

MODELLING THE UPTAKE OF VISITOR RESEARCH IN PROTECTED AREA VISITOR MANAGEMENT

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"Life's a journey – let's get lost!"

ABSTRACT

Protected areas are characterised as environments of constant change, complexity and uncertain conditions. Managers have to achieve biodiversity objectives against a backdrop of great expectations from society. Pressured to deliver quality visitor experiences and generate revenues to fund conservation, they simultaneously face the charge of minimising negative economic, environmental and social impacts from tourism. Effective protected area management should be led by evidence-based decision-making, particularly in areas that require substantial levels of skills and expertise, such as visitor management.

The expansion of tourism research worldwide is significant in terms of the number, sources and communication of research outputs. Through the past two decades, scholars have acknowledged the increasing importance of information on visitors' characteristics, perceptions and behaviours; visitor use patterns; and the benefits and impacts of visitation to protected areas. Yet, there is growing concern that research remains underutilised by policymakers and practitioners, despite the applied nature of the field. Discrepancies and inefficiencies between the production and utilisation of research have been noted both in a broader tourism context and in protected area settings, pointing towards a research-practice divide. Despite its critical importance, it is not clear to what extent the body of visitor research has helped protected area managers identify strategies to deal with visitor management challenges. We know little about its uptake in management areas, current utilisation levels, and the factors that influence its absorption into policy and practice. The purpose of this thesis is to address these knowledge gaps.

This study adopts a mixed-methods research approach. The first part of the thesis describes and delineates two fundamental constructs in protected area tourism research. These include the components of visitor research and the application areas where research is taken up. The results of a systematic quantitative literature review structurally and geographically portray the nature of the body of knowledge on visitor research produced in protected areas during the years 2014 through 2018. Six categories of visitor research are confirmed, using national parks as case studies. There were four categories often produced: socio-demographic attributes; psychographic attributes; use patterns and behaviour; and

experience outcomes. The areas of application, as recommended by the authors of these studies, were evaluated, providing a global perspective of the usability of visitor research in protected areas. Nine visitor management application areas emerged, encompassed in three broader management categories: strategic; tactical and operational; and monitoring and evaluation. The majority of visitor research produced in national parks lead to recommendations for applications in management activities that exhibit a strong visitor interface. These include enhancing the visitor experience; managing visitor use and visitor impacts; improving visitor interpretation and communication; and monitoring and evaluating social and environmental conditions. Even though most studies identified at least one management application area, some areas appeared to be underserved by the current body of knowledge. The findings attest to the importance of accommodating a diverse range of visitor research types for evidence-based decision-making in the value-laden process of managing visitors in protected areas. Apart from the enhanced understanding of the constructs themselves, this thesis also explores linkages between them. The analysis also considered the conceptual, instrumental and symbolic use of visitor research. Academic researchers in outdoor recreation do adapt and embrace the demand for management research. Researchers frequently make recommendations towards instrumental use of knowledge and often suggest more than one area of application. Embedded research capacity further stimulates recommendations towards management applications. That said, recommendations do not automatically translate into implementation. Knowledge utilisation is influenced by many other factors apart from the provision of information.

The thesis explores literature to identify the overarching theoretical explanations and influential individual factors of knowledge utilisation. It also examines the measurement of utilisation. In the second part of the study, the researcher conducted a Delphi survey among a sample of 26 experts from various countries and continents, each highly knowledgeable in protected area visitor research. The main objectives were to determine experts' views on the current application of visitor research in protected areas and identify factors that influence its uptake. The results revealed five dimensions of influencers connecting to six theoretical explanations of knowledge utilisation. The third part of the study applied these findings to develop and test a conceptual model through structural equation modelling (SEM). For this purpose, the researcher utilised data obtained from a survey of 252

researchers working with protected areas. This part of the study quantifies the research-practice gap of the body of visitor research collected in PAs by studying the movement of knowledge through the different utilisation stages. The results confirm other authors' hypotheses of sub-optimal use of visitor research in practice. Large percentages of respondents reached the utilisation stages of *reference*, *effort*, *influence* and *application* only some of the times. Few researchers reported that their results usually influenced management decisions.

The SEM analysis outcomes lead to a novel explanation for the utilisation of visitor research in the context of protected area visitor management. It also reaffirms the importance of the organisational interest and interaction explanations, as widely cited in knowledge utilisation literature. The role of absorptive capacity towards strengthening knowledge utilisation in protected areas is confirmed. The results identify two significant factors that promote better utilisation of visitor research, namely engagement between researchers and practitioners and the skills, capacity and awareness of practitioners to interpret and apply visitor research effectively.

The study outcomes strengthen our understanding of the contribution that both researchers and their research make towards policy transformation in protected area visitor management. Relationship-focussed engagement, where researchers and end-users understand each other's needs and collaborate to achieve common goals, is required to generate more policy-relevant research. Resultantly, more appropriate research questions are formulated, increasing the feasibility of applied research methods and a greater likelihood of practitioners implementing the recommendations. Ongoing engagement also increases the absorptive capacity of practitioners. The study concludes with recommendations proposed to both protected areas and research communities for improving visitor research utilisation. The final chapter identifies a set of significant remaining knowledge gaps that present possibilities for future research.

DEFINITION OF KEY TERMS AND LIST OF ABBREVIATIONS

This section describes the key concepts used in this thesis and its definitions:

Absorptive capacity

An organisation's ability to identify, take in and fully understand, and make full use of knowledge (Tanriverdi & Venkatraman, 2005).

Conceptual use of knowledge

The application of research findings to enhance understanding in the form of theories, concepts and hypotheses, redefining problems without necessarily bringing about direct change in policy (Cherney & McGee, 2011).

Data

Data is considered information that is raw or unorganised, consisting of detached numbers, symbols, words or syllables which relate to the conditions and processes of a business. (Martin & Powell, 1992).

Explicit knowledge

Knowledge that is easy to communicate, store, and distribute – otherwise regarded as documented information and data (Xiao & Smith, 2007).

Information

Information consists of organised facts and data, that are relevant, and dedicated to a particular situation or condition (Baskerville & Dulipovici, 2006).

Instrumental use of knowledge

The application of research findings to an identifiable specific problem in ways which directly influence practitioner decision-making or policy design (Cherney & McGee, 2011).

Knowledge

Knowledge is information with an added lens of values, truths, intuition, beliefs, perspectives and concepts, judgements, experiences and expectations, methodologies, and know-how (adapted from Wiig, 1993; Davenport & Prusak, 1998).

Knowledge transfer

The exchange of knowledge between the producer of knowledge and the recipient of knowledge (Baskerville & Dulipovici, 2006).

Knowledge translation

Defined as the "...practice, science, and art of bridging the know-do gap between knowledge accumulation and use ..." (Ottoson, 2009:6).

Knowledge utilisation / research utilisation

Whether and to what extent sources of evidence are utilised in management or policy decisions (Xiao & Smith, 2007). The terms knowledge utilisation, knowledge use, knowledge application, research utilisation, research use, research uptake, research application and research absorption are used interchangeably in this thesis.

Management application area / management area / application area

A management area, activity or decision where research is applied to (Author's definition).

Management practice

"... An entity of instruments to support the implementation of concepts and ideas at all levels of conceptualisation and realisation of concepts, ultimately aiming to support organisational processes ..." (Nedelko & Potočan, 2016).

National park

A natural or natural-like area substantial in size and "... set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities ..." (Dudley, 2008:2).

Nature-based tourism

Although no universally consented definition for nature-based tourism exists in literature, it is referred to as recreation primarily or solely to spend time in nature-based attractions and participate in outdoor recreation (Tyrväinen, Uusitalo, Silvennoinen & Hasu, 2014).

Organisational memory

Refers to “... the individual recollections and shared interpretations of historical information consequent to implementing earlier decisions and brought to bear on present decisions ...” (Baskerville & Dulipovici, 2006:93). Organisational memory is also kept intact as organisational culture, procedures, practices, structures and workplace ecology.

Potential absorptive capacity

The measures that an organisation takes to value, acquire and assimilate new external knowledge (Camisón & Forés, 2010).

Problem visitor behaviour

Behaviour by visitors that are considered incompatible with the desired environmental, social and cultural objectives of a protected area (Adapted from Hendee & Dawson, 2002; McKercher, Weber & du Cros, 2008).

Protected area (PA)

It is defined by the International Union for Conservation of Nature (IUCN) as “... a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values ...” (Dudley, 2008:2).

Realised absorptive capacity

The collective efforts towards integrating and restructuring existing and new knowledge to incorporate this new knowledge into organisational systems and processes (Camisón & Forés, 2010).

Strategy

A strategy is a plan, a guideline or a set of guidelines, representing an intended course of action aimed at dealing with a situation (Mintzberg, 1987).

Symbolic or political use of knowledge

The application of research findings to support existing political or strategic positions for the justification of actions, policies, practices or decisions (Adapted from Cherney & McGee, 2011; Xiao & Smith, 2007).

Tacit knowledge

Implicit knowledge based on experiences (Xiao & Smith, 2007) which is undocumented, non-verbalised and unarticulated (Baskerville & Dulipovici, 2006).

Tourist

Any visitor whose trip to a protected area includes an overnight stay (Leung, Spenceley, Hvenegaard & Buckley, 2018).

Understanding

Understanding provides answers to questions about “why” and is needed to assess the relevance of data and information (Ackoff in McCool, 2012:182).

Visitor

A person who visits the lands and waters of a park or protected area for purposes mandated for the area. A visitor is not paid to be in the park and does not live permanently in the park (Eagles, 2002).

Visitor experience

A person’s instantaneous or ongoing subjective and personal response to an activity, milieu or an event outside of their familiar environment (Packer & Ballantyne, 2016).

Visitor impact

The degradation of natural and cultural resources, social conditions, or local communities due to the use of protected area resources by a visitor (adapted from Marion & Reid, 2007).

Visitor management (VM)

The management and planning frameworks, strategies, practices, tools and techniques used to align tourism to protected area objectives and values and respond to the potential negative impacts from visitation (adapted from Leung *et al.*, 2018).

Visitor management activity areas

The assortment of management decisions, actions and activities encountered in protected area visitor management (Author's definition).

Visitor management planning framework

In the context of visitor management, McCool, Clark and Stankey (2007:25) describe a framework as "... a process that involves a sequence of steps that lead managers and planners to explicate the particular issue ...", stating that a framework provides a general conceptual basis through which issues are resolved.

Visitor research

Data and information gathered to increase our knowledge of visitors. In particular, their socio-demographic and psychological attributes; behaviours and use patterns; along with the benefits and impacts resulting from their visitation. It includes data from the social, environmental, and resource aspects involved in tourism and recreation (Author's definition).

Visitor use

Use of protected area resources by a visitor during their visit (Leung *et al.*, 2018).

Visitor use management

Proactive and flexible management of the effects of visitor use and the natural and administrative environments, by utilising an array of strategies and tools to achieve desired state objectives (adapted from IVUMC, 2016).

Wilderness area

A substantial area of largely unmodified or somewhat modified space with its natural character kept intact and no permanent or notable human interference, protected and managed to preserve the natural environment (Dudley, 2008).

Wisdom

The capacity to perceive and assess the long-standing consequences of behaviour to make trade-offs between short- and long-term effects (Ackoff in McCool, 2012:182).

The table below provides a summary of abbreviations and their meanings often referred to in this proposal.

Abbreviation	Meaning
ADAPT	The importance placed on adaptation efforts by researchers.
CONTEXT	Perceptions about various conditions present in the context of the protected area.
DISSE	The importance placed on dissemination efforts by researchers.
ENGAGE	Engagement between protected area practitioners and researchers.
IUCN	International Union for Conservation of Nature.
KU	Knowledge utilisation.
LINKA	Linkages between researchers and end-users.
MAN	Management application areas.
PA	Protected area.
SCA	Perceived skills, capacity and awareness of practitioners.
SQLR	Systematic quantitative literature review.
TIMING	Timing of research.
VM	Visitor management.
VR	Visitor research.

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MODELLING THE UPTAKE OF VISITOR RESEARCH IN PROTECTED AREA VISITOR MANAGEMENT

CHAPTER 1: CONTEXTUALISATION OF THE STUDY

1.1 INTRODUCTION

Protected areas across the globe acknowledge the benefits of visitation towards financing conservation (Whitelaw, King & Kolkach, 2014), building societal support for the preservation of natural and cultural heritage (Wright & Matthews, 2015) and providing benefits to local communities (Snyman & Bricker, 2019). Simultaneously, they also face the charge of managing visitor use and minimising negative economic, environmental and social impacts (Leung, Spenceley, Hvenegaard & Buckley, 2018). Decision-makers in protected areas are, however, generally ill-equipped to manage the dual demands of its biodiversity and visitor experience mandates (McCool & Khumalo, 2015).

Navigating the challenges of shifting financial support and changing visitor needs requires protected areas (PAs) to take a more visitor-centric approach that offers quality experiences to visitors (Pearce & Dowling, 2018; Rodger, Taplin & Moore, 2015). For a tourism provider to stay competitive in the global arena of the 21st century, it needs to exhibit an ability to attract visitors over extended time frames (McCool, 2006). Continuously meeting visitor expectations over extended periods requires active participation from various stakeholders, including community leaders, visitors and PA managers. It further requires an earnest intention to consider the potential of the area, its conservation imperative and heritage significance, the capacity of local entities to implement tourism, as well as visitor expectations. The changing landscape of tourism within PAs, emphasised by the increase in public-private partnerships and other agreements between private tour operators and PA managers, adds to the complexity of PA management (McCool, 2006). Full comprehension of the nature and diversity of visitor expectations and experiences and appropriate partnerships is as necessary to the responsible management of PAs as the understanding of the biodiversity and biophysical processes occurring within the area of use (McCool,

2006). Understanding the nature, extent and range of impacts that occur as a result of visitation, and the causal and non-causal factors that affect them are equally crucial for managing visitor use (Marion, 2016).

Higher visitation levels equate to higher income levels for the destination (Dolnicar, 2006). But tourism activities come at a high environmental cost (Juvan & Dolnicar, 2017), placing strain on any tourism destination's natural resources through impacts such as waste, water consumption and carbon emissions. In environmentally sensitive destinations which demand mindful experiences and practices, such as PAs, the consequences of tourism can be even more devastating (Brown, Ham & Hughes, 2010). Visitation to PAs inescapably affects a site or area; creating a tension between a PA's mandate of conserving and protecting ecosystems and species versus its drive to enable access to current and future generations (Marion, Leung, Eagleston & Burroughs, 2016). Impacts can permanently alter resource conditions and negatively influence the visitor experience (Kidd, Monz, D'Antonio, Manning, Reigner, Goonan & Jacobi, 2015). The result is a compromised conservation and biodiversity mandate, possibly combined with reduced visitation, decreased revenue income and negative consequences on resource conservation initiatives (Farrell & Marion, 2002; Gössling, 2002).

The principal response by PA managers has been that of visitor management (VM), but often with little emphasis placed on enhancing the benefits visitor experiences bring to society (Weiler, Moore & Moyle, 2013). Visitor management, as promulgated in this study, encompass all the frameworks, strategies, practices, tools and techniques used to align tourism and recreation to PA objectives by providing opportunities for quality visitor experiences while also responding to the potential negative impacts from visitation.

In such complex and "messy" environments such as VM, data and information become critical for effective decision-making (McCool, 2012). A comprehensive, multidisciplinary approach is needed to address VM challenges. Such an approach should consider data from both environmental and social sciences as the two are intricately linked in outdoor recreation management (Manning, 2011). When visitor research is not available to PA managers, several problems may occur: (i) managers base their decisions on personal opinions often influenced by financial and other resource restrictions; (ii) inefficient use of

valuable resources arise as there is no reliable data on which to base allocation (Wardell & Moore, 2004); (iii) a PA's ability to evaluate management performance and adapt management approaches is limited (Wardell & Moore, 2004); (iv) there is a poor understanding of the extent and causal factors involved in visitation-related impacts, reducing the efficacy of VM interventions (Marion, 2016); (v) managers lean too much on certain types of VM strategies such as site hardening and site development (Booth, 2006); and (vi) there is no understanding of visitor preferences, values and behaviours, which limits an agency's ability to learn from alternative management strategies (Wardell & Moore, 2004).

One could therefore reasonably expect visitor research (VR), as one of several areas of knowledge required in PA management, to be considered a valuable component in the VM decision-making process. Nonetheless, it is not clear how PA managers identify and prioritise strategies that deal with the various aspects related to VM and perhaps more importantly, what knowledge informs those decisions.

Understanding the extent to which VR is applied in VM and whether it is indeed optimally used, is essential. The lack of academic reviews in this area points towards a gap in the current understanding of knowledge utilisation and the diversity and usefulness of VR collected.

Several scholars have studied knowledge utilisation in fields outside of tourism. Researchers have identified a range of factors that influence the utilisation of academic and scientific knowledge by practitioners, such as (i) access to research by practitioners; (ii) organisational settings, role and expertise of practitioners; (iii) practitioners' focus on operational activities; (iv) practitioners' preference towards unambiguous and easily understood information; (v) expertise of the knowledge producer; (vi) ease of use of the research; (vii) relevance of the research to practitioners; (viii) perceptions among practitioners of the potential benefits of research; (ix) perceptions of risk of applying the research; (x) timing of the research; (xi) resources required to implement the findings; (xii) social conditions involved; (xiii) leadership; (xiv) politics in the organisation; and (xv) communication or lack thereof (taken from Hemsley-Brown, 2004; Ottoson, 2009; Roux, Rogers, Biggs, Ashton & Sergeant, 2006 and Ye, Desouza & Paquette, 2011).

Similarly, tourism scholars have noted discrepancies and inefficiencies between the production and utilisation of research (McCool, 2012; Xiao & Smith, 2007), with the industry regarded as a slow adopter of the practice of knowledge management (Cooper, 2006). Earlier studies have pointed out several challenges in knowledge utilisation by practitioners in recreational services. These include perceptions held by practitioners that research is not relevant to their needs and that academic researchers are more concerned with engaging in knowledge conversations with themselves. The fact that practitioners pay little attention to scholarly publications and tend to rely more on intuition and experience (as opposed to research) to make decisions, further limits utilisation (Xiao & Smith, 2007).

1.2 PROBLEM STATEMENT

More than a decade ago, Wardell and Moore (2004) acknowledged the utilisation of VR in PA management decision-making is poorly understood. Even today, literature reviewing the implementation of knowledge management in PAs remains scant, let alone the specific applications of VR in VM policies and practices. Research utilisation challenges in PAs have been explored to some degree but with minimal, if any, recent enquiries. As early as 2001, Buckley, Witting and Guest highlighted the need to increase the number of applications of VR in PAs. Observations by Darcy, Griffin, Craig, Moore and Crilley (2007) revealed a lack of integration of VR into park management tools and less optimal utilisation of VR in other areas of PA management.

Scholars have documented insufficient levels of VR (Booth, 2006) and uncoordinated efforts in collecting data about visitors in natural areas (Buckley, Robinson, Carmody & King, 2008; Moore & Hockings, 2013). Other inefficiencies include an overreliance on visitor use statistics and satisfaction data with little attention paid to alternative types of VR such as activities and movements, motivations, expectations and attitudes (Griffin, Moore, Darcy & Crilley, 2008). Few recreation ecologists are available that measure, monitor and analyse resource impacts and the use-related, environmental, and managerial factors involved (Marion, 2016). Unsystematic data collection suppresses information flow (Moore & Hockings, 2013) and forces management to make decisions with unreliable or no information (Griffin *et al.*, 2008). Environmental and social science data is often treated as

distinct components in outdoor recreation management, even though the issues they investigate are closely linked (Manning, 2011).

Despite researchers continually collecting data, academic understanding remains fragmented on how knowledge of the visitor's characteristics and behaviours, use patterns, and resultant benefits and impacts, are incorporated into protected area visitor management. Only a handful of authors have recorded the state of knowledge of social science VR (see Lovelock, Farminer & Reis, 2011a,b,c,d) and resource impacts arising from visitation (Marion *et al.*, 2016). Resultantly, there is still a lack of understanding of how such knowledge is absorbed into practice. Existing literature has not explicitly described the types and nature of VR utilised in PA visitor management activities. As such, practitioners have no guidelines to firstly discern how they could maximise the use of the VR already available to them, or secondly, how to approach future research projects in a way that increases the application of the research.

Current knowledge presents numerous fundamental shortcomings. Firstly, there is limited information about where to apply the visitor research best to enhance decision-making. Such insights could guide PA managers and researchers to prioritise the collection, transfer and application of data in ways that improve strategic, tactical and operational decision-making in VM. Secondly, current knowledge as to whether VR is optimally applied is lacking. Thirdly, the movement of this body of visitor knowledge produced by both internal and external researchers through the different stages of knowledge utilisation is yet to be described and measured. This knowledge is not only vital for the consumers of knowledge who rely on useful data and information for decision-making but also managers who need to justify investment in such knowledge resources (Rich, 1997). Fourthly, managers and researchers require insight into what they can do to improve research use.

Knowledge utilisation scholars have highlighted the importance of conducting empirical investigations that explore determinants of successful movement of research through the stages of utilisation (Landry, Amara & Lamari, 2001). Ultimately, both knowledge producers and end-users have to be empowered to craft viable solutions that improve current levels of knowledge utilisation to impact VM practices meaningfully.

1.3 STUDY AIM AND OBJECTIVES

This exploratory study applies knowledge utilisation theory to investigate the use of visitor research in the practice of protected area visitor management.

The following objectives support the overall aim of the study:

- A. Define the main components of visitor research within the context of protected areas.
- B. Define different management application areas in the context of protected area visitor management.
- C. Explore theoretical models explaining knowledge utilisation and the measurement thereof.
- D. Identify the management application areas of recently produced visitor research.
- E. Evaluate the types of use occurring in recently produced visitor research.
- F. Determine which factors influence the uptake of visitor research in visitor management policies and practices.
- G. Develop an integrated framework describing the movement and components of visitor research utilisation.
- H. Measure the actual level of utilisation of recently produced visitor research.
- I. Construct and empirically test a structural model that seeks to explain the utilisation of visitor research.

Background information on the research context is subsequently provided, followed by the theoretical underpinnings of the study and the integrated framework of the study. Details of the research approach and mixed methodology applied in the study, are provided in section 1.7.

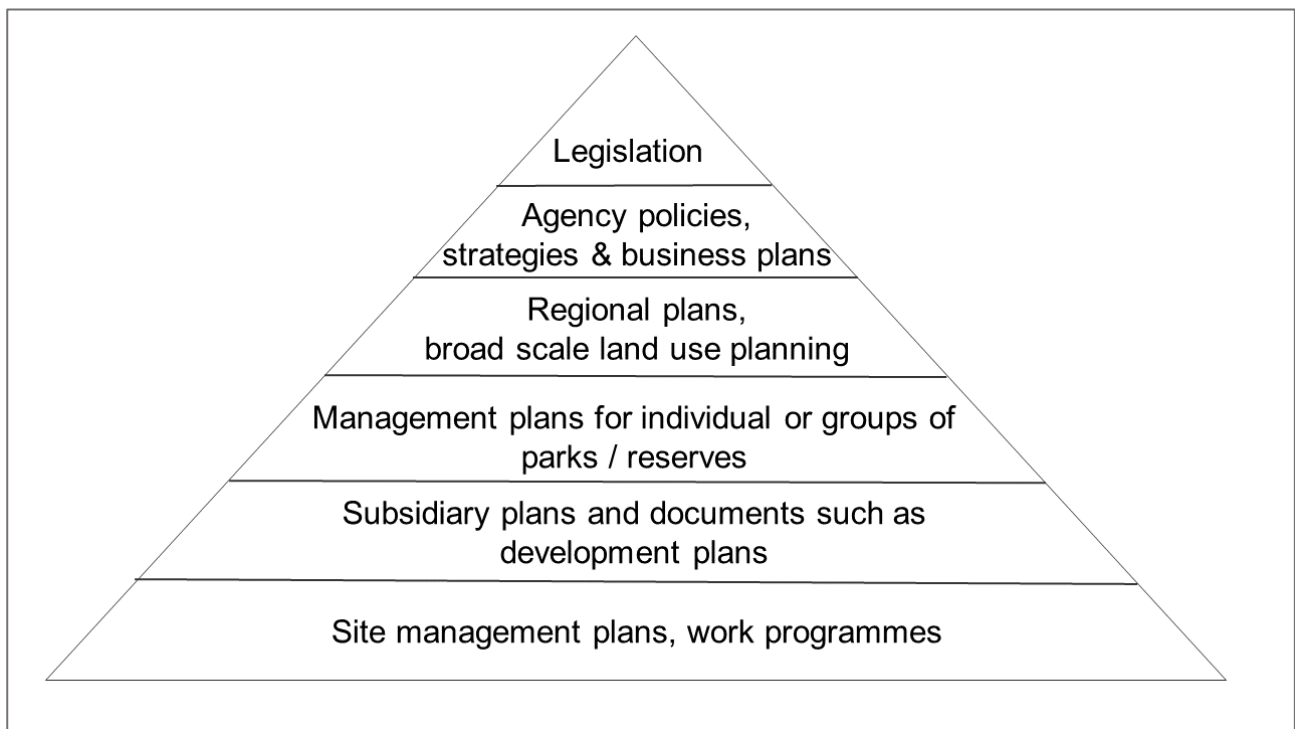
1.4 BACKGROUND ON PROTECTED AREA VISITOR MANAGEMENT

Tourism in PAs needs attractive natural scenery, intact wildlife and ecological systems, and authentic cultures for it to contribute economically, stimulate job creation and ultimately support conservation efforts. Visitation to PAs provides various benefits to the individuals who journey through them. Many visitors develop an attachment to the conservation values

associated with the natural areas they traverse, which is instrumental in safeguarding the future of PAs globally. It is imperative to manage tourism sustainably and prevent or minimise any negative impacts (Leung *et al.*, 2018).

Sustainable VM is embodied in multiple tiers of PA planning and management. Legislation sits at the top, issuing the mandate to conserve the natural area in question. As one moves down the hierarchy, plans and policies become more detailed. The next tier involves corporate strategies, business plans and policies at the PA agency level. Some agencies put forward regional plans or broad-scale land-use planning. The fourth tier encompasses individual and group park management plans. At the very bottom are site management plans which are very operational in nature. The diagram by Thomas and Middleton (2003) describes the hierarchy typically utilised in park planning (Figure 1).

Figure 1: Planning hierarchy diagram



Source: Thomas and Middleton (2003).

Successful management of recreational use requires comprehension of both the complex nature of public land recreational planning and the frameworks available to navigate such complexities (McCool *et al.*, 2007). The challenges associated with VM can be difficult to

arbitrate without appropriate structural processes in place to guide management's reasoning; while planning frameworks aid in assessing visitor impacts and reaching justifiable conclusions on proper actions to be taken (Farrell & Marion, 2002). Indeed, all tourism providers and decision-makers need direction in generating enabling conditions for sustainable behaviour (Juvan & Dolnicar, 2017).

Efforts towards managing visitor use will remain crucial in PAs around the world; many of which have experienced record visitor numbers in recent years (Miller, Fefer, Kraja, Lash & Freimund, 2017). Yet, VM remains a secondary priority due to a lack of understanding of the interaction between visitors and nature, and priority given to environmental management over visitor experience objectives (Newsome, Moore & Dowling, 2013). Three pillars support outdoor recreation management: resource, social and management aspects. All three can potentially shape and influence outdoor recreation opportunities and experiences. Disregarding any one of them, or the linkages between them can have dire consequences for recreation (Manning, 2011).

Managers are increasingly expected to base decisions on scientific evidence taking into consideration the variety of societal changes; growing and varied demand for providing recreational opportunities; uncertainty and complexity about the outcomes of their decisions; as well as limited organisational capacity (McCool *et al.*, 2007; McCool, 2012). Notwithstanding a clear link between satisfactory visitor experiences and societal support, PAs have paid more attention to the management of visitors' impacts on the environment and each other, than on improving visitor experiences or providing more benefits (Weiler *et al.*, 2013). In the last two decades, however, authors have called for a shift in focus from predominantly threat-based management strategies to more holistic views that also serve to enhance the visitor experience (McCool, 2006; Weaver & Lawton, 2017; Weiler *et al.*, 2013).

Before defining VM in the context of this study, we briefly discuss this two-pronged mandate and its significance to PA tourism: managing the impacts of visitation while providing quality visitor experiences. The next section lays the foundation for subsequent discussions of the various management activities as application areas requiring visitor data and insights to enhance decision-making in complex circumstances.

1.4.1 Managing visitor impacts

A range of interconnected factors related to visitation, the environment and managerial actions and decisions contributes to visitor impact problems (Marion, 2016). Decisions regarding visitor access and experiences, protection of resources, and visitor use management are inherently complex and require the consideration of environmental and social science research, management experience and professional judgements (Marion, 2016).

Some impacts are a direct result of visitors' actions while others result from simply allowing visitors access to a site or destination (Manning, Anderson & Pettengill, 2017). Impacts can also be the product of a lack of knowledge by practitioners or bad management judgements, such as poorly designed trails or facilities (Marion, 2016). Abolishing preventable impacts (such as derogatory behaviour) and minimising unpreventable impacts (such as vegetation trampling and disturbance to wildlife) are the primary focus areas of managers (Marion & Reid, 2007).

Impacts from visitor use are not limited to environmental costs, but it can have social and cultural consequences as well (Mason, 2005). Almost any type of leisure activity in PAs can cause environmental degradation and lead to diminished levels of visitor satisfaction, particularly when visitor behaviour and numbers reach unacceptable levels (Brown *et al.*, 2010). Even relatively low levels of use could lead to devastating impacts (Brown *et al.*, 2010; Park, Manning, Marion, Lawson & Jacobi, 2008).

Impacts can also be incremental, with conditions deteriorating faster and faster as time goes by (Farrell & Marion, 2002). Left unmanaged, such effects can permanently alter resource conditions (loss of species) and negatively influence the visitor experience (Kidd *et al.*, 2015). The result is a compromised conservation and biodiversity mandate, possibly combined with less visitation, decreased revenue income and a reduced ability to conserve nature (Farrell & Marion, 2002; Gössling, 2002).

The fields of recreation ecology and more recently, tourism, produce research dedicated to recording the diversity and extremity of visitor impacts in PAs globally (see Kidd *et al.*, 2015;

Manning *et al.*, 2017; Marion, 2016; Marion *et al.*, 2016; Monz, Marion, Goonan, Manning, Wimpey & Carr, 2010b; Newsome *et al.*, 2013, Park *et al.*, 2008). It is well-known that tourism can lead to several undesirable repercussions to the biophysical (land, air, water, wildlife, vegetation) and value components of nature (as reviewed in Juvan & Dolnicar, 2017). To evaluate the ecological, social and managerial implications thereof, managers need a thorough understanding of the type, extent and range of impacts; along with their relationships to important causal and influential factors (Marion *et al.*, 2016). Both human values and scientific evidence influences the normative identification and evaluation of impacts (Monz *et al.*, 2010b). The field of recreation ecology has evolved from studying use-impact relationships to examining alternative causal and non-causal factors that affect the nature and extent of visitation-related impacts (Marion, 2016).

Scholars categorise visitor impacts in various ways (see Garrod, Fyall & Leask, 2006 and Manning *et al.*, 2017). One can make a distinction between the impacts of visitation and those arising from problem visitor behaviour. Impacts from visitation are viewed as “... visitation-related impairment of natural and cultural resources, social conditions, and neighbouring communities ...” (Marion & Reid, 2007:5). Problem behaviour entails inappropriate behaviour visitors display while at the site or destination (Hendee & Dawson, 2002; McKercher *et al.*, 2008). Many of the problem visitor behaviours encountered in PAs can be classified as uninformed or unskilled actions rather than vindictive behaviour, materialising among a particular segment of tourists (Brown *et al.*, 2010). Adverse impacts of visitation are not always due to problem visitor behaviour. For example, carbon emissions from recreational vehicles is a consequence of visitation. Trails, on the other hand, generally degrade because they have sections that are too steep, directly ascend the fall line, or traverse flat terrain and wet soils (Marion, 2016). Others view visitor impacts along a spectrum, with illegal actions at the one end and unpreventable actions at the other (Park *et al.*, 2008). Most impacts materialise at or near tourist facilities and at sites or parks highly frequented by visitors (Marion *et al.*, 2016).

Researchers in tourism concede that transportation contributes the most to greenhouse emissions, accounting for between 47% and 93% of carbon emissions directly related to tourism. Tourists would have to drastically modify travel behaviour to improve on negative impacts (Cvelbar, Grün & Dolnicar, 2017). Aside from the main culprit, numerous other

sources of impacts present themselves in PAs. Table 1 provides a summary of visitor impacts encountered in PAs, categorised into six groups, based on the resource or experiential aspect impacted: deterioration of natural resources; deterioration of cultural and historical resources; transportation-related impacts; impacts on neighbouring communities; impacts on the visitor experience; and impacts on tourist facilities and services. The table also indicates various underlying causes associated with each impact, where relevant. A spectrum of visitor impacts is involved with some unavoidable impacts on the one end, such as waste generated through tourism activities, and impacts directly related to misbehaviour of visitors on the other end, such as driving off-road. An impact on one resource can have numerous secondary effects, and although there might seem to be duplication across the six categories, impacts are interrelated. For example, increased mortality of wildlife due to the speeding of visitors affects natural resources, which in turn affects the visitor experience.

Table 1: Visitation-related impacts encountered in protected areas and common causes thereof

Impact	Visitation-related causes
Deterioration of natural resources	
Air.	Pollution.
Geological features.	Recreational activities such as hiking, mountain climbing and bouldering. Graffiti and carvings by visitors.
Noise – alteration of natural soundscapes.	Normal social interaction. Rowdy visitors. Park transportation services. Motorised activities. Use of technological devices.
Soil – exposure and loss of soil, muddiness.	Trampling by visitors. Trail use during wet seasons. Motorised trail / road use. Trail design, position, trail slope alignment angle, trail grade. Type of recreational use.
Vegetation – trampling and loss of plants.	Recreational activities such as off-trail hiking or camping in non-designated areas.
Vegetation – introduction and dispersal of alien species.	Introducing non-native plant seeds to trails and recreational sites and their dispersal through PAs by humans and their livestock.
Vegetation – reduction in plant cover, height and biomass, reduced growth, slow or no flowering and impaired seed production.	Picking of wildflowers. Pollution of air through carbon emissions. Removal of plant cover. Trampling by visitors and recreational vehicles. Tree damage and felling for firewood. Visitors venturing off-trail and proliferation of informal trails.
Water – availability.	Activities such as camping and hiking. Excessive usage.
Water – quality and health of water ecosystems.	Activities such as camping and hiking. Disposal of soap and other chemicals. Disturbance of sediment through activities such as swimming, boating, paddling. Introduction of alien species. Irresponsible disposal of waste. Littering. Oil spillage from boats. Pollution.
Wildlife - altering of habitats.	Intentional or unintentional altering of habitats. Littering.
Wildlife – behavioural and biophysical changes or death.	Exploitation of wildlife. Feeding of wildlife. Harassing of animals. Irresponsible disposal of waste. Pollution of air through carbon emissions causes decreased health or even death in animals.

Impact	Visitation-related causes
	Littering. Road kills. Visitors venturing off-trail.
Nocturnal wildlife – decreased ability to hunt, navigate, procreate or conceal itself from predators.	Light pollution from vehicles and handheld lighting devices. Noise from motorised activities. Noise generated by rowdy visitors.
Deterioration of cultural and historical resources	
Damage to rock art.	Recreational activities such as mountain climbing and bouldering. Malicious damage by visitors.
Noise – deterioration of cultural soundscapes.	Normal social interaction between visitors. Rowdy visitors. Motorised activities. Use of technological devices.
Damage to cultural assets.	Graffiti and carvings by visitors. Handling, touching or leaning on exhibits. Theft of artefacts. Wear and tear on footpaths and carpets or floors of sites.
Reduced aesthetic value.	Graffiti and carvings by visitors. Development of tourism facilities and services.
Transportation related problems	
Carbon emissions impacting air, vegetation, wildlife, human health and contributing to climate change.	Motorised activities. Not opting for environmentally friendly transportation.
Congestion on roads and parking areas.	Increased visitor use. Inadequate visitor management interventions. Not following park rules and regulations / code of conduct.
Impacts on vegetation.	Driving off-road. Park transportation services can increase visitor densities to specific sites, leading to impact on vegetation and lead to changes in spatial patterns resulting in new unused areas being impacted.
Impacts on wildlife.	Park transportation services can increase visitor densities to specific sites, leading to impact on wildlife and changes in spatial patterns resulting in new unused areas being impacted. Road kills.

Impact	Visitation-related causes
Impacts on neighbouring communities	
Conflict.	Derogatory behaviour by visitors. Visitors intruding on local community members' private property or damaging lawns due to limited parking space.
Other challenges.	Locals become inherently integrated with the attraction or experience.
Impacts on the visitor experience	
Conflict between user groups.	Not following park rules and regulations / code of conduct / zonation principles.
Conflict between visitors and local community members.	Derogatory behaviour by visitors. Locals becoming hostile towards visitors. Visitors intruding on local community members' private property or damaging lawns due to limited parking space.
Crowding.	Increased visitor use. Visitors not following park rules and regulations / zonation principles. Spatial and temporal use patterns. Type of use. Visitor motivations and behaviour.
Damage to vegetation.	Introduction of alien plants by tourists.
Derogatory behaviour.	Visitor behaviour: Feeding of wildlife; graffiti and carvings; littering; theft; unruly behaviour; vandalism; speeding.
Management activities.	Visitor management, waste management, development of tourist facilities, customer services could influence visitor experiences.
Noise levels.	Normal social interaction. Park transportation services. Rowdy visitors. Motorised activities. Use of technological devices.
Reduced aesthetic value of the destination.	Increased visitor use. Damage to vegetation. Graffiti and carvings on natural and cultural resources and tourist facilities and services.
Reduced wildlife sightings.	Human presence. Exploitation of wildlife. Feeding of wildlife leading to killing or problem animals. Harassing of animals. Light pollution from handheld lighting devices. Littering. Noise generated by rowdy visitors. Pollution of air through carbon emissions causes decreased health or even death in animals. Road kills. Speeding by tourists. Visitors venturing off-trail.
Safety concerns.	Many recreational activities have some level of risk involved.

Impact	Visitation-related causes
	Derogatory behaviour by visitors can lead to conflict.
Urban atmosphere.	Motorised activities. Increased visitor use.
Impacts on tourist facilities and services	
Damage to facilities.	Wear and tear from normal use by visitors. Graffiti and carvings by visitors. Accidental or malicious damage to buildings, sculptures and others.
Damage to interpretative material.	Accidental or malicious damage to signage and other interpretive material.
Trail degradation.	Poor trail design and position, trail slope alignment angle, trail grade. Trail use.

Sources: Taken from Bouchard, Little, Rundell, Vlodayer and Maciejewski (2015); Brown *et al.*, (2010); Du Plessis, van der Merwe and Saayman, (2012); Eagles and McCool (2002); Eagleston and Marion (2017); Garrod *et al.*, (2006); Garrod, Fyall and Leask, (2002); Gössling, Peeters, Hall, Ceron, Dubois, Lehmann and Scott (2012); Guimarães *et al.*, (2018); Hendee and Dawson (2002); Hockett, Marion and Leung (2017); Juvan and Dolnicar (2017); Manning *et al.*, (2017), Marion (2016); Marion *et al.*, (2016); Marion & Reid, (2007), Mason (2005); Mason, Newsome, Moore and Admiraal (2015); Monz *et al.* (2016); Monz *et al.*, (2010b); Ng, Leung, Cheun and Fang, (2017); Park *et al.*, (2008); Pickering and Hill (2007); Pickering and Norman (2017); Pouwels, Sierdsema, Foppen, Henkens, Opdam and van Eupen, (2017); Rodriques- Rodriques (2012); Taff, Newman, Pettebone, White, Lawson, Monz and Vagias, (2013); van der Merwe and Joubert (2014); Wang, Xia and Chen (2008).

Evidently, there is an extensive range of possible impacts that managers of PAs have to try to minimise or eliminate. The effects of resource and experiential impacts represent both a threat to the integrity of natural resources and ecosystems and the provision of quality visitor experiences. Full comprehension of these impacts, their spatial effects and variation rates, and linkages with causal and influential factors is necessary to identify and implement effective management interventions (Marion, 2016). The study of recreation ecology identifies and measures visitor impacts and goes on to examine its underlying causes and other interrelated factors contributing to unacceptable resource, experiential and managerial impacts (Monz *et al.*, 2010b). Similarly, research on social impacts considers a variety of factors to understand why the problem occurs. Crowding, for example, can be due to several factors unrelated to overall use levels, including motivations and behaviour of visitors, type of use and spatial and temporal use patterns (Marion, 2016).

Apart from managing visitor use, managers are also responsible for providing satisfactory visitor experiences, as subsequently discussed.

1.4.2 Providing quality visitor experiences

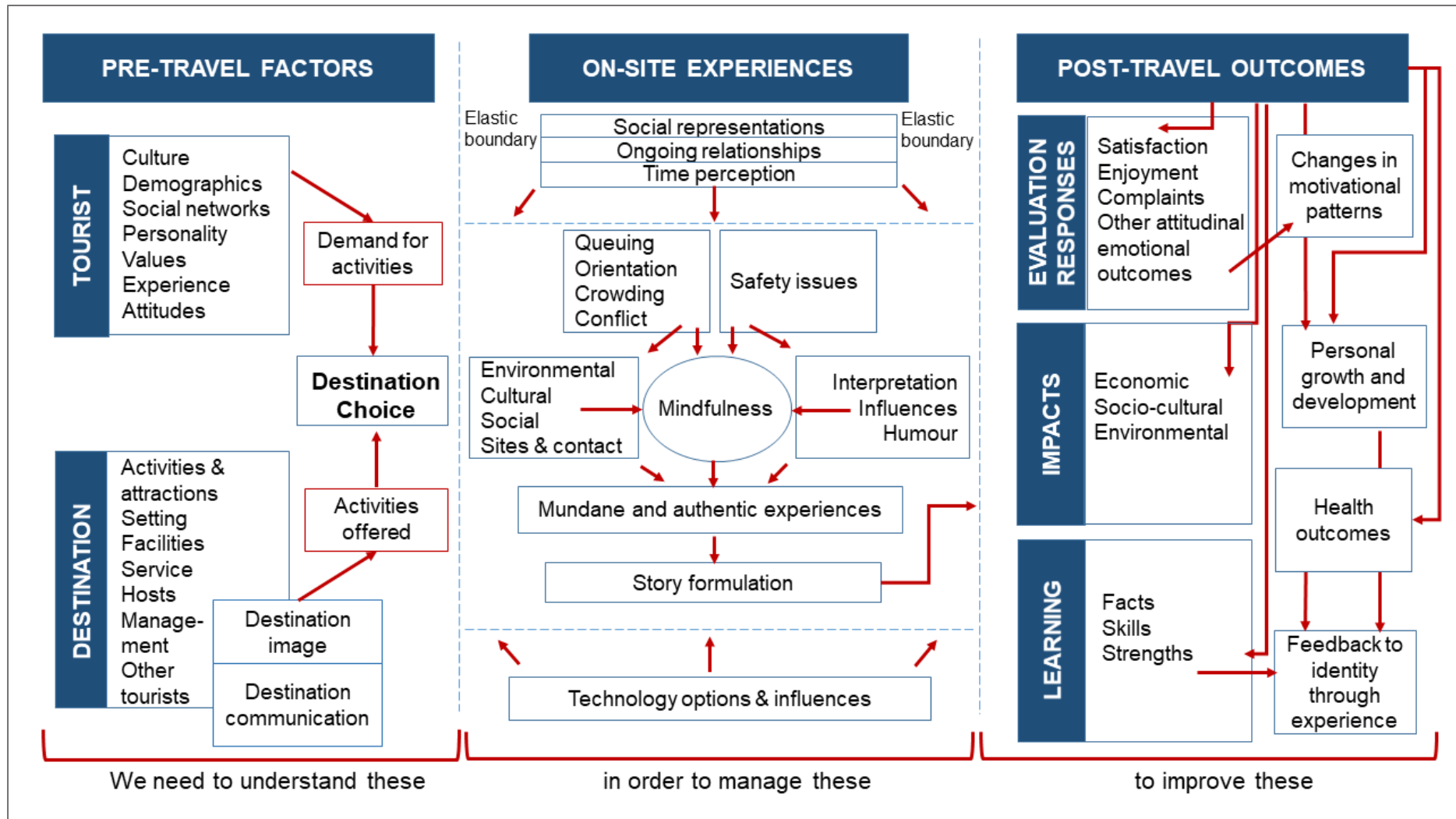
Managing visitor experiences is a messy and wicked challenge, influenced by social and political, as well as environmental complexities (McCool, 2012). Following the call by authors (McCool, 2006; Weiler *et al.*, 2013) for increased consideration towards the visitor experience, Weaver and Lawton (2017) suggest a “third-generation” approach to visitation. Colonial views of parks created to satisfy human wants and needs characterise the first-generation era. Protected areas reserved the benefits from visitation for a few wealthy individuals belonging to the elite of the time, the ‘preferred visitor type’. Management assumed this segment was better-behaved and had little impact on the environment due to low visitor numbers. Increased visitation from a broader part of society, however, soon resulted in growing support towards a more biocentric approach to manage environmental impacts from the growing demand, with the visitor viewed as a threat and a necessary evil. This second-generation approach still dominates today. Accordingly, the biodiversity mandate of PAs presides over recreational mandates. Scientifically-based management and monitoring of visitors ensures a more sustainable coexistence between nature and humans to safeguard natural resources for future generations (Weaver & Lawton, 2017).

To the contrary, the proposed third-generation approach promulgates a state of symbiosis as opposed to coexistence between PAs and its visitors. Coexistence is seen as sub-optimal, while symbiosis, initially conceptualised by Budowski (1976), represents the scenario where both PAs and visitors derive mutual benefits. Biophysical assets not only receive protection from visitation but are enhanced by visitor actions. Simultaneously, visitors derive a range of benefits from the interaction with the natural environment. This state effectively transforms the view of the visitor from being an imminent threat to an opportunity. Scholars Weaver and Lawton (2017) propose expanding existing VM and monitoring practices by including concepts such as visitor motivation and mobilisation, in a move towards symbiosis through resolution-based interactions as opposed to conflict-based interactions. Collectively, visitors to national parks and other PAs invest considerable amounts of money, time and effort towards the quest of experiencing natural and cultural heritage resources first-hand. The opinions of those that have visited exude power to influence and harness support for PAs and further development of new tourist opportunities (Eagles, 2002).

Visitor experiences are multi-dimensional, and there are many ways to conceptualise them (McCool, 2012). Historically, the managers that primarily informed VM plans were trained in environmental management (Newsome *et al.*, 2013; Weaver & Lawton, 2017). However, information on visitors, as well as their behaviours and opinions, plays a vital role in effective planning and management (Griffin *et al.*, 2008; McCool, 2012; Newsome *et al.*, 2013; Wardell & Moore, 2004).

While the study of tourist behaviour is daunting and riddled with complexity, tourist experiences can be delineated into different constituents, each with a set of elements that collectively contribute to overall performance. Author Pearce (2011) provides a structured, contemporary view of tourist behaviour and experiences and depicts three clear overarching dimensions. The first dimension involves pre-travel factors, starting on the one end with the tourist's characteristics and socio-psychological makeup and the destination's attributes, plus the tourist's perceptions thereof, at the other end. Both of these flow into the decision-making process before the tourist embarks on the travel. The next dimension involves the elements involved in tourists' on-site experiences, followed by the three different categories of outcomes of the experience. These include the evaluative responses by the tourist, the physical impacts, and the learning outcomes of the experience. Figure 2 outlines a concept map for understanding tourist behaviour based on Pearce's (2011) delineation. In an earlier version of the framework (Pearce, 2005), the author highlights the importance of understanding the visitor (its characteristics, motivations and perceived destination images) and resultant influences thereof on decision-making as well as physical interaction with the destination, to better understand on-site experiences. A greater understanding would contribute to optimised positive outcomes (measured by evaluation responses such as visitor satisfaction and learning outcomes) and reduced negative impacts on the destination.

Figure 2: Concept map for understanding tourist behaviour



Source: Adapted from Pearce (2011:159) and Pearce (2005:17).

The model by Pearce (2011) stresses the significance of utilising a diverse range of VR that not only describes the on-site experiences of visitors but incorporates a holistic view of the visitor into management decision-making. What visitors do and why they do it is particularly interesting to decision-makers, the academics studying such behaviour and to the visitors themselves. It also matters to public sector managers tasked with the responsibility of managing on-site behaviour, as well as to business stakeholders responsible for developing, growing and marketing tourism products (Pearce, 2005). Monitoring of visitors generates data that provide useful inputs into various management activities such as planning, resource allocation, visitor interpretation, improved visitor experiences, marketing initiatives and public liability (Newsome *et al.*, 2013).

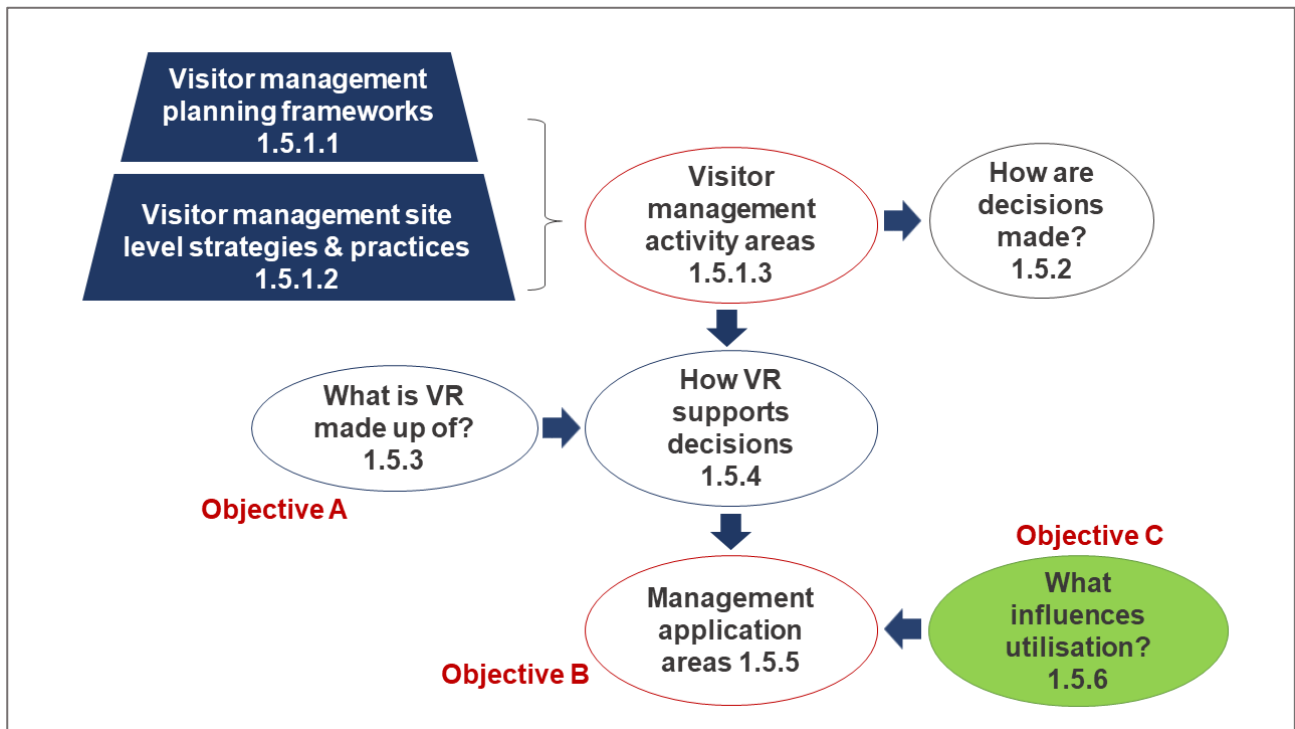
From the background information provided, one can conclude that the practice of VM involves an array of activities performed at various organisational levels and across different departmental responsibilities. Clearly defining the arrangement of actions and decisions involved in VM is necessary at this point, along with determining how VR supports these activities. There is a significant need for intelligence to help practitioners understand the visitor and its interactions with nature-based tourism destinations if quality visitor experiences are one of their primary goals.

Section 1.5 further explores these areas by reviewing the literature on VM planning and practices and its linkages with visitor research.

1.5 THEORETICAL CONTEXT OF THE STUDY

This section explores available literature and theory, addressing research objectives A, B and C of this study. It first describes the various frameworks, strategies and practices available to managers. These techniques consist of high-level VM planning frameworks (section 1.5.1.1) and site-level strategies and practices (1.5.1.2). Combined, these constitute the VM activity areas (1.5.1.3) which VR supports. The literature on how managers prioritise and make VM decisions is discussed in section 1.5.2 as a preview of the role of VR in VM. Figure 3 outlines the topics explored and structure of the theoretical context.

Figure 3: Theoretical context of the study



Source: Author's construct.

Next, we examine the main components of VR (section 1.5.3), addressing objective A of the study, followed by literature on how VR is purposefully applied in VM (1.5.4). This then leads to a delineation of the management application areas (1.5.5) that absorb VR, meeting objective B. Lastly, section 1.5.6 examines the theoretical models explaining knowledge utilisation, and the measurement thereof (section 1.5.6), serving objective C.

Based on the contextual background provided in section 1.4, the researcher defines VM as *the collection of frameworks, strategies, practices, tools and techniques used to align tourism and recreation to PA objectives through providing opportunities for quality visitor experiences, while also responding to the potential negative impacts from visitation.*

1.5.1 Visitor management planning and practices

As a point of departure, this section first introduces adaptive management as a recognised concept in natural resource management (Stankey, Clark & Bornman, 2005). It can be viewed as a response to the unpredictable and complex nature of resource management

challenges commonly experienced in PAs. Uncertainty and complexity include changing political environments and sources of funding, climate change, intricate ecosystems, social complexities including stakeholders with competing and ever-increasing interests in PA governance and management (Moore & Hockings, 2013). Adaptive management promotes the implementation of management strategies based on the currently available (and often inferior) information, monitoring successes and failures of implementation, learning from past experiences and adjusting and improving strategies over time. The process forms an ongoing cycle of learning by doing, improving and adapting strategies to incorporate new knowledge gained through experience (Manning, 2014; Moore & Hockings, 2013; Stankey *et al.*, 2005).

Against this backdrop, adaptive management is supported by a range of available VM frameworks, strategies and practices (Moore & Hockings, 2013). Over the last couple of decades, managers have slowly moved towards broader decision-making processes, including a variety of strategies and tactics when deciding the best course of action (Eagles & McCool, 2002; Manning *et al.*, 2017; Marion, 2016; Park *et al.*, 2008). Several VM planning frameworks have been put forward and adopted by PAs to minimise the wide range of visitor impacts (Spenceley, Kohl, McArthur, Myles, Notarianni, Paleczny & Pickering & Worboys, 2015). Apart from the planning frameworks, a variety of site-level management strategies and practices are available to minimise any negative effects of visitation; as described and categorised by numerous scholars (see Manning *et al.*, 2017; Marion, 2016; Spenceley *et al.*, 2015).

The next section addresses both levels of management to give context to the various activities as well as the complexity involved in VM. It also explores the supporting role of VR in VM planning and implementation decision-making.

