Received: 5 December 2017 | Revised: 28 June 2018 | Accepted: 2 July 2018
DOI: 10.1002/jtr.2228

RESEARCH ARTICLE

WILEY

Investigating value added from heritage assets: An analysis of landmark historical sites in Wales

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Funding information
Original research for this project was funded by Welsh Government

Abstract

We reveal how tourist visitation to similar historical sites supports different levels of local gross value added (GVA). The paper shows how information on tourism activity at few historical sites can be used to analyse causal recipes defining whether sites support relatively high/low levels of GVA. Fuzzy-set qualitative comparative analysis is employed to offer perspectives not possible with other analytical methods. The study reveals that for a set of similar heritage sites, that factors supporting local economic impacts are complex and with this having ramifications for management interventions around sites that seek to boost the economic impacts of visitation.

KEYWORDS

fuzzy-set qualitative comparative analysis (fsQCA), heritage sites, visitor impacts, Wales

1 | INTRODUCTION

This paper provides an analysis of how tourist visitation to a group of heritage assets (historical sites and castles) works to support local gross value added (GVA). The analysis reveals that visitation to similar historical sites actually supports very different levels of economic activity. While the paper works to contribute to the evidence base on the economic impacts of visitation to heritage assets, it also seeks to investigate the reasons why tourism to the different historical sites supports different levels of GVA. The paper also illustrates how even information on tourism spending and activity at relatively few historical sites can be used to systematically analyse the causal recipes that define whether a site will support relatively high or low levels of GVA. In the case the small number of sites examined made traditional econometric and cluster type analysis impractical in furthering the analysis. However, the paper reveals how fuzzy-set qualitative comparative analysis (fsQCA) can be employed to offer analytical perspectives that would not have been possible with other analytical methods.

The fsQCA method is used in the paper to show that the causal conditions defining whether sites might be associated with relatively high-GVA or low-GVA supported per visitor are actually complex. The method provides a valuable means of understanding the different configurations of activity that can be associated with both high and low levels of GVA per visitor at the case sites. Fundamentally, there are different routes to how heritage sites support tourism value added. The practical implications of the findings for management of heritage sites are investigated in the conclusions to the paper. The paper then seeks to contribute to the research literature on the economic value of heritage tourism in two ways: first, by showing that the factors supporting the local economic effects of tourism at similar heritage sites are complex and vary by site; second, by demonstrating how an economic impact assessment based on input–output methods can be improved upon to gain a structured understanding of the causal recipes leading to impact, and with this offering valuable perspectives for management through the use of the fsQCA method.

The remainder of the paper is structured as follows. Section 2 provides background to the paper in terms of the connections between heritage assets and regional economic development. Section 3 introduces the case material on Wales and examines how visitation to heritage sites in rural parts of Wales supports regional economic activity. The section shows that similar heritage assets support very different levels of economic activity. In Section 4, we introduce the fsQCA method through which the historical heritage assets are grouped in terms of causal recipes that describe their ability to induce regional economic activity from visitor spending (here in terms of high-GVA and low-GVA supported per visitor) and the results from employing the method. Section 5 contains discussion of the findings and concludes.

2 | BACKGROUND

There has been a great deal of research to explore the economic effects associated with different types of tourist, and how tourism spending supports (or sometimes does not support) local economic activity. In terms of analytical means of understanding the wider economic effects associated with tourism spending, the framework of tourism satellite accounts (TSA) has been particularly useful, and with input–output frameworks also being commonly used to reveal the indirect and induced effects connected with different types of tourism spending (Frechtling, 2010; UNWTO, 2008).

The analytical input–output framework has been widely used in the study of visitation specifically linked to heritage sites and to cultural events. For example, in a recent paper, Parga-Dans and Alonso-Gonsalez (2018) examined the direct and indirect economic effects of reopening a cave at the Altamira World Heritage site and employed an input–output method to estimate the value of activity supported in Cantabria. Bryan, Munday, and Bevins (2012) also used input–output methods to investigate the economic activity supported by visitation to national museums sites in Wales. Çela, Lankford, and Knowles-Lankford (2009) also employed an approach based on input–output frameworks to examine visitation to a national heritage area in the United States. Studies grounded in input–output frameworks can have a role in revealing, to different types of stakeholders, the value of heritage tourism, to gain buy-in for new developments, and as one means of providing evidence of benefits to set against costs, particularly where heritage sites are under different types of pressures. Çela et al. (2009) make the point that the more discretionary characteristics of spending at heritage sites makes it important for tourism planners to understand visitor expenditure patterns.

The analysis of the role of heritage tourism in more peripheral areas might be particularly relevant. Researchers have argued that the analyses of the consumption of heritage as a means of economic regeneration have perhaps been too focused on urban areas. In these cases, heritage tourism might be seen as a means of bringing spending power to cities and looked on positively by inward investors (see Aas & Ladkin, 2005; Chang, Milne, Fallon, & Pohlmann, 1996; MacDonald & Jolliffe, 2003; Richards, 1996). However, these types of effects are also important for more peripheral areas. Heritage tourism has been viewed as a means of reversing the problems of older industrial areas caused by declines in heavy resource intensive industry and manufacturing and as a means of providing new economic opportunity in areas of high unemployment. The ways through which tourism expenditure supports local economic activity may be particularly important in more rural and peripheral areas, or areas where structural change has left a legacy of old industrial assets. Pérez-Alvarez, Torres-Ortega, Díaz-Simal, Husillos-Rodríguez, and De Luis-Ruiz (2016) show, for example, the important role of heritage tourism in boosting economic prospects in old mining areas. Moreover Fonseca and Ramos (2012) draw attention to how heritage tourism can assist in addressing economic issues in more peripheral areas where there are few alternative avenues in improving economic prospects. While heritage tourism may provide a developmental route for periphery areas, positive economic impacts levered from increased, or more targeted, visitation to heritage sites cannot be guaranteed but have to be planned and managed. For example, Urry (1990) showed, in the United Kingdom case, that the growth of the heritage industry has increased tourism (particularly international visits). However, it is only selected sites which fully benefit due to the importance of bespoke factors, including the quality of the attractions, transportation infrastructure, accessibility of media information, and competition from adjacent similar attractions. Urry (1990) however suggests that even in the most disadvantaged, peripheral, or rural locations, heritage can potentially be mobilized to gain competitive advantage in a “race” between places.

