Enhancing knowledge transfer in tourism: An Elaboration Likelihood Model approach

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ABSTRACT

It has been widely recognised that knowledge transfer between tourism academics and the tourism industry is inefficient and ineffective. This research responds to this challenge by applying the Elaboration Likelihood Model (ELM) as a framework to guide the design of knowledge transfer in tourism, from the early design of research through to the delivery of the data. The ELM model posits that messages can influence behaviour via both peripheral and central cues, yet surprisingly has scarcely been applied to knowledge transfer literature. The paper argues that new technology enables innovative, usable and credible visualisation of tourism data, thus maximising the opportunity to apply principles of ELM and ultimately the transfer of knowledge to an array of tourism stakeholders from different backgrounds. In doing so, it presents an opportunity to depart from traditional reporting formats, and as such, enhances the uptake of academic tourism research by the tourism industry.

1. Introduction

Knowledge transfer (KT) has an immense impact on economic and socio-cultural systems, especially as it influences innovation management at its very core (Grosse Kathoefer & Leker, 2012; Sørensen, 2007). Nowadays, universities play an increasingly important role in the knowledge economy in terms of producing and disseminating knowledge. Although universities are aware of their role in terms of knowledge creation, the general perception remains that universities are 'ivory towers' and do not relate to every-day practical realities and business practices (Hawkins, 2006). As such, the transfer of academic knowledge into industry is an emerging concern for academics and practitioners alike (Cooper, 2006; Czernek, 2017; Walters, Burns, & Stettler, 2015).

In times of continuous technological, socio-economical and regulatory advancement, academic researchers and industry practitioners in many sectors (IT, engineering, medicine etc.), have embraced cooperation to promote bidirectional knowledge sharing (Brennenraedts, Bekkers, & Verspagen, 2006; Cummings & Teng, 2003). However, as emphasised by Czernek (2017), Walters et al. (2015), and Scott and Ding (2008), the tourism and hospitality industries are lagging in this area. Although competitive research funding programmes such as ARC Discovery in Australia, Innovate UK in United Kingdom, Horizons 2020 in the European Union and the United States Department of Commerce now require dissemination and communication of research results

(Australian Research Council, 2016; European Commission, 2016; Government of United Kingdom, 2018; US Department of Commerce, 2018), concerns remain as to how to best communicate processes and results to a wider audience.

Tourism research faces idiosyncratic knowledge transfer hurdles, which are attributed to the vagaries of the tourism industry. The tourism industry is spatially diffuse, highly fragmented in its ownership structure and product offerings, seasonal, characterised by a highly changeable workforce, and, perhaps most importantly, thought to have a low uptake of research findings (Czernek, 2017; Hallin & Marnburg, 2008; Hjalager, 2002; Shaw & Williams, 2009). One of the persistent criticisms of the failure of KT in tourism research relates to communication (Cooper, 2006; Czernek, 2017; Hawkins, 2006; Thomas, 2012; Xiao & Smith, 2007). First, it is posited that one communication challenge relates to the nature of the research being undertaken; Xiao and Smith (2007, p. 315) argue that tourism research's multidisciplinarity can cause issues: 'some of its contributing disciplines make significant contributions to conceptual understanding whereas others contribute more to instrumental, political and process uses'. Thus, while academics produce a significant quantum of tourism research, only a small subset of it may be relevant for industry. A second communication challenge relates to language. Often when academia and the tourism industry attempt to communicate and collaborate, it seems that the two speak two different languages – one academic, one commercial.

A lack of applied knowledge of tourism management has hindered

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the debate on knowledge transfer in the tourism industry (Grizelj, 2003). In response to this deficiency, using the Elaboration Likelihood Model (ELM) as a framework, this paper explores the elements of ELM that may enable successful bi-directional knowledge transfer, with a focus on knowledge transfer from academia to industry. The paper is based upon research which adopted an action research approach to undertake a project that tracked tourists via an app with integrated GIS and survey software, as they travelled through Tasmania. This research was based upon a participatory design approach which featured extensive engagement between university researchers and local tourism stakeholders.

1.1. Knowledge transfer: definitions and origins

As early as the 1960s, discussion surrounding the concept of knowledge transfer and management emerged within various fields and disciplines (Tuomi, 2002). Its first formal definition was provided by Chase (1997, p. 83): 'the encouragement of people to share knowledge and ideas to create value-adding products and services.' Since then, a variety of definitions have emerged many focussing on new knowledge (Kakabadse, Kakabadse, & Kouzmin, 2003; Rogers, 1995) as a result of interaction between one entity (individual or group) to another (Czernek, 2017; Hawkins, 2006). The process of knowledge transfer has been widely conceptualised through the Triple Helix framework that investigated University-Industry-Government relations in the knowledge-based economies (Champenois & Etzkowitz, 2017; Etzkowitz & Leydesdorff, 1995).

Recently, the concept of innovation has been incorporated into these definitions – Hallin and Marnburg (2008) argue that the key role of KT is the ability to promote innovation in light of the knowledge-based economy. Furthermore, Champenois and Etzkowitz (2017) assert that the interaction of the three institutional spheres – University-Industry-Government – provides a location conducive to 'innovation in innovation'. This paper uses two definitions of KT to guide its direction. We combine elements of sharing and idea generation from the early definition by Chase (1997) with the aforementioned work by Hallin and Marnburg (2008). Like Xiao and Smith (2007), we regard KT as an 'outcome' as well as a 'process' of academic research, with the application of knowledge representing the ultimate goal of information dissemination. Consequently, we define KT in tourism as the sharing of knowledge and ideas between groups that results in the creation of innovative tourism products and services.