1.5.1.1 Visitor management planning frameworks

In the context of VM, McCool *et al.* (2007:25) describe a framework as:

“... a process that involves a sequence of steps that lead managers and planners to explicate the particular issue ...”; stating that a framework provides a general theoretical basis through which issues may be resolved. It does not necessarily produce one definitive

answer to a problem. Instead, it serves as a systematic process for making decisions related to visitor use management (Miller *et al.*, 2017). Numerous works address the leading frameworks used by public land custodians for recreational planning purposes. These are commonly referred to as visitor management planning frameworks, or visitor management frameworks (see Brown, Koth, Kreag & Weber, 2006; Eagles & McCool, 2002; Farrell & Marion, 2002; Graham, Nilsen & Payne, 1988; Leung *et al.*, 2018, McCool *et al.*, 2007; Miller *et al.*, 2017; Moore & Hockings, 2013; Newsome *et al.*, 2013; Nilsen & Taylor, 1997; Simpson, 2003). Frameworks that focus on allocation decisions in recreational and tourism planning provide a systematic approach for decision-making. By doing so, it considers the desired state of an area, alternative ways in which to attain such desired state, the potential effects of alternative methods, and public approval of proposed management interventions. Furthermore, such frameworks allow the continued feedback loop required for an adaptive management approach (McCool *et al.* 2007).

Most frameworks were designed with specific countries or land management agencies in mind or as enhancements of prior models (Miller *et al.*, 2017; Von Ruschkowski, Burns, Arnberger, Smaldone & Meybin, 2013). These include Recreational Carrying Capacity (RCC), the Recreation Opportunity Spectrum (ROS), Limits of Acceptable Change (LAC), Visitor Impact Management (VIM), Visitor Experience and Resource Protection (VERP), Visitor Activities Management Programme (VAMP), the Tourism Optimisation Management Model (TOMM) and the Visitor Use Management framework (VUM). The frameworks of ROS, LAC and VIM are the most popular in countries such as the United States, Canada and Australia (Moore & Hockings, 2013). Following an evaluation of RCC and a range of other frameworks used in PAs, Farrell and Marion (2002) developed an alternative for PAs in Central and South America, called the Protected Area Visitor Impact Management (PAVIM). More recently, in the US, six land management agencies came together in 2011 to form the Interagency Visitor Use Management Council (IVUMC). The IVUMC developed yet another framework, called the Visitor Use Management framework (VUM) to address some of the past challenges experienced with prior frameworks (Miller *et al.*, 2017).

Collectively, management actions covered by the range of frameworks involve the following:

- developing statements that relate to PA objectives and current regulatory and policy mandates;
- determining the desired natural and social conditions, including the range of visitor experiences and appropriate facilities, and services to be provided;
- analysing and describing existing natural and social conditions;
- prioritising impact problems;
- understanding the underlying causes of impacts;
- facilitating and negotiating stakeholder consultation;
- developing resource and social indicators and standards for monitoring of conditions;
- putting forward zonation strategies;
- evaluating alternative management strategies;
- delineating project resources, requirements and timeframes;
- implementing alternative management strategies;
- monitoring the effectiveness of management strategies; and
- implementing adaptive management to evaluate and improve the efficacy of implemented actions to achieve desired conditions.

(from Brown *et al.*, 2006; Eagles & McCool, 2002; Farrell & Marion, 2002; Graham *et al.*, 1988; IVUMC, 2018; Leung *et al.*, 2018; Marion, 2016; McCool *et al.*, 2007; Miller *et al.*, 2017; Moore & Hockings, 2013; Newsome *et al.*, 2013; Nilsen & Taylor, 1997; Simpson, 2003 and Weiler *et al.*, 2013).

By the beginning of the 21st century, however, few examples of successful, integrated frameworks in PAs and national parks were available (Simpson, 2003). A further ten years along the line, the situation seemed unchanged (Newsome *et al.*, 2013). Managers are uncertain about which frameworks to adopt for specific problems (Newsome *et al.*, 2013). Most frameworks, fuelled by the assumption that visitors will cause damage (whether intentionally or not), focus deliberately on managing the negative impacts of visitation to minimise the damage caused to environmental resources. Some include the management of desired visitor experiences, but with a strong emphasis on minimising visitor impacts

rather than enhancing the benefits to visitors (Weiler *et al.*, 2013). While each of the frameworks provide a useful overall strategy for managing visitors, the majority focus on the overarching policies of limiting use or zonation and, with the exceptions of VIM and PAVIM, do not provide much detail to managers on the range of alternative practices and tactics available. These frameworks further assume PA agencies possess the necessary financial and human resources and expertise in VM and monitoring programmes for effective implementation. PAs have struggled to select indicators, specify standards and implement the monitoring programmes typically required by such high-level frameworks (Farrell & Marion, 2002), resulting in low levels of adoption globally (Brown *et al.*, 2006). A lack of scientific comprehension of certain visitor impacts has biased decisions on standards (Farrell & Marion, 2002; McCool *et al.*, 2007). The organisational design of some PAs further complicates the matter. Visitor management decisions are sometimes made by staff not based in the park, leading to disparate views on visitor impacts between operational park staff and corporate decision-makers. Many parks in developing countries are entirely understaffed, have no knowledge of impact management and struggle to gain access to tourism researchers with expertise in frameworks (Farrell & Marion, 2002). Developing countries have further indicated that the rigid planning guidelines of first world countries are unworkable as its contexts require strategies that allow for more “wobble room”, creativity and local knowledge (Farrell & Marion, 2002).

Since value judgements influence many decisions in recreation management, the implementation of VM in public land areas should represent the divergent values and systems of knowledge of all stakeholders involved. Inclusive public engagement processes help elicit views from different stakeholder groups as managers and technical planners are unable to represent the views of different value systems (McCool *et al.*, 2007). Only five out of the eight frameworks discussed prioritise public consultation processes (LAC, VERP, PAVIM, VUM and TOMM) and only four of them include an explicit step that seeks to investigate the underlying causes of impacts (VIM, PAVIM, TOMM and VUM).

A responsive and adaptable decision-making framework is needed to deal with the rapid growth in visitor numbers seen in PAs (Farrell & Marion, 2002). Interestingly, Moore and Hockings (2013) investigated whether VM frameworks enhanced the adaptive management of VM in PAs in Australia. The researchers found that, although VM frameworks promote

monitoring of impacts and enhanced common understandings, it scored low on several adaptive management principles. The authors attribute the results to a lack of commitment to the implementation of frameworks, reflecting a lack of integration of VM with business planning. A knowledge gap exists about the extent to which management regard visitor research as strategic input into the respective frameworks.

This section focused on formal frameworks, yet PA staff and local communities often apply informal practices that allow them to understand the dynamic relationships at play (Spenceley *et al.*, 2015). A small number of PA's collect data on the experiences and movements of visitors. Managers tend to be reactive to impacts, going into "problem-solving mode" instead of investing the time and effort to understand the underlying challenges and complexities at play. Management at a site scale, without considering the site's context within the broader ecosystem or region, sometimes relocates the problem to another area (Miller *et al.*, 2016). The next section focuses on operational strategies, practices and tools - the so-called manager's toolbox (Eagles & McCool, 2002; Marion, 2016) – applied in PAs today.

1.5.1.2 Site-level strategies and practices

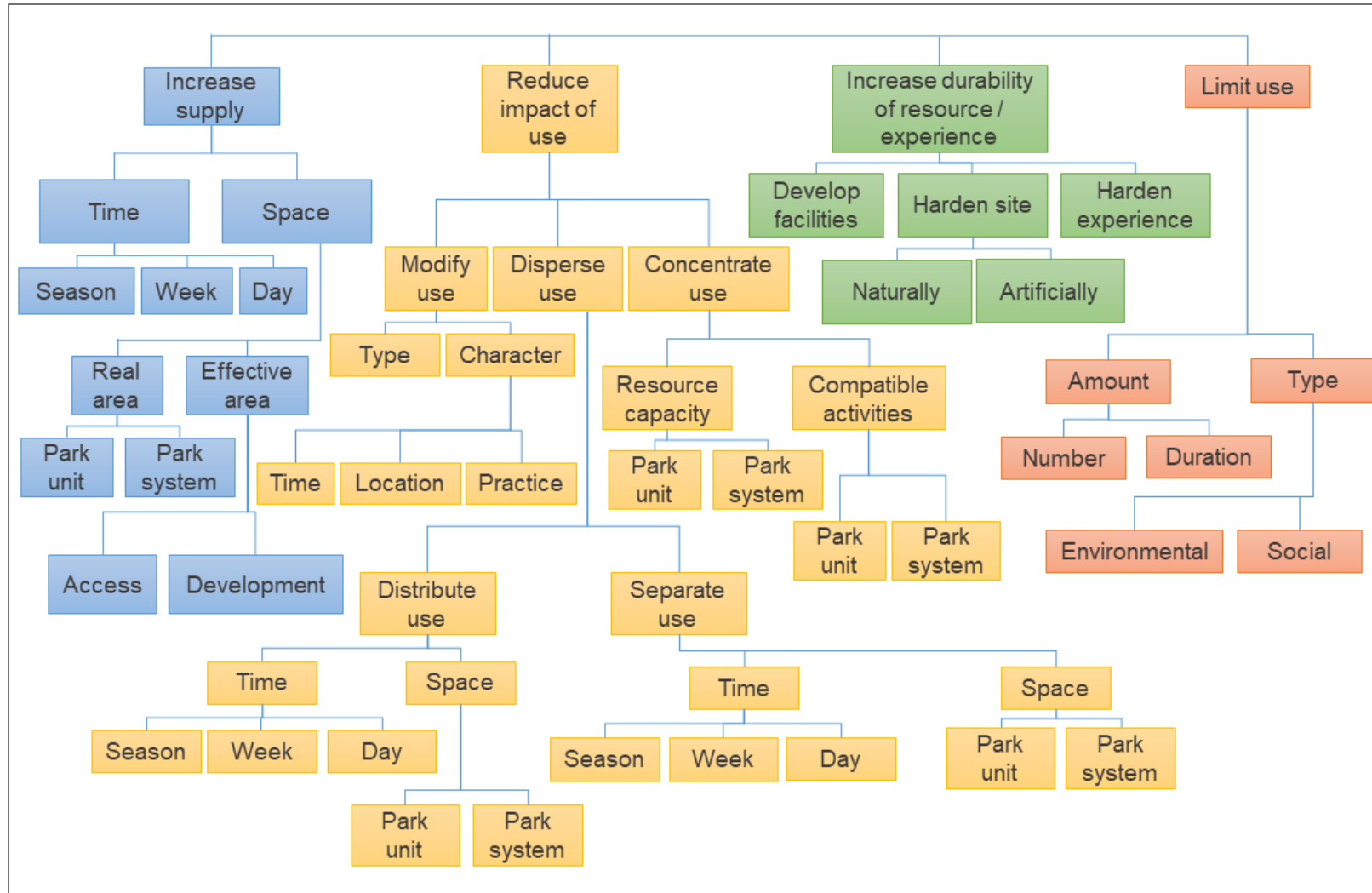
Some scholars classify VM strategies by its degree of directness towards addressing specific visitor behaviour (Graefe & Vaske, 1987; Park *et al.*, 2008). Direct strategies regulate or restrict visitor movements, impacting the visitor experience, while indirect strategies attempt to influence visitor behaviour by triggering the drivers for change. An example of a direct strategy would be to ban all campfires while an indirect strategy would be to apply interpretive methods that educate visitors of the impacts of campfires and encourage responsible alternatives. Similarly, management practices can be either hard or soft. Soft approaches focus on the visitor experience and make use of tactics such as educational and interpretative methods and self-regulation, as opposed to hard approaches involving policing, enforcing, restricting use or types of use and other physical management approaches (Mason, 2005; Marion & Reid, 2007).

According to Marion and Reid (2007), managers of public land typically respond to visitor impacts by setting rules and regulations, informing or educating visitors, and through site

management. Mason (2005) also grouped the typical strategies into three categories: managing the number of visitors; adapting the resource and altering the visitor's behaviour. Spenceley *et al.* (2015) referred to four main strategies to reduce the negative impacts of visitors in PAs: (i) managing the supply of visitor opportunities; (ii) managing the demand of visitor opportunities; (iii) altering the resources to withstand more use; and (iv) eliminating or moderating the impact of use.

The Spenceley *et al.* (2015) categorisation is similar to Manning *et al.* (2017)'s classification of management interventions into four main strategies and six categories of practices. The main strategies include: (i) increasing supply; (ii) reducing the impact of use; (iii) increasing the durability of the resource or the experience and (iv) limiting use. The six categories of management practices include: (a) information or education; (b) rationing or allocation; (c) rules and regulation; (d) law enforcement, (e) zoning and (f) facility development or site design and maintenance. Each of the four management strategies exhibits several sub-strategies (Figure 4).

Figure 4: Strategies and sub-strategies for managing outdoor recreation



Source: Adapted from Manning *et al.* (2017:34).

To summarise, in addition to the high level, or more strategic planning actions originating from VM frameworks (section 1.5.1.1), management by sites further requires managers to plan and implement “ground level” tasks such as:

- setting rules and regulations;
- policing and enforcing rules and regulations;
- informing or educating visitors about low impact practices;
- modifying visitor behaviour by promoting alternative sites, times of use and recreational opportunities, as well as informing visitors of appropriate and inappropriate behaviours;
- altering visitor expectations;
- increasing the durability of the resource or the experience by hardening the site or designing, developing and maintaining more sustainable visitor infrastructure (e.g. trails, recreation sites, facilities);
- managing the demand by restricting total numbers or certain types of use;
- reducing the impact of use by altering the type of use, dispersing use to other sites or concentrating use at hardened sites;
- managing the supply of experiences by increasing or decreasing the size of the area, distributing visitation from peak periods to off-peak periods, increasing the number of accessible hours or days or offering differential pricing.

(from Manning *et al.*, 2017; Marion, 2016; Marion & Reid, 2007).

In literature, uncertainty exists as to the effectiveness of soft and hard VM approaches that help safeguard the longevity of PAs worldwide (Mason, 2005). The majority of researchers who have attempted to answer this question focused on measuring the efficacy of only two types of interventions: educational efforts and use limitation. In most cases, researchers collected data based on attitudinal variables and not actual behaviour (Park *et al.*, 2008). Without access to tourism or recreational ecology researchers, how do managers know which strategies, tactics or practices to apply to which problem behaviours, and what knowledge informs such decisions? Many have called for a shift towards focusing on the visitor experience (Guimarães *et al.*, 2018; Mason, 2005; McCool, 2006; Moore & Hockings, 2013; Weiler *et al.*, 2013). Evidence of management practices and decision processes that

absorbs knowledge about visitors, their experiences, visitation-related impacts and their underlying causes, is limited.

1.5.1.3 Visitor management activity areas

The assortment of activities encountered in VM, through the planning frameworks and site-level strategies and practices discussed up until this point, can arguably be categorised into three levels: i) strategic planning actions and decisions; ii) decisions related to strategies for site-level management (or implementation strategies), and iii) actions related to monitoring, evaluation and reporting of progress on implementation. Table 2 itemises the VM activities that stand to benefit from new knowledge of visitors.

For this study, including lower-level day-to-day operational tasks in the list would not be useful, since many implementation activities do not involve planning or decision-making and would likely require little to no VR to execute. The implementation activity categories include only the main strategies involved in site-level management, for which there exists a fair degree of consensus among authors (see Manning *et al.*, 2017; Spenceley *et al.*, 2015; Cole, Petersen & Lucas, 1987).

Table 2: Visitor management activities areas

Visitor management activity areas	Consisting of:
Category 1: Strategic planning actions and decisions	
Setting a PA's objectives.	Developing statements pertaining to PA objectives and current regulatory and policy mandates.
Determining the desired natural and social conditions.	Determining the desired natural and social conditions, including the range of visitor experiences and appropriate facilities, and services to be provided
Inventory of existing conditions.	Analysing and describing existing natural and social conditions.
Prioritising impacts.	Prioritising impact problems.
Investigating the underlying causes of impacts.	Understanding the underlying causes of impacts.
Stakeholder consultation.	Facilitating and negotiating stakeholder consultation.
Developing indicators and standards for monitoring.	Developing resource and social indicators and standards for monitoring of conditions.
Evaluating and selecting management strategies.	Evaluating and selecting appropriate management strategies.
Setting zones or recreational opportunity classes.	Formulating zoning or recreational opportunity class strategies.
Resource planning.	Delineating project resources, requirements and timeframes.
Category 2: Implementation strategies	
Restricting use levels.	Strategies for restricting the amount and type of use.
Increasing the supply of recreation opportunities.	Strategies for increasing the supply of recreational opportunities through time and space.
Reducing the impact of use.	Strategies for modifying, dispersing or concentrating use, including influencing visitor behaviour.
Increase the durability of the resource or the experience.	Strategies towards increasing the durability of the resource or the experience by developing sustainable facilities, hardening the site or hardening the experience by shaping visitor expectations to be more realistic.
Category 3: Monitoring and evaluation actions	
Monitoring & evaluation of visitor impacts.	Monitoring and evaluation of visitor impacts.
Monitoring & evaluation of management effectiveness.	Monitoring and evaluation of the effectiveness of management frameworks, strategies and practices.

Source: Author's construct based on literature in section 1.5.1.

Section 1.5.1 has defined and described the activities that possibly absorb some form of VR for informed decision-making. This thesis revisits the issue of proper categorisation of VM activity areas after a discussion of the literature on the application of VR in VM activities

(section 1.5.4). What is clear at this stage is that activities involved in VM range from high level strategic and planning related decision-making tasks to activities that require on-going attention from managers. Secondly, there exists a lack of understanding of how VM activities absorb visitor research. The results from this section strengthen the finding by Brown *et al.* (2010) that managers of PAs lack the theoretical structures for examining visitor behaviour and determining the best course of action to eliminate or mediate impacts from visitation (Brown *et al.*, 2010).

The next section discusses the factors driving management priorities and the selection of management strategies.

1.5.2 Decision-making in visitor management

Selecting appropriate management interventions depends on firstly understanding the root causes and influential factors affecting visitor impacts and secondly on evaluating the potential outcomes of a variety of management actions (Marion, 2016).

Multiple researchers have challenged some of the guidelines traditionally put forward as preferred type(s) of management interventions. A popular belief in wilderness and outdoor recreation management is that indirect management interventions (such as physical alterations to the site or low impact education) should be applied first, followed by direct actions if needed, an idea reinforced by Manning *et al.* (2017). Certain circumstances warrant direct interventions (Cole *et al.*, 1987). These same authors concede that management may prefer a secondary tactic (one considered useful but less important), over a primary tactic (addressing the problem directly). This is particularly true if the consequences or cost implications from implementing the primary tactic are too severe or if the secondary tactic offers more benefits. Regulations and restrictions on visitor behaviour are preferred methods among managers, but it can be difficult to enforce and are not always successful in achieving its goals. Such hard approaches also negatively impact visitor experiences. Increasing the durability of resources can alter the character of the recreational opportunity, such as paving a dirt road (Eagles & McCool, 2002). Selecting management interventions is not a straightforward task.

Manning *et al.* (2017) packaged several lessons learnt from academic and professional literature and 25 case studies of interventions in national parks into 36 principles for the management of outdoor recreation. These set the groundwork for the management of visitor impacts. However, to make objective judgements in the selection of strategies and practices to implement, managers should follow a systematic and inclusive process which considers all the available alternatives (Manning *et al.*, 2017). Authors such as Manning *et al.* (2017) and Cole *et al.* (1987) have put forward different variants of management matrices that guide managers of public land areas in selecting from an array of management practices. Those developed by Manning *et al.* (2017) represent an organised and comprehensive approach to identifying strategies and practices that address a list of 16 management problems. A similar matrix developed by Cole *et al.* (1987) provides additional insights into potential strategies and tactics.

While the bulk of management practices suggested by Cole *et al.* (1987) and Manning *et al.* (2017) focus on management actions that restrict, regulate, allocate and develop, both matrices include practices that attempt to influence visitor behaviour, through information and education initiatives. In the case of Manning *et al.* (2017), education/information was listed as one of several potential solutions in 16 out of the 16 listed management problems. These involve promoting among visitors the use of alternative sites, times of use and recreational opportunities, as well as informing visitors of appropriate and inappropriate behaviours and activities. Similar to this, Cole *et al.* (1987) listed various practices that promote or demand certain behaviour of tourists and discourage other behaviours.

Scholars have suggested various sets of criteria that can be applied when selecting appropriate management practices (Table 3). While there is an overlap between the sets of criteria, there are also notable differences.

Table 3: Criteria for the selection of appropriate management interventions

Authors	Criteria for selection
IVUMC (2016)	Investment in time Investment in resources Level of uncertainty on the issue Probability of impacts Stakeholder interest Potential for legal action
Newsome <i>et al.</i> (2013)	Location of the impact Extent of the impact Ease of implementation Cost of implementation Effectiveness in addressing the impact Visitor preferences Preferences of natural area managers and their organisations
Eagles and McCool (2002)	Objectives of the PA Extent of the management problem The values involved Cost of implementation and maintenance Perceived effectiveness
Farrell and Marion (2002)	Level of expected effectiveness Financial and human resources required Effects on the visitor experience Expected visitor compliance
Cole <i>et al.</i> (1987)	Costs to visitors Financial resources required Likelihood of success
Graefe and Vaske (1987)	Consistency with management objectives Cost and effort required to implement Likelihood of success Potential visitor resistance Potential problems created

Source: Author's construct.

Selecting appropriate management interventions is a complicated task which should consider various aspects. As evident from Table 3, five out of the six works cited above recommend including some form of knowledge of the visitor into the strategy selection process (albeit sometimes only to understand the visitor's resistance to management interventions). The extent to which managers take heed to this advice is not known.

Many PAs across the globe lack the necessary resources and knowledge to effectively address visitor impacts (Farrell & Marion, 2002; Guimarães *et al.*, 2018; McCool *et al.*, 2007), making it essential to prioritise impacts for management action. Toward this end, experts have developed tools to assist managers in prioritising actions that address visitor impacts. One such process is the sliding scale of analysis, packaged within the Visitor Use Management Framework (IVUMC, 2016). It lets managers quantify the importance and risk associated with a particular VM project, rather than prioritising a specific visitor impact. It is a decision support tool that allows managers to use professional judgement in determining the level of analysis or effort required for a VM project. This allows for more flexibility in decision-making by marrying the investment in time and resources needed for implementation with the level of uncertainty, probability of impacts to natural resources and visitor satisfaction, stakeholder interest, and potential for legal action. Another example is Guimarães *et al.* (2018)'s five-stage management cycle process to assess the priority of different areas (not impacts) for management intervention. The purpose of the management tool, applied to the Araripe UGGp in Brazil, is to equip technical staff and managers with a process that optimises decision-making, given the constraints on financial and human resources.

Both these tools rely on a fair amount of human judgement, along with available technical reports and data. The priority matrix by Guimarães *et al.* (2018) recognises the importance of incorporating data on visitor demand, visitor characteristics and judgements on ideal visitor experiences strongly. However, it is not entirely clear exactly what type of data the agency sourced from where and whether the agency relied mostly on secondary sources to describe visitors. Judging by the information available from the source, it seems as if managers' level of understanding of the visitor relies on a combination of management perceptions and third-party data, limited to basic information about visitation. Zoning decisions seemingly ignore visitor perspectives. Visitors' opinions could differ not only from that of managers', but also among different visitor segments. Since both the tools mentioned above were developed very recently, little is known of the current level of implementation and effectiveness thereof.

Most managers operate in a resource-restricted environment (McCool *et al.*, 2007), adding more complexity to the already challenging task of decision-making in the disordered and

uncertain world of VM. How can VR assist in reducing uncertainty in the management of visitor impacts and experiences?

1.5.3 What constitutes visitor research

Academia has not yet developed a formal definition for visitor research in the context of PAs. McCool (2012:182) refers to Ackoff's positivist categorisation of the "stuff" provided to managers by researchers. Each category is different and follows a hierarchy of increasing value to decision-makers (Table 4).

Table 4: Character of "stuff" researchers communicate to managers

Item	Definition
Data	Symbols representing objects, events and properties – product of measurement.
Information	Data that has been processed into forms useful for decisions – information is useful in deciding what to do, not how to do it.
Knowledge	Consists of know-how, how to do something. Knowledge is derived from experience or others who have experience. Transfer of knowledge is the basis of training, but not of education.
Understanding	Provides answers to questions about why – understanding is needed to assess the relevance of data and information.
Wisdom	The ability to perceive and evaluate the long-term consequences of behaviour – needed to make trade-offs between short and long terms effects.

Source: Adapted from Ackoff (in McCool, 2012:182)

Visitor research encompasses *all of the "stuff" transferred from internal and external researchers to managers, including data and information, knowledge, understanding and wisdom.*

Management challenges in outdoor recreation are traditionally dichotomised into environmental research issues, studying resource impacts; and social science issues, covering social aspects such as that of crowding and conflicts. The two are intricately linked and require an all-encompassing, multidisciplinary approach (Manning, 2011). In formulating

a definition and categorisation of different types of VR for this study, the researcher takes an interdisciplinary approach to describe the various types of VR captured in PA studies.

The recreation ecology field of study has improved understanding of how visitation-related, ecological and managerial factors influence ecological conditions and systems (Monz *et al.* (2010a). This study field has investigated the impacts of concentrated use (e.g. hiking, camping), as well as dispersed use, where visitors are not bound to specific routes or destinations (Monz, Pickering & Hadwen, 2013). Focus has shifted from use-impact relationships, towards the examination of other causal and non-causal factors that influence the nature and extent of visitation-related impacts (Marion, 2016). Although this type of research is expanding, international support of such studies remains limited (Marion, 2016), partly due to relatively few scientists specialising in this domain (Marion, 2016), and partly because of a lack of funding to conduct this type of research (Monz *et al.*, 2010a). Attention to recreation ecology research has not been consistent at the international conferences on Monitoring and Management of Visitors in Recreation and PAs (MMV). Varying numbers of abstracts is seen, depending on the themes of the conference and who attended. Research on the impacts on wildlife, vegetation and soils remain popular, similar to the broader recreation ecology literature. An increase in landscape-level impacts and the proliferation of geographic information systems (GIS) methods to conduct such research is however observed (Pickering, Rossi, Hernando & Barros, 2018).

The review of impacts in section 1.4.1 identified six interrelated groups of impacts occurring as a result of visitation to PAs. Researchers use both environmental and social science data to measure and monitor these impacts and their associated management interventions. Integration of such data sources, by for example, including the visitor's perspective on acceptable levels of resource impacts, provides managers with a frame of reference from which to evaluate impacts (D'Antonio, Monz, Newman, Lawson & Taff, 2013). Table 5 lists examples of research studying the impacts of visitation.

Table 5: Research on the impacts of visitation and relevant examples in literature

Type of visitor impact studied	Includes	Examples in literature
Impacts on natural resources	Environmental impacts of visitation, its underlying causes, and relational analysis with other factors.	Marion <i>et al.</i> (2016).
Impacts on cultural and historical resources	Deterioration in cultural and historical assets, soundscapes and aesthetic values and management thereof.	Schmudde (2015).
Transportation related impacts	Impacts related to transportation and the management thereof, such as congestion on roads and parking areas.	Anderson, Manning, Valliere, Reigner, Pettengill and Pierce (2015)
Impacts on neighbouring communities	Studies examining how visitation and management interventions affect neighbouring communities both positively and negatively.	Acquah, Nsor, Arthur & Boadi (2017).
Impacts on the visitor experience	All aspects affecting visitor experiences and satisfaction, such as crowding, conflicts, quality and service delivery.	Huang (2017).
Impacts on tourist facilities and services	Impacts related to tourist facilities and services, such as trails, accommodation, hospitality services.	Janočková, Koščová and Jablonská (2015).

Source: Author's construct.

A plethora of global research captures the social, economic and use-related aspects of visitation. This, despite the fact that social science in outdoor recreation is still relatively young (Manning, 2011).

As visitor numbers increase, quantitative data becomes more important to understand varying usage levels, as well as the assortment of activities visitors engage in during different times of the year, in varying ecosystems, managed by numerous types of agencies with diverse biodiversity mandates (Buckley, 2002). These statistics, along with information on visitor expectations and satisfaction levels are necessary to develop and manage tourist facilities and services, as well as to manage performance in meeting those demands (Griffin *et al.*, 2008). Expectedly, research on visitor numbers and spatial and temporal usage patterns dominate the MMV conferences. Data on visitor numbers and visitor use patterns appeared in 52% and 40% of all 758 abstracts, respectively (Pickering *et al.*, 2018).

Research presented at earlier MMV conferences focussed more on methods of collecting data on visitor numbers and locations. Researchers now pay more attention to collecting data on the socio-psychological characteristics of visitors such as perceptions, behaviours, experiences and attitudes. Of the 644 social science abstracts analysed, data on visitor preferences (32%), visitor profiling (24%) and visitor attitudes (20%) was most common, followed by data on visitor behaviour (16%), motivations (14%), willingness to pay (12%) and visitor experiences (10%) (Pickering *et al.*, 2018). Other authors concur that socio-psychological factors make up a large component of research on tourists (Park, Wu, Morrison, Shen, Cong & Li, 2016). Most commonly, these include perceptions and images of destinations; motivations; visitor satisfaction and loyalty; and constraints. Scholars from a variety of disciplines within social sciences have collected data towards understanding visitor behaviour. However, there is no clear, unified terminology that is being applied (Booth, 2006). Concepts such as place attachment are increasingly studied, and tourism researchers have also employed concepts from philosophy and sociology, such as spiritual values (Park *et al.*, 2016). Visitor research has also borrowed concepts from business research (Park *et al.*, 2016), for example, the term “service quality” is being applied to measure visitor satisfaction with the facilities and services offered by PAs, most notable in developed parks (Moore, 2012).

Researchers now use more affordable and accurate methods of data collection for monitoring visitors’ movements, participation, impacts and motivations (Moore, 2012). Technology plays an increasingly important role in data collection through global positioning systems (GPS), GIS, airborne radar, digital photography, infrared, photoelectric and seismic pads, video and still photography (Moore, 2012). Data from social media and other collaborative technologies, such as volunteer GPS data, are more commonly utilised by researchers for purposes of PA management (Pickering, Chabau-Gibson & Raneng, 2018). Crowdsourced data has reportedly assisted in things like modelling visitor flows in parks; however, the jury is still undecided as to whether such data is representative of actual levels of visitor use, characteristics of visitors and the values visitors attach to parks. Both the profile of person posting and the focus of the website itself influences the patterns of use and values represented in this type of data (Heikinheimo, Di Minin, Tenkanen, Hausmann, Erkkonen & Toivonen, 2017; Pickering *et al.*, 2018). Researchers have also applied animation to measure visitor perceptions towards social, resource and managerial

conditions in trail management (Reichhart & Arnberger, 2010). Such advancements in data collection methods, combined with the increased consumerisation of technology among broader society over the last two decades have undoubtedly contributed to a wide variety of VR being generated (Levin, Lechner & Brown, 2017).

Table 6 delineates the array of research on social, economic and use-related aspects of visitation and provides examples. Although the list focuses on VR collected in outdoor recreational settings, other types of VR encountered in the broader tourism sector, such as occupancy rates, are included where it makes sense to do so in the context of PAs.

Table 6: Research on the social, economic and use-related aspects of visitation with relevant examples in literature

Type of visitor research	Includes	Examples in literature
Attitudes	Visitor attitudes towards nature, recreation, tourism development, conservation, communities, management actions and so forth.	Arnberger, Eder, Alex, Sterl and Burns (2012); Nowaczek and Smale (2010); Xu and Fox (2014).
Behavioural intentions	Intended visitor behaviour, intentions to return, intention to purchase and so forth.	Barnes, Mattsson and Sørensen (2016); Jarvis, Stoeckl and Liu (2016); Miller, Freimund and Blackford (2018).
Beliefs	Beliefs underlying visitor behaviour.	Curtis, Ham and Weiler (2010).
Characteristics of the visit	Length of stay, frequency of visits, size of travel group, type of travel group, mode of transport, travel distance.	Arrowsmith, Chhetri and Zanon (2005); Kruger and Saayman (2014); Nyaupane and Graefe (2008).
Culture	Cultural differences in participation in nature-based tourism.	Stone and Nyaupane (2016).
Demand for recreation	Demand for experiences, facilities and services.	Arbieu, Grünewald, Martín-López, Schleuning and Böhning-Gaese (2017).
Economic benefits of visitation	Studies investigating economic benefits to local or regional communities arising from visitation to PAs, such as economic impact assessments	Koontz, Thomas, Ziesler, Olson and Meldrum (2017).
Emotions	Emotional affinity or aversion towards destinations, experiences and management.	Ballantyne, Packer and Sutherland (2011).
Expectations	Expectations of all aspects of the visitor experience.	Botha, Saayman and Kruger (2016).
Experiences	Understanding the nature and quality of visitor experiences.	Barnes <i>et al.</i> (2016); Pearce and Dowling (2018).
Familiarity	Preferences for familiarity and the influence of familiarity on tourist behaviour and decision-making.	Arnberger <i>et al.</i> (2012); Carneiro and Crompton (2010); George (2010).
Knowledge and awareness	A visitor's knowledge of the PA, its rules and regulations and facilities, environmental knowledge, awareness of	Alessa, Bennett and Kliskey (2003); Darcy, Griffin, Crilley and Schweinsberg (2010); Zhang, Zhang, Zhang and Cheng (2014).

Type of visitor research	Includes	Examples in literature
	various aspects relating to the experience and the management of the PA.	
Loyalty	Commitment to a destination, place or brand.	Pinkus, Moore, Taplin and Pearce (2016).
Mindfulness	Mindfulness towards the environment, local communities and other visitors.	Manning <i>et al.</i> (2017).
Motivations	Purpose of the visit and motivations towards specific activities.	Hermann, van der Merwe, Coetzee and Saayman (2016); Lemieux, Eagles, Slocombe, Doherty, Elliot and Mock (2012).
Perceived benefits of visitation	Human health and well-being values and perceived quality of life.	Lemieux <i>et al.</i> (2012); Levin <i>et al.</i> (2017); Sandifer, Sutton-Grier and Ward (2015); Steckenreuter and Wolf (2013).
Perceptions and opinions	Visitor perceptions towards recreational conflict, facilities and services, management practices, safety, environmental conditions and so forth.	George (2010); Pickering and Rossi (2016).
Place attachment	Emotional, cognitive, and functional bond with a place.	Halpenny (2010); Steckenreuter and Wolf (2013).
Satisfaction	Overall satisfaction with the visit, satisfaction with facilities and experiences and service quality.	Darcy <i>et al.</i> (2010); Jarvis <i>et al.</i> (2016); Rodger <i>et al.</i> (2015); Tonge, Moore and Taplin (2011).
Segmentation	Grouping of visitors into segments based on characteristics of the visit or visitor, demographics, behaviour, motivations and so forth. Recording of differences between segments.	Arnegger, Woltering and Job (2010); Luo and Deng (2008); Mehmetoglu (2006); Miller <i>et al.</i> (2018a); Nyaupane and Graefe (2008).
Sense of place	Meanings and values that people attach to places.	Barendse, Roux, Erfmann, Baard, Kraaij and Nieuwoudt (2016).
Social & personal norms	Normative beliefs held by visitors.	Brown <i>et al.</i> (2010); Needham, Szuster and Bell (2011); Raymond, Brown and Robinson (2011); Zhang <i>et al.</i> (2014).
Socio-demographics of the visitor	Gender, age, place of residence, ethnic group, income level, level of education and so forth.	Darcy <i>et al.</i> (2010).

Type of visitor research	Includes	Examples in literature
Sources of information	Sources of information on destinations, tourism products and PA management.	Dey and Sarma (2010).
Spending behaviour	Trip expenditure and its determinants.	Cini and Saayman (2014); Kruger, Saayman and Manners (2012); Mehmetoglu (2007).
Values	Understanding visitors' values for improved persuasive communication.	Dolnicar, Cvelbar and Grün (2017); Miller, Freimund, Powell, Metcalf and Nickerson (2018b); Zhang <i>et al.</i> (2014).
Visitor behaviour	Decision-making, on-site visitor behaviour, problem visitor behaviour, loyalty.	Dolnicar, Cvelbar and Grün (2017); Marschall, Granquist and Burns (2017), Rodger <i>et al.</i> (2015).
Visitor incident reports	Data from incident records.	Gstaettner, Kobryn, Roger, Phillips and Lee (2019).
Visitor use statistics	Number of visitors, seasonal use patterns, types of activities engaged in, the level of use, occupancy rates and visitor movement patterns.	Cheung (2013); Levin <i>et al.</i> (2017); Meijles, Bakker, Groote and Barske (2014); Wolf, Hagenloh and Croft (2012).
Willingness to pay	Willingness to pay towards tourism products and services as well as conservation efforts.	Frontuto, Dalmazzone, Vallino and Giaccaria (2017).

Source: Author's construct.

To logically arrange this diversity of research, the researcher uses the categories developed by Booth (2006) and Newsome *et al.* (2013) to establish a more integrated set of categories (Table 7). While both studies combined visitors' characteristics into one category, the breadth and depth of data and information available today on the psychographic dimensions of visitors, their experiences and post-trip reflections (Pickering *et al.*, 2018), arguably warrants it to be treated as a distinct type of research.

Table 7: Visitor research categorisations by Booth (2006) and Newsome *et al.* (2013)

Booth (2006)	Newsome <i>et al.</i> (2013)
Visit numbers.	Visit or visitor numbers.
Visit and visitor characteristics.	Visit characteristics.
The visitor experience (from motivation through satisfaction).	Visitor characteristics or profiling, including motivations, expectations and preferences.
Visitor impacts.	Data to identify and quantify site-specific impacts.
Recreational benefits.	Visitor outcomes which encompasses visitor satisfaction, experiences, future intentions and behaviours.
Recreation resource demand and supply.	
Recreation management processes and techniques.	

Source: Adapted from Newsome *et al.* (2013) and Booth (2006).

At this stage, the researcher proposes five main categories for visitor research, listed and described in Table 8.

Table 8: Proposed categorisation of visitor research

Category of visitor research	Description
Socio-demographic attributes of visitors	Data and information on visitors' gender, age, culture, place of residence, ethnic group, income level, education and so forth.
Psychological attributes of visitors	Data and information on visitors' attitudes, beliefs, values, emotions, expectations, familiarity, existing knowledge and awareness, mindfulness, motivations, and social & personal norms.
Visitor use statistics, visitor demand, target markets & segmentation	Aggregated statistics on the level of use and level of demand for experiences, facilities and services; temporal and spatial use patterns; occupancy rates; segmentation and profiling.
Visitor experience outcomes	Data and information on visitor experiences, satisfaction and loyalty; attitudinal and emotional outcomes and benefits received from visitation; changes in place attachment, sense of place, awareness and knowledge; and visitors' future intentions.
Visitor impacts	Data and information recording the social, environmental and economic impacts of visitation and its underlying causes.

Source: Adapted from Newsome *et al.* (2013) and Booth (2006).

The visitor research categories proposed in Table 8 were re-examined after completing a pre-test of data collection as part of the systematic quantitative literature review (SQLR) in Article 1 (see section 1.7.2).

The next section first discusses the findings from reviews on the state-of-knowledge in PA agencies in a few developed countries. It then summarises information from a few key works that explore the application of different types of visitor research in management.

1.5.4 The use of visitor research in visitor management decisions

In support of study objective E, this section reviews literature that i) has captured the state-of-knowledge of VR in PAs and ii) investigated the application of VR in the various management practices.

1.5.4.1 Issues in the collection and application of visitor research

When visitor research is not available to PA managers, several problems may occur: (i) managers base their decisions on personal opinions, often influenced by financial and other

resource restrictions; (ii) inefficient use of valuable resources arise as there is no reliable data on which to base allocation (Wardell & Moore, 2004); (iii) a PA's ability to evaluate management performance and adapt management approaches is limited (Wardell & Moore, 2004); (iv) there is a poor understanding of the extent and causal and non-causal factors involved in visitation-related impacts, reducing the efficacy of VM interventions (Marion, 2016); (v) managers lean too much on certain types of VM strategies such as site hardening and site development (Booth, 2006); and (vi) there is no understanding of visitor preferences, values and behaviours, which limits an agency's ability to learn from alternative management strategies (Wardell & Moore, 2004).

Researchers from developed countries have raised the following concerns about the collection of VR:

- Insufficient levels of VR is collected in natural areas;
- visitor use statistics are occasionally unreliable due to the estimation techniques used;
- efforts in collecting VR are uncoordinated and fragmented;
- logistical challenges have made monitoring visitor use problematic in some PAs;
- few recreation ecology specialists are available to measure, monitor and analyse resource impacts; and
- there is a lack of available funding to perform such studies.

(From Booth, 2006; Buckley *et al.* 2008; Eagles, 2002; Marion, 2016; Monz *et al.*, 2010a; Moore & Hockings, 2013; Newsome *et al.*, 2013).

Effective research application demands the use of different types of knowledge, embedded in various sources and accessed through a variety of people and services (Xiao & Smith, 2007). As early as in 2001, Buckley, Witting and Guest highlighted the need to increase the number of applications of VR in PAs, yet shortcomings continued:

- There is an overreliance on visitor use statistics and satisfaction data; and
- few studies are available on visitors' experiences, movements, motivations, expectations, preferences and attitudes; the benefits of visitation and particularly, of off-site benefits; the utilisation, evaluation and impact of VM interventions; latent

demand and the constraints to use; and time-series data on visitor and visit attributes.

(From Booth, 2006; Griffin *et al.*, 2008; Lovelock *et al.*, 2011c,d).

A lack of formal knowledge management frameworks to assist with the management, dissemination and utilisation of knowledge across various departments within PA agencies (Darcy *et al.*, 2007) have resulted in:

- The underutilisation of VR after collection has occurred;
- a lack of dedicated resources to analyse and interpret the data effectively;
- a lack of integration of VR into management and planning activities including park management tools;
- a lack of integration between environmental and social science data;
- a lack of dissemination of VR to other staff who might find it beneficial;
- a frail link between monitoring programs and stated management priorities;
- the complexity of some research areas has limited the transferability of the knowledge into management use; and
- a large part of the data gathered is relevant only in site-specific applications, limiting its application in decision-making.

(From Booth, 2006; Buckley *et al.* 2008; D'Antonio *et al.*, 2013; Darcy *et al.*, 2007; Lovelock *et al.*, 2011c,d).

Although insightful, most of the reviews on the state of knowledge of VR in different countries are outdated and lack geographic representation of the global PA network (most notably Booth, 2006; Darcy *et al.*, 2007; Darcy *et al.*, 2010; Griffin, Moore, Crilley, Darcy & Schweinsberg, 2010a,b; Lovelock *et al.*, 2011a,b,c,d; Wardell & Moore, 2004). There is limited understanding of the variety, and types of VR collected in PAs today to serve the different VM activity areas.

A systematic quantitative literature review of the abstracts presented at the first seven MMV conferences provides a useful delineation of the types of VR collected for VM in PAs and other nature-based destinations (Pickering *et al.*, 2018). While the abstracts represented research from 57 different countries, the authors acknowledge that the number of abstracts

did not proportionally represent the number of PAs within a country. There is also no indication of the different types of VR utilised for different kinds of practices. This knowledge is explored further in the next section.

1.5.4.2 The purposeful application of visitor data in management decisions

The challenge of integrating VR into VM is compounded by, among others, the complicated relationship between different types of resource use, and the site-specific and disparate nature of impacts and its associated management approaches (Booth, 2006). The varying structures and purposes for which data is collected in PAs further complicate the uptake of VR (Darcy *et al.*, 2007). Relatively few studies review how management activities utilise visitor research. Wardell and Moore (2004) examined the application of VR in nine PA agencies in Australia and New Zealand. Similar information is provided in a review by Booth (2006) on VR collected in New Zealand outdoor recreation destinations. More recently, Newsome *et al.* (2013) discussed reasons for monitoring different types of visitor data, based on case studies in Australia, the United Kingdom and the United States. Coordinators of the United States' National Park Service (NPS) visitor statistics program outlined how data from this program is used as input into various decisions by park management, communities and businesses in the vicinity of parks (Ziesler & Pettebone, 2018). A review of recreation ecology research by Marion (2016) illustrated how visitor use management absorbs environmental and social data on resource impacts.

Viewed collectively, these studies demonstrate the versatile nature of VR in terms of usability. Table 9 presents a summary of the identified management application areas associated with each VR type.

Table 9: The application of different types of visitor research in visitor management activities in Australia, New Zealand, United Kingdom and United States.

Type of VR	Application areas mentioned (author abbreviation in brackets)
Visitor numbers.	Decisions about site, facility and visitor program designs (N, W, Z). Economic analysis (W). Funding, budgeting & staffing (W). Interpretation (W). Local communities and businesses in the vicinity of parks use it for planning of amenities, stock replenishment, and visitor services (Z). Marketing (W). Modelling / estimating future use and resource degradation (B, Z). Park management plans and tourism plans (N). Park performance reporting (N, W). Planning and prioritising (W). Public accountability (N). Resource allocation decisions (B, N). Strategic and regional planning (W). Visitor impact management (W). Visitor management (N). Visitor use management (Z). VM planning frameworks (N).
Temporal & spatial data on the nature, trends and patterns of human usage; along with other data describing visitor travel behaviour (spending, mode of transport etc.)	Decisions about site and facility designs and locations (B, N). Economic analysis (W). Funding, budgeting & staffing (W). Interpretation (W). Marketing (W). Park management plans and tourism plans (N). Park performance reporting (W). Planning and prioritising (W). Simulations of use patterns used in VM (N). Strategic and regional planning (W). To test the consequences of management actions (N). To test the efficacy of management interventions (B). Visitor impact management (W). Visitor spending data is used to assess economic benefits to communities (W, Z). Visitor use management (Z). VM planning frameworks (N).
Visitor characteristics – both demographical and socio-psychological; including preferences, expectations, attitudes and more.	Altering visitor expectations (B). Decisions about site and facility designs and locations (B, N, W). Economic analysis (W). Enhancing visitor experiences (N). Funding, budgeting & staffing (W). Influencing / managing visitor behaviour and visitor choices (B). Information provision (B). Interpretation (N, W). Judgments of impact acceptability used to establish biophysical and social standards for an area (W). Marketing (N, W)

Type of VR	Application areas mentioned (author abbreviation in brackets)
	Park management plans and tourism plans (N). Park performance reporting (W). Planning and prioritising (W). Resource allocation (N). Strategic and regional planning (W). Visitor impact management (W, B). Visitor segmentation (N). VM planning frameworks (N).
Data on the extent, range and types of visitor impacts and its underlying causes; including relational analyses and long-term monitoring.	Assess effectiveness of management strategies (M, N). Decisions about site and facility design and locations (M, N). Determine the extent and range of impacts (M). Enhancing visitor experiences (N). Legislative and legal requirements – visitor impact monitoring (N). Modelling / estimating future use and resource degradation through relational analyses (M). Park management plans and tourism plans (N). Park performance reporting (W). Resource allocation decisions (N). Selection of effective management interventions in visitor impact management (B, M, W). Visitor impact monitoring protocols (M). Visitor use management (N). VM planning frameworks (N).
Visitor experience outcomes (benefits, satisfaction, injuries).	Decisions about site and facility design (N, W). Economic analysis (W). Enhancing visitor experiences (N). Funding, budgeting & staffing (W). Interpretation (W). Legislative and legal requirements – visitor impact monitoring (N). Marketing (W). Measuring a PA agency's contribution to wider governmental objectives and value to society (B). Park management plans and tourism plans (N). Park performance reporting (N, W). Planning and prioritising (W). Strategic and regional planning (W). Understanding loyalty (N). Visitor impact management (W). VM planning frameworks (N).
Demand for recreation.	Evaluation of the PA agency's ability to meet outdoor recreation needs of the public (B). Performance reporting (N). Understanding public demand and reasons for non-use could lead to alternative strategies in the supply and management of outdoor recreation (B).

Sources: Taken from Booth (2006) (indicated as B in the table); Marion (2016) (M); Newsome *et al.* (2013) (N); Wardell & Moore (2004) (W) and Ziesler & Pettebone (2018) (Z).

Section 1.5.3 demonstrated that a wide variety of VR is collected today by researchers working towards understanding the visitor experience and improving PA management in various ways. Academic understanding of its utilisation is, however, fragmented within the literature with no studies offering a comprehensive view of the application thereof in VM. Section 1.5.4 highlighted various issues in the collection and application of VR. A few authors have provided useful insight into the potential areas of application of different types of VR. The actual levels of use of research by practitioners and research influence in management decisions remain unknown. Collectively, these reviews represent only a handful of developed countries. This further limits our understanding of the current status of utilisation of visitor research globally.

There is little insight available into the current level of integration of VR into VM decision-making and actions. More research is required to inform the body of knowledge on the nature and types of VR currently utilised in VM. Various questions remain unanswered. What is the overall level of use of VR in PAs? To what use(s) have the various categories of VR been put? How has VR advanced through the stages of knowledge utilisation? What influences the adoption of VR in VM? This thesis focusses on addressing these knowledge gaps.

1.5.5 Management application areas revisited

At this point, a revisit of the VM activity areas listed in section 1.5.1.3 is necessary to reaffirm and strengthen the application categories for use in the empirical investigation of this study (Objective E). The literature discussed in section 1.5.4 identified additional management application areas where VR is absorbed. These include marketing; enhancing the visitor experience; interpretation and communication; influencing and controlling visitor behaviour; measuring a PA's contribution to broader government objectives; reporting of visitor numbers, and decisions taken on the design and development of tourist facilities. Some of these areas relate more to the broader context of tourism management than visitor use management per se. However, they still represent substantial areas of uptake of VR, judging by the review of the literature. To this end, a new term, management application areas, seems more appropriate for use in this study from this point forward.

For purposes of this study, identifying the management strategies which VR sought to inform, is more important than knowing exactly which practices were employed as a result of the added knowledge of VR (refer to Manning *et al.*'s (2017) four main strategies and six categories of practices). The researcher subsequently adjusted the VM activity areas to include the additional area of marketing. At the same time, mainly for practical reasons, the researcher consolidated related categories, such as the selection of management strategies and the decision of which impacts to prioritise for management action. Similar actions were taken with the inventory of existing conditions; understanding the underlying causes of impacts and the monitoring and evaluation of visitor impacts which were amalgamated into monitoring and evaluation of natural and social conditions. The activity of influencing or controlling visitor behaviour, mentioned by Booth (2006), is embedded in the higher-level strategy of reducing usage impacts and therefore not treated as a separate application area. The management application areas depicted in Table 10 represents a starting block for achieving Objective E. Similar to the VR categories, it is re-examined after completing a pre-test of data collection as part of the SQLR process in Article 1 (see section 1.7.2).

Table 10: Management application areas revisited

Management application areas	Consisting of:
Strategic planning actions and decisions	
Setting a PA's objectives.	Developing statements pertaining to PA objectives and current regulatory and policy mandates.
Determining the desired natural and social conditions.	Determining the desired natural and social conditions, including the range of visitor experiences and appropriate facilities, and services to be provided
Developing indicators and standards for monitoring.	Developing resource and social indicators and standards for monitoring of conditions.
Selecting management strategies and prioritising impacts.	Evaluating and selecting appropriate management strategies and prioritising impacts for management action.
Setting zones or recreational opportunity classes.	Formulating zoning or recreational opportunity class strategies.
Resource planning.	Delineating project resources, requirements and timeframes.
Implementation strategies	
Marketing.	Marketing of visitor experiences.
Restricting use levels.	Strategies for restricting the amount and type of use.
Increasing the supply of recreation opportunities.	Strategies for increasing the supply of recreational opportunities through time and space.
Reducing the impact of use.	Strategies for modifying, dispersing or concentrating use, including influencing visitor behaviour.
Increase the durability of the resource or the experience.	Strategies towards increasing the durability of the resource or the visitor experience by developing facilities, hardening the site or hardening the experience.
Monitoring and evaluation actions	
Monitoring & evaluation of natural & social conditions.	Analysing, describing and monitoring existing natural and social conditions to measure the impact of visitors and investigate the underlying causes of impacts.
Monitoring & evaluation of management effectiveness.	Monitoring and evaluation of the effectiveness of management frameworks, strategies and practices.

Source: Author's construct.

Although tourism has been slow to adopt the practice of knowledge management (Cooper, 2006), an increase in the application thereof has been reported since 2000. The literature on the implementation of knowledge management in PAs is, however, still scant (Darcy *et al.*, 2010). The next section explores the theories and concepts that attempt to explain knowledge application and measurement thereof in practice.

1.5.6 Knowledge utilisation theories and explanations

The application of knowledge is integral to management and policy decision-making in a post-industrial society (Xiao & Smith, 2007). Tourism research activity has increased exponentially during the past two decades (Chambers, 2018). Yet there is growing concern that tourism research is underutilised by policymakers and practitioners, despite the applied nature of the field (Mair, Merton & Smith, 2014). Several scholars have noted discrepancies and inefficiencies between the production and utilisation of tourism research (Hudson, 2013; Pyo, 2012; Thomas, 2012; Xiao & Smith, 2007). Some have even gone as far as to describe the tourism sector as being research-averse (Cooper, Ruhanen & Scott, 2015). The words of Ritchie and Ritchie (2002:451) best sum up the situation “... a great deal of research is being conducted in tourism, but is inefficiently used and rarely exploited to its full potential ...”.

Earlier studies have brought to light some of the challenges in the adoption of knowledge by practitioners in recreational services, including the view of practitioners that research was not relevant to their needs; that practitioners perceive academics to be more concerned with their own knowledge conversations; the fact that practitioners paid little attention to academic publications; and the suggestion that managers rely more on intuition and personal experience to make decisions than on research (Xiao & Smith, 2007). Studies that have investigated knowledge utilisation in fields other than tourism reveal a range of factors influencing practitioners’ ability to use knowledge:

- Access to research by practitioners;
- Organisational settings of practitioners;
- The role and expertise of the practitioner.
- Practitioners’ focus on operational activities.
- Practitioners’ preference towards unambiguous and easily understood information complimenting existing plans.
- The expertise of the producer.
- The ease of use of the research.
- The relevance of the research to practitioners.
- Perceptions among practitioners of the benefits received.

- Perceptions of risk of applying the research.
- Timing of the research.
- Resources required to apply the research.
- Social conditions involved.
- Leadership.
- Politics in the organisation.
- Communication.
- The gap between research and practice.

(Hemsley-Brown, 2004; Ottoson, 2009; Roux *et al.*, 2006 & Ye *et al.*, 2011).

This section first clarifies the meaning of the terms knowledge and knowledge utilisation, then moves on to discuss the main theories and models explaining the occurrence of knowledge utilisation. It briefly touches on the complexities and challenges of the research-practice gap as well as the concept of organisational memory as an alternative form of knowledge that influences management decision-making. Next, the section discusses the measurement of knowledge utilisation and mentions a range of determining factors tested previously.

1.5.6.1 Defining knowledge and knowledge utilisation

The field of knowledge management is troubled with definitions and terms used interchangeably while it represents distinct concepts (Beesley & Cooper, 2007). Estabrooks, Thompson, Lovely and Hofmeyer (2006) allude to the difficulties scholars face due to a lack of standard definitions in the literature. This section is an attempt to describe the salient terms applicable to the scope of this study, but acknowledge that literature does not offer a shared understanding of all definitions and terms used.

Starting with the building blocks, data is considered information that is raw or unorganised, consisting of detached numbers, symbols, words or syllables which relate to the conditions and processes of a business (Martin & Powell, 1992). Information is facts and data that are processed to take on a new form and used to describe a particular situation or condition (Baskerville & Dulipovici, 2006). Knowledge is information with an added lens of values, truths, intuition, beliefs, perspectives and concepts, judgements, experiences and

expectations, methodologies, and know-how (adapted from Wiig, 1993 and Davenport & Prusak, 1997). Knowledge can consist of ideas, skills, policy or innovation. It represents a progressive action, moving either sideways, hierarchically, expanding or exchanging between stakeholders and different contexts, and then reaching specific outcomes (Ottoson, 2009). Knowledge codified in symbolic forms, characters or numbers can also become information (Alavi & Leidner, 2001).