Then, the visitation linked to heritage tourism could be important in economic development processes, and with techniques such as input–output analysis one means of establishing the levels of local GVA that might be dependent on tourism spending. However, while visitor expenditure surveys accompanied by input–output economic modelling can show up differences between heritage sites in their ability to support local value added, it may not provide enough information to planners about the causal recipes at different sites. In particular are the characteristics leading to relatively high value added per heritage site visitor the same across sites, or do these factors differ across sites? Although econometric techniques and cluster analysis might provide some insights into the common determinants of the higher value added supported per visitor at a range of sites, such techniques might not be best placed to show planners the different routes that lead to similar outcomes. Moreover, econometric and cluster analysis techniques may be less than useful where the number of site observations is limited.

In the case that follows these problems were very evident. The case that follows reveals a series of historical sites where it was possible to use visitor spending surveys and input–output methods to explore how the sites differed in their ability to support high levels of value added per visitor. However, a further layer of analysis was required to explore whether there were different routes to high value added per visitor. In this process, the fsQCA analysis was found to provide insights not offered by simple cluster or econometric analysis.

3 | ECONOMIC ACTIVITY SUPPORTED BY VISITATION TO LANDMARK HERITAGE SITES IN WALES

3.1 | Case, data, and method

The analysis presented in this section is based on information collected to evaluate the economic return of European Union (EU) funding used to support visitation around heritage in Wales (Welsh Economy Research Unit, 2015). Over 150 tourism-facing sites and initiatives in Wales received funding under the “Environment for Growth” theme of the 2007–2013 EU Structural Funding round, including sites related specifically to heritage tourism. Estimating the economic impact of visitor sites, however, presented distinct challenges: Many of the economic impacts of visitation do not occur at the site, but more widely throughout the regional economy, as visitors spend money on accommodation and other services away from the heritage site in question. Meanwhile, heritage sites themselves will have impacts away from their immediate location through their purchases of goods and labour.

The assessment of the economic impacts of spending by visitors to identified heritage sites was assisted by visitor spending surveys collected at sites (see Table 1 for the breakdown of surveys undertaken to support the research). The sites comprised castles, one bishop's palace, two Iron Age fortress sites, and a UNESCO recognized industrial heritage site.

TABLE 1 Heritage Site Visitor Surveys undertaken

Description	Survey (2013)
Blaenavon Ironworks Historical industrial site. Ironworks of importance in the development of the steel industry and innovative processes.	104
Caernarfon Castle Edwardian castle in north-west Wales cared for by Cadw (Welsh Government's historic environment service).	249
Caerphilly Castle Castle in industrial south Wales constructed by Gilbert de Clare in the 13th century.	196
Conwy Castle Built by Edward I in 13th century on north coast of Wales. Fortress played key part in several wars and was a refuge for Richard II in 1399.	212
Harlech Castle Fortress in Gwynedd, north Wales. Built by Edward I in 13th century. Recognized as an excellent example of early European military architecture.	90
St Davids Bishops Palace In Pembrokeshire (south west Wales). An ancient cathedral with remains of bishop's palace nearby.	141
Carew Castle Norman castle in Pembrokeshire with origins around 1100, but with present structure dating from around 1270.	130
Castell Henllys Archaeological site in north Pembrokeshire comprising Iron Age hillfort and exercise in reconstruction archaeology whereby experiments in prehistoric farming have been practised.	168
Pembroke Castle In Pembroke, West Wales and dating from 1093. William Marshal, one of the most powerful men in 12th-century Britain, rebuilt the castle in stone creating most of the current structure.	100
Dinefwr Castle Castle at Llandeilo above River Twyi in Carmarthenshire. Built in 12th century and on National Trust property.	73
Dinas Emrys Wooded hillock near Beddgelert in Gwynedd, north-west Wales. Some remains of the Iron Age hillfort and castle structures.	130
Carreg Cennen Castle Remains of castle in the village of Trap, near Llandeilo in Carmarthenshire within the Brecon Beacons National Park. Positioned above a limestone precipice.	107
Criccieth Castle In North West Wales. Built by Llywelyn the Great of the kingdom of Gwynedd but modified following its capture by English forces of Edward I in the late 13th century.	184
Denbigh Castle Built in north Wales following the 13th-century conquest of Wales by Edward I.	106

The funding secured under the Environment for Growth umbrella provided an opportunity to help individual site managers address some of the difficult economic measurement issues they face. At the same time, it provided an opportunity to ensure that impacts were reported consistently, and hence comparably, across the supported projects through the use of a shared suite of questionnaires. The visitor spending survey was designed to record expenditure, by item, for respondents—with these data later being aggregated into categories by the research team (e.g., food and drink, transport, accommodation, souvenirs, high street shopping, recreation, and entertainment). The visitor spending survey was also designed to capture data on non-spend trip related items including the purpose of visit to the heritage site (leisure trip from home, leisure trip as part of a longer break, business purposes, etc.); make-up of party (by age), whether the trip involved an overnight stay; mode of transport to the site; regularity of visit to the site (first-timer, repeat visitor); and site satisfaction (enjoyment of visit, rating of facilities and staff). Visitors who had spent the previous night in Wales away from home were asked supplementary questions on their accommodation and spend.

The direct economic impact of this visitor expenditure in the region occurred, for example, as visitors purchased food and drink, paid for parking, and met accommodation costs. However, an estimate of direct effects only covers part of total impact. There was also a need to consider how the visitor spending supported regional economic activity (in Wales) indirectly. Expenditure by visitors requires outputs from other Welsh industries. For example, visitors stay in local B&Bs/guesthouses, and purchases are made by these accommodation providers from local farms or wholesalers to provide their services. This regional sourcing then in turn leads to further regional spending by the local farms and so on. The extent of these supplier effects, then, depends on the level of regional sourcing for the particular sector and on the levels of regional sourcing by its suppliers. Additionally, visitor spending adds to local incomes, the large part of which will likely be spent in the region. These induced-income effects can be added to supplier effects to estimate the total indirect consequences of the direct local economic activities (for an explanation of these indirect and induced effects associated with Welsh tourism spend, see, e.g., Jones, Munday, & Roberts, 2003).