The evolution of knowledge transfer and management (terms that are often used interchangeably) as a concept has been influenced by three phases in the knowledge management literature (Cooper, 2006):

1. The role of information technologies in enhancing productivity by managing the rapid growth and availability of information.
2. An understanding that people live in a knowledge-based society that is driven by markets rather than production, and, as such, the focus is on customers and service quality. It is understood that businesses become more competitive by immersing themselves into untapped practices and knowledge.
3. The realisation that knowledge has become a resource. This stage focusses on removing barriers to knowledge transfer and adoption.

Given these developments many governments are actively promoting the diffusion and commercialisation of research. This is a result of a realisation that the ability successfully exploiting its intellectual and knowledge-based assets is a key factor playing into a nation's competitiveness (Ruhanen & Cooper, 2004). The transfer of knowledge is a pivotal factor when determining the success of knowledge management structures. For example, since the launch of the program in 1990, the Australian Government has funded 211 Cooperative Research Centres for industry-led research hosted by an Australian university or research organisation. The programme has seen approximately 4 billion

AUD spent to facilitate knowledge transfer between researchers, government and industry (Australian Government, 2016; The Allen Consulting Group, 2012). In return, The Allen Consulting Group (2012) report estimated upwards of 14.45bn AUD in direct economic benefits as a return on this investment. More recently, popular political discourses around an innovation economy and an 'ideas boom' have led to further incentivising for research in collaboration with industry, including the Linkage Grants scheme of the Australian Research Council (Australian Government, 2015). While political will, and to some extent, research funding, exists to support and enhance KT, there are still barriers to maximising its efficiency and outcomes.

1.2. Constraints of knowledge transfer in tourism

The concept of knowledge transfer appears infrequently in tourism research. This differs from other academic fields of study such as agriculture, engineering, ICT and mining, who have a strong tradition of University-Industry-Government collaboration, which is often framed as extension, research and development (R&D) or research and innovation (Caravannis, Rozakis, & Grigoroudis, 2018; Chapman et al., 2018; McDowell, 2003; Roling, 1988). An entire body of research is now dedicated to exploring the phenomena of technology transfer, with publications such as the *Journal of Technology Transfer* devoted to the field. Several authors (e.g. Scott & Ding, 2008; Walters et al., 2015) highlight this difference in research traditions. They pose that the tourism industry trails behind other industries in terms of knowledge sharing practices. When it is addressed within the tourism literature, research into academic knowledge generation and transfer tends to be primarily focused on the hospitality sector (Cooper, 2006; Frechtling, 2004; Ruhanen & Cooper, 2004). A small body of research addresses knowledge transfer in tourism enterprises; Xiao and Smith (2007) identify that knowledge transfer faces barriers in a tourism industry built primarily on small and medium enterprises, while Cooper (2006), Shaw and Williams (2009), and Weidenfeld, Williams, and Butler (2010) investigate knowledge transfer as it is applied to the varying sizes of tourism enterprises.

The reasons why knowledge transfer in tourism falls behind other industries has been considered from a number of angles. Czernek (2017) argues that tourism practitioners regard tourism research as 'unnecessarily complicated' and 'excessively sophisticated'. As such, they favour tools that are easy to implement, understand and are solution-based. Similarly, Walters et al. (2015, p. 492) emphasise that in order to ensure a successful communication between tourism researchers and tourism practitioners, tourism research should be presented 'in a manner that enables industry to have a comprehensive understanding of the results'. In other words, tourism researchers should learn how to be bilingual, i.e. they should learn the language of the industry. A further constraint on knowledge transfer is the current publishing environment within which many academics now work. Journal ranking schemes and performance incentives for publishing within high ranking journals act as powerful incentives for the prioritisation of publications over industry engagement and dissemination. While recent government initiatives in countries such as the United Kingdom (UK) and Australia have added engagement and impact to their research priorities, research output and journal ranking quality (referred to as the publish or perish phenomenon) remains the dominant standard for promotion and appointment processes. Arguably, this serves as a significant constraint to enhanced knowledge transfer practices between the tourism industry and academia.

The effectiveness of academic knowledge transfer between universities and the tourism industry is discussed by Cooper (2006) and Xiao and Smith (2007). They propose that knowledge use is more effective when developed in collaborative research networks. The authors argue that there is a need for research designs that examine issues associated with improved knowledge and use of academic research. The same authors summarise the work of Menon and Varadarajan (1992),

and Souchon and Diamantopoulos (1996) who argue that three central components must exist to enable an effective academic knowledge transfer:

1. 'Usability', which refers to the potential that knowledge can be employed. This component is also affected by usability and value because the extent of use is affected by its perceived quality and potential to produce desired results.
2. 'Usefulness', which refers to the potential for a body of knowledge to produce an outcome that can be evaluated as effective.
3. 'Credibility', which is the quality of research information in terms of whether it can be believed.

Despite the emergence of numerous theoretical models, there is relatively little academic literature pertaining to knowledge transfer between academic researchers and the tourism industry (Bouncken, 2002; Czernek, 2017; Frechtling, 2004; Hallin & Marnburg, 2008). The recreation literature, for example, explores the reasons why tourism practitioners do not find academic research relevant to their needs; authors such as Kelly (2000) and Hemingway and Parr (2000) argue that a disconnect exists between practitioners that espouse an appreciation for research, but ultimately fail to use it. Suggestions have been made that when academic knowledge is generated, it is often seen as overly complicated and difficult for operators to absorb and to understand (Bouncken, 2002; Ritchie & Ritchie, 2002). Similarly, Hallin and Marnburg (2008) argue that too often, the techniques and strategies which are offered to the hospitality industry are too unclear to implement. Alternatively, Ruhannen and Cooper (2002) argue that the standard delivery of results via PowerPoint presentations, reports or workshops do not always reach a wide audience. Cooper (2006) suggests this delivery mode illustrates a lack of understanding of the need for possible commercial outcomes to be highlighted through research. Therefore, the need for approaches that capitalise on technological innovations and ensure efficient communication at all stages of research design and reporting are paramount.