Scholars describe knowledge through several dichotomous processes. The most common of these is the definition of knowledge as being either explicit (meaning it consists of documented data and information) or tacit (represented by implicit knowledge based on experiences) (Xiao & Smith, 2007). Some are, however, of the opinion that knowledge is better described along a continuum: starting as data and information which is unstructured, lone-standing and context-independent at the one end, with structured, embedded, and context-dependent knowledge at the other end. Knowledge can also be categorised according to the types of sources (for example academic or non-academic), how the data was collected (primary versus secondary research) and according to its organisational and communication strategies (internal versus externally executed) (Xiao & Smith, 2007).

Knowledge utilisation is described as whether and to what extent sources of evidence are utilised in management or policy decisions (Xiao & Smith, 2007). Drawing on the early work by Beyer and Trice (1982), Patton (1997) and Rich (1997); Xiao and Smith (2007) provide a formal definition thereof. It is described as the process and resultant outcome from the management and organisation of data and information; the social and affective associations that affect its use and explication; the ability to elect research knowledge appropriate for decision-making; and the activities associated with putting research into action. Knowledge utilisation is sometimes also referred to as knowledge application or research utilisation, while employment is a more applicable term when considering the utilisation of specific works (Xiao & Smith, 2007).

Knowledge utilisation should not be confused with knowledge transfer, which is the exchange of knowledge between the producer and the recipient (Baskerville & Dulipovici, 2006). Knowledge transfer relates strongly to the term knowledge diffusion; both are rooted in the same theory (Ottoson, 2009). To add to the confusion, a broad range of terms are

associated with knowledge translation, including evidence-based decision-making; research utilisation; innovation diffusion; knowledge transfer; research implementation and dissemination; and the uptake of research (Estabrooks *et al.*, 2006). This is, however, a contradiction to other works that confine knowledge translation to the “...practice, science, and art of bridging the know-do gap between knowledge accumulation and use ...” (Ottoson, 2009:6), which seems more of a precursor to utilisation than utilisation itself. To clear up some of the confusion, Ottoson (2009) suggested finding the communalities through which each term is viewed, by considering the lens. For example, knowledge transfer and knowledge diffusion add a lens of movement, while translation theory adds the lens of language. All the knowledge-for-action theories connect with use at some point in time. Knowledge utilisation adds the lens of use, with research knowledge being the *what* that moves between different stakeholders (Ottoson, 2009).

In this study, the terms knowledge utilisation, knowledge use, knowledge application, research utilisation, research use, research uptake, research absorption and research application are used interchangeably, with knowledge utilisation viewed as a process which occurs over time.

Any study on knowledge use would need to recognise that: (i) different types of research could lead to different types of utilisation; (ii) types and levels of utilisation may vary over time; (iii) research disseminated by internal sources is more likely to be adopted than those originating from external sources; (iv) different levels of utilisation are evident in different areas of application and (v) problem-solving and decision-making is influenced by many other factors apart from the provision of information (politics, beliefs, values and so forth) (Rich, 1997).

1.5.6.2 Theories and models explaining knowledge utilisation

This section first focuses on the main explanations of knowledge utilisation before discussing literature in the context of protected areas and ecosystem management. The study of knowledge utilisation has, through more than seven decades of investigation, contributed significantly towards the academic understanding of research-practice gaps in various disciplines (Estabrooks, Derksen, Winther, Lavis, Scott, Wallin & Profetto-McGrath,

2008). This expanding body of knowledge explores various concepts and factors that influence the utilisation of research by policymakers (Crona & Parker, 2011). However, the study field still lacks a formal definition to house different concepts of knowledge use in an encompassing and uncomplicated manner (Heinsch, Gray & Sharland, 2016).

Notwithstanding the lack of integration, knowledge utilisation literature describes six main streams of theories interpreting the influencers of organisational knowledge uptake: (i) Push and pull models, (ii) dissemination models, (iii) engineering explanations, (iv) organisational interest explanations, (v) the two communities metaphor, and (vi) interaction explanations (from Amara, Ouimet & Landry, 2004; Belkhdja, Amara, Landry & Ouimet, 2007; Landry *et al.*, 2001). This section briefly describes these streams, expounding the major differences, advantages and limitations.

‘Push models’ (knowledge-driven approaches) suggest a linear movement of ideas from research towards absorption, enabling the diffusion of innovation. In contrast, ‘pull models’ (problem-solving approaches) start from the premise of a real-life problem identified by the end-user, then directed to the researcher for modification into a research question and proposed solutions. Utilisation is stimulated by the fact that end-users are receptive and willing to implement workable solutions (Rosenberg, 1982; Yin & Moore, 1988). Generally, researchers use push strategies to get knowledge across the research-management divide, while managers employ pull strategies to solicit the required information. Both approaches have limitations. For example, end-users may feel alienated from the research forced onto them in the push model, perceiving it to have little practical relevance (Heinsch *et al.*, 2016). In the context of VM in PAs, this often entails limited financial and human resources and technical know-how (Leung *et al.*, 2018). In the case of the pull model, utilisation may be limited when end-users solicit research for easily identifiable operational issues, ignoring more substantial information needs (Roux *et al.*, 2006).

The ‘dissemination model’ also speaks to the movement of knowledge, but from the premise that knowledge transfer does not happen automatically and that additional action is required to channel knowledge to relevant end-users. Focus is on the necessary mechanisms employed to ensure such dissemination. It occurs when the end-user becomes aware of the

new knowledge, though they are neither involved in the production of the research nor selection of useful information (Belkhodja *et al.*, 2007; Landry *et al.*, 2001).

Moving away from the knowledge movement process, 'engineering explanations' attribute the level of utilisation to the characteristics (such as reliability, complexity, observability, compatibility) and type of research conducted (qualitative versus quantitative, applied versus basic research and so forth). Although such explanations may be applicable in some public sector cases, it largely ignores the organisational and social context in which governmental organisations operate (Amara *et al.*, 2004).

'Explanations of organisational interest' counters this limitation by describing how the contextual variables embedded in organisational features and interests influence utilisation by managers and professionals. Variables could include an organisation's size, the positions held by its end-users, alignment with organisational needs and types of policy domains (Landry, Lamari & Amara, 2003). Within this group of explanations, scholars have identified the user's context as a factor influencing the demand for academic research (Cherney, Head, Boreham, Povey & Ferguson, 2013). This context could influence beliefs held by practitioners and decision-makers that a particular piece of evidence is relevant, of value, of a certain level of quality, and feasible to implement. End-users' skills to interpret and apply research findings, also play an important role, along with access to research outputs such as reports and journals (Cherney *et al.*, 2013).

From a different viewpoint, the 'two communities metaphor' (Caplan, 1979) ascribes the low level of instrumental use of social sciences research to the fact that researchers and end-users reside in two culturally different worlds. Each community has different objectives and values; operate within different paradigms; experience varying challenges; and have different viewpoints about the context of research (Xiao & Smith, 2007). Managers, who look for simple, easy-to-use answers, often regard knowledge produced by academics as overcomplicated (Ritchie & Ritchie, 2002). This theory describes the research-management gap as a barrier-overcoming process with bridges, gaps and vehicles as metaphors (Xiao & Smith, 2007). Two influential factors have been highlighted – the adaptation of research outputs into products that managers can understand and align to the organisation's challenges, as well as practitioners' efforts towards acquiring research (Amara *et al.*, 2004).

The 'interaction explanations', on the other hand, assume social interactions between researchers and practitioners to be one of the most important predictors of utilisation (Landry *et al.*, 2003). The interaction model was developed in response to criticisms against previous science-push and demand-pull models. Prior models either did not involve users in the production of research results, did not assume responsibility for the transfer of research, or focused largely on the instrumental use of research findings (Belkhdja *et al.*, 2007). Various scholars support the interaction explanations (see Amara *et al.*, 2004; Cherney & McGee, 2011, Cherney, Head, Boreham, Povey & Ferguson, 2012a; Crona & Parker, 2011; Cherney, Povey, Head, Boreham, Ferguson, 2012b; de Goede, van Bon-Martens, Mathijssen, Putters & van Oers, 2012; Estabrooks, Squires, Strandberg, Nilsson-Kajermo, Scott, Profetto-McGrath, Harley & Walling, 2011). Knowledge utilisation scholars increasingly agree that committed relationships and exchanges between researchers and practitioners along with joint efforts lead to more functional knowledge (Heinsch *et al.*, 2016) and significantly counters suboptimal research use (Dunn 1980; Yin & Moore 1988; Oh 1997; Landry *et al.*, 2001).

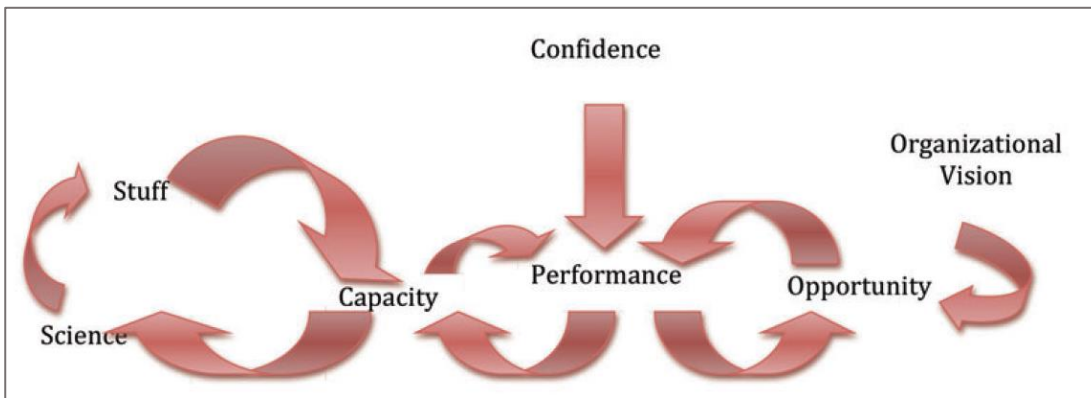
Returning to the focus of knowledge utilisation in VM in PAs, much can be learned from the challenges that aggravate the research-practice gap, documented by McCool (2012). PAs are social-ecological systems, known for uncertainty as they encapsulate various elements interacting at different scales. In the context of social-ecological systems, which designate PAs and in which PAs function, relationships are considered loosely-coupled, meaning there may be several causes associated with certain outcomes. In this system, changes in independent variables may result in considerably delayed responses in the dependent variable, which makes confirmation of causal effects tricky. For example, broad changes in societal beliefs and preferences about visitor experiences may manifest in visitor behaviour and attitudes only after mainstream adoption by society. Relationships are often non-linear in the sense that a small change in one variable may lead to a substantial change in another. Also, the nature of the cause-and-effect linkages in the system, lack of conclusive evidence, and complexity of the system itself, complicates our understanding of the relationship between management actions and its effects on different aspects of visitor experiences.

The academic environment of researchers, which favours and rewards publications over spending time with managers to translate research findings into actionable objectives,

further constrains research application (McCool, 2012). What the author describes here, links strongly to the idea of two different communities. He equates the current mental model of research utilisation to a “hypodermic needle” approach where managers are injected with data and information under the assumption (by researchers) that the presentation of data and information leads to knowledge transfer and management action. Such an approach focuses on management capacity rather than management performance and is unable to deal with the complex nature of VM in PAs.

Much of the research communicated to managers is data and information, while what PAs need is knowledge, understanding and wisdom (refer to Table 4). A more accurate depiction of the research-management interaction, as suggested by McCool (2012), can be seen in Figure 5. The ultimate goal of applied research is to improve the performance of managers in providing high-quality visitor experiences. Organisations with highly skilled practitioners, well-entrenched relationships with academia and a culture that values research are more likely to make evidence-based policy decisions (Newman & Head, 2015). For organisations to take full advantage of external research, they need internal absorptive capacity, which is an organisation’s ability to identify, take in and fully understand, and make full use of knowledge (Tanriverdi & Venkatraman, 2005). Such increased capacity may, however, not translate into improved performance because of other factors such as: (i) not having an opportunity to implement and monitor the effectiveness of VM practices; (ii) managers not having the confidence to implement changes or (iii) a misalignment between organisational objectives and the research presented which influence opportunity (McCool, 2012).

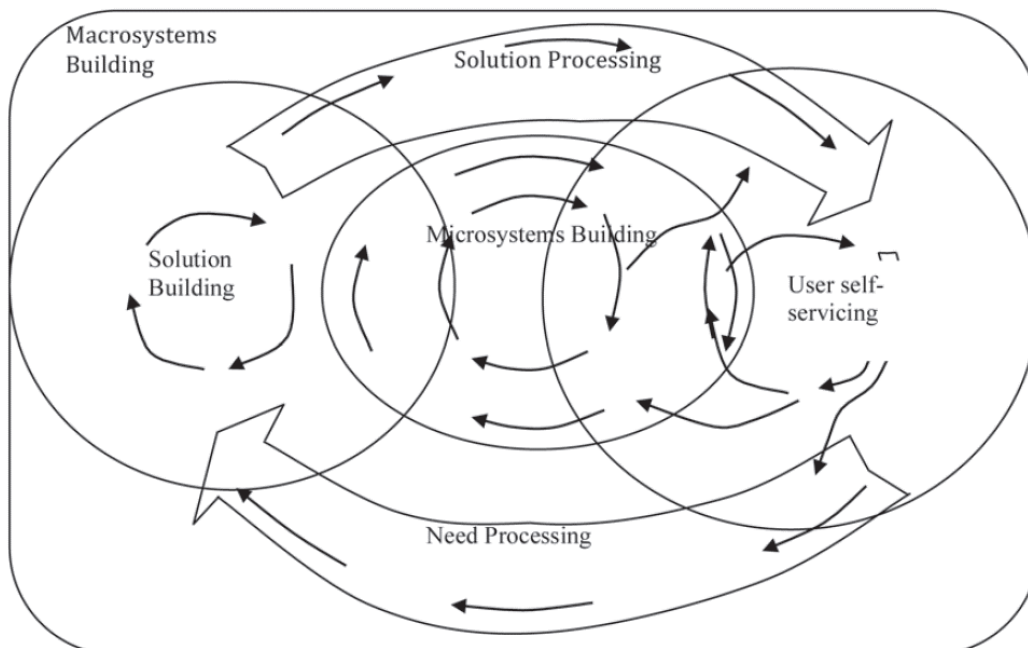
Figure 5: Model of capacity building in a post-normal situation



Source: McCool (2012:184).

There seem to be many influential factors that complicate the path of VR towards application. McCool (2012) puts forward the model of research applications designed by Havelock (1972) (refer to Figure 6) as an alternative model for the effective utilisation of research in the applied, value-laden problems of visitor experiences in PAs. In this model, micro-systems processing, represented as a series of interactions between researchers and managers, is put forward as the driving force behind knowledge transfer and understanding between the two communities (McCool, 2012).

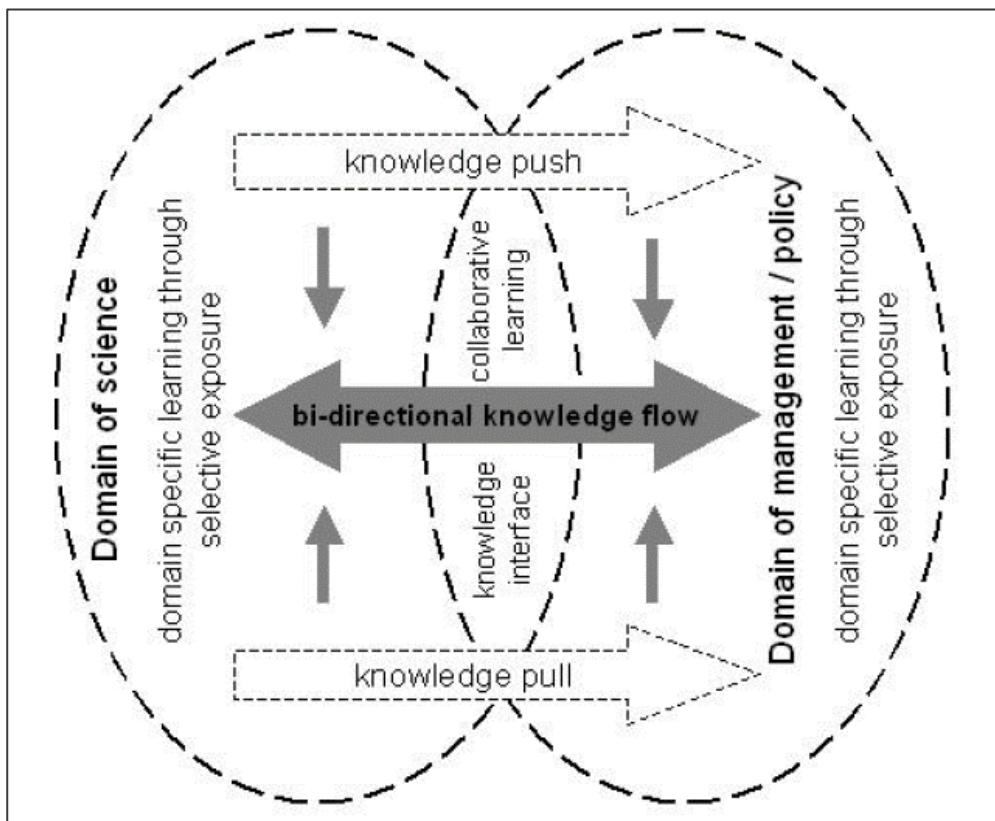
Figure 6: Model of research applications and technology transfer



Source: Havelock (1972), obtained from McCool (2012:185).

The authors further suggested that such a process is iterative and symmetrical; the aim being to improve manager self-servicing and to construct methodological and theoretical competencies (solution building). McCool (2012) contends that such a model would require adjustments in the macro-system of both communities; such as the reward systems of academic institutions. On the micro-level, an increased understanding among researchers of management priorities, along with appropriate mechanisms to facilitate engagements with managers, is necessary. One way to do this would be through employing communities of practice (CoP). To this end, Roux *et al.* (2006) introduced a knowledge interfacing model that facilitates flow between researchers, policy-makers and resource managers in ecosystem management (Figure 7). The authors suggest moving beyond the push-pull approach, advocating for bi-directional flow of knowledge between the two communities, with the end goals being shared understanding and co-production of new knowledge.

Figure 7: Knowledge interface model to bridge the science-management divide



Source: Roux *et al.* (2006).

Research is not the only source of knowledge that managers rely on to make justifiable decisions. Over time, knowledge accumulates and manifests in organisational memory

(Rich, 1997). Organisational memory refers to “... the individual recollections and shared interpretations of historical information consequent to implementing earlier decisions and brought to bear on present decisions ...” (Baskerville & Dulipovici, 2006). Many of the decisions taken to inform planning frameworks in PAs have an extended lifespan which may be counterproductive to an adaptive management approach, particularly in a context highly influenced by societal changes such as that of tourism (McCool *et al.*, 2007, McCool, 2012). Kransdorff (2006) argues that, for organisations to improve the quality of decision-making, they need to improve their experiential learning abilities. The presence of organisational memory can promote organisational learning by recollecting good and bad management decisions of the past. At the opposite end, organisational learning is hampered when decision-makers are deprived of the ability to recognise that present conditions (i) differ from those in the past and (ii) require different decisions and accompanying new knowledge. Organisational memory further biases decisions towards maintaining the status quo, whether good or bad (Baskerville & Dulipovici, 2006; Zakaria & Mamman, 2015). While the literature is clear on the positive and negative effects of organisational memory on organisational learning and decision-making, very little is known about the interactions between organisational memory and VR and whether organisational memory influences the uptake of new knowledge in the VM context.

1.5.6.3 The measurement of knowledge utilisation

Serious theoretical, conceptual and methodological gaps have been noted in the area of measurement and evaluation of knowledge utilisation, even though a plethora of research is available to frame our understanding of knowledge use (Estabrooks *et al.*, 2011). The ability to measure use is important for the consumers of knowledge that rely on useful data and information for decision-making and for managers to justify investment in such knowledge resources (Rich, 1997). Earlier works focus on dimensions such as the specific areas of application, preferred types of information, the extent to which information is absorbed, information diffusion patterns, the role of information in decisions already taken, and the rate of adoption (Rich, 1997).

Many of the past studies on measurement have taken an input-output model approach, including the information utilisation questionnaire by Larsen (1981); the level of use scale

by Hall, Loucks, Rutherford and Newlove (1975); the behavioural, affective and cognitive use instrument by Anderson, Ciarlo and Brodie (1981); and the USER instrument by Menon and Wilcox (1994). Scholars have not been critical of the unwarranted assumptions and problems in methodologies associated with the input-output model. According to Landry *et al.* (2003) and Rich (1997), these include:

- The lack of a definitive construct for the dependent variable “use”;
- problems associated with the selection of independent variables;
- the view of use as a discrete event;
- the belief that a cause-effect relationship exists between a specific piece of research and the end-user’s objective;
- the perception that problem-solving is affected mainly by information;
- the idea that use of information is linked directly to a particular action; and
- the belief that it is appropriate and possible to measure the influence of a single piece of evidence on the problem-solving abilities of an individual.

Problem-solving does not depend on a single piece of evidence, and research evidence does not generate just one effect, therefore viewing utilisation as a discrete decision is regarded problematic (Landry *et al.*, 2003, Rich, 1997). Such methodological challenges are ascribed to the fact that “... there is not yet an integrated conceptual model used by the experts in the field of knowledge utilisation ...” Landry *et al.* (2003).

Knowledge utilisation should be thought of as a decision-making process, capturing the extent to which research has contributed to influencing a particular goal or desired result (Landry *et al.*, 2003). For this reason, from an evaluation perspective, the concepts or terms such as “influence”, “use” and “impact” need to be constructed measurably, acknowledging the different types of research use. “Use” may refer to the reception and cognition of research, but does not guarantee comprehension. At the same time, “influence” implies the information has contributed towards a decision or an activity or led to alternative understandings. “Impact” on the other hand places the focus on an action-orientated outcome, implying that practitioners utilised the information and took action even if it means the action was to reject the information (Rich, 1997). Scholars have placed more emphasis on identifying the determining factors of utilisation than on the types of research or utilisation (Landry *et al.*, 2001; Landry *et al.*, 2003; Rich, 1997). Most contemporary studies, however,

refer to the three types of use of knowledge: instrumental, conceptual and symbolical. Instrumental use, also known as “knowledge for action”, refers to research being applied in a behavioural or action-oriented way to find solutions to a specific, identifiable problem. An example would be research that leads to a change in policy, practices, decisions (Cherney & McGee, 2011; de Goede *et al.*, 2012; Estabrooks *et al.*, 2011; Xiao & Smith, 2007). Conceptual use implies the application of knowledge in the development of new theories, hypothesis or conceptual thinking about the problems at hand, but without necessarily directly changing policy or decisions (Cherney & McGee, 2011). This is also called “knowledge for understanding” (Rich, 1977). When practitioners apply research to justify a political position or practice or defend prior decisions, it is called symbolic or political use (Cherney & McGee, 2011; Xiao & Smith, 2007).

While such definitions of knowledge utilisation along a spectrum of applications are useful, it does not describe the complexity accompanying the process of knowledge use, particularly the range of uses from the transmission to the actual application. Knott and Wildavsky (1980) addressed this challenge by conceptualising utilisation as a process rather than a single event and whose scale was later adapted by Landry *et al.* (2001) (Table 11). Since its inception, this scale has proven to be reliable and relevant in numerous empirical studies (Belkodja, Amara, Landry & Ouimet, 2007; Cherney *et al.*, 2013; Cherney *et al.*, 2012a&b; Cherney & McGee, 2011; Ion, Stîngu & Marin, 2019; Landry *et al.*, 2003).

Table 11: Stages of knowledge utilisation

Stage	Description and statement to respondent
Stage 1	Transmission: I transmitted my research results to the practitioners and professionals concerned.
Stage 2	Cognition: My research reports were read and understood by the practitioners and professionals concerned.
Stage 3	Reference: My work has been cited as a reference in the reports, studies, and strategies of action elaborated by practitioners and professionals.
Stage 4	Effort: Efforts were made to adopt the results of my research by practitioners and professionals.
Stage 5	Influence: My research results influenced the choice and decision of practitioners and professionals.
Stage 6	Application: My research results gave rise to applications and extension by the practitioners and professionals concerned.

Source: Landry *et al.* (2001).

Knowledge utilisation encompasses six cumulative stages, starting with the *transmission*, or the transfer of research outputs. *Cognition*, or understanding of the research results by practitioners, builds on transmission and is followed by *reference*, or actions where practitioners and professionals cite the research as a reference in their reports, studies, and strategies. The next stage is named *effort*, and involve the actions taken by practitioners to adopt the outputs of the research. The final stages involve *influence* and *application*. Influence happens when the research has influenced the choices and decisions of end-users. Application is said to have happened when the research gave rise to applications and extension in management activities.

In terms of predicting the level of knowledge use in social sciences, results from empirical testing by Landry *et al.* (2001) among 1 229 Canadian social science researchers demonstrated the interaction explanations are superior to those of the two communities' theory, the push and pull models and the dissemination model. Determinants found to be significantly and positively related to utilisation were: use of quantitative methodologies; adaptation of research outputs; dissemination efforts by researchers; linkages between researchers and end-users; the user's context; the researcher's publication assets and the degree of importance of external funding. The study also proved that the contexts of both the user and the researcher influences uptake of research; with the utilisation of social science research being much more complex than the theories put forward by the interaction explanations alone. The authors further highlighted the need for more theoretical research to improve interaction theory of knowledge utilisation and more empirical investigations that explore the determinants for the successful flow of evidence through the six stages of utilisation.

In a follow-up study, Landry *et al.* (2003) measured the utilisation of university research in Canadian government agencies by adapting the scale used by Landry *et al.* (2001) and using independent variables derived from the engineering, organisation interest, two communities and the interaction explanations. The results indicated the variables originating from the two communities and interaction explanations as very good predictors of utilisation, while the engineering explanations were the worst. Similarly, using social network analysis, Crona and Parker (2011) found that policymakers with more direct interactions with knowledge producers and peers show greater utilisation efforts. More recently, researchers

Newman, Cherney and Head (2015), in surveying more than 2 000 policy officials in Australia, illustrated how the two communities theory does not accurately describe the relationship between policy and research.

Table 12 provides a list of variables found to influence the level of research use. The list represents a wide variety of factors with no real common thread in terms of theoretical explanations to guide an overarching theory of knowledge utilisation.

Table 12: Determining factors influencing knowledge utilisation

Explanatory variables	Literature
Acquisition efforts by users.	Amara <i>et al.</i> (2004); Landry <i>et al.</i> (2003).
Adaptation of research outputs to user's needs	Amara <i>et al.</i> (2004); Cherney <i>et al.</i> , (2012a&b); Cherney <i>et al.</i> (2013); Cherney & McGee (2011); Landry <i>et al.</i> (2001); Landry <i>et al.</i> (2003).
Advantages of collaborative research.	Cherney <i>et al.</i> (2012b); Cherney <i>et al.</i> (2013).
Benefits of the research to society.	Ion <i>et al.</i> (2019).
Commissioned research.	van der Arend (2014).
Direct interactions between researchers and end-users.	Crona & Parker (2011).
Dissemination efforts by researchers.	Cherney <i>et al.</i> , (2012a&b); Cherney & McGee (2011); Landry <i>et al.</i> (2001); Landry <i>et al.</i> (2003).
Effects of investing in research partnerships.	Cherney <i>et al.</i> (2013). Cherney <i>et al.</i> (2012b).
Extent that research is directed towards practitioners.	Cherney <i>et al.</i> (2012a).
Focus on the advancement of scholarly knowledge.	Ion <i>et al.</i> (2019); (Landry <i>et al.</i> (2003).
Importance of external funding.	Cherney <i>et al.</i> (2012a); Cherney & McGee (2011); Landry <i>et al.</i> (2001).
Importance of information from government, international organisations, university researchers.	van der Arend (2014)
Importance of information from interest groups, think tanks, professional associations, private consultants.	van der Arend (2014)
Importance of media coverage.	Cherney <i>et al.</i> (2012a).
Importance of research in the field of the user.	Amara <i>et al.</i> (2004); Landry <i>et al.</i> (2003)
Intensity of use of research sources.	Belkhodja <i>et al.</i> (2007).
...Continues on the next page	

Explanatory variables	Literature
Involvement of the researcher in the policy process.	De Goede <i>et al.</i> (2012).
Involvement of the user in the research process.	De Goede <i>et al.</i> (2012).
Level of administration of the user.	Landry <i>et al.</i> (2003).
Level of education of the user.	Landry <i>et al.</i> (2003).
Linkages between researchers and end-users.	Cherney <i>et al.</i> (2012a&b); Cherney & McGee (2011); Belkhodja <i>et al.</i> (2007); Landry <i>et al.</i> (2001); Landry <i>et al.</i> (2003); van der Arend (2014).
Number of external grants.	Cherney <i>et al.</i> (2012a&b); Cherney <i>et al.</i> (2013).
Peer-to-peer interactions of end-users.	Crona & Parker (2011).
Perceived contribution of the research to professional objectives of the researcher.	Ion <i>et al.</i> (2019)
Policymaking based on sound research.	Van der Arend (2014).
Policy relevance.	Amara <i>et al.</i> (2004).
Preferred types of information.	Rich & Oh (1993).
Prioritisation of high-quality research by end-users.	Cherney <i>et al.</i> (2013).
Prioritisation of the feasibility of research by end-users.	Cherney <i>et al.</i> (2013); Cherney <i>et al.</i> (2012b).
Prioritisation of the usability of research by end-users.	Cherney <i>et al.</i> (2013); Cherney <i>et al.</i> (2012b).
Problems associated with the orientation of research partnerships.	Cherney <i>et al.</i> (2012b).
Regular interactions with knowledge brokers or link staff.	van der Arend (2014).
Relevance of research to user's work.	Amara <i>et al.</i> (2004); Belkhodja <i>et al.</i> (2007); Cherney <i>et al.</i> (2012b); Landry <i>et al.</i> (2003).
Research focus on real life problems.	Ion <i>et al.</i> (2019)
Research is treated as a preferred source of information.	Belkhodja <i>et al.</i> (2007).
Research partners.	van der Arend (2014).
The researcher's context.	Cherney <i>et al.</i> (2012b); Landry <i>et al.</i> (2001).
The researcher's publication assets.	Landry <i>et al.</i> (2001).
The specific areas of application the information is put to in decision-making.	Rich (1997).
...Continues on the next page	

Explanatory variables	Literature
The user's context.	Amara <i>et al.</i> (2004); Cherney & McGee (2011); Cherney <i>et al.</i> (2012b); Landry <i>et al.</i> (2001); Landry <i>et al.</i> (2003).
Training activities that integrate research results.	Ion <i>et al.</i> (2019)
Types of research (qualitative, quantitative, or mixed).	Amara <i>et al.</i> (2004); Cherney <i>et al.</i> (2012a&b); Cherney <i>et al.</i> (2013); Cherney & McGee (2011); Ion <i>et al.</i> (2019); Landry <i>et al.</i> (2001); Landry <i>et al.</i> (2003).
User's experience with research.	Belkhodja <i>et al.</i> (2007); De Goede <i>et al.</i> (2012);
User's awareness of media publications.	De Goede <i>et al.</i> (2012).

Source: Author's construct.

Apart from the lack of an umbrella theory to drive conceptual frameworks of knowledge utilisation, there is also no definitive list of variables to predict knowledge use (Cherney *et al.*, 2012), perhaps because of the contextual differences seen in different academic disciplines. Several studies have further demonstrated that different explanatory variables apply in different academic disciplines. One such study involved 639 academics in social sciences in Australia (Cherney *et al.*, 2013). Knowledge utilisation in the academic field of Education is significantly related to four variables: i) investing in research partnerships; ii) advantages of collaborative research; iii) the number of external grants; (iv) and importance of adapting research outputs to end-users' needs. In the field of Sociology, however, only two variables proved to be significant, namely, the number of external grants and prioritisation of high-quality research by end-users.

Researchers have also measured the levels of instrumental, conceptual and symbolic use and its determinants (Amara *et al.*, 2004; Cherney & McGee, 2011). Conceptual use was found to be more important for daily use by practitioners in government agencies than symbolic use which in turn proved to be more important than instrumental use. To simultaneously increase instrumental, conceptual and symbolic use of university research in government agencies, researchers should be encouraged to i) produce more quantitative studies; ii) cater towards the needs of end-users; iii) consider the context in which government agencies operate; iv) pay attention to the relevance of their work to the practice areas of professionals and managers in government agencies; and v) increase interactions with practitioners in government agencies. End-users, on the other hand, should also be

encouraged to make greater efforts towards the acquisition of knowledge (Amara *et al.*, 2004). In a study among Australian sociologists and criminologists, Cherney and McGee (2011) also found conceptual use to be more prevalent than instrumental or symbolic use. Their study supports many of the findings by Landry *et al.* (2001) and Amara *et al.* (2004). Factors shown to be essential to get research past the transmission stage included: (i) focussing on users' needs; (ii) considering users' context; (iii) adapting products to users; (iv) efforts towards dissemination; (v) the importance of external funding and (vi) intensifying interaction with users. A higher proportion of researchers who made it to stage 6 of utilisation (refer to Table 11), used quantitative methods.

Some researchers interested in identifying associated indicators of knowledge use have taken qualitative approaches to construct research utilisation. Estabrooks *et al.* (2011) found knowledge utilisation can be measured in various ways including self-report, observations, thinking out loud, interviews and document audits.

No empirical studies appear to be available to guide conceptual thinking in the context of VM in PAs, nor any studies that measure the utilisation of VR in a broader tourism context. Despite research in knowledge utilisation expanding, the lack of an integrated conceptual model has contributed towards methodological challenges seen in previous attempts to measure utilisation. In terms of factors influencing research use, the interaction explanations have produced promising results. Yet, research has also demonstrated the theories put forward by the interaction explanations alone cannot explain the application of research.

No literature is available that has proposed and tested a relevant method for measuring knowledge utilisation of VR and therefore also no studies that describe the utilisation of VR in PAs. Current literature provides little insight into the role of different categories of VR in the context of VM. No studies are available that have endeavoured to describe the associations between categories of VR and visitor management activities. Such knowledge could serve as a guide to managers (and the knowledge producers supporting them), on prioritising the collection of data and information for management decision-making. The advancement of visitor research through the different stages of utilisation, has also yet to be described and measured, along with its determinant factors influencing such movement.

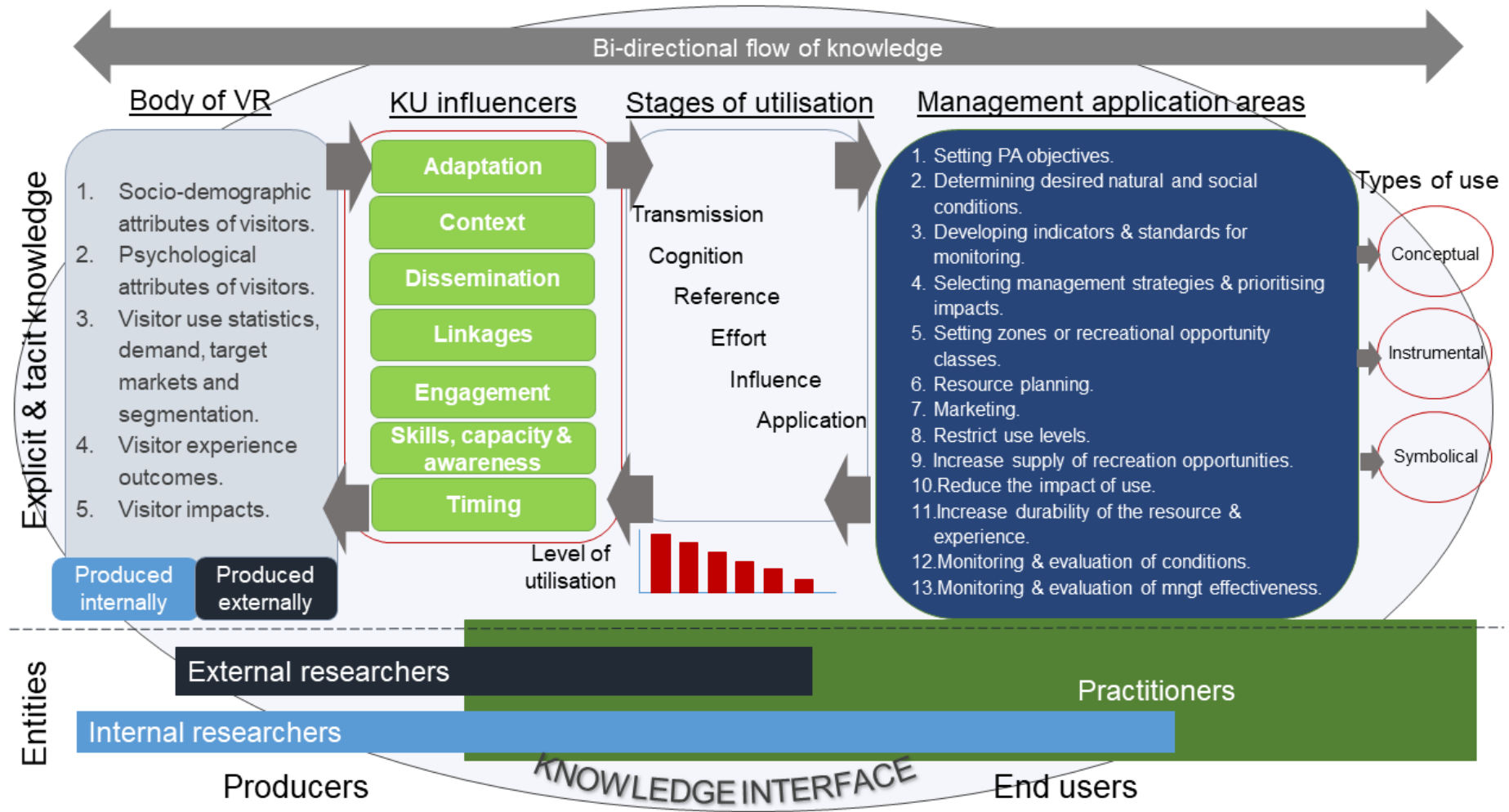
1.6 INTEGRATED FRAMEWORK AND HYPOTHESES

This section presents and discusses the integrated framework of the study. The framework is a portrayal of the researcher's broad understanding of the process, components and entities involved in the utilisation of VR in PAs, along with the knowledge gaps in need of further empirical enquiry.

1.6.1 Integrated framework of the study

The integrated framework presented here frames the researcher's understanding of the utilisation of VR in VM, informed by the theoretical context explored in section 1.5 of this thesis. The researcher describes this phenomenon along the dimensions of (i) the movement of knowledge, (ii) the factors influencing the movement and utilisation of knowledge, (iii) the process by which knowledge moves, (iv) the application areas where knowledge is absorbed into, (v) the entities involved in the knowledge production and utilisation process, (vi) the interactions between the entities and (vii) the end result of utilisation. The framework is presented in Figure 8.

Figure 8: Proposed integrated framework for the utilisation of visitor research in visitor management



Source: Author's construct.

The body of VR, comprising both explicit and tacit knowledge, is the “*what*” that moves between stakeholders when viewed through the lens of use (Ottoson, 2009). Knowledge transferred by researchers, represented by the categories of VR (defined in section 1.5.2) collides at some point with the factors inhibiting or promoting use – the influencers of utilisation. The expected interactions between knowledge utilisation and the influencers of utilisation are described as part of the conceptual model put forward for testing. The body of knowledge goes through a process of utilisation which involves the steps of transmission, cognition, reference, effort, influence and application (Knott & Wildavsky, 1980).

The management application areas, as identified in section 1.5 of this thesis, act as the main application areas of knowledge. Three types of use are witnessed, namely instrumental, conceptual and symbolical use (Cherney & McGee, 2011). Knowledge moves in both directions, firstly from internal and external producers of knowledge to end-users in decision-making. Secondly, movement takes place in the opposite direction, as the decisions made and the knowledge and understanding gained from both the decision process as well as the consequences of management decisions (monitoring and evaluation), are shared with producers (Mason, 2005; McCool *et al.*, 2007). Such increased understanding is absorbed back into organisational memory which can lead to an additional demand for VR.

The entities involved in the application of VR comprise the producers of knowledge (internal and external researchers) and the end-users of knowledge (the practitioners involved in decisions about VM in PAs). The framework assumes that external researchers engage less with VR produced internally as such VR is not always subject to publication. The knowledge interface process represents both the interactions between the entities and the actual movement of knowledge. The researcher further assumes that greater levels of interaction exist between practitioners and internal researchers than practitioners and external researchers.

The framework presented here also visually represents the knowledge gaps to be explored by empirical research. These relate directly to objectives A, D, E, F, G, H and I of this study:

- A. Define the main components of VR within the context of PAs.
- B. Define different management application areas in the context of VM.

- C. Explore theoretical models explaining knowledge utilisation and the measurement thereof.
- D. Identify the management application areas of recently produced VR.
- E. Evaluate the types of use occurring in recently produced VR.
- F. Determine which factors influence the uptake of VR in VM policies and practices.
- G. Develop an integrated framework describing the movement and components of VR utilisation.
- H. Measure the actual level of utilisation of recently produced VR.
- I. Construct and empirically test a structural model that seeks to explain the utilisation of VR.

The empirical investigation of this study further refines the components of VR (Objective A) and the application areas of recently produced VR (Objective D). At the same time, the study analyses the types of use recommended in recently produced VR (Objective E). These are all addressed in Article 1. Articles 2 and 3 investigate objectives F through I. Section 1.7.4 describes the conceptual model used to propose a structural model for explaining the utilisation of VR in VM (Objective I).

The integrated framework presented here can be viewed as an explanatory framework (Saunders, Lewis & Thornhill, 2012), as it represents large components of concepts and themes derived from the existing body of knowledge, supplemented with the experiences and own expectations of the researcher.

1.6.2 Hypotheses to be tested

In Article 1, three assumptions, based on a combination of existing literature on the application of VR in VM and the researcher's experiences and own expectations, were tested:

H₁: Different types of VR are associated with different types of management application areas.

H₂: There is an association between the number of VR types utilised in a study and the number of management application areas recommended.

H₃: The mean number of recommended management application areas differs significantly between studies externally produced and those produced by a combination of internal and external researchers.

In both Articles 2 and 3, the researcher's major assumption that VR is currently underutilised in PAs was tested. First, the opinions of experts were consulted in the Delphi survey in Article 2. Next, by surveying a sample of researchers, the movement of VR collected in PAs through the different stages of utilisation were quantified.

H₄: VR does not currently reach its full potential of application in protected area visitor management strategies, practices and policies.

In addition, seven hypotheses were constructed to test the relationships between the latent variables in the structural model in Article 3:

H₅: The importance placed on the adaptation of research outputs relates positively to knowledge utilisation.

H₆: The presence of favourable conditions relevant to the context of the PAs the researcher worked in relates positively to knowledge utilisation.

H₇: The importance placed on dissemination efforts relates positively to knowledge utilisation.

H₈: The level of engagement between PA practitioners and researchers relates positively to knowledge utilisation.

H₉: The importance of linkage mechanisms between PA practitioners and researchers relates positively to knowledge utilisation.

H₁₀: The perceived level of skills, capacity and awareness of practitioners relates positively to knowledge utilisation.

H₁₁: The perceived timing of the research results, reaching practitioners at the right point in time, relates positively to knowledge utilisation.

Note: The numbering of H₅ through H₁₁ are presented differently in Chapter 4 (Article 3), starting with H₁.

This section provided an overview of the proposed integrated conceptual framework for studying the utilisation of VR in VM. The research approach taken to achieve this is explained in more detail in the next section.

1.7 RESEARCH METHODOLOGY

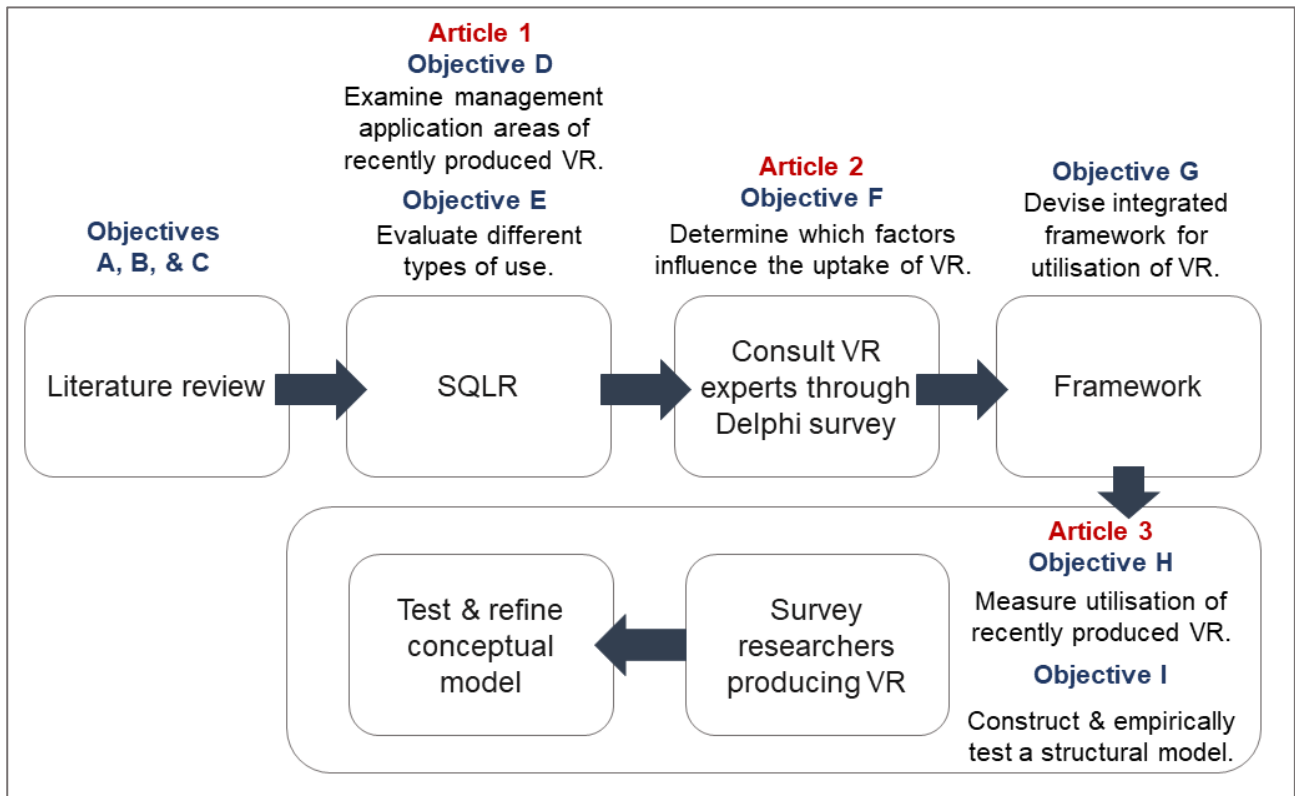
The research paradigm guiding this study was that of a positivist approach as the researcher adopted the position of a natural scientist, collecting measurable observations allowing for the formulation of hypothesis and subsequent statistical analysis (Saunders *et al.*, 2012). The researcher's positivist philosophy underpins the research design of this thesis.

1.7.1 Description of inquiry strategy and broad research design

A positivist approach is concerned with the assessment of the current level of knowledge as well as the acquisition of new knowledge. The strategy of enquiry for the study is one of an empirical nature. The researcher's main intention was to achieve an acceptable level of knowledge since objectives A, B and C (literature review) evaluate current knowledge. Objectives D and E examine current knowledge and convert it into new knowledge. Objectives F, H and I are concerned with acquiring new knowledge. The literature review of this study has determined that little or no secondary data was available to achieve objectives D through I without conducting further empirical work. The next natural step in the research process, following a positivist approach, is then to acquire knowledge by means of an empirical research strategy to generate and analyse observable data.

This study adopted a multiphase sequential mixed methods approach (Saunders *et al.*, 2012) as depicted in Figure 9 and described per article in the subsequent sections.

Figure 9: Multi-phased sequential mixed method research approach



Source: Author's construct.

Article 1 (refer to Chapter 2) utilises a mixed-method technique called a systematic quantitative literature review (SQLR). Article 2 (Chapter 3) takes a qualitative approach using the Delphi survey method, and Article 3 (Chapter 4), uses a quantitative approach through an online survey method.

The quantitative approaches in Articles 1 and 3, which looked for associations and causal relationships in the data, align strongly with the positivist philosophy of the researcher. Qualitative research (Article 2) is also not uncommon in positivism. The study is both of an exploratory nature (Articles 1 and 2), aimed at understanding the phenomena of knowledge utilisation better, and explanatory nature (Articles 1 and 3), as it studies the relationships between variables. Staying true to the positivist approach, the research was, as far as possible, conducted in a value-free way. A positivist approach in the context of this study

implies the researcher remained separate from the data used in Article 1 and from the participants engaged with in Articles 2 and 3 so that the data could be captured in an objective manner and not in any way influenced by the researcher's interests. The study examined existing literature and theory related to the contexts of knowledge utilisation, VR and VM, to develop its framework. The positivist approach further implied that the researcher viewed statements by the respondents as facts that could be measured.

Table 13 lists the timeframes in which data was collected and captured for each article.

Table 13: Timeframes in which data was collected

Article	Methodology approach	Timelines
Article 1	Systematic quantitative review of literature.	January – July 2019.
Article 2	Qualitative: Delphi survey with experts.	August – September 2019.
Article 3	Quantitative: Pilot study.	October 2019.
Article 3	Quantitative: Survey among researchers.	November 2019 – January 2020.

The next section outlines the sampling and data collection methods involved in Objectives D through I.

1.7.2 Article 1: Systematic review of the current knowledge base

Article 1 (refer to Chapter 2) utilised the mixed method technique of SQLR to describe the nature of recently produced VR and its management application areas. In contrast to a traditional narrative review, a systematic review methodically assesses all research studies that address a particular research question to construct a structured quantitative synopsis of the body of knowledge (Onwuegbuzie & Frels, 2016; Pickering & Byrne, 2014). The SQLR contributes to the three parts involved in the practice of research writing, namely, the processes of knowledge creation, text production and identity formation (Pickering, Grignon, Steven, Guitart & Byrne, 2015).

1.7.2.1 Sampling

The units of analysis investigated in Article 1 consisted of case studies of VR conducted in a PA context. Case studies are found in published or unpublished documents, books, reports and articles. Since much of the research produced internally by PAs is not publically available, collecting all literature in the field systematically and consistently, would not be practical. Subsequently, the researcher opted to focus the investigation on case studies published in academic journals only, a common strategy applied in the systematic review of the literature (Pickering *et al.*, 2015). This exploratory approach provided an opportunity for the researcher to explore the extent to which academic research include management recommendations and determine which management areas they recommend the new insights to be applied. This is supportive of the exploratory nature of research objectives D and E.

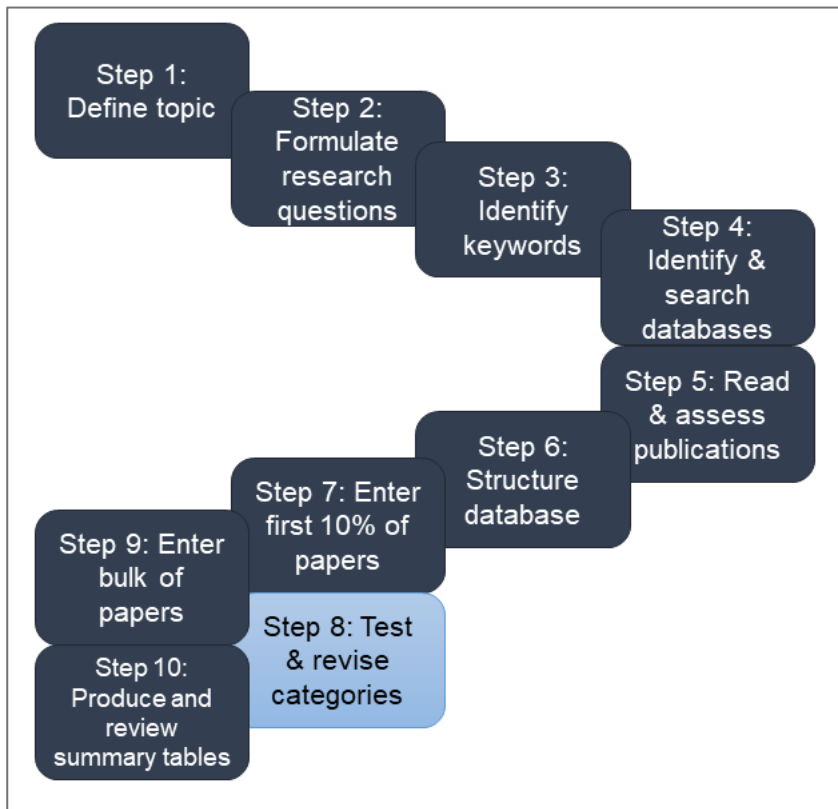
The literature collected was further subjected to the following inclusion and exclusion criteria:

- Only peer-reviewed journal articles published over the five-year period of 2014 through 2018 was included to keep the investigation current.
- Only articles published in the English language were included.
- As a form of sampling, only case studies of research conducted in national parks, as a category II PA (IUCN, 2019) were included.

1.7.2.2 Data collection

The knowledge creation part of the systematic review, which is the action of collecting and summarising the data to create new data, followed the steps outlined by Pickering *et al.* (2015), illustrated in Figure 10.

Figure 10: Steps involved in undertaking a SQLR in relation to the process of knowledge creation



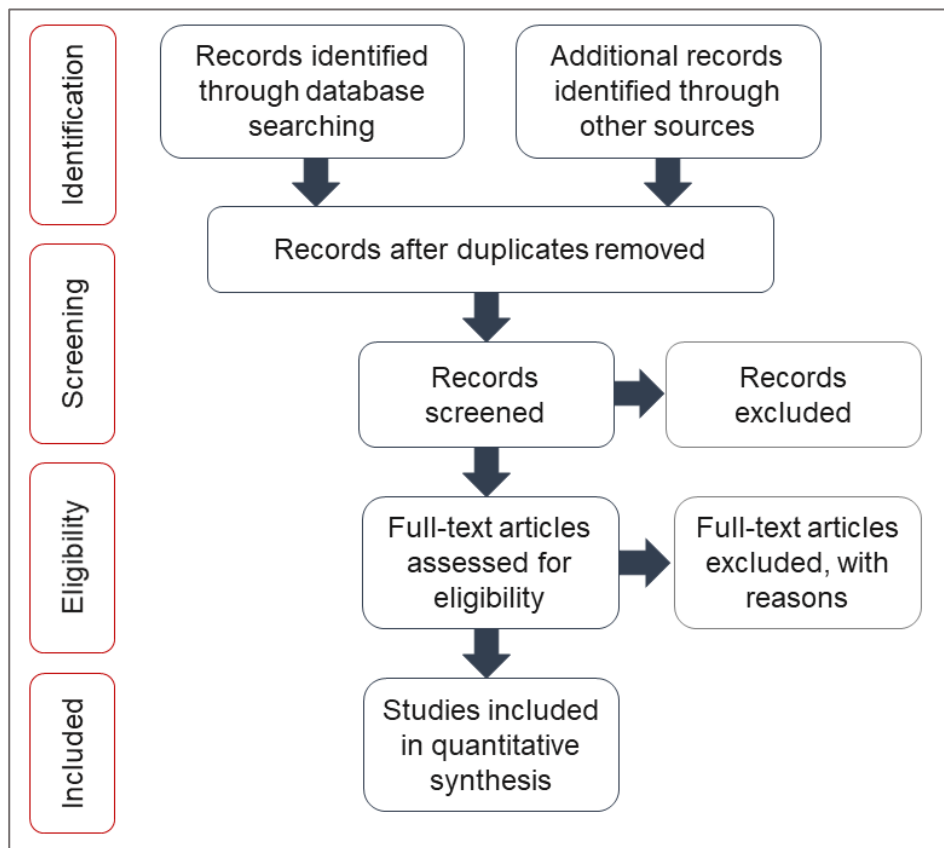
Source: Adapted from Pickering *et al.* (2015:1762).

