

FOUR WHEEL DRIVE TOURISM AND ECONOMIC DEVELOPMENT OPPORTUNITIES FOR REMOTE AREAS

Andrew Taylor
Charles Darwin University

Dean Carson
Charles Darwin University

Desert areas account for around 70% of Australia's landmass but are home to less than 3% of the population. The economies of many desert areas have been described as marginal or peripheral. Tourism is an important economic activity for desert destinations and one sector, four wheel drive tourism, has been gaining increasing attention. This paper examines the spending patterns of four wheel drive visitors to desert regions of the Northern Territory of Australia and compares them to non-four wheel drive leisure visitors for a five year period from 2000 to 2004. In addition to assessing the amount of expenditure (overall and per day), the research investigates whether there were differences in expenditure items and the dispersal of expenditure among destinations. This information can help inform decisions about levels of investment for attracting the four wheel drive market which might be justified, and the types of product opportunities that might arise from a growing market.

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INTRODUCTION

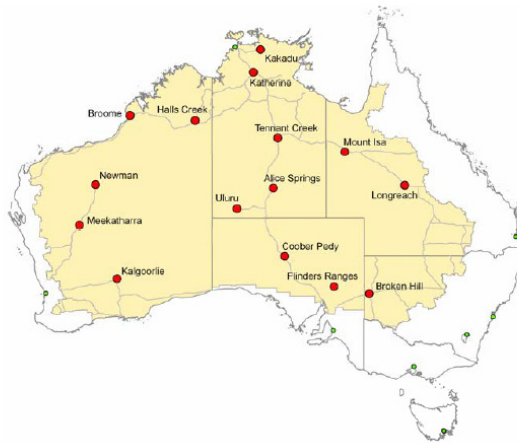
From a tourism perspective, desert Australia has been described as marginal, remote, or peripheral (Carson and Harwood, 2007). While up to 70% of Australia's mainland landmass can conceivably be defined as 'desert', less than 3% of the total Australian population live in desert regions (Desert Knowledge Cooperative Research Centre, 2007) and the four largest towns have populations of less than 30,000 residents. There are typically very large distances between towns, and they are connected by limited transport networks. For example, Alice Springs, the best



known desert town, has a resident population of around 25 000, and is 515 kilometres by road from the nearest substantial settlement (Tennant Creek with a population of 1,500). Alice Springs is 2,930 kilometres by road from Sydney. Alice Springs is in the Northern Territory, but is 1,525 kilometres by road from the capital, Darwin (Jacaranda, 2006).

The states and territories of Australia have established regional tourism associations (RTAs) who are responsible for coordinating tourism marketing and fostering business networks within their jurisdictions. There are 85 such RTAs in Australia, with 11 situated in desert regions (Australian Bureau of Statistics, 2005) mainly in the Northern Territory, Queensland, Western Australia and New South Wales (Figure 1). In 2005, an estimated 4.5 million visitors spent at least one night in one or more desert destinations as defined by these RTA boundaries. Of concern for desert tourism in Australia, this figure represented a decrease over the previous four years (by 15% from the peak visitation experienced in 2001) compared with a smaller decrease in visitor numbers of six percent for Australia as a whole (Tourism Research Australia, 2005a, 2005b). Notably, the international market share for desert areas declined from 20% of all visitors to just 13%. Nonetheless, tourism remains an important economic activity in desert destinations.

Figure 1. Desert areas of Australia



In addition to decline in visitor numbers, desert tourism has seen increasing concentrations of visitors at a small number of iconic sites

(such as Ayer's Rock/ Uluru and King's Canyon in the Petermann region) and in the larger population centres, and diminishing diversity in the trip patterns of desert visitors (Desert Knowledge Australia, 2005). Around 30% of the desert tourism market in Australia is on organised tours, and there is evidence that fewer tour alternatives are offered now than in past years (Carson & Taylor, 2006). Tours tend to focus on sightseeing at the icon sites and, there is limited variance in the average lengths of stay for desert destinations (Carson, Middleton, & Jacobsen, 2007). In summary, it can be argued that relatively fewer people are visiting desert Australia, they are visiting fewer attractions and destinations, and the market is becoming increasingly homogenised.