Economic impacts, levered by visitors to the sites, were expressed in terms of spending (output), GVA, and employment. To estimate indirect economic impact, it was necessary to use a model of the Welsh economy which showed how different types of consumption spending created supplier and induced-income effects across different sectors of the Welsh economy. The input–output tables for Wales provided such a framework (Jones, Bryan, Munday, & Roberts, 2010). It is accepted that there are issues using input–output tables for this type of analysis because of the general assumptions of the simple model (see, e.g., Miller & Blair, 2009, who review the general limitations of the input–output model).

In addition to the input–output tables, the analysis also used the TSA for Wales 2010 (produced by Cardiff University for Visit Wales; see Jones et al., 2003 for description of this work). Using this tool, further analysis was possible on aspects of tourism's economic significance. The TSA provided information on tourism's direct economic importance to Wales, including an employment module detailing how tourism directly supports Welsh employment. The TSA allowed the estimation of tourism direct gross value added. This variable shows how much of the total GVA created in Wales is as a result of tourists' spending before, during, or after trips to Wales.

Visitor volume estimates were combined with data from the visitor spending surveys and then with modelling of the indirect impacts of visitor spending. This provided a gauge of the effects associated with visitation to the individual heritage sites. The visitor volume estimates were combined with data from structured visitor spending surveys by, first, for each site, taking the total annual visitor volume and applying age-related data from the visitor spending survey to calculate the total number of annual adult visits. Here, adults were defined as people of 16 years of age or older. Then, the average expenditure per adult visit derived from the visitor spending survey was multiplied by the total number of annual adult visits to calculate a total annual gross spending figure for each site. The breakdown of gross spending by component (e.g., food and drink, transport, accommodation, souvenirs, high street shopping, recreation, and entertainment) was derived by applying the proportion of spend for each component found in the visitor spending survey, to the total gross spend. Following this, indirect impacts of visitor spending were modelled to provide a gauge of the effects associated with visitation to individual heritage sites.

Key issues here were double counting and additionality. Although the visitor spending survey asked respondents their motivation for the visit, this was constructed around relatively narrow categories. These consisted of leisure trip from home; leisure trip as part of a longer break or holiday; volunteering; routine work purposes; nonroutine business purposes; and other. It was not possible, therefore, to identify visitors who on the day they were questioned had the sole purpose to visit heritage sites and who consequently may have visited 2 (or more) of the 14 sites on that day, leading to them being double counted in the analysis. Then, an individual survey respondent may only in part be motivated to visit the region because of that specific heritage attraction—or indeed may visit more than one attraction during the same regional trip. Counting whole-trip impact would therefore overestimate impact associated with the heritage site. Here then a single day's impact was allocated (including one night's accommodation for staying visitors) to a heritage site visit, that is, assuming only that the visit to the heritage site is the main motivator for that day's activities. Information gathered on the length of time spent at the site and on multi-destination trips was used to test the reasonableness of this assumption.

Displacement also serves to lower the net additional impact of the EU supported activity. For tourism in this regional context, displacement largely refers to how far visitors have been attracted away from other Welsh attractions—and if this is the case, it offers little additional economic impact. It was not possible to systematically adjust the questionnaire returns to account for this element. It is therefore accepted that if there was some displacement from other Welsh sites that is not accounted for in the estimates that follow.

3.2 | Economic impact of visitation

Table 2 provides an overview of economic impact associated with visitation to the sites identified in Table 1. In developing the estimates in these tables, it was necessary to gross up the information in the visitor surveys to the overall visitor numbers at each site over a year, or season, as appropriate. As highlighted above, the information on tourism spending at the sites becomes an input into an economic model for Wales. This economic model generates an estimate of the GVA and employment connected to the tourist visits.

Table 2 first provides an estimate of the site visitor total trip impact. Here, for example, a visit to the heritage site might only take up 1 day of a 3-day visit. However, we first account for the economic impact associated with the whole trip. The heritage site in question clearly represents just part of the visit, but it is important to consider the type and impact of visitors to (and in) Wales that heritage sites are helping to attract (and retain). Table 2 also provides an estimate of the economic effects associated with the visit to the heritage site itself. These are the effects associated with visitor spending at the site, and those directly attributable to it (a single day's impact, e.g., including one night's accommodation for staying visitors).

The economic impact is reported in terms of GVA and supported employment. It is important to note that the employment estimates in the second panel do not link directly to full-time equivalent employment at the respective sites. Rather, the economic impact numbers reveal the direct and indirect employment impacts associated with the tourism spending as a whole, reported as full-time equivalent employment supported per £ of different types of tourism spending in Wales for a given year.

There are a series of determinants of the scale of visit-led economic impacts. Fundamentally, this reflects differences in spending patterns from day trips as opposed to staying visitation, and then precisely what tourists spend money on. In the case of site-supported economic effects, this is inevitably bounded by the supply side around sites and events. Some heritage sites featured few opportunities to purchase goods and services. This was often with good reason, to preserve the services deriving from the environmental assets at sites. For these reasons, care needs to be exercised in comparing sites on the economic impact numbers. Smaller on-site impacts may not be a bad news story.

Analysis of Table 2 reveals that visitor numbers to the selected sites varied considerably from around 1,900 in the case of Dinas Emrys (Beddgelert) to 176,000 in the case of Conwy Castle in North Wales. The table also reveals major differences in the proportion of visitors that reported that they were staying away from home during the visit, with this being one factor expected to increase levels of regional spending associated with the trip.