1.3. The Elaboration Likelihood Model (ELM)

The Elaboration Likelihood Model is a widely applied persuasion model that informs how different kinds of messages influence peoples' attitudes and behaviours. Petty and Cacioppo (1986) outline two methods of persuasion: central and peripheral. They argue that cognitive effort in processing a message is related to behavioural impact; more direct processing effort leads to more influence over future behaviour. Central-route and peripheral persuasion can be seen as opposite extremes of a continuum, with central-route persuasion requiring the maximum effort and leading to the largest behavioural effect (Brown, Ham, & Hughes, 2010; Kitchen, Kerr, Schultz, McColl, & Heather, 2014; Wright, 1997). The elaboration likelihood can range anywhere from the pre-attention and low elaboration stage (peripheral route), which does not involve much cognitive effort, to the focused attention and high elaboration stage (central route). The latter requires the greatest investment of cognitive effort.

The ELM offers a theoretical explanation as to how recipients cognitively elaborate on a particular message in different contexts and situations (Angst & Agarwal, 2009). Sussman and Siegal (2003, p. 50) explain that 'elaboration involves attending to the content of the message, scrutinising and assessing its content, and reflecting on issues relevant to the message.' When a message is presented to individuals in different contexts and situations, the way recipients perceive the message will vary according to how much cognitive effort they will devote to that message. This process informs how new perceptions have formed, and how previous views and convictions have been modified. On the other hand, attitudes and new perceptions are shaped by recipients' emotional and cognitive evaluations of themselves, others, surrounding objects or facts; these factors influence one's behaviour,

emotions, preferences and knowledge (Zander, 2006). The strength and impact of the persuasion method is assessed by attitudinal and behavioural effect (Kitchen et al., 2014).

The ELM is widely applied in the fields of healthcare, commerce, advertising communications, media, politics as well as protected areas management (Brown et al., 2010; Kitchen et al., 2014). Only a small body of research employs the ELM in knowledge transfer and knowledge management contexts (Fadel, Durcikova, & Cha, 2008; Sussman & Siegal, 2003). For a comprehensive review of Elaboration Likelihood Model, please see Kitchen et al. (2014).

In the applied context of knowledge transfer, the ELM helps us to understand the impact various factors may have upon the likelihood that information is taken up. In other words, the aforementioned components of knowledge transfer – 'usability', 'usefulness', and 'credibility' – should be strongly linked with information adoption and whether the chosen transmission channels deliver the intended outcome. The latter is particularly pertinent, when assessing new technologies as means to transmit knowledge. Fadel et al. (2008, p. 1) argue that 'information technology is an ideal vehicle for supporting mediated knowledge transfer'. On the other hand, there have been some suggestions that the ease of modern information technology can hinder this process, as users simply do not need to work as hard and expend as much thought and energy (Yoo, Goo, Huang, Nam, & Woo, 2017).

Previous research has suggested that when dealing with stakeholders of different information technological abilities, self-efficacy determines whether a central or peripheral route to decision making is taken (if they are not confident with technology, then they tend to use peripheral cues) (Yoo et al., 2017). The traditional ELM model argues that two factors influence decision-making: information quality (via the central route) and source credibility (peripheral route factors) (Petty & Cacioppo, 1986). Yoo et al. (2017) added two more factors of peripheral route variables: interactivity and accessibility. The authors frame these factors and the route that they influence as follows:

1. Source Credibility – peripheral route
2. Quality – uses central route
3. Interactivity – peripheral route
4. Accessibility – peripheral route

Given that the mandate of the ELM is to maximise uptake of communicated messages, this approach offers an appropriate framework against which knowledge transfer programs can be designed. In saying this, the approach taken for this research does not attempt to assess whether the ELM is validated in this instance, but rather it applies the ELM as an explanatory framework to aid in the design of knowledge transfer.

1.4. Knowledge transfer and the tourism tracer project

Tasmania is an island located to the south eastern coast of mainland Australia. The island is around 500 km north to south and around 400 km from west to east. Tasmania is sparsely populated, with just over half a million residents. Almost half its land mass is protected as a national park, crown land, state forestry land and much of that is listed as World Heritage Area. Tasmania's primary economic sectors include agriculture and tourism, the latter of which is worth 9 per cent of the Gross State Product (State of Tasmania, 2015). Tourism is undergoing a sustained growth period on the island with an 8% growth in 2016, bringing total f visitors to the state to 1.2 million in 2016 (Hardy et al., 2017; State of Tasmania, 2015).

In terms of tourism research, Tasmania has a natural advantage as an island with three major entry points (Hobart Airport, Launceston Airport, and the ferry terminal at Devonport), thus making the interception of tourists arriving in or leaving the state relatively easy. Since 1978, Tourism Tasmania has administered the Tasmanian Visitors Survey (TVS) to departing visitors. This database of up to 9000

respondents is collected on a yearly basis and provides the state with a highly valuable data set on visitors' demographics, reason for visit, travel party structure and information on places that tourists visited (Hardy et al., 2017). Private research companies administer the TVS and its large data set is highly regarded by the tourism industry.

While the Tasmanian tourism industry is relatively highly engaged with research undertaken by the TVS, there was, at the start of this research, relatively little engagement with the university sector. In 2013, a network called the Tourism Research and Education Network (TRENd) was set up within the University of Tasmania with the goal of enhancing linkages between the university and the industry. TRENd signed MOUs (Memorandums of Understanding) with state government agencies and was in the process of organising industry events around the time that this study began. However, there was a great deal of scepticism about the ability of the university to undertake industry relevant research in a timely manner, which was regularly communicated to the research team. This scepticism of the likelihood of industry relevant research being able to be undertaken by the university was so strong that when the funding body for this research project announced calls for proposals, the research team was unable to secure an, in principle, non-financially binding support letter from the industry for this research initiative. This scepticism and disconnect between academia and the tourism industry underpinned our approach that sought to overcome this. Specifically, the research team sought to produce outcomes that could be directly applicable to a wide range of tourism stakeholders in Tasmania.

