Jefferson County Accounting for Current and Future Scenarios,* [Online], Available: http://urpl.wisc.edu/academics/workshop/jefferson%20county/team1/JCEconfinal.pdf [20 Aug 2013].

Carson, R.T., Flores, N.E. and Meade, N.F. (2001) 'Contingent Valuation: Controversies and Evidence', *Environmental and Resource Economics*, vol. 19, pp. 173-210.

Carson, R.T., Flores, N.E., Martin, K.M. and Wright, J.L. (1996) 'Contingent valuation and Revealed Preference Methodologies: Comparing the Estimates for Quasi-Public Goods', *Land Economics,* vol. 72, no.1, pp. 80-99.

Cesario, F.T. (1976) 'Value of Time in Recreation Benefit Studies', *Land Economics*, vol. 52, no. 1, pp. 32-41.

Cessford, G.R. (1995) 'Mountain Biking Impacts and Rider Preferences', Proceedings of the New Zealand Recreation Association Conference. [Online], Available: http://www.mountainbike.co.nz/politics/doc/profile/index.htm [01 Mar 2012].

Chakraborty, K. and Keith, J.E. (2000) 'Estimating the Recreation Demand and Economic Value of Mountain Biking in Moab, Utah: An Application of Count Data Models', *Journal of Environmental Planning and Management,* vol. 43, no. 4, pp. 461-469.

Chhabra, D., Sills, E. and Cubbage, F. (2003) 'The Significance of Festivals to Rural Economies: Estimating the Economic Impacts of Scottish Highland Games in North Carolina', *Journal of Travel Research,* vol. 41, May, pp. 421-427.

Choong-KI, L. and Taylor, T. (2005) 'Critical reflections on the economic impact assessment of a mega-event: the case of the 2002 Fifa World Cup', *Tourism Management,* vol. 26, pp. 595-603.

Clawson, M. (1959) 'Methods of measuring the demand for and value of outdoor recreation', in Clawson, M. and Knetsch, J.L. *Economics of Outdoor Recreation,* Washington: Resources for the Future.

Clawson, M. and Knetsch, J.L. (1966) *Economics of Outdoor Recreation,* Washington: Resources for the Future.

Coles, T., Dinan, C. and Hutchison, F.C. (2012a) 'Tourism and the public sector in England since 2010: a disorderly transition?', *Current Issues in Tourism*, vol. 15, no-1-2, pp.1-33.

Coles, T., Dinan, C. and Hutchison, F.C. (2012b) 'May we live in less interesting times? Changing public sector support for tourism in England during the Sovereign Debt Crisis', *Journal of Destination Marketing & Management*, vol. 1, no-1-2, pp. 4-7.

Cameron, T.A. 'Combining Contingent Valuation and Travel Cost Data for the Valuation of Nonmarket Goods', *Land Economics*, vol. 68, no. 3, pp. 302-317.

Campos, P. Caparrós. and Oviedo, J.L. (2007) 'Comparing Payment-Vehicle Effects in Contingent Valuation Studies for Recreational Use in Two Protected Spanish Forests', *Journal of Leisure Research,* vol. 39, no. 1, pp. 60-85.

Connell, J. and Page, S.J. (2005) 'Evaluating the Economic and Spatial Effects of an Event: The Case of The World Medical and Health Games', *Tourism Geographies,* vol. 7, no. 1, pp. 63-85.

Cooper, C., Fletcher, J., Fyall, A., Gilbert, D. and Wanhill, S. (2008) *Tourism Principles and Practice,* 4th edition, Harlow: Pearson Education Limited.

Cope, M., Doxford, D. and Hill, T. (1998) 'Monitoring Tourism on the UK's First Long-Distance Cycle Route', *Journal of Sustainable Tourism*, vol. 6, no. 3, pp. 210-223.

Cornwall Council (2013) *The Camel Trail,*[Online] Available: http://www.cornwall.gov.uk/default.aspx?page=13412 [04 May 2013]

Creswell, J.W. (1998) *Qualitative Inquiry And Research Design Choosing Among Five Traditions*, Thousand Oaks: Sage Publications.

Crick-Furman, D. and Prentice, R. (1999) 'Modelling Tourists' Multiple Values', *Annals of Tourism Research,* vol. 27, no. 1, pp. 69-92.

Crompton, J.L. (1995) 'Economic Impact Analysis of Sports Facilities and Events: Eleven Sources of Misapplication', *Journal of Sport Management,* vol. 9, pp. 14-35.

Crompton, J.L. (2006) 'Economic Impact Studies: Instruments for Political Shenanigans?', *Journal of Travel Research,* vol. 45. August, pp. 67-82.

Crompton, J.L., Lee, S. and Shuster, T.J. (2001) 'A Guide for Undertaking Economic Impact Studies: The Springfest Example', *Journal of Travel Research*, vol. 40, pp. 79-87.

Crompton, J.L. and McKay, S.L. (1994) 'Measuring the Economic Impact of Festivals and Events: Some Myths, Misapplications and Ethical Dilemmas', *Festival Management and Event Tourism,* vol. 2, pp. 33-43.

Crouch, G.I. (1995) 'A Meta-Analysis of Tourism Demand', *Annals of Tourism Research,* vol. 22, pp. 103-118.

Cycle West. (2011) *Discover the Cycle West Routes*, [Online], Available: http://www.cycle-west.com/ [02 Oct 2013]

Daniels, M.J., Norman, W.C. and Henry, M.S. (2004) 'Estimating Income Effects of A Sport Tourism Event', *Annals of Tourism Research,* vol. 31, no. 1, pp. 180-199.

Department for Environment, Food and Rural Affairs (DEFRA) (n.d. a), *Rural Development Programme for England RDPE,* [Online], Available: https://www.gov.uk/government/policies/stimulating-economic-growth-in-rural-areas/supporting-pages/rural-development-programme-for-england [14 Oct 2013].

Department for Environment, Food and Rural Affairs (DEFRA) (n.d. b), *Rural Tourism Action Plan,* [Online], Available: http://www.englandtourismframework.co.uk/Images/FINALRural%20Tourism%20Action%20Plan_tcm31-26712.pdf [14 Oct 2013].

Department of the Arts, Sport, the Environment, Tourism and Territories (1993) *The Economic Impact of Sport and Recreation – Household Expenditure,* Canberra: A.J. Law.

Devon County Council (n.d.) *Census Profile Exeter,* [Online], Available: http://www.devon.gov.uk/census_profile-exeter.pdf [02 Oct 2013]

Diamond, P.A. and Hausman, J.A. 'Contingent Valuation: Is Some Number better than No Number?', *The Journal of Economic Perspectives*, vol. 8, no. 4, pp. 45-64.

Douglas, A.J. and Johnson, R.L. (2004) 'The Travel Cost Method and the Economic Value of Leisure Time', *International Journal of Tourism Research,* vol. 6, pp. 365-374.

Dredge, D. and Jenkins, J. (2007) *Tourism Planning and Policy,* Sydney: Wiley.

Drudd, A., Grais, W. and Pyatt, G. (1986) 'Macroeconomic Modelling Based on Social-Accounting Principles', *Journal of Policy Modeling,* vol. 8, no. 1, pp. 111-145.

Duffield, B.S. (1982) 'Tourism: the measurement of economic and social impact', *Tourism Management,* vol. 3, no. 4, pp. 248-255.

Dwyer, L. and Forsyth, P. (2008) 'Economic Measures of Tourism Yield: What Markets to Target?', *International Journal of Tourism Research,* vol. 10, pp.155-168.

Dwyer, L., Forsyth, P. and Spurr, R. (2004) 'Evaluating tourism's economic effects: new and old approaches', *Tourism Management,* vol. 25, pp. 307-317.

Dwyer, L., Forsyth, P. and Spurr, R. (2005) 'Estimating the Impacts of Special Events on an Economy', *Journal of Travel Research,* vol. 43, pp. 351-359.

Dwyer, L., Forsyth, P. and Spurr, R. (2006) 'Assessing the Economic Impacts of Events: A Computable General Equilibrium Approach', *Journal of Travel Research,* vol. 45, pp. 59-66.

Dyer, P, Gursoy, D., Sharma, B. and Carter, J. (2007) 'Structural modeling of resident perceptions of tourism and associated development on the Sunshine Coast, Australia', *Tourism Management,* vol, 28, pp. 409-422.

Eadington, W.R. and Redman, M. (1991) 'Economics and Tourism', *Annals of Tourism Research,* vol. 18, pp. 41-56.

Felsenstein, D. and Fleischer, A. (2003) 'Local Festivals and Tourism Promotion: The Role of Public Assistance and Visitor Expenditure', *Journal of Travel Research,* vol. 41, May, pp. 385-392.

Fix, P. and Loomis, J. (1997) 'The Economic Benefits of Mountain Biking at One of Its Meccas: An Application of the Travel Cost Method to Mountain Biking in Moab, Utah', *Journal of Leisure Research,* vol. 29, no. 3, pp. 342-352.

Fix, P. and Loomis, J. (1998) 'Comparing the Economic Value of Mountain Biking Estimated Using Revealed and Stated Preference', *Journal of Environmental Planning and Management,* vol. 41, no. 2, pp. 227-236.

Fix, P., Loomis, J. and Eichhorn. (2000) 'Endogenously chosen travel costs and the travel cost model, an application to mountain biking at Moab, Utah', *Applied Economics, v*ol. 32, no.10, pp. 1227-1231.

Flemming, C.M. and Cook, A. (2008) 'The recreational value of Lake McKenzie, Fraser Island: An application of the travel cost method', *Tourism Management*, vol. 29, pp. 1197-1205.

Fletcher, J.E. (1989) 'Input-Output Analysis and Tourism Impact Studies', *Annals of Tourism Research,* vol. 16, pp. 514-529.

Flick, U. (1998) *An Introduction to Qualitative Research,* London: Sage Publications.

Font, A.R. (2000) 'Mass Tourism and the Demand for Protected Natural Areas: A Travel Cost Approach, *Journal of Environmental Economics and Management,* vol. 39, pp. 97-116.

Ford, H. And Wright, I. (2001) 'The Future of the United Kingdom Tourism Survey', in Lennon, J.J. (ed.) *Tourism Statistics International Perspectives and Current Issues*, London: Continuum.

Forestry Commission (2008) Monitoring the quality of experience in Bedgebury Forest Final Report. [Online]. Available: http://www.forestry.gov.uk/pdf/BedgeburyreportFV.pdf/$FILE/BedgeburyreportFV.pdf [06 Mar 2012]

Forestry Commission Scotland (2005) An Ambition for Forest Cycling and Mountain Biking Towards a National Strategy: Final Report. [Online]. Available: http://www.forestry.gov.uk/pdf/forestcyclingandmountainbiking.pdf/$FILE/forestcyclingandmountainbiking.pdf [03 Dec 2010]

Forestry Commission England. (2013) *Explore Haldon Forest Park,* [Online], Available: http://www.forestry.gov.uk/forestry/EnglandDevonNoForestHaldonForestPark [09 Sep 2013]

Frechtling, D.C. (2006) 'An Assessment of Visitor Expenditure Methods and Models', *Journal of Travel Research*, vol. 45, pp. 26-35.

Frechtling, D.C. and Horváth, E. (1999) 'Estimating the Multiplier Effects of Tourism Expenditures on a Local Economy through a Regional Input-Output Model', *Journal of Travel Research*, vol. 37, pp. 324-332.

Fuller, C., Bennett, R.J. and Ramsden, M. (2002) 'The Economic Development Role of English RDA's: The Need for Greater Discretionary Power', *Regional Studies*, vol. 36, no. 4, pp. 421-428.

Gazel, R.C. and Schwer, R.K. (1997) 'Beyond Rock and Roll: The Economic Impact of the Grateful Dead on a Local Economy', *Journal of Cultural Economics*, vol. 21, pp. 41-55.

GBTS (2012) *Great Britain Tourist Survey 2012*, [Online], Available: http://www.visitengland.org/Images/GB%20Summary%20Tables_2012_tcm30-37313.pdf [14 Oct 2013].

Gelan, A. (2003) 'Local Economic Impacts The British Open', *Annals of Tourism Research*, vol. 30, no. 2, pp. 406-425.

Grous, A. (2011) 'The British Cycling Economy, Gross Cycling Product Report', [Online], Available: http://corporate.sky.com/documents/pdf/publications/the_british_cycling_economy.htm [16 May 2011]

Gursoy, D., Jurowski, C. and Uysal, M. (2002) 'Resident attitudes A structural modelling approach', Annals of Tourism Research, vol. 29, no. 1, pp. 79-105.

Gursoy, D. and Rutherford, D.G. (2004) 'Host Attitudes Toward Tourism An Improved Structural Model', *Annals of Tourism Research*, vol. 31, no. 3, pp. 495-516.

Hailu, G., Boxall, P.C. and McFarlane, B.L. (2005) 'The influence of place attachment on recreation demand', *Journal of Economic Psychology*, vol. 26, pp. 581-598.

Hair, J., Anderson, R., Tatham, R., and Black, W. (1998) *Multivariate Data Analysis*, 5th edition, New Jersey: Prentice Hall.

Hall, C.M. and Jenkins, J.M. (1995) *Tourism and Public Policy*, London: Routledge.

Hall, C.M. (1998) 'The Institutional Setting-Tourism and the State', in Ioannides, D. and Debbage, K.G. (ed.) *The Economic Geography of the Tourist Industry a Supply-side Analysis*, London: Routledge.

Hall, C.M. (2000) *Tourism Planning Policies, Processes and Relationships*, Harlow: Pearson Education.

Hanemann, W.M. (1994) 'Valuing the Environment Through Contingent Valuation', *The Journal of Economic Perspectives,* vol. 8. no.4, pp. 19-43.

Hanley, N.D. (1989) 'Valuing Rural Recreation Benefits: An Empirical Comparison of Two Approaches', *Journal of Agricultural Economics*, vol. 40, no. 3, pp. 361-374.

Hara, T. (2008) *Quantitative Tourism Industry Analysis Introduction to Input-Output, Social Accounting Matrix Modelling, and Tourism Satellite Accounts,* Oxford: Elsevier.

Hay, B. and Rogers, M. (2001) 'Practical Solutions to Impossible Problems? Lessons from Ten Years of Managing the United Kingdom Tourism Survey', in Lennon, J.J. (ed.) *Tourism Statistics International Perspectives and Current Issues*, London: Continuum.

Herrero, L.C., Sanz, J.A., Devesa, M., Bedate, A. and Barrio, M.J.D. (2006) 'The Economic Impact of Cultural Events: A Case-Study of Salamanca 2002, European Capital of Culture', *European Urban and Regional Studies,* vol. 13, no. 1, pp. 41-57.

Hiller, H.H. (1998) 'Assessing the Impact of Mega-Events: A Linkage Model', *Current Issues in Tourism,* vol.1, no. 1, pp. 47-57.

Hindsley, P., Landry, C.E. and Gentner, B. (2011) 'Addressing onsite sampling in recreation site choice models', *Journal of Environmental Economics and Management,* vol. 62, pp. 95-110).

Hotelling, H. (1947) 'An economic study of the monetary evaluation of recreation in the National Parks', *US. Department of the Interior, National Park Service and Recreational Planning Division, Washington DC,* in Clawson, M. and Knetsch, J.L. *Economics of Outdoor Recreation,* Washington: Resources for the Future.

HM Treasury (2003), *The Green Book Appraisal and Evaluation in Central Government,* [Online], Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf [14 Oct 2013].

HM Treasury (2010), *Spending Review* [Online], Available: http://www.direct.gov.uk/prod_consum_dg/groups/dg_digitalassets/@dg/@en/documents/digitalasset/dg_191696.pdf [22 Jul 2013].

Hudson, I. (2001) 'The Use and Misuse of Economic Impact Analysis: The Case of Professional Sports', *Journal of Sport and Social Issues*, vol. 25. February, pp. 20-39.

Hughes, G.C. (1982) 'The employment and economic effects of tourism reappraised', *Tourism Management*, vol. 3, pp. 167-176.

Hughes, H.L. (1994) 'Tourism multiplier studies: a more judicious approach', *Tourism Management*, vol. 15, no. 6, pp. 403-406.

Income and source of income by UK Countries and regions, (2009-2011) [Online], Available: http://www.ons.gov.uk/ons/datasets-and-tables/index.html?pageSize=50&sortBy=none&sortDirection=none&newquery=household+income+exeter [19 Mar 2013]

Israel, G.D. (1992) 'Determining Sample Size', [Online], Available: http://www.soc.uoc.gr/socmedia/papageo/metaptyxiakoi/sample_size/samplesize1.pdf [01 Mar 2012]

Jelinski, D.E. and Wu, J. (1996) 'The modifiable areal unit problem and implications for landscape ecology', *Landscape Ecology*, vol. 11, no. 3, pp. 129-140.

Johansen, S., Sorensen, K., Braendvang, A.K. and Dybedal, P. (2001) 'Tourism Statistics and Models on the Regional Level in Norway', in Lennon, J.J. (ed.) *Tourism Statistics International Perspectives and Current Issues,* London: Continuum.

Johnson, R.L. and Moore, E. (1993) 'Tourism Impact Estimation', *Annals of Tourism Research,* vol. 20, pp. 279-288.

Kasimati, E. (2003) 'Economic Aspects and the Summer Olympics: A Review of Related Research', *International Journal of Tourism Research,* vol. 5, pp. 433-444.

Kottke, M. (1988) 'Estimating Economic Impacts of Tourism', *Annals of Tourism Research,* vol. 15, pp. 122-133.

Krizek, K.J. (2007) ‘Estimating the Economic Benefits of Bicycling and bicycle Facilities: an Interpretive Review and Proposed Methods’, *Essays on Transport Economics,* pp. 219-248.

Kweka, J., Morrissey, O. and Blake, A. (2003) ‘The Economic Potential of Tourism in Tanzania’, *Journal of International Development,* vol. 15, pp. 335-351.

Lee, C-K. and Han, S-Y. (2002) ‘Estimating the use and preservation values of national parks’ tourism resources using a contingent valuation method’, *Tourism Management,* vol. 23, pp. 531-540.

Lee, C-K. And Mjelde, J.W. (2007) ‘Valuation of ecotourism resources using a contingent valuation method: The case of the Korean DMZ’, *Ecological Economics,* vol. 63, pp. 511-520.

Li, G. Song, H. and Witt, S. F. (2005) ‘Recent Developments in Econometric Modelling and Forecasting’, *Journal of Travel Research*, vol. 44, August, pp. 82-99.

Li, S. and Blake, A. (2009) ‘Estimating the Olympic-related Investment and Expenditure’, *International Journal of Tourism Research,* vol. 11, pp. 337-356.

Linetop Ltd (n.d.) *Visitor Monitoring*: *Bikes*, [Online], Available: http://www.linetop.co.uk/bikes.htm [12 Sep 2013].