The PRISMA flow chart (available in Article 1) describes the search strategy and review protocol of the SQLR. The search term ((visitor OR tourist) AND “national park”) was used to search for journal articles published in the English language, from 2014 to 2018, in four databases: EBSCO Host, ScienceDirect, Scopus and Web of Science Core Collection. The number of databases used exceeded the minimum recommended number of three (Griffith University, 2018). Many view Google Scholar as a useful tool for researchers (Hightower & Caldwell, 2010). Some researchers have, however, noted challenges in using Google Scholar for systematic reviews, particularly concerning reproducibility, generalisability and precision. This is ascribed to the different database and search phrase structures used, combined with the fact that Google Scholar adjusts its algorithms and policies regularly (Giustini & Boulos, 2013). Practically, this means that results found one day in Google Scholar could have changed a day later. Scholars further concluded that, despite its high sensitivity and extensive coverage, Google Scholar could not produce all research material cited in a systematic review conducted previously. Moreover, search strategies in Google

Scholar often yield unmanageable numbers of results, but Google limits the display of the results to only 1 000 records. For these reasons, the researcher excluded Google Scholar from the list of databases.

Within the steps 4 and 5, Moher, Liberati, Tetzlaff and Altman (2009) describe a series of sub-steps, depicted in Figure 11. These steps ensured the researcher kept to a systematic process that is reproducible.

Figure 11: Flow of information through different stages of a systematic review



Source: Adapted from Moher *et al.* (2009:334).

The researcher constructed a database in a Microsoft Excel spreadsheet with rows representing individual case studies and columns representing a range of pre-determined variables collected from the cases. This is in line with the methods proposed by Onwuegbuzie and Frels (2016) and Pickering and Byrne (2014) for systematically analysing literature. The spreadsheet was set up so that each of the variables and its set of potential values (e.g. MAN1, MAN2, etc.) were captured in a separate column. After coding, the

majority of data were of the discrete type (either 1 or 0), with the exception being author names and year of publication, being categorical data.

Before data capturing commenced, the researcher coordinated a pre-test of the data collection instrument. This involved four experienced tourism researchers capturing the data from the same five journal articles into the Excel spreadsheet. The purpose of the pre-test was to assess whether the data fields proposed allowed for consistent data capturing between different researchers, which is a requirement for the reproducibility of a systematic quantitative literature review. The construction of the VR and MAN categories involved a mix of areas identified firstly from literature in section 1.5 of this thesis, combined with the SQLR pre-test and pilot of the first 10% of case studies (Step 7).

Outcomes of the pre-test indicated that the management application areas required revision. The capturing of the visitor use management strategies within the implementation layer of the management application areas (Table 10) was most problematic and yielded differing opinions among the four researchers. The VR categories, originally proposed in Table 8, were altered slightly to better fit the pre-travel-, on-site- and post-travel-related factors proposed by Pearce (2011). In this regard, the researcher added a sixth category, *travel arrangements and pre-visit information* (VR3). VR3 encompassed knowledge of visitors' sources of information, sources of influence on purchasing decisions, booking channels used, travel companions and distance travelled to destination. After simplifying the management application areas and VR categories, the researcher captured data from the first 10% of the selected studies as an additional step in testing the data fields and refining the categories (after Pickering *et al.*, 2015). Relevant changes were made before the researcher proceeded to assess and capture the remaining 90% of the studies.

The list of final variables captured from each case study and a reference to the source on which the choice of variables was based are listed in Table 14.

Table 14: Variables included in the systematic quantitative literature review

Variable name	Variable description	Based on
Authors	Surnames and initials of the knowledge producers.	
Journal name	Name of the peer-reviewed journal.	
Year	Year of publication of research.	Pickering <i>et al.</i> (2018).
Producer type	Type of knowledge producer: Internal researcher(s), external researcher(s) or both.	Author's construct.
Research method	Type of research method(s) employed: Quantitative, qualitative or mixed.	Pickering <i>et al.</i> (2018).
Type of data	Type of data utilised – primary data, secondary data, or both.	Hox & Boeije (2005).
PA	Name of the PA(s) in which the study was conducted.	Author's construct.
Country1, Country2 Etc.	Name of the country in which the study was conducted. One publication could involve numerous countries.	Pickering <i>et al.</i> (2018).
Continent1, Continent2, Etc.	Continent(s) in which the case study PA was located.	Pickering <i>et al.</i> (2018).
MAN1 MAN2 Etc.	Nine potential management application areas in which VR could be absorbed into.	Review of literature (section 1.5.5) and outcomes of the pre-test and pilot phases.
#MAN	Number of management application areas mentioned.	Author's construct.
VR1, VR2 Etc.	Six potential categories of VR that can be utilised in a study.	Review of literature (section 1.5.3) and outcomes of the pre-test and pilot phases.

A final sample size of 407 case studies was achieved and used for further analysis in Article 1.

1.7.2.3 Data analysis

First, the researcher performed exploratory data analysis (Saunders *et al.*, 2012) and calculated descriptive statistics using Excel and SPSS to explore the data and identify appropriate analysis techniques. Categorical data were quantified to describe the occurrences and frequencies of the variables in question (Onwuegbuzie & Frels, 2016). The sample of case studies was described by measuring and graphically displaying the

frequencies of the variables measured. The Pearson correlation coefficient test (de Winter, Gosling & Potter, 2016) examined the relationship between the number of VR types employed in a study and the number of management application areas recommended. To examine relations between each of the research types, and each management application area, Chi-square tests of independence (Saunders *et al.*, 2012) were performed. This test is commonly performed to test the equality of two proportions obtained from independent samples relations. In most cases, the researcher used the Pearson Chi-Square test (χ^2), and Fischer's exact test when the assumption of adequate cell count was violated (Yates, Moore, & McCabe, 1999). The effect size or strength of the relationships was tested using the *phi* coefficient (ϕ) and used in combination with Cohen's (1988) criteria of small ($0.10 \leq \phi < 0.30$); medium ($0.30 \leq \phi < 0.50$); and large ($\phi \geq 0.50$). While χ^2 may indicate statistical significance of the relationship, ϕ allows for interpretation of the substance of the relationship, making it meaningful at a practical level (Pallant, 2010). Scholars recommend an independent-samples t-test when testing for significant differences between two means of independent groups (Leedy & Ormrod, 2014). The researcher used this test to assess whether the mean number of management application areas differed significantly between studies produced by external researchers only and those involving a combination of external and embedded researchers or staff.

1.7.3 Article 2: Delphi survey investigating influential factors

The main goal of the empirical enquiry in Article 2 (refer to Chapter 3) was to explore which factors influenced research utilisation in the context of VM in PAs, among a panel of visitor research and visitor management experts from various countries. Doing so either confirmed or refined the influencers already identified in the literature review. The study also gathered opinions about the current application of VR in VM.

1.7.3.1 Selection of experts

The researcher collected data from key individuals with the experience, knowledge and occupations that put them in a position to contribute to our understanding of the topic. A pool of potential participants was identified based on their experience and responsibilities working with visitor research in a PA visitor management context and then screened for eligibility.

The process of identifying individuals involved a series of steps. A systematic review of visitor research in PAs (under review) produced a useful list of experienced researchers. This list was expanded by including senior managers in PAs responsible for visitor research or visitor management, and authors of PA visitor management literature, identified through internet searches and personal knowledge. This approach produced an initial list of 56 experts, two of which had retired but still actively involved in the PA network. One expert delegated the task to a more experienced colleague, and another forwarded the invitation to a global PA visitor management interest group, a form of snowball sampling.

Three screening questions assessed individuals' eligibility for participation, based on their (i) current positions held; (ii) responsibilities in conducting or overseeing visitor research; and (iii) involvement in visitor management. Thirty-four experts from six different continents responded. Eight were excluded either because their responses were incomplete (six), or the qualifying criteria weren't satisfied (two). The remaining 26 experts resided in: Africa (six); Australasia (six); North America (six); Europe (five); South America (two) and Asia (two). The final list of experts had, on average, 21 years of experience working with, or for PAs (minimum 6 and maximum 49 years). Experts also indicated their involvement in both visitor management and research on various continents. Half of the experts had been involved in visitor management on more than one continent with 20% having worked on four or more continents. Sixty-nine per cent noted involvement in the collection of visitor research on only one continent, while 20% had collected visitor data in three or more continents.

Sixteen experts were external researchers or consultants who work with PAs regularly; half of which held a well-established publication record (h-index of 20 and above according to Google Scholar profiles) at the time of writing this article. Seven experts were senior staff members at a PA agency (five being senior managers in research, and two senior visitor management experts). The remaining three experts worked for a national department or ministry of environment with responsibilities of overseeing visitor research in several PAs.

Of the 26 experts who successfully completed round one, 20 proceeded to complete round two of the Delphi survey, representing a retention rate of 77%.

Experts' areas of specialisation included: visitor monitoring and management; economics of outdoor recreation; park and PA management; tourism and outdoor recreation; environmental planning; recreation ecology; wilderness and recreation management; ecotourism; visitor behaviour; public land management; ecosystem services; sustainable tourism; tourism development; and visitor interpretation among others.

1.7.3.2 Data collection

The Delphi technique is a well-established means of collecting information and gaining consensus among experts on various factors or issues under consideration (Landeta, 2006; Tonni & Oliver, 2013). It involves a series of steps initiated through the selection of an expert panel, consulted on their opinions of what they view to be the most important elements associated with the issue under consideration, in this case, determining the influential factors of the utilisation of VR in VM.

In round one, the geographically dispersed sample of experts was approached via email and invited to participate in a discussion, either via an online asynchronous interview using SurveyMonkey® which they could fill out in their own time, or an online synchronous interview with the help of the video conferencing service, Zoom. Scholars recognise both asynchronous and synchronous online interview methods as useful tools in qualitative social science research (Archibald, Ambagtsheer, Casey & Lawless, 2019; Hesse-Biber & Griffin, 2013; Ratislavová & Ratislav, 2014). Only one participant opted for using the video conferencing tool.

Appendix B provides an example of the invitation email to experts, along with the accompanying informed consent form, the interview schedule used in round 1 and the questionnaire used in round 2 of the Delphi process. The major interview themes, drawn from the knowledge gaps identified in the literature review of this proposal, included: (i) the efficient use of visitor research in PA strategic, tactical and operational decisions and (ii) factors influencing the utilisation of VR in VM policies and practices. The researcher avoided asking leading questions to participants and included a combination of open, probing and closed questions (Saunders *et al.*, 2012). Most data generated were qualitative; however, some questions also involved nominal data (yes/no and positive or negative influence for

each factor measured). The interview schedule took a deductive approach, using existing theory to identify the main variables, themes, components and issues of the main research questions.

1.7.3.3 Data analysis

The identification of themes was fundamental in the analysis of data gathered in the open-ended answers in round one (Figure 1). The research used an inductive process to code expert answers manually and then grouped these into common themes (Braun & Clarke, 2006). Results of the thematic analyses of Q5 and Q6 not only described the current status of utilisation but further revealed several themes of influencers. The data from Q8 delivered similar results, with many repetitions of themes already mentioned in Q5 and Q6, pointing towards data saturation. The researcher anonymised the combined influencer themes arising from Q5, Q6 and Q8. These are summarised in the results. The researcher then used this knowledge, together with the results of Q7, to create a consolidated 37-item list of potential influencers which was presented back to experts in round two.

An evaluation of the means of each of the 37 items (round 2) indicated all 37 were regarded as influential, albeit at differing levels. Using the mean range of each, the level of influence was recoded into three levels as an indication of its importance: Somewhat influential ($m < 3.5$); influential ($3.5 \leq m < 4$); and very or extremely influential ($m \geq 4$). Measuring the level of influence of each item in this manner helped the researcher identify the most important elements. Finally, five major categories of influencers of utilisation were identified by grouping relevant items together.

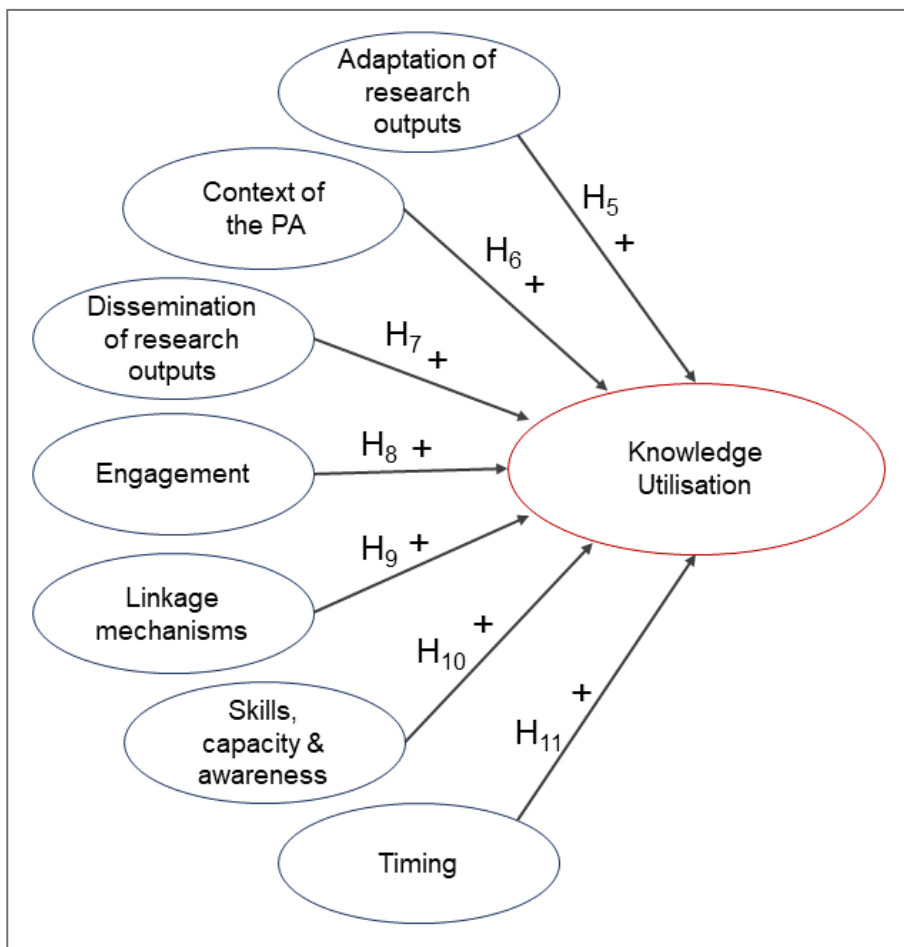
1.7.4 Article 3: Conceptual model development and testing

Article 3 (refer to Chapter 4) tested associations between the level of knowledge utilisation and a variety of potential influencers to establish how well the explanatory variables predict movement in utilisation levels. Literature and the results obtained from Articles 1 and 2 provided direction into potential explanatory variables. The researcher used structural equation modelling (SEM) to test the conceptual model.

1.7.4.1 Conceptual model

Model specification is the first step towards the SEM process. It involves the conceptualisation of the hypothesised links between the dependent and independent variables, which forms the basis of the structural pathways the researcher wishes to test (Kline, 2015). Figure 12 presents the conceptual model with the latent variables.

Figure 12: Conceptual model with hypothesised linkages



Note: The numbering of H₅ through H₁₁ are presented differently in Article 3, starting at H₁.

Table 15 provides operational definitions of the variables as well as the literature from which the measurements were derived.

Table 15: Operationalising the latent variables included in the conceptual model

Abbreviation	Description of variable	Based on:
KU	The movement of VR through different stages of utilisation, also measuring the overall level of utilisation.	Landry <i>et al.</i> (2001).
ADAPT	Perceived importance of adapting research outputs to the user's needs.	Amara <i>et al.</i> (2004); Cherney <i>et al.</i> (2013); Cherney <i>et al.</i> , (2012a,b); Cherney & McGee (2011); Landry <i>et al.</i> (2001); Landry <i>et al.</i> (2003).
CONTEXT	Perceptions about numerous conditions or organisational circumstances present in the particular PAs the researcher has worked in.	Amara <i>et al.</i> (2004); Cherney <i>et al.</i> , (2012b); Landry <i>et al.</i> (2003) and results from expert interviews (Chapter 3).
DISSE	Perceived importance of dissemination efforts.	Cherney <i>et al.</i> , (2012a,b); Cherney & McGee (2011); Landry <i>et al.</i> (2001); Landry <i>et al.</i> (2003).
ENG	Engagement between practitioners and researchers.	Amara <i>et al.</i> (2004); Belkhodja <i>et al.</i> (2007); Cherney <i>et al.</i> (2012b); van der Arend (2014); and results from expert interviews (Chapter 3).
LINKA	Perceived importance of linkage mechanisms between researchers and practitioners.	Cherney <i>et al.</i> (2012a,b); Cherney & McGee (2011); Landry <i>et al.</i> (2001); Landry <i>et al.</i> (2003); van der Arend (2014).
SCA	Perceptions about PA practitioners' awareness, skills and capacity to source, interpret and apply VR effectively in decision-making.	Belkhodja <i>et al.</i> (2007); Ouimet <i>et al.</i> (2009); Olsewski & Bednarska (2016); and the results from expert interviews (Chapter 3).
TIMING	Relevance of the research at a specific point in time.	Landry <i>et al.</i> (2001); Cherney & McGee (2011); Olszewski (2015); and the results from expert interviews (Chapter 3).

Note: Also refer to subsequent Table 16.

1.7.4.2 Sampling

The population of participants in Article 3 consisted of individuals recently involved in the collection, analysis or reporting of VR for a PA. Recent involvement was defined as the preceding five years. A database of authors and their contact details, developed during the SQLR process (Article 1), was used as a basis for the sampling framework. The researcher expanded this database by i) performing internet searches to find additional qualifying

authors and ii) making use of snowball sampling by requesting participants to pass the invitation on to fellow researchers. The researcher obtained ethical clearance from the University of Pretoria's Committee for Research Ethics.

1.7.4.3 Data collection

The self-completion questionnaire (see Appendix C of the thesis) consisted of 15 structured questions. These included five screening questions that capture categorical data related to an individual's involvement in VR in the preceding five years, type of role assumed (embedded or external researcher), research tasks performed and categories of PAs they had worked with. Four other categorical questions captured supplementary experiential and geographical background on the respondents, namely: years of experience in engaging with PA practitioners and professionals; size categories of PAs they've worked with; country of residence and year of birth to determine the age. The remaining questions captured ordinal data using matrix-style scales which acted as measurements of the theoretical constructs.

The dependent variable of the model, knowledge utilisation or KU of VR, was measured using the frequently cited and widely applied knowledge utilisation scale developed by Landry *et al.* (2001). The scale has proven to be reliable in studies involving social scientists and other academic researchers (Cherney *et al.*, 2012a&b; Cherney *et al.*, 2013; Cherney & McGee, 2011; Landry *et al.* 2001, Landry *et al.*, 2003) and measured the movement of the body of VR through different stages of utilisation. Another existing scale (Cherney *et al.*, 2012b) measured the perceived importance of dissemination efforts (DISSE).

The remainder of scales were either an original construction by the researcher or adapted from previous research. To measure the perceived importance of adaptation of research outputs (ADAPT), a modification of the scale used by Cherney *et al.* (2012b) was used. CONTEXT, or context of the protected area, represents the perceptions (of the researcher) about numerous conditions or organisational circumstances in the particular PAs the researcher has worked in. The level of engagement between PA practitioners and researchers was measured using two items from the user's context scale by Landry *et al.* (2001) combined with three items arising from interviews with experts (Chapter 3, Article 2). The measurement of the perceived level of importance of linkage mechanisms between

researchers and practitioners (LINKA) was an adaptation of the scales conceptualised by Cherney *et al.* (2012b) and Landry *et al.* (2001). SCA, or skills, capacity and awareness of practitioners, measures how often a researcher found PA practitioners to possess the necessary skills and resources required to interpret and apply the research effectively, along with practitioners' awareness of the importance of VR in decision-making. TIMING consisted of a single item which measured a researcher's perception of whether their research outputs reached practitioners at just the right time. Both SCA and TIMING originated from the expert interviews.

Table 16 presents a list of the variables captured, according to its corresponding question number, descriptions and measurements used.

Table 16: Summary of the scales used in Article 3

Survey question numbers	Abbrev.	Representing	Measurement	Scale development based on
Q1	GEO	A researcher's involvement in collecting, analysing or reporting visitor data on six different continents.	Seven categorical options plus an open-ended answer option.	Author's construct.
Q2	VR	A researcher's involvement in five different categories of VR.	Six categorical options plus an open-ended answer option.	Author's construct.
Q3	ROLE	A researcher's involvement in different research tasks.	Seven categorical options.	Author's construct.
Q4.1 – Q4.6	KU	Refer to table 15.	Ordinal scales of 1 to 5.	Landry <i>et al.</i> (2001).
Q5.1 – Q5.7	ADAPT			Adaptation of scale used by Cherney <i>et al.</i> (2012b).
Q6.1 – Q6.4	DISSE			Cherney <i>et al.</i> (2012b).
Q7.2; Q7.4; Q7.5, Q7.7 & Q7.8	ENG			New scale developed using elements of Landry <i>et al.</i> (2001) and results from expert interviews (Chapter 3).
Q7.6	TIMING			Results from expert interviews (Chapter 3).
Q8.1 – Q8.4	LINKA			Adaptation of scales used by Cherney <i>et al.</i> (2012b) and Landry <i>et al.</i> (2001).
Q9.1 – Q9.6	CONTEXT			New scale developed based on results from expert interviews (Chapter 3).
Q9.7 & Q9.8	SCA			New scale developed based on results from expert interviews (Chapter 3).
...Continues on the next page				

Survey question numbers	Abbrev.	Representing	Measurement	Scale development based on
Q10	PATYPE	Experience of the researcher in terms of the categories of PAs worked in.	Eight categorical options plus an open-ended answer option.	IUCN (2019) categories.
Q11	PASIZE	Experience of the researcher in terms of the size categories of PAs worked in.	Five categorical options.	Author's construct.
Q12	HIS	Number of years the researcher has been engaging with PA practitioners.	Five categorical options.	Author's construct.
Q13	RTYPE	Type of researcher: Internal staff of a PA, externally affiliated, both or other.	Three categorical options plus an open-ended answer option.	Author's construct.
Q14	YEAR	Researcher's year of birth to determine age.	Text.	
Q15	COUNTRY	Country of residence of the researcher.	Categorical.	

Source: Author's construct.

The researcher first conducted a pilot study to test the questionnaire amongst a small group of researchers. After minor adjustments were made, the entire sample of researchers was contacted per email and invited to participate in an online questionnaire, hosted on SurveyMonkey®. The software captured respondents' answers online. The researcher extracted these into an Excel spreadsheet and imported the data into SPSS with the help of a statistician. A total of 294 individuals clicked on the survey link, of which 252 had completed most of the questions and 239 submitted fully completed questionnaires. The use of online questionnaires fit the positivist approach by the researcher as it allowed the researcher to remove herself from the data collection process.

1.7.4.4 Data analysis

SEM has become an important and popular research tool in social sciences (Hair, Ringle, & Sarstedt, 2012). It is a multivariate statistical analysis technique capable of measuring the underlying latent constructs identified by factor analysis, and assessing the paths of the hypothesised relationships between the constructs (Klem, 2000). Researchers use SEM to test straightforward relationships between two variables, or to assess relationships between multiple independent and dependent variables (the structural model), simultaneously (Gefen, Straub & Boudreau, 2000; Hair, Black, Babin, & Anderson, 2010). Furthermore, a SEM analysis assesses both the structural and the measurement model. This composite analysis allows for the evaluation of measurement errors of the observed variables as an essential component of the model. For this reason, the estimates presented by SEM is preferred over those originating from first-generation statistical methods, such as linear regression models, which assume that the data is error-free (Gefen, Rigdon & Straub, 2011)

Researchers can opt between a covariance-based technique (CB-SEM) and a variance-based approach, known as partial least squares (PLS-SEM) (Hair, Sarstedt, Ringle & Mena, 2012). The CB-SEM approach aims at reproducing the theoretical covariance matrix, without focusing on the explained variance, while PLS-SEM aims at maximizing the explained variance of the dependent constructs (Hair *et al.*, 2012). PLS-SEM has less restrictive assumptions than CB-SEM, which is one of the reasons why many scholars view it as less suitable (Hair, Ringle, & Sarstedt, 2011). CB-SEM was considered more appropriate for this study for the following reasons: The main objective is to assess relationships between the latent variables; the structural model is simplistic; the relationship between the indicators and latent variables is modelled in reflective mode; and the sample size used is large enough (Hair, Matthews, Matthews & Sarstedt, 2017).

The researcher performed the CB-SEM analysis in two steps. First, the researcher assessed the structural and measurement aspects of the model by examining the reliability and validity of the scales, followed by an evaluation of the construct validity and model parameters of the measurement model. If the variance-covariance matrix estimated by the model does not properly replicate the sample variance-covariance matrix, the model is modified and assessed again (Nusair & Hua, 2010). In the second step, the researcher assessed the

structural model for convergent validity. Following model modification, CFA is again performed, and the overall model fit is evaluated against the goodness-of-fit indices. An investigation of the model parameters followed this. Lastly, the structural pathways between the dependent and the independent variables are examined (Nusair & Hua, 2010). The details of this process follow.

Step 1: Measurement model analysis

In this step, scale reliability and validity is assessed, followed by construct validity and examination of the model parameters of the measurement model.

Scale reliability and validity

This step of the analysis examined the scales representing the latent variables (Table 15), for *construct validity*, to determine the extent to which it measures what it claims to be measuring (Nusair & Hua, 2010). In essence, it evaluates whether a scale is meaningful in practice (Bolarinwa, 2015). Different types of evidence can be produced to demonstrate construct validity.

Factorial validity assesses whether the range of items put forward to make up a particular dimension of a construct is, in fact, highly correlated to one another (Bolarinwa, 2015). To this end, Exploratory Factor Analysis (EFA) was performed. Suitability of the data for factor analysis was determined using the criteria of Bartlett's test of sphericity ($p < 0.05$) and the Kaiser-Meyer-Olkin (KMO) measure (> 0.60) (Tabachnick & Fidell, 2007). The criteria for a satisfactory standardised factor loading for individual items in each scale is usually between 0.5 and 0.9; however, values between 0.3 and 0.5 were still considered acceptable (Chin, 1998, in Nusair & Hua, 2010).

Convergent validity looks for evidence that the same concept measured in different ways produces comparable results. Confirmatory Factor Analyses (CFA) were performed to assess the convergent validity of the internal factor structure of existing scales supported by theory or previous research as it is a more stringent measure (Suhr, 2006). The extent to which the model fits the data is determined by examining the model fit at the hand of several test statistics. This study made use of five fit indices representing different measurements.

The first test used is the relative / normed chi-square (χ^2/df) which is an alternative to Model Chi-Square. A general rule of thumb is that the χ^2/df value must be smaller than 3 to indicate that the two constructs are unique (Hooper, Coughlan & Mullen, 2008). The Comparative Fit Index (CFI) assumes that all latent variables are unrelated (independent model) and compares the sample covariance matrix with this independent model (Hooper *et al.*, 2008). A CFI value of 0.90 or more is considered an acceptable model fit (Hu & Bentler, 1999). The Incremental Fit Index, or IFI, similar to CFI, should be greater than 0.90 for a good fit (Bentler & Bonett, 1980). Root Mean Square Error of Approximation (RMSEA) is linked to residual in the model. An RMSEA value of 0.08 or less indicates an acceptable model fit (Browne & Cudeck, 1993). Similarly, the Standardised Root Mean Residual Square (SRMR), a measure of the mean absolute covariance residual, should be 0.08 or less for an acceptable fit (Hu & Bentler, 1999).

Internal consistency reliability is the degree to which responses are consistent across the items of a measure (Kline, 2015). *Construct reliability* was assessed by calculating Cronbach's alphas for the scales; with Guttman Split-Half Coefficient used for a two-item scale. The cut-off for reliability is a Cronbach's alpha value of 0.6 and above (Hair, Black, Babin & Anderson, 2010) or in the case of two-item scales, a Guttman Split-Half Coefficient of 0.6 or larger (Benton, 2015).

Construct validity of the measurement model

Next, the researcher examined the *construct validity of the measurement model* by examining *convergent* and *discriminant validity*. A CFA was performed to validate the factor structure of the measurement model tested, with the overall model fit evaluated using the same goodness-of-fit indices and criteria discussed earlier (Pallant, 2016). If the variance-covariance matrix estimated by the model does not properly replicate the sample variance-covariance matrix, the model is modified and assessed again (Nusair & Hua, 2010). Additional model parameters are also assessed. The first of these involves an evaluation of the values and significance of the factor loadings. Factor loadings produce information about the magnitude and direction of the relationships between the latent and observed variables (Kline, 2015). As a general rule of thumb, standardised factor loadings in measurement models should exceed 0.30 with higher values suggesting better indications of the observed variables for the latent variable (Kline, 2015; Lei & Wu, 2007). Factor loadings also have to

be statistically significant. Next, the standardised residual variances (error variances) are assessed. These reveal the amount of variance in the item attributed to error and are measured by z-scores. The criteria for an acceptable error variance is a z-value between -2.58 and 2.58 in the case of large samples (Field, 2009). Lastly, the R-square or R^2 values are inspected. These indicate the amount of true variance in the item as a result of the latent variable. The minimum level considered acceptable is 0.25 (Kline, 2015).

Tests of *discriminant validity* seek to find evidence that one concept is different from other closely related concepts. The researcher used the recently proposed technique of heterotrait-monotrait ratio of correlations (HTMT) (Voorhees, Brady, Calantone & Ramirez, 2016) to test the discriminant validity of the latent constructs in the measurement model. Strictly speaking, the HTMT should be lower than 0.85, or lower than 0.90 as a more lenient criterion.

Step 2: Structural model analysis

The purpose of structural modelling is not just to test whether the model matches the observed data, but to reveal a model that best describes the phenomenon under investigation. As such, structural models may be revised by the removal of insignificant paths to improve the model fit (Seyal, Rahman & Rahim, 2002). Following model modification, CFA is again performed, and the overall model fit evaluated against the goodness-of-fit indices. An investigation of the model parameters described earlier (standardised factor loadings, standardised residual variances and R^2) follows this.

The final step was to determine causal relationships among the latent variables using path analysis. Path analysis examines whether correlations between variables are consistent with the hypothesised links. To do this, the researcher inspected the statistical significance, size, and direction (positive/negative) of the gamma (γ) values to describe the relationships between dependent and independent variables. A gamma value between 0.1 and 0.3 represent a small effect size; between 0.3 and 0.5 a medium effect; and ≥ 0.5 , a large effect (Field, 2009).

1.8 CONTRIBUTION OF THE STUDY

1.8.1 Academic value and contribution of the study

This interdisciplinary study strengthens academia's understanding of the research-practice gap by contributing to the growing number of studies investigating the application of knowledge in management decision-making. It confirms current understanding in the field of knowledge management and extends this knowledge into the field of tourism and recreation management. Combining knowledge utilisation theory with secondary and empirical data obtained through various methods, it conceptualises the dynamics and components involved in protected area research utilisation.

In the context of tourism and particularly protected areas tourism, this study makes a unique and original contribution by being the first to explain the utilisation of visitor research in the context of visitor management in PAs. The study utilises a conceptual model to appraise the effect of seven influencers, connecting to all six major groups of theoretical explanations (as defined by Amara *et al.*, 2004; Belkhodja, Amara, Landry & Ouimet, 2007; Landry *et al.*, 2001). The outcomes of the study lead to an original comprehension of knowledge utilisation in the context of PAs. It reaffirms the importance of certain theoretical explanations in existing knowledge utilisation literature (Landry *et al.*, 2003). It brings to light contextual differences between the utilisation of knowledge in PAs and previous study contexts. The level of uptake of visitor research in protected area visitor management believed to be underutilised but without scientific verification, is established with empirical data.

Conceptual definitions of two fundamental constructs in the field of tourism and recreation, namely, visitor research, and its application areas in visitor management, are refined. Article 1 describes the nature of the body of knowledge of VR, structurally and geographically, and demonstrates how management decisions and actions absorb VR, providing a global perspective of the usability of VR in PAs. The findings emphasise the significance of accommodating a diverse range of VR types for evidence-based decision-making in the value-laden process of managing visitors in PAs (Manning, 2011; Marion, 2016). The study identifies nine visitor management application areas, encompassed in three broader management categories (strategic, tactical and operational).

Methodologically this study demonstrates how a systematic quantitative literature review can be applied to investigate knowledge utilisation in a particular context by examining the types of utilisation proposed and the management application areas recommended by producers of research (Article 1). During the process of developing the measurement model (Article 3), three new scales were developed and found to be valid and reliable for purposes of respectively studying i) engagement and alignment between PA practitioners and researchers, ii) perceptions about the skills, capacity and awareness of PA practitioners in dealing with visitor research, and iii) the effect that certain conditions in the PA organisation have on research use.

The outcomes of this study tend to the need for an improved understanding of the phenomenon of research use in PAs (Wardell & Moore, 2004), strengthen our understanding of the contribution of both research and researchers towards transforming policy (Cherney & McGee, 2010) and highlight the importance of engagement between practitioners and researchers to narrow the research-practice gap (McCool, 2012).

1.8.2 Industry relevance of the study

The theoretical contribution aside, this research has practical relevance to PA practitioners and the research community. The level of uptake of visitor research in visitor management believed to be underutilised but without scientific verification, was established with empirical data. Such knowledge reveals gaps in the research-practice interaction and demonstrates in which stages of the process (Knott & Wildavsky, 1980) those gaps are occurring. This could encourage further collaborative efforts in which solutions are co-designed by researchers and managers (van der Arend, 2014) to improve the use of VR.

Enhanced understanding of the potential use of visitor research in different management application areas could assist PA staff in re-evaluating current visitor management and research approaches. New approaches could better incorporate knowledge of visitor impacts and its causal and non-causal factors; visitor attributes, behaviours and use patterns; along with the benefits arising from visitor experiences, into planning and practice. Practitioners can use the research findings to guide planning towards more visitation-

focussed management strategies, policies and practices through better utilisation of research. Such understanding could also assist managers in their motivation towards acquiring more knowledge to be effective in managing visitor impacts. Increased use of research could lead to the development of alternative visitor management approaches (Mason, 2005) and more theoretical structures (Manning, 2011) to assist managers in determining the best course of action to eliminate or mediate impacts from visitation (Brown *et al.*, 2010). In doing so, managers are better equipped to handle the sometimes opposing demands of its biodiversity and visitor experience mandates (McCool & Khumalo, 2015).

This study has also sought to equip researchers with knowledge of the determinants that increase the likelihood of new knowledge created in academic realms to be absorbed to become institutional knowledge in PAs. This could stimulate further discussions around the mechanisms to be used for improving the utilisation of VR in PAs.

1.9 THESIS OUTLINE

This study is divided into five chapters. This section provides a brief overview of each chapter. The article-based nature of this thesis requires that sufficient information be provided in each article for it to be read as a stand-alone document, as well as part of the thesis. This inevitably results in some duplication of key information mentioned in different parts of the thesis. This duplication of information is most notable in the literature that contextualises the research problem and relevant theory; along with information about the methods used; and the main findings and contribution of the study.

Chapter 1: Contextualisation of the study

Chapter 1 addresses several areas that make up the contextual background of the study. Background literature on the importance of VM in PAs is provided, as a justification for choosing to study knowledge utilisation in this particular context. This is followed by the first part of the theoretical background exploring the activities that make up VM in PAs; what VR consists of; and how it supports VM. The second part of the theoretical context addresses the main explanations of knowledge utilisation and related theories, the measurement of

utilisation and potential factors that influence it. This review of the literature leads to the problem statement, which outlines the theoretical knowledge gaps to be explored and the specific research objectives this study seeks to achieve. From this, an integrated conceptual framework is formulated for the study and a series of hypotheses is constructed. A detailed breakdown of the research methodology is provided, and the expected academic and industry relevance is discussed.

The empirical investigation of this study is addressed in three separate articles.

Chapter 2: Article 1

Chapter 2 presents Article 1, which had three objectives. The first was to describe the nature of academic VR produced in PAs, and in so doing, strengthening and clarifying the categories of VR encountered in modern literature. The second, and main objective, was to identify the areas of uptake of VR, or more specifically, the visitor management application areas where VR was envisioned to be applied. A third objective was to determine the types of knowledge use anticipated by the researchers who produced the VR. The researcher explores the associations between the six VR types and nine MAN and between the number of VR types utilised and the number of MAN recommended. The number of recommended application areas between studies produced by external researchers and those involving a combination of external and embedded researchers is also evaluated for significant differences. The article was submitted to the Journal of Outdoor Recreation and Tourism and is currently under review.

Chapter 3: Article 2

Chapter 3, or Article 2, represents the results of an essential step in the investigation of what influences knowledge use, which subsequently informed the framework of the study. The primary objectives of Article 2 were to establish what the contemporary view is on the utilisation of VR in PAs and to determine which factors inhibit or promote the utilisation of VR by practitioners. The article was submitted to the Journal of Sustainable Tourism and is currently under review.

Chapter 4: Article 3

The last article, presented in Chapter 4, examines linkages between seven potential influential factors and the level of utilisation of VR. The primary objectives were to measure the actual level of utilisation of recently produced VR and then to construct and empirically test a structural model that seeks to explain the utilisation of VR in PA visitor management. The article was submitted to Tourism Recreation Research and is currently under review.

Chapter 5: Summary, conclusions and recommendations

The final chapter concludes with an overview of how the research objectives were addressed, followed by a summary of the main findings and implications of the study. The theoretical, methodological and practical contributions are discussed. A set of recommendations to researchers and PAs follows. The chapter also addresses the limitations of the study, and provide suggestions for new areas of research to be explored in future.

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CHAPTER 2: ARTICLE 1

WHERE DID ALL THE VISITOR RESEARCH GO? A SYSTEMATIC REVIEW OF APPLICATION AREAS IN NATIONAL PARKS

Chapter 2 presents the first article of this study, which is the result of a systematic quantitative literature review of 407 visitor research studies conducted in national parks. The nature of academic VR produced in PAs is described, strengthening the categories of VR encountered in modern literature. The second, and main objective, was to identify the areas of uptake of VR, or more specifically, the management application areas where VR was envisioned to be applied. Thirdly the types of knowledge use anticipated by the researchers who produced the VR is investigated. Associations between VR categories and management application areas are examined. The article also explores linkages between the number of VR types utilised in a study and the number of application areas recommended. Lastly, it investigates whether there is a significant difference in the mean number of application areas in studies produced by a combination of embedded and external researchers versus studies produced by external researchers only.

The article was submitted to the Journal of Outdoor Recreation and Tourism (JORT) (Scopus listed) and is currently under review. The article presented in this chapter is in its original format as submitted to JORT. The journal has a strong focus on improving understanding of how visitor research in protected areas is utilised. JORT has also been found to be the preferred journal for visitor research in national parks. For these reasons, this journal was deemed appropriate.

The editorial guidelines for the authors wishing to publish in the JORT are available at:
<https://www.elsevier.com/journals/journal-of-outdoor-recreation-and-tourism/2213-0780/guide-for-authors>

WHERE DID ALL THE VISITOR RESEARCH GO?

A SYSTEMATIC REVIEW OF APPLICATION AREAS IN NATIONAL PARKS

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ABSTRACT

National parks face the challenge of managing visitors in ways that minimise negative economic, environmental and social impacts and simultaneously have to provide satisfactory experiences. Limited information is however available summarising the diversity of research on visitors and how such research informs management strategies and practices. Through a systematic quantitative literature review of 407 studies in national parks, this paper describes the characteristics of visitor research in peer-reviewed publications in English from 2014 to 2018. Visitor research encapsulates data about visitors' socio-demographic and psychographic attributes; travel arrangements and pre-visit information; visitor use patterns at the destination; experience outcomes and the visitation-related impacts. Most of the research leads to recommendations for applications in management activities that exhibit a strong visitor interface, such as enhancing the visitor experience, managing visitor use, improving visitor interpretation and communication, and monitoring and evaluating social and environmental conditions. There is an association between different types of research and its management applications. Most studies included recommendations for application in an identifiable management problem, but research evaluating past management decisions or practices were less common. Studies involving embedded researchers were more likely to include practical recommendations, an important result with the apparent decline in embedded research capacity worldwide.

Management implications

The findings of this study propose a number of strategic actions for managers of protected areas including to:

- clearly articulate their key intelligence needs to external researchers so that management-relevant research is prioritised;
- advocate for more research that evaluates the effectiveness of current visitor management practices;
- encourage closer engagements between PA staff and external researchers;
- together with researchers, (i) carefully consider the number and combination of visitor research types used in each study and (ii) co-design research studies to promote multiple applications of use in order to maximise the value of research;
- demand from researchers a demonstration of how visitor research can be optimally applied to enhance decision-making.

Keywords: visitor research; visitor management; national parks; knowledge utilisation; systematic review.

1. INTRODUCTION

What visitors do and why they do it is important to those making decisions about visitors, academics studying such behaviour and to the visitors themselves (Pearce, 2005). In protected areas (PA), decisions regarding visitor access and use are inherently complex and require insights from environmental and social science research, management experience and professional judgements (Marion, 2016).

Those involved in PA visitor management decision-making often lack experience in dealing with complex visitation-related problems, since most technical managers were historically trained in environmental management (Blahna *et al.*, 2020). Through the past two decades, scholars have acknowledged the important role of information about visitors, their behaviours, motivations and opinions for the effective planning and management of PAs (Griffin, Moore, Darcy & Crilley, 2008; McCool, 2012; Newsome *et al.*, 2013; Wardell & Moore, 2004). Visitor research has been applied in different management activities

including, but not limited to park-, tourism- and visitor management plans; decisions about site, facility and visitor program designs; measuring visitor impacts and its associated causal and non-causal factors; resource allocation; visitor interpretation; improving visitor experiences; marketing and public liability (Booth, 2006; Marion, 2016; Newsome *et al.*, 2013; Wardell & Moore, 2004; Ziesler & Pettebone, 2018).

The utilisation of visitor research into practice has not been without challenges. As early as 2001, Buckley, Witting and Guest highlighted the need to increase the application of visitor research in PAs, yet shortcomings continued. The lack of formal frameworks to assist with the management, dissemination and utilisation of knowledge across various departments within PA agencies have contributed to weak levels of absorption of visitor research into park management tools (Darcy, Griffin, Craig, Moore & Crilley, 2007). There is an overreliance on visitor use statistics and satisfaction data but limited use of research on visitor activities and movement, motivations, expectations as well as attitudes (Griffin *et al.*, 2008). Few studies have successfully integrated environmental and social science data when studying visitor impacts and its underlying causes (D'Antonio, Monz, Newman, Lawson & Taff, 2013). A frail link exists between monitoring programs and stated management priorities (Buckley, Robinson, Carmody & King, 2008). Despite these acknowledgements, the utilisation in PA management decision-making remains inadequately evaluated, judging from the dearth of literature. Visitor management frameworks in PAs rely on an adaptive management-by-objectives approach (Pierce & Manning, 2015). Yet, it is unclear if and how visitor research informs the formation of these objectives. Furthermore, researchers have not fully described the types and nature of research utilised, leaving a gap in the current understanding of knowledge utilisation and a lack of appreciation for the diversity and usefulness of visitor research.

Knowledge utilisation literature refers to three types of knowledge use: instrumental, conceptual and symbolic or political (Landry, Amara, Lamari, 2001; Weiss, 1979). Instrumental use, also known as “knowledge for action”, refers to the application of research in a behavioural or action-oriented way to find solutions to a specific, identifiable problem. An example would be research that leads to a change in policy or decisions (Xiao & Smith, 2007). Conceptual use, also known as “knowledge for understanding” (Rich, 1977), implies the application of knowledge in the development of new theories, hypotheses or conceptual

thinking about the problems at hand, but without necessarily directly changing policy or decisions (Cherney & McGee, 2011). Symbolic or political use entails the application of research to justify a political position or practice or defend prior decisions (Cherney & McGee, 2011; Xiao & Smith, 2007). We know little about the extent to which visitor research is dedicated towards conceptual, instrumental or symbolic use in the management of public lands.

This paper sought to address these gaps. By using a systematic quantitative literature review, it first i) describes the nature of academic visitor research produced in PAs, using national parks as case studies. It then ii) examines the potential integration of such research into management decisions and actions, and next, iii) outlines how researchers envision knowledge utilisation. The paper then investigates whether associations exist between iv) research types and the management application areas recommended and v) the number of research types used and the number of application areas recommended. Lastly, vi) it looks for a significant difference between the number of application areas in studies conducted exclusively by external researchers versus those conducted by a combination of embedded and external researchers.

2. WHAT DOES VISITOR RESEARCH COMPRISE?

Visitor research for protected areas is multidisciplinary in nature, incorporating social, economic, environmental, and other use-related aspects of visitation. Pearce (2011) identified dimensions involved in analysing tourist behaviour and experiences that could be applied to visitor research for protected areas, with research on (i) pre-travel factors, (ii) tourists' on-site experiences and (iii) post-travel outcomes all relevant. Both in terms of volume and variety, there is a plethora of research on each of these dimensions by researchers in protected areas.

Research on topics relating to pre-travel factors included studies examining socio-demographic characteristics of park visitors (e.g. Cini & Saayman, 2014), motivations towards visiting national parks (e.g. Hermann, van der Merwe, Coetzee & Saayman, 2016); sources of information of nature-based tourists (e.g. Dey & Sarma, 2010); expectations for experiences in national parks (e.g. Botha, Saayman & Kruger, 2016); cultural differences in

beliefs about participation in nature-based tourism (e.g. Stone & Nyaupane, 2016); attitudes toward the natural environment, conservation and tourism (e.g. Xu & Fox, 2014) and towards risks in a national park (e.g. George, 2010); visitors' environmental values (e.g. Pickering & Rossi, 2016); and underlying beliefs about transport choices (e.g. Curtis, Ham & Weiler, 2010) in national parks. Research on on-site experiences and behaviour of protected area visitors have generated data and information on, among others, the characteristics of the visits, including the length of stay, frequency of visits, size of the travel group, mode of transport (e.g. Kruger & Saayman, 2014); visitor spending (e.g. Cini & Saayman, 2014); on-site wildlife watching behaviour (e.g. Marschall, Granquist & Burns, 2017) and non-compliance of visitor behaviour (e.g. Goh, Ritchie & Wang, 2017) as well as visitor use statistics (e.g. Levin, Lechner & Brown, 2017). Research on post-travel outcomes include remembered experiences of park visitors (e.g. Barnes, Mattsson & Sørensen, 2016); levels of satisfaction (e.g. Jarvis, Stoeckl & Liu, 2016) and other perceived benefits of visitation to PAs (e.g. Sandifer, Sutton-Grier & Ward, 2015); loyalty to national parks (e.g. Pinkus, Moore, Taplin & Pearce, 2016); intention to return (e.g. Barnes, Mattsson & Sørensen, 2016; e.g. Jarvis, Stoeckl & Liu, 2016) and willingness to pay (e.g. Frontuto, Dalmazzone, Vallino & Giaccaria, 2017) among protected area visitors; increased knowledge and awareness due to interpretive experiences in national parks (e.g. Tubb, 2003); place attachment (e.g. Steckenreuter & Wolf, 2013) and sense of place (e.g. Barendse, Roux, Erfmann, Baard, Kraaij & Nieuwoudt, 2016) in national park settings; perceptions towards recreational conflicts encountered in PAs (e.g. Hung & Hsieh, 2014); opinions on protected area management practices (e.g. Arnberger, Eder, Alex, Sterl, & Burns, 2012); reports of visitor safety incidents (e.g. Gstaettner, Kobryn, Roger, Phillips & Lee, 2018) and the social, environmental and economic impacts of visitation on protected areas and its underlying causes (e.g. Marion, Leung, Eagleston & Burroughs, 2016; Ng, Leung, Cheung & Fang, 2018).

To logically arrange this diversity of research areas into workable groups, the categories developed by Booth (2006) and Newsome *et al.* (2013) (Table 1) were used as a basis to develop a more integrated set of categories to use for the systematic review.

Table 1: Visitor research categorisations by Booth (2006) and Newsome *et al.* (2013)

Booth (2006)	Newsome <i>et al.</i> (2013)
Visit numbers.	Visit or visitor numbers.
Visit and visitor characteristics.	Visit characteristics.
The visitor experience (from motivation through satisfaction).	Visitor characteristics or profiling, including motivations, expectations and preferences.
Visitor impacts.	Data to identify and quantify site-specific impacts.
Recreational benefits.	Visitor outcomes which encompass visitor satisfaction, experiences, future intentions and behaviours.
Recreation resource demand and supply.	
Recreation management processes and techniques.	

While both combined visitors' characteristics into one category, the breadth and depth of data and information available today on the psychographic dimensions of visitors, their experiences and post-trip reflections (Pickering *et al.*, 2018) arguably warrants it to be treated as a distinct type of research. Neither categorisations cater for knowledge of pre-trip travel decisions and arrangements, such as preferences towards travel bookings channels (Douglas, 2016) and other travel decisions that occur before visiting a PA (Gutiérrez, Tørset, Skjetne & Odeck, 2017). The authors added a category to accommodate this type of information. Table 2 lists the final categorisation used in this study.

Table 2: Visitor research types and definitions

	<i>Visitor research type</i>	<i>Data and information on:</i>
VR1	Socio-demographic attributes of visitors	Gender, age, culture, place of residence, ethnic group, income level, employment, level of education, marital status, children and so forth.
VR2	Psychographic attributes of visitors pre-visit	Attitudes, expectations, motivations, preferences, perspectives, pre-trip knowledge and awareness, beliefs, values and mindfulness.
VR3	Travel arrangements and pre-visit information	Sources of information, sources of influence on purchasing decisions, booking channels used, travel companions, distance travelled to destination.
VR4	Visitor use patterns and behaviour at the destination	Statistics on the demand for and actual use of experiences, facilities & services; visitor spend; temporal and spatial use patterns including frequency of visits, length of stay and occupancy rates; visitor behaviour on site.
VR5	Visitor experience outcomes as a result of visitation	Visitor experiences, emotions, satisfaction, loyalty and safety incidences as a result of visitation; changes in place attachment and sense of place; post-trip knowledge and awareness; future intentions (intention to return or volunteer, willingness to pay, willingness to recommend, support towards management interventions) and appreciation of natural resources.
VR6	Visitor impacts as a result of visitation	Social, environmental and economic impacts of visitation, whether positive or negative.

Source: Taken from Booth (2006), Newsome *et al.* (2013), Pearce (2011), Pickering *et al.* (2018).

3. METHODS

3.1. Study approach

This study employs a Systematic Quantitative Literature Review (SQLR) methodology (after Pickering & Byrne, 2014) to examine peer-reviewed journal articles containing case studies of visitor research in protected areas. The review focuses on Category II Protected Areas, commonly known as national parks, as they are the most popular types of PAs, and occur globally. As a result, most visitor research for PAs is likely to be from national parks, and hence the patterns found here are likely to reflect that broader literature. Also, although case studies of visitor research in PAs can be found in published or unpublished documents, books, reports and articles, much of the research produced internally by PAs are not publicly available. Hence collecting all literature in the field systematically and consistently, would not be practical. Subsequently, this review focuses on case studies in academic journals

only, a common strategy for the systematic review of literature (Pickering, Grignon, Steven, Guitart & Byrne, 2015).

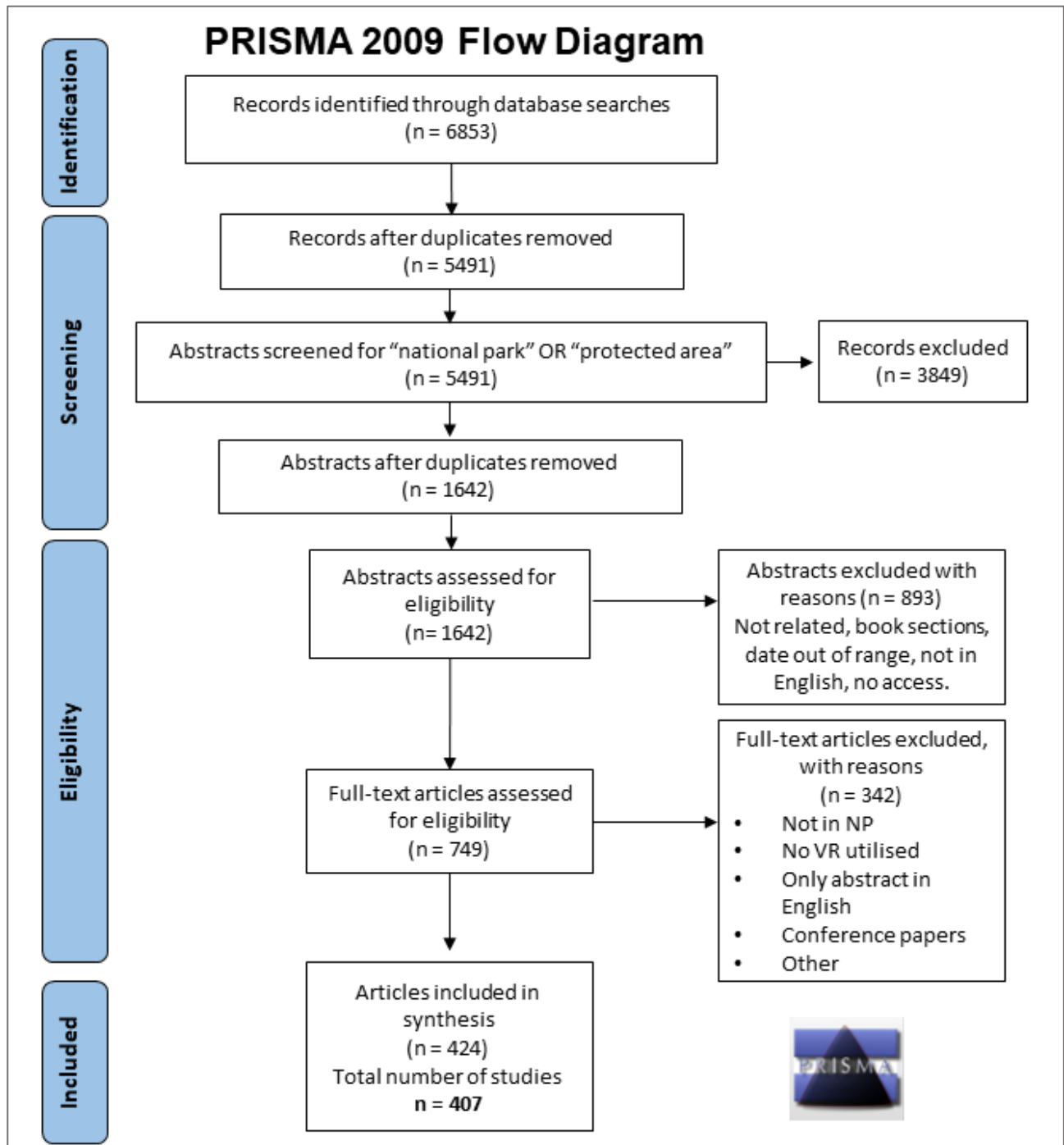
This paper first describes recent visitor research along the following dimensions: the research approaches used; types of data utilised; visitor research types involved; the number of visitor research types captured per study; types of researchers involved; countries where the research was conducted; and the main academic journals in which they were published. Next, we describe visitor research in relation to the way it could be applied in management and the types of knowledge utilisation suggested. Lastly, associations are tested between variables.