Table 2, for example, shows that for Caernarfon Castle, total visitor expenditure during the trip supported around £13.3 m of GVA, which was estimated to be connected to 595 full-time equivalent jobs in the region. However, as stressed earlier, this does not really hint at the site-supported impacts, that is, what might more reasonably be associated with the heritage site itself. Recall that, in some cases, these economic impacts could reflect spending that is away from the site itself but within the region. Table 2 also reports estimated site-supported effects. Recall also that the GVA and employment

TABLE 2 The economic impacts connected to visitation to Welsh heritage sites

	Carew Castle 2013	Castell Henllys 2013	Pembroke Castle 2013	Dinefwr Castle 2013	Dinas Emrys 2013	Blaenavon Ironworks 2013/2014	Caernarfon Castle 2013/2014	Caerphilly Castle 2013/2014	Carreg Cennen 2013/2014	Conwy Castle 2013	Criccieth Castle 2013/2014	Denbigh Castle 2013/2014	Harlech Castle 2013/2014	St Davids Palace 2013/2014
Annual visitors	30,992	24,310	83,867	59,844	1,933	18,867	167,860	110,954	17,161	176,231	40,574	13,461	74,335	32,454
Questionnaires completed	130	168	100	73	130	104	249	196	107	212	184	106	90	141
Number in respondents' parties	449	671	384	251	420	314	1,215	628	301	929	699	318	287	430
Staying away from home in Wales (%)	86.8	71.7	81.0	65.8	92.3	65.4	79.9	57.1	47.7	75.5	97.3	66.0	86.7	78.7
Economic impact														
Total trip														
Gross value added	£2,257,000	£1,749,800	£5,514,300	£4,538,800	£129,100	£1,082,900	£13,274,600	£4,978,500	£863,600	£11,493,300	£3,124,500	£448,400	£5,288,000	£2,894,800
Supported employment: FTE	101	78	246	202	6	49	595	224	39	516	140	20	237	130
GVA to create each job	£22,347	£22,433	£22,416	£22,469	£21,517	£22,100	£22,310	£22,225	£22,144	£22,274	£22,318	£22,420	£22,312	£22,268
Visits to create each job	307	312	341	296	322	385	282	495	440	342	290	673	314	250
Total trip GVA per visitor	£72.83	£71.98	£65.75	£75.84	£66.79	£57.40	£79.08	£44.87	£50.32	£65.22	£77.01	£33.31	£71.14	£89.20
Directly attributable to site														
Gross value added	£262,900	£256,970	£819,700	£862,600	£26,250	£242,800	£2,659,500	£1,545,100	£170,000	£3,177,500	£609,300	£181,800	£1,151,400	£639,000
Employment FTEs	14	14	44	46	1.4	13	142	82	9.5	178	33	10	63	34
GVA to create each job	18,779	18,355	18,630	18,752	18,750	18,677	18,729	18,843	17,895	17,851	18,464	18,180	18,276	18,794
Visits to create each job	2,214	1,736	1,906	1,301	1,381	1,451	1,182	1,353	1,806	990	1,230	1,346	1,180	955
On-site GVA per visitor	£8.48	£10.57	£9.77	£14.41	£13.58	£12.87	£15.84	£13.93	£9.91	£18.03	£15.02	£13.51	£15.49	£19.69

TABLE 3 Outcome and condition variables employed in the analysis

	Outcome variable	Condition variables				
		Personal attributes		Location attributes		Site attributes
	1. GVA per visitor (£s)	2. Adult visitors as a percentage of all visitors (%)	3. Percentage of visitors who were first time visitors (%)	4. Employee jobs in visitor services locally (within 25 miles [40 km]; employees)	5.Other attractions within local vicinity (25 miles [40 km]) having 50,000+ visits per year (attractions)	6. Renown/ Importance of site (graded on a scale of 1 to 6 [1 = *low*; 6 = *high*])
Carew Castell	**8.48**	**75.1**	**73.4**	9,610	**3**	**1**
Castell Henllys	**10.57**	**63.9**	**62.7**	11,760	**3**	**2**
Pembroke Castle	**9.77**	**62.5**	**79.0**	8,535	**3**	**3**
Dinefwr Castle	**14.41**	**82.1**	**63.0**	19,485	**5**	**2**
Dinas Emrys	**13.58**	**75.2**	**43.8**	15,090	**16**	**3**
Blaenavon Ironworks	**12.87**	**72.9**	**78.8**	47,685	**21**	**6**
Caernarfon Castle	**15.84**	**81.4**	**63.0**	14,020	**19**	**6**
Caerphilly Castle	**13.93**	**68.5**	**67.3**	53,160	**21**	**4**
Carreg Cennan	**9.91**	**81.1**	**63.5**	20,447	**10**	**2**
Conwy Castle	**18.03**	**77.2**	**60.4**	17,848	**20**	**6**
Criccieth Castle	**15.02**	**63.2**	**72.3**	9,255	**12**	**3**
Denbigh Castle	**13.51**	**72.3**	**72.7**	20,067	**16**	**4**
Harlech Castle	**15.49**	**69.7**	**68.9**	8,340	**7**	**6**
St Davids Palace	**19.69**	**87.9**	**68.1**	7,000	**3**	**4**

estimates reported in Table 2 are picking up on both the direct, indirect, and induced effects associated with visitor spending connected to their visits to these heritage sites.

Regional GVA supported by visitation to the 14 sites varied from £26,250 in the case of Dinas Emrys in rural North Wales, to around £3.2m in the case of Conwy Castle. The information contained in Table 2 may be important for regional authorities investing in heritage assets revealing how site specific visitation links through to regional GVA and employment opportunities.

As well as providing indicators in terms of the site visits required to create a Welsh full-time equivalent job, the Table also shows variation in regional GVA generated per visitor by spending connected to the visit itself (but note earlier assumptions on what might reasonably be credited to a site visit). This varies from £8.48 in the case of Carew Castle in West Wales to a high of £19.69 in the case of St David's Bishops Palace also in West Wales. There is clearly some interest in explaining this variation in GVA per visitor, but the potential for undertaking any systematic analysis is somewhat reduced by the very small number of sites.