Loomis, J.B. (1990) ‘Comparative Reliability of the Dichotomous Choice and Open-Ended Contingent Valuation Techniques’, *Journal of Environmental Economics and Management*, vol. 18, pp. 78-95.

Loomis, J.B. (2005) *Updated Outdoor Recreation Use Values on National Forests and Other Public Lands*, [Online], Available: http://74.125.155.132/scholar?q=cache:WPWU7c8Gly8J:scholar.google.com/&hl=en&as_sdt=0 [28 Oct 2011]

Loomis, J.B. (2006) ‘A Comparison of the Effect of Multiple Destination Trips on Recreation Benefits as Estimated by Travel Cost and Contingent Valuation Methods’, *Journal of Leisure Research*, vol. 38, no.1, pp. 46-60.

Lumsden, L., Downward, P. and Cope, A. (2004) ‘Monitoring of cycle tourism on long distance trails: the North Sea Cycle Route’, *Journal of Transport Geography*, vol. 12, pp. 13-22.

Lundie, S. and Dwyer, L. (2007) ‘Environmental-Economic Measures of Tourism Yield’, *Journal of Sustainable Tourism*, vol. 15, no. 5.pp. 503-519.

Madrigal, R. (1995) ‘Residents’ perceptions and the role of the government’, Annals of tourism Research, vol. 22, no. 1. pp. 86-102.

Madsen, B. and Jensen-Butler. (2004) ‘Theoretical and operational issues in sub-regional economic modelling, illustrated through the development and application of the LINE model’, *Economic Modelling*, vol. 21, pp. 471-508.

Massieu, A. (2001) ‘A System of Tourism Statistics (STS): Scope and Content’, in Lennon, J.J. (ed.) *Tourism Statistics International Perspectives and Current Issues*, London: Continuum.

Mazzochi, M. (2008) *Statistics for Marketing and Consumer Research*, London: SAGE.

McConnell, K.E. and Strand, I. (1981) ‘Measuring the Cost of Time in Recreation Demand Analysis: An Application to Sportfishing’, *Journal of Agricultural Economics*, vol. 63, no.1, pp. 153-156.

McHone, W.W. and Rungeling, B. (2000) ‘Practical Issues in Measuring the Impact of a Cultural Tourist Event in a Major Tourist Destination’, *Journal of Travel Research*, vol. 38, no. 300, pp. 300-303.

Mitchell, R.C. and Carson, R.T. (1989) *Using Surveys to Value Public Goods: The Contingent Valuation Method*, Washington: Resources for the Future.

Mooi, E. and Sarstedt, M. (2011) *A Concise Guide to Market Research*, Berlin, Springer-Verlag.

Morey, E.R., Buchanan, T. and Waldman, D.M. (2002) ‘Estimating the benefits and costs to mountain bikers of changes in trail characteristics, access fees, and site closures: choice experiments and benefits transfer’, *Journal of Environmental Management*, vol. 64, pp. 411-422.

Morey, E.R. and Waldman, D.M. (1998) 'Measurement Error in Recreation Demand Models: The Joint Estimation of Participation, Site Choice, and Site Characteristics', *Journal of Environmental Economics and Management,* vol. 35, pp. 262-276.

Morey, E.R., Shaw, W.D. and Rowe, R.D. (1991) 'A Discrete-Choice Model of Recreational Participation, Site Choice, and Activity Valuation When Complete Trip Data Are Not Available', *Journal of Environmental Economics and Management,* vol. 20, pp181-201.

Mundet, L. and Coenders, G. (2010) 'Greenways: a sustainable leisure experience concept for both communities and tourists', *Journal of Sustainable Tourism,* vol.18, no.5, pp. 657-674.

Mules, T. (1999) 'Estimating the economic impact of an event on a local government area, region, state or territory', in Dwyer, L., Forsyth, P. and Spurr, R. (2004) 'Evaluating tourism's economic effects: new and old approaches', *Tourism Management*, vol. 25, pp. 307-317.

Nachmias, C.F, and Nachmias, D. (1996) *Research Methods in the Social Sciences, 5th edition,* London: Arnold.

National Centre for Social Research, (n.d) *The Framework method for qualitative data analysis,* [Online], Available: http://www.natcen.ac.uk/our-expertise/framework [04 May 2013]

National Readership Survey (n.d.) *Social Grade – Definitions and Discriminatory Power,* [Online], Available: http://www.nrs.co.uk/lifestyle-data/ [05 Oct 2013]

Northcote, J. and Macbeth, J. (2005) 'Conceptualising Yield Sustainable Tourism Management', *Annals of Tourism Research*, vol. 33, no.1, pp. 190-220.

Norušis, M.J. (2012) *IBM SPSS Statistics 19 Statistical Procedures Companion,* Upper Saddle River: Prentice Hall.

O'Brien, D. (2010) *Measuring the value of culture: a report to the Department for Culture Media and Sport*, [Online], Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/77933/measuring-the-value-culture-report.pdf [19 Aug 2013].

Office for National Statistics (n.d.) *International Passenger Survey*, [Online], Available: http://www.ons.gov.uk/ons/guide-method/surveys/respondents/household/international-passenger-survey/index.html [07Aug 2013]

Oppenheim, A. N. (1966) *Questionnaire Design, Interviewing and Attitude Measurement*, London: Continuum.

O'Sullivan, D, and Jackson, M.J. (2002) 'Festival Tourism: A Contributor to Sustainable Economic Development?', *Journal of Sustainable Tourism*, vol. 10, no. 4. pp. 325-342.

Parlett, G. Fletcher, J. and Cooper, C. (1995) 'The impact of tourism on the Old Town of Edinburgh', *Tourism Management*, vol. 16, no. 5, pp. 355-360.

Patterson, T., Gulden, T., Cousins, K. and Kraev, E. (2004) 'Integrating environmental, social, and economic systems: a dynamic model of tourism in Dominica', *Ecological Modelling*, vol. 175, pp. 121-136.

Portney, P.R. (1994) 'The Contingent valuation Debate: Why Economists Should Care', *Journal of Economic Perspectives*, vol. 8, no. 4, pp. 3-17.

Pyatt, G. (1988) 'A SAM Approach to Modeling', *Journal of Policy Modeling*, vol. 10, no. 3, pp. 327-352.

Randall, A. (1994) 'A Difficulty with the Travel Cost Method', *Land Economics*, vol.70, no. 1, pp. 88-96.

Reynolds, P.C. and Braithwaite, R.W. (1997) 'Whose yield is it anyway? Compromise options for sustainable boat tour ventures', *International Journal of Contemporary Hospitality Management*, vol. 9, no.2, pp. 70-74.

Rickman, D.S. and Schwer, R.K. (1995) ‘A comparison of the multipliers of IMPLAN, REMI, and RIMS II: Benchmarking ready-made models for comparison’, *Annals of Regional Science*, vol. 29, pp. 363-374.

Roberts, D. (1997) ‘The economic base of rural areas: a SAM-based analysis of the Western Isles, 97’, *Environment and Planning A,* vol. 35, pp. 95-111.

Robison, M.H. (1997) ‘Community input-output models for rural area analysis with an example from central Idaho’, *Annals of Regional Science,* vol. 31, pp. 325-351.

Ruane, M. J. (2006) *Essentials of Research Methods A guide to Social Science Resear*ch, Blackwell Publishing.

Ryan, C. and Garland, R. (1999) ‘The use of a specific non-response option on Likert-type scales, *Tourism Management,* vol. 20, no. 1, pp. 107-113.

Saayman, M. and Saayman, A. (2006) ‘Estimating the Economic Contribution of Visitor Spending in the Kruger National Park to the Regional Economy’, *Journal of Sustainable Tourism,* vol. 14. no. 1, pp. 67-80.

Samdin, Z. (2008) ‘Willingness to Pay in Taman Negara: A Contingent Valuation Method’, *International Journal of Economics and Management,* vol. 2, no. 1, pp. 81-94.

Shaw, G. and Williams, A.M. (1994) *Critical Issues in Tourism A Geographical Perspective*, 2nd edition, Oxford: Blackwell Publishers.

Shaw, G. and Williams, A.M. (2004) *Tourism and Tourism Spaces,* London: SAGE Publications.

Siderelis, C. and Moore, R. (1995) ‘Outdoor Recreation Net Benefits of Rail-Trails’, *Journal of Leisure Research*, vol.27, no.4, pp. 344-359.

Sinclair, M.T. (1998) ‘Tourism and Economic Development: A Survey’, *The Journal of Development Studies*, vol.34, no. 5, pp.1-51.

Sinclair, M.T. and Stabler, M. (1997) *the economics of tourism,* London: Routledge.

Slee, B. Farr, H. and Snowdon, P. (1997) ‘The Economic Impact of Alternative Types of Rural Tourism’, *Journal of Agricultural Economics,* vol. 48, no. 2, pp. 179-192.

Smith, E. (2010) Portrait of the South West, Office for National Statistics, [Online], Available: http://www.ons.gov.uk/ons/search/index.html?newquery=portrait+of+the+south+west [04 May 2013]

Smith, L.J. (1998) 'Tourism as an Industry', in Ioannides, D. and Debbage, K.G. (ed.) *The Economic Geography of the Tourist Industry a Supply-side Analysis*, London: Routledge.

Smith, K.V. and Kaoru, Y. (1990) 'What have we learned since Hotelling's Letter? A Meta-Analysis', *Economics Letters*, vol. 32, pp. 267-272.

Smith, L.J. (1995) *Tourism Analysis A Handbook,* 2nd edition, Harlow: Longman Group Limited.

Smyth, R. (1986) 'Public policy for tourism in Northern Ireland', *Tourism Management*, vol. 7, pp. 120-126.

Song, H., Dwyer, L. and ZhengCao, G.L. (2012) 'Tourism Economics Research: A Review and Assessment', Annals of Tourism Research, vol. 39, no. 3, pp. 1653-1682.

Song, H. and Li, Gang. (2008) 'Tourism Demand modelling and forecasting – A review of recent research', *Tourism Management*, vol.29, pp. 203-220.

South West RDA (2011) *South West RDA The Economics Story*, [Online], Available: http://www.bristol.ac.uk/red/about/swrda/the-economics-story.pdf [09 Mar 2013].

South West Tourism Alliance (2008) *The Value of Tourism to the South West Economy in 2008*, [Online], Available: http://www.swtourismalliance.org.uk/documents/q/category/finance-facts-figures-documents/value-of-tourism-archive/value-of-tourism-2008/ [04 May 2013]

South West Tourism (2005) *Towards 2015,* [Online], Available: http://www.swtourismalliance.org.uk/documents/q/category/about-us-docs/towards-2015/5/ [14 Oct 2013].

Strauss, A. and Corbin, J. (1998) *Basics of Qualitative Research*, 2nd edition, London: SAGE Publications Ltd.

Stynes, D.J. (1999) *Economic Impacts of Tourism*, [Online], Available: http://www.msu.edu/course/prr/840/econimpact/pdf/ecimpuoL1.pdf [13 Mar 2011].

Stynes, D.J. (2001) *Economic Impact Concepts*, [Online], Available: https://www.msu.edu/course/prr/840/econimpact/concepts.htm [13 Mar 2011].

Stynes, D.J. and White, E.M. (2006) 'Reflections on measuring Recreation and Travel Spending', *Journal of Travel Research*, vol. 45, pp. 8-16.

Sugiyarto, G., Blake, A. and Sinclair, M.T. (2003) 'Tourism and Globalization Economic Impact in Indonesia', *Annals of Tourism Research,* vol. 30, no. 3, pp. 683-701.

Sun, Y.-Y. and Stynes, D.J. (2006) 'A note on estimating visitor spending on a per-day/night basis', *Tourism Management,* vol.27, pp. 721-725.

Sustrans, (n.d.). *Planning your cycle routes,* [Online], Available: http://www.sustrans.org.uk/change-your-travel/get-cycling/planning-your-cycle-routes [14 Oct 2013].

Taylor, J. (2002) 'Mountain Bike World Cup 2002- Fort William: Economic Impact Study Research Report no. 88', [Online], Available: http://www.sportscotland.org.uk/NR/rdonlyres/F291B2C5-D226-420C-BE71-E359580C9020/0/mountainbike_worldcup2002_researchreport88.pdf [17 Jan 2011].

The Guardian, (2012) *How Britain became a cycling nation*, [Online], Available: http://www.theguardian.com/sport/2012/jul/14/british-cycling-world-beaters [14 Oct 2013].

The Times (2013) *Cycling revolution shifts into top gear*, [Online], Available: http://www.thetimes.co.uk/tto/public/cyclesafety/article3840260.ece [14 Oct 2013].

TNS (2013a) Great Britain Tourism Survey 2012 Methods & Performance Report. [Online], Available: http://www.visitengland.org/Images/GB%20Tourist%202012%20-%2030-08-2013%20-%20FV_tcm30-38527.pdf [13 Apr 2014].

TNS (2013b) The GB Day Visitor Statistics 2012. [Online], Available: http://www.visitengland.org/Images/GBDVS%20Annual%20Report%202012_FINAL_%2028%20March%202013_tcm30-37336.pdf [13 Apr 2014].

Tooman, L.A. (1997) ‘Multipliers and Life Cycles: A Comparison of Methods for Evaluating Tourism and its Impacts’, *Journal of Economic Issues,* vol.31, no. 4, pp. 917-932.

Tourism Alliance (2012) *UK Tourism Statistics 2012,* [Online], Available: http://www.tourismalliance.com/downloads/TA_327_353.pdf [04 May 2013]

Tribe, J. (1995) *the economics of recreation, leisure & tourism,* 3rd edition, Oxford: Butterworth-Heinemann.

Tribe, J. (1997) ‘The Indiscipline of Tourism’, *Annals of Tourism Research,* vol. 24, no. 3, pp. 638-657.

Tym & Partners and Total Marketing Solutions (2006) ‘Developing Off-road Cycling in Woodlands in the South West’ [Online], Available: http://www.silvanustrust.org.uk/uploads/documents/Woodland%20Renaissance/12.15.06%20Woodland%20Cycling%20Final%20Report.pdf [20 Feb 2013].

Tyrell, T.J. and Johnston, R.J. (2001) ‘A Framework for Assessing Direct Impacts of Tourist Events: Distinguishing Origins, Destinations and Causes of Expenditures’, *Journal of Travel Research,* vol. 40, pp. 94-100.

Tyrell, T.J. and Johnston, R.J. (2006) ‘The Economic Impacts of Tourism: A Special Issue’, *Journal of Travel Research,* vol. 45. August, pp. 3-7.

Tyrell, T., Paris, C.M. and Biaett, V. (2013) ‘A Quantified Triple Bottom Line for Tourism: Experimental Results’, *Journal of Travel Research,* vol. 52, no. 3, pp. 279-293.

Tyrväinen, L. and Väänänen, H. (1998) ‘The economic value of urban forest amenities: an application of the contingent valuation method’, *Landscape and Urban Planning,* vol. 43, pp. 105-118.

UK National Ecosystem Assessment (2011) *UK National Ecosystems Assessment Technical Report,* [Online], Available: http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx [20 Aug 2013].

Vanhove, N. (2005) *the economics of tourism destinations,* Oxford: Elsevier Butterworth-Heinemann.

Vatn, A. and Bromley, D.W. (1994) ‘Choices without Prices without Apologies’, *Journal of Environmental Economics and Management*, vol. 26, pp. 129-148.

Vaughan, D.R., Farr, H. and Slee, R.W. (2000) ‘Estimating and interpreting the local economic benefits of visitor spending: an explanation’, *Leisure Studies*, vol. 19, pp. 95-118.

Vaughan, W.J. and Russell, C.S. (1982) ‘Valuing a Fishing Day: An Application of a Systematic Varying Parameter Model’, *Land Economics*, vol.58, no.4, pp.450-463.

Visit England, (2011) *Annual Survey of Visits to Visitor Attractions*, [Online], Available: http://www.visitengland.org/insight-statistics/major-tourism-surveys/attractions/Annual_Survey/ [04 May 2013].

Visit England, (n.d.) *Day Visits (Great Britain Day Visits Survey)*, [Online], Available: http://www.visitengland.org/insight-statistics/major-tourism-surveys/dayvisitors/ [07 Aug 2013].

Visit South West, (n.d.) *Your official guide to the South West*, [Online], Available: http://www.visitsouthwest.co.uk/ [10 Oct 13].

Wagner, J.E. (1997) ‘Estimating the Economic Impacts of Tourism’, *Annals of Tourism Research*, vol. 24, pp. 592-608.

Walle, A.H. (1997) ‘Quantitative Versus Qualitative Tourism Research’, *Annals of Tourism Research*, vol. 24, no. 3, pp.524-536.

Walo, M., Bull, A. and Breen, H. (1996) ‘Achieving Economic Benefits at Local Events: A Case Study of a Local Sports Event’, *Festival Management and Event Tourism*, vol. 4, pp. 95-106.

Wanhill, S. (1994) ‘The measurement of tourist income multipliers’, *Tourism Management*, vol. 15, no. 4, pp. 281-283.

Warwick, D.P. and Lininger, C.A. (1975) *The Sample Survey: Theory and Practice*, New York: McGraw-Hill.

Watson, P., Wilson, J., Thilmany, D. and Winter, S. (2007) 'Determining Economic Contributions and Impacts: What is the difference and why do we care?', *The Journal of Regional Analysis & Policy,* vol. 37, no. 2, pp. 140-146.

Webb, D. and Collis, C. (2000) 'Regional Development Agencies and the 'New Regionalism' in England', Regional Studies, vol.34, no. 9, pp. 857-864.

Weed, M. and Bull, C. (2004) Sports tourism participants, policy and providers. Elsevier Butterworth-Heinemann.

West, G.R. (1993) 'Economic Significance of Tourism in Queensland', *Annals of Tourism Research*, vol. 20, pp. 490-504.

Western Canada Mountain Bike Tourism Association (2006) 'Sea to Sky Mountain Biking Economic Impact Study Overall Results' [Online], Available: http://www.mbta.ca/assets/pdfs/S2S_E_I_Study.pdf [26 May 2011]

Wheater, C. P. and Cook, P. A. (2000) *Using Statistics to Understand the Environment*, London: Routledge.

Williams, A.M. and Shaw, G. (1988) 'Tourism: Candyfloss Industry or Job Generator', *The Town Planning Review*, vol. 59, pp. 81-103.

Williams, A.M. and Shaw, G. (1991) *Tourism and Economic Development, Chichester*: Wiley.

Willis, K.G. (1991) 'The Recreational Value of the Forestry Commission Estate in Great Britain: A Clawson-Knetsch Travel Cost Analysis, *Scottish Journal of Political Economy*, vol. 38, no. 1, pp. 58-75.

Willis, K.G. and Garrod, G.D. (1991) 'An Individual Travel-Cost Method of Evaluating Forest Recreation', *Journal of Agricultural Economics*, vol. 42, no. 1, pp. 33-42.