These trends have had important economic implications for the desert tourism sector. They imply a lack of innovation in terms of new product offerings and accessing new markets. Fostering innovation in the desert will require collaboration between suppliers and customers, which the literature argues needs to be led by small firms and relatively independent travellers, particularly in peripheral destinations (Stuart, Pearce, and Weaver, 2005). Small firms are more likely than large firms to have decision makers interacting with customers on a regular basis. They are more able to change their business practices in response to customer needs (McKelvey and Texier, 2000). At the same time, relatively independent travellers are better positioned to make spontaneous consumption choices, to change their itineraries in-trip, and to negotiate individual arrangements with product suppliers (Hyde and Lawson, 2003).

It has been reported elsewhere (Schmallegger and Carson, 2007) that the key independent travel markets for desert Australia are likely to include self-drive tourists and international backpackers. Research by Tremblay et al (2005) and Desert Knowledge Australia (2005) has focused on the self-drive markets for desert Australia. In particular, the four wheel drive or "off road" market has been identified as having high growth potential and a number of characteristics that make it attractive to desert destinations. Carson and Taylor (2006) suggested that these include:

- A capacity, and desire, to access more remote destinations;
- Trip patterns which include multiple destinations and frequent movement between destinations;
- Relatively flexible itineraries; and
- Relatively high rates of repeat visits.

There is no widely accepted definition of four wheel drive tourism. The use of a four wheel drive vehicle as a form of transport is a prerequisite, however this research is interested in travel where there is a stronger link between the vehicle and the travel experience. A 'product market' view of tourism (Scott, 2002) sees consumers and suppliers interact in the marketplace using a shared set of concepts (Rosa, et al. 1999). In the case of four wheel drive tourism, the evidence suggests that some consumers view the vehicle as key to the travel experience (witness, for example the proliferation of four wheel drive recreation clubs across Australia and internationally), destinations and tourism product suppliers distribute experiences with 'four wheel drive' in the label (and with infrastructure specifically targeted at four wheel drive travellers), and there is a facilitating industry of vehicle manufacturers, accessory providers and others who market their services through an explicit link between the vehicle and some touristic concepts. The dialogue between consumers and suppliers (and other organisations) helps construct a language about the experience so that the definition becomes meaningful for all parties (Aaker and Joachimsthaler, 2000). A simple product market definition of 4WD tourism may therefore be (although other definitions are possible):

Tourism experiences which the consumer and supplier perceive as heightened in value by the use of 4WD vehicles.

This definition allows for experiences to be on or off-road, to be completely dominated by use of the four wheel drive vehicle, or to have that activity as part of a broader trip experience. Surveys by Taylor and Prideaux (2008) suggest that four wheel drive travellers develop a sense of belonging to the destinations they visit, and so are likely to actively engage in destination development through activities such as infrastructure maintenance and product promotion. Four wheel drivers are motivated to explore the landscape, undertake activities in remote locations (birdwatching, fossicking etc) or to test the capabilities of the vehicle and driver. The research by Carson and Taylor (2006) and Taylor and Prideaux (2008) is part of a multi-disciplinary study of four wheel drive tourism in desert Australia sponsored by the Desert Knowledge Cooperative Research Centre, a collaboration between universities, government agencies and private enterprise aiming to conduct research that contributes to improved livelihoods for desert people. Prior to this research, very little was known about four wheel drive tourism in any

environment, although a small number of studies have considered environmental impacts (for example, Priskin, 2003).

Some optimism regarding the potential for four wheel drive tourism to provide economic benefits for Aboriginal settlements in desert Australia has been observed. Desert Knowledge Australia (2005), for example, report on the future of outback tourism as being favourable economically for local Aboriginal communities. However, the reasons for such optimism are unclear. They appear to lie mainly in assertions of the (growing) size of the market, and the level of contact between the markets and otherwise isolated settlements. There has been no published research into the expenditure patterns of four wheel drive travellers, nor of the economic flows arising from that expenditure. Cartan and Carson (2009) have argued that settlements along desert tracks (the main attractions for many four wheel drive travellers) have largely failed to create innovative and economically significant ventures. They suggest that any economic benefits are more likely to accrue to businesses in major service centres and places of origin than to the more remote and smaller desert settlements. In desert Australia, this might translate to major urban centres, particularly Alice Springs (Northern Territory), Mt Isa (Queensland), Broken Hill (New South Wales) or Kalgoorlie (Western Australia) attracting a disproportionate amount of trip expenditure.