2. Methods

The goal of this study was to use the ELM as a framework to guide the design of research that would maximise knowledge transfer. The study was funded by a research body committed to producing industry relevant research that could be utilised by the tourism industry. Consequently, an action research approach was deemed appropriate. This approach seeks to create change by producing new knowledge and improvements to 'real life' practical situations within organisations, or in this case, sectors (Patton, 2002; Susman, 1983; Susman & Evered, 1978). At the heart of this approach is the placing of theory and practice side by side and involving those within organisations so that specific problems can be explored (McKay & Marshall, 2001; Patton, 2002). Given that this study was not conducted at an organisational level, the research team took the ethos of the action research approach and applied it to the case of Tasmania. Two approaches can be taken to studies utilising action research: participatory, critical approaches that are suited to situations with unequal power relations; or pragmatic approaches that are suited to contexts, where practical problems in organisational settings are studied with the expectation that solutions will be sought (Botterill & Platenkamp, 2012; Johansson & Lindhult, 2008; Khoo-Lattimore & Gibson, 2015; Reason & Bradbury, 2001; Susman, 1983). A pragmatic approach was used for this study. The research followed Susman's (1983) five phases of action research, all of which require self-reflection and planning, acting and observing (Altrichter, Kemmis, McTaggart, & Zuber-Skerritt, 2002). These were: 1. diagnosis of the problem; 2. deliberating over possible forms of action; 3. 'action taking', where collaborations were formed with key industry groups in order to work with them in an attempt to solve the problem; 4. evaluation of the data to assess the success of the action in conjunctions with our industry partners; and 5. specifying learning where general findings are identified and shared with those participating in the research process (Susman, 1983; Susman & Evered, 1978). For this project, we used these five phases but synthesised them into three stages to respond to the needs of the stakeholders within our case study region. These were:

1. Diagnosis of the problem and deliberation over possible forms of action;

2. Action taking; and
3. Evaluation and sharing of the data.

Unlike research that uses focus groups, surveys or ethnography, the action research approach collates data through its stakeholder consultation stages. In stage one this included interview with key stakeholders, feedback following a public seminar and via a specially convened advisory board. During stage two, data was gathered from observation, interviews with key stakeholders, and assessments of user engagement with the technology, blogs and a website. The data from the interviews and feedback from the public seminars was transcribed and analysed manually using theoretical sampling techniques, thus allowing for iterative refinement and the development of themes that reflected the current environment (Hardy, 2005). Stakeholder engagement with the technology was drawn from the assessment of website traffic, which were collected automatically by the team's IT provider.

It was the research team's priority that the research approach and data gathering process was undertaken in a methodologically rigorous, transparent and replicable manner to reassure the industry stakeholders that our data was of a high quality from its inception stage, through to its analytical stage. We sought to encourage the use of peripheral and central cues at all stages of the research. The following paragraphs provide a detailed discussion of the stages of action research that were taken as well as using the ELM framework as a guide.

3. Results

3.1. Stage 1: Diagnosis of the problem and deliberation over possible forms of action (November 2015–March 2016)

3.1.1. Encouraging use of central cues

The research team set up structures to ensure high level industry involvement from the outset of the project. Following the announcement that the research funding had been granted in November 2015, the team liaised with key stakeholders within the industry and government departments. Interview notes recorded their feedback and ascertained that while longitudinal data had been captured via the TVS on visitor demographics for the past 30 years in the state (Hardy et al., 2017), there was a general sense that a lack of research existed on how tourists dispersed through the state, where they stayed overnight and how they consumed destinations. During this stage, it was also ascertained that aligning new research to the long-running TVS would enhance the quality of the research as it could build upon existing data. These interviews served a dual purpose; they collated research needs and enhanced the credibility of the methods the research team subsequently proposed.

In addition to liaising with key stakeholders to determine a research question the research team also advertised a lunch time seminar that tourism industry representatives were invited to attend in two locations within the state. This was widely advertised and held at an easy to access, central location. Over 50 members of the community attended the two workshops and the research needs that were discussed during the workshop were recorded, transcribed and thematically arranged, and incorporated into the survey design.

Following this, in order to ensure that the data was relevant for the tourism industry, the research team established an Advisory Board made up of government and tourism industry representatives, to help ensure that the project produced relevant, engaging and impactful research for the Tasmanian community. This Board met every three months for the life of the project, and advised on matters including project design, methodology, recruitment, marketing, key areas of analysis, Dashboard functionality and testing. Significantly, it allowed key stakeholders to have a say in the direction of the research and report back to their networks.

3.1.2. Encouraging use of peripheral cues

According to Yoo et al. (2017) source credibility occurs as a result of peripheral cues. This was particularly important for this research as the research team was aware that despite some tourism stakeholders having high level research skills, there were many who did not. For these stakeholders, trust in the research would need to be gained through the provision of peripheral cues.

In order to do this, we assembled a team of researchers with two essential skills: research skills and communication skills. The interdisciplinary and international research team provided central cues to those with research skills in the industry. But for those stakeholders whose self-efficacy was low, we needed to assemble a team with high level communication skills who could relate to the needs of the tourism industry – we termed this being *'bilingual'*. Our international collaborators were invited to Tasmania to meet with the research team and give seminars on their research. This attracted significant media attention and their seminars were well attended. Our international collaborators delivered seminars in non-academic language that detailed the current state of play in tourist tracking and digital visitor technologies. Consequently, they played a significant role in aligning the research in Tasmania with other international projects on tourist tracking. These seminars acted as important peripheral cues for those less well versed in research as well as important cues with higher levels of self-efficacy in research.