Wilton, J.J. and Nickerson, N.P. (2006) 'Collecting and Using Visitor Spending Data', *Journal of Travel Research*, vol. 45, pp.17-25.

Wood, E.H. (2005) 'Measuring the economic and social impacts of local authority events', *International Journal of Public Sector Management*, vol. 18, no. 1, pp. 37-53.

World Health Organisation. (2013). *Health Economic Assessment Tool (HEAT) for cycling and walking*, [Online], Available: http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/Transport-and-health/activities/promotion-of-safe-walking-and-cycling-in-urban-areas/quantifying-the-positive-health-effects-of-cycling-and-walking/health-economic-assessment-tool-heat-for-cycling-and-walking [07 Oct 2013].

World Tourism Organisation. (2008) 'Recommendations for Tourism Statistics 2008', [Online], Available: http://unstats.un.org/unsd/publication/Seriesm/SeriesM_83rev1e.pdf [01 Mar 2012].

Wright, S. Nelson, J.D., Cooper, J.M. and Murphy, S. (2009) 'An evaluation of the transport to employment (T2E) scheme in Highland Scotland using social return on investment (SROI)', *Journal of Transport Geography,* vol. 17, pp. 457-467.

Yamane, T. (1973) *Statistics An Introductory Analysis, 3rd edition,* New York: Harper.

Yoon, Y., Gursoy, D. and Chen, J.S. (2001) 'Validating a tourism development theory with structural equation modeling', *Tourism Management,* vol. 22, pp. 363-372.

Yu, Y. And Turco, D.M. (2000) 'Issues in Tourism Event Economic Impact Studies: The Case of the Albuquerque International Balloon Festival', *Current Issues in Tourism,* vol. 3, no. 2, pp. 138-149.

Zhou, D. Yanagida, J.F. Chakravorty, U. and Leung, P. (1997) 'Estimating the Economic Impacts from Tourism', *Annals of Tourism Research,* vol. 24, no. 1, pp. 76-89.

Appendix 1: Overview of the 1 South West off-road cycling sites

Site	*Site Type*		*Owner(s)*							*Official Opening Date*	*Site Sensitivities*										*Visitor Facilities*						*Trail Facilities*					
	SPC	RH	BCC	CC	FC	FODDC	NSC	NT	SWLT		G2	MAI	NCI	NNR	SAC	SAM	SPA	SSSI	WC	BH	BS	BW	C	CP	I S	R	G	B	R	B	SA	PT
Haldon Forest Park		X			X					Sep 2010							X	X		X		X	X	X	X	X	X	X	X	X	X	X
Moors Valley Country Park		X			X					Oct 2010										X	X	X	X	X	X	X	X	X		X	X	
Siblyback Lake	X								X	Sep 2010			X							X			X	X	X	X					X	
Tamar Lake	X								X	Sep 2010			X							X			X	X	X	X					X	
Forest of Dean		X			X	X				Jul 2011									X	X	X	X	X	X	X	X	X	X	X	X	X	
Ashton Court		X	X		X		X	X		Oct 2011	X			X	X	X				X		X	X	X	X		X	X	X		X	
Leigh Woods		X	X		X		X	X		Oct 2011	X			X	X	X											X	X	X		X	
Roadford Lake	X								X	Feb 2012			X							X			X	X	X	X					X	
Plym Valley		X						X		Apr 2012												X	X	X	X	X		X			X	
Wimbleball Lake	X								X	Aug 2012			X							X			X	X	X	X					X	
Lanhydrock and Cardinham Woods		X		X	X			X		Oct 2012		X	X							X		X	X	X	X	X	X	X	X		X	

Source: Author

Appendix 2: Key to Appendix 1 overview of the 1 South West off-road cycling sites
Source: Author

Site Type:		***Owner(s):***	
SPC	Start Pedalling Centre	BCC	Bristol City Council
RH	Regional Hub	CC	Cornwall Council
		FC	Forestry Commission
		FODDC	Forest Of Dean District Council
		NSC	North Somerset Council
		NT	National Trust
		SWLT	South West Lakes Trust
Site Sensitivities:		***Visitor Facilities:***	
G2	Grade II Listed Landscape	BH	Bike Hire
MAI	Minor Archaeological Interests	BW	Bike Wash
NCI	Nature Conservation Interests	BS	Bike Shop
NNR	National Nature Reserve	C	Cafe
SAC	Special Area of Conservation	CP	Car Park
SAM	Scheduled Ancient Monument	I S	Information Station
SPA	Special Protection Area	R	Ranger Service
SSSI	Site of Special Scientific Interest		
WC	Water Course		
Trail Facilities:			
G	IMBA Standard Green Grade Trail		
B	IMBA Standard Blue Grade Trail		
R	IMBA Standard Red Grade Trail		
B	IMBA Standard Black Grade Trail		
SA	Skills Area		
PT	Pump Track		
Trail Opening Colour Coding:			
	Green = Trails Fully Opened		
	Amber = Trails Due to Open in 2011		
	Red = Trails Due to Open in 2012		
Site Accessibility Colour Coding:			
	Blue = Indicates the Principle Modes of Transport Required to Access the Site		

Appendix 3: Key to Appendix 4 1 South West Cycle Adventure site selection assessment

1SW Site Selection Criteria	***Criteria Description***	***Criteria Scores***					
A	Must be fully open and operational at time of study	Not open		1	Due to open	2	Fully open
B	Should facilitate a wide range of off-road cyclists based on International Mountain Bike Association (IMBA) trail grades	1	Offers 1 grade	2	Offers 2 Grades	3	Offers more than 2 grades
C	Must have automatic trail counters in place	0	No counters in place	1	Counters due to be in place	2	Counters currently in operation
D	Sites should be of the same type for comparison	SPC	Start Pedalling Centre	RH	Regional Hub		
E	Sites should provide a degree of geographical spread	(Typology Comparison and Assessment)					
F	Car park charges must be in operation	0	No charge or unknown	1	Charges in operation		
G	Must currently receive similar no of visitors	(Typology Comparison and Assessment)					
H	Must have similar non cycling activities	Typology Comparison and Assessment					
I	Must have evidence of pre-existing cycling demand	0	No cycling	1	Cycling		

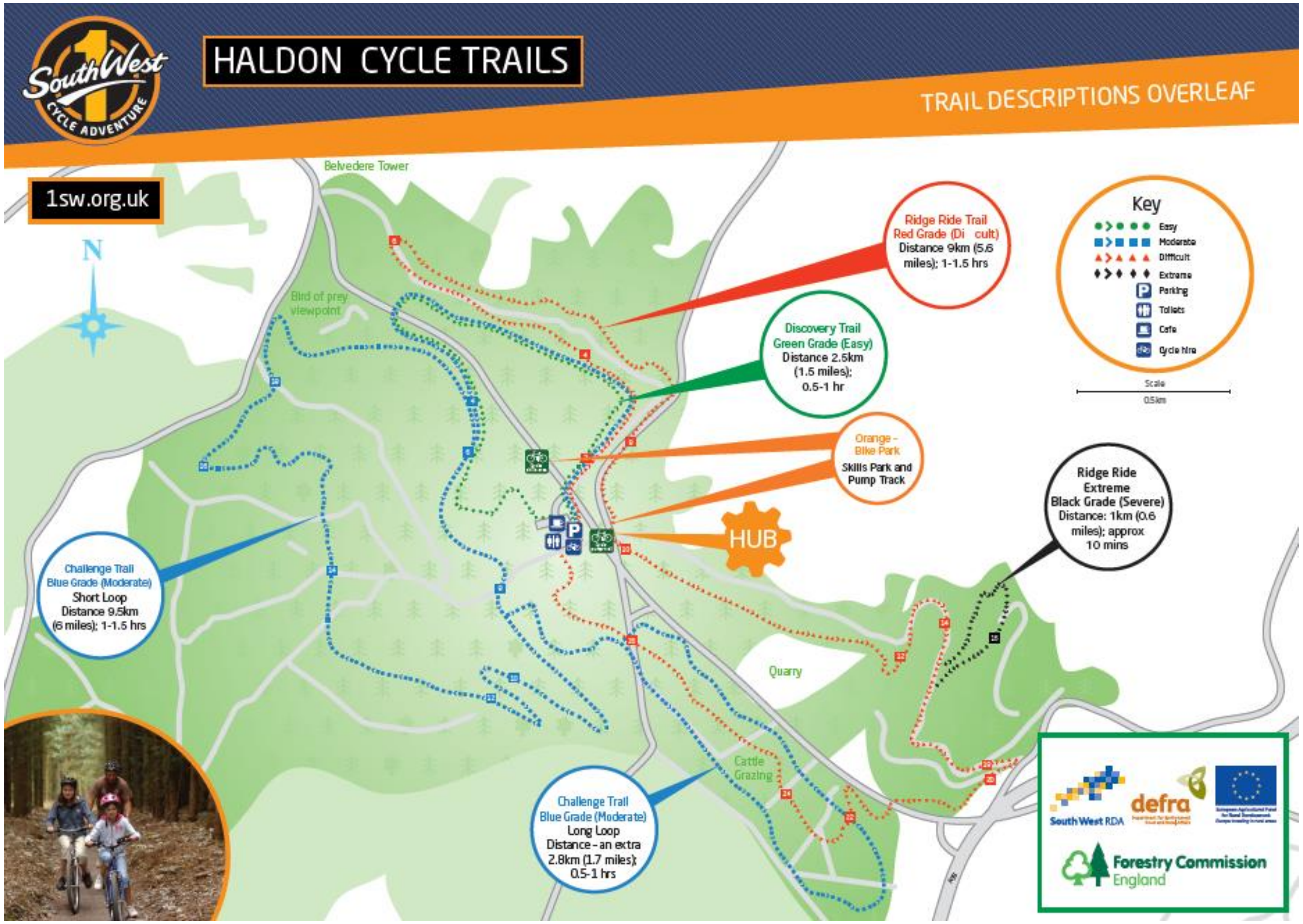
Source: Author

Appendix 4: 1 South West Cycle Adventure site selection assessment

	Site Selection Criteria (Maximum Score)								
1SW Site	***A (2)***	***B (3)***	***C (2)***	***D***	***E***	***F (1)***	***G***	***H***	***I (1)***	***Total***
Haldon Forest Park	2	3	2	RH		1	300,000		1	9
Moors Valley Country Park	2	2	2	RH		1	1,000,000		1	8
Siblyback Lake	2	1	2	SPC		1	70,374		0	6
Tamar Lake	2	1	2	SPC		1	4,500		0	6
Forest of Dean	1	3	1	RH		1	135,000		1	7
Ashton Court	1	2	1	RH		0	1,600,000		1	5
Leigh Woods	1	2	1	RH		0	1,600,000		1	5
Roadford Lake		1	0	SPC		1	20,227		1	3
Plym Valley		3	0	RH		0	80,000		1	4
Wimbleball Lake		1	0	SPC		1	167,600		1	3
Lanhydrock		3	0	RH		0	150,000		0	3
Cardinham Woods		3	0	RH		0	108,000		0	3

Source: Author

Appendix 5: Haldon Forest Park off-road cycle trail map



391

HALDON CYCLE TRAILS

South West 1 Cycle Adventure

TRAIL GRADES

Find the right single track grade for your abilities

Green Easy

Suitable for: Beginners in good health with basic bike skills. Most types of bike.
Trail: Relatively flat & wide.

Blue Moderate

Suitable for
Riders in good health with basic off-road riding skills. Basic mountain bikes.

Trail
Some "single-track" sections & small obstacles of root & rock.

Red difficult

Suitable for
Proficient mountain bikers with good off-road riding skills & fitness. Good mountain bikes.

Trail
Challenging. Climbs, tricky descents & technical features such as drop-offs & large rocks.

Black Severe

Suitable for
Expert mountain bikers with high level of fitness. Quality off-road mountain bikes.

Trail
Greater challenge & difficulty. Expect large & unavoidable features.

Find the right non single track for you

Orange Extreme

Suitable for
Extreme level riders with expert technical skills & good fitness. Technical bike skills important. Jumping ability obligatory.

Trail
Extreme levels of exposure & risk, large features.

Forest road & similar

Suitable for
Cyclists in good health. Map reading useful (routes not always marked.) Most bikes.

Trail
Gradients can vary. Surfaces may be uneven or potholed in places. Look out for vehicles & other users.

Mountain biking is a potentially hazardous activity carrying a significant risk.

Not every site contains a full range of trails.

Visit www.1sw.org.uk to find more trails in the region.

DISCOVERY TRAIL

GREEN GRADE (Easy)
DISTANCE 2.5KM (1.5 MILES); 0.5-1 HR

Beginners will really enjoy cycling this fully surfaced trail with stunning views and play features. Also used by walkers, you'll need to be a considerate cyclist.

CHALLENGE TRAIL

BLUE GRADE (Moderate)
SHORT LOOP DISTANCE 9.5KM (6 MILES) 1-1.5 HRS
LONG LOOP DISTANCE - AN EXTRA 2.8KM (1.7 MILES) 0.5-1 HRS

A great confidence builder for when you feel ready to move on from the Discovery Trail. Along the trail you will encounter a combination of surfaces, some narrow sections and gentle gradients providing a challenge to intermediate cyclists. Add on the longer loop and build up your stamina.

RIDGE RIDE TRAIL

RED GRADE (Difficult)
DISTANCE 9KM (5.6 MILES); 1-1.5 HRS

Take on Haldon's imposing ridge with this fast and flowing trail. Tight corners and lively descents will test your reflexes on this narrow singletrack route through the forest. You can take it steady, but picking up the pace will very quickly make the trail much more challenging. Only for experienced riders with appropriate bikes and protective equipment.

RIDGE RIDE EXTREME

BLACK GRADE (Severe)
DISTANCE: 1KM (0.6 MILES); APPROX 10 MINS

An optional technical loop, this section is more demanding than the previous sections of the Ridge Ride Trail and adds a challenge for more experienced riders. Expect roots, rocks, berms, drops and a step down, with a steep forest road climb to rejoin the main trail.

SKILLS PARK

ORANGE - BIKE PARK

The skills park and pump trail are purpose built to help cyclists develop off road cycling skills and get a feel for their bike. Whether you're new to off road cycling, or an experienced rider, there's plenty here to increase your skills, boost your confidence and help you get the most out of the trails! There are no severe features and, whether you're looking to progress your abilities or just loosen up before a ride, the park is suitable for novice to advanced riders.

1sw.org.uk

Appendix 6: Main study questionnaire

Haldon Forest Park Off-road Cyclist Survey

We would be very grateful if you could spare a few minutes to answer some questions regarding your visit today. Please respond by following the instructions in brackets for each question and following the arrows (➔**Q**) when required. Your answers will be treated in the strictest confidence and the results will contain no information that may identify you.

If you would like to participate in a future follow-up interview about off-road cycling at Haldon Forest Park please add your details at the end of the survey. This does not commit you to taking part, participation is voluntary and you can opt out at any time. Your details will be kept private and confidential, and your anonymity will be maintained in our report

Important note:

Please do not complete the following questions if you have already completed a survey at this site, or are under 16 years of age. Please also indicate by ticking the appropriate box, if you are involved with any of the following organisations.

□ 1 South West
□ Economic and Social Research Council
□ Forestry Commission
□ National Trust
□ University of Exeter

Thank you very much for taking the time to complete this survey, if you have any questions please ask!

SECTION 1: TODAY'S VISIT

1 Which statement best describes your visit to Haldon Forest Park today? *(Please tick <u>one</u> box only)*

□	On a day trip from home	**(➔Go to Question 7)**
□	On holiday, staying away from home	**(Continue)**

2 In total, How many nights will you stay away from home on this trip?

(Please write in the number of nights) ______ nights

3 Are you staying with family or friends during your stay? *(Please tick one box only)*

□ Whole stay **(➔ Q5)** □ Part stay **(➔ Q5)** □ No **(Continue)**

4 For the majority of this trip what kind of accommodation are you staying in?
(Please tick one box only)

□ Holiday / second home □ Hotel □ B&B / Guesthouse
□ Hostel / Bunkhouse □ Self-catering □ Camping / Caravan site

□ Other (Please state):____

5 What is the nearest TOWN to where you are staying? *(Please write in name of the town)*

□ (Tick if touring and record most recent destination): ____________________________

6 What type of holiday do you consider this to be? *(Please tick one box only)*

□ Main holiday of the year □ Additional long holiday (4 nights plus) □ Short break

7 Which of the following activities in addition to off-road cycling activities will you take part in **ON THIS** particular holiday / day trip? *(Please tick any that apply)*

□ Visit cities or towns
□ Go to the beach
□ Go sightseeing in the countryside
□ Visit historic houses / castles
□ Visit museums or galleries
□ Go shopping for non-essentials
□ Hill / coastal walking
□ Surfing
□ Other (Please state):_________
____

8 On the following scale, please circle the number which reflects the importance of off-road cycling in motivating your visit to Haldon Forest Park today.

Most important 10 9 8 7 6 5 4 3 2 1 0 Not important at all

9 Have you visited Haldon Forest Park before for any reason?

□ Yes **(Continue)** □ No **(➔Q12)** □ Can't remember **(➔ Q12)**

10 Have you ridden the off-road cycle trails at Haldon Forest Park before?

□ Yes **(Continue)** □ No **(➔ Q12)** □ Can't remember **(➔ Q12)**

11 In the last 12 months, how many times have you visited Haldon Forest Park to cycle? *(Please write in the number of times)* times: _____

12 How long will you spend at Haldon Forest Park today?
(Please write in the number of hours) hours: _____

13 Please indicate the total number of times you will ride the following trails **TODAY**:

(Please write in the number of times)

Trail	Sign Colour	Grade	Distance	Number of Times
Discovery Trail	Green	Easy	1.5m (2.5km)	______
Challenge Trail	Blue	Moderate	6m (9.5km)	______
Ridge Ride Trail	Red	Difficult	5.6m (9km)	______
Ridge Ride Extreme	Black	Severe	0.6m (1km)	______
Skills Park	Orange	Moderate	N/A	______
Pump Track	Orange	Moderate	N/A	______

14 How much in total will you spend **TODAY** at Haldon Forest Park on:

(Please write the amount in pounds)

Parking Fees	£______
Bike Hire	£______
Go Ape	£______
Cafe / Refreshment kiosks	£______
Other activities (*please state*): ____________________________________	£______

15 In addition to your spend at Haldon Forest Park how much in total will you spend **TODAY** in and around the South West on:
(Please write the amount in pounds)

Accommodation (last night if applicable, otherwise tonight)	£______
Travel & Transport (including fuel / parking)	£______
Eating and drinking out (e.g. pubs / restaurants etc.)	£______
Entertainment (including activities / attractions)	£______
Non-essential shopping (e.g. gifts / souvenirs)	£______
Groceries (e.g. other food and beverage expenses)	£______
Bike Shop products / services	£______
Off-road cycling coaching or guiding services	£______

16 Did you bring your own bike with you for this visit?

□ Yes **(➔ Q18)** □ No **(Continue)**

17 If no, did you? *(Please tick one box only)*

□ Hire a bike from Forest Cycle Hire at Haldon Forest Park?