Table 3 reveals potential person, location, and site variables which might be used to explain some of the variation in site-supported GVA per visitor shown in Table 2. The personal attributes data were derived from the visitor surveys completed at the sites, whereas data on location attributes were derived from secondary statistical data.[1]

Historic character and the renown of sites (rated simply Low 1 to High 6 and based on a combination of identified site renown factors including uniqueness of attraction, key historical events at site, and whether having UN Heritage site status) have been found to be an important factor driving site visits (Kerstetter, Confer, & Graefe, 2001). Moreover, research has revealed that people with an interest in visiting heritage or cultural sites (i.e., "heritage tourists") tend to stay longer, spend more, are more highly educated, and have a higher average annual income than the general traveller (see Travel Industry Association, 1997). It is accepted that this is not a universal conclusion in relation to the value of heritage tourists to the local economy (see Staiff, Bushell, & Watson, 2013) and that there may be important differences between "heritage tourists" and "tourists at heritage sites." Notwithstanding this, indicators of high renown, such as attaining World Heritage Status, have been shown to alter the visitor profile of a site and increase the prospects of drawing higher spending individuals interested in culture.

Within Table 3, and under personal attributes, are variables relating to adult visitors as a percentage of all visitors, with the expectation that sites leveraging larger numbers of children (under 16 in age) would feature lower GVA per visitor. Another variable relates to the percentage of visitors that were first time. Visitors coming to a site for the first time might purchase more goods and services resulting from the novelty of the first visit and may even be spending more because of inexperience of cheaper options (see also Del Chiappa, Tinaz, & Michele Turco, 2014; Hennessey, Dongkoo, & Macdonald, 2012, for different spending patterns of first time visitors).

Table 3, under location attributes, reveals other facets expected to be connected to GVA supported per visitor. For example, the strength of the local tourism supply side is proxied by employee jobs in the locality of the built heritage. There is some association between this variable and the presence of other attractions in the locality that

[1]Employee jobs in visitor services locally derived from Business Register Employment Survey, ONS (as published on StatsWales). https://statswales.wales.gov.uk/Catalogue/Business-Economy-and-Labour-Market/People-and-Work/Employment/Jobs/Employees-Only/Business-Register-and-Employment-Survey-SIC2007/EmployeeJobsInTourismRelatedIndustries-by-Area-Year Other attractions within local vicinity-Visits to Tourist Attractions in Wales 2013, Report for Visit Wales (Welsh Government) by Beaufort Research. http://gov.wales/docs/caecd/research/2014/140923-visits-tourist-attractions-2013-revised-en.pdf

cater for large numbers of visitors (over 50,000 per annum). In both cases, the strength of the supply side in the locality may provide more opportunities for spending associated with the heritage site visit.

In what follows, we show how selected of the identified conditions can be used to examine causal recipes leading to high-GVA or low-GVA per visitor outcomes at the identified heritage sites. The notion of high-GVA and low-GVA suggested here is a feature of the employment of the specific method (fsQCA) and its set-theoretic approach to analysis, in that the method allows openness to possible asymmetrical relationships between causal conditions and outcomes (Fiss, Sharapov, & Cronqvist, 2013). Then, the presence and the absence of the outcome, respectively, may require different explanations (see Berg-Schlosser, De Meur, Rihoux, & Ragin, 2009). Therefore, in the next section, analysis is undertaken with regard to each of high-GVA and low-GVA outcomes separately.

4 | ANALYSIS OF BUILT HERITAGE SITES OF CONDITIONS AND GROSS VALUE ADDED

4.1 | Fuzzy-set qualitative comparative analysis

FsQCA is used to examine selected data from Table 3 to provide a more systematic analysis of the causal recipes linked to the regional GVA supported by the visitation to the historic heritage sites. This method is evolving as an important tool in tourism economic analysis in the analysis of causal configurations (see recently, e.g., Pappas, 2017; Olya & Gavilyan, 2016).

FsQCA offers a set-theoretic approach to causality analysis, in respect of conditions and an outcome (Ragin, Epstein, Duerr, & Kenworthy, 2008).[2] The method is of potential value here because of its flexibility to deal with relatively small data sets (here 14 heritage sites), and the asymmetric nature of analysis, whereby the limits of an outcome variable are considered in separate analyses (as described in Section 3.2—for the GVA per visitor outcome, this can be partitioned into consideration of each of high-GVA and low-GVA cases). FsQCA is then a means of exploring set relations. The method works to initially transform a set of variables expected to be determinants of an outcome (such as here high-GVA per visitor to a heritage site) into set representation (such as the level of membership to a renowned heritage site). The method then allows a better understanding of the combination of causal sets that make-up a subset of the outcome set.

FsQCA has particular value here as distinct from regression analysis (see Vis, 2012, for comparative discussions). For example, while a simple regression explores the effects of changes in independent variables on a dependent variable, the fsQCA method allows the investigator to examine the combined conditions that lead to an outcome (such as higher regional GVA levels supported per visitor). Moreover, the fsQCA method is better suited to problems where there are relatively small numbers of observations and allows the analyst to explore whether there are different combinations of factors that lead to a given outcome.

[2]FsQCA v2.5 software is employed in the analysis undertaken in this section (see Ragin et al., 2008).

To enable the fsQCA analysis of the heritage site data (see Table 3), the condition and outcome variable values need to be transformed (calibrated) into representing memberships of relevant sets, using their continuous scale values, in the form of fuzzy membership scores (see Ragin, 2008). This is allowing for the fact that a heritage site's membership of a set might be by degree, rather than strictly "in" or "out" of the set. Each variable has a respective fuzzy membership score within a 0.0–1.0 domain, that is, with the limits representing 0.0 (full exclusion "non-membership" from a set) and 1.0 (full inclusion "membership"). Clearly, calibration is a key issue here for the continuous variables described in Table 3, and we adopt a popular transformation process, the direct method (see Ragin, 2008). This requires three threshold qualitative anchors for full membership (upper threshold), full non-membership (lower threshold), and the crossover point. These are then used within log-odds formulae to create the necessary membership scores. Evaluation of the three qualitative anchors here follows the approach presented in Andrews, Beynon, and McDermott (2016) and Beynon, Jones, and Pickernell (2016). This approach involves the identification of the 5th percentile (lower threshold), 95th percentile (upper threshold), and 50th percentile (cross-over point) values, based on a constructed probability density function graph for each variable.