3.2. Search strategy, review protocol and PRISMA 2009 Flow Diagram

The search term ((visitor OR tourist) AND “national park”) was used to search for journal articles published in the English language, from 2014 to 2018, in four databases: EBSCO Host, ScienceDirect, Scopus and Web of Science Core Collection. The search identified a potential 6 853 records. Duplicate records were removed and the remaining abstracts screened for the phrase “national park” or “protected area”. After removing additional duplicates not detected in the first step, the authors screened 1 642 abstracts for eligibility and further assessed 749 full-text articles. This sifting process resulted in a total of 424 eligible journal articles. The PRISMA flow chart (Figure 1) describes the search strategy and review protocol of the SQLR.

Since multiple journal articles may arise from one research study using the same data, treating each journal article as a separate record can overinflate numbers of visitor research types. To counter this, the authors carefully examined each article’s study location and data collection periods. Articles from the same study were combined and captured as a single record. The results of this review are thus based on the number of studies and not the number of articles. Using this approach, the final number of records (studies) reviewed was 407.

Figure 1: PRISMA Flow Diagram of the study



**Not in NP* refers to studies where the research scope was not specific to a national park context or the study was not conducted in a national park. **No VR utilised* refers to studies where no identifiable type of visitor research was involved in the production of the article.

3.3. Data capturing and coding

Several pre-determined variables were extracted from the text of each study and captured into a Microsoft Excel spreadsheet: Title; authors; year of publication; journal name; place of study (country); types of researchers involved (embedded/external/combined); research approach used (qualitative/quantitative/mixed); types of data used (primary/secondary/both); visitor research types involved; management application areas recommended; whether clear, practical recommendations were provided; and types of knowledge utilisation recommended. Each row in the spreadsheet represented an individual case while each variable's associated categories (for example, MAN1, MAN2, etc.) was captured in a separate column. After coding, the majority of data were of the discrete type (either 1 or 0), with the following exceptions being categorical data: author and journal names, year of publication, being. These methods are in line with those proposed by Onwuegbuzie and Frels (2016) and Pickering and Byrne (2014) for systematically analysing literature.

Countries were coded based on the location of the national park where the study took place. To code the type of knowledge utilisation, the authors operationalised the definitions of Xiao and Smith (2007) and Cherney and McGee (2011). A study could exhibit multiple types of knowledge use. If the research was applied towards the justification of actions, policies, practices or decisions, it was coded as 'symbolic'. If applied in ways which directly influence practitioner decision-making or policy design, it was regarded as 'instrumental'. Utilisation was considered conceptual if it was directed towards an enhanced understanding in the form of theories, concepts or hypotheses; or for redefining problems; without necessarily changing policy. All published articles made a conceptual contribution of some kind, even if just enhancing thinking of a particular problem. If utilisation was exclusively conceptual, with no indication of it being applied to influence or justify any policies or practices, the study was coded 'conceptual only'.

To code how visitor research was applied in management, an iterative process was followed, which is explained next.

3.4. Refining the management application areas through an iterative approach

To code how visitor research was applied in management, nine management application area categories were developed. Their construction was an amalgamation of areas firstly identified from visitor management literature and secondly, results of the SQLR process. The authors consulted literature describing visitor management strategies and activities (see Manning *et al.*, 2017; McCool, Clark & Stankey, 2007; Newsome *et al.*, 2013) and the production and use of visitor research in protected areas in Australia, New Zealand, United Kingdom (see Booth, 2006; Newsome *et al.*, 2013; Wardell & Moore, 2004) and North America (see Marion, 2016; Ziesler & Pettebone, 2018).

The categories were refined by performing a crosscheck pilot study. This involved four experienced tourism researchers who independently coded the same five journal articles. Although researchers captured most variables consistently, the management areas were adjusted further (Table 3) to form nine management areas allocated to three broader management categories. This included strategic management decisions that involve high levels of complexity and require commitments that span over many years (long term) (Evans, Stonehouse & Campbell, 2012). Determining the PA's recreational objectives and value, and revenue generation and pricing strategies were regarded as strategic. Enhancing the visitor experience, visitor use management, interpretation and communication-related activities, marketing and human resource management were categorised as tactical and operational management activities, which involve the implementation of strategy and other day-to-day operational activities (medium to short term planning and activities) (Evans, Stonehouse & Campbell, 2012). A third category was created to reflect the monitoring and evaluation of natural and social conditions; and visitor management effectiveness. Such activities can be seen as tactical or operational too. However, the high prevalence of monitoring and evaluation undertakings in national parks justifies such classification.

Next, the lead author coded data from the first 10% of the studies as an additional step to test the data fields and categories (after Pickering *et al.*, 2015). Final changes were then made, and the remaining 90% of studies coded.

Table 3: Management application areas and descriptions

	Management application area		Description
Strategic	MAN1	Determining the PA's recreational objectives and value.	<i>Developing statements pertaining to PA recreational objectives; determining the desired natural and social conditions; determining the PA's recreational value, including economic impact assessments.</i>
	MAN2	Revenue generation and pricing strategies.	<i>Developing new strategies for increased revenue generation and / or pricing strategies.</i>
Tactical & Operational	MAN3	Enhancing the visitor experience by understanding visitor needs.	<i>Understanding visitor needs in order to link the demand and supply of recreational opportunities for purposes of improving visitor experiences.</i>
	MAN4	Visitor use management.	<i>The tactical and operational management of human use to maintain or achieve desired conditions or experiences and respond to the potential negative impacts of visitation.</i>
	MAN5	Visitor interpretation and communication.	<i>Through various methods, communicate information to the visitor that is essential for a satisfactory experience and help visitors form intellectual and emotional connections with the meanings and significance inherent in the resources. Includes visitor signage and environmental education.</i>
	MAN6	Marketing.	<i>Marketing of visitor experiences.</i>
	MAN7	Human resource management.	<i>Human resource planning (staffing & training) for all areas of visitor management.</i>
Monitoring & evaluation	MAN8	Monitoring & evaluation of natural & social conditions, including visitor use monitoring.	<i>Analysing, describing and monitoring existing natural and social conditions to measure visitor use and the impacts thereof.</i>
	MAN9	Monitoring & evaluation of visitor management effectiveness.	<i>Monitoring and evaluation of the effectiveness of visitor management frameworks, strategies and practices.</i>

Source: Authors' conceptualisation.

3.5. Analysis of the data

First, the authors performed exploratory data analysis (Saunders, Lewis & Thornhill, 2012) and calculated descriptive statistics to summarise the main characteristics of visitor research. Three associations are tested with inferential statistics. The Pearson correlation coefficient (de Winter, Gosling & Potter, 2016) is used to test the relationship between the

number of research types employed in a study and the number of management application areas recommended. To examine relations between each of the research types and management application areas, Chi-square tests of independence (Saunders *et al.*, 2012) are performed. This test is commonly performed to test the equality of two proportions obtained from independent samples relations. In most cases, the Pearson Chi-Square test (χ^2) was used, and Fischer's exact test when the assumption of adequate cell count was violated (Yates, Moore, & McCabe, 1999). The effect size or strength of the relationships are tested using the *phi* coefficient (ϕ) and used in combination with Cohen's (1988) criteria of small ($0.10 \leq \phi < 0.30$); medium ($0.30 \leq \phi < 0.50$); and large ($\phi \geq 0.50$). While χ^2 may indicate statistical significance of the relationship, ϕ allows for interpretation of the substance of the relationship, making it meaningful at a practical level (Pallant, 2010). Lastly, the authors tested whether the mean number of management application areas differed significantly between studies produced by external researchers only and those involving a combination of external and embedded researchers using an independent samples t-test (Leedy & Ormrod, 2014).

4. RESULTS

4.1. Who does the research, what methods and data are used, where is it conducted and published?

The majority of visitor research studies were conducted exclusively by staff from external organisations (83%), predominantly academic institutions. Just 16% of studies involved a combination of external and embedded researchers or staff working for a national park or park agency, with only four studies (1%) conducted entirely by embedded researchers or staff only.

Researchers published national parks visitor research in more than 170 different journals representing various fields of study, including tourism, hospitality and recreation; geography; environmental, health and business sciences. The most popular was the Journal of Outdoor Recreation and Tourism with 33 studies, while the Journal of Sustainable Tourism (16), Journal of Park and Recreation Administration (13) and Tourism Management (13) also published several of the articles.

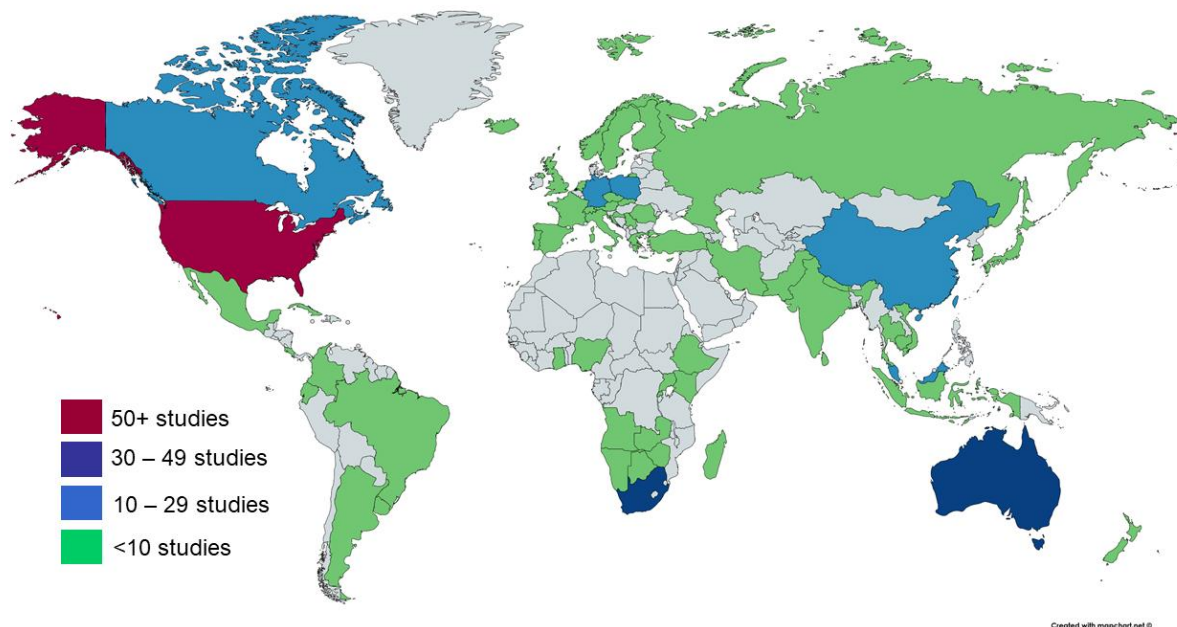
The research is conducted in national parks in 65 countries but predominantly in the United States of America with 94 studies (Figure 2), with considerable numbers from South Africa (48) and Australia (41). Six other countries, Poland, Malaysia, Canada, China, Taiwan and Germany, produced between 10 and 20 studies each, but the remaining countries had few studies each.

Of the 407 studies, nearly all involve quantitative research (84%) and mainly utilise primary data (78%) (Table 4). In contrast, qualitative only and mixed methodology were less common (8% respectively), and only 6% of studies used both primary and secondary visitor data.

Table 4: Research approach and type of data utilised in national park visitor research studies (2014 – 2018)

Type of research approach	n	%	Type of data utilised	n	%
Quantitative only	341	84	Primary	317	78
Qualitative only	33	8	Secondary	65	16
Mixed methods	33	8	Both	23	6

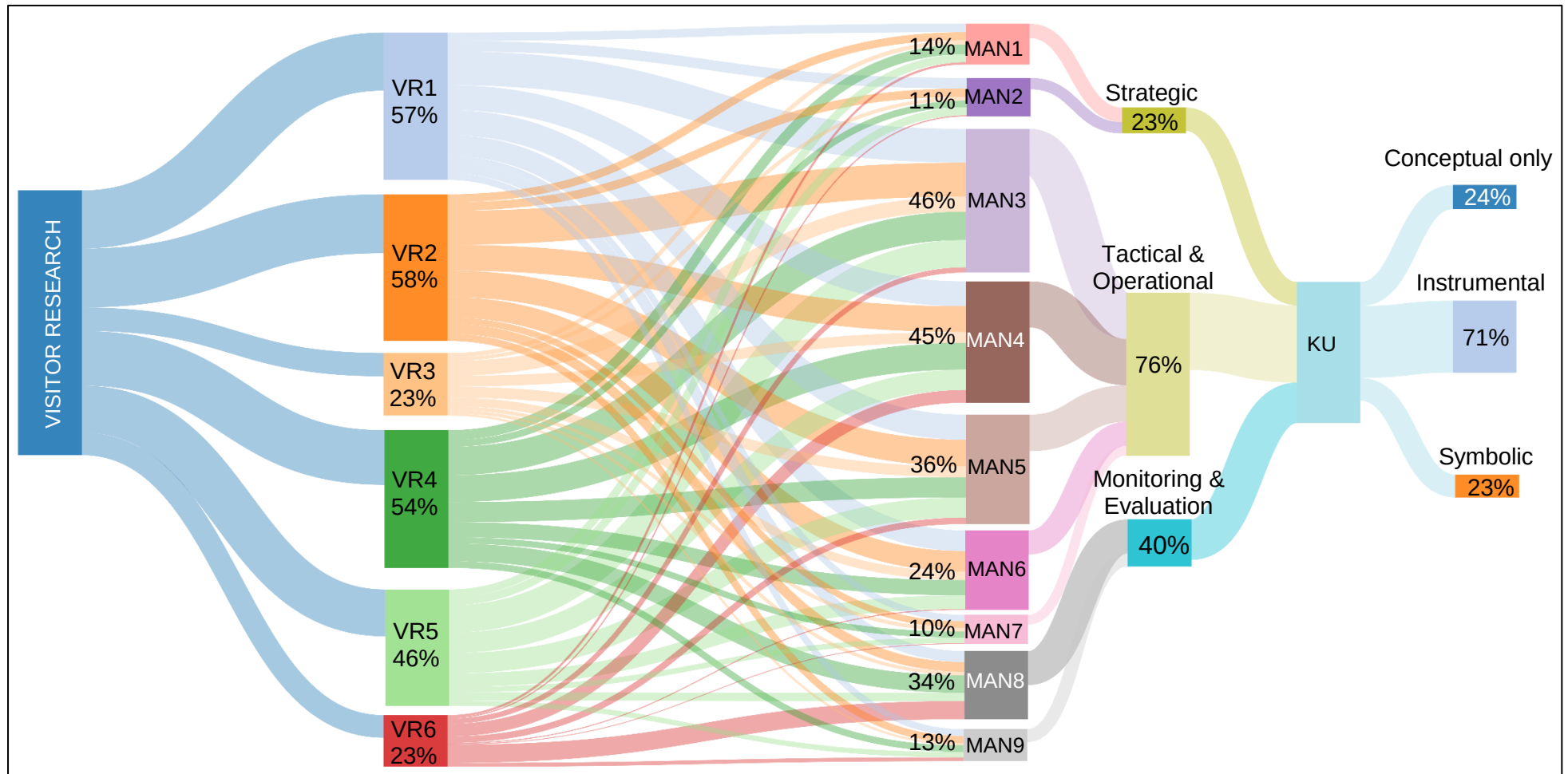
Figure 2: Number of studies of visitor research in national parks per country based on original research papers published in English between 2014 and 2018



4.2. Distribution of visitor research types, management applications and types of knowledge utilisation

The percentage of studies according to the six types of visitor research, nine management application areas; and the movement between them is assessed and visualised using a flow map (Figure 3). The most common visitor research in the studies were psychographic attributes of visitors (58%), socio-demographic attributes of visitors (57%), and data about visitor use patterns and behaviour at the destination (54%). Data about visitor experience outcomes was also common among studies (46%), in contrast to research on visitors' travel arrangements and visitor impacts (23% respectively).

Figure 3: Flow map showing the proportion of the 407 studies for each type of visitor research and management application area.



*The percentages and thickness of the lines represent the proportion of studies in that category.

Most studies utilise more than one type of visitor research (mean of 2.6 types per study) with 30% only looking at one kind. Nearly all studies involve one or more management areas (Table 5), with an average of 2.3 per study. A fifth of studies covered four or more management areas.

Table 5: Distribution of studies by number of management applications mentioned

Number of management areas mentioned	n	%
0	32	7.8
1	101	24.8
2	104	25.6
3	92	22.6
4+	78	19.2
Mean		2.32
Mode		2

Visitor research is commonly applied in management activities related to enhancing visitor experiences (46%) and visitor use management (45%) (Figure 3). More than a third of the studies involved visitor interpretation and communication (36%). Roughly the same proportion of studies (34%) recommended actions of monitoring and evaluation of natural and social conditions in national parks, including counting visitor use. Almost a quarter of studies (24%) made recommendations for the marketing of visitor experiences. In contrast, some areas of management were uncommon, including determining PA's recreational objectives or recreational value (14%); monitoring and evaluating the effectiveness of visitor management strategies (13%); revenue generation and pricing strategies (11%); and recommendations related to human resource management (10%). Overall, 76% of the studies mentioned tactical and operational decisions and actions; 40% involved monitoring and evaluation activities of some kind, and 23% involved strategic planning activities.

Reflecting on the knowledge utilisation literature, it can be seen that most studies exhibit instrumental use (71%), where research findings are applied to an identifiable specific management problem, influencing practitioner decision-making or policies. A disparity is observed between the number of studies with an identifiable management problem (71%)

versus those that provided at least one clear, practical recommendation in language management would understand (62%). Research making a conceptual contribution, but not used to influence or justify any policies are defined as conceptual only (24% of studies). Less than a quarter of studies (23%) exhibit symbolic use, the application of research to support existing political or strategic positions for the justification of actions, policies, practices or decisions.

4.3. Associations between visitor research types and management application areas

Certain types of visitor research are more likely to be applied in certain management areas. The results of the Pearson Chi-Square tests and the effect sizes are reflected in Table 6. Research examining visitor impacts and its underlying causes (VR6) is likely to be absorbed in activities monitoring social and environmental conditions (MAN8). This association was substantial. Knowledge of who visitors are (VR1), along with their opinions, attitudes, motivations and other psychographic attributes (VR2), was inclined to be taken up in marketing decisions (MAN6) and also actions that monitor social and environmental conditions and visitor use (MAN8). Data related to visitors' travel arrangements and other pre-trip information (VR3) was also associated with the monitoring of social and environmental conditions. These relationships were all of moderate strength.

The analysis revealed other associations, but with small effect sizes. Determining a PA's recreational objectives and/or measuring recreational values (MAN1) was only associated with research on visitor experience outcomes (VR4). Socio-demographic attributes of visitors (VR1) and visitor experiences outcomes (VR5) are both likely to inform revenue generation and pricing strategies (MAN2). Interestingly, all six types of research were linked to enhancing the visitor experience (MAN3) and marketing activities (MAN6). All but visitor use patterns and on-site behaviour (VR4) were associated with the monitoring of use and other natural and social conditions (MAN8). Staffing and training of personnel (MAN7) is likely to absorb data on visitors' travel arrangements (VR3).

Activities related to visitor use management (MAN4) and the monitoring and evaluation of visitor management effectiveness (MAN9) showed no significant relationships with any of the research types.

Studies utilising more types of visitor research tend to make more recommendations relating to different management areas, although the relationship was not very tight (Pearsons correlation coefficient, $p = 0.231$; $p = 0.000$).

The results further suggest that when the staff of national parks or park agencies partake in the research process, more management application areas are recommended for utilisation. Research produced by a combination of external and embedded researchers displayed significantly more application areas (mean = 2.61) compared to those produced by external researchers only (mean = 2.26, independent samples t-test $t = -1.776$, $p = 0.076$), but the effect was not great.

Table 6: Significant associations between research types and management areas

MAN categories	MAN1 Objectives and values	MAN2 Revenue and pricing strategies	MAN3 Enhance visitor experience	MAN4 Manage visitor use	MAN5 Interpret and communicate	MAN6 Marketing	MAN7 Human resources	MAN8 Monitor natural and social conditions	MAN9 Monitor and evaluate effectiveness
VR code									
VR1 Socio-demographics	-	$\chi^2 = 24.259^{**}$ $\phi = .244^2$	$\chi^2 = 34.218^{**}$ $\phi = .290^2$	-	$\chi^2 = 11.840^{**}$ $\phi = .171^2$	$\chi^2 = 41.069^{**}$ $\phi = .318^3$	-	$\chi^2 = 54.420^{**}$ $\phi = -.366^3$	-
VR2 Psychographic	-	-	<i>Fisher's exact</i> $= 34.718^{**}$ $\phi = .290^2$	-	<i>Fisher's exact</i> $= 21.275^{**}$ $\phi = .227^2$	<i>Fisher's exact</i> $= 39.981^{**}$ $\phi = .301^3$	-	<i>Fisher's exact</i> $= 79.209^{**}$ $\phi = .439^3$	-
VR3 Travel arrangements	-	-	$\chi^2 = 16.190^{**}$ $\phi = .199^2$	-	$\chi^2 = 6.054^*$ $\phi = .122^2$	$\chi^2 = 12.092^{**}$ $\phi = .172^2$	$\chi^2 = 5.734^*$ $\phi = .119^2$	$\chi^2 = 19.279^{**}$ $\phi = -.218^3$	-
VR4 Use patterns and on-site behaviour	$\chi^2 = 6.056^*$ $\phi = .122^2$	-	$\chi^2 = 7.222^{**}$ $\phi = .133^2$	-	-	$\chi^2 = 4.000^*$ $\phi = .099^1$	-	-	-
VR5 Experience outcomes	-	$\chi^2 = 11.153^{**}$ $\phi = .166^2$	$\chi^2 = 22.221^{**}$ $\phi = .234^2$	-	$\chi^2 = 6.946^*$ $\phi = .131^2$	$\chi^2 = 5.394^*$ $\phi = .115^2$	-	$\chi^2 = 41.473^{**}$ $\phi = -.319^3$	-
VR6 Impacts of visitation	-	-	<i>Fisher's exact</i> $= 27.621^{**}$ $\phi = .256^2$	-	-	<i>Fisher's exact</i> $= 29.903^{**}$ $\phi = .245^2$	-	<i>Fisher's exact</i> $= 110.434^{**}$ $\phi = .529^4$	-

* $p < .05$; ** $p < .01$;

Effect size:

1 negligible to none ($\phi < 0.10$)

2 small ($0.10 \leq \phi < 0.30$)

3 medium ($0.30 \leq \phi < 0.50$)

4 large ($\phi \geq 0.50$)

N=407

5. DISCUSSION AND IMPLICATIONS

The findings are discussed along the lines of the geographical coverage of the research in comparison with other reviews; the management application areas that emerged; the use of certain types of research in certain management activities; types of knowledge use; and the role of embedded researchers.

5.1. Geographical coverage

There were clear patterns in the academic literature regarding where visitor research has been conducted, and geographical biases have been seen in other reviews (Pickering *et al.* 2018) and Godtman Kling, Fredman and Wall-Reinius (2017). However, hot and cold spots for research differ somewhat among these three reviews. Pickering *et al.* (2018), examined the proceedings of the first seven conferences on Monitoring and Management of Visitors in Recreational and Protected Areas (MMV), while Godtman Kling, Fredman and Wall-Reinius (2017) reviewed international literature on trails research. In all three reviews, much of the research was from North America but far more so in the research on trails (40%, Godtman Kling *et al.*, 2017) than on general visitor research (28% of studies here), and only accounted for 15% of the conference proceedings (Pickering *et al.* 2018). There is also lots of research from Europe (25% of this review), 28% in Godtman Kling *et al.* (2017) but 73% in Pickering *et al.* (2018). With the MMV conferences in Europe, they are likely to attract more European authors. Also, the current study only included visitor research from national parks, while much of the research in Europe originate from other PA categories.

Trails research produces more papers from Oceania (18%, Godtman Kling *et al.*, 2017), compared to the 11% in this review and the 6.1% in conference abstracts (Pickering *et al.*, 2018). Visitor research from African national parks in this review contributed 18% to the overall sample, but a negligible 1.3% at the MMV conferences (Pickering *et al.*, 2018) and trails research (0.9%, Godtman Kling *et al.*, 2017). It has been acknowledged that Africa is grossly underrepresented at the MMV conferences, which is surprising considering that South Africa is the country with the second-highest number of visitor research studies in this review. The low representation from Latin America is likely due to the study limitation of including only studies published in the English language.

5.2. The application of visitor research in PA management

Visitor research informs different PA management activities in various ways. While there are some indications of this in the literature (Booth, 2006; Marion, 2016; Newsome *et al.*, 2013; Wardell & Moore, 2004; Ziesler & Pettebone, 2018), this study is the first to identify, proportionally, the management areas to which academic research is directed to. Most of the research leads to recommendations for applications in management activities that exhibit a strong visitor interface, such as enhancing the visitor experience, managing visitor use, improving visitor interpretation and communication, and monitoring and evaluating social and environmental conditions.

We start the discussion of where different types of visitor research are applied by first looking at the four research types utilised most often: socio-demographic; and psychographic attributes of visitors; data on visitor use patterns and visitor behaviour at the destination; and research on visitor experience outcomes. This is followed by the use of visitor impacts research which is a critical component in informing visitor use and impact management (Marion, 2016). Lastly, information about visitors' travel arrangements and pre-trip information is discussed.

Our findings reveal that knowledge of visitors' socio-demographic and psychographic attributes is likely to be used in decisions about enhancing visitor experiences, marketing, interpretation and communication practices, as well as the monitoring of social and environmental conditions. There are many similarities to observations made in PAs in Australia, Canada, New Zealand, the United Kingdom and the United States. These include the use of visitor attributes in marketing (Newsome *et al.*, 2013; Wardell & Moore, 2004); interpretation (Newsome *et al.*, 2013; Wardell & Moore, 2004) and communication of other essential information to visitors (Booth, 2006); and for improving or altering visitor experiences (Booth, 2006; Newsome *et al.*, 2013). Several authors have mentioned the use of this kind of research in visitor use and impact management practices, such as site and facility design (Booth, 2006; Newsome *et al.*, 2013; Wardell & Moore, 2004); along with judgements about the acceptability of impacts (Wardell & Moore, 2004); and for influencing visitor behaviours (Booth, 2006). These links were, however, not apparent in our review. There was also limited evidence of this research informing strategic park- and regional

planning or measurement of park or management performance (corroborating Wardell & Moore, 2004) and decisions about the allocation of financial and human resources (also found by Booth, 2006; Newsome *et al.*, 2013). In our study, psychographic attributes were found to be related to revenue generation or pricing strategies. This could be due to several studies capturing visitors' opinions on national park access fees, contributions to conservation efforts and payments toward different types of experiences.

Academic research that incorporates national park visitor use statistics, such as temporal and spatial use patterns and visitor spending data, is likely to be absorbed in three management areas. Firstly, there is a link with the strategic activity of defining recreational objectives or measuring the recreation value of a PA, also observed in other literature. Visitor spending data is applied in estimating the local and regional economic contribution of recreational spending (Wardell & Moore, 2004; Ziesler & Pettebone, 2018); and visitor use patterns are utilised in park and tourism management plans (Newsome *et al.*, 2013). Understanding visitor use and spending patterns can secondly help improve visitor experiences and thirdly, inform marketing efforts (Wardell & Moore, 2004). Previous literature identified multiple other, more diverse applications of this type of data. These include public accountability (Newsome *et al.*, 2013); park performance measurement (Booth, 2006); allocation of financial and human resources (Booth, 2006; Newsome *et al.*, 2013; Wardell & Moore, 2004); visitor use and impact management and visitor management planning frameworks (Booth, 2006; Newsome *et al.*, 2013; Wardell & Moore, 2004); planning for interpretation and education (Ziesler & Pettebone, 2018), as well as estimating future use and resource degradation (Ziesler & Pettebone, 2018).

Previous studies indicate that data about the outcomes of visitor experiences are applied to inform visitor management planning frameworks (Newsome *et al.*, 2013); visitor use and impact monitoring and management (Booth, 2006; Newsome *et al.*, 2013; Wardell & Moore, 2004); and for enhancing visitor experiences (Newsome *et al.*, 2013). The current review similarly demonstrates the wide use thereof to improve visitor experiences and monitor natural and social conditions. Still, there was not enough evidence to prove a link with visitor use management activities. Visitor experience outcomes have reportedly been used to measure a PA's contribution to society and wider governmental objectives (Booth, 2006); park performance reporting (Newsome *et al.*, 2013; Wardell & Moore, 2004); and resource

allocation (Wardell & Moore, 2004). Our review of academic visitor research did not corroborate these. It did, however, reveal that this type of data is used in revenue generation and pricing strategies. Both the current study and other authors found this type of data is likely to be applied for visitor interpretation and communication (Booth, 2006) and marketing (Wardell & Moore, 2004).

Measuring and monitoring visitor impacts, and examining their underlying causal and non-causal factors, produce essential information for PA management to respond effectively to the effects of visitation on the environment, communities, tourist infrastructure and other visitors (Marion *et al.*, 2016). Expectedly, visitor impact research from our sample displayed a strong link with monitoring changes in natural and social conditions. It is further likely to be applied in improving visitor experiences (also reported in Newsome *et al.*, 2013), and marketing efforts. The fact that it did not associate with visitor use management, though, alludes to a missing link between measuring impacts and the formulation of strategies and practices that address those impacts. The SQLR process itself revealed numerous academic visitor impact studies had no managerial recommendations.

In contrast to the attributes of visitors and their experience outcomes, we know little about where and how protected area management has applied data related to visitors' travel arrangements and other pre-trip information. Recommendations from the literature suggest this research type could, for example, be utilised as supplementary information in profiling visitors (Kruger, Viljoen & Saayman, 2017) and determining demand (Avila-Foucat, Gendron, Revollo-Fernandez, Popoca & Ramírez, 2017). Such data could also inform how visitors utilise PA spaces through the choice of travel mode (Choe, Schuett & Sim, 2017), the segmentation of visitors (Mehmetoglu, 2006) and valuations of recreational services through travel cost method analysis (Blayac, Hamadé & Salles, 2016). In our sample, we found this type of research to be associated with five application areas, including improving the visitor experience; informing marketing; interpretation and communication; planning human resources, and monitoring visitor use environmentally and socially.

These findings further demonstrate, on an aggregated scale, that multiple uses of the same research type is possible and should be encouraged (Buckley, Witting & Guest, 2001). Practically, however, and similar to the findings of Booth (2006), a large part of the data

gathered is relevant only in site-specific applications, limiting further applications. When scoping projects, careful consideration should be given to the number and combination of research types collected in each study to optimise application thereof and ultimately, the value of the research. This will require practitioners to have knowledge of other research gaps in the PA organisation or to work with intermediaries that have a broader view of the organisation's goals.

Despite the multifarious nature of applications of academic visitor research, some management areas appear to be underserved by the current body of knowledge. There is much less evidence of how research currently informs strategic planning activities compared to tactical and operational, and monitoring activities. Defining a PA's recreational objectives is a necessary step in high-level park management and visitor management planning frameworks (McCool *et al.*, 2007), but few studies address this topic. This could be ascribed to the nature of such strategic planning activities, i.e. not occurring frequently and typically involving mostly internal staff. Many of the decisions taken to inform planning frameworks in PAs have a long life span, which can in some cases be counterproductive to an adaptive management approach, particularly in a context highly influenced by societal changes such as that of tourism (McCool *et al.*, 2007; McCool, 2012). There is further little proof of application of visitor research in revenue generation and pricing strategies and human resource management planning. Further investigation is needed on the dynamics around such planning decisions. Perhaps more concerning, though, is the lack of studies that evaluate the effectiveness of current visitor management practices. In contrast, many studies in our sample addressed various aspects of visitor use management, but no relations with any research types unfolded. Considered a necessity in the continuous feedback loop required in an adaptive management context (Moore & Hockings, 2013), such feedback should be encouraged by PA managers.

These knowledge gaps present an opportunity for future studies to explore the utilisation of visitor research in management areas on a more inclusive level (including non-published literature) and at the PA agency level to understand the inclination of management to source and incorporate research into the various strategic, tactical and operational decisions.

5.3. Knowledge utilisation types

Against the backdrop of Weiss (1979)'s statement that instrumental use is rare and more often encountered in private rather than public organisations, the sizable proportion of recommendations towards instrumental use for park management is encouraging. That being said, recommendations do not automatically translate into implementation. Knowledge utilisation is influenced by many other factors apart from the provision of information (Rich, 1997). Still, given the difference in priorities between academic researchers and practitioners, a phenomenon known as the two-communities metaphor in knowledge utilisation literature (Xiao & Smith, 2007), the prevalence of instrumental use in the body of knowledge studied is noteworthy.

Generally speaking, academic structures prefer and reward conceptual and theoretical advancements (McCool, 2012), while practitioners look for simple, easy-to-use answers (Ritchie & Ritchie, 2002). More than a third of the studies reviewed did not provide clear, practical recommendations to practitioners. Practitioners are not the primary target audience of academic journals; therefore, researchers might have adapted their research outputs through alternative dissemination mechanisms that clearly outline the practical implications in more detail and a language meaningful to practitioners (Landry *et al.*, 2001). PA managers have the right to question the motives of researchers applying to research their parks, but should also realise that not all studies have to provide a definitive endpoint, as conceptual use adds to the body of theory for further testing (Rodger, Taplin & Moore., 2015).

The low occurrence of symbolic use could be counterproductive to the concept of adaptive management, which promotes an ongoing cycle of learning by doing, improving and adapting strategies to incorporate new knowledge gained through experience (Moore & Hockings, 2013; Stankey *et al.*, 2005). Research that results in symbolic use is useful to assess management decisions of the past and should be prioritised in the research agendas of PA agencies. More research is needed to understand how much symbolic research is conducted outside of the published literature realm.

5.4. Collaborative research increases application

Involving staff embedded in PAs in the research process leads to greater numbers of recommendations towards management applications of the research. In the face of research capacity of conservation agencies declining worldwide (Roux, Kingsford, Cook, Carruthers, Dickson & Hockings, 2019), research responsibilities are increasingly outsourced to external researchers; posing a risk of management's research priorities being neglected (Kingsford, 2018). Investing in embedded research capacity improves knowledge exchange between practitioners and researchers as embedded researchers are committed to supporting management-related research (Roux *et al.*, 2019). Embedded researchers' knowledge of the unique context of each PA may help align research objectives with the practitioners' key intelligence needs and ensure long-term research goals are not neglected (Roux *et al.*, 2019). The domain of social-ecological systems is complex and require engagement between researchers, practitioners and decision-makers to address policy problems (McCool, 2012).

6. CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

This paper provides a global perspective on the usability of visitor research in protected areas by examining case studies in national parks in over 60 countries. It applies the existing method of SQLR in a novel way to confirm the main components of visitor research gathered and its areas of use in management decisions and actions. The novelty of this application is perhaps best seen in the measurement of different types of knowledge utilisation by studying the integration between the research produced in academic peer-reviewed publications and practical recommendations made towards supporting various management activities.

An enhanced understanding of the potential use of visitor research in different management areas can assist PA staff in re-evaluating current approaches to increase the application of visitor research into planning and practice (Buckley, Witting & Guest, 2001). Managers can motivate for the acquisition of certain types of knowledge that inform visitor use and impact management (Marion, 2016) and visitor experience management (McCool, 2006); ultimately leading to the consideration of alternative visitor management approaches (Mason, 2005). This study identified gaps in the research-practice interaction, particularly in strategic planning activities. There is little evidence of the absorption of academic visitor research into

this management category (similar to the findings of Darcy *et al.*, 2007), even though scholars have documented its usefulness in planning activities (Newsome *et al.*, 2013, Wardell & Moore, 2004). Visitor research can provide more theoretical structures used to assist managers in determining the best course of action to eliminate or mediate impacts from visitation (Brown *et al.*, 2010) and improve adaptive management by evaluating and reflecting on visitor management decisions of the past (Marion, 2016, Newsome *et al.*, 2013). In doing so, managers can be better equipped to handle the sometimes opposing demands of its biodiversity and visitor experience mandates (McCool & Khumalo, 2015).

Effective utilisation of knowledge demands the use of different types of knowledge (Xiao & Smith, 2007). The results of this paper attest to the importance of accommodating a diverse range of visitor research types for evidence-based decision-making in the value-laden process of managing visitors in PAs (described by Manning, 2011; Marion, 2016). Certain types of research are more inclined to be absorbed in certain types of management decisions. During the research design process of a study, researchers and practitioners could encourage the collection of different types of data with the view to increase applications as this review has shown that more research types lead to greater numbers of management recommendations. This could counter the limitation of site-specific data (Booth, 2006) to some extent.

The substantial number of recommendations towards instrumental use of visitor research found in this review corroborates the findings by Newman and Head (2015) that academics, in this case, outdoor recreation and tourism researchers, are adapting and embracing the demand for management research. In addition, the case for embedded researchers in PAs, put forward by Roux *et al.* (2019) is supported as this review has proven their involvement in the research process leads to greater numbers of recommendations towards management applications.

Irrespective of the occurrence of instrumental and to a lesser degree, symbolic use found in existing visitor research, it is not yet known to what extent academic research addresses the research requirements of PAs at a collective or organisational scale. There remain considerable opportunities for researchers to empirically investigate the current and potential contribution of visitor research in visitor management decision-making, a

shortcoming highlighted decades ago (Wardell & Moore, 2004). There is furthermore significant gaps in understanding the current level of utilisation; whether the available visitor research can be applied more effectively by practitioners; which factors influence utilisation; and how this can be addressed to remove the barriers to utilisation. Further investigation is required to determine whether studies involving embedded researchers bring about higher levels of actual uptake in management decision-making.

The most significant limitation of this review is the exclusive use of visitor research studies published in peer-reviewed academic journals, which has several implications. Similar to other reviews (Godtman Kling *et al.*, 2017), the overall number of research studies is undercounted as studies in other types of publications such as books, book chapters and conference papers, research management reports along with other unpublished research, were not included. Certain types of research could be underrepresented in academic reviews. An example is visitor use statistics, gathered primarily to satisfy legal and policy mandates (Ziesler & Pettebone, 2018) and which, on its own, may not be considered suitable for publishing in academic journals.

The authors acknowledge that the search strategy excluded a significant number of other types of PAs with similar characteristics to that of national parks, such as wilderness areas and state parks in the US. It is further possible that the requirement for either phrases “national park” or “protected area” to be present in the abstract of an article, might have been too restrictive, however, the authors found it to be the most efficient way of sifting through the 5 491 abstracts which appeared in the initial search results.

As with most systematic reviews, only articles published in the English language were included, which limits the representativeness of the sample (Pickering & Byrne, 2014). The final 407 studies included in this review should therefore be seen as a sample of the visitor research produced in the English language, rather than the absolute number of studies.

The limitations in the design of this study provide opportunities for further research. More in-depth research could include performing a country-specific or agency-specific evaluation of the knowledge utilisation pathways to develop appropriate strategies to combat the underutilisation of visitor research. Future studies could also investigate the utilisation of

visitor research from the demand side, that is, practitioner pull into policy documents, strategies and other planning activities such as park management plans, visitor management plans, and marketing plans. Lastly, the definition and categorisation of both the visitor research types and management application areas may require further refinement towards more formal, academically accepted constructs.

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DECLARATION OF INTERESTS

This paper forms part of a series of papers from an unpublished PhD thesis (available from the University of Pretoria). Whilst care was taken not to introduce personal bias into the research process; it should be noted that the lead author is employed by a protected area agency which could have influenced the design, analysis and interpretation of the results.

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CHAPTER 3: ARTICLE 2

THE UTILISATION OF PROTECTED AREA VISITOR RESEARCH: A CONCEPTUAL FRAMEWORK

Chapter 3 presents the second article in this study. The article frames the question of whether VR available to PA managers has been optimally applied and if not, what influences utilisation. The article describes problematic issues and possible contributing factors in the use of VR as evident from literature. It then draws on the main knowledge utilisation theories to further explore the phenomenon. The empirical investigation aimed to achieve two main objectives: (i) to establish contemporary views among experts on the utilisation of VR in PAs, and (ii) to determine perceived factors that inhibit or promote utilisation by practitioners. The influential factors are aligned with the main knowledge utilisation theories to propose a conceptual framework for the utilisation of VR as a departure point towards narrowing the research-practice gap in protected area visitor management.

The article was submitted to the Journal of Sustainable Tourism (JOST) (Scopus listed; A+ on ABDC list) and is currently under review. The article presented in this chapter is in the original format as submitted to JOST. The journal welcomes theoretical, conceptual and empirical research about one or more of the economic, social, cultural, political, organisational or environmental aspects of sustainable tourism. Effective application of visitor research can enhance managerial decision-making toward more sustainable tourism management. JOST is one of the leading journals for the publication of protected area visitor research and, as such, deemed appropriate.

The editorial guidelines for the authors wishing to publish in the JOST are available at:

<https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=rsus20>

THE UTILISATION OF PROTECTED AREA VISITOR RESEARCH: A CONCEPTUAL FRAMEWORK

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ABSTRACT

Visitor research constitutes a substantial body of knowledge within tourism literature. Effective application thereof enhances managerial decision-making towards more sustainable tourism management. However, this research is rarely exploited to its full potential. Little is known about the process of utilisation of visitor research in tourism and recreation. This article conceptualises this phenomenon in the context of protected areas by applying knowledge utilisation theory. A two-round Delphi survey was conducted among a panel of visitor research and visitor management experts from various countries to explore the current levels of utilisation of visitor research, influencers inhibiting and promoting utilisation, and the components of utilisation impacted. The results suggest visitor research is not optimally applied in visitor management strategies, practices and policies. The process of utilisation is complex and involves at least five different categories of influencers: Skills, capacity and awareness of practitioners; the engagement between researchers and practitioners; the organisational context; dissemination efforts; and the characteristics of research. Influencers underpinned by organisational interest and interaction explanations appear to play an important role in utilisation. The study proposes a novel conceptual framework outlining the dynamics involved in the movement of visitor research from researchers to practitioners across the stages of utilisation. Recommendations for closing the research-practice gap are provided.

Keywords: visitor research; knowledge utilisation; research-practice gap; visitor management; protected areas.

1. INTRODUCTION

Increasingly, protected area (PA) managers worldwide are pressed to deliver quality visitor experiences and generate revenues to support conservation, while at the same time facing the charge of minimising negative economic, environmental and social impacts from tourism (Leung, Spenceley, Hvenegaard & Buckley, 2018).

Effective PA management should be led by evidence-based decision-making (Roux, Kingsford, Cook, Carruthers, Dickson & Hockings, 2019). This goes without saying in the complex setting of PA visitor management which is characterised by continuous change and uncertainty (Spenceley *et al.*, 2015) and inconsistent management approaches and frameworks (Albrecht, 2018, Miller, Fefer, Kraja, Lash & Freimund, 2017). Visitor management requires substantial levels of skills and expertise (Leung *et al.*, 2018); and is seated within a volatile social, political and biophysical context (McCool, 2012).

Management challenges in outdoor recreation are traditionally dichotomised into environmental research issues, studying resource impacts; and social science issues, covering social aspects, e.g. crowding and conflicts. The two are intricately linked and require an all-encompassing, multidisciplinary approach (Manning, 2011). There is a subsequent growing urgency for PA managers to have access to information on visitors' characteristics, use patterns, their expectations, motivations, satisfaction, opinions as well as behaviours, visitor impacts and its influential and causal factors; for application towards effective planning, tourism development, visitor use and impact management, resource allocation, visitor interpretation, improved visitor experiences, marketing efforts, risk management and other management activities (from Griffin, Moore, Darcy & Crilley, 2008; Marion, 2016; McCool, 2012; Newsome, Moore & Dowling, 2013; Wardell & Moore, 2004).

One could reasonably expect the application of visitor research, as one of several knowledge sources required in effective PA management, to be a catalyst in enhancing the level of decision-making in visitor management. Notwithstanding the importance of visitor

research, it is not clear to what extent the body of research has helped PA managers identify and prioritise strategies that deal with the challenges of managing visitors, nor how research is transmitted across the range of application areas that stand to benefit. The expansion of tourism research has been significant in terms of the amount and variety of research outputs and the number of researchers who produce those (Chambers, 2018). Despite this, academics and practitioners have noted discrepancies and inefficiencies between the production and utilisation thereof, both in a broader tourism context (Hudson, 2013) and in outdoor recreation settings (Manning, 2011). This creates a research-practice divide, also witnessed in a variety of other applied sciences (Pfeffer & Sutton, 2000). The situation is perhaps best summed up by the words of Ritchie and Ritchie (2002:451) "... a great deal of research is being conducted in tourism, but is inefficiently used and rarely exploited to its full potential ...".

This article first explores the literature on utilisation-related challenges and factors contributing to sub-optimal use before discussing the main knowledge utilisation explanations. The empirical investigation address three key research questions: (i) what is the contemporary view on the extent to which PA practitioners utilise visitor research? (RQ1); (ii) is the available visitor research optimally integrated into strategic, tactical and operational decisions by PAs? (RQ2); (iii) what influences the uptake of visitor research by PA practitioners and how? (RQ3). Five categories of influencers are identified from experts' inputs. The authors then align these with the main knowledge utilisation theories. We present a conceptual framework to depict the dynamics and components involved in the process of utilisation, for improving understanding of how the research-practice gap in PA visitor management can be overcome.

2. LITERATURE REVIEW

2.1. Limitations of visitor research in protected area management

For this paper, we define visitor research as data and information gathered to increase our understanding of visitors, their characteristics, behaviours and visitor use patterns, along with the benefits and impacts resulting from visitation. Research uptake in PA management decision-making has, for a long time, been recognised as a neglected area of study (Wardell & Moore, 2004) with only a few scholars exploring its challenges to date. Less optimal

utilisation of visitor research was noted by Darcy, Griffin, Craig, Moore and Crilley (2007) who observed a disjunction between visitor research and park management tools. Unsystematic data collection has suppressed information flow (Moore & Hockings, 2013) and contributed to compromised management decision-making abilities (Griffin *et al.*, 2008). Others have called for an increase in the number of applications of visitor research in PAs (Buckley, Witting & Guest, 2001).

One of the major challenges widening the research-practice gap in PAs is the complexity associated with social-ecological systems. These systems are known for uncertainty as they encapsulate a variety of elements that interact at different scales (McCool, 2012). Recreational use on public lands is impacted by continual changes in visitor preferences, advances in technology, urban developments and other societal demands. The practitioner and research communities have not been able to cope with these shifts (Cervený, Blahna, Selin & McCool, 2020). Those involved in PA visitor management decision-making often lack the experience in dealing with complex visitation-related problems, since most technical managers were trained in environmental management (Blahna *et al.*, 2020). The management process, influenced by political factors, is a source of misconceptions that divide researchers and practitioners (Manning, 2011). Limited communication between the two communities further constrains research use (Manning, 2011). The research-management relationship is further challenged by the academic environment researchers find themselves in; favouring and rewarding publications over spending time with PA managers to translate research findings into actionable objectives. The mental model of research utilisation is equated to a “hypodermic needle” approach, where PA agency managers are injected with data and information under the assumption (by researchers) that the presentation of data and information automatically equates to knowledge transfer and management action (McCool, 2012).

Apart from the previously mentioned studies and the works of a few others, documenting the state-of-knowledge, or reviewing the application of visitor research in visitor management (see Booth, 2006; Griffin, Moore, Crilley, Darcy & Schweinsberg, 2010a&b; Marion, 2016; Pickering, Rossi, Hernando & Barros, 2018), little is known about the extent and drivers of actual utilisation to improve decision-making in visitor management. Any

further attempts toward this aim should arguably be underpinned by an understanding of knowledge utilisation.

2.2. Challenges in the utilisation of knowledge

Knowledge utilisation is described as whether and to what extent sources of evidence are utilised in management or policy decisions (Xiao & Smith, 2007). Drawing on the early work by Beyer and Trice (1982), Patton (1997) and Rich (1997), the authors summarise knowledge utilisation as the process and resultant outcome from the management and organisation of data and information; the social and affective associations that have an effect on its use and explication; the ability to elect research knowledge appropriate for decision-making; and the activities associated with putting research into action. Some of the challenges that have been noted in the adoption of knowledge by practitioners in recreational services include the view by practitioners that research was not relevant to their needs; that academics were more concerned with engaging in knowledge conversations with themselves; the fact that practitioners paid little attention to academic publications; and the suggestion that managers rely more on intuition and personal experience to make decisions than on research (Xiao & Smith, 2007).

Studies that investigated the utilisation of research in fields other than tourism uncovered various items influencing practitioners' ability to use knowledge (Table 1) (Amara *et al.*, 2004; Belkhodja *et al.*, 2007; Cherney & McGee, 2011; Cherney *et al.*, 2012a&b; Cherney *et al.*, 2013; Crona & Parker, 2011; de Goede, van Bon-Martens, Putters & van Oers, 2012; Hemsley-Brown, 2004; Ion, Stîngu & Marin 2019; Landry *et al.*, 2001; Landry *et al.*, 2003; Olszewski, 2015; Ottoson, 2009; Rich & Oh, 1993; Roux *et al.*, 2006; van der Arend, 2014).

Table 1: Categories and influencers of knowledge utilisation

Category	Influencer
Acquisition efforts	Efforts by the practitioner to acquire research.
Attributes of the practitioner	Awareness of media publications about research.
	Experience with research.
	Level of education.
	Perceptions held about the risks of the research.
	Preferred sources of information.
	Preferred types of information.
	Prioritisation of high-quality research.
	Prioritisation of the feasibility of the research.
	Prioritisation of the usability of research.
	The practitioner's context.
	Time allocated towards research or intellectual reflection.
Attributes of the researcher	Level of publication outputs.
	The researcher's context.
Characteristics of the research	Benefits to society.
	Commissioned research.
	Extent to which research is directed towards practitioner's needs.
	Focus on advancement of scholarly knowledge.
	Perceived contribution of the research to professional objectives of the researcher.
	Relevance of the research in policy decisions.
	Relevance and importance of the research to the practitioner's work.
	Research focus on real life problems.
	Timing of the research.
	Type of research (quantitative, qualitative or mixed).
Dissemination efforts	Adaptation of research outputs to the practitioner's needs.
	Dissemination efforts of the researcher.
Funding	Importance placed on external funding.
	Number of external grants.
Interactions between researchers and practitioners	Interactions between researchers and practitioners.
	Involvement of the practitioner in the research process.
	Involvement of the researcher in decision-making.
	Communication between researchers and practitioners
	Investment in research partnerships.
	Linkages between researchers and practitioners.
	Problems associated with the orientation of research partnerships.
	Types of research partners.
Organisational settings	Intensity of use of research sources.
	Leadership.
	Number of employees.
	Organisational capacity
	Organisational type
	Peer-to-peer interactions of practitioners.
	Policy-making based on research.
	Politics.
	Training activities that integrate research results.

Research is not the only source of knowledge managers rely on to make justifiable decisions. Organisational memory refers to “...the individual recollections and shared interpretations of historical information consequent to implementing earlier decisions and brought to bear on present decisions...” (Baskerville & Dulipovici, 2006). The recollection of good and bad management decisions of the past could promote or hinder learning and decision-making (Kransdorff, 2006) and bias decisions towards maintaining the status quo (Baskerville & Dulipovici, 2006; Zakaria & Mamman, 2015). Little is known of the interactions between organisational memory and visitor research; and whether organisational memory promotes or hinders the uptake of new knowledge in the PA visitor management context.

The study of knowledge utilisation has, through more than seven decades of investigation, contributed significantly towards the academic understanding of research-practice gaps in various disciplines (Estabrooks, Derksen, Winther, Lavis, Scott, Wallin & Profetto-McGrath, 2008). The body of knowledge exploring various concepts involved in the utilisation process and factors influencing utilisation of research by policymakers is also expanding (Crona & Parker, 2011). However, the study field still lacks a formal definition to house different concepts of knowledge utilisation in an encompassing and uncomplicated manner (Heinsch, Gray & Sharland, 2016). Notwithstanding, we discuss the prominent theories explaining knowledge utilisation in the next section.

2.3. Knowledge utilisation theories

Knowledge utilisation literature describes six main streams of theories interpreting the influencers of organisational knowledge uptake: (i) Push and pull models, (ii) dissemination models, (iii) engineering explanations, (iv) organisational interest explanations, (v) the two communities metaphor, and (vi) interaction explanations (from Amara, Ouimet & Landry, 2004; Belkhodja, Amara, Landry & Ouimet, 2007; Landry, Amara & Lamari, 2001). This section briefly describes these streams, expounding the major differences, advantages and limitations.

‘Push models’ (knowledge-driven approaches) suggest a linear movement of ideas from research towards absorption, enabling the diffusion of innovation. In contrast, ‘pull models’ (problem-solving approaches) start from the premise of a real-life problem identified by the

end-user, then directed to the researcher for modification into a research question and proposed solutions. Utilisation is stimulated by the fact that end-users are receptive and willing to implement workable solutions (Rosenberg, 1982; Yin & Moore, 1988). Generally, researchers use push strategies to get knowledge across the research-management divide, while managers employ pull strategies to solicit the required information. Both approaches have limitations, though. For example, end-users may feel alienated from the research forced onto them in the push model, perceiving it to have little practical relevance (Heinsch *et al.*, 2016). In the context of visitor management, this often entails limited financial and human resources and technical know-how (Leung *et al.*, 2018). In the case of the pull model, utilisation may be limited when end-users solicit research for easily identifiable operational issues, ignoring more substantial information needs (Roux, Rogers, Biggs, Ashton & Sergeant, 2006).

The ‘dissemination model’ also speaks to the movement of knowledge, but from the premise that knowledge transfer does not happen automatically and that additional action is required to channel knowledge to relevant end-users. Focus is on the necessary mechanisms employed to ensure such dissemination. It occurs when the end-user becomes aware of the new knowledge, though they are neither involved in the production of the research nor selection of useful information (Belkhodja *et al.*, 2007; Landry *et al.*, 2001).

Moving away from the knowledge movement process, ‘engineering explanations’ attribute the level of utilisation to the characteristics (such as reliability, complexity, observability, compatibility) and type of research conducted (qualitative versus quantitative, applied versus basic research and so forth). Although such explanations may be applicable in some public sector cases, it largely ignores the organisational and social context in which governmental organisations operate (Amara *et al.*, 2004).

‘Explanations of organisational interest’ counters this limitation by describing how the utilisation by managers and professionals is influenced by contextual variables embedded in organisational features and interests, such as an organisation’s size, the positions held by its end-users, alignment with organisational needs and types of policy domains (Landry, Lamari & Amara, 2003). Within this group of explanations, the user’s context has been identified as a factor influencing the demand for academic research (Cherney, Head,

Boreham, Povey & Ferguson, 2013). This context could influence the beliefs held by practitioners and decision-makers that a particular piece of evidence is relevant, of value, of a certain level of quality, and feasible to implement. End-users' skills to interpret and apply research findings, also play an important role, along with access to research outputs such as reports and journals (Cherney *et al.*, 2013).