□ Bring a demo bike from a local bike shop?

□ Other (please specify):____

18 Will you come back and ride the off-road trails at Haldon Forest Park again?

□ Yes **(Continue)** □ No **(➔ Q20)**

19 If yes, when do you intend to return? *(Please tick <u>one</u> box only)*

□ During this holiday	□ Within 1 month	□ Within 3 months
□ Within 6 months	□ Within the year	□ Some point in the future

SECTION 2: YOUR CYCLING

20 Where do you **<u>mainly</u>** purchase your cycling equipment? *(Please tick **<u>ONE</u>** box only)*

□ Independent bike shops	□ National bike shop chains (e.g. Halfords)
□ Online retailers	□ Second-hand sources (e.g. Classifieds / eBay)

21 Are you a member of any cycling clubs, associations or governing bodies? (e.g. British Cycling)

□ Yes **(Continue)** □ No **(➔ Q23)**

22 If yes, please state: ____

23 What kind of cyclist are you? *(Please <u>circle</u> the number you think appropriate for each line)*

Frequent	1	2	3	4	5	Occasional
Serious	1	2	3	4	5	Casual
Experienced	1	2	3	4	5	Inexperienced

24 Why do you cycle? *(Please tick <u>any</u> that apply)*

□ Fitness / to lose weight	□ To meet new people	□ To compete
□ Be with friends / family	□ For a challenge	□ To explore the outdoors
□ Scenic views / fresh air	□ Get away from daily pressures	□ Find solitude

25 Where do you **<u>prefer</u>** to cycle? *(Please tick **<u>ONE</u>** box only)*

□ Roads	□ Linear cycle routes (e.g. Tarka trail / Camel Trail)
□ Cycle paths	□ Off-road cycling sites (e.g. Haldon Forest Park)
□ Public rights of way (e.g. bridleways)	□ Other (please state):_______________________

26 Which season(s) do you ride in?

Winter	(Dec - Feb)	□	Yes	□	No	Spring	(Mar - May)	□ Yes	□ No
Summer	(Jun - Aug)	□	Yes	□	No	Autumn	(Sep - Nov)	□ Yes	□ No

27 How long have you been cycling off-road? *(Please tick box or write number of years)*

□ Today is my first time **(➔ Q30)** □ Less than a year About _____ years

28 Select the option which <u>best</u> describes your off-road cycling experience: *(Please tick <u>one</u> box only)*

□ Beginner □ Intermediate □ Advanced □ Expert / Professional

29 What grade of trail do you typically ride? *(Please tick one box only)*

□ Easy □ Moderate □ Difficult □ Severe

30 Please indicate your preferences for off-road cycle trails. ***(Please tick one box per line)***

	I always avoid this	I avoid if possible	OK sometimes	I usually prefer this	Must have
Trail Preferences: Uphill Sections					
Gradual / Easy / Relaxed Climbs	□	□	□	□	□
Short / Hard / Steep Climbs	□	□	□	□	□
Long / Hard / Steep Climbs	□	□	□	□	□
Trail Preferences: Downhill Sections					
Slower / Gentle / Easy Descents	□	□	□	□	□
Fast / Smooth / Open / Clear Descents	□	□	□	□	□
Fast / Rough / Tight Descents	□	□	□	□	□
Slower / Steep / Technically Difficult Descents	□	□	□	□	□

31 Had you heard of 1 South West Cycle Adventure before this survey?

□ Yes **(Continue)** □ No **(➔ Q33)**

32 If yes, how did you hear about it? *(Please tick any that apply)*

□ 1 South West website
□ 1 South West information station / sign
□ Social media e.g. Facebook etc.
□ News / magazine article
□ Other website
□ Other (please state): ______________

33 Last year did you ride at any of the following off-road cycling sites in the South West?
(Please tick any that apply)

□ Tamar Lakes Country Park
□ Moors Valley Country Park
□ Forest of Dean
□ Siblyback Lake Country Park
□ Ashton Court Bristol
□ Gawton Woodlands
□ Other (please state):____

34 Last year did you ride at any other purpose built off-road cycling sites in the UK:

□ Yes **(Continue)** □ **No** **(➔ Q36)**

35 If yes, where did you visit? (Please list all sites visited): ______________________________

____

36 What is your favourite purpose built off-road cycling site? (Please write in site name)

____

37 Please respond to the following statements. *(Please tick one box only for each statement)*

	Strongly Agree	Agree	Don't know	Disagree	Strongly Disagree
My main reason for visiting the South West is to ride these trails.	□	□	□	□	□
I am now inspired to visit other off-road cycling sites in the South West.	□	□	□	□	□
The South West needs more off-road cycling facilities.	□	□	□	□	□
The South West is not a premium destination for off-road cycling.	□	□	□	□	□
Haldon Forest Park is a valuable public recreation facility.	□	□	□	□	□
The off-road trails at Haldon Forest Park are inspiring.	□	□	□	□	□
Haldon Forest Park only caters for novice cyclists.	□	□	□	□	□
Purpose built trails offer more exciting riding than public rights of way.	□	□	□	□	□
I prefer riding in rural environments than towns and cities.	□	□	□	□	□
I prefer cycling off-road where I can follow a clearly signposted route.	□	□	□	□	□

SECTION 3: PAYING FOR OFF-ROAD CYCLING FACILITIES

38 Did you pay to park at Haldon Forest Park Today?

□ Yes **(Continue)** □ No **(➔ Q42)** □ Discovery Pass **(➔ Q42)**

39 Did you find out how much it would cost you to park before visiting?

□ Yes □ No

Please note: This survey is an academic exercise only

Questions 40 - 42 have no connection to current or future car park policy at Haldon Forest Park

40 How would you describe the current parking charges for the trail facilities at Haldon Forest Park?

□ Very good value □ About Right □ Over-priced

41 How much would the parking fee have to have been to make you turn around and drive out of the car park?

(Please write in the amount in pounds) £________

42 Please respond to the following statements about paying for the off-road cycling facilities at Haldon Forest Park. *(Please tick one box only for each statement)*

	Strongly Agree	Agree	Don't know	Disagree	Strongly Disagree
I would not pay more to fund the development of new trails.	□	□	□	□	□
I would pay more if the money was used for additional trail maintenance.	□	□	□	□	□
I would pay more if the additional money provided better facilities.	□	□	□	□	□
Trail maintenance should be exclusively funded by off-road cyclists.	□	□	□	□	□

SECTION 4: PLEASE ANSWER SOME FINAL QUESTIONS ABOUT YOURSELF

43 What is your gender? □ Male □ Female

44 What is your age? □ 16 - 24 □ 25 - 34 □ 35 - 44 □ 45 - 54 □ 55 - 64 □ 65 +

45 Including <u>yourself</u>, please write in the number of people over and under 16 years of age in your group <u>today</u>. Under 16 years of age _______ Over 16 years of age _______

46 What is your ethnic group? *(Please tick <u>one</u> box only)*

□ White □ Black or Black British □ Asian or Asian British

□ Mixed □ Chinese □ Other (please specify:________________

47 What are the first 5 characters of your UK postcode? Or which country do you live in if not from the UK? *(Please write in the first 5 postcode characters <u>or</u> the name of the country)*

Postcode (Example: **EX32 8**):______________ Country:___________________________

48 What is your highest educational qualification? *(Please tick <u>one</u> box only)*

□ No qualifications

□ 'O' level passes; CSE/GCSE; NVQ level 1; Foundation level GNVQ

□ Undergraduate Degree, Postgraduate Degree, NVQ levels 4 and 5; HNC; HND

□ School Certificate / Higher School Certificate; 'A' levels /'AS' levels; NVQ level 2 or 3; Intermediate / Advanced GNVQ

49 What best describes what you usually do during the week? *(Please tick <u>one</u> box only)*

□ Employed full-time □ Employed part-time □ In full-time education

□ Looking after home / family □ Retired □ Unemployed

50 What is your total annual household income? *(Please tick one box only)*

- ◻ Under £15,000
- ◻ £15,000-£29,000
- ◻ £30,000-£44,999
- ◻ £45,000-£59,000
- ◻ £60,000-£74,999
- ◻ £75,000 and over

51 Which of the following best describes the occupation of the main wage earner in your household? *(Please tick one box only)*

- ◻ Student
- ◻ State pensioner
- ◻ Higher managerial, administrative and professional
- ◻ Intermediate managerial, administrative and professional
- ◻ Supervisory, clerical, junior managerial, administrative and professional
- ◻ Skilled manual worker
- ◻ Semi-skilled or unskilled manual worker
- ◻ Unemployed with state benefits only

MANY THANKS FOR TAKING THE TIME TO COMPLETE THIS SURVEY

Would you be willing to take part in a follow-up interview in the future? (Please fill in your details)

First name: _______________________ Tel / email:_________________________

If found please return to: 1SW Project, University of Exeter Business School, Streatham Court, Exeter, EX4 4PU

Appendix 7: Prize draw terms and conditions

In title

1 South West CASE Studentship Prize Draw Competition Terms & Conditions

Competition details form part of these terms and conditions.

This prize draw is managed, controlled and administered by 1 South West Cycle Adventure (The Promoter) alone and any correspondence concerning this promotion should be directed at 1 South West Cycle Adventure.

Entry is open to residents of the UK except employees (and their families) of 1 South West Cycle Adventure, the suppliers of the prizes and any other companies / organisations associated with the competition.

Entrant(s) must be aged 16 or over and only one entry per person can be accepted. Proof of identity and age may be required.

Entries are limited to survey quota(s)

The competition closes at 17.00 on 28th October 2012.
Use of a false name or address will result in disqualification.

Entries that are incomplete, illegible or indecipherable will not be valid and deemed void.
All entries must be made directly by the person entering the competition.

The prize(s) are stated as 1 x Mountain Bike (Claud Butler Cape Wrath 01) and 3 x Whackjob Clothing Prizes (1 x Organic Cotton Hoodie, 1 x Bamboo Fibre Trail T-Shirt and 1 x Bamboo Fibre Trail Jersey), are not transferrable to another individual and no cash or other alternatives will be offered.

1 x Mountain bike prize must be collected from Haldon Forest Park within 30 days of receipt of notification from the winner. Thereafter the prize claim will be void.

3 x Whackjob clothing prizes will only be dispatched to the winner(s) on confirmation of receipt of notification from the winner, who will be asked to confirm their postal delivery address.
The winner of the 1 x mountain bike prize is responsible for expenses and arrangements not specifically included in the prize draw, including the collection of the prize.

Prizes are subject to availability and the prize suppliers’ terms and conditions.
The promoters reserve the right to amend or alter the terms of competitions at any time and reject entrants not entering into the spirit of the competition.
In the event of a prize being unavailable, the Promoter reserves the right to offer an alternative prize of equal or greater value.

The winner(s) agree(s) to the use of their name, photograph and disclosure of county of residence and will co-operate with any other reasonable requests made by the Promoter relating to any post-winning publicity without any additional compensation.

Winner of the mountain bike prize agrees to participate in any publicity photographs of the bike collection / handover ceremony arranged by the Promoter.

The name of the winner of the 1 x mountain bike prize will be displayed on the 1 South West Cycle Adventure web site following the competition.

Unless stated otherwise the winner(s) will be drawn at random within 14 working days of the competition closing date, from all entries received by 17.00 28th October 2012.

Reasonable effort will be made to contact the winner(s). If the winner(s) cannot be contacted, or are unable to comply with these terms and conditions, the Promoter reserves the right to offer the prize to the next eligible entrant drawn at random.

Confirmation of the prize will be made in writing to the winner(s).

Failure to respond, collect, or provide an address for delivery, or failure to meet eligibility requirements may result in forfeiture of the prize.

The selection decision is final and no correspondence will be entered into.
The Promoter is 1 South West Cycle Adventure Hosted by Forestry Commission (Peninsula) Bullers Hill, Kennford, Exeter, Devon, EX6 7XR.

In the event of a discrepancy between these terms and conditions and the details of the promotional material (or any other terms conditions provided / referred to at the time of entry), the details of the promotional material (and any other terms and conditions provided / referred to at the time of entry) shall prevail.

Appendix 8: Pilot questionnaire

European Agricultural Fund for Rural Development: Europe Investing in Rural Areas

Forest of Dean Off-road Cyclist Survey

We would be very grateful if you could spare a few minutes to answer some questions regarding your visit today. Please respond by following the instructions in brackets for each question and following the arrows (**➔Q**) when required. Your answers will be treated in the strictest confidence and the results will contain no information that may identify you.

If you would like to participate in a future follow-up interview about off-road cycling at the Forest of Dean please add your details at the end of the survey. This does not commit you to taking part, participation is voluntary and you can opt out at any time. Your details will be kept private and confidential, and your anonymity will be maintained in our report

Important note:
Please do not complete the following questions if you have already completed a survey at this site, or are under 16 years of age. Please also indicate by ticking the appropriate box, if you are involved with any of the following organisations.

- □ 1 South West
- □ Economic and Social Research Council
- □ Forestry Commission
- □ National Trust
- □ University of Exeter

Thank you very much for taking the time to complete this survey, if you have any questions please ask!

SECTION 1: TODAY'S VISIT

1 Which statement best describes your visit to the Forest of Dean today? *(Please tick one box only)*

- □ On a day trip from home **(➔Q7)**
- □ On holiday, staying away from home **(Continue)**

2 In total, How many nights will you stay away from home on this trip?

(Please write in the number of nights) ______ nights

3 Are you staying with family or friends during your stay? *(Please tick one box only)*

□ Whole stay **(➔ Q5)** □ Part stay **(➔ Q5)** □ No **(Continue)**

4 For the majority of this trip what kind of accommodation are you staying in? *(Please tick one box only)*

□ Holiday / second home	□ Hotel	□ B&B / Guesthouse
□ Hostel / Bunkhouse	□ Self-catering	□ Camping / Caravan site

□ Other (*Please state*):____

5 What is the nearest TOWN to where you are staying? *(Please write in name of the town)*

□ (Tick if touring and record most recent destination): ____________________________

6 What type of holiday do you consider this to be? *(Please tick one box only)*

□ Main holiday of the year □ Additional long holiday (4 nights plus) □ Short break

7 Which of the following activities in addition to off-road cycling activities will you take part in on this particular holiday / day trip? *(Please tick any that apply)*

□ Visit cities or towns	□ Go shopping for non-essentials
□ Go to the beach	□ Hill / coastal walking
□ Go sightseeing in the countryside	□ Surfing
□ Visit historic houses / castles	□ Other (Please state):_________
□ Visit museums or galleries	__________________________

8 On the following scale, please circle the number which reflects the importance of off-road cycling in motivating your visit to the Forest of Dean today.

Most important 10 9 8 7 6 5 4 3 2 1 0 Not important at all

9 Have you visited the Forest of Dean before for any reason?

□ Yes **(Continue)** □ No **(➔ Q12)** □ Can't remember **(➔ Q12)**

10 Have you ridden the off-road cycle trails at the Forest of Dean before?

□ Yes **(Continue)** □ No **(➔ Q12)** □ Can't remember **(➔ Q12)**

11 In the last year, how many times have you visited the Forest of Dean to cycle?
(Please write in the number of times) times: _____

12 How long will you spend at the Forest of Dean today?
(Please write in the number of hours) hours: _____

13 Please indicate the total number of times you will ride the following trails today:
(Please write in the number of times, note: 'DH' Refers to Downhill Trails).

Trail	Sign Colour	Grade	Distance	Number of Times
Corkscrew DH Trail	Orange	Severe	N/A	______
Flatland DH Trail	Orange	Severe	N/A	______
O.C DH Trail	Orange	Severe	N/A	______
Endo DH Trail	Orange	Severe	N/A	______
Mr Rooty DH Trail	Orange	Severe	N/A	______
Ski Run DH Trail	Orange	Severe	N/A	______
Freeminer Trail	Red	Difficult	2.75m (4.5km)	______
Verderer Trail	Blue	Moderate	7m (11km)	______
Family Cycle Trail	Green	Easy	11m (17.5km)	______
Intermediate Skills Park	Blue	Moderate	N/A	______
Family Skills Park	Blue	Moderate	N/A	______

14 How much in total will you spend **TODAY** at the Forest of Dean on: *(Please write amount in pounds)*

Parking Fees	£_____
Bike Hire	£_____
Bike Uplift Service *(Flyup)*	£_____
Go Ape	£_____
Cafe / Refreshment kiosks	£_____
Other activities (*please state*): ____	£_____

15 In addition to your spend at the Forest of Dean how much in total will you spend **TODAY** in and around the South West on: *(Please write amount in pounds)*

Accommodation (last night if applicable, otherwise tonight)	£_____
Travel & Transport (including fuel / parking)	£_____
Eating and drinking out (e.g. pubs / restaurants etc.)	£_____
Entertainment (including activities / attractions)	£_____
Non-essential shopping (e.g. gifts / souvenirs)	£_____
Groceries (e.g. other food and beverage expenses)	£_____
Bike Shop products / services	£_____
Off-road cycling coaching or guiding services	£_____

16 Did you bring your own bike with you for this visit?

□ Yes **(➔ Q18)** □ No **(Continue)**

17 If no, did you? *(Please tick one box only)*

- □ Hire a bike from Pedalabikeaway at the Forest of Dean?
- □ Bring a demo bike from a local bike shop?
- □ Other (please specify):____

18 Will you come back and ride the off-road trails at the Forest of Dean again?

□ Yes **(Continue)** □ No **(➔ Q20)**

19 If yes, when do you intend to return? *(Please tick one box only)*

□ During this holiday	□ Within 1 month	□ Within 3 months
□ Within 6 months	□ Within the year	□ Some point in the future

SECTION 2: YOUR CYCLING

20 What kind of cyclist are you? *(Please circle the number you think appropriate for each line)*

Occasional	1	2	3	4	5	Frequent
Serious	1	2	3	4	5	Casual
Experienced	1	2	3	4	5	Inexperienced

21 From the options below, choose the 3 most relevant reasons why you cycle and number them **1, 2, 3** in order of importance, where 1 is the most important. *(Please number 3 options only)*

__ Fitness / to lose weight	__ To meet new people	__ To compete
__ Be with friends / family	__ For a challenge	__ To explore the outdoors
__ Scenic views / fresh air	__ Get away from daily pressures	__ Find solitude

22 Where do you prefer to cycle? *(Please tick one box only)*

□ Roads	□ Linear cycle routes (e.g. Tarka trail / Camel Trail)
□ Cycle paths	□ Off-road cycling sites (e.g. Forest of Dean)
□ Public rights of way (e.g. bridleways)	□ Other (please state):________________________

23 Which season(s) do you ride in?

Winter	(Dec - Feb)	□	Yes	□	No	Spring	(Mar - May)	□	Yes	□	No
Summer	(Jun - Aug)	□	Yes	□	No	Autumn	(Sep - Nov)	□	Yes	□	No