Four wheel drive travellers are likely to spend large amounts of money on their vehicles, purchasing (and then preparing) them for desert trips, or in hiring them in situ. Taylor and Carson (2007) also reported that desert trips are relatively long, and travellers spend relatively long periods of time preparing for them. Along with visiting multiple destinations and a higher tendency to repeat visit (Carson and Taylor, 2008), these may be indicators of economic activity. However, the relationship between trip structures and more direct measures of economic value, particularly at local and regional levels, is problematic. There are issues with estimating expenditure, attributing expenditure to specific destinations or activities, and assessing the worth of multipliers. The difficulties in discerning the economic contribution are exacerbated for multiple destination trips which are very common to desert itineraries.

Dwyer and Forsyth (1997) have summarised the literature relating to measurement of economic benefits of particular types of tourism activities. The most common measures used were total trip expenditures and average daily expenditure per visitor. While these measures provide some summary, it may be more meaningful at a local level to investigate what products and activities are purchased (Wilton and Nickerson, 2006). Research has also attempted to identify the determinants of expenditure

within market segments (see McKay, et al, 2002, for example). Demographic, socio-economic and touristic variables have been correlated in various ways with rates of expenditure, types of products, and activities consumed. Coupling an understanding of expenditure items with the dynamics of local supply can provide insights into local economic benefits (Supradist, 2004). For example, expenditure on souvenirs manufactured outside the region may have less economic impact than expenditure on services involving higher local inputs. Estimates of trip spending, particularly on activities such as motoring (MacKay, Andereck, and Vogt, 2002) or recreational boating (Lee, 2001) may be confused by expenditure relating to purchasing and maintaining the craft or vehicle. Lee, for example, found that visitors from more distant origins spent less in the destination on food and fuel, having made more of these purchases before leaving home. Dwyer and Forsyth (1997) recognise that more sophisticated measures of economic yield are required to understand the impacts of a market on a destination, but they also acknowledge the high cost of collecting and analysing data for such measures. The recommendation is therefore to use a variety of measures, including total expenditure, expenditure on specific items, expenditure per day, and length of stay. Relatively high yield markets tend to have higher daily expenditure and higher lengths of stay.

Consequently, this paper examines the spending patterns of four wheel drive visitors to desert regions in the Northern Territory of Australia and compares them to non-four wheel drive leisure visitors to the same destinations. The study examines data from a five year period 2000 to 2004. In addition to assessing the amount of expenditure (overall and per day), the research investigates whether there were differences in the items of expenditure and the dispersal of expenditure among destinations. This information can inform decisions about the level of investment in attracting the four wheel drive market that might be justified, and the types of product opportunities that might arise from the market.

METHODS

Tourism NT is the government destination marketing organisation (DMO) for the Northern Territory. The Northern Territory includes four of Australia's eleven desert RTAs – Alice Springs, Petermann, MacDonnell and Barkly. Between 1997 and 2004, Tourism NT conducted a survey of around 4,500 visitors to the Northern Territory each year called the Northern Territory Travel Monitor (NTTM). The NTTM

included two questions which can be used to identify four wheel drive tourists. Respondents were asked the mode of transport they used to travel between destinations in the Northern Territory. "Four wheel drive" was a response option. Between 2000 and 2004, 3,893 respondents (33%) who had visited a desert region in the Northern Territory had accessed these destinations by four wheel drive vehicle. Respondents were also asked about the activities they had undertaken while in the Northern Territory. Included among these were "four wheel driving". Between 2000 and 2004, 3,345 respondents (28%) who had visited a desert region in the Northern Territory claimed to have done four wheel driving as an activity.

Neither of these variables corresponds exactly with the product market definition of four wheel driving provided in the introduction. Visitors travelling by four wheel drive may be simply describing the type of vehicle, rather than attributing any enhancement of the experience to having that vehicle. On the other hand, where the experience is enhanced, or even dependent upon, the four wheel drive vehicle, respondents may not identify four wheel driving as a separate activity. It is likely, however, that the cohort of four wheel drive travellers who do meet the definition for this research have answered either that they travelled by four wheel drive vehicle or that they did four wheel driving as an activity. For the purposes of this research, a desert four wheel drive tourist is considered to be one who spent at least one night in a desert region in the Northern Territory, and who either travelled by four wheel drive between destinations or cited four wheel driving as an activity. For the period 2000 to 2004 this produced a sample of 4,860 respondents, or 40% of all leisure visitors to desert areas of the Northern Territory. The potential misclassification of some respondents is accepted as a limitation of using a secondary data set.