3.2. Stage 2: Implementing the industry engagement strategy (February 2016–May 2017)

3.2.1. Encouraging use of peripheral cues

In order to engage the tourism industry in our research, the team employed a number of strategies to provide peripheral cues. During the first year, the project was funded by a research organisation called Sense-T, but the team used University of Tasmania branding as it was regarded as symbolising unbiased, reliable research. This acted as a significant peripheral cue for both industry members with lower knowledge of research, as well as for potential participants in the study.

In the second year of the research, once the project had attracted a large amount of attention, but was no longer funded by Sense-T, the team employed a marketing firm and graphic designer to design a brand architecture, including a logo for the study. The project was branded 'Tourism Tracer'. This was consistently used on our signage, pamphlets, dashboard, and all marketing collateral.

At the commencement of the data collection phase in February 2016, a media release was created to advertise the study. During this time, it was reported that the research received in-kind support from Hobart Airport, Launceston Airport and the Spirit of Tasmania ferry operator. These well-known brands added further credibility and therefore acted as peripheral cues of credibility for the industry.

Once data began to be collected, a second media release that was prepared invited a response from the head of the Tourism Industry Council. The following testimonial was given: *'It's almost jaw-dropping when you see the potential of what that could mean for the state'* (SBS News, 2016). This acted as an incredibly powerful peripheral cue and resulted in the story being reported in all major newspapers in every state of Australia, during April 2016.

Following the media releases, in 2016 a blog was created to detail the progress of the project. The blog was designed to trigger both peripheral and central cues. For those with fewer research skills, the blog visualised the data using animations rather than graphs, so that users could visualised where different types of tourists travelled. It was a resounding success; analytics revealed it received 4000 hits in its first week of existence and in total was accessed over 8000 times.

3.2.2. Encouraging use of central cues

Based on previous research that demonstrated the effect that information quality has upon central cues (Zhou, 2012), the team gave a

special focus to communicating the quality of the data via the blog, as the main central information-processing route. For those who had high levels of research skills (aka self-efficacy) we developed a data insights page on the blog, where detail was provided on methods and analytical techniques. For those who had high levels of IT skills (self-efficacy) it was apparent that the team had used highly innovative animated programming to visualise the data sets. This acted as an important central cue that was further consolidated when the research team received Merit Awards at both the Tasmanian and Australian 2016 i-awards, which is Australia's leading digital awards program.

3.3. Stage 3: Evaluation and sharing of the data (April 2016–May 2017)

3.3.1. Encouraging use of central cues

As with the data collection stage, this stage focussed on demonstrating the quality of the data through our analysis and visualisations, in order to encourage central cues. This was done in a number of ways, to build upon the intense interest in the project and in particular, the blog.

The team decided to design a data dashboard that allowed for bespoke access of the data, depending on stakeholders' needs. This resulted in the development of www.tourismtracer.com. The integrated tracking and survey data were overlaid on a map of Tasmania and filters gave the user options to view the movement of different styles of tourists (see Fig. 1), such as those who were in the state for different reasons, those who were different ages, in different styles of transport, who entered and exited the state through different locations and were repeat or first time visitors to the state. Instructions on how to use the dashboard's filters were provided on a YouTube video, serving the purpose of further encouraging the use of central cues.

In addition to visualising our own data on the dashboard, the quality of the data was enhanced by coordinating our GPS data with the Australian Tourism Warehouse GPS data set. This data contained the GPS coordinates of a large majority of the attractions, restaurants and events in the state. The synthesis of these two data sets meant that individual operators could find their business on the map and then visualise the movement of tourists, by differing segment, to and from their business and then on to other businesses. For those already adept at data analytics, the integration of these multiple data sets acted as powerful central cue.

3.3.2. Encouraging use of peripheral cues

Prior to the release of the dashboard in May 2017, the team undertook extensive market testing of the dashboard amongst a range of stakeholders to ensure that it was as user friendly as possible. Six key stakeholders were asked to view and use the dashboard and to describe their perception of the user experience. Thus, the interview data assisted with issues that required adjustment such as the visuals used on the dashboard. Our observations of stakeholders' use of the dashboard elicited data on the most and least used parts of the dashboard. Several adjustments were made to incorporate our critical observations. These included changes to the time slider and filters.