24 How long have you been cycling off-road? *(Please tick box or write number of years)*

□ Today is my first time **(➔ Q27)** □ Less than a year About _____ years

25 Select the option which best describes your off-road cycling experience: *(Please tick one box only)*

□ Beginner □ Intermediate □ Advanced □ Expert / Professional

26 What grade of trail do you typically ride? *(Please tick one box only)*

□ Easy □ Moderate □ Difficult □ Severe

27 Please indicate your preferences for off-road cycle trails. (Please tick one box per line)

	I always avoid this	I avoid if possible	OK sometimes	I usually prefer this	Must have
Trail Preferences: Uphill Sections					
Gradual / Easy / Relaxed Climbs	□	□	□	□	□
Short / Hard / Steep Climbs	□	□	□	□	□
Long / Hard / Steep Climbs	□	□	□	□	□
Trail Preferences: Downhill Sections					
Slower / Gentle / Easy Descents	□	□	□	□	□
Fast / Smooth / Open / Clear Descents	□	□	□	□	□
Fast / Rough / Tight Descents	□	□	□	□	□
Slower / Steep / Technically Difficult Descents	□	□	□	□	□

28 Have you heard of the 1 South West Cycle Adventure Project www.1sw.org.uk ?

□ Yes **(Continue)** □ No **(➔ Q30)**

29 If yes, how did you hear about it? *(Please tick any that apply)*

□ 1 South West website
□ 1 South West information station / sign
□ Social media e.g. Facebook etc.
□ News / magazine article
□ Other website
□ Other (please state): _______________

30 Last year did you ride at any of the following off-road cycle sites in the South West?
(Please tick any that apply)

□ Tamar Lakes Country Park
□ Moors Valley Country Park
□ Haldon Forest Park
□ Siblyback Lake Country Park
□ Ashton Court Bristol
□ Gawton Woodlands
□ Other (please state):____

31 Last year did you ride at any other purpose built off-road cycling sites in the UK:

□ Yes **(Continue)** □ **No** **(➔ Q34)**

32. If yes, where did you visit? (Please list all sites visited): ______________________________

____

33 What is your favourite purpose built off-road cycling site? (Please write in site name)

____

34 Please respond to the following statements. *(Please tick one box only for each statement)*

	Strongly Agree	Agree	Don't know	Disagree	Strongly Disagree
My main reason for visiting the South West is to ride these trails.	□	□	□	□	□
I am now inspired to visit other off-road cycling sites in the South West.	□	□	□	□	□
The South West needs more off-road cycling facilities.	□	□	□	□	□
The South West is not a premium destination for off-road cycling.	□	□	□	□	□
The Forest of Dean is a valuable public recreation facility.	□	□	□	□	□
The off-road trails at the Forest of Dean are inspiring.	□	□	□	□	□
The Forest of Dean only caters for novice cyclists.	□	□	□	□	□
Purpose built trails offer more exciting riding than public rights of way.	□	□	□	□	□
I prefer riding in rural environments than towns and cities.	□	□	□	□	□
I prefer cycling off-road where I can follow a clearly signposted route.	□	□	□	□	□

SECTION 3: PAYING FOR OFF-ROAD CYCLING FACILITIES

35 Did you pay to park at the Forest of Dean Today?

□ Yes **(Continue)** □ No **(➔ Q39)** □ Discovery Pass **(➔ Q39)**

36 Did you find out how much it would cost you to park before visiting?

□ Yes □ No

Please note: This survey is an academic exercise only

Questions 37 - 39 have no connection to current or future car park policy at the Forest of Dean

37 How would you describe the current parking charges for the trail facilities at the Forest of Dean?

□ Very good value □ About Right □ Over-priced

38 How much would the parking fee have to have been to make you turn around and drive out of the car park?

(Please write in the amount in pounds) £________

39 Please respond to the following statements about paying for the off-road cycle facilities at the Forest of Dean.

(Please tick *<u>one</u>* *box only* *<u>for each statement</u>)*

	Agree	Agree	Don't know	Disagree	Disagree
I would not pay more to fund the development of new trails.	□	□	□	□	□
I would pay more if the money was used for additional trail maintenance.	□	□	□	□	□
I would pay more if the additional money provided better facilities.	□	□	□	□	□
Trail maintenance should be exclusively funded by off-road cyclists.	□	□	□	□	□

SECTION 4: PLEASE ANSWER SOME FINAL QUESTIONS ABOUT YOURSELF

40 How many people are there in your immediate party (including yourself)?
(Please write in the number of people and *<u>circle your details</u>)*

Age	0-5	6-15	16-24	25-34	35-44	45-54	55-64	65+
Male								
Female								

41 What is your ethnic group? *(Please tick* *<u>one</u>* *box only)*

□ White □ Black or Black British □ Asian or Asian British

□ Mixed □ Chinese □ Other (please specify:_______________ __

42 What are the first 5 characters of your UK postcode? Or which country do you live in if not from the UK? *(Please write in the first 5 postcode characters* *<u>or</u>* *the name of the country)*

Postcode (Example: **EX32 8**):______________ Country:__________________________ __

43 What is your highest educational qualification? *(Please tick* *<u>one</u>* *box only)*

□ No qualifications

□ 'O' level passes; CSE/GCSE; NVQ level 1; Foundation level GNVQ

□ Undergraduate Degree, Postgraduate Degree, NVQ levels 4 and 5; HNC; HND

□ School Certificate / Higher School Certificate; 'A' levels /'AS' levels; NVQ level 2 or 3; Intermediate / Advanced GNVQ

44 What best describes what you usually do during the week? *(Please tick* *<u>one</u>* *box only)*

□ Employed full-time □ Employed part-time □ In full-time education

□ Looking after home / family □ Retired □ Unemployed

45 What is your total annual household income? *(Please tick one box only)*

□	Under £15,000	□	£15,000-£29,000	□	£30,000-£44,999
□	£45,000-£59,000	□	£60,000-£74,999	□	£75,000 and over

46 Which of the following best describes the occupation of the main wage earner in your household? *(Please tick one box only)*

□	Student	□	State pensioner
□	Higher managerial, administrative and professional	□	Intermediate managerial, administrative and professional
□	Supervisory, clerical, junior managerial, administrative and professional	□	Skilled manual worker
□	Semi-skilled or unskilled manual worker	□	Unemployed with state benefits only

MANY THANKS FOR TAKING THE TIME TO COMPLETE THIS SURVEY

Would you be willing to take part in a follow-up interview in the future? (Please fill in your details)

First name: ________________________ Tel / email:__________________________

If found please return to: 1SW Project, University of Exeter Business School, Streatham Court, Exeter, EX4 4PU

Appendix 9: Pilot questionnaire structure analysis

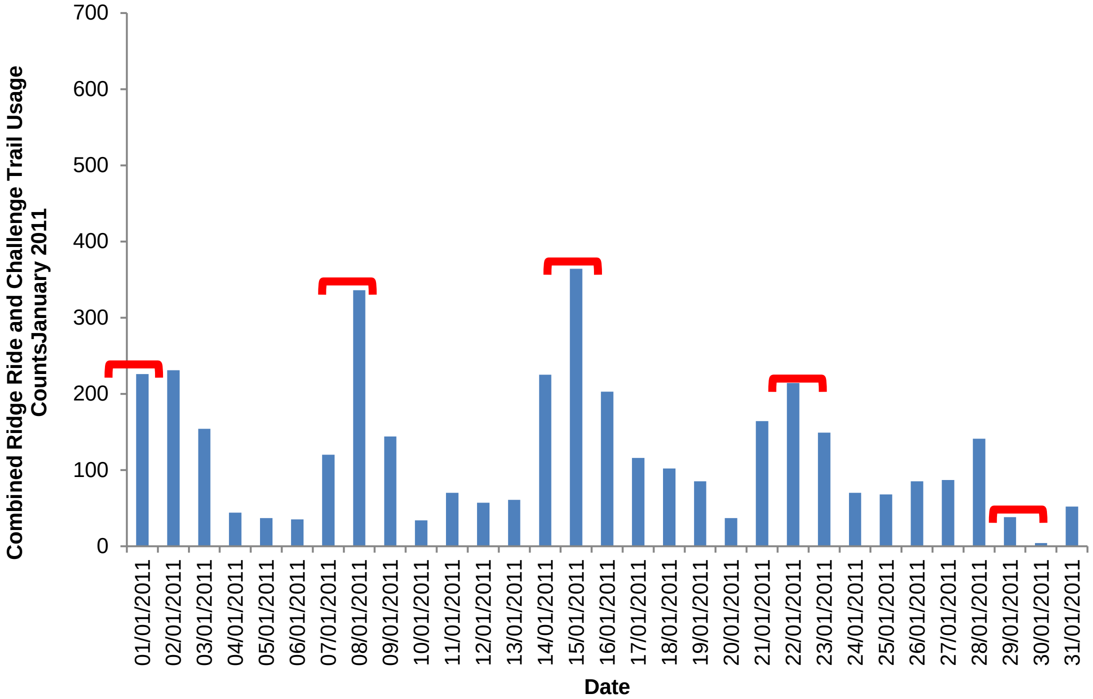
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23
R1	1		1	1	1			1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R2	1							1	1	1	1	1	1	1		1		1	1	1	1	1	1
R3	1						1	1	1	1		1	1	1	1	1		1	1	1	1	1	1
R4	1	1	1					1	1	1	1	1	1	1		1		1	1	1	1	1	1
R5	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R6	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R7	1	1	1		1	1	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1
R8	1	1	1	1	1			1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R9	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R10	1							1	1	1	1	1	1	1		1		1	1	1	1	1	1
R11	1		1		1			1	1	1	1		1	1		1		1	1	1	1	1	1
R12	1							1		1	1	1	1	1	1	1		1		1	1	1	1
R13	1							1	1	1	1	1	1	1		1		1	1	1	1	1	1
R14	1						1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R15	1						1	1	1	1	1	1	1		1	1		1	1	1	1	1	1
R16	1							1	1	1	1	1	1			1		1	1	1	1	1	1
R17	1						1	1	1	1	1	1	1	1	1								
R18	1							1	1	1	1	1	1	1		1		1	1	1	1	1	1
R19	1						1	1		1		1	1	1	1	1		1	1	1	1	1	1
R20	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R21	1							1	1	1	1	1	1	1		1	1	1	1	1	1	1	
R22	1						1	1	1	1	1	1	1	1		1		1	1	1	1	1	1
R23	1						1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R24	1							1	1	1	1	1	1	1		1		1	1	1	1	1	1
R25	1							1	1	1		1	1	1		1		1	1	1	1	1	1
R26	1							1	1	1	1	1	1	1		1		1	1	1	1	1	1
R27	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R28	1							1	1	1	1	1	1	1		1		1	1	1	1	1	1
R29	1							1	1	1	1	1	1	1		1		1	1	1	1	1	1
R30	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R31	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R32	1						1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R33	1							1	1	1	1	1	1		1	1		1	1	1	1	1	1
R34	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R35	1	1	1	1			1	1	1	1	1	1	1			1		1	1	1	1	1	1
R36	1						1	1	1			1	1	1		1		1	1	1	1	1	1
R37	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R38	1						1	1	1	1	1	1	1	1		1		1	1	1	1	1	1
R39	1							1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R40	1							1	1	1	1	1	1		1	1				1	1	1	1
R41	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1		1	1	1	1	1	1
R42	1	1	1				1	1	1	1	1	1	1	1		1		1	1	1	1	1	1
R43	1												1	1	1	1		1		1	1	1	1
R44	1	1	1		1	1	1	1	1			1	1	1	1	1		1	1	1	1	1	1
R45	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R46	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R47	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
R48			1	1	1	1		1	1	1	1	1	1	1	1	1		1	1	1	1	1	1
Total	47	10	13	7	10	7	18	47	45	45	41	46	48	43	29	47	1	46	44	47	47	47	46
No. Incorrect	0	6	8	4	0	0	6	0	0	0	1	1	1	0	0	1	2	0	1	12	12	5	0
No Missing	1							1	3	2	5	3	0	5	19		2	2	4	1	1	1	2
No. Correctly Filtered	0	0	0	2	0	0	34	0	0	1	1	0	0	0	0	0	44	0	0	0	0	0	0
% Correct	96	4	10	10	21	15	96	96	88	92	75	88	98	79	21	96	85	92	81	71	71	85	92
No Correct (Holiday Visitors)		4	5	3	5	5																	
% Correct (Holiday Visitors)		80	100	60	100	100																	

	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	% of Questions Answered
R1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	91
R2	1	1	1	1	1			1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	76
R3	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	80
R4	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	85
R5	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	83
R6	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	83
R7	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	91
R8	1	1	1	1	1			1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	87
R9	1	1	1	1	1	1					1	1	1	1	1	1	1	1	1	1	1	1	1	76
R10	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	80
R11	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	78
R12	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	78
R13	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	80
R14	1	1	1	1	1			1	1	1	1	1				1	1	1	1	1	1	1	1	76
R15	1	1	1	1	1		1	1	1	1	1	1				1	1	1	1	1	1	1	1	76
R16	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	76
R17			1	1	1		1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	63
R18	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	78
R19	1	1	1	1	1			1	1	1	1	1		1	1	1								61
R20	1	1	1	1	1			1			1	1	1	1	1	1	1	1	1	1	1	1	1	76
R21	1	1	1	1	1			1			1	1		1	1	1	1	1	1	1	1	1	1	72
R22	1	1	1	1	1		1	1			1	1				1	1	1	1	1	1	1	1	72
R23	1	1		1	1			1	1	1	1	1	1	1	1	1								65
R24	1	1	1	1	1		1	1	1	1	1	1				1	1	1	1	1	1	1	1	74
R25	1	1	1	1	1		1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	76
R26	1	1	1	1	1	1		1		1	1	1	1	1			1	1	1	1	1	1	1	74
R27	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	80
R28	1	1	1	1	1			1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	76
R29	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	80
R30	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	83
R31	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	80
R32	1	1	1	1	1	1	1	1		1	1	1				1	1	1	1	1	1	1	1	78
R33	1	1	1	1	1	1	1	1	1	1	1	1		1			1	1	1	1	1	1	1	76
R34	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	80
R35	1	1	1	1	1			1			1	1				1	1	1	1	1	1	1	1	74
R36	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	76
R37	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	83
R38	1	1	1	1	1			1	1	1	1	1				1	1	1	1	1	1	1	1	74
R39	1	1	1	1	1		1	1	1	1	1	1		1		1	1	1	1	1	1	1	1	78
R40	1	1	1	1	1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	74
R41	1	1	1	1	1			1			1	1	1	1	1	1	1	1	1	1	1	1	1	87
R42	1	1	1	1	1			1		1	1	1		1		1	1	1	1	1	1	1	1	78
R43	1	1	1	1				1			1	1	1				1	1	1		1	1		50
R44	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	91
R45	1	1	1	1	1			1	1	1	1	1				1	1	1	1	1	1	1	1	85
R46	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	96
R47	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	96
R48	1	1	1	1	1	1		1	1	1	1	1				1	1	1	1	1	1	1	1	83
Total	47	47	47	48	46	11	24	47	33	41	48	48	32	37	31	45	46	46	46	45	46	46	45	3767
No. Incorrect	0	0	4	3	2	0	0	0	1	0	1	0	0	1	0	1	45	0	0	0	0	0	0	78.5
No Missing	1	1	1	0		2	24	1	14	7	0	0	8	3	9	3	2	2	2	3	2	2	3	
No. Correctly Filtered	0	0	0	0	0	35	0	0	1	0	0	0	8	8	8	0	0	0	0	0	0	0	0	
% Correct	96	96	88	94	92	92	0	96	40	71	98	100	67	85	63	85	-2	92	92	88	92	92	88	
No Correct (Holiday Visitors)																								
% Correct (Holiday Visitors)																								

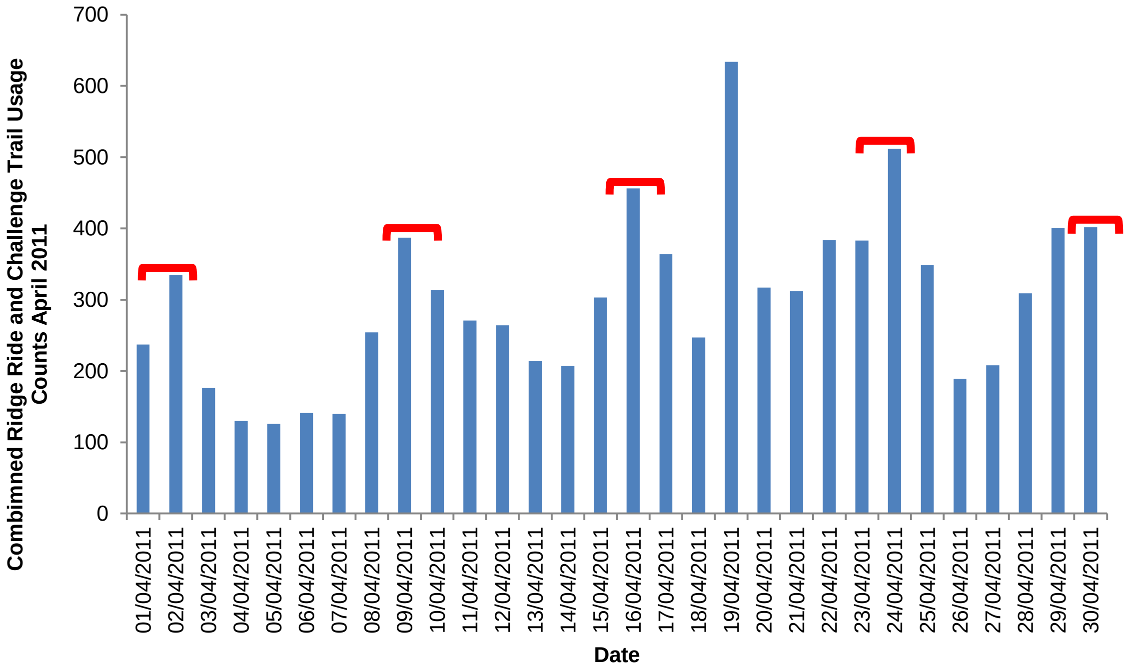
Appendix 10: Haldon Forest Park questionnaire survey schedule

Winter: January 2012																																
Date:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
Day:	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	
Survey Dates:														X	X										X							
Target Quotas:														22	22										22							66
Spring: April 2012						Easter Weekend																										
Date:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29			
Day:	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S			
Survey Dates:						X	X	X	X												X	X		X				X				
Target Quotas:						20	20	20	20												20	20		20				20				160
Summer: July 2012																																
Date:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Day:	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	
Survey Dates:							X	X				X	X	X	X										X		X	X	X			
Target Quotas:							20	20				20	20	20	20										20		20	40	20			180
Autumn: October 2012																																
Date:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Day:	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	
Survey Dates:						X	X	X	X											X									X			
Target Quotas:						21	21	16	16											21									16			95
Total Survey Quota:																																520