Table 1. Study sample sizes

	Full NTTM sample	Leisure visitors	Leisure & visited desert	Leisure, visited desert and 4WD	Desert 4WD as % of total
2000	4,036	3,351	2,763	1,094	39.6%
2001	3,648	2,955	2,446	915	37.4%
2002	3,791	2,957	2,407	1,057	43.9%
2003	3,736	2,939	2,317	912	39.4%
2004	4,084	2,989	2,128	882	41.4%
Total	19,295	15,191	12,061	4,860	40.3%

The NTTM used recall questions to collect expenditure for the entire travel party during the 24 hours prior to completing the survey form. Accommodation expenditure was collected based on the actual cost of the accommodation (for the whole travel party) on the night the survey was completed. The location of the accommodation provider was recorded and coded to a sub-region within the Northern Territory. This enabled the region in which the survey was completed to be identified. This approach yielded a sample of 6,235 surveys completed in desert areas of the Northern Territory for the period 2000 to 2004, of which 38% (2,339) were completed by four wheel drive travellers.

The expenditure items produced by this method included:

- Cost of accommodation tonight (accom\$) - the accommodation cost for the entire travel party for the night on which the respondent filled out the survey form.
- Money spent on individual items (item a-n\$) - expenditure by the travel party during the past 24 hours. Items collected were:
 - Food and drinks
 - Cultural tours/shows by Indigenous people
 - Other tours in the NT
 - Transport within the NT
 - Aboriginal art work/ artefacts
 - Shopping/ gifts/ souvenirs/ Entertainment/ admission fees/ other incidental expenses
- Total travel party expenditure on items (total\$) = total of expenditure on items [item a-n\$ listed above] in past 24 hours excluding accommodation
- Total expenditure (exp_ttl) = total travel party expenditure in past 24 hours including accommodation [(exp_ttl) = total\$ + accomm\$]
- Estimated total expenditure for travel party on the entire trip (tot_exp). This variable was collected in fixed dollar ranges (for example, 'less than \$500' and '\$3,001 - \$5,000')

Total expenditure by the entire travel party for the entire trip was calculated in a three step approach. Firstly accommodation costs were summed with the combined travel party expenditure on individual items during the past 24 hours. This excluded expenditure on transport used to reach the Northern Territory. Secondly, nights spent in the Northern Territory were calculated by summing the nights spent at each overnight stop with the nights in transit, where visitors travelled overnight in a bus

or other vehicle. If the number of nights recorded against an overnight (night1 to night 10) stop was not stated ('99') these night were excluded from the calculation of total nights in the Northern Territory to avoid artificial inflation of this figure. Likewise, if nights in transit (tran_ngt) was recorded as '99' this variable was excluded. The two variables were multiplied out so that the calculation of total trip expenditure reads as:

$$\begin{aligned} &\text{Total expenditure=} \\ &(\text{accom\$} + \text{food\$} + \text{tourse\$} + \text{toursrg\$} + \text{trans\$} + \text{aborig\$} + \text{shop\$} + \text{entrtrtn\$} + \text{other\$}) * \\ &(\text{night1} + \text{night2} + \text{night3} + \text{night4} + \text{night5} + \text{night6} + \text{night7} + \text{night8} + \text{night9} + \\ &\text{night10} + \text{tran_ngt}) \end{aligned}$$

This approach reduced the available sample marginally to 6,062 of which 37% (2,247) were four wheel drive travellers. A very small number of records (six) had expenditure of more than \$10,000 recorded against them for a period of 24 hours. These were removed because of their distortional impact on total expenditure data given that there were no commonly discernable characteristics to suggest they might represent one particular market more so than another.

Consideration was given to using per person expenditure in the analysis. However, the composition of four wheel drive travel parties was very similar to others in terms of both the number of individuals in the party and the type of group. For example, two thirds of travel parties for both groups were comprised of two people and only a very small proportion of four wheel drive parties (three percent) and others (two percent) consisted of more than four persons. Similarly around 45% of both four wheel drive parties and others were travelling as adult couples and 20% were travelling alone. Slightly more four wheel drive parties (13%) than others (nine percent) were travelling as family groups. Based on these comparisons it is viable to expect little difference in expenditure results produced on a travel party basis when compared to those produced for individuals.