Overall, the dashboard had simplicity at its core; the entry page contained only the brand logo and the sponsors' logos, and all other pages were purposefully sparse in their layout to minimise confusion and enhance engagement wherever possible. For those with less research background in the tourism industry, a number of techniques were used to encourage peripheral cues. The dashboard's use of animated dots to represent tourists moving through the state (see Fig. 2) and its avoidance of unnecessary graphs or tables ensured that the data did not overwhelm non-researchers. If users chose to view the tourists' movement as animations, the page would automatically darken after 6pm, so that viewers would know that the tourists' movement they were watching was occurring at night-time. The dashboard was designed to be accessible via computer and smartphone, further enhancing its access. It proved highly effective, as it was an unusual approach; indeed,
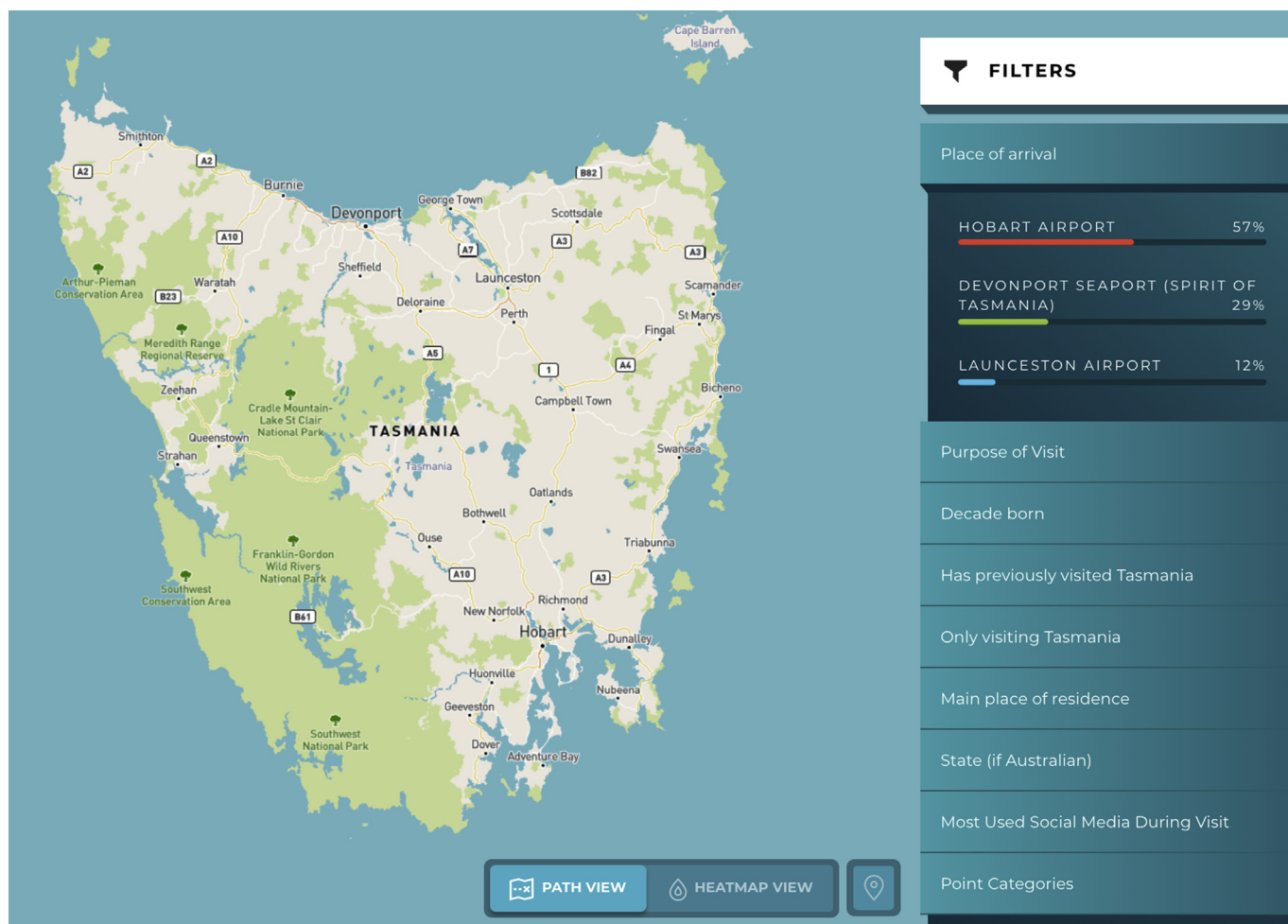
Fig. 1. Tourism Tracer dashboard with demographic and behavioural filters.

it was one of the first times that tourists' movement had been reported in an animated way, thus provided significant peripheral cues regarding the quality of the data.

The dashboard was launched in May 2017 by the Premier of Tasmania and was accessed over 5000 times in the year following its launch. This resulted in an invitation from the United Nations World Tourism Organisation (UNWTO) for the research project to be an official Research Partner of the Sustainable Tourism branch of the UNWTO. These two events acted as very powerful indicators of source credibility and in doing so, attracted the attention of those not previously aware of the research. Source credibility has been documented as playing an important role in the provision of peripheral cues and attitudinal change (Petty & Cacioppo 1986; Sussman & Siegal, 2003).

Ultimately, the interactivity, accessibility and source credibility of the dashboard proved to be highly significant. Since its creation the dashboard as has been accessed over 5000 times from users in all continents across the globe.

4. Conclusion

The purpose of tourism tracer project was to maximise knowledge transfer between the tourism research community and the tourism industry. The research team needed to communicate their data using cutting-edge technology to a variety of stakeholders within the tourism industry, ranging from researchers in government bodies, through to operators with different educational backgrounds. The action research approach elicited several key insights into knowledge transfer in tourism. First, it highlighted the need effective communication and the

uptake of academic research to be maximised at all stages of research. Efficient and appropriate communication between the research community and the tourism industry is paramount, especially given recent mandates in the UK and Australian university sectors for academics to undertake impact-driven research.

The second key insight from this research relates to its theoretical contribution. ELM techniques have rarely, if ever, been applied to studies of knowledge transfer in tourism. Our application of the technique demonstrated how the recognition of the roles of peripheral and central cues in communication can enhance the process and outputs of knowledge transfer. For this research, consideration of the ELM was embedded into all stages of the project's aims, design, data collection, analysis and visualisation (Fig. 3).