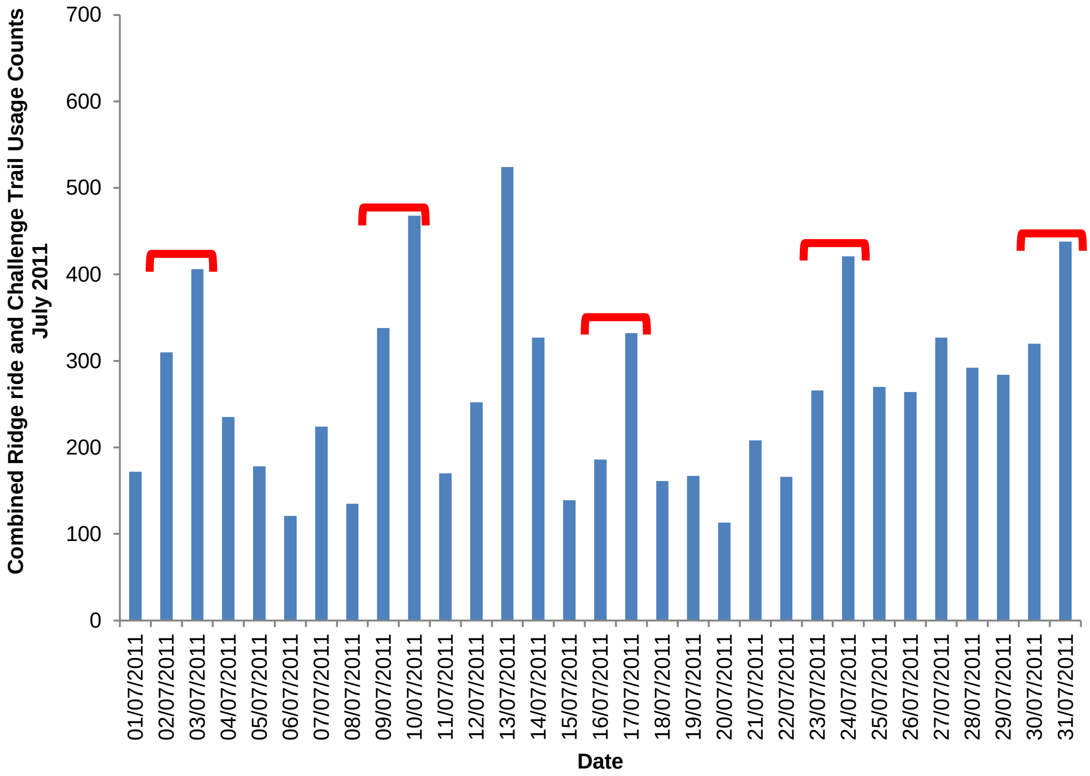
Appendix 11: Haldon Forest Park seasonal trail counts
Note: For clarity weekend data are highlighted by the red markers above the data bars.



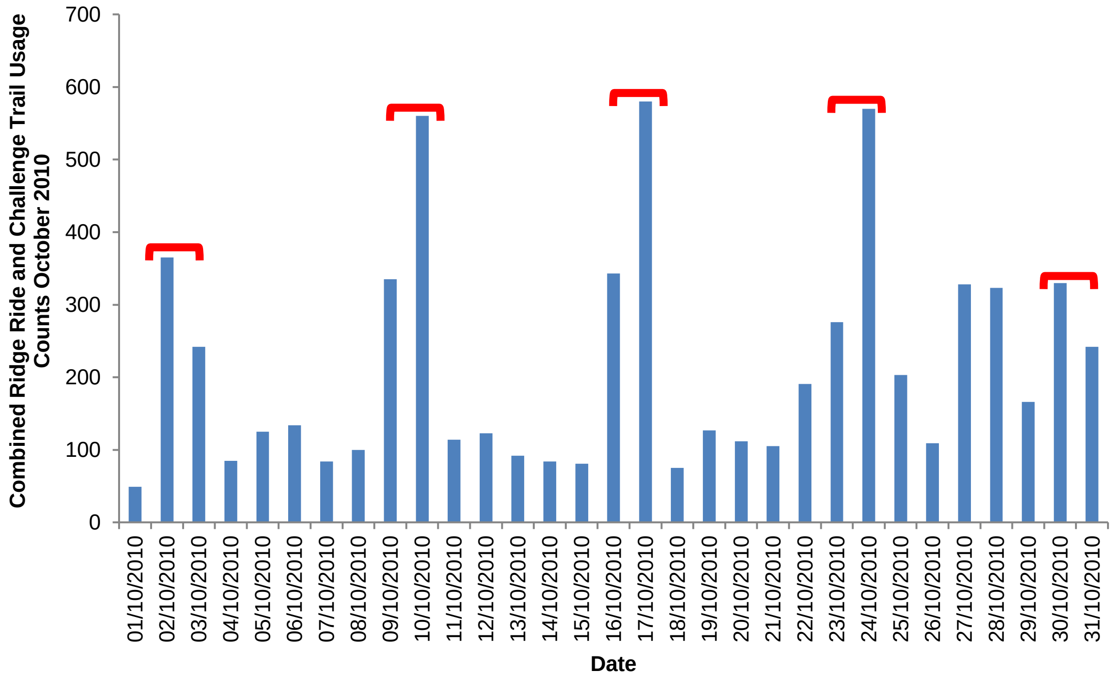
Source: Author



Source: Author



Source: Author



Source: Author

Appendix 12: Interview schedule

Prompt	Question	Section	Objective	Section	Question	Prompt
When was it? How long was your trip? Where did you stay Who did you go with? What were your main holiday activities? Did you visit any other off-road cycling locations during your holiday?	12. Please can you tell me about your recent visit?	**Section 4: Your visit to the South West (Holiday visitors only)** **(Related to Section 1 questionnaire survey)**	**4** ***Examine variations among users in terms of their onsite behaviours***	**Section 1: Your off-road cycling experience** **(Related to Section 2 questionnaire survey)**	1. Can you tell me how you started off-road cycling?	Did anyone introduce you to off-road cycling? Where did you start?
Was off-road cycling the main reason?	13. How important was off-road cycling in your decision to visit the South West?				2. Can you tell me about your typical off-road cycling routine?	Where do you go? When do you go? Who do you normally go with? Does it involve riding at the same places or do you seek out new? How often do you go?
	14. Was this the first time you have been off-road cycling in the South West.				3. Why do you go off-road cycling?	What motivates you to go? Health / Social reasons?
Prompt: Why? / Why not?	15. Will you come back to the South West to go off-road cycling?				4. In your spare time do you do any other activities in addition to off-road cycling?	
	9. When did you last cycle at Haldon Forest Park?	**Section 3: Haldon Forest Park off-road cycling provision** **(Related to Section 3 questionnaire survey)**	**5** ***Revisit and reappraise the cases made for public funding and investment in purpose built off-road cycling sites***	**Section 2: Purpose-built off-road cycle trails as public recreation facilities** **(Related to Section 3 questionnaire survey)**	5. How important are off-road cycling sites to you?	What role do they play in your life?
	10. Thinking back to your last visit, what did you like and dislike about your cycling experience?				6. What would encourage you to go more often?	Is there anything stopping you?
Prompt: What changes would you like to see?	11. What if anything would improve your off-road cycling experience at Haldon Forest Park?				7. Why do you think off-road cycling sites have become so popular?	
					8. What kind of off-road cycling sites would you like to see in the future?	Better links to other trails? More facilities?

Appendix 13 Framework analysis

Theme	**Introduction to off-road cycling**					
Sub Theme	**Formal**	**Informal**	**Solo**	**Group**	**Internal Trigger**	**External Trigger**
Respondent A		(L 7)	(L 8)			(L 7 / L 9)
Respondent B	(L 13)			(L 15)		(L 9)
Respondent C		(L 11)	(L 11)			(L 7)
Respondent D		(L 7)		(L 7)		(L 7)
Respondent E		(L 8)		(L 7)		(L 7)
Respondent F		(L 9)		(L 9)	(L 9)	
Respondent G		(L 7)	(L 11)		(L 9)	
Respondent H		(L 7)	(L 11)		(L 11)	
Respondent I		(L 6)		(L 7)		(L 7)
Respondent J		(L 6)		(L 6 / L 7)		(L 6 / L 7)
Respondent K		(L 6)	(L 7)		(L 6)	
Frequency	9%	91%	45%	55%	36%	64%

Theme	Motivations for going off-road cycling				
Sub Theme	**Health**	**Environmental**	**Social**	**Physical**	**Emotional**
Respondent A	(L 52)	(L 39)			(L 36)
Respondent B	(L 36 / L 43)	(L 39)	(L 40)	(L 38)	(L 37)
Respondent C	(L 21)	(L 21)			(L 21)
Respondent D	(L 24)		(L 24)		
Respondent E	(L 13)				(L 13)
Respondent F			(L 21)	(L 22)	
Respondent G					(L 17)
Respondent H					(L 21)
Respondent I		(L 30)			(L 30)
Respondent J	(L 29)	(L 30)	(L 25)	(L 26)	(L 26)
Respondent K	(L 25)				(L 25)
Frequency	64%	45%	36%	27%	82%

Theme	Reasons why purpose-built off-road cycling sites are important						
Sub Theme	**Safety**	**Convenience**	**Predictability**	**Environmental**	**Social**	**Emotional**	**Public service**
Respondent A	(L31)		(L 34)			(L 47)	
Respondent B	(L 130)	(L 58)	(L 124 / L 150)	(L 55)	(L 56)		(L 58)
Respondent C		(L 27)		(L 29)			
Respondent D							
Respondent E					(L 15 / L 16)		
Respondent F				(L 29)			(L 29)
Respondent G				(L23 / L 24)			
Respondent H					(L 30)		(L 27)
Respondent I					(L 37)		(L 38)
Respondent J	(L 37)		(L 39)	(L 37)	(L 39)	(L 38)	(L 42)
Respondent K				(L 30)	(L 30)		(l 32)
Frequency	27%	18%	27%	55%	55%	18%	55%

Theme	Typical off-road cycling trip characteristics							
Sub Theme	**Solo**	**Group**	**Purpose-built**	**Natural**	**Frequent***	**Less Frequent****	**Local**	**Non Local**
Respondent A	(L 24)		(L 21)		(L 43)		(L 47)	
Respondent B	(L 29)			(L 21)	(L 32)		(L 20)	(L 22 / L 23)
Respondent C		(L 15)	(L 14)	(L 14)	(L 16)		(L 18)	(L 19)
Respondent D		(L 16)	(L 15)	(L 12)	(L 16)		(L 11)	(L 13 / L 20)
Respondent E			(L 11)		(L 9)		(L 11)	
Respondent F		(L 12)	(L 15)	(L 12)		(L 19)	(L 12)	(L 13)
Respondent G	(L 13)		(L 13)	(L 14 / L15)	(L 14)		(L 14)	(L 15)
Respondent H		(L 19)	(L 15)		(L 18)		(L 19)	
Respondent I		(L 21)	(L 27)				(L 27)	(L 21)
Respondent J		(L 17)	(L 15)	(L 15)	(L 23)		(L 15)	(L 16)
Respondent K		(L 15)	(L 11)	(L 12)	(L 12)		(L 11)	(L 11 / L 12)
Frequency	27%	64%	91%	64%	82%	9%	100%	73%

*Frequent = ≥ once per week **Less Frequent < once per week

Appendix 14: Cluster profiling tables

	Active Trail Centre Explorers	Non Bike Owners	Active Off-road Explorers	Cycle Path Adventurers	New Trail Centre Riders	Active Trail Centred	Total	*H*
Cluster Descriptives	**1**	**2**	**3**	**4**	**5**	**6**	**343**	
Count	**91**	**32**	**48**	**29**	**27**	**116**	**100**	
% of cases	**26.5**	**9.3**	**14**	**8.5**	**7.9**	**33.8**	**0**	
Your Visit								
Visit type (n = 343)								***42.13*****
Day Visitors	**78(85.7%)**	**19(59.4%)**	**46(95.8%)**	**26(89.7%)**	**27(100%)**	**111(95.7%)**		
Holiday Visitors	**13(14.3%)**	**13(40.6%)**	**2(4.2%)**	**3(10.3%)**	**0(0%)**	**5(4.3%)**		
In total how many nights will you stay away from home n = 35								***6.08***
Mean number of nights	**4.6**	**8.4**	**3.5**	**8**	**0**	**6**		
Are you staying with family or friends during your stay? (n = 36)								***7.52***
Whole stay	**5(38.5%)**	**4(30.8%)**	**2(100%)**	**0(0%)**	**0(0%)**	**2(40%)**		
Part stay	**1(7.7%)**	**5(38.5%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**		
No	**7(53.8%)**	**4(30.8%)**	**0(0%)**	**3(100%)**	**0(0%)**	**3(60%)**		
Are you staying with family or friends during your stay? (n = 36) Collapsed								***7.52***
Whole or part stay	**6(46.2%)**	**9(69.3%)**	**2(100%)**	**0(0%)**	**0(0%)**	**2(40%)**		
No	**7(53.8%)**	**4(30.8%)**	**0(0%)**	**3(100%)**	**0(0%)**	**3(60%)**		

For the majority of this trip what kind of accommodation are you staying in? (n = 19)								***1.01***
Holiday / second home	**0(0%)**	**1(20%)**	**0(0%)**	**2(66.7%)**	**0(0%)**	**1(33.3%)**		
Hotel	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**		
B&B / Guesthouse	**1(12.5%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**		
Hostel / Bunkhouse	**3(37.5%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**		
Self-catering	**1(12.5%)**	**3(60%)**	**0(0%)**	**0(0%)**	**0(0%)**	**1(33.3%)**		
Camping / Caravan site	**3(37.5%)**	**1(20%)**	**0(0%)**	**1(33.3%)**	**0(0%)**	**1(33.3%)**		
Other	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**		
What type of holiday do you consider this to be? (n = 42)								***8.52***
Main holiday of the year?	**0(0%)**	**5(38.5%)**	**0(0%)**	**1(33.3%)**	**0(0%)**	**0(0%)**		
Additional long holiday (4 nights plus)	**6(46.2%)**	**5(38.5%)**	**0(0%)**	**2(66.7%)**	**0(0%)**	**3(27.3%)**		
Short break	**7(53.8%)**	**3(23.1%)**	**2(100%)**	**0(0%)**	**0(0%)**	**8(72.7%)**		
Additional activities to off-road cycling on this particular holiday / day trip? (Multiple Response Frequency)								
Visit cities or towns?	**15(16.3%)**	**9(15.3%)**	**2(6.9%)**	**7(23.3%)**	**5(21.7%)**	**18(15.5%)**		***9.88***
Go shopping for non-essentials	**9(9.8%)**	**7(11.9%)**	**4(13.8%)**	**4(13.3%)**	**5(21.7%)**	**13(11.2%)**		***5.07***
Go to the beach	**19(20.7%)**	**10(16.9%)**	**7(24.1%)**	**4(13.3%)**	**3(13.0%)**	**25(21.6%)**		***5.68***
Hill / coastal walking	**13(14.1%)**	**8(13.6%)**	**6(20.7%)**	**6(20.0%)**	**3(13.0%)**	**15(12.9%)**		***4.24***
Go sightseeing in the countryside	**8(8.7%)**	**13(22.0%)**	**5(17.2%)**	**4(13.3%)**	**3(13.0%)**	**12(10.3%)**		***23.86******
surfing	**8(8.7%)**	**1(1.7%)**	**1(3.4%)**	**1(3.3%)**	**1(4.3%)**	**10(8.6%)**		***4.62***
Visit historic houses / castles	**8(8.7%)**	**4(6.8%)**	**0(0%)**	**2(6.6%)**	**0(0%)**	**4(3.4%)**		***10.72***
Other	**10(10.9%)**	**6(10.2%)**	**4(13.8%)**	**2(6.7%)**	**3(13.0%)**	**16(13.8%)**		***3.17***
Visit museums / galleries	**2(2.2%)**	**1(1.7%)**	**0(0%)**	**0(0%)**	**0(0%)**	**3(2.6%)**		***2.78***
Motivation Factor (n = 341)								***12.86*****
Mean motivation factor (Percentage motivating factor)	**9.8 (98%)**	**9.1 (91%)**	**9.5(95%)**	**9.3(93%)**	**9.8(98%)**	**9.7(97%)**		

Have you visited Haldon Forest Park before? (n = 343)								***23.62*****
Yes	**78(85.7%)**	**18(56.3%)**	**46(95.8%)**	**23(79.3%)**	**23(85.2%)**	**107(92.2%)**		
No	**13(14.3%)**	**13(40.6%)**	**2(4.2%)**	**6(20.7%)**	**4(14.8%)**	**9(7.8%)**		
Can't Remember	**0(0%)**	**1(3.1%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**		
Have you ridden the off-road cycle trails at Haldon Forest Park before? (n = 289)								***20.82*****
Yes	**76(98.7%)**	**13(72.2%)**	**43(93.5%)**	**22(95.7%)**	**20(90.9%)**	**99(96.1%)**		
No	**1(1.3%)**	**5(27.8%)**	**3(6.5%)**	**1(4.3%)**	**2(9.1%)**	**4(3.9%)**		
In the last 12 months how many times have you visited Haldon Forest Park to Cycle? (Mean) (n = 273)	**32.8**	**9.8**	**17.1**	**9.9**	**9.3**	**22.7**		***34.93*****
Will you come back and ride the off-road trails at Haldon Forest Park Again? (n = 342)								***2.82***
Yes	**90(98.9%)**	**31(96.9%)**	**48(100%)**	**29(100%)**	**27(100%)**	**114(99.9%)**		
No	**1(1.1%)**	**1(3.1%)**	**0(0%)**	**0(0%)**	**0(0%)**	**1(0.9%)**		
If yes, when do you intend to return? (n = 313)								***42.23*****
During this holiday	**3(3.4%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**	**5(4.5%)**		
Within 1 month	**56(64.4%)**	**10(33.3%)**	**30(63.8%)**	**15(55.6%)**	**24(92.3%)**	**88(79.3%)**		
Within 3 months	**11(12.6%)**	**5(16.7%)**	**8(17.0%)**	**7(25.9%)**	**1(3.8%)**	**8(7.2%)**		
Within 6 months	**8(9.2%)**	**5(16.7%)**	**4(8.5%)**	**3(11.1%)**	**1(3.8%)**	**5(4.5%)**		
Within the year	**3(3.4%)**	**2(6.7%)**	**3(6.4%)**	**1(3.7%)**	**0(0%)**	**1(0.9%)**		
Some point in the future	**6(6.9%)**	**8(26.7%)**	**2(4.3%)**	**1(3.7%)**	**0(0%)**	**4(3.6%)**		
How long will you spend at Haldon Forest Park (Mean hours) (n = 343)	**3.5**	**3.8**	**2.9**	**2.8**	**3.2**	**2.9**		***32.69*****