In addition to expenditure, the NTTM asked about activities and places visited in the Northern Territory as well as the types of accommodation used at each destination. These variables have been used as supporting evidence to the expenditure data as a means of addressing issues of respondent recall for expenditure items.

The direct expenditure approach used here has limitations for comparing expenditure behaviour between four wheel drive travellers to others in desert areas. First, the 24 hour recall period applied to recording expenditure on individual items may attribute some expenditure to desert

regions where it did not occur when travellers enter a desert region from a non-desert region. Secondly, the process of extrapolating expenditure during the 24 hour period to represent total trip expenditure has limitations insofar as it can at best be considered an approximation. Expenditure amounts on individual items are likely to fluctuate between regions and during different stages of the trip (for example, close to arrival, during the trip proper, and pre-departure). Data on non-essential items like tours, Aboriginal attractions and arts, and entertainment may be particularly problematic because the extrapolation of the past 24 hours expenditure of these items by multiplying by the number of nights spent in the Northern Territory may be less representative of actual expenditure than for items like fuel, food and shopping which are consumed more regularly.

RESULTS

A substantial proportion of both four wheel drive (39%) and other travel parties (43%) said they had a planned budget of more than \$9,000 for their trip in the Northern Territory. This figure excludes transport to the Northern Territory and pre-booked items. Average recorded daily expenditure on all items was five percent lower for four wheel drive travellers at \$368 compared to \$384 for other desert travellers (Table 2). However, average expenditure for the entire trip to the Northern Territory (again excluding transport to the Northern Territory and pre-booked items) was markedly higher for four wheel drive travellers at \$4,370 compared to \$3,028 for other travellers. More than two thirds of four wheel drive and other traveller expenditure was in desert regions. The 32% higher average total trip expenditure by four wheel drive travellers reflects their tendency to stay more nights in the Northern Territory (at eighteen on average compared to thirteen for others) and to visit more destinations on their trip (at five compared to four). And while both groups spend on average three nights in each desert and non desert location, four wheel drivers spend more nights in total in the desert at ten compared to seven.

Accommodation expenditure in desert areas by four wheel drive travellers averaged \$79 per day compared to \$98 for other travellers. This represented 21% and 25% of average daily expenditure respectively. Total expenditure in desert areas on accommodation averaged \$605 for four wheel drive travellers and \$502 for others (Table 2). Four wheel drive travellers were more likely to use caravan parks (58% compared with 40%) and less likely to use hotels (14% compared with 24%) or

hostels (18% compared with 28%). During their trip, four wheel drive travellers spent an average of \$627 on food and beverages in desert areas which was significantly (37%) higher than for other travellers (\$404). On a daily basis the comparison shows a relatively marginal difference at \$73 and \$70 respectively, or 20% and 18% of all travel party expenditure.

Transport costs were inclusive of airfares within the Northern Territory, fuel, car rental, and public transport costs. Desert four wheel drive travellers spent on average close to double (\$486 compared to \$252) during their trip on these items. On a daily basis the difference was also noticeable averaging to \$68 per day for four wheel drivers and \$47 for others, or 18% and twelve percent of daily travel party expenditure for the respective groups. Four wheel drive travellers to the desert spent an average of \$62 per day on general (other than Aboriginal) tours, compared with \$75 for other travellers. Tours represented 17% of total trip expenditure by four wheel drivers and 29% by others. The combined expenditure of desert travellers on Aboriginal cultural attractions, and arts and crafts comprised seven percent of average daily four wheel drive travel party expenditure and eleven percent for others. This represents \$25 and \$40 per day respectively. These items were one of only two where total expenditure in the desert by four wheel drivers (\$264) was less than for others (\$296).