Based on the qualitative anchors found for each continuous condition variable, adult visitors, first time, other attractions, and outcome GVA, the respective fuzzy membership scores can be found for each case's variable values. For the case of renowned importance, the 1 to 6 scales were transformed to the membership scores values, 0.0, 0.2, 0.4, 0.6, 0.8, and 1.0.

4.2 | RESULTS

In what follows, the fsQCA based findings over the considered four condition variables (adult visitors, first time visitors, other attractions, and renown) are outlined.[3] The first stage of results using fsQCA is elucidation of the associated fuzzy set data, undertaken through a truth table (see Table 4). The truth table reveals all the different combinations of condition attributes that are connected to the outcome, that is, separately considering high-GVA or low-GVA per visitor—as described previously. This is used to synthesize the results of fuzzy-set analyses of the logically possible configurations of a given set of causal conditions (see Ragin, 2008).

Rows in Table 4 represent configurations based on the considered four condition variables, through considering case strong membership to a configuration (membership score values below and above 0.5 are assigned the values 0 and 1, respectively). Recall that there are four condition variables in Table 3 which means there are 16 ($2^4 = 16$) possible configurations.

Table 4 reveals that 10 configurations have at least one heritage site associated with them in terms of strong membership (note Configurations 1, 2, 3, 8, 10, and 11 are struck through in Table 4 since there is no case-based supporting evidence – these are termed

[3]With 14 cases (built heritage sites) considered, it was deemed appropriate to limit the number of included condition variables. Here, we used a similar number to that used in other fsQCA based studies, see, for example, Beynon et al. (2016).

TABLE 4 Configurations existing from data (four condition variables and outcome condition—GVA per visitor at heritage site)

Config.	Adult_ Visitors	First_ Time	Other_ Attractions	Renown_ Importance	No.	Heritage sites	Raw consistency High GVA	Raw consistency Low GVA
~~1~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~		~~0.517~~	~~0.998~~
~~2~~	~~0~~	~~0~~	~~0~~	~~1~~	~~0~~		~~0.789~~	~~0.998~~
~~3~~	~~0~~	~~0~~	~~1~~	~~0~~	~~0~~		~~0.953~~	~~0.998~~
4	0	0	1	1	3	Denbigh Castle, Caerphilly Castle, Blaenavon Ironworks	0.817	0.862
5	0	1	0	0	2	Castell Henllys, Pembroke Castle	0.441	**0.942**
6	0	1	0	1	1	Harlech Castle	0.806	0.749
7	0	1	1	0	1	Criccieth Castle	**0.996**	0.854
~~8~~	~~0~~	~~1~~	~~1~~	~~1~~	~~0~~		~~1.000~~	~~0.818~~
9	1	0	0	0	2	Carreg Cennen Castle, Dinefwr Castle	0.574	0.773
~~10~~	~~1~~	~~0~~	~~0~~	~~1~~	~~0~~		~~0.909~~	~~0.806~~
~~11~~	~~1~~	~~0~~	~~1~~	~~0~~	~~0~~		~~0.819~~	~~0.992~~
12	1	0	1	1	1	Conwy Castle	**0.936**	0.757
13	1	1	0	0	1	Carew Castle	0.706	0.785
14	1	1	0	1	1	St Davids Bishops Palace	**1.000**	0.656
15	1	1	1	0	1	Dinas Emrys	0.913	**0.983**
16	1	1	1	1	1	Caernarfon Castle	**1.000**	0.624

remainders[4]). This means the study continued initially with 10 of the configurations with empirical evidence for their consideration (so employing a frequency threshold of 1 in terms of an fsQCA parameter).

Within the fsQCA framework, the term consistency shows how far any causal combination (configuration) connects to an outcome. This is in the form of a subset relation (where how far membership scores in one set [condition] are consistently less than or equal to their corresponding membership scores in another [outcome]—see Appendix A for further elucidation on consistency). Here (see Table 4), it can be viewed as the proportion of memberships, in fuzzy terms, in the outcome explained by each logical configuration. The heritage site column gives the names of the built heritage sites associated with a configuration. The last two consistency columns in Table 4 show the respective raw consistency values associating a configuration with GVA (high-GVA and low-GVA, respectively).

With respect to the separately considered outcomes, high-GVA and low-GVA, the identification of configurations considered to be associated with either of them (or not) are defined by consistency threshold values. Choice of consistency threshold for the raw consistency measure influences the strength of evidence used in subsequent analysis (see Ragin, 2006), and with configurations above or below the threshold cut-off value designated fuzzy subsets of the outcome or not fuzzy subsets, respectively. The causal combinations that are fuzzy subsets of the outcome delineate the kinds of cases in which the outcome is found.

With reference to the consistency value results in Table 4, a consistency threshold of 0.92 was employed for both when considering high-GVA and low-GVA (using the same threshold value for both high-GVA and low-GVA outcomes, following Andrews et al., 2016). In Table 4, the bold values in the consistency columns show those configurations with such consistency values above the identified consistency threshold.

Moving beyond the truth table elucidation of considered configurations of condition attributes, the fsQCA method moves to associated necessity and sufficiency findings for the high-GVA and low-GVA outcomes. In fsQCA terms, these are described as necessity, if a condition must be present for the outcome to occur (analysis of necessity); and sufficiency, if a given condition or combination of conditions can produce this result. In undertaking fsQCA, Ragin (2008) suggests both necessity and sufficiency should be investigated.

In terms of necessity, in regard to each of high-GVA and low-GVA, no individual condition attributes (including their presence or absence) were identified that had an associated necessity based consistency value (in singular variable terms) above the considered threshold of 0.9 (see Young & Park, 2013). Hence, no condition attributes were considered necessary for the respective outcome to be materialized.

Table 5 reports the findings in regard to sufficiency. Table 5 uses a notation prescribed in Ragin and Fiss (2008). Full circles (●) indicate presence of a condition (e.g., renowned heritage site or high number of adult visitors), barred circles (Θ) indicate a condition's absence (e.g., not-renowned heritage site or low numbers of adult visitors) in an identified causal recipe (i.e., a specific combination of causally relevant condition variables) linked to an outcome where the notion of combined causes is captured through the set-theoretic underpinnings of fsQCA. The causal recipes are found using the Quine–McCluskey algorithm for minimization of Boolean functions, based on discerning identified configuration from others (see Ragin, 2009).