From a different viewpoint, the 'two communities metaphor' (Caplan, 1979) ascribes the low level of instrumental use of social sciences research to the fact that researchers and end-users reside in two culturally different worlds with different objectives and values; each operating within different paradigms, experiencing different challenges and having different viewpoints about the context of research (Xiao & Smith, 2007). Managers who look for simple, easy-to-use answers, often regard the knowledge produced as overcomplicated (Ritchie & Ritchie, 2002). This theory describes the research-management gap as a barrier-overcoming process with bridges, gaps and vehicles as metaphors (Xiao & Smith, 2007). Two influential factors have been highlighted – the adaptation of research outputs into products that managers can understand and align to the organisation's challenges, as well as practitioners' efforts towards acquiring research (Amara *et al.*, 2004).

The 'interaction explanations' view social interactions between researchers and practitioners as one of the most important predictors of utilisation (Landry *et al.*, 2003). This model was developed in response to criticisms of previous science-push and demand-pull models. Scholars increasingly agree that committed relationships, exchanges and joint efforts between researchers and practitioners lead to more functional knowledge (Heinsch *et al.*, 2016) and significantly counters suboptimal utilisation (Dunn, 1980; Yin & Moore, 1988; Oh 1997; Landry *et al.*, 2001). The works of various scholars support the interaction explanations (Cherney *et al.*, 2012a&b; Crona & Parker, 2011; de Goede *et al.*, 2012; Estabrooks *et al.*, 2011).

Evidently, various theoretical stances provide explanations for the phenomenon. Despite their usefulness in suggesting potential barriers or opportunities in the pathway towards utilisation by practitioners, no studies could be found that examined the relevance of the explanations above in the context of PAs.

3. METHODS

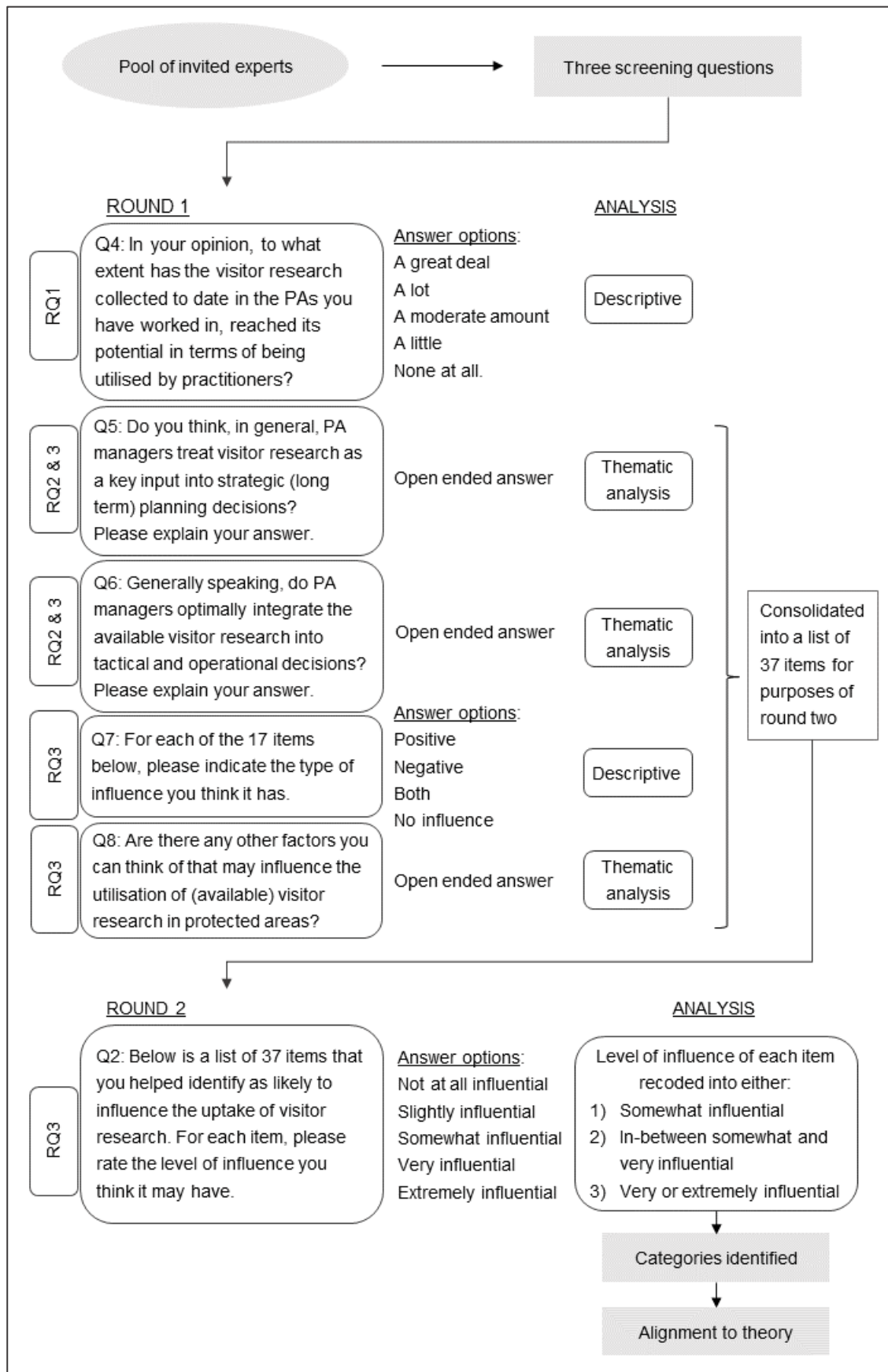
To gather information from experts, the authors followed a qualitative approach, allowing for identification of themes and exploration of underlying meanings (Saunders, Lewis & Thornhill, 2012). It was anticipated that various items would be mentioned as reasons behind the current utilisation of research (RQ3). The Delphi technique facilitates the convergence of opinion on a specific real-world issue by collecting data from a panel of experts through questionnaires delivered in multiple iterations (Hsu & Sandford, 2007). The technique is commonly applied in the development of concepts or frameworks, which is the focus of this study. Such a process usually comprises of two steps, starting with the identification of a set of concepts, followed by taxonomy development (Okoli & Pawlowski, 2004).

The researcher obtained ethical clearance from the University of Pretoria's Committee for Research Ethics. Participants were informed of the purpose of the study and a list of conditions related to informed consent provided. These included voluntary participation in the study and privacy and confidentiality to all participants. Individuals could stop participation at any point in time without any negative consequences. The conditions further stated that any quotations used in reporting would be anonymised to protect the identity of the respondent. The identity, job titles, employers and other personal information of respondents remain known only to the authors.

3.1. The Delphi process

A two-round Delphi survey was carried out to firstly gather information, and in a second iteration, allow participants to reassess their initial judgments of the array of influencers mentioned in the first round. An outline of the questions posed to participants in the form of semi-structured interviews during round one and a structured questionnaire in round two is provided in Figure 1. The graphic further indicates how the data collected relate to the research objectives (RQ1 – RQ3) and how it was analysed.

Figure 1: The Delphi process, data collected and analysis performed in this study



3.2. Selection of experts

The researcher collected data from key individuals with the experience, knowledge and occupations that put them in a position to contribute to our understanding of the topic. A pool of potential participants was identified based on their experience and responsibilities working with visitor research in a PA visitor management context and then screened for eligibility. The process of identifying individuals involved a series of steps. A database of researchers who published peer-reviewed articles during the years 2014 through 2018 was used to identify experienced researchers. This list was expanded by including senior managers in PAs responsible for visitor research or visitor management, and authors of PA visitor management literature, identified through internet searches and personal knowledge. This approach produced an initial list of 56 experts, two of which had retired but still actively involved in the PA network. One expert delegated the task to a more experienced colleague, and another forwarded the invitation to a global PA visitor management interest group, a form of snowball sampling.

Three screening questions assessed individuals' eligibility for participation, based on their (i) current positions held; (ii) responsibilities in conducting or overseeing visitor research; and (iii) involvement in visitor management. Thirty-four experts from six different continents responded. Eight were excluded either because their responses were incomplete (six), or the qualifying criteria weren't satisfied (two). The remaining 26 experts resided in: Africa (six); Australasia (six); North America (six); Europe (five); South America (two) and Asia (two). The final list of experts had, on average, 21 years of experience working with, or for PAs (minimum 6 and maximum 49 years). Experts also indicated their involvement in both visitor management and research on various continents. Half of the experts had been involved in visitor management on more than one continent with 20% having worked on four or more continents. Sixty-nine per cent noted involvement in the collection of visitor research on only one continent, while 20% had collected visitor data in three or more continents.

Sixteen experts were external researchers or consultants who work with PAs on a regular basis; half of which held a well-established publication record (h-index of 20 and above according to Google Scholar profiles) at the time of writing this article. Seven experts were senior staff members at a PA agency (five being senior managers in research, and two

senior visitor management experts). The remaining three experts worked for a national department or ministry of environment with responsibilities of overseeing visitor research in a number of PAs.

Of the 26 experts who successfully completed round one, 20 proceeded to complete round two of the Delphi survey.

3.3. Data collection

The panel of experts was invited to participate in either an online asynchronous interview using SurveyMonkey® or an online synchronous interview via the video conferencing service Zoom. Both interview methods are recognised tools in qualitative social science research (Archibald, Ambagtsheer, Casey & Lawless, 2019; Hesse-Biber & Griffin, 2013; Ratislavová & Ratislav, 2014). Experts were approached via email during the week of 29 July to 5 August 2019 for participation in round one. All but one opted for an asynchronous interview, which facilitated data collection over different time zones and geographical distances. The interviews were conducted in English, semi-structured and provided many opportunities for participants to expand on their answers, unlike with quantitative methods using structured questionnaires. In addition, follow-up email conversations were held where further clarity on a respondent's answers as needed. The majority of responses were received within a week of the first invitation. Reminders were sent to those who hadn't responded after two weeks. Invitations for round two were sent on the 28th of August 2019. A reminder was sent after a week, and data collection concluded two weeks later.

In round one, experts provided their views on the current level of utilisation and elaborated whether the research was treated as a key input into i) strategic and ii) tactical and operational decisions. Using a 17-item list of potential influencers, experts then noted the type of influence of each. Here a list of items that impact the uptake of research by practitioners was hypothesised, informed by the literature explored. An additional three items, based on the lead author's personal experience of managing tourism research in a PA agency, were included, bringing the total to 17 items (Table 2). The three additional items were: Collaboration between internal and external researchers; a researcher's level of experience working with PAs with high visitation levels; and previous involvement in PA

visitor management. Lastly, experts could mention any other influencers not listed or discussed before.

In round two, a list of 37 potential influencers, identified by panellists in round one, was presented to experts. Measuring the level of influence of each was essential to determine the most dominant factors at play. Likert scales have been utilised in other small sample Delphi studies to measure importance (Hofman, Hughes & Walters, 2020). We used a five-point Likert scale, with 1 = not at all influential, 2 = slightly influential, 3 = somewhat influential, 4 = very influential and 5 = extremely influential. In this study, the Delphi method was used for embracing varying opinions to inform the development of a conceptual framework (Okoli & Pawlowski, 2004). Round two granted opportunity for experts to re-examine their initial responses by also considering the influencers identified by other panellists. The Likert-ratings produced an aggregated judgement of the assortment of influencers involved in research utilisation. All 37 items had mean values above 3. Standard deviations were calculated to determine how widely the answers varied as an indication of consensus or diversity of opinion (Kaynak & Marandu, 2006). All were below the recommended threshold value of 1.5 for a 5-point scale (Giannarou & Zervas, 2014). Furthermore, the authors were able to use the results to group the influencers into categories for appraisal against the existing theory. Hence, the Delphi process served its purpose of informing the taxonomy of the conceptual framework (Okoli & Pawlowski, 2004), and data collection was subsequently concluded after round two.

3.4. Data analysis

The identification of themes was fundamental in the analysis of data gathered in the open-ended answers in round one (Figure 1). An inductive process was used to manually code expert answers, which were then grouped into common themes (Braun & Clarke, 2006). Results of the thematic analyses of Q5 and Q6 not only described the current status of utilisation but further revealed several themes of influencers. The data from Q8 delivered similar results, with many repetitions of themes already mentioned in Q5 and Q6, pointing towards data saturation. The combined influencer themes from Q5, Q6 and Q8 were anonymised and are summarised in the results. This knowledge, together with the results of

Q7, was used to create a consolidated 37-item list of potential influencers which was presented back to experts in round two.

An evaluation of the means of each of the 37 items (round 2) indicated all 37 were regarded as influential, albeit at differing levels. Using the mean range of each, the level of influence was recoded into three levels as an indication of its importance: Somewhat influential ($m < 3.5$); influential ($3.5 \leq m < 4$); and very or extremely influential ($m \geq 4$). Measuring the level of influence of each item in this manner helped the authors identify the most important elements. Finally, five major categories of influencers of utilisation were identified by grouping relevant items together.

3.5. Assumptions and limitations

The focus of the study is on the utilisation of available visitor research by practitioners. An assumption was made that individuals with experience in dealing with both visitor research and visitor management in PAs would likely have witnessed varying levels of utilisation across different research projects and PA contexts. As such, these individuals would be in a good position to comment on the current state of utilisation and identify influencers of utilisation. The significant proportion of external researchers consulted may have introduced bias, however, given PAs' reliance on them for conducting research, the inclusion of researchers who have worked with PAs for many years, we felt, was justified. The past experiences of the lead author in managing tourism research influenced the research design, i.e. the selection of the 17 items used in round one, as well as the analysis and interpretation of results. The inclusion of open-ended questions and the inductive nature of the Delphi process and its thematic analysis countered this limitation (Knowles, 2019). The lead author's employment at a PA agency could have influenced the way experts responded. The use of an asynchronous data collection method in all but one of the interviews reduced this limitation as participants could freely express their views in their own words without the pressure of being directly observed by the interviewer, such as in face-to-face interviews (Ratislavová & Ratislav, 2014).

4. RESULTS

4.1. Results of round one

The majority of experts (62%) were of the opinion that only a moderate amount of the visitor research collected to date had reached its potential of utilisation by PA practitioners, while more than a quarter (27%) believed only a little had been utilised.

4.1.1. Visitor research as a key input into strategic, long term planning

Expert opinion varied on whether visitor research is being treated as a key input into strategic, or long term planning in PAs. While six of the 26 experts noted a slow improvement in managers' attitudes towards research, six others felt research is not yet an important component in strategic planning. Four said utilisation in long-term planning had been witnessed but to a lesser degree. Uptake in strategic planning varied quite a lot between PAs and even within PA agencies. Various reasons were cited for the statements provided. Some experts witnessed certain types of research being prioritised when it comes to strategic planning.

4.1.2. The integration of visitor research into tactical and operational decisions

Most experts believed that visitor research is underutilised in tactical and operational decisions, with a clear gap between what is produced and what is utilised. Levels of utilisation in tactical and operational decisions also vary within and between PAs, with some believing there is still too much focus on natural resource management. Three experts acknowledged that research utilisation is a slow and ongoing process, while two expressed uncertainty about the implementation of their own research recommendations. On a more positive note, seven experts specifically mentioned they'd seen improvements in some areas. New public planning manuals have facilitated the use of visitor data, but are still only seen in a small proportion of PAs.

4.1.3. Expert views on the initial list of influencers

More than 70% of experts agreed that 16 out of the 17 items influenced research utilisation. The exception was the level of experience of a researcher in terms of the number of publication outputs (articles, books, etc.) (Less than 50% agreed). When asked about the

direction of influence, 14 items were regarded positive by the majority, encouraging the uptake of research. The organisational memory of a PA was viewed as both a positive and negative influencer by 42% of experts. Similarly, 46% of experts regarded the type of research conducted (qualitative, quantitative, or mixed) as both encouraging and inhibiting the uptake of research (Table 2).

Table 2: Expert views on the directions of influence of the 17 items

Item	Direction of influence	% of experts who agree
Acquisition efforts by practitioners.	+	62%
Adaptation of research outputs to suit the practitioner's needs.	+	81%
Availability of practitioners that are trained in the role of visitor research in PA visitor management.	+	89%
Collaboration between internal and external researchers.	+	84%
Dissemination efforts by the researcher.	+	77%
Interactions between the researcher and practitioner(s).	+	85%
Involvement of the practitioner in the research process.	+	54%
Involvement of the researcher in management decision-making.	+	58%
Organisational memory of the PA.	+ / -	42%
Practitioner experience with and understanding of visitor research.	+	65%
Relevance of the research to the practitioner's work.	+	85%
Research is directed towards practitioners.	+	77%
Researcher experience in PA visitor management.	+	81%
Researcher experience in terms of publication outputs (articles, books, etc.).	Not influential	44%
Researcher's experience in working in PAs with high visitation levels.	+	56%
Researchers taking the practitioner's context into consideration.	+	89%
Type of research conducted (qualitative, quantitative, or mixed).	+ / -	46%

Direction of influence: + Positive; - Negative; + / - Both positive and negative.

4.1.4. Inhibitors and promoters identified through thematic analysis

A number of inhibitors and promoters of knowledge use emerged from expert interviews. The most frequently mentioned influencer inhibiting the application of visitor research into strategic planning, tactical and operational decisions was a lack of capacity and ability (in terms of resources, budget, skills and time) of managers to value, source, interpret and apply research effectively. Managers, many of whom are historically trained in natural resource management, lack the skills required to interpret and absorb research into tactical and

operational decisions. In some PAs, there exists a tug of war between preserving the conservation integrity and allowing more visitors, and a reluctance in others to allow any tourism activities at all. Few practitioners have been adequately trained in visitor management, and many lack the time and resources to synthesise the implications of the research for management. Research further competes for the attention of managers, with many other seemingly more pressing matters grabbing their attention. Among many PAs, there is still an under-appreciation of visitor research, often perceived as secondary in importance to environmental research, with a lack of credibility in social sciences witnessed in some PAs. Often, there is too much emphasis placed on certain types of visitor research and a reluctance to try new innovative methods of data collection.

Utilisation is further constrained when the research scope does not incorporate the area's broader recreational use challenges, limiting the number of applications of a specific piece of research and management's ability to respond to complex nature of visitor management.

Discord between the priorities of researchers and managers hinders the chances of the research outcomes being absorbed into planning decisions.

Another inhibitor is the timeframes required to collect, analyse and report research, seen as constraining for decision-making. Results are often only conveyed to practitioners months or years after the fieldwork was done, and the connection between researchers and practitioners lost. Many researchers further neglect to clearly outline the implications of their research for policy-making.

Internal politics and a lack of support for change further affects the uptake of visitor research. Research is often commissioned for the wrong reasons, for example, to demonstrate adequate park performance, and rarely towards genuine attempts for improving current practices. Ironically, researchers that have put forward recommendations for drastic amendments or improvements have found PAs do not necessarily have the budgets to implement or even consider them in tactical and operational decisions.

The inhibitors of research uptake are summarised in Figure 2.

Figure 2: Influencers inhibiting the utilisation of visitor research

Themes	Examples of expert quotes
Competing (management) priorities	<i>...Research results tend to get lost under more urgent matters...</i> (Expert 8)
Lack of appreciation for / credibility of social science	<i>"Why should we ask visitors? They may tell a lie" (this is an extreme but typical statement). They often perceive ecological data as key input, but not social ones.</i> (Expert 1) <i>In the past emphasis was on natural sciences research and not on social sciences.</i> (Expert 25)
Lack of budget to acquire research and implement recommendations	<i>The results of such research may indicate drastic amendments or improvements which are not necessarily financially feasible to include in tactical and operational decisions for the PA.</i> (Expert 21)
Lack of capacity and ability of managers to value, source, interpret and apply research effectively	<i>There are issues of manager's capacity to apply and appreciate the value of research, or even have the time or resources to do so.</i> (Expert 4) <i>The biggest problem is that many managers do not have sufficient training to understand the implications of the data and the resultant information and reports. Those with a resource training usually do not understand the methods used, the statistical analysis, or the implications of the findings.</i> (Expert 18)
Lack of practitioner skills in visitor management	<i>Many managers have very weak training in the many subfields of visitor management, so find it very difficult if not impossible to understand the implications of the findings for management.</i> (Expert 16) <i>There is often poor policy and administrative guidance towards best practices in visitor management.</i> (Expert 18)
Misalignment between researcher and PA management priorities	<i>...The researcher's priorities and that of the protected area may not be aligned and such research may not necessarily be considered for planning purposes.</i> (Expert 21) <i>If researchers are only following their research goals; on the other side, managers only needing data for management but neglecting any research interest will detract researchers from PA research.</i> (Expert 1)
Negative attitudes towards tourism	<i>A few (managers) see visitors as a threat, rather than a benefit.</i> (Expert 18)
Not adapting outputs to illustrate relevance to practitioner context	<i>I must say that many researchers do a poor job of phrasing their findings so that managers can easily understand the implications of this research.</i> (Expert 18)
Focus on environmental management	<i>They are more concerned with the environment or animals and not as concerned with visitors except as it applies to money generation.</i> (Expert 14)
Politics	<i>Internal politics and a lack of support for change influences the utilisation of visitor research.</i> (Expert 13)
Reluctance to try new methods of data collection	<i>We are also finding a generational issue arising where older PA practitioners are unfamiliar / resistant to using new ways of obtaining data in part because they are unfamiliar with it.</i> (Expert 3)
Research commissioned for the wrong reasons	<i>In many cases individuals commission research either because they are told to or they are concerned with showing they are doing well. It is very rare to find research that is commissioned because folk want to do things better and even rarer to find that someone actually takes up some of the research suggestions to improve the visitor experience.</i> (Expert 13)
Results cannot be reapplied elsewhere	<i>... results of the research appear quite limited and is often restricted to very particular issues. Most of the time, it refers to very technical operations such as the size of the parking lots, the installation of showers or toilets, vans parking... A complete and integrated view of the recreational uses is often lacking.</i> (Expert 2) <i>I think often there is good information for particular issues in particular places but this information can't always be reapplied in other areas.</i> (Expert 6)
Time required to collect, analyse and report research	<i>Many (managers) view the timelines associated with collecting, analyzing and reporting as constraining.</i> (Expert 11)
Too much emphasis on certain types of visitor research	<i>They use visitor research in a very constrained way - they really only appear to be interested in visitor satisfaction.</i> (Expert 14)

A number of factors positively influencing utilisation were mentioned too, although they were less prevalent in the expert answers than inhibitors. Influencers promoting utilisation include close collaboration between practitioners and researchers, with PA agencies clearly articulating their research needs, and researchers fully comprehending the context of the PA and practitioner, increases the likelihood of uptake by management.

Similarly, dissemination mechanisms that facilitate direct contact between researchers and practitioners encourage utilisation. The timing of the research - whether it is considered relevant at the time of a certain topical or political management issue – could act as either a promoter or inhibitor of research.

Many organisational factors were also mentioned. Support for the research in terms of funding; endorsement at the executive, and institutional level; a policy environment that encourages innovation, and change in visitor services; and practitioners' willingness to incorporate research recommendations into their work, all positively influence uptake. Rising visitor numbers have led to a greater focus on visitor management, spurring demand for visitor research, and more sophisticated types thereof, benefiting planning activities. More PAs recognise the importance of visitor research.

The promoters of research uptake are summarised in Figure 3.

Figure 3: Influencers promoting utilisation of visitor research

Themes	Examples of expert quotes
A policy environment encouraging innovation in visitor services	<i>The park and the park agency must have a policy environment that encourages innovation and improvement in visitor services. (Expert 18)</i>
Dissemination	<i>There must be a mechanism created to make sure the researchers provide data, findings, and papers to the managers. And if at all possible should be required to report directly to managers, through personal contact. (Expert 16)</i>
Improved collaboration and trust between researchers and practitioners	<i>When researchers embed themselves in the context that they are studying and involve practitioners in the problem formulation, research design and data collection, then there should be a stronger likelihood of co-ownership of the research findings by practitioners. (Expert 20)</i> <i>...can probably only be achieved if there is a trusting partnership between managers and researchers. (Expert 22)</i>
Increasing visitor numbers and improved budgets	<i>But the role of visitor research has increased due to growing visitor numbers and changing budgeting systems. E.g. in some contexts managers can justify bigger budget needs due to increasing visitor numbers. At the same time they need to pay an increasing focus on visitor management, which needs information based on visitor research. (Expert 16)</i>
Institutional support	<i>Institutionally it must be supported at all levels. (Expert 23)</i>
PA agencies clearly articulating their research needs	<i>It would be very helpful if park managers publicly stated their visitor management research needs. (Expert 16)</i>
Recognition of the importance of research	<i>What I observe, however, is a (slow) change in this attitude towards visitor data. More PAs are now interested in reporting reliable visitor numbers. (Expert 1)</i>
Relevance to local / regional policy makers	<i>Collecting data which might be of interest for local or regional political decision-makers (Expert 1)</i>
Researchers accommodating the reality of the PA	<i>Researchers informed about the reality of PA management can contribute more effectively, often seeing issues that were not initially the object of the research during its execution. (Expert 9)</i>
Support by champion higher up	<i>Having a champion / politician to work with - somebody higher up in the ranks that helps speed up the process. (Expert 10)</i>
The maturity of the research collected	<i>For example, you often need to understand where people are going, what they're doing, and how often - before you can start to understand visitor behaviours, attitudes, needs and motivations in engaging with public conservation land and waters. Generally the latter information is more useful for strategically influencing / informing long-term planning decisions. (Expert 6)</i>
Timing of the research	<i>The uptake of the research is very variable ... depending on ... and the timing of research. (Expert 3)</i>
Willingness (of practitioners) to collaborate	<i>The willingness of practitioners to collaborate with or / and listen to the researchers. (Expert 7)</i>

4.2. Consensus about the most important influencers (round two)

The results and analysis of round two revealed which inhibitors and promoters of utilisation are most influential. Expectedly, all 37 items presented to experts were regarded as at least somewhat influential in the uptake of visitor research. However, 16 items were rated either very or extremely influential (a mean score of 4 and above). Five categories of influencers

emerged after related influencers were grouped together, with each category housing at least one very or extremely influential factor. The majority of the most important influencers are however housed within the categories of the *context of the PA*, *engagement between researchers and practitioners* and *skills, capacity and awareness of practitioners*.

Two out of the three influencers that comprise the *skills, capacity and awareness of practitioners* are regarded as very or extremely influential. According to the experts, a PA practitioner's capacity and ability in terms of skills and resources to source, interpret and apply research effectively, is one of the most influential factors impacting knowledge use (mean = 4.47), along with awareness of the importance of empirical research for better management decision-making (m = 4.32).

Half of the influencers categorised as *engagement between researchers and practitioners* are very or extremely influential. These include practitioners' willingness to collaborate with researchers (m = 4.44); researchers' understanding and addressing practitioners' needs (m = 4.4); PA agencies clearly articulating their needs to researchers (4.37); alignment between the PA agency objectives and a researcher's goals (m = 4.21); trust between practitioners and researchers (m = 4.11); and the level of interactions between practitioners and researchers (m = 4.1). Four other engagement items, all leaning towards a mean score of 4, are mentionable: the involvement of the practitioner in the research problem formulation and research process; researchers being aware of and taking the constraints and challenges that exist in a PA into consideration; the presence of embedded researchers; and a researcher's level of experience in visitor management. Interestingly, researcher experience in visitor management is considered more influential (m = 3.80) than experience in working with highly visited PAs (m = 3.42).

Of the 13 items grouped under the *context of the PA*, six are regarded as very or extremely important. Having a champion higher up in the organisation or government that supports the research is not only regarded as the most important contextual factor, but it achieved the highest score of all 37 items (m = 4.67). Intriguingly, the relevancy of the research to local and regional policy-makers is considered less influential (m = 4.15) than having the support of a senior-level official in the PA agency but still considered very important. A policy environment encouraging innovation, change and improvement in visitor services (m = 4.37)

and the availability of funding to implement recommendations ($m = 4.25$) are also very influential factors. Internal politics within the PA agency plays a role ($m = 4.21$), along with institutional support at all levels of the organisation ($m = 4.11$).

Dissemination efforts were shown to be an important influencer overall; however, only one out of its three items is considered very influential. The adaptation of research outputs to suit end-users, for example, making reports more easily digestible to practitioners or delivering reports in line with practitioner's timelines, is seen as the most influential dissemination action ($m = 4.2$) affecting knowledge utilisation.

One *characteristic of the research* stands out as a very important influencer: the timing of the research becoming available ($m = 4.05$) – meaning whether the research was relevant at just the right point in time, making it more favourable for use in policies and practices.

Interestingly, experts were of the view that the previous involvement of researchers in the management decision-making process is only somewhat influential. Compared to other items, it was rated one of the least important influencers overall. Opinions were also a bit more divided on the influence of a researcher's past experience working with PAs that host large or increasing numbers of visitors ($m = 3.42$), even though 55% of experts rated it as very or extremely influential. A similar pattern was noted on whether a researcher's experience in working with PAs with large numbers of visitors made any difference, with the percentage of experts believing it to be very or extremely influential dropping to 45%.

A summary of the categories, influencers and level of influence, as rated by the experts in round two, is provided in Figure 4.

Figure 4: Utilisation categories, influencers and level of influence

Category	Influencer	Level of influence
Skills, capacity & awareness of practitioners	Capacity & ability to source, interpret and apply research effectively.	
	Practitioners' awareness of the importance of empirical research for better decision-making.	
	Practitioners' expertise in and knowledge of visitor management.	
Engagement between PA practitioners and researchers	Practitioners' willingness to collaborate with / listen to researchers.	
	The researcher's focus on practitioners' needs.	
	PA agencies clearly articulating their research needs to researchers.	
	Alignment between researcher's goals and PA management objectives.	
	Trust between researchers and practitioners.	
	The extent of the interactions between researchers and practitioners (personal informal contacts, participation in committees, workshops and meetings etc.)	
	Involvement of the practitioner in the problem formulation and research process.	
	Researchers taking the reality of the PA (in terms of budget, politics, resources, challenges) into consideration.	
	The availability of an internal (embedded) researcher in the PA for external researchers to collaborate with.	
	A researcher's level of experience in PA visitor management.	
	A researcher's level of experience in working with PAs that receive high numbers of visitors.	
	Involvement of the researcher in management decision-making.	
Context of the PA	Having a champion higher up in the organisation or government that supports the research.	
	A policy environment in the PA agency that encourages innovation, change and improvement in visitor services.	
	Availability of funding for implementing recommendations.	
	Internal politics within the PA agency.	
	The relevance of the research to local / regional policy decision-makers.	
	Institutional support of the research at all levels.	
	Precedence given to natural resource management with little focus on visitor management.	
	Competing management priorities.	
	Efforts by practitioners to acquire research.	
	Social acceptance of visitor research within the PA.	
	Organisational memory.	
	Large or increasing numbers of visitors experienced by the PA or agency (the more visitors, the more focus on using visitor research).	
	Practitioners' focus on sourcing or applying research for single use purposes - not approaching the acquisition of visitor research in a way that will result in multiple applications.	
Dissemination efforts of researchers	Adapting research outputs to practitioners' needs.	
	Researchers reporting results directly to managers through personal contact.	
	The dissemination efforts by the researcher (such as sending reports, having meetings with practitioners, using media outlets etc.).	
Characteristics of the research	The timing of the research – relevance at a specific point in time.	
	The type of visitor research collected.	
	The time associated with collecting, analysing and reporting research.	
	Research commissioned for the wrong reasons.	
	If the research can be reapplied to other contexts.	
	Practitioners' willingness to try new methods of obtaining data.	

 Somewhat influential

 Influential

 Very and extremely influential

5. DISCUSSION

Only a modest amount of visitor research currently reaches its potential of application in protected area visitor management strategies, practices and policies. Similar observations have been made by other scholars examining the integration of visitor research in protected areas (Buckley *et al.*, 2008; Darcy *et al.*, 2007; Griffin *et al.*, 2008; McCool, 2012; Moore & Hockings, 2013). Utilisation is a slow and ongoing process which can benefit from improved interactions between the producers and end-users of research (Roux *et al.*, 2006); however, there are many other factors influencing usage levels in addition to the interactions between researchers and practitioners (Hemsley-Brown, 2004). We discuss each of the five categories of influencers at the hand of knowledge utilisation literature and then propose a conceptual framework for explaining the use of visitor research.

5.1. Linking the five categories of influencers to theoretical explanations

5.1.1. Skills, capacity and awareness of practitioners

Practitioners require the necessary skills and expertise for acquiring, interpreting and applying the available research into decisions (Camisón & Forés, 2010). It has long been recognised that a lack of skills and resources in PAs inhibit the successful implementation of visitor management (Farrell & Marion, 2002). Similarly, the lack of understanding of the interactions between visitors and nature (Newsome *et al.*, 2013) and a shortage of time and resources to analyse and interpret research effectively (Darcy *et al.*, 2007) contribute to a decreased capacity of visitor management. Scholars have further noted uncoordinated efforts and insufficient levels of visitor research being collected in natural areas (Booth, 2006; Buckley, Robinson, Carmody & King, 2008; Moore & Hockings, 2013), along with inadequate formal knowledge management frameworks to assist with the management, dissemination and utilisation of knowledge across various departments within PA agencies (Darcy *et al.*, 2007). Apart from having the capability to do so, there is also an awareness needed of the importance of collecting new data for policy decisions among practitioners in the first place, thereby promoting the acquisition of new knowledge, along with the political will to try new data collection methods. This category aligns with both the 'demand-pull' (Rosenberg, 1982; Yin & Moore, 1988) and 'organisational interest' (Landry *et al.*, 2003) explanations where end-users recognise a need for and actively source new knowledge.

Open-minded practitioners effectively pull knowledge resources by identifying a real-life problem to be addressed with research. This category recognises the user's context in terms of having the necessary skills and resources available in their immediate working environment to absorb new knowledge (Cherney *et al.*, 2013), further supporting the 'organisational interest' knowledge utilisation theory.

5.1.2. Engagement between PA practitioners and researchers

The high levels of influence seen in the items representing engagement between practitioners and researchers attest to the contemporary importance of the 'interaction explanation' knowledge utilisation theory (Heinsch *et al.*, 2016). Advocating for stronger linkages between the producers and end-users of knowledge increases the likelihood for knowledge production that align with the needs of end-users (McCool, 2012), encouraging practitioner support and uptake in policies and practices (Roux *et al.*, 2006). Managers need to drive applied research by clearly articulating their needs to researchers (Manning, 2011), while researchers' involvement in problem definition ensures the problem identified is suitable for scientific study (Manning, 2011). Meaningful relationships between academia, practitioners and decision-makers promote more management-relevant research and can lead to the development of wisdom that more effectively addresses the complexities practitioners have to deal with (McCool, 2012). Constant interaction helps build the capacity of both parties to more effectively collaborate with each other (van der Arend, 2014), creating trust between researchers and practitioners. Misalignment between the PA agency objectives and researchers' goals (McCool, 2012) can be overcome by employing appropriate mechanisms (Xiao & Smith, 2007). In this regard, the interaction explanations overlap with that of the organisational interest as the alignment with organisational needs and types of policy domains describe an organisational context (Landry *et al.*, 2003). Successful implementation of research depends largely on the degree that researchers and practitioners understand and appreciate each other's competencies, positions and processes (Manning, 2011). One item, a practitioner's willingness to collaborate, arguably is an organisational interest rather than an interaction between the two parties as it involves underlying beliefs or intentions of practitioners, describing the user's context (Cherney *et al.*, 2013).

Improved knowledge of the context of the PA, more active researcher involvement in management activities and greater practitioner involvement in the research process (sometimes facilitated through embedded researchers), effectively draws the two communities closer together and result in more effective, actionable research likely to be adopted (Manning, 2011).

5.1.3. The context of the PA

The organisational and social contexts in which governmental organisations such as PAs operate, along with inherent beliefs held by end-users all collectively form part of the group of explanations called ‘organisational interest’ (Landry *et al.*, 2003). In this study, a number of interesting and important organisational features emerged as promoters of improved utilisation of research. Evidently, experts felt the support of an individual higher up in the PA agency ranks contributes tremendously towards the research being applied to policies and practices. This finding is similar to what Hemsley-Brown (2004) concluded about leadership support of the research at a sufficiently high level. In our study, experts believed institutional support at all levels and relevance to local or regional policy decision-makers increased the chances of research being taken up in policy decisions. Furthermore, policy environments that encourage adaptive management principles in visitor management generally regard research as an important component in decision-making (Marion, 2016; Newsome *et al.*, 2013). Internal politics is known to have an effect on the use of research (Ottoson, 2009), along with the availability of funding (Cherney *et al.*, 2012a; Landry *et al.*, 2001).

5.1.4. Dissemination efforts of researchers

The ‘dissemination theory’ of knowledge utilisation focusses on researchers’ efforts in transferring knowledge to practitioners by firstly deciding which information should be shared and then proceeding with the act of transmitting that information to end-users through various mechanisms (Belkhodja *et al.*, 2007; Landry *et al.*, 2001). This finding (dissemination) is in line with numerous other studies which found that adaptation of research outputs into products understandable by managers, and aligned to the organisation’s challenges is a critical influencer (see Amara *et al.*, 2004; Cherney *et al.*, 2013; Cherney *et al.*, 2012a; Cherney & McGee, 2011; Landry *et al.*, 2001; Landry *et al.*,

2003). In fact, such adaptation efforts is an important bridge to help overcome the research-management gap encompassed in the ‘two communities’ metaphor (Amara *et al.*, 2004).

5.1.5. Characteristics of the research

The idea that certain attributes of the research presented to practitioners have a bearing on its utilisation is aligned to the ‘engineering explanations’ of knowledge utilisation theory (Amara *et al.*, 2004). The timing of research has implications for its usefulness (Manning, 2011). Research results are timed right in two ways – one being coincidental where the research just happened to be produced at a time where managers needed it. The other involves close collaboration where management research needs are made known to researchers who actively pursue and prioritise managerially useful information (Olszewski, 2015). The latter linkage mechanism corresponds with the ‘interaction explanations’ (Landry *et al.*, 2003). Scholars have noted an overreliance on visitor statistics and satisfaction data in management activities (Griffin *et al.*, 2008), and in this study, experts also put forward the type of visitor research collected as an important influencer. The length of time spent conducting and reporting research frustrates managers and can limit the usability of research, as managers are pressured to make decisions urgently (Manning, 2011; McCool, 2012).

In summary, it would appear that each of the six major groups of knowledge utilisation explanations (push models; dissemination; engineering explanations; organisation interests; two communities theory and the interaction explanations) hold true in the context of the utilisation of visitor research in PAs. Judging by the number of items and their levels of influence, it can be concluded that the items underpinned by the ‘organisational interest’ and ‘interaction explanations’ have greater levels of influence in the uptake of research in PA visitor management.

5.2. Conceptual framework explaining the utilisation of visitor research in PAs

A conceptual framework is provided next to depict the authors’ understanding of research utilisation in visitor management; informed by the literature explored in this article, the results obtained from the empirical investigation and the lead author’s personal experiences of managing tourism research in a protected area agency. It is described along the dimensions

of (i) the movement of knowledge, (ii) factors influencing the movement and utilisation of knowledge, (iii) process by which knowledge moves, (iv) application areas where knowledge is absorbed into, (v) entities involved in the knowledge production and utilisation process, (vi) interactions between the entities, and (vii) end result of utilisation.

The body of research, comprising of both explicit and tacit knowledge, is the “what” that moves between stakeholders when viewed through the lens of use (Ottoson, 2009). Knowledge transferred by researchers collides at some point with the factors inhibiting or promoting use, the influencers of utilisation (Hemsley-Brown, 2004). Knowledge utilisation itself is a process rather than a single event, best described by the six cumulative stages conceptualised by Knott and Wildavsky (1980) and later adapted by Landry *et al.* (2001). The process starts with the *transmission* of research. *Cognition*, or understanding of the research results by practitioners, builds on transmission and is followed by *reference*, or actions where practitioners and professionals cite the research as a reference in their reports, studies, and strategies. The next stage is named *effort*, which involves the actions taken by practitioners to adopt the outputs of the research. The final stages involve *influence* and *application*. Influence happens when the research has affected the choices and decisions of end-users. *Application* is said to have happened when the research gave rise to applications and extension in management activities.

The entities involved in research utilisation comprise the producers (internal and external researchers) and the end-users of knowledge (practitioners involved in PA visitor management) (Baskerville & Dulipovici, 2006). The authors make an assumption that external researchers engage less with research produced internally as such knowledge is not always subjected to publication and public dissemination. The authors further propose that greater levels of interaction exist between practitioners and internal researchers than practitioners and external researchers (Roux *et al.*, 2019), provided there are internal research capabilities in the first place.

Once visitor research is applied to management activities, three types of utilisation can occur, namely instrumental, conceptual and symbolic use (Cherney & McGee, 2011). Instrumental use implies the employment of research in an action-oriented way to find practical solutions to a specific management challenge (Xiao & Smith, 2007). Conceptual

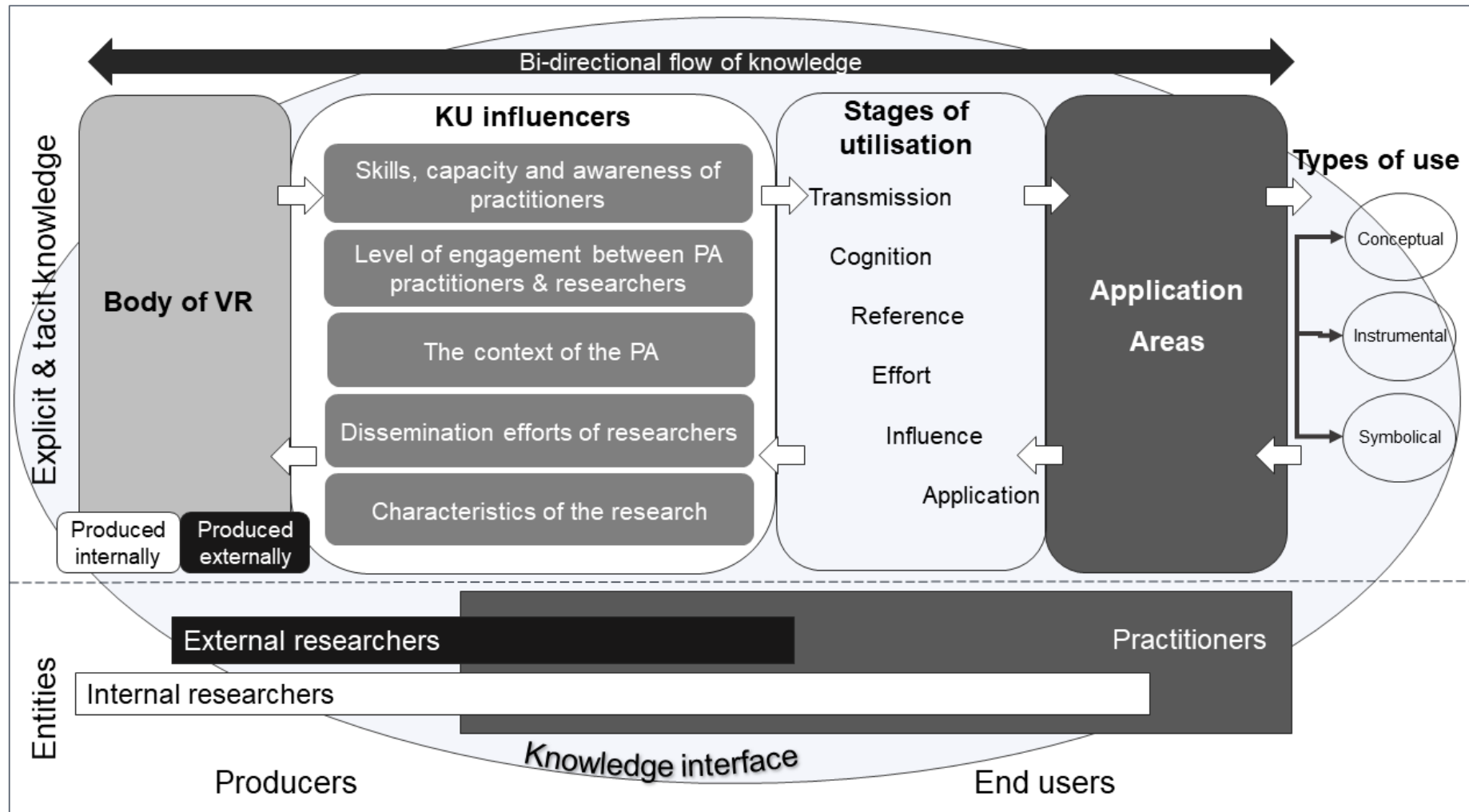
use, also known as “knowledge for understanding” (Rich, 1977), implies the application of knowledge in the development of new theories, hypotheses or understandings about the problems at hand, but without necessarily directly changing policy or decisions (Cherney & McGee, 2011). Symbolic or political use entails the application of research for the purpose of justifying a political position or practice or defend prior decisions (Cherney & McGee, 2011; Xiao & Smith, 2007).

The utilisation of research demands a process that facilitates the transfer of understanding and knowledge, moving beyond the transfer of data and information (McCool, 2012). Based on this principle, the knowledge interface dimension, informed by Roux *et al.* (2006), represents the mechanisms that facilitate knowledge flow between communities. In an attempt to move away from the push-pull models, the authors advocate for a bi-directional flow of knowledge through ongoing interactions between the two communities, in order to realise a shared and enhanced understanding of the subject at hand. Knowledge of practitioner challenges is communicated to researchers who in turn produce research to address these challenges (Manning, 2011). The new insights arising from the research are transferred from the producers to the end-users (Baskerville & Dulipovici, 2006). Although not the focus of this article, it is acknowledged that movement again takes place in the opposite direction, as the enhanced understanding gained from management decisions and actions, and the consequences thereof are shared with researchers (Mason, 2005; McCool *et al.*, 2007) through knowledge interface mechanisms (Roux *et al.*, 2006). Such increased understanding can be absorbed back into the organisational memory of a PA (Baskerville & Dulipovici, 2006) and lead to an additional demand for research, representing an iterative and symmetrical process at the micro-level (McCool, 2012). In practice, knowledge moves in such a bi-directional fashion continuously (Roux *et al.*, 2006). In visitor management, regular engagements create a shared understanding of the problem at hand and its interrelated factors; and allow for evaluation and reflection on decisions of the past (Marion, 2016). For purposes of this study, though, we limit the focus to understanding the inhibitors and promoters of the utilisation of knowledge moving in one direction: from researchers to practitioners.

Current knowledge interface models require adjustments in the macro-system of both communities; such as the reward systems of academic and government institutions which

favour academic publications over recurrent discussions with managers (McCool, 2012). On the micro-level, an increased understanding among researchers of management priorities along with appropriate mechanisms to facilitate engagements with managers is necessary (McCool, 2012).

Figure 5: A conceptual framework explaining the utilisation of visitor research in PAs



6. CONCLUSION AND RECOMMENDATIONS

Protected area managers are increasingly expected to base decisions on scientific evidence taking into consideration the variety of societal changes; growing and varied demand for providing recreational opportunities; uncertainty and complexity about the outcomes of their decisions; as well as limited organisational capacity (McCool *et al.*, 2007). The practitioner and research communities have struggled to cope with these societal shifts (Cervený, Blahna, Selin & McCool, 2020). Yet, this study confirms other authors' beliefs that protected areas are not optimally applying the available visitor research (Buckley *et al.*, 2008; McCool, 2012).

This article used knowledge utilisation theory and empirical data obtained through expert interviews, to make an original contribution by conceptualising the dynamics and components involved in protected area research utilisation. The process of utilisation is complex (McCool, 2012) and involves many influencers that inhibit or promote the use of visitor research in practice (Hemsley-Brown, 2004). The authors identified five categories of influencers; each impacting utilisation differently. Although the categories align with several theoretical explanations, it would appear as if the organisation interest and interaction explanations (Landry *et al.*, 2003) are most influential.

This knowledge is important for researchers and practitioners with an earnest desire to help PAs navigate the intricate challenges of visitor management. By identifying and prioritising influencers, a number of practical recommendations were made to close the research-practice gap. These findings can inform researchers of the determinants that increase the likelihood of new knowledge to be absorbed to become institutional knowledge in PAs. As such, it can stimulate further discussions around the mechanisms (see van der Arend, 2014) for improving the utilisation of visitor research in PAs.

This study has several limitations. The focus was limited to studying the movement of knowledge from researchers to practitioners. The small number of experts consulted cannot be assumed to represent the views of the larger population, and their opinions are subject to personal bias which could have influenced the results of the study. The inclusion of a large proportion of external researchers and consultants may also have biased the results.

Further research to empirically test the effects of the five categories of influencers on overall levels of utilisation is necessary to appraise its impact and confirm its relevance in the context of PA visitor management. More in-depth studies could be considered, such as the difficulties and challenges encountered on both sides of the two communities. Future studies could also examine contextual differences between countries, regions and PA agencies.

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DECLARATION OF INTERESTS

This paper forms part of a series of papers from an unpublished PhD thesis (available from the University of Pretoria). The past experiences of the lead author in managing tourism research influenced the research design, i.e. the selection of the 17 items used in round one, as well as the analysis and interpretation of results. However, the inclusion of open-ended questions and the inductive nature of the Delphi process and its thematic analysis countered this limitation (Knowles, 2019). The lead author's employment at a PA agency could have influenced the way experts responded. This limitation was reduced through the use of an asynchronous data collection method (in all but one of the interviews) as participants could freely express their views in their own words without the pressure of being directly observed by the interviewer, such as in face-to-face interviews (Ratislavová & Ratislav, 2014).

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CHAPTER 4: ARTICLE 3

ADVANCING VISITOR RESEARCH UPTAKE IN POLICY AND PRACTICE: A STRUCTURAL EQUATION MODEL

Chapter 4 presents the third article of this study, in which a structural equation model was developed and tested to explore the effect of seven potentially influential factors on knowledge utilisation in PA visitor management. The article provides empirical evidence of the presumed, yet unverified, underutilisation of VR.

Article 3 was submitted to Tourism Recreation Research (Scopus listed; A on ABDC list) and is currently under review. This multidisciplinary journal focuses on research problems in various tourism and recreational settings and aims to find solutions for sustainable development. The knowledge produced in Article 3 highlights gaps in the research-practice interaction and encourages further collaborative efforts and co-designed solutions between researchers and managers to enhance the use of VR. The article presented in this chapter is in the original format as submitted.

The editorial guidelines for the authors wishing to publish in Tourism Recreation Research are available at:

<https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=rtr20>

ADVANCING VISITOR RESEARCH UPTAKE IN POLICY AND PRACTICE: A STRUCTURAL EQUATION MODEL

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ABSTRACT

A great deal of visitor research is being produced, yet suboptimal use thereof by practitioners raises concerns. This study is the first to measure actual levels of utilisation of visitor research in tourism and recreation management, using protected areas as context. It investigates seven potential drivers of use including the adaptation of research outputs; organisational context; dissemination efforts by researchers; engagement between practitioners and researchers; linkage mechanisms; skills, capacity and awareness of practitioners as well as the timing of the research. A structural equation model was developed and tested using data collected from 252 producers of visitor research. The results of the online survey empirically confirm other scholars' beliefs of the underutilisation of research in protected area policies and practices. Engagement between the researcher and practitioner communities, as well as the potential absorptive capacity of protected areas, contribute significantly towards increased levels of research uptake. The importance of both the interaction and organisational interest explanations in knowledge utilisation is confirmed. Managerial implications are discussed along with recommendations for future research.

Keywords: knowledge utilisation; tourism; research-practice gap; visitor research; absorptive capacity; structural equation modelling.

1. INTRODUCTION

Tourism research activity has increased exponentially during the past two decades (Chambers, 2018). Yet, there is a growing concern that research remains underutilised by policymakers and practitioners, despite the applied nature of the field (Mair, Merton & Smith, 2014). Discrepancies and inefficiencies between the production and utilisation of tourism research have been noted by Hudson (2013), Pyo (2012), Thomas (2012) and Xiao and Smith (2007). Some have even gone as far as to describe the tourism sector as being research-averse (Cooper, Ruhanen & Scott, 2015).

As popular tourist destinations, protected areas (PA) are no different. The gap between research and practice has contributed towards challenges in the implementation of strategies, policies and practices related to visitor experiences (McCool, 2012); and detachment between visitor research and park management tools (Darcy, Griffin, Craig, Moore & Crilley, 2007). Others have expressed concerns about the uncoordinated efforts in collecting data about visitors (Buckley, Robinson, Carmody & King, 2008; Moore & Hockings, 2013); contributing to management decisions often being based on unreliable or no information (Griffin, Moore, Darcy & Crilley, 2008). Even though researchers continually collect data about visitors in PAs, understanding of the uptake of knowledge into management strategies and practices remains fragmented. We broadly define visitor research as data and information that enhance our understanding of visitor characteristics, perceptions and behaviours; use patterns, and the benefits and impacts arising from visitation to PAs.

Visitor research plays a significant role in effective planning and management of protected areas (PA) (Griffin *et al.*, 2008; Marion, 2016; McCool, 2012; Newsome, Moore & Dowling, 2013; Wardell & Moore, 2004). Full comprehension of the nature and diversity of visitor expectations and experiences is as necessary to responsible PA management as understanding the biodiversity and biophysical processes occurring within the area of use (McCool, 2006). Visitor management, a challenging and “wicked” problem (Manning, Anderson & Pettengill, 2017; McCool & Stankey, 2003), requires effective collaboration between researchers and management (McCool, 2012). However, many of the decision-makers in PAs come from a

background of environmental management, and as such find the dual demands of biodiversity and tourism experience mandates challenging (McCool & Khumalo, 2015; Newsome *et al.*, 2013; Weaver & Lawton, 2017). An apparent decline in the internal research capacity of PAs worldwide poses an additional threat to evidence-based decision-making (Roux, Kingsford, Cook, Carruthers, Dickson & Hockings, 2019). The effect of COVID-19 on tourism incomes may put further pressure on PAs' abilities to retain skilled researchers and scientists within their ranks (Hockings *et al.*, 2020). Should this decline in internal capacity continue, PAs will be even more dependent on external research partners to deliver actionable research, magnifying the need for effective collaboration and co-learning between different stakeholders (Roux, Rogers, Biggs Ashton & Sergeant, 2006).

Acknowledging that various factors may influence the utilisation of research - what can we do to improve the application of existing and new visitor research in PA management decision-making? We know little about the extent and drivers of actual utilisation in PAs. The two communities can use such knowledge to craft solutions that improve current levels of research utilisation and ultimately enhance the contribution of visitor research in management policies and practices.

This article investigates the utilisation of visitor research in tourism and recreation management, using protected areas as context. The study utilises data collected from a survey among 252 producers of visitor research, to firstly measure the actual level of utilisation. It then applies structural equation modelling to test the relationships between the level of utilisation and a set of seven theoretical constructs, hypothesised to improve utilisation. Notwithstanding the varying geographical and experiential contexts where research has been produced around the world, the outcomes lead to a novel explanation for the use of visitor research in PAs and an articulation of the status quo globally.

2. LITERATURE REVIEW

2.1. Measuring knowledge utilisation

Knowledge utilisation is defined as whether and to what extent sources of evidence are utilised in management or policy decisions (Xiao & Smith, 2007). Serious

theoretical, conceptual and methodological gaps have been noted in the area of measurement and evaluation of knowledge utilisation, even though a plethora of research is available to frame our understanding thereof (Estabrooks, Squires, Strandberg, Nilsson-Kajermo, Scott, Profetto-McGrath, Harley & Walling, 2011). Existing studies have taken an input-output model approach through, for example, the information utilisation questionnaire by Larsen (1981), the level of use scale by Hall, Loucks, Rutherford and Newlove (1975), the behavioural, affective and cognitive use instrument by Anderson, Ciarlo and Brodie (1981) and the USER instrument by Menon and Wilcox (1994). As such, scholars have not been critical of the unwarranted assumptions and problems in methodologies associated with the input-output model. According to Landry, Lamari and Amara (2003) and Rich (1997), these include the lack of a definitive construct for the dependent variable “use”; problems associated with the selection of independent variables; and the view that use is a discrete event.