The combined expenditure of desert travellers on Aboriginal cultural attractions, and arts and crafts comprised seven percent of average daily four wheel drive travel party expenditure and eleven percent for others. This represents \$25 and \$40 per day respectively. These items were the others for which total expenditure in the desert by four wheel drivers (\$164) was less than for others (\$214). Daily expenditure in the desert on shopping (other than food and beverages) and souvenirs, as well as admission fees to entertainment venues formed a relatively minor component of the average daily expenditure of desert travellers at around seven percent and three percent respectively for both four wheel drivers and others. The relative contribution of these items to total expenditure in the desert extrapolated to \$317 compared to \$226 by others.

Four wheel drive travellers spent an average of \$29 more per day (\$380) than other travellers in destinations other than Alice Springs (where average daily expenditure was \$351). The average length of stay in Alice Springs for four wheel drive travellers was five nights and thirteen nights in other desert areas. Non-four wheel drive travellers averaged four nights in Alice Springs and nine in other desert areas. The additional expenditure in other (compared to Alice Springs) areas by four wheel drivers was comprised of accommodation (\$37 per day above other

desert travellers) and transport (\$17 per day). While non four wheel drive travellers spent \$58 per night more in destinations outside Alice Springs, this was almost completely accounted for by their additional expenditure on accommodation.

Table 2. Expenditure on items

	Average daily expenditure		% of daily expenditure		Total expenditure in desert areas		% daily desert expenditure	
	4WD visitors	Others	4WD visitors	Others	4WD visitors	Others	4WD visitors	Others
Accommodation	\$79	\$98	21%	25%	\$605	\$502	22%	24%
Food & drinks	\$73	\$70	20%	18%	\$627	\$404	22%	19%
Aboriginal tours & shows	\$9	\$19	3%	5%	\$59	\$93	2%	4%
Other tours	\$62	\$75	17%	19%	\$428	\$392	15%	19%
Transport within the NT	\$68	\$47	18%	12%	\$486	\$252	17%	12%
Aboriginal art & crafts	\$16	\$21	4%	5%	\$105	\$123	4%	6%
Pleasure, shopping & souvenirs	\$29	\$27	8%	7%	\$215	\$155	8%	7%
Entertainment & admission fees	\$12	\$12	3%	3%	\$102	\$71	4%	3%
Other expenses	\$20	\$16	5%	4%	\$165	\$114	6%	5%
Total	\$368	\$384	100%	100%	\$2,792	\$2,106	100%	100%

DISCUSSION AND CONCLUSIONS

The research found that four wheel drive travellers spent more on their total trip than other visitors to desert Northern Territory. The average daily expenditure was similar, so the difference in total expenditure was accounted for by the longer lengths of stay in the Northern Territory by four wheel drivers. Of further note, the additional nights were a result of visits to additional destinations. In other words, four wheel drive travellers delivered similar economic benefits to more destinations than other travellers. While average daily expenditure was similar for four wheel drive and other desert travellers, the composition of the expenditure was quite different. Four wheel drive travellers spent less

on accommodation and Aboriginal tourism products, and more on transport and food and beverages.

Four wheel drive travellers tended to select caravan park accommodation even where hotel or hostel accommodation was available and preferred by other travellers and chose not to consume Aboriginal tourism products in destinations where other travellers did consume them. This has enormous implications as, on the one hand, four wheel drive travellers, while spending less, show a preference for accommodation types which are more likely to be locally owned and managed rather than part of a national or international hotel or hostel group. The economic contribution of these is likely to be more direct for the region. On the other hand, there have been limited opportunities for Aboriginal cultural tourism enterprises to benefit from four wheel drive travel. Either the nature of the products that have been available or the method of their distribution has not matched the demands of the market. Not only did four wheel drive travellers spend more on transport within desert Northern Territory, they appeared to spend more frequently, refuelling regularly as they travelled. There are only three airports in the Northern Territory with regularly scheduled commercial services, and two of these are in the desert (Alice Springs and Yulara near Uluru/ Ayer's Rock). Most tours originate from Alice Springs or Yulara and payment for these is made once. It is likely that the transport expenditure by four wheel drive travellers has had greater local economic implications than that by other desert visitors.

Expenditure on food and beverages appeared similar for four wheel drive and other desert travellers. It is quite possible, however, that the nature of this expenditure was different for the two groups. Higher use of caravan parks and commercial camping grounds by four wheel drive travellers implies they prepared their own meals rather than eating out at restaurants in which case the economic benefits would be distributed in a different way. A greater difference in expenditure on organised tours may have been expected between four wheel drive and other travellers. Four wheel drive travellers by definition have their own transport, and have a lesser need to go on organised tours to do their sightseeing. However, the definition of four wheel drive traveller used in this research would include those who went on a four wheel drive tour (and therefore selected have done a 'four wheel drive activity') and those (particularly international) travellers who rented a four wheel drive vehicle for at least part of their visit to desert Australia. Tours may have been taken during the non-four wheel drive trip phases.