Larger circles indicate core conditions (presence or absence) that are part of complex and parsimonious solutions. Complex and

[4]From Ragin (2008), a remainder in fsQCA, is a logically possible combination of conditions lacking empirical instances. This could be due to inadequate information about such cases or because the cases simply do not exist.

TABLE 5 Sufficiency analyses results for GVA and ~GVA outcomes (including complex and parsimonious solutions)

Conditions	High GVA			Low GVA	
Adult_Visitors	⊖	●	●	⊖	●
First_Time	•		•	•	•
Other_Attractions	●	•		⊖	●
Renown_Importance	⊖	●	●	⊖	⊖
Complex solution	CO1	CO2	CO3	CN1	CN2
Configurations (see Table 4)	7	12, 16	14, 16	5	15
Consistency	0.996	0.924	1.000	0.942	0.983
Raw coverage	0.211	0.464	0.432	0.362	0.143
Unique coverage	0.084	0.144	0.113	0.273	0.053
Solution consistency	0.945			0.944	
Solution coverage	0.660			0.415	
Parsimonious Solution	PO1	PO2		PN1	PN2
Configurations (see Table 4)	7	12, 14, 16		5	15
Consistency	0.964	0.938		0.946	0.985
Raw coverage	0.301	0.577		0.391	0.223
Unique coverage	0.128	0.403		0.287	0.118
Solution consistency	0.948			0.952	
Solution coverage	0.704			0.509	

Note. ● and ⊖ denote the presence (high) and absence (low) of a variable, and large and small sized circles denote core and peripheral conditions, respectively.

parsimonious solutions are both considered and take different perspectives on the consideration of remainders (see Footnote 4). Remainders are those configurations neither considered as a fuzzy subset nor not fuzzy subset of an outcome. Moreover, following Rihoux and Ragin (2009), the complex solution is defined as a "minimal formula derived without the aid of any logical remainders" (p. 181) (so not considering Configurations 1, 2, 3, 8, 10, and 11 and with these struck through in Table 4), and the parsimonious solution as a "minimal formula derived with the aid of logical remainders" (p. 183) (so considering Configurations 1, 2, 3, 8, 10, and 11 struck through in Table 4 if enable a more parsimonious solution).

Also shown in Table 5 are further measures, namely, Unique consistency—the degree to which cases sharing a given causal combination (configuration) agree in displaying the relative outcome; Raw coverage—the overall coverage of a causal combination that may overlap with other combinations; and Unique coverage—coverage uniquely due to a causal combination (see Ragin, 2008, for their technical details).

To accompany subsequent discussion of these fsQCA results visualizations of groupings of the considered 14 heritage site are presented in Figure 1.

The established causal recipes in Table 5 are next described. First are those associated with high-GVA, then low-GVA, with the main discussion focusing on the parsimonious solutions. In the first high-GVA per visitor case (PO1 in Table 5), the presence of other attractions is a core condition, but the number of adult visitors and renown are core absent conditions (meaning not large numbers of adult visitors and not a renowned heritage site). This solution relates to Criccieth Castle and may suggest it is not the main draw within the area for visitors but rather performs more of a secondary role. In the second causal recipe, PO2 core present conditions are adult visitors and renown, and with these relating to the cases of Conwy Castle, St Davids, and Caernarfon Castle. This may suggest the heritage sites related to this causal recipe

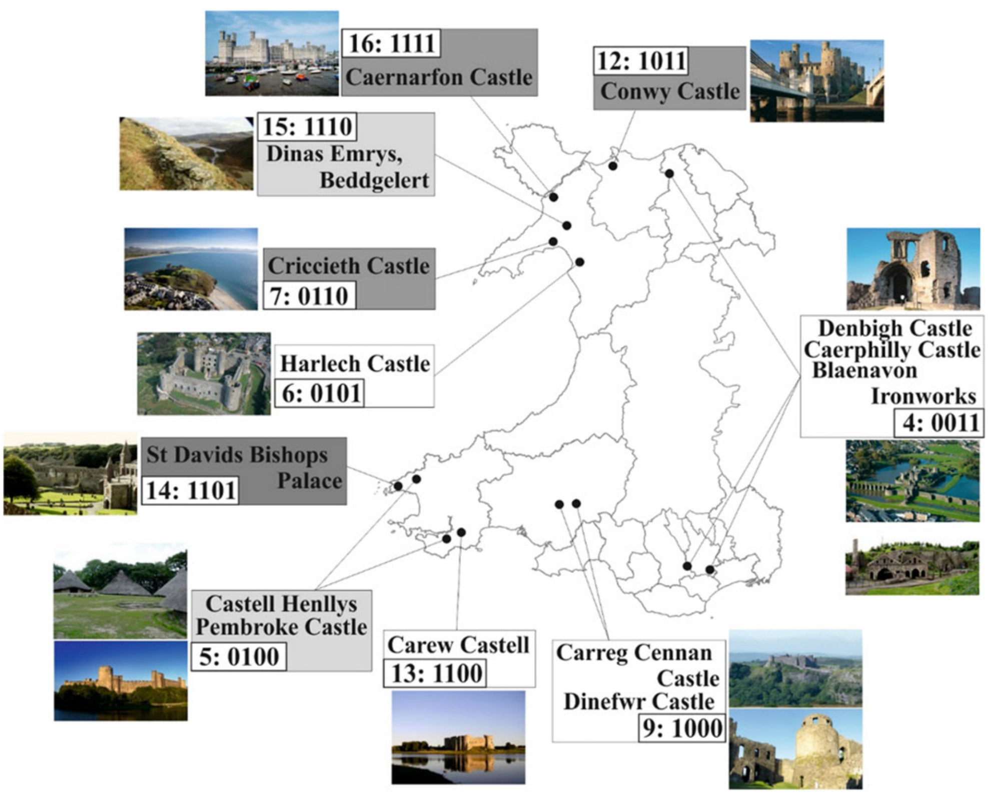

FIGURE 1 Geographical exposition of castles in strong membership based configurations [Colour figure can be viewed at wileyonlinelibrary.com]

are well positioned especially with the connection between adult visitors and being renowned. Critically here, GVA associated with the average visitor is not a simple menu but hints at the common characteristics of sites (adult visitors and renown) but then with this associated with differences in the number of first time visitors and the presence of other attractions. This type of information then hints at the characteristics of sites that might be focused on in marketing activity, but with the approach also hinting at where scarce resources might be placed in terms of heritage improvement.