Please indicate the total number of times you will ride the following trails (Mean / Mode)								
Discovery Trail	**Mean 0.2 / Mode 0**	**Mean 0.5 / Mode 0**	**Mean 0.2 / Mode 0**	**Mean 0.7 / Mode 0 / 1**	**Mean 0.2 / Mode 0**	**Mean 0.2 / Mode 0**		***9.88***
Challenge Trail	**Mean 1.1 / Mode 1**	**Mean 1.1 / Mode 1**	**Mean 1 / Mode 1**	**Mean 0.8 / Mode 1**	**Mean 1 / Mode 1**	**Mean 1 / Mode 1**		***3.80***
Ridge Ride Trail	**Mean 1.4 / Mode 1**	**Mean 0.7 / Mode 0**	**Mean 1.2 / Mode 1**	**Mean 0.6 / Mode 0**	**Mean 0.8 / Mode 0**	**Mean 1 / Mode 1**		***31.21****
Ridge Ride Extreme	**Mean 0.8 / Mode 1**	**Mean 0.4 / Mode 0**	**Mean 0.6 / Mode 0**	**Mean 0.2 / Mode 0**	**Mean 0.4 / Mode 0**	**Mean 0.5 / Mode 0**		***26.58****
Skills Park	**Mean 0.7 / Mode 0**	**Mean 1.4 / Mode 0**	**Mean 0.4 / Mode 0**	**Mean 0.3 / Mode 0**	**Mean 0.4 / Mode 0**	**Mean 0.5 / Mode 0**		***11.81****
Pump Track	**Mean 0.5 / Mode 0**	**Mean 1 / Mode 0**	**Mean 0.4 / Mode 0**	**Mean 0.2 / Mode 0**	**Mean 0.3 / Mode 0**	**Mean 0.3 / Mode 0**		***6.70***
How much in total will you spend today at Haldon Forest Park on: (Mean)								
Parking Fees	**1.86**	**2.59**	**1.97**	**2.14**	**2**	**1.53**		***14.15****
Bike Hire	**0.23**	**27.13**	**4.08**	**0**	**0**	**0.32**		***234.88****
Go Ape	**0**	**0**	**0**	**0**	**0**	**0**		
Cafe / Refreshment Kiosks	**3.91**	**5**	**2.68**	**3.01**	**2.81**	**3.56**		***18.79****
Other Activities	**1.24**	**0**	**0.81**	**0.86**	**1.15**	**1.26**		***8.88***
Mean total spend	**7.24**	**34.72**	**9.54**	**6.01**	**5.96**	**6.67**		

In addition to your spend at Haldon Forest Park how much in total will you spend today in the South West (Mean)								
Accommodation	**5.27**	**4.38**	**0**	**0.69**	**0**	**3.75**		***15.46*****
Travel and Transport	**9.46**	**13.66**	**5.71**	**5.45**	**6.48**	**6.67**		***11.58****
Eating and drinking out	**14.14**	**9.28**	**4.31**	**9.62**	**3.33**	**7.77**		***9.67***
Entertainment	**0.93**	**1.66**	**0**	**2.76**	**3.33**	**0.69**		***3.33***
Non-essential shopping	**2.24**	**0.63**	**0**	**0.07**	**1.96**	**1.59**		***6.17***
Groceries	**9.44**	**6.72**	**5.96**	**3.1**	**2.96**	**6.99**		***7.90***
Bike Shop products / services	**3.35**	**1.41**	**2.92**	**0.86**	**2.41**	**1.72**		***2.44***
Off-road cycling coaching or guiding services	**1.9**	**6.25**	**0.21**	**0**	**0.37**	**0**		***4.83***
	46.73	**43.99**	**19.11**	**22.55**	**20.84**	**29.18**		
Your Cycling								
Did you bring your own bike with you for this visit? (n =)								
Yes	**71 (100%)**	**0 (0%)**	**27 (100%)**	**24 (100%)**	**33 (100%)**	**91 (100%)**		
No	**0 (0%)**	**25 (100%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**		
If no, did you?								
Hire a bike from forest cycle hire at Haldon Forest Park?	**1 (100%)**	**23 (95.8%)**	**0 (0%)**	**0 (0%)**	**1 (100%)**	**0 (0%)**		
Bring a demo bike from a local shop?	**0 (0%)**	**1 (4.2%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**		
Other	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**		
Where do you mainly purchase your cycling equipment? (n = 297)								***9.77***
Independent bike shops	**35(43.2%)**	**14(51.9%)**	**22(55.0%)**	**17(63.0%)**	**12(50%)**	**59(60.2%)**		
National bike shop chains	**1(1.2%)**	**3(11.1%)**	**2(5.0%)**	**5(18.5%)**	**3(12.5%)**	**10(10.2%)**		
Online retailers	**42(51.9%)**	**8(29.6%)**	**16(40%)**	**5(18.5%)**	**8(33.3%)**	**26(26.5%)**		
Second-hand sources	**3(3.7%)**	**2(7.4%)**	**0(0%)**	**0(0%)**	**1(4.2%)**	**3(3.1%)**		

Membership of cycling clubs, associations, governing bodies (n = 340)								***25.00***
Yes	**19(78.9%)**	**6(18.8%)**	**20(41.7%)**	**3(10.7%)**	**0(0%)**	**17(14.8%)**		
No	**71(21.1%)**	**26(81.3%)**	**28(58.3%)**	**25(89.3%)**	**27(100%)**	**98(85.2%)**		
What kind of cyclist are you? (Frequency) (n = 335)								***40.91***
Very Occasional	**1(1.2%)**	**4(12.5%)**	**0(0%)**	**3(10.7%)**	**1(3.7%)**	**3(2.6%)**		
Occasional	**2(2.3%)**	**2(6.3%)**	**0(0%)**	**3(10.7%)**	**6(22.2%)**	**9(7.8%)**		
Neither Frequent nor Occasional	**11(12.8%)**	**4(12.5%)**	**4(8.7%)**	**10(35.7%)**	**8(29.6%)**	**23(19.8%)**		
Frequent	**20(23.3%)**	**11(34.4%)**	**13(28.3%)**	**7(25.0%)**	**5(18.5%)**	**31(26.7%)**		
Very Frequent	**52(60.5%)**	**11(34.4%)**	**29(63.6%)**	**5(17.9%)**	**7(25.9%)**	**50(43.1%)**		
What kind of cyclist are you? (Frequency) (n = 335) Collapsed								***40.91***
Occasional	**3(3.5%)**	**6(18.8%)**	**0(0%)**	**6(21.4%)**	**7(25.9%)**	**12(10.4%)**		
Neither Frequent nor Occasional	**11(12.8%)**	**4(12.5%)**	**4(8.7%)**	**10(35.7%)**	**8(29.6%)**	**23(19.8%)**		
Frequent	**72(83.8%)**	**22(68.8%)**	**42(91.9%)**	**12(42.9%)**	**12(48.1%)**	**81(69.8%)**		
What kind of cyclist are you? (Seriousness) (n = 324)								***50.63***
Very casual	**0(0%)**	**4(12.5%)**	**0(0%)**	**5(19.2%)**	**4(15.4%)**	**3(2.8%)**		
Casual	**3(3.4%)**	**3(9.4%)**	**5(11.1%)**	**7(26.9%)**	**6(23.1%)**	**8(7.4%)**		
Neither Serious nor Casual	**21(24.1%)**	**12(37.5%)**	**7(15.6%)**	**7(26.9%)**	**9(34.6%)**	**41(38%)**		
Serious	**30(34.5%)**	**10(31.3%)**	**16(35.6%)**	**5(19.2%)**	**3(11.5%)**	**39(36.1%)**		
Very Serious	**33(37.9%)**	**3(9.4%)**	**17(37.8%)**	**2(7.7%)**	**4(15.4%)**	**17(15.7%)**		

What kind of cyclist are you? (Seriousness) (n = 324) Collapsed								***50.63***
Casual	**3(3.4%)**	**7(21.9%)**	**5(11.1%)**	**12(46.1%)**	**10(38.5%)**	**11(10.2%)**		
Neither Serious nor Casual	**21(24.1%)**	**12(37.5%)**	**7(15.6%)**	**7(26.9%)**	**9(34.6%)**	**41(38%)**		
Serious	**63(72.4%)**	**13(40.7%)**	**33(73.4%)**	**7(26.9%)**	**7(26.9%)**	**56(51.8%)**		
What kind of cyclist are you? (Experience) (n = 325)								***70.64***
Very Inexperienced	**1(1.2%)**	**4(12.5%)**	**0(0%)**	**2(7.7%)**	**2(7.7%)**	**0(0%)**		
Inexperienced	**2(2.4%)**	**1(3.1%)**	**0(0%)**	**6(23.1%)**	**3(11.5%)**	**4(3.6%)**		
Neither Inexperienced nor Experienced	**16(18.8%)**	**12(37.5%)**	**5(10.9%)**	**12(46.2%)**	**16(61.5%)**	**37(33.6%)**		
Experienced	**29(34.1%)**	**10(31.3%)**	**22(47.8%)**	**5(19.2%)**	**4(15.4%)**	**46(41.8%)**		
Very Experienced	**37(43.5%)**	**5(15.6%)**	**19(41.3%)**	**1(3.8%)**	**1(3.8%)**	**23(20.9%)**		
What kind of cyclist are you? (Experience) (n = 325) Collapsed								***70.64***
Inexperienced	**3(3.6%)**	**5(15.6%)**	**0(0%)**	**8(30.80%)**	**5(19.2%)**	**4(3.6%)**		
Neither Inexperienced nor Experienced	**16(18.8%)**	**12(37.5%)**	**5(10.9%)**	**12(46.2%)**	**16(61.5%)**	**37(33.6%)**		
Experienced	**66(77.6%)**	**15(46.9%)**	**41(89.1%)**	**6(23.0%)**	**5(19.2%)**	**69(62.7%)**		
Off-Road Cycling Experience (n = 332)								***76.50***
Beginner	**0(0%)**	**3(11.5%)**	**0(0%)**	**7(25.0%)**	**4(16.0%)**	**1(0.9%)**		
Intermediate	**23(25.3%)**	**15(57.7%)**	**16(34.0%)**	**17(60.7%)**	**19(76.0%)**	**63(54.8%)**		
Advanced	**59(64.8%)**	**8(30.8%)**	**29(61.7%)**	**4(14.3%)**	**2(8.0%)**	**47(40.9%)**		
Expert / Professional	**9(9.9%)**	**0(0%)**	**2(4.3%)**	**0(0%)**	**0(0%)**	**4(3.5%)**		
What grade of trail do you typically ride? (n = 332)								***60.22***
Easy	**0(0%)**	**4(14.3%)**	**0(0%)**	**3(10.7%)**	**0(0%)**	**4(2.9%)**		
Moderate	**13(14.3%)**	**11(39.3%)**	**11(23.4%)**	**18(64.3%**	**18(72.0%)**	**57(40.7%)**		
Difficult	**64(70.3%)**	**12(42.9%)**	**32(68.1%)**	**6(21.4%)**	**7(28.0%)**	**75(53.6%)**		
Severe	**14(15.4%)**	**1(3.6%)**	**4(8.5%)**	**1(3.6%)**	**0(0%)**	**4(2.9%)**		

Why do you cycle? (Multiple Response Frequency)								
Fitness to lose weight?	**74(15.6%)**	**25(18.1%)**	**41(17.6%)**	**25(21.0%)**	**20(18.5%)**	**100(19.0%)**		***3.50***
To meet new people?	**18(3.8%)**	**4(2.9%)**	**10(4.3%)**	**3(2.5%)**	**5(4.6%)**	**16(3.0%)**		***3.24***
To compete?	**19(4.0%)**	**3(2.2%)**	**14(6.0%)**	**2(1.7%)**	**0(0%)**	**11(2.1%)**		***20.46*****
Be with friends / family?	**65(13.7%)**	**20(14.5%)**	**33(14.2%)**	**19(16.0%)**	**20(18.5%)**	**79(15.0%)**		***1.40***
For a challenge?	**79(16.7%)**	**21(15.2%)**	**37(15.9%)**	**12(10.1%)**	**22(20.4%)**	**81(15.4%)**		***26.57*****
To explore the outdoors?	**66(13.9%)**	**23(16.7%)**	**33(14.2%)**	**18(15.1%)**	**12(11.1%)**	**78(14.8%)**		***8.19***
Scenic views / fresh air?	**60(12.7%)**	**23(16.7%)**	**34(14.6%)**	**23(19.3%)**	**16(14.8%)**	**75(14.3%)**		***3.71***
Get away from daily pressures?	**60(12.7%)**	**12(8.7%)**	**23(9.9%)**	**13(10.9%)**	**10(9.3%)**	**72(13.7%)**		***15.47*****
Find solitude?	**33(7.0%)**	**7(5.1%)**	**8(3.4%)**	**4(3.4%)**	**3(2.8%)**	**14(2.7%)**		***21.88*****
Which seasons do you ride in? (n = 343)								
Winter (Dec-Feb)								***21.47*****
Yes	**87(95.6%)**	**25(78.1%)**	**46(95.8%)**	**21(72.4%)**	**20(74.1%)**	**101(87.1%)**		
No	**4(4.4%)**	**7(21.9%)**	**2(4.2%)**	**8(27.6%)**	**7(25.9%)**	**15(12.9%)**		
Spring (Mar - May) (n = 343)								***5.83***
Yes	**91(100%)**	**31(96.9%)**	**48(100%)**	**29(100.0%)**	**26(96.3%)**	**115(99.1%)**		
No	**0(0%)**	**1(3.1%)**	**0(0%)**	**0(0%)**	**1(3.7%)**	**1(0.9%)**		
Summer (Jun - Aug) (n = 343)								***1.96***
Yes	**91(100%)**	**32(100%)**	**48(100%)**	**29(100%)**	**27(100%)**	**115(99.1%)**		
No	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**	**1(0.9%)**		
Autumn (Sep - Nov) (n = 343)								***10.67***
Yes	**91(100%)**	**29(90.6%)**	**48(100%)**	**28(96.6%)**	**26(96.3%)**	**113(97.4%)**		
No	**0(0%)**	**3(9.4%)**	**0(0%)**	**1(3.4%)**	**1(3.7%)**	**3(2.6%)**		

Please indicate your preferences for off-road cycle trails (n = 336)								
Trail preferences: Uphill sections Gradual / Easy / Relaxed Climbs								***11.345****
I always avoid this	**5(5.7%)**	**1(3.2%)**	**2(4.2%)**	**0(0%)**	**0(0%)**	**2(1.8%)**		
I avoid if possible	**6(6.8%)**	**1(3.2%)**	**0(0%)**	**0(0%)**	**2(7.7%)**	**6(5.3%)**		
Ok Sometimes	**40(45.5%)**	**9(29.0%)**	**21(43.8%)**	**8(27.6%)**	**11(42.3%)**	**59(51.8%)**		
I usually prefer this	**20(22.7%)**	**14(45.2%)**	**16(33.3%)**	**14(48.3%)**	**10(38.5%)**	**30(26.3%)**		
Must have	**17(19.3%)**	**6(19.4%)**	**9(18.8%)**	**7(24.1%)**	**3(11.5%)**	**17(14.9%)**		
Trail preferences uphill sections: Short / Hard / Steep Climbs (n = 336)								***35.62*****
I always avoid this	**0(0%)**	**1(3.4%)**	**0(0%)**	**3(10.3%)**	**0(0%)**	**1(0.7%)**		
I avoid if possible	**4(4.4%)**	**2(6.9%)**	**1(2.1%)**	**5(17.2%)**	**3(11.1%)**	**13(9.5%)**		
Ok Sometimes	**29(32.2%)**	**15(51.7%)**	**17(36.2%)**	**16(55.2%)**	**17(63.0%)**	**57(41.6%)**		
I usually prefer this	**37(41.1%)**	**10(34.5%)**	**18(38.3%)**	**3(10.3%)**	**6(22.2%)**	**40(29.3%)**		
Must have	**20(22.2%)**	**1(3.4%)**	**11(23.4%)**	**2(6.9%)**	**1(3.7%)**	**26(19.0%)**		
Trail preferences uphill sections: Long / Hard / Steep Climbs (n = 333)								***50.42*****
I always avoid this	**1(1.1%)**	**1(3.4%)**	**0(0%)**	**9(31.0%)**	**2(8.0%)**	**12(8.8%)**		
I avoid if possible	**13(14.4%)**	**7(24.1%)**	**4(8.7%)**	**9(31.0%)**	**14(56.0%)**	**27(19.9%)**		
Ok Sometimes	**35(38.9%)**	**16(55.2%)**	**24(52.2%)**	**8(27.6%)**	**6(24.0%)**	**48(35.3%)**		
I usually prefer this	**24(26.7%)**	**3(10.3%)**	**10(21.7%)**	**1(3.4%)**	**2(8.0%)**	**26(19.1%)**		
Must have	**17(18.9%)**	**2(6.9%)**	**8(17.4%)**	**2(6.9%)**	**1(4.0%)**	**23(16.9%)**		

Please indicate your preferences for off-road cycle trails								
Trail preferences downhill sections: Slower / Gentle / Easy descents (n = 316)								***10.32***
I always avoid this	**8(9.5%)**	**2(6.7%)**	**3(7.0%)**	**0(0%)**	**1(4.0%)**	**5(4.7%)**		
I avoid if possible	**15(17.9%)**	**2(6.7%)**	**5(11.6%)**	**2(7.4%)**	**3(12.0%)**	**16(15.0%)**		
Ok Sometimes	**38(45.2%)**	**11(36.7%)**	**22(51.2%)**	**10(37.0%)**	**10(40.0%)**	**47(43.9%)**		
I usually prefer this	**13(15.5%)**	**9(30.0%)**	**4(9.3%)**	**11(40.7%)**	**7(28.0%)**	**22(20.6%)**		
Must have	**10(11.9%)**	**6(20.0%)**	**9(20.9%)**	**4(14.8%)**	**4(16.0%)**	**17(15.9%)**		
Trail preferences downhill sections: Fast / Smooth / Open / Clear descents (n = 331)								***5.18***
I always avoid this	**1(1.1%)**	**1(3.4%)**	**0(0%)**	**0(0%)**	**0(0%)**	**0(0%)**		
I avoid if possible	**2(2.2%)**	**1(3.4%)**	**1(2.2%)**	**0(0%)**	**1(3.8%)**	**1(0.8%)**		
Ok Sometimes	**18(20.2%)**	**8(27.6%)**	**11(23.9%)**	**9(32.1%)**	**7(26.9%)**	**29(22.0%)**		
I usually prefer this	**32(36.0%)**	**10(34.5%)**	**21(45.7%)**	**15(53.6%)**	**8(30.8%)**	**57(43.2%)**		
Must have	**36(40.4%)**	**9(31.0%)**	**13(28.3%)**	**4(14.3%)**	**10(38.5%)**	**45(34.1%)**		
Please indicate your preferences for off-road cycle trails								
Trail preferences downhill sections: Fast / Rough / Tight descents (n = 334)								***42.61*****
I always avoid this	**0(0%)**	**1(3.3%)**	**0(0%)**	**2(7.1%)**	**0(0%)**	**3(2.6%)**		
I avoid if possible	**1(1.1%)**	**3(10.0%)**	**2(4.2%)**	**8(28.6%)**	**2(7.7%)**	**7(6.1%)**		
Ok Sometimes	**7(8.0%)**	**7(23.3%)**	**11(22.9%)**	**11(39.3%)**	**8(30.8%)**	**29(25.4%)**		
I usually prefer this	**41(46.6%)**	**14(46.7%)**	**20(41.7%)**	**3(10.7%)**	**13(50.0%)**	**36(31.6%)**		
Must have	**39(44.3%)**	**5(16.7%)**	**15(31.3%)**	**4(14.3%)**	**3(11.5%)**	**39(34.2%)**		