Expenditure on attractions and souvenirs was relatively low for both four wheel drive and other travellers. It is unclear whether these products have been inherently unimportant, or whether the existing product offerings have lacked appeal. A consistent pattern of product preferences has emerged from the research. This may reflect the desired experiences of the market, or it may reflect the homogenised structure of the tourism industry in desert Australia that was observed by Carson, Middleton and Jacobsen (2007) and Cartan and Carson (2009). In summary, four wheel drive travellers appear to offer economic benefits for desert destinations at least equivalent to those provided by other markets. The advantage of the market is that they provide income for more destinations, without compromising the income to more popular destinations. This research has only superficially associated expenditure patterns with yield potential, and further research is required here. There is a different pattern of expenditure regarding individual items (accommodation, food and beverage, tours etc.), and this will have implications for product development and the accrual of local benefits.

Economic analysis of tourism behaviour is difficult, and researching such behaviour is generally subject to limitations. Beyond the limitations of the data previously noted, the research reported here has been able to only partly address some of the key issues in understanding the economic implications of four wheel drive tourism activity in desert Australia. This research has treated the four wheel drive market as homogenous, however it may be that certain segments within the market have higher or lower yield potential. Taylor and Prideaux (2008) have provided some clues as to the nature of some of the differences such as a segment with a vent for testing their skills and their vehicle capabilities to a segment which seeks to do primarily non-four wheel drive activities. Likewise, different destinations may experience different levels of economic benefit. While there is a need for further research into the economic value of four wheel drive tourism in desert Australia, the research here has demonstrated that the market is likely to make a similar overall daily contribution as other desert travellers. There may be advantages in stimulating four wheel drive development in localised desert destinations because their contribution extends over longer travel periods and to more destinations. Destination marketing agencies are advised to increase their understanding of what the four wheel drive market wants, and invest in products which meet these expectations.

REFERENCES

- Aaker, D. & Joachimsthaler, E. (2000). *Brand Leadership*. New York, The Free Press.
- Australian Bureau of Statistics. (2005). *Tourism Region Maps and Concordance Files (cat. no. 9503.0.55.001)*. Canberra, Australian Bureau of Statistics.
- Carson, D. & Harwood, S. (2007). Authenticity as Competitive Advantage for Remote Tourism Destinations. In I. McDonnell, S. Grabowski and R. March (Eds.) *Proceedings of the 17th annual CAUTHE Conference*, Sydney: Sydney University of Technology.
- Carson, D. & Taylor, A. (2006). Charge of the Might Brigade. Paper presented at the 2006 Desert Knowledge Symposium and Business Showcase. Alice Springs Convention Centre, Alice Springs: 1-3 November 2006.
- Carson, D. & Taylor, A. (2008). Sustaining Four Wheel Drive (4WD) Tourism in Desert Australia. *Rangelands Journal*, Vol. 30, No.1, pp.77-83.
- Carson, D., Middleton, S. & Jacobsen, D. (2007). *Tourism Innovation in the Northern Territory: Product Gaps and Investment Strategies*. Darwin, Charles Darwin University.
- Cartan, G. & Carson, D. (2009). Local Engagement in Economic Development and Industrial Collaboration around Australia's Gunbarrel Highway. *Tourism Geographies*, Vol. 11, No.2, pp.169-186.
- Desert Knowledge Australia. (2005). *Our Outback: Partnerships and Pathways to Success in Tourism*. Alice Springs, Desert Knowledge Australia.
- Desert Knowledge Cooperative Research Centre. (2007). Desert Australia. [Http://www.desertknowledgecrc.com.au/aboutus/desertaustalia.html](http://www.desertknowledgecrc.com.au/aboutus/desertaustalia.html). Accessed the 26 th of April 2007.
- Dwyer L. & Forsyth, P. (1997). Measuring the benefits & yield from foreign tourism. *International Journal of Social Economics*, Vol. 24, No.1, pp.223-236.
- Hyde, K. & Lawson, R. (2003). The nature of independent travel. *Journal of Travel Research*, Vol. 42, No.1, pp.13-23.
- Jacaranda. (2006). *Jacaranda Atlas (Sixth Edition)*. Brisbane, John Wiley and Sons.
- Lee, H. (2001). Determinants of recreational boater expenditures on trips. *Tourism Management*, Vol. 22, No.6, pp.659-667.
- MacKay, K., Andereck, K. & Vogt, C. (2002). Understanding vacationing motorist niche markets. *Journal of Travel Research*, Vol. 40, No.4, pp.356-363.
- McKelvey, M. and Texier, F. (2000). Surviving technological discontinuities through evolutionary systems of innovation: Ericsson and mobile telecommunications. In P. Saviotti and B. Nooteboom (Eds.) *Technology and Knowledge: From the Firm to Innovation Systems*, Cheltenham: Edward Elgar.
- Priskin, J. (2003). Physical impacts of four-wheel drive tourism and recreation in a semi-arid, natural environment. *Ocean and Coastal Management*, Vol. 46, No.1, pp.127-155.