During the diagnoses and problem deliberation stage, the research team created peripheral cues such by ensuring the research team included a person able to communicate effectively with the tourism industry – we referred to this as ensuring we were 'bilingual'. The team also held a seminar soon after the research was announced that was led by our international collaborators- this situated the research in the international context and assured the industry that the approach was relevant and could be of use to the tourism industry. The research team ensured the research question was relevant by involving the tourism industry in deliberations over the precise research question, by assessing the research question in light of existing sources of data and creating an advisory board for the duration of the project. Once the research began, the research team continued to encourage central cues through regular research updates (called Data Insights) and as data began to be collected, the team applied for and was subsequently
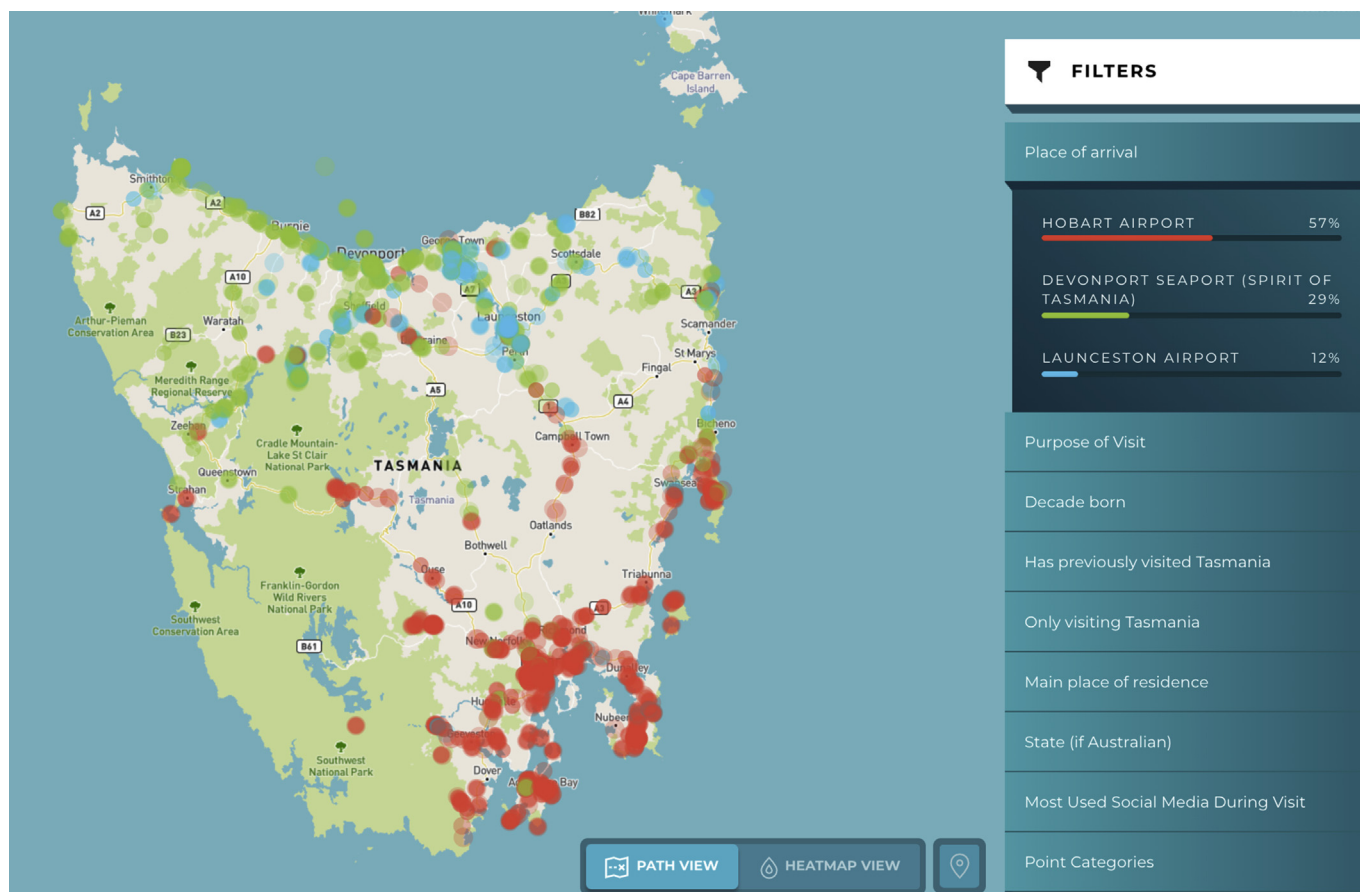
Fig. 2. Tourism Tracer's animated data dashboard indicating dispersal of tourists.

granted several industry awards. Peripheral cues were also encouraged through branding the research project (as Tourism Tracer), using social, print, radio and television media to update data collection progress and through the sharing of industry testimonials of support for the project. These actions ensured that interest and support for the project remained.

During the data evaluation and sharing stages, central cues were encouraged in several ways. Initially the analysis was detailed on a blog, which was paired with, YouTube videos that gave instructions on how to interpret the data. This approach was taken following the suggestion by Fadel et al. (2008, p. 1) that technology offers an alternative to enhance knowledge transfer. Moreover, this approach was also a result of criticisms by Ruhanen and Cooper (2004) and Cooper (2006) that traditional modes of data presentation are neither appropriate for a wide audience, nor do they facilitate insights that are relevant for business operators. Following the success of the blog, a data dashboard was released, and this catered for stakeholders with and without research expertise, thus encouraging both central and peripheral cues. In order to encourage peripheral cues, the data dashboard used animations and avoided using raw statistics and traditional academic forms of data visualisation, such as complicated graphs and data tables. The user-friendly filters allowed users to interact with the data at the level that they required; participants became intellectually involved through this process as they were able to engage with the data, thus, in turn, it encouraged communication via the central route (Yoo et al., 2017). Finally, central cues were encouraged during the final stage by aligning the data with other publicly available data sets. This approach has been documented as positively influencing users with a high level of research knowledge, thus encouraging uptake via the central route (Sussman & Siegal, 2003).

Overall, the action research approach illustrated the multiple stages

that ELM should be considered when planning, undertaking and evaluating tourism research that seeks to maximise knowledge transfer. The ELM approach engaged stakeholders with little expertise in research through its use of peripheral cues. In addition, it engaged those with high levels of research knowledge through its use of central cues. Consequently, the ELM offers a holistic approach to the *process* of knowledge transfer.