Trail preferences downhill sections: Slower / Steeper / Technically difficult descents (n = 330)								***44.80*****
I always avoid this	**1(1.1%)**	**3(10.0%)**	**2(4.3%)**	**4(14.3%)**	**1(4.0%)**	**6(5.3%)**		
I avoid if possible	**3(3.4%)**	**8(26.7%)**	**4(8.7%)**	**15(53.6%)**	**5(20.0%)**	**9(7.9%)**		
Ok Sometimes	**24(27.6%)**	**10(33.3%)**	**11(23.9%)**	**4(14.3%)**	**10(40.0%)**	**42(36.8%)**		
I usually prefer this	**31(35.6%)**	**3(10.0%)**	**14(30.4%)**	**3(10.7%)**	**6(24.0%)**	**28(24.6%)**		
Must have	**28(32.2%)**	**6(20.0%)**	**15(32.6%)**	**2(7.1%)**	**3(12.0%)**	**29(25.4%)**		
Had you heard of 1 South West Cycle Adventure before this survey? (n = 343)								***27.21*****
Yes	**34(37.4%)**	**2(6.3%)**	**19(39.6%)**	**2(6.9%)**	**2(7.4%)**	**32(27.6%)**		
No	**57(62.6%)**	**30(93.8%)**	**29(60.4%)**	**27(93.1%)**	**25(92.6%)**	**84(72.4%)**		
If yes, how did you hear about it? (Multiple Response Frequency)								
1 South West Website	**13(35.1%)**	**0(0%)**	**6(25.0%)**	**2(66.7%)**	**2(100%)**	**11(29.7%)**		***6.61***
News / magazine article	**5(13.5%)**	**0(0%)**	**3(12.5%)**	**0(0%)**	**0(0%)**	**3(8.1%)**		***1.79***
1 South West information station /sign	**6(16.2%)**	**2(66.7%)**	**9(37.5%)**	**1(33.3%)**	**0(0%)**	**12(32.4%)**		***8.2***
Other website	**3(8.1%)**	**0(0%)**	**1(4.2%)**	**0(0%)**	**0(0%)**	**1(2.7%)**		***1.55***
Social media e.g. Facebook etc.	**2(5.4%)**	**0(0%)**	**1(4.2%)**	**0(0%)**	**0(0%)**	**3(8.1%)**		***1.06***
Other	**8(21.6%)**	**1(33.3%)**	**4(16.7%)**	**0(0%)**	**0(0%)**	**7(18.9%)**		***1.69***

Last year did you ride at any of the following off-road cycling sites in the South West? (Multiple Response Frequency)								
Tamar Lakes Country Park	**2(2.3%)**	**1(11.1%)**	**0(0%)**	**1(8.3%)**	**7(6.9%)**	**2(2.8%)**		***2.28***
Siblyback Lake Country Park	**1(1.1%)**	**1(11.1%)**	**2(6.1%)**		**3(2.9%)**	**2(2.8%)**		***5.32***
Moors Valley Country Park	**8(9.1%)**	**0(0%)**	**1(3.0%)**	**1(8.3%)**	**9(8.8%)**	**4(5.6%)**		***6.62***
Ashton Court	**18(20.5%)**	**3(33.3%)**	**13(39.4%)**	**1(8.3%)**	**19(18.6%)**	**5(7.0%)**		***26.04*** ***
Forest of Dean	**27(30.7%)**	**4(44.4%)**	**6(18.2%)**	**3(25.0%)**	**25(24.5%)**	**16(22.5%)**		***19.00****
Gawton Woodlands	**17(19.3%)**	**0(0%)**	**3(9.1%)**	**1(8.3%)**	**12(11.8%)**	**12(16.9%)**		***14.45*** ***
Other	**15(17.0%)**	**0(0%)**	**8(24.2%)**	**5(41.7%)**	**27(26.5%)**	**30(42.3%)**		***15.97***
What is your favourite purpose-built off-road cycling site? (Mode)	**Haldon Forest Park**	**Haldon Forest Park**	**Haldon Forest Park**	**Haldon Forest Park**	**Haldon Forest Park**	**Haldon Forest Park**		
Top 3 favourite purpose-built off-road cycling sites * Cut-off point for site options with < 2 responses								
1	**Haldon Forest Park (27.5%)**	**Haldon Forest Park (43.8%)**	**Haldon Forest Park (33.3%)**	**Haldon Forest Park (37.9%)**	**Haldon Forest Park (70.4%)**	**Haldon Forest Park (62.9%)**		
2	**Afan (25.3%)**	**Cannock Chase (6.3%)**	**Afan (18.8%)**	**Grizedale (10.3%)**	*****	**Afan (3.4%) / F.O.D (3.4%)**		
3	**Brechfa (5.5%)**	*****	**Coed Y Brenin (12.5%)**	*****	*****	**Gawton (2.6%)**		

General attitude statements regarding off-road cycling in the South west								
My main reason for visiting the South West is to ride these trails (n = 225)	**2.95**	**2.15**	**2.24**	**2.26**	**2.82**	**2.69**		***15.91*****
I am now inspired to visit other off-road sites in the South West (n = 306)	**3.38**	**3.16**	**3.13**	**3.16**	**3.52**	**3.30**		***12.09****
The South west needs more off-road cycling facilities (n = 297)	**3.68**	**3.47**	**3.50**	**3.40**	**3.67**	**3.62**		***8.50***
The South West is not a premium destination for off-road cycling (n = 214)	**2.82**	**1.93**	**2.71**	**2.44**	**2.75**	**2.28**		***22.03*****
Haldon Forest Park is a valuable public recreation facility (n = 335)	**3.76**	**3.81**	**3.83**	**3.66**	**3.74**	**3.82**		***4.91***
The off-road trails at Haldon Forest park are inspiring (n = 321)	**3.42**	**3.61**	**3.26**	**3.59**	**3.60**	**3.44**		***9.57***
Haldon Forest Park only caters for novice cyclists (n = 296)	**2.24**	**2.09**	**2.16**	**2.00**	**2.04**	**2.03**		***4.46***
Purpose built trails offer more exciting riding than public rights of way (n = 312)	**3.33**	**3.48**	**2.83**	**3.23**	**3.74**	**3.41**		***22.99*****
I prefer riding in rural environments than towns and cities (n = 330)	**3.50**	**3.48**	**3.54**	**3.56**	**3.62**	**3.62**		***0.72***
I prefer cycling off-road where I can follow a clearly signposted route (n = 303)	**3.05**	**3.03**	**2.50**	**3.39**	**3.52**	**3.11**		***31.97*****
Kruskall-Wallis Test, H, 5df, *Significant at - p≤.05,**Significant at - p≤.001,								
4 point Likert scale where 1 = strongly disagree, 4 = strongly agree								

Paying for off-road cycling facilities								
Did you pay to park at Haldon Forest park today? (n = 343)								***8.17***
Yes	**51(56.0%)**	**23(71.9%)**	**28(58.3%)**	**18(62.1%)**	**14(51.9%)**	**57(49.1%)**		
No	**14(15.4%)**	**7(21.9%)**	**11(22.9%)**	**8(27.6%)**	**6(22.2%)**	**26(22.4%)**		
Discovery Pass	**26(28.6%)**	**2(6.3%)**	**9(18.8%)**	**3(10.3%)**	**7(25.9%)**	**33(28.4%)**		
Did you find out how much it would cost you to park before visiting? (n = 192)								***11.23****
Yes	**10(19.2%)**	**1(4.3%)**	**6(21.4%)**	**7(36.8%)**	**4(28.6%)**	**20(35.7%)**		
No	**42(80.8%)**	**22(95.7%)**	**22(78.6%)**	**12(63.2%)**	**10(71.4%)**	**36(64.3%)**		
How would you describe the current parking charges for the trail facilities at Haldon Forest Park? (n = 189)								***4.75***
Very good value	**8(15.4%)**	**3(13.0%)**	**1(3.6%)**	**3(15.8%)**	**1(7.1%)**	**7(13.2%)**		
About right	**35(67.3%)**	**17(73.9%)**	**18(64.3%)**	**11(57.9%)**	**10(71.4%)**	**32(60.4%)**		
Over-priced	**9(17.3%)**	**3(13.0%)**	**9(32.1%)**	**5(26.3%)**	**3(21.4%)**	**14(26.4%)**		

How much would the parking fee have to have been to make you drive out of the car park? (n = 161)								
Mean / Modal Price	**Mean 5.86 / Mode 5.00**	**Mean 9.48 / Mode 5.00**	**Mean 5.56 / 5.00**	**Mean 5.94 / 5.00**	**Mean 5.60 / 5.00**	**Mean 6.48 / 5.00**		***6.56***
Attitude statements regarding paying for the off-road cycling facilities at Haldon Forest park								
I would not pay more to fund the development of new trails (n = 252)	2.15	2.19	2.10	2.33	2.17	2.22		1.28
I would pay more if the money was used for additional trail maintenance (n = 275)	3.25	3.07	3.06	3.00	3.09	3.01		10.50
I would pay more if the additional money provided better facilities (n = 264)	3.17	3.04	2.82	2.80	3.10	2.90		12.90*
Trail maintenance should be exclusively funded by off-road cyclists (n = 248)	2.24	2.00	2.03	2.00	2.00	2.08		4.13

	Active Trail Centre Explorers	Non Bike Owners	Active Off-road Explorers	Cycle Path Adventurers	New Trail Centre Riders	Active Trail Centred	Total	*H*
Cluster Descriptives	1	2	3	4	5	6		
Count	91	32	48	29	27	116	**343**	
% of cases	26.5	9.3	14	8.5	7.9	33.8	**100**	
Demographic information								
What is your gender? (n = 343)								37.40**
Male	85(93.4%)	19(59.4%)	46(95.8%)	17(58.6%)	23(85.2%)	94(81.0%)		
Female	6(6.6%)	13(40.6%)	2(4.2%)	12(41.4%)	4(14.8%)	22(19.0%)		
What is your age? (n = 343)								20.45**
16-24	6(6.6%)	3(9.4%)	3(6.3%)	0(0%)	5(18.5%)	9(7.8%)		
25-34	25(27.5%)	11(34.4%)	4(8.3%)	16(55.2%)	9(33.3%)	32(27.6%)		
35-44	31(34.1%)	10(31.3%)	19(39.6%)	5(17.2%)	9(33.3%)	43(37.1%)		
45-54	25(27.5%)	6(18.8%)	18(37.5%)	4(13.8%)	4(14.8%)	28(24.1%)		
55-64	4(4.4%)	1(3.1%)	3(6.3%)	4(13.8%)	0(0%)	3(2.6%)		
65+	0(0%)	1(3.1%)	1(2.1%)	1(3.4%)	0(0%)	1(0.9%)		
Mean age	39	37	42	40	34	38		

Gender / Age Cross tabulation (n = 284)								
Male								
16-24	5(5.9%)	1(5.3%)	3(6.5%)	0(0%)	5(21.7%)	9(9.6%)		
25-34	24(28.2%)	5(26.3%)	4(8.7%)	1(5.9%)	8(34.8%)	28(29.8%)		
35-44	28(32.9%)	7(36.8%)	18(39.1%)	9(52.9%)	7(30.4%)	31(33.0%)		
45-54	24(28.2%)	5(26.3%)	17(37.0%)	4(23.5%)	3(13.0%)	22(23.4%)		
55-64	4(4.7%)	1(5.3%)	3(6.5%)	3(17.6%)	0(0%)	3(3.2%)		
65+	0(0%)	0(0%)	1(2.2%)	0(0%)	0(0%)	1(1.1%)		
Female (n = 59)								
16-24	1(16.7%)	2(15.4%)	0(0%)	0(0%)	0(0%)	0(0%)		
25-34	1(16.7%)	6(46.2%)	0(0%)	2(16.7%)	1(25.0%)	4(18.2%)		
35-44	3(50.0%)	3(23.1%)	1(50%)	7(58.3%)	2(50.0%)	12(54.5%)		
45-54	1(16.7%)	1(7.7%)	1(50%)	1(8.3%)	1(25.0%)	6(27.3%)		
55-64	0(0%)	0(0%)	0(0%)	1(8.30%)	0(0%)	0(0%)		
65+	0(0%)	1(7.7%)	0(0%)	1(8.30%)	0(0%)	0(0%)		
Group composition								
Number of people under 16 years of age (Mean)	0.7	1.88	1.0	1.31	0.37	0.65		
Number of people over 16 years of age (Mean)	2.73	2.66	3.21	2.07	2.3	2.17		
Adult and under 16 group	17(18.7%)	12(37.5%)	12(25%)	14(48.3%)	5(18.5%)	31(26.7%)	91(26.5%)	0.00
Adult only group	74(81.3%)	20(62.5%)	36(75%)	15(51.7%)	22(81.5%)	85(73.3%)	252(73.5%)	12.80*

What is your ethnic group? (n = 342)								2.93
White	89(97.8%)	31(96.9%)	46(95.8%)	28(96.6%)	27(100%)	114(99.1%)		
Black or Black British	0(0%)	0(0%)	1(2.1%)	0(0%)	0(0%)	1(0.9%)		
Asian or Asian British	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)		
Mixed	2(2.2%)	1(3.1%)	1(2.1%)	0(0%)	0(0%)	0(0%)		
Chinese	0(0%)	0(0%)	0(0%)	1(3.4%)	0(0%)	0(0%)		
Other	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)		
What is your highest educational qualification? (n = 341)								0.22
No qualifications	4(4.4%)	1(3.1%)	1(2.1%)	0(0%)	0(0%)	4(3.5%)		
Level 1	17(18.9%)	4(12.5%)	7(14.6%)	6(20.7%)	8(29.6%)	28(24.3%)		
Level 2	17(18.9%)	2(6.3%)	6(12.5%)	5(17.2%)	6(22.2%)	24(20.9%)		
Level 3	52(57.8%)	25(78.1%)	34(70.8%)	18(62.1%)	13(48.1%)	58(50.4%)		
What best describes what you usually do during the week? (n = 340)								12.87*
Employed full-time	79(88.8%)	25(78.1%)	42(89.4%)	18(62.1%)	23(85.2%)	96(82.8%)		
Employed part time	4(4.5%)	3(9.4%)	2(4.3%)	6(20.7%)	2(7.4%)	11(9.5%)		
In full time education	3(3.4%)	3(9.4%)	0(0%)	0(0%)	1(3.7%)	2(1.7%)		
Looking after home / family	1(1.1%)	0(0%)	0(0%)	2(6.9%)	1(3.7%)	5(4.3%)		
Retired	2(2.2%	1(3.1%)	2(4.3%)	3(10.3%)	0(0%)	2(1.7%)		
Unemployed	0(0%)	0(0%)	1(2.1%)	0(0%)	0(0%)	0(0%)		

What is your total annual household income? (n = 319)								3.72
Under £15,000	4(4.4%)	4(13.8%)	2(4.3%)	0(0%)	2(8.7%)	5(4.6%)		
£15,000 - £29,000	18(20.0%)	5(17.2%)	9(19.6%)	6(26.1%)	9(39.1%)	29(26.9%)		
£30,000 - £44,999	26(28.9%)	6(20.7%)	11(23.9%)	5(21.7%)	5(21.7%)	27(25.0%)		
£45,000 - £59,000	16(17.8%)	6(20.7%)	11(23.9%)	7(30.4%)	3(13.0%)	19(17.6%)		
£60,000 - £74,999	22(24.4%)	6(20.7%)	8(17.4%)	3(13.0%)	1(4.3%)	14(13.0%)		
£75,000 and over	4(4.4%)	2(6.9%)	5(10.9%)	2(8.7%)	3(13.0%)	14(13.0%)		
Mean household income	£44,644	£42,482	£45,923	£45,043	£36,912	£43,249		
NRS grades for occupation of main wage earner (n = 343)								3.50
Grade A	20(22.0%)	11(34.4%)	19(39.6%)	9(31.0%)	5(18.5%)	34(29.3%)		
Grade B	30(33.0%)	9(28.1%)	8(16.7%)	5(17.2%)	3(11.1%)	25(21.6%)		
Grade C1	3(3.3%)	2(6.3%)	5(10.4%)	5(17.2%)	3(11.1%)	11(9.5%)		
Grade C2	13(14.3%)	2(6.3%)	5(10.4%)	3(10.3%)	4(14.8%)	14(12.1%)		
Grade D	2(2.2%)	0(0%)	0(0%)	0(0%)	1(3.7%)	3(2.6%)		
Grade E	2(2.2%)	1(3.1%)	1(2.1%)	2(6.9%)	0(0%)	0(0%)		
Not Graded	0(0%)	1(3.1%)	0(0%)	0(0%)	0(0%)	1(0.9%)		

NRS + Pensioner Classification for occupation of main wage earner (n = 343)								3.50
Grade A	20(22.0%)	11(34.4%)	19(39.6%)	9(31.0%)	5(18.5%)	34(29.3%)		
Grade B	30(33.0%)	9(28.1%)	8(16.7%)	5(17.2%)	3(11.1%)	25(21.6%)		
Grade C1	3(3.3%)	2(6.3%)	5(10.4%)	5(17.2%)	3(11.1%)	11(9.5%)		
Grade C2	13(14.3%)	2(6.3%)	5(10.4%)	3(10.3%)	4(14.8%)	14(12.1%)		
Grade D	2(2.2%)	0(0%)	0(0%)	0(0%)	1(3.7%)	3(2.6%)		
Grade E	2(2.2%)	0(0%)	0(0%)	0(0%)	0(0%)	3(2.6%)		
State Pensioner	0(0%)	1(3.1%)	1(2.1%)	2(6.9%)	0(0%)	0(0%)		
Not Graded	0(0%)	1(3.1%)	1(2.1%)	0(0%)	0(0%)	1(0.9%)		
Kruskall-Wallis Test, *H*, 5df, *Significant at - p≤.05,Significant at - p≤.01,**								