- Rosa, J., Porac, J., Runser-Spanjol, J. & Saxon, M. (1999). Sociocognitive dynamics in a product market. *Journal of Vacation Marketing*, Vol. 63, No.1, pp.64-77.
- Schmallegger, D. & Carson, D. (2007). Reaching the independent traveller: Product distribution issues for Aboriginal tourism enterprises in remote Australia. Paper presented at the Third International Conference on Tourism. Athens, Greece: 5-6 July, 2007.
- Scott, N. (2002). Product market perspective of self-drive tourism. In D. Carson, I. Waller and N. Scott (Eds.) *Drive Tourism: up the wall and around the bend*, Melbourne: Common Ground.
- Stuart, P., Pearce, D. & Weaver, A. (2005). Tourism Distribution Channels in Peripheral Regions: The Case of Southland, New Zealand. *Tourism Geographies*, Vol. 7, No.3, pp.235-256.
- Supradist, N. (2004). Economic Leakage in Tourism Sector. [Http://theses.lub.lu.se/archive/2006/09/07/1157641240-17033-472/Nareeta.pdf](http://theses.lub.lu.se/archive/2006/09/07/1157641240-17033-472/Nareeta.pdf). Accessed the 29 th of April 2007.
- Taylor, A. & Carson, D. (2007). It's all good: Implications of Environment Choice by Domestic four wheel drive Travellers in Australia. Proceedings of the 17th annual CAUTHE Conference. Sydney, 11-14 Feb 2007. Sydney: Sydney University of Technology.
- Taylor, A. & Prideaux, B. (2008). Profiling Four Wheel Drive Tourism Markets for Desert Australia. *Journal of Vacation Marketing*, Vol. 14, No.1, pp.71-86.
- Tremblay, P., Schoenborn, D., Petheram, L., Young, M. & Lammers, K. (2005). *Assessing Demand for Indigenous Tourism: International Comparisons; A report for the Northern Territory Tourist Commission*. Darwin, Charles Darwin University.
- Tourism Research Australia. (2005a). International Visitor Survey. [Http://www.tra.australia.com/international.asp?sub=0038](http://www.tra.australia.com/international.asp?sub=0038). Accessed the 21 st of December 2009.
- Tourism Research Australia. (2005b). Quarterly Reports. [Http://www.tra.australia.com/domestic.asp?sub=0031](http://www.tra.australia.com/domestic.asp?sub=0031). Accessed the 21 st of December 2009.
- Wilton, J. & Nickerson, N. (2006). Collecting and using visitor spending data. *Journal of Travel Research*, Vol. 45, No.1, pp.17-25.

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REFEREED ANONYMOUSLY

Andrew Taylor (andrew.taylor@cdu.edu.au) is a Senior Research Fellow with the Population and Tourism Studies Group within the School for Social Policy and Research at Charles Darwin University, Ellengowan Rd, Darwin, Northern Territory, Australia.

Dean Carson (dean.carson@cdu.edu.au) is Principal Research Fellow with the Population and Tourism Studies Group within the School for Social Policy and Research at Charles Darwin University, Ellengowan Rd, Darwin, Northern Territory, Australia.

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