Certain inherent beliefs are also problematic, such as the assumption that a cause-effect relationship exists between a specific piece of research and the end-user’s objective; that information use is directly linked to a particular action; and that it is appropriate and possible to measure the influence of a single piece of evidence on the problem-solving abilities of an individual. Lastly, there is a perception that problem-solving is affected mainly by information. The former does not depend on a single piece of evidence and research evidence does not generate just one effect, therefore viewing utilisation as a discrete decision is problematic (Landry *et al.*, 2003, Rich, 1997). Researchers have attributed such methodological challenges to the fact that “...there is not yet an integrated conceptual model used by the experts in the field of knowledge utilisation...” (Landry, Lamari & Amara, 2003, p. 192). Knowledge utilisation should be thought of as a decision-making process, capturing the extent to which research has contributed to influencing a particular goal or a desired end result (Landry *et al.*, 2003).

For this reason, from an evaluation perspective, the concepts or terms such as “influence”, “use” and “impact” require measurable constructs that acknowledge the different types of use. “Use” may simply refer to the reception and cognition of research, but does not guarantee understanding. At the same time, “influence” implies information has contributed towards a decision or an activity or led to alternative

understandings. “Impact” on the other hand places the focus on an action-orientated outcome, implying that information usage is followed by an action (even if the action is to reject the information) (Rich, 1997). While definitions of knowledge utilisation along a spectrum of applications are useful, it does not describe the complexity accompanying the process, particularly the range of uses from the transmission to actual application.

Scholars Knott and Wildavsky (1980) addressed this challenge by conceptualising utilisation as a process rather than a single event and whose scale was later adapted by Landry, Amara, and Lamari (2001). Since its inception, this scale has proven to be reliable and relevant in numerous empirical studies (Belkoudja, Amara, Landry & Ouimet, 2007; Ion, Stîngu & Marin, 2019; Landry *et al.*, 2003). Knowledge utilisation encompasses six cumulative stages, starting with the *transmission*, or the transfer of research outputs. *Cognition*, or understanding of the research results by practitioners, builds on transmission and is followed by *reference*, or actions where practitioners and professionals refer to the research in reports, studies, and strategies. The next stage, referred to as *effort*, involve actions taken by practitioners to adopt the outputs of the research. The final stages involve *influence* and *application*. Influence happens when the research has influenced the choices and decisions of end-users. Application is said to have happened when the research gave rise to applications and extension in management activities.

2.2. Development of the theoretical model

Knowledge utilisation, as the dependent variable, was contextualised in the previous section. This section presents the theoretical model and the independent variables of the study. Just as there is no umbrella conceptual framework for knowledge utilisation, there is also no definitive list of variables to predict it (Cherney *et al.*, 2012b); perhaps because of the contextual differences seen in different academic disciplines (seen in Cherney, Head, Boreham, Povey & Ferguson, 2013; Landry *et al.*, 2001). We examined a long list of variables found to affect the level of research use in different contexts (see Amara, Ouimet & Landry, 2004; Belkoudja *et al.*, 2007; Cherney *et al.*, 2013; Cherney & McGee, 2011; Cherney *et al.*, 2012a&b; Crona & Parker, 2011; de Goede, van Bon-Martens, Mathijssen, Putters & van Oers, 2012; Ion *et al.*, 2019;

Landry *et al.*, 2001; Landry *et al.*, 2003; Ouimet, Landry, Ziam & Bédard, 2009; van der Arend, 2014). Most of these works corroborate the existence of six main interpretations of the influencers of research use.

Push models promote the idea of researchers driving knowledge forward in a linear direction towards practitioners for uptake, whether relevant to their context or not. In pull models, practitioners present researchers with real-life problems who translate it into research objectives to develop solutions (Rosenberg 1982; Yin & Moore 1988). Dissemination interpretation represents additional efforts required to transfer knowledge from producers to end-users through measures employed by researchers, such as making reports available or adapting research reports to a format that practitioners can digest (Belkhodja *et al.*, 2007; Landry *et al.*, 2001). The engineering interpretations ascribe utilisation to the attributes of the research outputs and the methods used (Amara *et al.*, 2004). Interpretations of organisational interest highlight the influence that certain organisational traits and interests have on knowledge use, including the context, interests and skills of the end-users themselves (Cherney *et al.*, 2013; Landry *et al.*, 2003). The two communities analogy (Caplan, 1979), viewed as flawed by Newman and Head (2015), argues the two culturally opposing environments of researchers and practitioners are to blame for the unsatisfactory levels of utilisation of research. The main idea behind the analogy is that the research-practice gap, caused by conflicting ideas, values, expectations and objectives of researchers and practitioners, can be overcome by employing certain mechanisms (described as bridges and vehicles) (Xiao & Smith, 2007). Conversely, the interaction interpretations propose that strong relationships between practitioners and researchers are major drivers of the utilisation of knowledge (Dunn 1980; Yin & Moore 1988; Oh 1997; Landry *et al.*, 2001). The interaction explanations have gained much traction in empirical studies (Amara *et al.*, 2004; Belkhodja *et al.*, 2007; Crona & Parker, 2011; de Goede *et al.*, 2012; van der Arend, 2014). While these studies produced promising results, the application of social science research cannot be explained by this theory alone.

No empirical studies appear to be available to guide conceptual thinking on the use of visitor research in PAs. From literature, we identified and hypothesise seven constructs that potentially drive the utilisation of visitor research, as subsequently discussed.

Importance of adaptation of research outputs to suit end-users' needs

Adaptation of research outputs to better suit the needs of practitioners is essential to overcome the gap created by differing contexts of the two communities (Amara *et al.*, 2004; Cherney *et al.*, 2013; Cherney & McGee, 2011; Landry *et al.*, 2001; Landry *et al.*, 2003). Huberman and Thurler (1999) suggested various mechanisms in this respect, including making reports more readable and understandable to end-users; operationalising recommendations; adjusting research outputs to suit the practitioner's expectations and address the deliverables of a project, and improving the presentation of reports. The dissemination interpretations support the idea of the adaptation of research outputs as an influencer, as a way of overcoming the two communities challenge.

The organisational context of the PA

The presence of certain conditions within the end-user's organisational context can influence knowledge use. Organisational factors proven to contribute significantly towards utilisation include the user's context (Amara *et al.*, 2004), the relevance of research in policy decisions (Landry *et al.*, 2003), and the importance of the availability of internal and external funding for research (Cherney *et al.*, 2012a; Landry *et al.*, 2001). In terms of organisational culture, increased levels of use are observed when the research was regarded as a preferred source of information by practitioners (Belkhodja *et al.*, 2007). Similarly, organisations with a culture that supports research for policy-making at various levels (van der Arend, 2014) and those that embrace adaptive management principles in visitor management (Marion, 2016, Newsome *et al.*, 2013) may be more successful in absorbing research. Leadership support at a high level also plays a role (Hemsley-Brown, 2004), as do organisational politics (Ottoson, 2009). These factors link to both the organisational interest and demand-pull theories of knowledge utilisation.

The importance of dissemination activities

Dissemination methods such as meetings, workshops and forums are valuable communicative tools that bring about a shared understanding of the objectives, progress and outcomes of the research among the two communities (Landry *et al.*, 2001; van der Arend, 2014). Dissemination activities improve awareness and transparency and encourage collaboration which enhances the usability of the

research. Researchers can synthesise large volumes of research outputs in presentations or reports, saving managers time (van der Arend, 2014). Such methods link to the dissemination theory, which proposes that additional efforts are required to transmit research outputs to practitioners. When viewed as a transactional cost, it implies that the higher the costs incurred by researchers, or the greater the dissemination efforts, the lower the costs experienced by practitioners and the greater the level of knowledge use (Landry *et al.*, 2001).

Engagement between researchers and practitioners

The significance of public use data is fully revealed when park and tourism managers become dependent on it for their work (Eagles, 2002). Knowledge utilisation scholars increasingly agree that committed relationships and exchanges between researchers and practitioners, along with joint research efforts, lead to more functional knowledge (Heinsch, Gray & Sharland, 2016). Effective alignment between research needs and efforts that consider both the needs of the end-user and the organisation, produce mutually beneficial research outputs that narrow the research-practice gap (Amara *et al.*, 2004; Belkhdja *et al.*, 2007; Ouimet, Landry, Ziam & Bédard, 2009; van der Arend, 2014). In ecosystem management, scholars have advocated for shared understandings and co-production of new knowledge between the entities involved (Roux *et al.*, 2006). Similarly, McCool (2012) put forward a model of micro-systems processing, represented as a series of interactions between researchers and managers, as the driving force behind knowledge transfer and understanding between the two communities (McCool, 2012). Apart from the importance of catering to the practitioner and organisational needs, a clear articulation of the organisation's research needs, along with collaboration and trust between researchers and practitioners, also play a role (Roux *et al.*, 2006). The engagement between researchers and practitioners described above relate to both the interaction and organisational interest interpretations of knowledge utilisation.

Importance of linkage mechanisms between researchers and practitioners

Researchers have established that linkage mechanisms, such as informal personal contacts, participation in committees, workshops and meetings, are valuable interactive predictors of knowledge utilisation (Cherney *et al.*, 2013; Cherney *et al.*, 2012a,b; Cherney & McGee, 2011; Landry *et al.*, 2001; Landry *et al.*, 2003; van der

Arend, 2014). The more resources academia allocate towards these types of linkage mechanisms, the higher the levels of research use. Similar to the dissemination efforts, the greater the sacrifice made by academia in terms of time and resources, the more utilisation improves (Landry *et al.*, 2001). Linkage mechanisms reside within the interaction explanations of knowledge utilisation.

Skills, capacity and awareness of practitioners

Practitioners' awareness and recognition of the value of research is positively associated with research use in public sector organisations (Ouimet *et al.*, 2009). Some have conceded that tourism practitioners pay little attention to academic publications and tend to rely more on intuition and experience to make decisions (Xiao & Smith, 2007). Studies have also found a link between the research capacity of an organisation and its research utilisation (Belkhodja *et al.*, 2007). In PAs, the unsystematic manner in which data is collected has suppressed information flow (Moore & Hockings, 2013), and contributed to managers basing their decisions on unreliable or no information (Griffin *et al.*, 2008). A lack of formal frameworks to assist with the management, dissemination and utilisation of knowledge across various departments within PA agencies, has led to inadequate skills and resources required to interpret and apply research effectively in policy and practice (Booth, 2006; Buckley *et al.* 2008; Darcy *et al.*, 2007; Lovelock, Farminer & Reis, 2011a,b). Combined, these components align strongly with the concept of absorptive capacity, which is an organisation's ability to identify, take in and fully understand, and optimally use knowledge (Tanriverdi & Venkatraman, 2005). The importance of absorptive capacity in improving research use has been studied in a tourism context (Olszewski & Bednarska, 2016) and in public-sector organisations with environmental mandates (McCullough, Roux & Fabricious 2016; Murray, Roux, Nel, Driver & Freimund, 2011). Absorptive capacity aligns to the organisational interest explanations and demand-pull interpretations.

Timing of the research

Research outputs are better accepted and assimilated by practitioners for use in policies and practices when they become available at just the right point in time, making it more relevant (Cherney & McGee, 2011; Olszewski, 2015). Data needs to reach PA practitioners in a time that is complimentary to their responsibilities (Eagles,

2002). Research results are timed right in two ways. Firstly, coincidental where the research just happened to be produced at a time where managers needed it. Secondly, purposeful where management research needs are made known to researchers through close collaboration and long-term planning, who then actively pursues useful and timely intelligence (Manning, 2011). Research timing aligns with various interpretations, including engineering, demand-pull and interaction explanations.

No studies could be found that describe the (i) advancement of the body of visitor knowledge in PAs through the different stages of utilisation, or (ii) its determinant factors. The next section describes our approach to investigate these areas.

3. METHODS

3.1. Sampling and data collection procedures

Researchers involved in the collection, analysis, and/or reporting of visitor research for protected areas were surveyed. A database of researchers who published peer-reviewed articles during the years 2014 through 2018 served as a basis of the sampling framework. The researchers expanded the list by identifying additional qualifying individuals which included those who had published visitor research after 2018. Additionally, snowball sampling was employed by requesting participants to circulate the survey link among fellow qualifying researchers. Usability of the questionnaire was tested through a pilot study, and adjustments made before distributing the online survey link (hosted on SurveyMonkey®), via email to the target audience. Data were collected during the period of October 2019 to January 2020.

3.2. Survey instrument

The questionnaire, in English, consisted of 15 structured questions. These included five screening questions that captured categorical data related to an individual's involvement in visitor research in the preceding five years, type of role assumed (embedded or external researcher), research tasks performed and the categories of PAs they had worked with. Four other categorical questions captured supplementary experiential and geographical background on the respondents, namely, years of

experience in engaging with PA practitioners and professionals, size categories of PAs they've worked with, country of residence and year of birth to determine the age of a respondent. The remaining questions captured ordinal data using matrix-style scales which acted as measurements of the theoretical constructs.

The level of and movement of the body of visitor research through different stages of utilisation, representing the dependent variable, was measured using the widely applied knowledge utilisation (KU) scale developed by Landry *et al.* (2001). The index comprises six stages of utilisation assessed on a five-point scale measuring frequency, ranging from 1 (never) to 5 (always) (Appendix A). Since most researchers assume different roles in various projects throughout their careers, the wording of the statements were adjusted from "my research results" to "the results of the work" to include data from all projects they were involved in and not just those they led. The authors summed up an individual's responses to each stage, to calculate a total ranging from a minimum of 6 to a maximum of 30 (after Belkhodja *et al.*, 2007).

A number of indices were developed or adapted from previous research, to measure the seven constructs representing the independent variables. A description of the items included in each scale, and the measurement thereof is provided in Appendix A. To measure the perceived importance of adaptation of research outputs (ADAPT), a modification of the scale used by Cherney *et al.* (2012b) was used. CONTEXT, or the organisational context of the PA, represents the perceptions (of the researcher) about numerous conditions or organisational circumstances in the particular PAs the respondent worked in. The perceived importance of dissemination efforts (DISSE) was measured using the scale by Cherney *et al.* (2012b). The level of engagement between PA practitioners and researchers was measured using two items from the user's context scale by Landry *et al.* (2001) combined with three items arising from literature. Combined, the five items represent the level of engagement between the two communities. Measurement of the perceived level of importance of linkage mechanisms between researchers and practitioners (LINKA) involved an adaptation of the scales conceptualised by Cherney *et al.* (2012b) and Landry *et al.* (2001). SCA, or skills, capacity and awareness of practitioners, measures how often a researcher found PA practitioners to possess the necessary skills and resources required to interpret and apply the research effectively, along with practitioners' awareness of the

importance of research in decision-making (Belkhodja *et al.*, 2007; Ouimet *et al.*, 2009). TIMING consisted of a single item measuring a researcher's perception of whether their research outputs reached practitioners at just the right time.

3.3. Data analysis

This study uses structural equation modelling (SEM) to explore the hypothesised linkages between knowledge utilisation and the seven potential drivers. This multivariate statistical analysis technique has become a popular and important tool in social sciences (Hair, Ringle, & Sarstedt, 2012), including the field of tourism (Nunkoo, Ramkissoon, Gursoy, 2013) with widespread applications in knowledge management.

A covariance SEM was performed in two steps using the statistical package SPSS and AMOSv25, a structural equation modelling program. The first step in modelling involved measurement model analysis. Scale reliability and validity were assessed, followed by construct validity and examination of the model parameters of the measurement model.

The authors examined six scales for *construct validity* to determine whether it measured what it claimed to be measuring (Nusair & Hua, 2010). Exploratory Factor Analyses (EFA) were performed to assess whether the range of items put forward to make up a particular dimension of a construct is highly correlated to one another (Bolarinwa, 2015). Suitability of the data for factor analysis was determined using the criteria of Bartlett's test of sphericity ($p < 0.05$) and the Kaiser-Meyer-Olkin (KMO) measure (> 0.60) (Tabachnick & Fidell, 2007). The criteria for a satisfactory standardised factor loading for individual items in each scale is usually between 0.5 and 0.9; however, values between 0.3 and 0.5 were still considered acceptable (Chin, 1998, in Nusair & Hua, 2010). *Internal consistency reliability* (Kline, 2015) was tested by calculating Cronbach's alpha values or Guttman Split-Half Coefficient in the case of two-item scales. The cut-off is a Cronbach's alpha value of 0.6 and above (Hair, Black, Babin & Anderson, 2010) or in the case of two-item scales, a Guttman Split-Half Coefficient of 0.6 or larger (Benton, 2015).

Confirmatory factor analyses (CFA) were performed to assess the *convergent validity* of two existing scales (KU & DISSE) (Suhr, 2006). The extent to which the model fits the data was determined by examining five goodness-of-fit indices representing different measurements. The first was the relative / normed chi-square (χ^2/df), with a value smaller than 3 indicating distinct constructs (Hooper, Coughlan & Mullen, 2008). The Comparative Fit Index (CFI) assumes that all latent variables are unrelated (independent model) and compares the sample covariance matrix with this independent model (Hooper *et al.*, 2008). A CFI value of 0.90 or more is considered an acceptable model fit (Hu & Bentler, 1999). The Incremental Fit Index, or IFI, similar to CFI, should be greater than 0.90 for a good fit (Bentler & Bonett, 1980). Root Mean Square Error of Approximation (RMSEA) is linked to residual in the model; with a value of 0.08 or less indicating acceptable model fit (Browne & Cudeck, 1993). Similarly, the Standardised Root Mean Residual Square (SRMR), a measure of the mean absolute covariance residual, should be 0.08 or less for an acceptable fit (Hu & Bentler, 1999).

Next, the authors assessed the *construct validity of the measurement model* by examining *convergent* and *discriminant validity*. A CFA was performed to validate the factor structure of the measurement model (Pallant, 2016). The overall model fit was evaluated using the same goodness-of-fit indices and criteria discussed earlier. The variance-covariance matrix estimated in the first attempt (Model 1) did not properly replicate the sample variance-covariance matrix. The measurement model was modified and assessed again (Model 2).

Additional model parameters were also assessed. Standardised factor loading values are expected to exceed 0.3 in measurement models and be statistically significant, with higher values suggesting better indications of the observed variables for the latent variable (Kline, 2015; Lei & Wu, 2007). Standardised residual variances (error variances) reveal the amount of variance in the item attributed to error. The criteria for an acceptable error variance is a z-value between -2.58 and 2.58 in the case of large samples (Field, 2009). Last, the R-square, or R^2 values were inspected for a minimum acceptable level of 0.25. These indicate the amount of true variance in the item as a result of the latent variable (Kline, 2015).

Tests of *discriminant validity* seek to find evidence that one concept is different from other closely related concepts. Discriminant validity of the latent constructs in the measurement model is commonly assessed in SEM analysis by examining the square root of the average variance extracted (AVE). Recently, authors have motivated for an alternative and superior technique for measuring discriminant validity. We used the heterotrait-monotrait ratio of correlations (HTMT) (Voorhees, Brady, Calantone & Ramirez, 2016) to test for discriminant validity. Strictly speaking, the HTMT should be lower than 0.85, or lower than 0.90 as a more lenient criterion.

In step two of the SEM process, the structural model was assessed for *convergent validity* and the model parameters investigated, followed by an examination of the structural pathways between the dependent and the independent variables (Nusair & Hua, 2010). Following measurement model modification, CFA was performed again, and the overall model fit was evaluated against the goodness-of-fit indices, succeeded by an investigation of the model parameters described earlier (standardised factor loadings, standardised residual variances and R^2). The final step was to examine whether correlations between variables are consistent with the hypothesised links, using path analysis. The statistical significance, size, and direction (positive / negative) of the gamma (γ) values were inspected to describe the relationships between dependent and independent variables. A gamma value between 0.1 and 0.3 represent a small effect size; between 0.3 and 0.5 a medium effect; and ≥ 0.5 , a large effect (Field, 2009).

4. RESULTS

4.1. Characteristics of the sample

The survey results produced 252 useable responses. Nearly all (82%) of the researchers surveyed were external to protected areas, some were employed by PAs (17%), but only 3% were affiliated with both. They were mainly very experienced, with a median age of 45.6 years and 69% having six or more years' direct experience. Collectively they represent researchers engaging with a diversity of visitor research and different types and sizes of PAs, from those with less than 50 000 visitors to areas with millions of visitors per year.

Two-thirds of respondents said they had worked with three or more types of visitor research. Almost 80% of respondents had crafted recommendations for practitioners, but the number of researchers who engaged directly with practitioners dropped to 59%. Only 17% of respondents had been tasked with all seven responsibilities; however, most (82%) had performed a minimum of four responsibilities. A little more than a quarter (26%) of respondents said they were involved in the implementation of research recommendations (Table 1).

Table 1: Types of researchers and their levels of experience in visitor research and protected areas

Item		Number (Percentage)	Item		Number (Percentage)
Involvement in research on different continents (multiple answers possible)	Africa	49 (19%)	Type of researcher	External researcher or consultant	195 (82%)
	Asia	34 (13%)		PA staff member	40 (17%)
	Australasia	27 (11%)		Other	11 (5%)
	Europe	124 (49%)	Sizes of PAs worked with (multiple answers possible)	Less than 50 000 visitors per year	121 (55%)
	North America	72 (29%)		50 000 to 199 999 visitors per year	117 (53%)
	South America	18(7%)		200 000 to 999 999 visitors per year	93 (42%)
	Antarctica	1 (0.4%)		1 million+ visitors per year	106 (48%)
Types of research involved in (multiple answers possible)	Socio-demographic attributes	195 (77%)	Number of years engaging with PA practitioners	No direct engagement	6 (3%)
	Psychological attributes	84 (33%)		Less than a year	6 (3%)
	Travel arrangements	90 (35%)		1 – 5 years	58 (25%)
	Visitor use patterns	194 (75%)		6 – 10 years	56 (24%)
	Visitor experience outcomes	154 (60%)		More than 10 years	103 (45%)
	Visitor impacts	150 (59%)			
Research tasks involved in (multiple answers possible)	Design	188 (79%)	Involvement in different categories of PAs (multiple answers possible)	(I) Nature reserve	124 (53%)
	Data collection	194 (81%)		(II) Wilderness area	69 (30%)
	Analysis	217 (91%)		(III) National park	182 (78%)
	Reporting	205 (86%)		(IV) National monument / feature	59 (25%)
	Recommendations	186 (78%)		(V) Habitat/species management area	67 (29%)
	Engaging with practitioners	142 (59%)		(VI) Protected landscape or seascape	105 (45%)
	Implementation	61 (26%)		(VII) PA with sustainable resource use	104 (45%)

*Iceland included in Europe and Central American countries included in North America.

4.2. The movement of visitor research through the stages of utilisation

The movement of visitor research through the six stages is best understood by looking at the percentage of respondents said to have ‘passed’ each stage of utilisation successfully (Table 2). Only respondents who scored a minimum of 3 (“sometimes”) were labelled as having passed a particular stage (after Cherney & McGee, 2011). The percentage of those who passed decreases from 91% of respondents who successfully transmitted research results, to 67% who said the results had been applied by end-users. It should be noted that one does not need to have passed all levels to reach the final stage – application (Cherney *et al.*, 2012b), as utilisation is not a linear movement. We observe this in our results as well as 67% of respondents passed stage 6, although only 55% passed all six stages.

Large percentages of respondents realised the stages of *reference*, *effort*, *influence* and *application* only some of the times (40%, 42%, 46% and 42% respectively). Only 32% of respondents reported PA managers usually make an effort to adopt the results or recommendations of their work. Less than a third (27%) of researchers said the results usually led to decisions being influenced, and only 25% reported the results were usually applied by practitioners and professionals.

Table 2: Distribution of visitor research in protected areas by stage of utilisation

Stages of utilisation	1 Never n (%)	2 Rarely n (%)	3 Sometimes n (%)	4 Usually n (%)	5 Always n (%)	Passed the stage n (%)	Mean & (SD)
Transmission	5 (2%)	18 (7%)	55 (21%)	81 (32%)	91 (38%)	91%	3.96 (1.03)
Cognition	4 (2%)	31 (12%)	91 (36%)	98 (38%)	21 (12%)	87%	3.48 (0.91)
Reference	10 (4%)	45 (18%)	102 (40%)	74 (29%)	25 (10%)	79%	3.23 (0.98)
Effort	14 (5%)	52 (20%)	108 (42%)	70 (27%)	12 (5%)	74%	3.05 (0.95)
Influence	17 (7%)	54 (21%)	117 (46%)	58 (23%)	10 (4%)	72%	2.96 (0.93)
Application	24 (9%)	59 (23%)	108 (42%)	55 (21%)	10 (4%)	67%	2.88 (0.98)
Respondents who passed all six stages						55%	

It is further observed that the means realised for each stage of utilisation were generally higher than those achieved in other academic fields (Ion *et al.*, 2019; Landry *et al.*, 2001).

The level of knowledge utilisation can also be evaluated from respondents' position in terms of experience in working with PA practitioners. While more than three-quarters of respondents had been involved in crafting recommendations for practitioners, much less of them reportedly engaged directly with practitioners (59%) (Table 1).

4.3. Testing the measurement model

Results of the reliability and validity tests of the scales are provided in Table 3. A more detailed description of the refinement of the scales is provided in Appendix B. Four items (A2, A3, C4, C5) and one construct (LINKA) were removed due to reliability or structural issues in the model.

Table 3: Results of the exploratory factor analysis and reliability tests of the constructs

Factors and items	Factor loading	Notes
Knowledge utilisation (KU) (<i>KMO=0.848; Bartlett's test of sphericity $p<0.001$. Eigenvalue= 3.838; % of Variance=57.22%. Internal consistency reliability achieved with scale $\alpha=0.884$.</i>)		
Transmission	0.637	
Cognition	0.727	
Reference	0.659	
Effort	0.827	
Influence	0.863	
Application	0.797	
Adaptation of research outputs (ADAPT after removal of A2 & A3) (<i>KMO=0.779; Bartlett's test of sphericity $p<0.001$. Eigenvalue=2.488; % of Variance=37.96%. Internal consistency reliability after removal of A2&A3 with scale $\alpha=0.744$.</i>)		
(A1) Readability and comprehensiveness of reports	0.469	Retained.
(A2) Specific, operational nature of conclusions or recommendations		Removed due to low factor loading ($\lambda=0.417$).
(A3) Provision of data that can be analysed by end-users		Removed due to low factor loading ($\lambda=0.368$).
(A4) Sensitivity to end-users' expectations	0.574	
(A5) Presentation / packaging of reports	0.584	
(A6) On-time delivery of results to end-users	0.651	
(A7) Attention to deliverables	0.765	
Dissemination (DISSE) (<i>KMO=0.720; Bartlett's test of sphericity $p<0.001$. Eigenvalue=2.284; % of Variance=44.42%. Internal consistency reliability achieved with scale $\alpha=.746$.</i>)		
(D1) Meetings to plan the scope of projects with end-users	0.535	
(D2) Meetings to report on a study's progress	0.676	
(D3) Meetings to discuss findings with end-users	0.848	
(D4) Organising dissemination activities for end-users	0.560	
Skills, capacity and awareness of practitioners (SCA) (<i>KMO=0.50; Bartlett's test of sphericity $p<0.001$. Eigenvalue=1.437; % of Variance=43.594%. Reliability measured with Guttman Split-Half Coefficient=0.608.</i>)		
(S1) Practitioners have the necessary skills and resources required to interpret and apply my research / data effectively	0.660	
(S2) Practitioners are aware of the importance of collecting data about visitors to inform management decisions	0.660	
...Continues on the next page		

Factors and items	Factor loading	Notes
Context of the PA (CONTEXT after removal of C4 & C5) ($KMO=0.712$; Bartlett's test of sphericity $p<0.001$). Eigenvalue=1.927; % of Variance=31.472%. Internal consistency reliability achieved after removal of C4 & C5 with $\alpha=0.638$.		
(C1) My work is supported by a champion higher up in the PA agency or government department	0.500	
(C2) The PA agencies I work with exhibit a policy environment that encourages innovation, change & improvement in visitor services	0.569	
(C3) Funding is available to PAs for implementing the recommendations of my work	0.483	
(C4) Internal politics within PA agencies prevent the uptake of my visitor research or data		C4&C5 formed their own factor but with very low Cronbach α (0.3). C4 was reverse scored, but Cronbach α still too low. On closer inspection C5 was not related to internal organisational conditions. Both items excluded.
(C5) My work is relevant to local or regional policy decision makers		
(C6) I receive institutional support of my work at all levels	0.672	
Engagement (ENGAGE) ($KMO=0.773$; Bartlett's test of sphericity $p<0.001$). Eigenvalue=2.442; % of Variance=36.07%. Internal consistency reliability achieved with scale $\alpha=0.734$.		
(E1) My work coincides with the needs and expectations of practitioners and professionals	0.590	
(E2) Practitioners attribute credibility to my work	0.600	
(E3) My work is aligned with the objectives of the organisation	0.629	
(E4) Practitioners articulate their research needs to me	0.613	
(E5) Practitioners put my recommendations into action	0.571	
Linkage mechanisms (LINKA) ($KMO=0.648$; Bartlett's test of sphericity $p<0.001$). Eigenvalue=1.802; % of Variance=27.924%. Internal consistency reliability not achieved ($\alpha=0.591$).		
(L1) Informal contacts with staff & professionals	0.342	Low factor loadings and internal consistency reliability < 0.6. Excluded from model.
(L2) Participation in committees, seminars & workshops	0.490	
(L3) Sending reports to practitioners & professionals	0.588	
(L4) Publication of articles in popular media	0.644	

After refinement, the constructs ADAPT, DISSE, CONTEXT, ENGAGE, SCA and TIMING were deemed valid and reliable and included in the measurement model. All were hypothesised to have a positive influence on the level of KU. As an initial indication of whether relationships existed between KU and each of the hypothesised influential factors, Pearson's correlation coefficients and descriptive statistics of the latent variables are provided in Table 4.

Table 4: Pearson correlation coefficients between the final constructs

Construct	ADAPT	CONTEXT	DISSE	ENGAGE	SKA	TIMING	KU
ADAPT							
CONTEXT	0.178***						
DISSE	0.522***	0.200***					
ENGAGE	0.386***	0.497***	0.295***				
SKA	0.66	0.507***	0.110	0.273***			
TIMING	0.360***	0.352***	0.339***	0.582***	0.264***		
KU	0.300***	0.462***	0.211***	0.624***	0.362***	0.462***	
Mean	4.18	3.13	4.14	3.74	3.46	3.37	3.26
Std dev	0.60	0.65	0.71	0.62	0.72	0.98	0.77

*** $p < 0.01$.

The correlation coefficient between KU and ENGAGE showed a moderate to a strong positive relationship, with moderately positive relationships detected between KU and CONTEXT and KU and TIMING. Weak positive relationships are witnessed between KU and ADAPT, KU and DISSE and KU and SCA.

In our study, we tested two variations of the measurement model (Model 1 and 2). In Model 1, we included all six independent variables (ADAPT, CONTEXT, DISSE, ENGAGE, TIMING & SCA). After performing the CFA, the model fit statistics (Table 5) indicated the variance-covariance matrix estimated by Model 1 did not properly replicate the sample variance-covariance matrix. The model was altered by removing the constructs TIMING and CONTEXT. This improved the model parsimony (Table 5) by achieving an adequate model fit and subsequently construct validity.

Table 5: CFA fit statistics for the two measurement models

Model fit statistics	Criteria	Model 1	Model 2
Independent variables included		ADAPT CONTEXT DISSE ENGAGE TIMING SCA	ADAPT DISSE ENGAGE SCA
χ^2/df	≤ 3.00	1.981	1.962
CFI	> 0.90	0.873	0.906
IFI	> 0.90	0.875	0.907
RMSEA	≤ 0.08	0.063	0.062
SRMR	≤ 0.08	0.094	0.058
Result		Close but not adequate fit.	Adequate fit.

χ^2/df = relative / normed chi-square; CFI = Comparative Fit Index; IFI = Incremental Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Residual Square.

The parameter estimates in terms of the standardised factor loadings, standardised residual variances and squared multiple correlations (R^2) for individual items in each construct is provided in Appendix C. These results, combined with the Cronbach's alphas (Table 3), indicate all of the constructs had good internal consistency. All the standardised factor loadings in Model 2 were statistically significant ($p < 0.05$) and ranged between 0.494 and 0.802, thus exceeding the minimum threshold of 0.3. The standardised residual variances were all statistically significant ($p < 0.05$). All of the R^2 values were above the minimum criteria of 0.25 (Kline, 2015), except for A1, which came close ($R^2 = 0.244$). The model was considered adequate as no parameter estimates were out of range.

To test the discriminant validity of the structural model, the HTMT ratios were calculated (Voorhees, Brady, Calantone, Ramirez, 2016). In our study, the HTMT of the constructs in Model 2 were all below the recommended maximum threshold of 0.85 (and of 0.90) (Table 6). Moreover, the one-sided 95% percentile confidence interval of HTMT does not cover 1; that is, it is significantly different from 1. Discriminant validity was therefore reached.

Table 6: HTMT analysis of the measurement model

	ADAPT	DISSE	ENGAGE	SCA	KU
ADAPT					
DISSE	0.708				
ENGAGE	0.520	0.395			
SCA	0.103	0.170	0.400		
KU	0.373	0.267	0.765	0.494	

4.4. Structural pathways

The final structural model was examined to test whether significant relationships existed between the dependent variable, KU and each of the independent variables (ADAPT, DISSE, ENGAGE & SCA). All independent variables were postulated to influence the level of KU positively. Notwithstanding the satisfactory model fit statistics of the alternative model, the structural paths do not present an ideal situation. Only two of the four constructs in the final model were found to be significantly and positively related to the level of KU: Engagement (ENGAGE) between researchers and practitioners and the skills, capacity and awareness of practitioners to interpret and apply research effectively (SCA).

Table 7: Path coefficients of the structural model

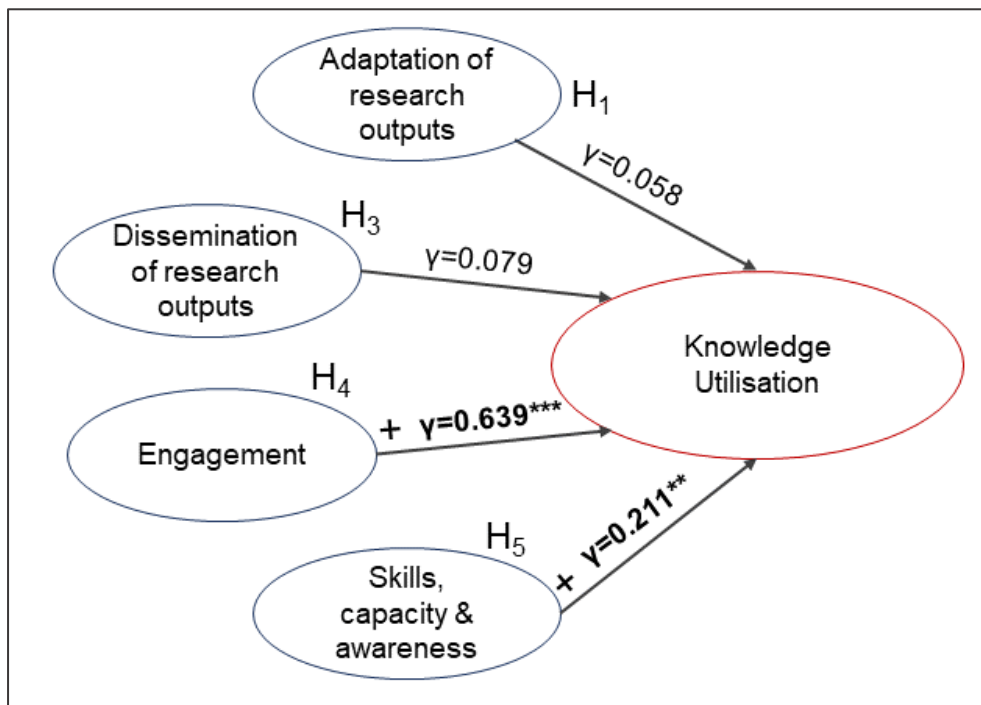
Relationship	Path coefficient	SE	t-statistics	p-value
H ₁ : ADAPT → KU	0.058	0.179	0.323	0.746
H ₃ : DISSE → KU	0.079	0.110	-0.718	0.473
H ₄ : ENGAGE → KU	0.639	0.118	5.425	<0.001***
H ₅ : SCA → KU	0.211	0.089	2.373	0.018**

**p<0.05.

***p<0.001.

The path coefficients (gamma or γ -values) of ENGAGE and SCA are shown in Table 7 and Figure 1.

Figure 1: The revised structural model with path coefficients



*** $p < 0.01$.

** $p < 0.05$.

Based on the size of the coefficients and the guidelines by Field (2009), we observe that engagement had a large effect size on KU ($\gamma \geq 0.5$) while the skills, capacity and awareness of practitioners exhibited a small effect size on KU ($\gamma < 0.3$). There were no effects of perceived importance of adaptation of research outputs and dissemination activities on the level of knowledge utilisation.

5. DISCUSSION

5.1. Use of visitor research by PAs

Similar to what was noted by Buckley, Witting and Guest (2001), levels of utilisation vary considerably across different PAs or PA systems, some being very successful at integrating research findings into practice, while others struggle. These 'hit and miss' results seen in the utilisation stages of reference indicate a large proportion of research is not absorbed into management decisions.

When compared with other sectors tested (Ion *et al.*, 2019; Landry *et al.*, 2001), the overall levels of utilisation appear to be higher though. Tourism is known as an applied

field of study (Mair *et al.*, 2014), making it possible that tourism researchers are more aware of the needs of professionals and practitioners and motivated to focus their research on real-life problems. Another possible explanation is provided by Hjalager (2002). The author argues that public tourism authorities, such as PAs, are better positioned to source and use research compared to smaller tourism businesses, due to a constant stream of income, economies of scale, and staff that are better educated.

A sizable proportion of researchers reportedly do not engage directly with practitioners, even though most said they had made recommendations for practitioners. The use of visitor research in PAs demands a process which facilitates the transfer of understanding and knowledge, moving beyond the transfer of just data and information (McCool, 2012). This requires meaningful, targeted cooperative interactions between researchers and practitioners and not just dissemination of results by means of sending reports and hosting meetings (Roux *et al.*, 2006).

In terms of predicting the level of knowledge utilisation, our results show the organisational interest and interactions interpretations, represented by two constructs in this study, explain the use of visitor research in PAs best. We discuss the implications of these findings next.

5.2. Engagement between researchers and practitioners

Effective engagement and co-production of research are required to generate more policy-relevant research (van der Arend, 2014). Effective engagement is necessary (van der Arend, 2014) if applied research is to provide useful knowledge for managers of outdoor recreation (Manning, 2011). This study highlights the importance of taking a relationship-focussed approach involving meaningful, targeted, human interactions between researchers and practitioners (Roux *et al.*, 2006). Relationships should advance towards a position where researchers understand and address the needs of end-users and end-user organisational objectives (Amara, Ouimet & Landry, 2004; Cherney & McGee, 2011). In this scenario, end-users also acknowledge the value of academic research in shaping and inspiring institutional frameworks and long-term research goals (Newman & Head, 2015). Our engagement construct included elements of the articulation of research needs by end-users; researchers' work being

aligned to the expectations and needs of end-users and aligned to the PA organisational objectives; practitioners assigning a certain level of credibility to researchers' work; and practitioners responding to the research results by implementing the recommendations.

Productive engagement and collaboration result in the formulation of more appropriate research questions; increase the feasibility of research methods applied, and lead to a greater likelihood of practitioners implementing the recommendations. More importantly, constant interaction helps build the capacity of both parties to collaborate more effectively (van der Arend, 2014). This reduces instances of demand-pull relationships where end-users mostly solicit research for easily identifiable operational issues, ignoring deeper information needs; and push models where end-users may feel alienated from the research forced onto them by researchers (Roux *et al.*, 2006). It is therefore not surprising that collaboration with users is touted as a requirement for funding of research (Arnott, Neuenfeldt & Lemos, 2020). Increased social interactions lead to better utilisation, which in turn could potentially stimulate more engagement between the parties and lead to further demand for research (Ouimet *et al.*, 2009).

A major stumbling block in researcher-practitioner relationships in PAs has been the reward systems found in academia and government organisations, prioritising publications over solution-oriented discussions with practitioners (McCool, 2012), pointing towards the two communities' challenge. Given that academic researchers produce the majority of visitor research, regular and close interactions are the driving forces behind the transfer of knowledge between the two communities (McCool, 2012). Newman and Head (2015), however, believe inroads have already been made in this area with academic researchers adapting and embracing the demands for management research and that a major overhaul of academic systems is unnecessary. They concede though that existing linkages could be strengthened, research outputs could be better tailored to practitioners' needs, and practitioners need to acknowledge the value of academic research in shaping and inspiring institutional frameworks and long-term research goals.

One of the informal mechanisms suggested for strengthening existing linkages is the employment of communities of practice (CoP) (McCool, 2012; Roux *et al.*, 2006).

CoPs introduce a knowledge interface level (Roux *et al.*, 2006) where academic and non-academic stakeholders come together to listen to each other, share knowledge and experiences in a 'safe' environment, co-learn, adapt and ultimately apply the new knowledge (Reed, Stringer, Fazey, Evely & Kruijsen, 2014). Such interactions also allow for the transfer of tacit knowledge (Roux *et al.*, 2006), which is the undocumented, implicit knowledge based on experiences (Xiao & Smith, 2007).

Complex and indistinct research outputs have to be filtered, systematised and adjusted prior to absorption in tourism operations (Hjalager, 2002). Researchers, after having already transmitted the results to end-users, usually acquit themselves from any further responsibilities (McCool, 2012) and so these responsibilities of systematising research outputs are typically passed onto the already overburdened managers. To the defence of researchers, the many different levels, profiles and contexts encountered in the end-user community they interact with, imply there is no standard audience of beneficiaries of research outputs. This makes systematising and adjusting of research outputs challenging, particularly for those inexperienced in dealing with the organisational structures (and politics) of PAs. Embedded researchers, as another mechanism for engagement, help bridge this gap by assuming the role of knowledge brokers between researchers and managers, promoting and facilitating management-relevant research and providing insights into PAs unique challenges, advancing social capital among stakeholders (Roux *et al.*, 2019). However, if internal research capacities are on the decline as indicated by Roux *et al.* (2019), it leaves an important gap in the step towards utilisation. This shortage in capacity point towards a lack of absorptive capacity in PAs.

5.3. The absorptive capacity of practitioners

Organisations with highly skilled practitioners, well-entrenched relationships with academia and a culture that values research are more likely to make evidence-based policy decisions (Newman & Head, 2015). For organisations to take full advantage of external research, they need internal absorptive capacity (Cohen & Levinthal, 1990). Two subcategories of absorptive capacity were first conceived by Zahra and George (2002) but have since been adapted in subsequent work by, among other, Camisón and Forés (2010). Potential absorptive capacity represents the measures taken by an

organisation to value, acquire and assimilate new external knowledge. Realised absorptive capacity is the collective efforts taken towards restructuring and integrating existing and new knowledge into organisational systems and processes. Our results indicate that awareness among PA practitioners of the importance of acquiring new research for management decision-making plays an important role in research uptake in policies and practices. Tourism organisations, in general, are not well-equipped to acquire knowledge from academia, lacking awareness and understanding of the different ways academia could assist (Olszewski & Bednarska, 2016). It is questionable whether PA agencies possess the right skills to manage the dual demands of PAs biodiversity and tourism experience mandates (McCool & Khumalo, 2015).

Our results highlight the need to equip PA practitioners with the necessary resources and skills required to interpret and apply the available visitor research in management decisions. The higher the combined effect of these conditions, or the higher a PA's potential absorptive capacity, the higher the level of research use. Potential absorptive capacity consists of acquisition and assimilation capacities (Camisón & Forés, 2010). Acquisition capacity is a PA's ability to find, identify, value and source external knowledge considered essential for its operations. Assimilation capacity is a PA's ability to absorb external knowledge and can consist of several procedures and practices that enable new knowledge to be evaluated, processed, interpreted and understood. The finding that higher levels of skills and capacity in understanding research implications and identifying areas of application lead to higher utilisation introduce a potential paradox. How do we expect practitioners to make sense of and apply the research outputs they receive from academics when often, these research partnerships were formed because PA managers did not possess these capabilities in the first place?

The answer might lie in the social dimensions of absorptive capacity. Absorptive capacity is made up of more than just the sum of the capabilities of individual subjects (Turner, 2013). Social interactions between the producers and end-users of knowledge could build the absorptive capacity of PAs in numerous ways: (i) raising awareness of new research that becomes available; (ii) helping managers gain access to relevant research and sift through mountains of research effectively; (iii) assisting

managers in formulating research agendas aimed at specific management objectives; (iv) supporting a more progressive research transmission process where outputs are also interpreted and even applied within the confines of the social interactions and (v) sensitising academic researchers about the needs of practitioners, who in turn educate the next generation of practitioners (van der Arend, 2014). These social interactions link to the engagement construct discussed earlier. More effective engagement between researchers and practitioners not only directly increases utilisation, but could improve absorptive capacity (McCullough, Roux & Fabricius, 2016), indirectly raising the level of utilisation of research.

5.4. Relationships not proven

The final model was unable to prove relationships between (the importance of) adaptation, dissemination efforts; and the level of knowledge utilisation. This finding is not entirely unexpected as other scholars yielded similar results after testing comparable constructs (Belkhodja *et al.*, 2007; Cherney *et al.*, 2012b). It can be argued that the perceived importance of dissemination and adaptation of research outputs are not differentiators of knowledge use, as most researchers regarded adaptation and dissemination as important. Moreover, we were unable to test three constructs: the importance of linkage mechanisms, timing and the organisational context of the PA. These factors could still play a pivotal role in the uptake of research as previous research suggests. Further investigation is needed to establish this fact.

6. CONCLUSION AND RECOMMENDATIONS

This article, the first to measure the level of research utilisation in the context of tourism and recreation, empirically confirms other authors' hypothesis of suboptimal levels of use of visitor research in practice (Buckley *et al.*, 2008; Darcy *et al.*, 2007; Griffin *et al.*, 2008; Hudson, 2013; McCool, 2012; Moore & Hockings, 2013; Pyo, 2012; Thomas, 2012; Xiao & Smith, 2007).

It quantifies the research-practice gap of the body of visitor research collected in protected areas through the different stages of utilisation. The results show that even though research in tourism and recreation appears to have advanced further than other academic disciplines, too little of it is absorbed into management decisions. More

importantly, the study demonstrates both engagements between researchers and practitioners and the absorptive capacity of PAs could be maximised to improve the current uptake of research in policies and practices.

Protected areas are characterised as environments of constant change, complexity and uncertain conditions. Managers are expected to achieve biodiversity objectives against a backdrop of great expectations from society (McCool & Khumalo, 2015). Most public organisations, however, struggle to address more complex, non-routine problems (Head & Alford, 2015) such as visitor management (Manning *et al.*, 2017; McCool & Stankey, 2003). How do we improve the capacity and ability of PA managers to make the most out of the visitor research transmitted to them? Examples of formal continuing education and professional development programmes organised by academic institutions for tourism and hospitality staff, seem promising although such programmes are not readily available everywhere. Different programmes cover different topics, including tourism management, operations, ecosystem services, administration and leadership, climate change, community engagement, customer service, marketing, finance, retailing, research methodology and sustainability analysis (Hudson, 2013; McCool, Hsu, Rocha, Sæþórsdóttir, Gardner, Freimund, 2012). It has been suggested that capacity can be built by encouraging staff to critically evaluate their own and their agency's tourism philosophies, ethics and management approach (McCool & Khumalo, 2015). This can be done by engaging with the research community, creating awareness among practitioners of alternative viewpoints and approaches through exposure to empirical research (McCool & Khumalo, 2015). CoPs serve as knowledge interface mechanisms that unite the two communities, bringing about shared understandings of complex problems. It increases absorptive capacity by instilling confidence and improving the skill with which decisions are made (McCool *et al.* 2012), however, its success is highly dependent on the voluntary contributions of time and expertise of stakeholders involved.

The paper introduces avenues for further research. The measurement of knowledge utilisation and the seven constructs tested did not account for contextual differences between the PAs researchers worked in – different sizes, IUCN categories, geographical contexts, research capacity, funding mechanisms and visitor carrying capacity to name a few. Utilisation levels vary across different projects, PAs or PA

systems; making an aggregated measurement such as the one reported here, less relevant in some circumstances. Capacity-building should be customised to address the needs of PAs facing similar challenges and situations, and the requirements of different regions should be taken into consideration. Future research could explore these specific needs. More research could be done to study the impacts of CoPs and other capacity-building mechanisms on the utilisation of research in PAs.

Data challenges include the fact that the study made use of self-reported data. This could have influenced the results due to the presence of social desirability biases among researchers who wish to portray a favourable level of utilisation of their own research (Cherney *et al.*, 2012a; Davies, Nutley, Walter, 2008). The authors were unable to establish the representativeness of the sample of researchers as the size of the population of researchers is unknown. Also, the English-based questionnaire limited participation from non-English speaking researchers. Three constructs could not be tested due to scale properties.

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DECLARATION OF INTERESTS

This paper forms part of a series of papers from an unpublished PhD thesis (available from the University of Pretoria). It should be noted that the lead author is employed by a protected area agency which could have influenced the research design, and the analysis and interpretation of the results. It could also have influenced the way individuals responded to the survey. The positivist approach of the lead author ensured that research was, as far as possible, conducted in a value-free way. This implies that the data was captured objectively and not in any way influenced by the researcher's interests. The study examined existing literature and theory to inform the selection of influencers investigated.

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APPENDIX A: MEASURES OF INDEPENDENT AND DEPENDENT VARIABLES

LIST OF VARIABLES AND ITS MEASUREMENTS

<i>KU</i> <i>Independent variable</i>	The index comprises six stages of utilisation assessed on a five point scale measuring frequency, ranging from 1 (never) to 5 (always): (<i>Transmission</i>) The results of the work have been transmitted to the practitioners and professionals concerned; (<i>Cognition</i>) the results have been read and understood by the practitioners and professionals concerned; (<i>Reference</i>) the results have been cited as a reference in the reports, studies and strategies of action elaborated by practitioners and professionals; (<i>Effort</i>) efforts were made by practitioners and professionals to adopt the results or recommendations of the work; (<i>Influence</i>) the results influenced the decisions of practitioners and professionals; (<i>Application</i>) the results gave rise to applications and extension by the practitioners and professionals concerned.
<i>ADAPT</i>	This index is based on the researcher's perception of the importance of adaptation of research outputs for practitioners. It comprises 7 items on a 6-point scale, ranging from 0 (<i>not applicable</i>), 1 (<i>not important at all</i>) to 5 (<i>extremely important</i>). The 7 items are: (A1) Readability and ease of comprehension of reports or research articles; (A2) specific, operational nature of conclusions or recommendations; (A3) provision of data that can be analysed by end-users; (A4) sensitivity to end-users' expectations; (A5) presentation / packaging of reports (graphics, colour, packaging); (A6) on-time delivery of results to end-users and (A7) attention to deliverables.
<i>CONTEXT</i>	This index represents the perceptions (of the researcher) about numerous organisational circumstances in the particular PAs the researcher has worked in. It comprises 6 items on a 6-point scale measuring frequency, ranging from My work is supported by a champion higher up in the PA agency or 0 (<i>not applicable</i>), 1 (<i>never</i>) to 5 (<i>always</i>). The 6 dimensions are the following: (C1) My work is supported by a champion higher up in the PA agency or government department; (C2) the PA agencies I work with exhibit a policy environment that encourages innovation, change & improvement in visitor services; (C3) funding is available to PAs for implementing the recommendations of my work; (C4) internal politics within PA agencies prevent the uptake of my visitor research or data; (C5) my work is relevant to local or regional policy decision makers; (C6) I receive institutional support of my work at all levels.
<i>DISSE</i>	This index measured the perceived importance of dissemination efforts, consisting of 4 items on a 6-point scale, ranging from 0 (<i>not applicable</i>), 1 (<i>not important at all</i>) to 5 (<i>extremely important</i>). The 4 items are: (D1) Preparing and conducting meetings in order to plan the subject and scope of projects with end-users; (D2) formal meetings to report on a study's progress or to discuss preliminary results with end-users; (D3) formal meetings to discuss findings with end-users; (D4) organising dissemination activities for end-users.

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ENGAGE	This index represents the perceived level of engagement and alignment between PA practitioners and researchers. It comprises 5 items on a 6-point scale, ranging from 0 (<i>not applicable</i>), 1 (<i>strongly disagree</i>) to 5 (<i>strongly agree</i>). The 5 items are: (E1) My work coincides with the needs and expectations of practitioners and professionals; (E2) practitioners and professionals attribute credibility to my work; (E3) my work is closely aligned with the objectives of the end-user organisation; (E4) practitioners clearly articulate their research or data needs to me; (E5) practitioners put my recommendations into action.
LINKA	This index measures the level of importance of linkage mechanisms between researchers and practitioners, as perceived by researchers. It consists of 4 items on a 6-point scale, ranging from 0 (<i>not applicable</i>), 1 (<i>not important at all</i>) to 5 (<i>extremely important</i>). The 4 items include: (L1) Informal contacts with staff and professionals of protected areas; (L2) participation in committees, seminars and workshops with staff of protected areas; (L3) sending reports to protected area practitioners and professionals; (L4) publication of articles in popular media.
SCA	This index, consisting of only 2 items, represents the perceived level of skills, capacity and awareness of practitioners. The index measures frequency on a 6-point scale, ranging from 0 (<i>not applicable</i>), 1 (<i>never</i>) to 5 (<i>always</i>). The 2 items are: (S1) practitioners have the necessary skills and resources required to interpret and apply my research / data effectively; (S2) practitioners are aware of the importance of collecting data about visitors to inform management decisions.
TIMING	TIMING is a unidimensional index measuring a researcher's perception of whether his/her research outputs reached practitioners at just the right time. It thus consisted of only 1 item on a 6-point scale, ranging from 0 (<i>not applicable</i>), 1 (<i>strongly disagree</i>) to 5 (<i>strongly agree</i>). The statement read: My results have reached users at just the right moment to be used.

APPENDIX B: DETAILED DESCRIPTION OF SCALE DEVELOPMENT

KU

An EFA using Principle Axis Factoring (PAF) of the six items that make up KU, produced satisfactory levels of both Kaiser-Meyer-Olkin (KMO) measure (0.848) and Bartlett's test result ($p < 0.001$). All six items had factor loadings larger than 0.6 and the six items combined into one factor with total variance explained (Extraction Sums of Squared Loadings) of 57.22%. This is an existing scale, used previously by other authors. As such, a CFA was performed, however the results obtained from the fit indices of $\chi^2/df.=8.558$, CFI=0.919, TLI=0.865, and RMSEA=0.174, were not sufficient for acceptable model fit. All standardised factor loadings were however above the threshold of 0.5. Internal consistency reliability was met as the Cronbach's alpha values for all individual items and the scale as a whole, were well above 0.6. The results indicate the scale was both reliable and valid.

The following constructs represented the independent variables in the measurement model.

ADAPT

Although the results of an EFA using PAF yielded an adequate Kaiser-Meyer-Olkin (KMO) measure (0.798) and Bartlett's test result ($p < 0.001$), two factor loadings (items A2 and A3) were low (.417 and .368 respectively) and the total variance explained (Extraction Sums of Squared Loadings) 31.265%. These items were removed from the scale and a subsequent EFA performed. The results showed a satisfactory KMO (0.778) and Bartlett's test result ($p < 0.001$), this time with four out of five items' factor loadings above the threshold of 0.5. Item A1 had a factor loading of 0.469, just slightly below the recommended threshold. A decision was made to retain A1 as the five items combined into one factor and the Cronbach's alpha values for all items and for the scale was above 0.6, which together with the results of the EFA, indicates the scale was both reliable and valid. Total variance explained (Extraction Sums of Squared Loadings) was 37.96%. Pearson's r between ADAPT and KU indicated a weak positive relationship.