Turning to the low-GVA solutions, PN1 shows the absence of conditions describing adult visitors, other attractions, and renown (and with this describing the Castell Henllys and Pembroke Castle cases). While aspects of this are similar to PO1, the absence of other attractions seems to move this causal recipe to low-GVA. The second low-GVA solution relates to the presence of core conditions relating to adult visitors and other attractions, but the absence of renown, and with this linking through to the Dinas Emrys case. Importantly, here is that the low value added solutions are not necessarily a mirror image of the high value added case. Indeed, only Configurations 5 and 12 are mirror images and the remaining solutions are asymmetrical.

5 | DISCUSSION AND CONCLUSIONS

The paper adds to an evidence base exploring the local economic impacts of tourism supported by visitation to heritage assets. The paper also reveals how an impact analysis grounded in an input–output framework can be supplemented by analysis within an fsQCA frame to derive insights into the different routes through which similar heritage sites work to support relatively high levels of GVA. The method employed in the latter analysis is particularly useful where a smaller number of site-level observations may restrict the use of other analytical techniques.

The paper shows selected heritage sites in Wales vary in their ability to support regional GVA. The underlying core conditions defining whether sites might be associated with relatively low or high-GVA supported per visitor are represented by complex configurations. The analysis suggests that over generalizing on the conditions supporting higher levels of regional GVA linked to heritage visitation is inappropriate.

A series of practical implications result from the research. In general, heritage tourism has been identified as a major growth area in Europe and elsewhere (Poria, Butler, & Airey, 2003; Richards, 1996), and the promotion of heritage tourism has formed part of many EU regional development programmes with museums, monuments, and other heritage attractions becoming a focus of regional economic development strategies (see Janiskee, 1996). In this context, making better connections between heritage assets and local economic returns in an era of competing demands from heritage organizations for public funds is important (Bryan et al., 2012). For example, the United Kingdom Culture, Media, and Sport Committee (2011) showed the consequences of public funding cuts for heritage at risk and that "Reductions in public funding alongside restrictions on credit, falling investment returns and the failure of development companies will make it much harder to find viable solutions for our heritage at risk" (p. 141). There is then a need to better understand the factors which contribute to a site's ability to attract relatively high or low levels of GVA levered by visitors.

The research in this paper would suggest that if increasing the impact of visitation is an aim of marketing and planning around heritage, then there is a need to understand that the demand and supply side routes to relatively high-GVA per visitor are complex. Then, for some sites, causal routes to relatively high-GVA supported per visitor may require different marketing plans and need to jointly focus on elements of the demand and the supply side around heritage assets. Identified here as important conditions in supporting high value added tourism is the higher proportion of adults in total visitors, but the analysis reveals that factors such as the number of first time visitors, the local supply side, and variables describing renown do not always feature in the same way in the high value added configurations.

We accept in the research here that the condition variables require far more exploration. For example, further analysis of visitor demographics at the heritage sites would be useful. However, the analysis reveals that one discrete configuration is inadequate to explain high or low value added per visitor supported at sites, and moreover, in only a few cases are the low/high value added solutions mirror images of one another.

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How to cite this article: Beynon MJ, Jones C, Munday M, Roche N. Investigating value added from heritage assets: An analysis of landmark historical sites in Wales. *Int J Tourism Res*. 2018;20:756–767. https://doi.org/10.1002/jtr.2228

APPENDIX A

This appendix elucidates on an important measure employed in this analysis, namely, the consistency measure. Within fsQCA, Ragin (2008) includes a standard measure of set-theoretic consistency (Cons), or the degree of inclusion between two sets (set-subset relationship—a fuzzy subset relation exists when the membership scores in one set are consistently less than or equal to their corresponding membership scores in another), given by

$$\mathrm{Cons}(X_i \le Y_i) = \frac{\sum_{i=1}^{N} \min(X_i, Y_i)}{\sum_{i=1}^{N} X_i},$$

where X_i is the degree of membership of an individual *i* in set X, and Y_i is its degree of membership in set Y. Table A1 shows an example data set, for which the consistency measure will be elucidated on (adapted from Ragin, 2008).

TABLE A1 Example condition and outcome variable values

Condition (C)	Outcome (O) (μ)	Not-outcome (~O) (1 - μ)
0.7	0.9	0.1
0.1	0.9	0.1
0.1	0.1	0.9

So consistency between condition (C) and outcome (O - with membership score μ):

$$\text{Cons}(C \le O) = \frac{\min(0.7, 0.9) + \min(0.1, 0.9) + \min(0.1, 0.1)}{0.7 + 0.1 + 0.1} = \frac{0.7 + 0.1 + 0.1}{0.7 + 0.1 + 0.1} = \frac{0.9}{0.9} = 1.000$$

$$\text{Cons}(C \le {}^{\sim}O) = \frac{\min(0.7, 0.1) + \min(0.1, 0.1) + \min(0.1, 0.9)}{0.7 + 0.1 + 0.1} = \frac{0.1 + 0.1 + 0.1}{0.7 + 0.1 + 0.1} = \frac{0.3}{0.9} = 0.333$$

The point to come out of this is that the condition is more consistent with the outcome rather than not-outcome (since Cons(C- O) > Cons(C ≤ ~O)). However, there is another point, namely, in consistency terms, the values of Cons(C ≤ O) and Cons(C ≤ ~O) are not the opposite of each other (given Cons(C ≤ O) = 1.000, we do not have Cons(C ≤ ~O) = 0.000 instead Cons(C ≤ ~O) = 0.333). This latter issue is a feature of the asymmetric aspect of fsQCA, whereby an outcome and not-outcome are considered separately (see end of Section 3.2).