From a practical perspective, while this study was conducted in Tasmania, a number of lessons have emerged that could assist industry destinations with their knowledge transfer practices. The first lesson learnt is that research bilingualism, from the inception of the research, through to its conclusion is essential. The inclusion of individuals within research teams that are able to translate research findings into palatable language and visuals will ensure that the take up, involvement in and use of data is maximised. Concurrently, there is also a need for individuals within the tourism industry to act as liaisons with the researcher responsible for transferring knowledge. This further enhance knowledge transfer. The second key lesson that has emerged from this study is the need for knowledge transfer practices to be embedded within all stages of the research. The stages may not be directly sequential and may occur concurrently. However, consideration of research plans, objectives, methods, analysis and visualisation is essential for all research that seeks to transfer knowledge. Too often, knowledge transfer is considered only once data analysis emerges; this project has highlighted the need to involve the industry in the early design of the research project. The third key lesson from this project is that it is integral to consider the range of stakeholders within the tourism industry who may use research data. Importantly, their interest and ability to interpret data differs widely. The use of the ELM and specifically its consideration of central and peripheral tools that enhance knowledge transfer will ensure that knowledge transfer in destinations beyond
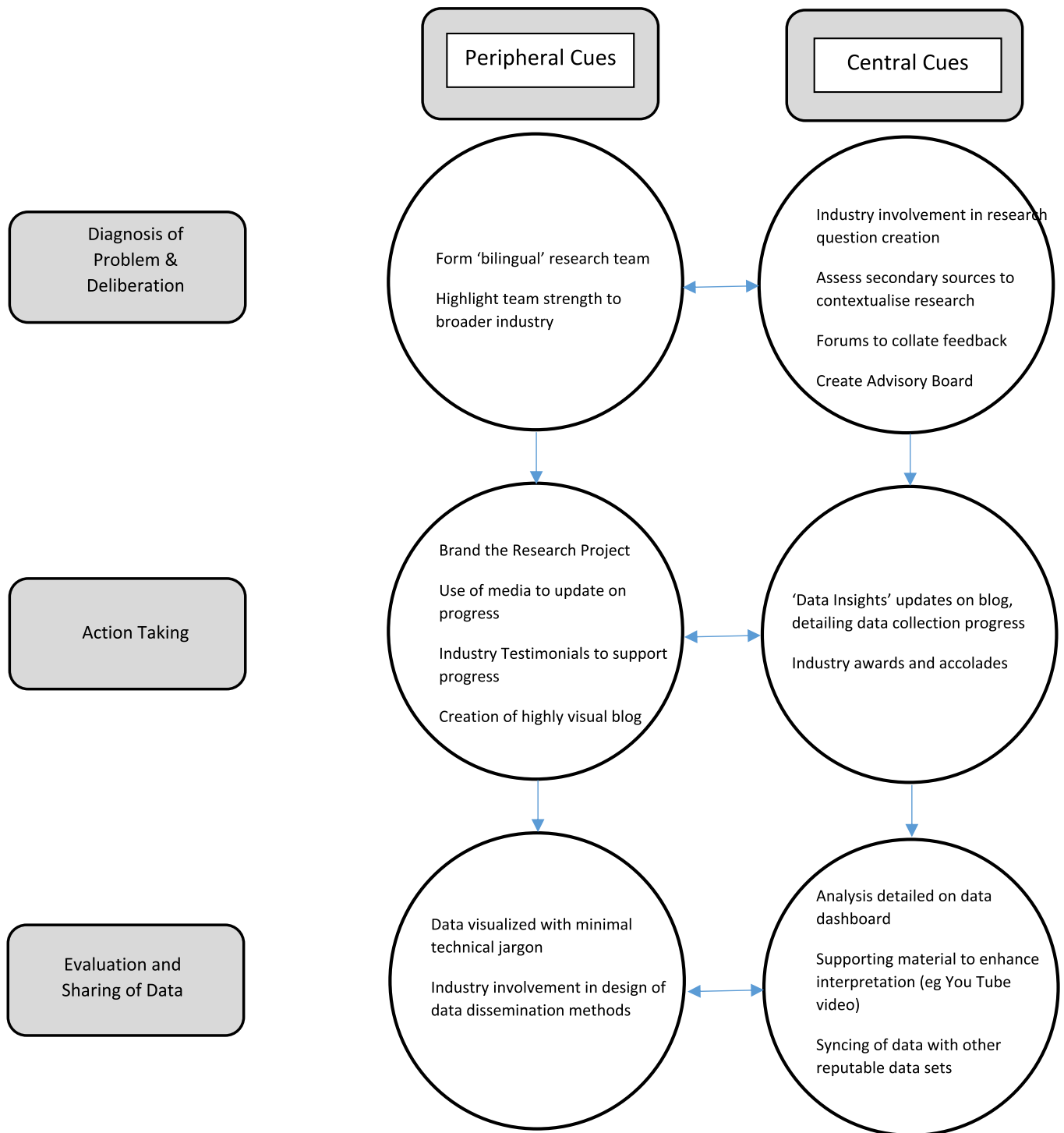
| Peripheral Cues | Central Cues |

Diagnosis of Problem & Deliberation

Form 'bilingual' research team

Highlight team strength to broader industry

Industry involvement in research question creation

Assess secondary sources to contextualise research

Forums to collate feedback

Create Advisory Board

Action Taking

Brand the Research Project

Use of media to update on progress

Industry Testimonials to support progress

Creation of highly visual blog

'Data Insights' updates on blog, detailing data collection progress

Industry awards and accolades

Evaluation and Sharing of Data

Data visualized with minimal technical jargon

Industry involvement in design of data dissemination methods

Analysis detailed on data dashboard

Supporting material to enhance interpretation (eg You Tube video)

Syncing of data with other reputable data sets

Fig. 3. Using the elaboration likelihood model for knowledge transfer in tourism.

Tasmania will be maximised.

Further research is now needed to qualify and quantify the impact that the ELM has upon knowledge transfer uptake by the tourism industry in the medium and longer term. Knowledge transfer may be regarded as the process for the design and delivery of research insights. Given that universities are now being encouraged to undertake impactful research, further research into this approach could offer the potential to maximise this outcome.

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