CONTEXT

An EFA including the six initial items (C1-C6) was unsuccessful. Items C4 and C5 formed a factor on their own but with very low Cronbach α (0.3). On closer inspection, C4 was

negatively rated in the scale. It was reverse scored, but the Cronbach α value was still too low. C5, also did not belong to the organisational context of a PA, but rather to the extended environment in which PAs operate. The authors decided to remove C4 and C5 and continue with one factor. The EFA of the final version of CONTEXT (C1-C3, C6) revealed an adequate KMO of 0.712 and a Bartlett's test result of $p < 0.001$, with all factor loadings equal to or larger than 0.5. Construct validity was therefore met. The correlation coefficient between the reduced-item CONTEXT and KU showed a moderate positive relationship (Pearson's $r = 0.462$). The scale was also deemed reliable as the individual and scale-level Cronbach's alpha values were above 0.5.

DISSE

The correlation coefficient between DISSE and KU showed a weak positive relationship (Pearson's $r = 0.211$). An EFA using PAF was performed, the results of which produced a satisfactory level of the KMO (0.720) and Bartlett's test result ($p < 0.001$) and all factor loadings were larger than 0.5. The four items created one factor with total variance explained (Extraction Sums of Squared Loadings) of 44.42%. This is an existing scale, used previously by other authors. A CFA was performed, however the results obtained from the fit indices of $\chi^2/df=4.648$, CFI=0.969, TLI=0.97, and RMSEA=0.121, was not sufficient for acceptable model fit. All standardised factor loadings were however above the threshold of 0.5. The Cronbach's alpha values of individual items and the scale was above 0.6, which together with the results of the EFA, indicates the scale was both reliable and valid.

ENGAGE

The correlation coefficient between ENGAGE and KU revealed a moderate to strong positive relationship (Pearson's $r = 0.624$). The EFA using PAF was satisfactory with a KMO of 0.715 and Bartlett's test result of $p < 0.01$. All four items' factor loadings exceeded the 0.5 cut-off level. In addition, the four items converged into one factor, indicating that the scale was valid. Total variance explained was 37.17%. The Cronbach's alpha value of all individual items and of the scale were all above 0.5, therefore the scale was also deemed reliable.

LINKA

Results of the EFA using PAF yielded a satisfactory KMO (0.648) and Bartlett's test result ($p < 0.01$). Two items' factor loadings were however below the minimum acceptable level of

0.5 ($L1 = 0.342$; $L2 = 0.490$). The correlation coefficient between KU and LINKA also revealed a negligible relationship between the variables (Pearson's $r = 0.127$). The Cronbach's alpha value of items L3 and L4 were both below 0.5 (0.474 and 0.465 respectively). Based on these findings, LINKA was excluded from the measurement model as it was neither valid nor reliable.

SCA

The EFA results of SCA was satisfactory with a KMO of 0.5 and a Bartlett's test result of $p < 0.01$. Both items' factor loadings exceeded 0.6. The total variance explained by the two items (Extraction Sums of Squared Loadings) equalled 43.594%. To test the scale's reliability, the Guttman Split-Half Coefficient was calculated. It reached a level of 0.608, above the 0.6 threshold. The scale was therefore both valid and reliable.

TIMING

TIMING consisted of a single item and showed a moderate positive relationship with KU (Pearson's $r = 0.462$). Since this variable consisted of only one item, validity and reliability could not be established.

APPENDIX C: ANALYSIS OF MODEL PARAMETERS

Variable	Item	Standardised factor loadings	Standardised residual variances	R-square
ADAPT	A1	0.494**	0.389**	0.244
	A4	0.613**	0.538**	0.375
	A5	0.547**	0.502**	0.299
	A6	0.638**	0.515**	0.407
	A7	0.756**	0.296**	0.571
DISSE	D1	0.591**	0.437**	0.350
	D2	0.674**	0.555**	0.454
	D3	0.802**	0.321**	0.644
	D4	0.571**	0.664**	0.326
ENGAGE	E1	0.513**	0.416**	0.263
	E2	0.595**	0.424**	0.354
	E3	0.556**	0.564**	0.309
	E4	0.625**	0.649**	0.390
	E5	0.675**	0.455**	0.455
SCA	S1	0.646**	0.410**	0.417
	S2	0.677**	0.400**	0.458

**p<0.05.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The final chapter concludes with an overview of how the research objectives were addressed, followed by a summary of the main findings and implications of the study. The theoretical, methodological and practical contributions are discussed, followed by a set of recommendations to researchers and PAs. The chapter also addresses the limitations of the study, and provide suggestions for new areas of research to be explored in future.

5.2 OVERVIEW OF THE STUDY

There is limited academic understanding of the research-practice gap within the bounds of visitor research produced in protected areas. Despite the critical importance of visitor research, it is not clear to what extent and in what way it informs visitor management policies and practices. More specifically, we know little about (i) the management areas where research is being absorbed into; (ii) the current levels of utilisation; and (iii) the factors influencing its pathway towards utilisation in policies and practices. The primary purpose of this study was to address these knowledge gaps.

This exploratory study utilised mixed methods and applied theory from the field of knowledge utilisation in its attempt to achieve the following objectives:

- A. Define the main components of visitor research within the context of PAs.
- B. Define different management application areas in the context of PA visitor management.
- C. Explore theoretical models explaining knowledge utilisation and the measurement thereof.
- D. Identify the management application areas of recently produced visitor research.
- E. Evaluate the types of use occurring in recently produced visitor research.

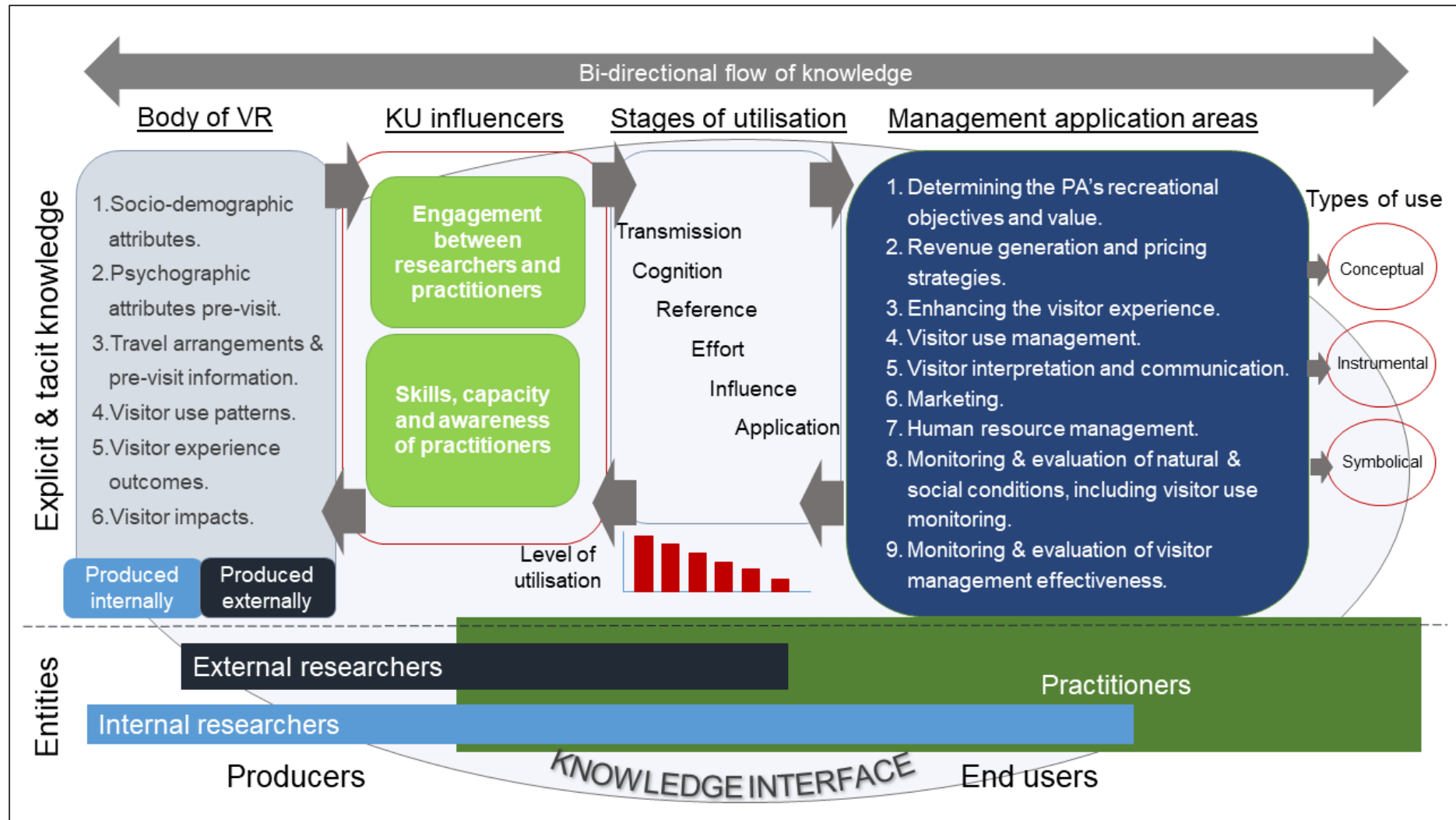
- F. Determine which factors influence the uptake of visitor research in visitor management policies and practices.
- G. Develop an integrated framework describing the movement and components of visitor research utilisation.
- H. Measure the actual level of utilisation of recently produced visitor research.
- I. Construct and empirically test a structural model that seeks to explain the utilisation of visitor research.

This thesis first identified the components of visitor research by studying the literature and then refined the categories through a systematic quantitative review of recently produced visitor research published in English peer-reviewed publications. This outcome directly served Objective A of the study. The management application areas underwent three iterations of refinement. First, the researcher identified the key visitor management activities involved in PA visitor management. After studying additional literature describing the use of visitor research in visitor management, the researcher proposed an initial set of management application areas by consolidating certain activities and including additional areas of uptake. The final set of application areas presented in this framework is a result of both the literature and the outcomes of the systematic review. These outcomes served Objectives B and D of the study. The thesis explored the theoretical models explaining knowledge utilisation and the measurement thereof, serving Objective C. The systematic review revealed three types of recommended use of recently produced research and varying levels of utilisation (Objective E). A Delphi survey among a small sample of experts determined which factors influence the uptake of visitor research in PA visitor management (Objective F). This provided the basis for a conceptual model which was subsequently tested by surveying 252 researchers and applying structural equation modelling (Objective I). Using the data generated from the survey of researchers, the actual levels of utilisation and movement of visitor research in PAs could be described, addressing Objective H of the study. This study found two significant factors that promote better utilisation of visitor research, further contributing towards objectives F.

5.3 MAIN FINDINGS AND IMPLICATIONS

This chapter discusses the main findings and implications of this study with the help of a revised version of the integrated framework (Figure 1). The framework portrays an enhanced understanding of the movement of the body of visitor research from researchers to practitioners, as studied through the lens of knowledge use (Ottoson, 2009). This integrated framework can be viewed as an explanatory framework (Saunders *et al.*, 2012), as it represents large components of concepts and themes derived from the literature explored and the results of the empirical investigations in this thesis, supplemented with the experiences and own expectations of the researcher.

Figure 1: Integrated framework for the utilisation of visitor research in visitor management



Source: Author's construction.

The subsequent sections integrate the main findings of the three articles as they relate to the different elements of the framework. These include the components and application areas of visitor research; the level and nature of current utilisation; factors influencing utilisation; and the interactions between researchers and practitioners.

The components of visitor research

The results of the systematic review of research published from 2014 to 2018 indicate protected area visitor research encapsulates a wide variety of visitation-related data and information. The most common visitor research types encountered in studies conducted in national parks during the years 2014 – 2018 were data about who visitors are (e.g. Cini & Saayman, 2014); their attitudes, beliefs, expectations, motivations, opinions and other psychographic attributes (e.g. De Urioste-Stone, Le, Scaccia & Wilkins, 2016); visitor use patterns and behaviours at the destination, including visitor use statistics (e.g. Mancini, Coghill, & Lusseau, 2018) and visitor experience outcomes, such as visitor satisfaction (e.g. Taplin, Rodger & Moore, 2016). A review by Griffin, Moore, Darcy and Crilley (2008) noted an overuse of visitor statistics and data about visitor satisfaction. Contrary to their finding that data about visitors' motivations, expectations and attitudes have been neglected, and similar to Pickering, Rossi, Hernando and Barros (2018), this study found such research to be on the increase. Research on visitors' travel arrangements and sources of information (e.g. Collum, & Daigle, 2015), and those measuring visitation-related environmental, social and economic impacts and its interrelated factors (e.g. Forrester, Clow, Roche, Heyvaert, & Battaglin, 2017), were less common. A possible reason for the lack of publications on visitation-related impacts could relate to the shortage of specialists in the field of recreation ecology that measure, monitor and analyse resource impacts; coupled with a lack of available funding to perform such studies (Marion, 2016; Monz, Cole, Leung & Marion, 2010). The study of recreation ecology identifies and measures visitor impacts and goes on to examine its underlying causes and other interrelated factors contributing to unacceptable resource, experiential and managerial impacts (Monz *et al.*, 2010). Such knowledge is essential for PA management to respond effectively to the effects of visitation on the environment, communities, tourist infrastructure and other visitors (Marion, Leung, Eagleston & Burroughs, 2016).

A diverse range of visitor research is needed for application in various management areas

Visitor research informs different PA management activities in various ways. While there are informal indications of this in the literature (Booth, 2006; Marion, 2016; Newsome, Moore & Dowling, 2013; Wardell & Moore, 2004; Ziesler & Pettebone, 2018), this study is the first to indicate where academic visitor research is directed for use. Most of this research lead to recommendations for applications in management activities that exhibit a strong visitor interface, such as enhancing the visitor experience (e.g. Arbieu, Grünewald, Martín-López, Schleuning & Böhning-Gaese, 2017); managing visitor use (e.g. Wolf, Brown & Wohlfart, 2017); improving visitor interpretation and communication (e.g. Botha, Saayman & Kruger, 2016); and monitoring and evaluating social and environmental conditions, including monitoring of visitor numbers (e.g. Jones, Malesios, Ioannidou, Kanakarakaki, Kazoli & Dimitrakopoulos, 2018). Similar to other reviews (Newsome *et al.*, 2013; Wardell & Moore, 2004), this thesis found that certain types of research are more inclined to be absorbed in certain types of management decisions.

Effective utilisation of knowledge demands the use of different types of knowledge (Xiao & Smith, 2007). The results of this paper attest to the importance of accommodating a diverse range of visitor research types for evidence-based decision-making in the value-laden process of managing visitors in PAs (Manning, 2011; Marion, 2016). An enhanced understanding of the potential use of visitor research in different management areas can assist PA staff in re-evaluating current research approaches in ways that increase the application of visitor research and enhance decision-making (Buckley, Witting & Guest, 2001). Managers can motivate for the acquisition of certain types of knowledge, for example, those that inform visitor use-, impact- (Marion, 2016) and experience management (McCool, 2006), which could lead to the consideration of alternative visitor management approaches (Mason, 2005). The study further demonstrates, on an aggregated scale, that multiple-use of the same research type is possible and should be encouraged (Buckley, Witting & Guest, 2001). Practically, however, a large part of the data gathered is limited to site-specific applications (Booth, 2006). The systematic review has also shown that greater numbers of research types combined in a study, lead to more management recommendations and subsequently greater potential for application. A collaborative approach to research design, involving practitioners and researchers, can increase the number of types of data collected

with the view of increasing application to other areas of the organisation (Darcy, Griffin, Craig, Moore & Crilley, 2007).

Some management areas are underserved

Despite the multifarious nature of applications of visitor research, some management areas appear to be neglected by the current body of knowledge. In the systematic review, there was limited evidence of how research informs strategic planning activities, compared to its use in tactical and operational, and monitoring activities. Defining a PA's recreational objectives is a necessary step in park, tourism and visitor management plans (McCool, Clark & Stankey, 2007). Still, there is little evidence of research being absorbed into these decisions. Expert opinions also vary on whether visitor research is being treated as a critical input into strategic, or long-term planning in PAs, and several believe that it is not yet an essential component in strategic planning. This could be due to the nature of such strategic planning activities, i.e. not occurring frequently and typically involving mostly internal staff. Many of the decisions that inform planning frameworks in PAs have a long lifespan, which limits a PA's ability to respond to societal changes (McCool *et al.*, 2007; McCool, 2012). Similarly, the use of research in revenue generation and pricing strategies; and resource allocation is less common. Perhaps more concerning, though, is that relatively few academic studies evaluate the efficacy of past management decisions or practices. Proper assessments of management performance are necessary for the continuous feedback loop that forms part of adaptive management (Moore & Hockings, 2013). Examples of such assessments in visitor use management are available in Marion (2016).

The types of knowledge use matter

The systematic review revealed most visitor research studies contain recommendations for application in an identifiable management problem, the so-called instrumental use of research (Cherney & McGee, 2011). Since external researchers produce the majority of studies, it suggests that academics are adapting and embracing the demand for management research (Newman & Head, 2015), at least in the field of outdoor recreation and tourism. This is, however, contrasting to earlier beliefs that instrumental use is rare in public sector organisations (Weiss, 1979). Managers in outdoor recreation require research primarily focussed on actionable issues, and not just to enhance understanding (Manning, 2011). This creates tension between the two communities as academics favour research

that builds on and tests theory (Manning, 2011) and are rarely incentivised for research absorption by management (McCool, 2012). Even though the ultimate objective of research is to provide usable knowledge, research outputs will be more valuable when considered within a theoretical framework. Thus, a compromise can be reached (Manning, 2011). Unfortunately, the systematic review also highlighted low levels of symbolic use, or research to justify a position or practice or defend prior decisions (Cherney & McGee, 2011).

Visitor research is not optimally applied

Several scholars in tourism and recreation have put forward the premise of suboptimal levels of use of visitor research in practice (Buckley *et al.*, 2008; Darcy *et al.*, 2007; Griffin *et al.*, 2008; Hudson, 2013; McCool, 2012; Moore & Hockings, 2013; Pyo, 2012; Thomas, 2012; Xiao & Smith, 2007). This thesis confirms those beliefs by measuring levels of use, obtained from the feedback of 252 researchers. Knowledge utilisation itself is a process rather than a single event, described by six cumulative stages (Knott & Wildavsky, 1980; Landry, Amara & Lamari, 2001). Significant numbers of researchers reached the utilisation stages of *reference*, *effort*, *influence* and *application* only some of the times, indicating a substantial amount of research is not absorbed into management decisions. Less than a third believe PA managers usually make an effort to adopt the results or recommendations of their work. Fewer researchers believe the results usually influence decisions, and a quarter thinks their results usually give rise to applications by practitioners and professionals. Most experts believe only a modest amount of visitor research currently reaches its potential of application in protected area visitor management strategies, practices and policies. The statement by Ritchie and Ritchie (2002:451) "... a great deal of research is being conducted in tourism, but is inefficiently used and rarely exploited to its full potential ..." still holds true today. Similar to what was noted by Buckley *et al.* (2001), levels of utilisation vary considerably across different PAs or PA systems. Some are successful at integrating research findings into practice, while others have great difficulties. Expert interviews also alluded to slow improvements in the uptake of research. When compared to other sectors investigated (Ion *et al.*, 2019; Landry *et al.*, 2001), the overall levels of utilisation appear to be higher though. Tourism is known as an applied field of study (Mair *et al.*, 2014), making it possible that tourism researchers are more aware of the needs of professionals and practitioners and motivated to focus their research on real-life problems.

Many influential factors play a role in knowledge utilisation

Knowledge transferred by researchers collides at some point with the influencers of utilisation (Figure 1). Feedback from the expert interviews strengthened the view that the process of knowledge utilisation is complex and involves many factors that either inhibit or promote the use of visitor research in management decision-making (Hemsley-Brown, 2004). Five categories of influencers, each impacting utilisation differently, were identified: Skills, capacity and awareness of practitioners; engagement between PA practitioners and researchers; the organisational context of the PA; dissemination efforts of researchers as well as the characteristics of the research. Although the categories aligned with several theoretical explanations, it would appear as if the organisational interest and interaction explanations (Landry, Lamari & Amara, 2003) are most influential. This knowledge is important for researchers and practitioners with a genuine interest in helping PAs navigate the intricate challenges of visitor management. By identifying and prioritising influencers, researchers can put forward a number of practical recommendations to close the research-practice gap.

In terms of predicting the level of knowledge utilisation, the results from the structural equation model indicated that the organisational interest and interactions interpretations, represented in this study by the engagement between researchers and practitioners, along with the absorptive capacity of end-user organisations, explain the use of visitor research in PAs best.

Engagement between researchers and practitioners and interface mechanisms

The domain of social-ecological systems is complex and requires engagement between researchers, practitioners and decision-makers to address policy problems (McCool, 2012). Both the expert interviews and the results of the structural equation model validated this statement. Effective engagement is necessary (van der Arend, 2014) if applied research is to provide useful knowledge for managers of outdoor recreation (Manning, 2011). The survey results indicated a sizable proportion of researchers reportedly do not engage directly with practitioners, even though most said they had provided recommendations to them. Research utilisation in PAs demands a process which facilitates the transfer of understanding and knowledge, as opposed to merely transferring data and information (McCool, 2012). This study highlights the enabling role of a relationship-focussed approach

that involves meaningful, targeted, human interactions between researchers and practitioners (Roux, Rogers, Biggs, Ashton & Sergeant, 2006). Relationships should advance towards a position where researchers understand and address the needs of end-users and end-user organisational objectives (Amara, Ouimet & Landry, 2004; Cherney & McGee, 2011). Simultaneously, end-users should acknowledge the value of academic research in shaping and inspiring institutional frameworks and long-term research goals (Newman & Head, 2015). The parties co-design the research problem to ensure it lends itself to scientific inquiry with theoretical underpinnings (Manning, 2011). Using purposefully designed knowledge interface mechanisms, the transfer of tacit knowledge is encouraged, and the two communities collaborate to achieve common goals (Roux *et al.*, 2006). The knowledge interface level displayed in Figure 1 represents such interactions between the entities and the mechanisms used to affect them. As one example of an informal mechanism, communities of practice introduce a knowledge interface level (Roux *et al.*, 2006). Academic and non-academic stakeholders come together to listen to each other; share knowledge and experiences in a 'safe' environment; co-learn; adapt and ultimately apply the new knowledge (Reed, Stringer, Fazey, Evely & Kruijsen, 2014).

Productive engagement and collaboration lead to more appropriate research questions; increase the feasibility of the research methods; and lead to a greater likelihood of practitioners implementing the recommendations. More importantly, constant interaction helps build the capacity of both parties to collaborate more effectively (van der Arend, 2014). This reduces instances of demand-pull relationships where end-users mostly solicit research for easily identifiable operational issues, ignoring deeper information needs; and push models where end-users may feel alienated from the research forced onto them by researchers (Roux *et al.*, 2006). Increased social interactions lead to better utilisation, which in turn could potentially stimulate more engagement between the parties and lead to further demand for research (Ouimet *et al.*, 2009).

Further support towards the case for embedded researchers

The case for embedded researchers in PAs (Roux *et al.*, 2019) is supported by the results of the systematic review which proved that their involvement in the research process leads to greater numbers of recommendations towards management applications. In the face of declining research capacity of conservation agencies worldwide (Roux, Kingsford, Cook,

Carruthers, Dickson & Hockings, 2019), research responsibilities are increasingly outsourced to external researchers; posing a risk of management's research priorities being neglected (Kingsford, 2018). Investing in embedded research capacity improves knowledge exchange between practitioners and researchers. Embedded researchers are committed to supporting management-related research and provide insights into a PA's unique context and challenges. Such interactions advance social capital among stakeholders, help align research objectives with the key intelligence needs of practitioners, and ensure long-term research goals are not neglected (Roux *et al.*, 2019).

Complex and indistinct research outputs have to be filtered, systematised and adjusted prior to absorption in tourism operations (Hjalager, 2002). Researchers, after having already transmitted the results to end-users, usually acquit themselves from any further responsibilities (McCool, 2012). The task of systematising research outputs is then typically passed on to the already overburdened managers. Embedded researchers, as another knowledge interface mechanism, help bridge this gap by assuming the role of knowledge brokers between researchers and managers (Roux *et al.*, 2019). However, suppose such internal research capacities are on the decline as indicated by Roux *et al.* (2019). In that case, it leaves an important gap in the step towards utilisation and points towards a lack of absorptive capacity in PAs.

The absorptive capacity of practitioners

The results of the structural equation model analysis indicated that potential absorptive capacity, or the measures taken by an organisation to value, acquire and assimilate new external knowledge (Zahra & George, 2002; Camisón & Forés, 2010), positively influences knowledge utilisation.

PAs are characterised as environments of constant change, complexity and uncertain conditions. Managers are expected to achieve biodiversity objectives against a backdrop of great expectations from society (McCool & Khumalo, 2015). Most public organisations, however, struggle to address more complex, non-routine problems (Head & Alford, 2015) such as visitor management (Manning *et al.*, 2017; McCool & Stankey, 2003). Organisations with highly skilled practitioners, well-entrenched relationships with academia and a culture that values research are more likely to make evidence-based policy decisions (Newman &

Head, 2015). For organisations to take full advantage of external research, they need internal absorptive capacity (Cohen & Levinthal, 1990).

Absorptive capacity consists of more than just the sum of the capabilities of individual subjects (Turner, 2013). Social interactions between the producers and end-users of knowledge could build the absorptive capacity of PAs in numerous ways: (i) raising awareness of new research that becomes available; (ii) helping managers gain access to relevant research and sift through mountains of research effectively; (iii) assisting managers in formulating research agendas aimed at specific management objectives; (iv) supporting a more progressive research transmission process where practitioners interpret and apply outputs within the confines of the social interactions and (v) sensitising academic researchers about the needs of practitioners, who in turn educate the next generation of practitioners (van der Arend, 2014). These social interactions link to the engagement construct discussed earlier. More effective engagement between researchers and practitioners not only directly increases utilisation, but could improve absorptive capacity (McCullough, Roux & Fabricius, 2016), indirectly raising the level of utilisation of research.

Outcomes of the hypotheses tested

This study set out to test eleven hypotheses through empirical inquiry. The results of this study support six of them. Their implications are included in the discussion of the main findings above. The researcher could unfortunately not assess three of the hypotheses due to scale properties. Table 1 provides a summary of the outcomes of the eleven hypotheses tested.

Table 1: Outcomes of the hypotheses empirically tested

H ₁	<i>Different types of visitor research are associated with different types of management application areas.</i> H₁ is supported. (see Article 1)
H ₂	<i>There is an association between the number of visitor research types utilised in a study and the number of management application areas recommended.</i> H₂ is supported. (see Article 1)
H ₃	<i>The mean number of recommended management application areas differs significantly between studies externally produced and those produced by a combination of embedded and external researchers.</i> H₃ is supported. (see Article 1)
H ₄	<i>Visitor research does not currently reach its full potential of application in protected area visitor management strategies, practices and policies.</i> H₄ is supported. (see Articles 2 and 3)
H ₅	<i>The importance placed on the adaptation of research outputs relates positively to knowledge utilisation.</i> H₅ is not supported. (H ₅ is presented as H ₁ in Article 3).
H ₆	<i>The presence of favourable conditions relevant to the context of the PAs a researcher worked in, relates positively to knowledge utilisation.</i> H₆ could not be tested. (H ₆ is presented as H ₂ in Article 3).
H ₇	<i>The importance placed on dissemination efforts relates positively to knowledge utilisation.</i> H₇ is not supported. (H ₇ is presented as H ₃ in Article 3).
H ₈	<i>H₈: The level of engagement between PA practitioners and researchers relates positively to knowledge utilisation.</i> H₈ is supported. (H ₈ is presented as H ₄ in Article 3).
H ₉	<i>H₉: The importance of linkage mechanisms between PA practitioners and researchers relates positively to knowledge utilisation.</i> H₉ could not be tested. (see Article 3)
H ₁₀	<i>H₁₀: The perceived level of skills, capacity and awareness of practitioners relates positively to knowledge utilisation.</i> H₁₀ is supported. (H ₁₀ is presented as H ₅ in Article 3).
H ₁₁	<i>H₁₁: The perceived timing of the research results, reaching practitioners at the right point in time, relates positively to knowledge utilisation.</i> H₁₁ could not be tested. (H ₁₁ is presented as H ₆ in Article 3).

The next section discusses the theoretical, methodological and practical contributions of this thesis.

5.4 CONTRIBUTION OF THE STUDY

This thesis investigates the widely recognised problem of underutilisation of research in tourism and recreation (Buckley *et al.*, 2008; Darcy *et al.*, 2007; Griffin *et al.*, 2008; Hudson, 2013; McCool, 2012; Moore & Hockings, 2013; Pyo, 2012; Thomas, 2012; Xiao & Smith, 2007), which has not received adequate attention to date. The empirical investigation was both of an exploratory nature (Articles 1 and 2), aimed at understanding the phenomena of research use better; and an explanatory nature (Articles 1 and 3), studying the relationships between variables. Contributions of the study relate to new developments in theory, advancements in methodology and insights that could lead to improving the practice of PA visitor management.

5.4.1 Theoretical contribution

This interdisciplinary study confirms current understanding in the field of knowledge management and extends this knowledge into the field of tourism and recreation management studies. The theoretical significance of this study comprises five high-level contributions cascading into lower-order findings that address numerous gaps in current literature.

By examining the link between research and practice, this study makes an original contribution towards advancing knowledge of the role and utilisation of research in visitor management policies and practices. As far as the researcher can tell, this study is the first attempt to explain the uptake of visitor research in the management of visitors. The study utilises a conceptual model to appraise the effect of seven influencers, connecting to all six major groups of theoretical explanations (Amara *et al.*, 2004; Belkhodja, Amara, Landry & Ouimet, 2007; Landry *et al.*, 2001). The outcomes lead to a novel comprehension of research use in the context of PA visitor management and reaffirm the importance of the organisational interest and interaction explanations (Landry *et al.*, 2003) widely cited in

knowledge utilisation literature. The role of absorptive capacity towards strengthening the utilisation of research (Tanriverdi & Venkatraman, 2005) is also confirmed. Contrary to previous investigations (e.g. Amara *et al.*, 2004; Cherney & McGee, 2011), this study could not find an association between knowledge utilisation and the perceived importance of adapting research outputs. Similarly, higher levels of perceived importance of dissemination of research outputs (Landry *et al.*, 2001) do not lead to improved levels of utilisation. These findings arguably provide evidence that the perceived importance of dissemination and adaptation of research outputs are not differentiators of knowledge use, as most researchers regarded adaptation and dissemination as important.

This study conceptually defined and tested three new constructs with the use of empirical data. *Engagement between researchers and practitioners* in PAs was found to be a strong predictor of research use. The construct comprises five items related to interactions. These include the articulation of research needs by end-users (Manning, 2011); alignment of researchers' work to the expectations and needs of end-users (Amara *et al.*, 2004; Cherney & McGee, 2011); alignment to the PA organisational objectives (McCool, 2012); practitioners assigning a certain level of credibility to researchers' work (Roux *et al.*, 2006); and practitioners responding to the research results by implementing the recommendations. The construct's link with utilisation highlights the importance of interactions between PA staff and researchers to move towards a certain level of maturity (Cherney *et al.*, 2013).

The construct of *context of the PA*, although not significantly related to research utilisation, is similarly unique to this study in that it investigates the effect that certain conditions in the PA organisation have on research use. These include support for the research from a senior public official (Hemsley-Brown, 2004); a policy environment fostering innovation, change and improvement in visitor services (Marion, 2016, Newsome *et al.*, 2013); the availability of funding for implementing research recommendations (Cherney *et al.*, 2012a; Landry *et al.*, 2001); and institutional support. Last but not least, *skills, capacity and awareness of practitioners* comprise two items that represent the perceived level of skills, capacity and awareness of practitioners to acquire, interpret and apply visitor research. This scale, although not vastly different from other instruments measuring absorptive capacity (Camisón & Forés, 2010), is a first in the context of protected areas tourism.

Conceptual definitions of two fundamental constructs in the field of tourism and recreation, namely, visitor research, and its application areas in visitor management, were refined. Article 1 described the nature of the body of knowledge of VR, structurally and geographically; and demonstrated how management decisions and actions absorb VR, providing a global perspective of the usability of VR in PAs. The findings emphasise the significance of accommodating a diverse range of VR types for evidence-based decision-making in the value-laden process of managing visitors in PAs (Manning, 2011; Marion, 2016). The study identified nine visitor management application areas, encompassed in three broader management categories (strategic, tactical and operational). To the researcher's knowledge, this was a novel academically constructed view of the impact of VR in terms of areas of uptake. The results provide a basis for futures studies to extend the discussion. The grouping of the nine application areas into broader management categories is similarly unique. It gives a new perspective into the data use seen in differing levels of management decision-making.

Apart from an enhanced understanding of the constructs themselves, this thesis establishes additional theoretical links. Empirical evidence in this study reveals different types of VR are associated with different management application areas (Booth, 2006; Marion, 2016; Newsome, Moore & Dowling, 2013; Wardell & Moore, 2004; Ziesler & Pettebone, 2018). The lack of association between visitor impact research and visitor use management presupposes a discrepancy between measuring impacts and formulating strategies and practices to address them. Future studies could look into this. The number of visitor research categories used in a study is associated with the number of application areas recommended. This finding highlights the need to maximise the value of research through the inclusion of more research types. Research produced in collaboration with embedded researchers (Roux *et al.*, 2019) exhibits significantly more recommended applications compared to those produced by external researchers only. The finding suggests that when the staff of national parks or park agencies take part in the research process, more management application areas are recommended for utilisation in articles, making it easier for practitioners to assimilate the findings into practice.

Lastly, the revised integrated framework offers an enhanced conceptual framing of the movement, components, entities and influencers involved in the utilisation of visitor research

in PA visitor management. The outcomes of this study not only tend to the need for an improved understanding of the phenomenon of research use in PAs (Wardell & Moore, 2004) but also strengthen our understanding of the contribution of both research and researchers towards transforming policy (Cherney & McGee, 2010) and highlight the importance of engagement between practitioners and researchers to narrow the research-practice gap (McCool, 2012).

5.4.2 Methodological contribution

This study utilised the existing method of systematic quantitative literature review (Pickering & Byrne, 2014) in a new way. In Article 1, the researcher applied it to (i) confirm the main components of visitor research and to (ii) further refine the management application areas. The novelty of its application is perhaps better seen in its use towards (iii) measuring different types of utilisation and (iv) examining the tendency of academic research to produce recommendations in various management activities.

In Article 3, the researcher constructed a questionnaire for measuring the actual level of utilisation and testing the structural model. Several scales were either adapted or newly developed to measure the seven constructs tested in the structural equation model. Three new scales were developed for purposes of respectively studying i) various conditions or organisational circumstances related to the PAs researchers have worked in; (ii) the level of engagement and alignment between PA practitioners and researchers, as well as (iii) perceptions about the skills, capacity and awareness of PA practitioners in dealing with VR. All three newly developed scales proved to be valid and reliable. The scale used to measure the perceived importance of adaptation of research outputs was a modified version of the one used by Cherney *et al.* (2012b). The altered scale also proved valid and reliable. The study also confirmed the validity and reliability of two existing scales measuring knowledge utilisation (Landry *et al.*, 2001) and the perceived importance of dissemination efforts (Cherney *et al.*, 2012b). Future studies may apply the same data collection instrument and scales to test new theories and hypotheses.

5.4.3 Practical contribution

Apart from the theoretical and methodological contributions, this research has practical relevance to PA practitioners and the research community. The level of uptake of visitor research in visitor management believed to be underutilised but without scientific verification, was established with empirical data. Such knowledge reveals gaps in the research-practice interaction and demonstrates in which stages of the process (Knott & Wildavsky, 1980) those gaps are occurring. This could encourage further collaborative efforts in which solutions are co-designed by researchers and managers (van der Arend, 2014) to improve the use of VR.

Enhanced understanding of the potential use of visitor research in different management activities could assist PA staff in re-evaluating current visitor management and research approaches (Manning, 2011), improving management performance (Wardell & Moore, 2004). Awareness of the usability of VR can increase a PA's acquisition capacities (Camisón & Forés, 2010), ensuring it has access to research that directly informs activities such as visitor use- and impact management strategies. By acquiring the right research, managers have the theoretical structures (Manning, 2011) to determine the best course of action to eliminate or mediate impacts from visitation (Brown *et al.*, 2010). Effective use of the range of visitor research types can guide planning towards more visitation-focussed management strategies (as proposed by Weaver & Lawton, 2017). In doing so, managers are better equipped to handle the sometimes opposing demands of its biodiversity and visitor experience mandates (McCool & Khumalo, 2015). Improved acquisition and uptake also provide reliable data on which managers can base their allocations of valuable, and often scarce, human and financial resources (Wardell & Moore, 2004).

This study has also sought to equip researchers with knowledge of the determinants that increase the likelihood of new knowledge created in academic realms to be absorbed to become institutional knowledge in PAs. This could stimulate further discussions around the mechanisms to be used for improving the utilisation of VR in PAs.

5.5 RECOMMENDATIONS

While the utilisation of visitor research has progressed in the last couple of years, VR is still underutilised, with levels of uptake varying considerably between PAs and within PA agencies. This section first provides some general recommendations before focussing on the suggestions aimed at PA organisations and researchers.

5.5.1 General recommendations

Protected area management can only meet the demand for knowledge, understanding and wisdom in the practice of visitor management by working closely with researchers in ways that promote deep connections between the two communities. Meaningful relationships between academia, practitioners and decision-makers enable more management-relevant research. They can lead to the development of wisdom that more effectively addresses the complexities practitioners have to deal with (McCool, 2012). Engagement between researchers and practitioners should move beyond transactional activities such as meetings and reports, to a relationship-focussed approach jointly pursuing shared goals. Effective engagement between the parties can improve the absorptive capacity of PAs by increasing awareness and access to existing research and encouraging research agendas that support management realities. Social interactions further promote the interpretation and application of research outputs and sensitise academic researchers to the needs of practitioners (van der Arend, 2014).

PAs might be at different stages of establishing and enhancing research partnerships with academia, some having already successfully mastered multiple initiatives. There is still much to be explored concerning the optimal mechanisms leading to meaningful relationships and effective engagement. Research and practitioner communities from various countries stand to benefit from sharing examples of successful partnerships, initiatives and projects. Such knowledge is important for researchers and practitioners with a sincere aspiration to help PAs navigate through the complex challenges of visitor management. PAs, academia and funding organisations should encourage further conversations on this. Collaboration with users could, for example, be put forward as a

requirement for funding of research (Arnott, Neuenfeldt & Lemos, 2020). But before crafting solutions, a critical evaluation at PA or PA agency level of the usefulness of the VR available to them is warranted. Alignment between what is being produced and what PAs require for informing decisions will increase uptake into policy.

One mechanism to form a knowledge interface layer between the two parties is informal communities of practice (Roux *et al.*, 2006). A community of practice provides a platform where producers and end-users of knowledge come together to listen to each other, share knowledge and experiences in a 'safe' environment, co-learn, adapt and ultimately apply the new knowledge (Reed, Stringer, Fazey, Evely & Kruijsen, 2014). Such interaction allows for the transfer of tacit knowledge (Roux *et al.*, 2006), which is the undocumented, implicit knowledge based on experiences (Xiao & Smith, 2007). Communities of practice could help to remove or at least relax some of the organisational and social barriers present in the PA context. It could be instrumental in the context of visitor management in PAs to build the capacity of practitioners by instilling confidence and improving the skill with which decisions are made (McCool *et al.* 2012). Other mechanisms, such as multi-year research partnerships, advisory committees, task forces, working groups and think tanks (van der Arend, 2014), could also be considered depending on the needs of a PA agency.

The next sets of recommendations relate to proposals specific to each of the two communities.

5.5.2 Recommendations to protected areas

Most public organisations find it challenging to address complex, non-routine problems (Head & Alford, 2015) such as VM (Manning *et al.*, 2017; McCool & Stankey, 2003). The taxing demands on PA managers to operate in an environment of constant change, complexity and uncertain conditions, against a backdrop of great expectations from society (McCool & Khumalo, 2015), magnifies the need for actionable research to inform decision-making. Effective collaboration and co-learning between researchers, intermediaries and practitioners (Roux *et al.*, 2019; Roux *et al.*, 2006) will become even more important going forward, along with equipping PAs with the absorptive capacity to apply VR effectively.

- PAs should endeavour to increase awareness of the importance of acquiring new VR for management decision-making. The results have shown this to be essential for improving the level of research use in policies and practices. Tourism organisations, in general, are not well-equipped to acquire knowledge from academia, lacking awareness and understanding of the different ways academia could assist. Those that do recognise the value of research, experience increased levels of research utilisation (Ouimet *et al.*, 2009). Greater appreciation of the importance of research should lead to greater efforts among end-users to acquire knowledge.
- PAs should initiate discussions on the availability and efficacy of mechanisms for improving research uptake.
- Managers and practitioners should invest time and resources to deliberate on their research needs, and research agendas should be kept current. Such exercises should involve managers, practitioners and researchers with different responsibilities and viewpoints.
- Research agendas should encourage different types of utilisation - conceptual, instrumental and symbolic use.
- Managers should communicate the research needs of the PA to the research community in clear and uncertain terms to prioritise management-relevant research.
- PAs should commission more symbolic use of research for evaluating the effectiveness of VM strategies and practices at various levels. Doing so will encourage adaptive management approaches.
- When scoping projects with researchers, practitioners should carefully consider the number and combination of research types collected in each study to promote multiple applications and optimise the value of research. This will require practitioners to have knowledge of other research gaps in the organisation or work with intermediaries that have a broader view of the organisation's goals.
- Managers and intermediaries should actively promote and facilitate closer engagement between PA staff and external researchers so both parties can learn to deal more effectively with each other by better understanding the other's position, competencies and value they bring to the relationship. To retain this knowledge within organisations, emphasis should be placed on building networks at institutional levels, rather than focussing on relationships between individuals.

- Managers should be bold enough to demand researchers to illustrate different ways in which the research produced can be optimally applied to enhance decision-making. Dissemination and adaption of research results alone are not sufficient, and practitioners should communicate their needs and expectations of the research outputs upfront. Ideally, outputs should include well-contemplated recommendations tailored to the context of the PA. This is particularly important in the case of high priority studies where PAs and other stakeholders have invested a considerable amount of time, effort and resources into co-developing and perhaps funding the research.
- PAs should provide researchers with opportunities to gain a rich understanding of the user's context, the research problem and the challenges experienced in the implementation of recommendations. This can be facilitated by the client who takes the time to articulate their unique complexities involved in managing visitor experiences. Involving researchers in the assimilation of the results and implementation of the recommendations would improve knowledge flow in both directions. PAs should endeavour to include researchers in decision-making activities at various levels of the PA or PA agency, including high-level strategic planning.
- Employing embedded researchers can increase the utility of VR. Investing in research capacity improves knowledge exchange between practitioners and researchers as embedded researchers are committed to supporting management-related research projects. Embedded researchers' knowledge of the unique context of each PA may help align research objectives with the practitioners' key intelligence needs and ensure long-term research goals are not neglected (Roux *et al.*, 2019). Complex and indistinct research outputs have to be filtered, systematised and adjusted before it can be absorbed in operations (Hjalager, 2002).
- For PAs to take full advantage of external research, they need internal absorptive capacity (Cohen & Levinthal, 1990). PAs should work hard to improve their acquisition and assimilation capacity so that the research transmitted to them will not go to waste. In this respect, several suggestions are made:
 - Staff should be encouraged to critically evaluate their own and their agency's tourism philosophies, ethics and management approaches (McCool & Khumalo, 2015);

- Managers should expose more staff to empirical research outputs to improve awareness of alternative viewpoints on tourism approaches (McCool & Khumalo, 2015).
- An improved embedded research capacity creates a valuable link between the research significance and its practical relevance, which should make assimilation easier.
- PAs can craft formal continuing education and professional development programmes for staff, in collaboration with academia. Such programmes can cover a range of topics, including tourism management, operations, ecosystem services, administration and leadership, climate change, community engagement, customer service, marketing, finance, retailing, research methodology and sustainability analysis (Hudson, 2013; McCool, Hsu, Rocha, Sæþórsdóttir, Gardner & Freimund, 2012).
- Social interactions between researchers and end-users can further increase the absorptive of PAs, indirectly raising the level of utilisation of research (van der Arend, 2014).
- Lastly, practitioners need to acknowledge the value of academic research in shaping and inspiring institutional frameworks and long-term research goals (Newman & Head, 2015).

While it is recognised that PAs operate under strained budgets, it is possible to achieve many of the recommendations above by closely collaborating with all stakeholders involved.

5.5.3 Recommendations to researchers

Regular and close interactions are the driving forces behind knowledge transfer between academic researchers and PAs (McCool, 2012). The utilisation of visitor research is improving, and academia is embracing the demand for management research, as seen in the number of recommendations towards instrumental use in Article 1. There is, however, a need to enhance existing research-practice interactions:

- At an institution level, establishing and strengthening long-term strategic partnerships with PA agencies and individual PAs is important for the sustainability of the research network and for increasing the absorptive capacity of PAs.

- Researchers should be aware of the strategic, tactical and operational objectives of a PA and the PA agency and align their work towards achieving these.
- Through regular engagements, researchers could stay informed of the needs in the organisation so that new research proposals consider the gaps in VR; and the skills provided by academia applied in a way that optimises data collection. Senior researchers could encourage post-graduate students to take up management-relevant topics, strengthening the strategic partnership between the academic institution and the PA organisation.
- Researchers should open up to co-producing research proposals with practitioners and intermediaries, such as embedded researchers. Research proposals should incorporate the needs and expectations of the end-users.
- To simultaneously increase instrumental, conceptual and symbolic use of academic research in PAs, researchers should be encouraged to:
 - Cater to the needs of end-users (Amara *et al.*, 2004);
 - Consider the context in which PAs operate (Amara *et al.*, 2004), including having an understanding of the complexity and lack of resources that characterise many PAs (McCool, 2012);
 - Pay attention to the relevance of their work to the practice areas of professionals and managers in government agencies (Amara *et al.*, 2004); and
 - Tailor research outputs to practitioners' needs (Newman & Head, 2015).
- Researchers should pay attention to underserved management areas. These include the activities of defining a PA's recreational objectives; revenue generation and pricing strategies; and human resource management planning. More research is needed to understand the potential contribution of VR in these areas.
- Solution-oriented discussions with practitioners should receive priority (McCool, 2012).
- Researchers should investigate the feasibility of hosting collaborative learning opportunities, starting with communities of practice and progressing towards formal continuing education and professional development programmes.

Research institutions at the start of the journey of engagement with PAs could begin by considering and evaluating the knowledge interface mechanisms available to them to further the application of their research in visitor management.

5.6 LIMITATIONS OF THE STUDY

Notwithstanding the bi-directional movement of knowledge between researchers and practitioners, the focus of this study was mainly on the utilisation of visitor research by practitioners. It did not investigate the factors affecting the opposite movement of knowledge from PA management decisions (and practices), back to researchers.

This study further did not aim to measure and compare the importance of different types of research in management activities. This thesis has, however, established that the array of management activities require a diversity of visitor research.

The lack of previous research studies on the utilisation of VR in PA visitor management could have influenced the conceptual thinking applied in this study, particularly in the areas of the study design and the development of the integrated framework (section 1.6.1). In this respect, this study could be regarded as exploratory, as it is the first to measure actual levels of utilisation and test for influencing factors in this specific context. The

A limitation of the SQLR performed in Article 1 is the exclusive use of VR studies published in peer-reviewed academic journals, which has several implications. The overall number of research studies is undercounted as studies in other types of publications such as books, book chapters and conference papers, and other unpublished literature were not included. The limitation of the scope to academic peer-reviewed literature has, however, provided the researcher with an opportunity to view the problem from a specific angle and make recommendations accordingly. The second implication of this limitation is that certain types of VR, particularly those considered less attractive for academic publishing, might be underrepresented in the sample. The SQLR search strategy excluded a significant number of other types of PAs with similar characteristics to that of national parks, such as state parks in the US. The requirement for either the phrase “national park” or “protected area” to be mentioned in the abstract of an article, might have been too restrictive. However, the researcher found it the most effective way of sifting through the 5 491 search results. As with most systematic reviews, the researcher only included articles published in the English language, which limits the representativeness of the sample (Pickering & Byrne, 2014). The

final 407 studies included in this review is a sample of the research produced in the English language, rather than the absolute number of VR studies.

The sample of experts consulted in Article 2, although carefully selected, cannot be assumed to represent the views of the larger population. The opinions of experts are also subject to personal bias which could have influenced the results of the study. The high levels of experience held by participants in the sample and the geographical spread of that experience somewhat countered this limitation. The significant proportion of external researchers consulted may have introduced bias. However, given PAs' reliance on them for conducting research, the inclusion of researchers who have worked with PAs for many years, could be justified. The past experiences of the researcher as a manager of tourism research for a PA agency, influenced the research design, i.e. the selection of the 17 items used in round one. It could also have influenced the analysis and interpretation of the results. The inclusion of open-ended questions and the inductive nature of the Delphi process, and its thematic analysis, countered this limitation (Knowles, 2019). The researcher's employment at a PA agency could also have influenced the way experts responded. The use of an asynchronous data collection method (in all but one of the interviews) reduced this limitation as experts could freely express their views in their own words without the pressure of being directly observed by the interviewer, such as in face-to-face interviews (Ratislavová & Ratislav, 2014).

Article 3 made use of self-reported data, which could have influenced the results due to social desirability biases among researchers who wish to portray a favourable level of utilisation of their research (Cherney *et al.*, 2012a; Davies, Nutley, Walter, 2008). The researcher could not establish the representativeness of the sample as the size of the population of researchers is unknown.

The researcher was unable to test three constructs. It is still possible that the importance of linkage mechanisms, the timing of research and the organisational circumstances of a PA may influence knowledge utilisation, as suggested by numerous scholars. More research is needed to confirm the role of these factors in the uptake of VR.

5.7 DIRECTIONS FOR FUTURE RESEARCH

Significant knowledge gaps remain which present possibilities for future research. The most prominent is the void in understanding the usefulness of VR in visitor management decision-making from the practitioner's point of view. Irrespective of the occurrence of recommendations towards instrumental and symbolic use in this study, it is not yet known to what extent available research has addressed the true research requirements of PAs on a collective or organisational scale.

The measurement of knowledge use levels and the seven constructs tested did not account for contextual differences between the protected areas in which the researchers had worked. These include different sizes, IUCN categories, geographical contexts, research capacity, funding mechanisms and visitor carrying capacity to name a few. Levels of utilisation likely fluctuate across different projects, PAs or PA systems. Researchers should evaluate knowledge utilisation at the PA level by looking into the inclination of management to source and incorporate VR into the various strategic, tactical and operational decisions. How strong is the pull of VR into policy documents, strategies and other planning activities such as park management plans, visitor management plans, and marketing plans? To what extent do VM practices incorporate academic and industry understanding of the shifts in society - more specifically, visitors' values, beliefs, attitudes, motivations, expectations and behaviour towards recreation in PAs? Have theories and methods of persuading humans to behave more responsibly towards nature and other visitors been applied in practice?

Some authors believe that, despite having received much attention from academics, varying levels of implementation of new knowledge into management practices at the ground level have been witnessed (Von Ruschkowski *et al.*, 2013). What are practitioners' views on the amount of VR that reaches the stages of effort, influence and application? How much and which types of VR are pulled into which VM decisions and how often does this occur? How often do practitioners pause decision-making to acquire VR? How much confidence do practitioners have in the quality of VR produced? How much do they rely on VR to guide their decisions?

Researchers can investigate the prevalence of symbolic use of research, outside of the published literature realm. Research that evaluates the effectiveness of current visitor management practices is important for adaptive management (Moore & Hockings, 2013). Such feedback should be encouraged by PA managers. The data collected in this study captured researchers' perceived level of uptake of VR and their recommendations for areas of uptake, which does not necessarily represent the reality playing out in PAs daily.

Further investigation is needed to understand the dynamics of planning decisions in PAs and how VR could assist. Future studies could also look at case studies of PAs where VR frequently reaches the more advanced stages of utilisation. What can we learn from them? An important factor to consider in future studies would be a differentiation between the roles of policy-makers, managers and practitioners and how their knowledge requirements differ (Newman & Head, 2015).

There are many other factors influencing usage levels, in addition to the interactions between researchers and practitioners. The full spectrum of these influencers is not yet fully understood. Notwithstanding the contributions of this study, its outputs are very much of an exploratory nature. More in-depth research could include performing a country-specific or agency-specific evaluation of the utilisation influencers to develop appropriate strategies that combat the underutilisation of VR. Future research should unpack absorptive capacity in the context of PAs to a level where both the current PAC and the RAC is evaluated and better understood. Capacity building initiatives should aim for customised solutions that address the needs of PAs facing similar challenges and situations. Future research could explore these needs in greater detail. Increased capacity of practitioners may, however, not translate into improved performance because of other factors such as: (i) not having an opportunity to implement and monitor the effectiveness of VM practices; (ii) managers not having the confidence to implement changes or (iii) a misalignment between organisational objectives and the research presented which influence opportunity (McCool, 2012). More in-depth studies of the difficulties and challenges encountered on both sides of the two communities are needed to examine contextual differences between countries, regions and PA agencies.

PAs need the help of the research community to assimilate VR. How can academia be motivated to become involved in activities not linked to academic performance outcomes? How much can PAs expect the research community to invest in building the capacity of practitioners? Thorny questions like these would require thorough research.

Lastly, the definition and categorisation of both the VR types and management application areas may require further refinement towards more formal, academic constructs.

5.8 CONCLUSION

The relevance of PA visitor research can be seen in the degree to which it is taken up by park and tourism managers in their daily duties (Eagles, 2002). This study set out to establish a contemporary view on the utilisation of VR in visitor management in PAs; the management activities where visitor research is typically absorbed into; and the factors influencing its assimilation into policies and practices.

This thesis addresses the research problem from different angles by adopting a sequential mixed-methods approach. The results form a coherent picture of both the current status of the uptake of visitor research and areas in need of improvement to overcome the research-practice gap. Though there is progress in the uptake of visitor research, with academic researchers showing great interest in management-relevant topics, research is still not being applied optimally in practice. Despite very different geographical and experiential contexts where research is conducted around the world, too little of it influences management decisions in PAs on an aggregate scale, indicating that this is a global conversation to be had. The outcomes reveal additional findings in terms of the types of use of research, the importance of close engagement between PA staff and researchers, and the need for equipping practitioners with the ability to assimilate research results.

The qualitative approach in Article 2 allowed the topic to be explored in greater detail, while the quantitative approach in Article 3 confirmed many of the statements made by experts and enabled the empirical testing of important constructs. Gaining access to the experience base of global experts enhanced the study immensely since much of the understanding of

the inner workings within and between organisations is embodied in unspoken, undocumented (tacit) knowledge. Inputs gained from a geographically dispersed sample of researchers confirmed the problem of utilisation is not unique nor confined to certain areas.

The novel framework of this study provides a simplistic and visual display of the basic elements involved in the utilisation of VR which offers an opportunity for the two communities to pause and reflect on their current position of research use and the many components, determinants and entities involved.

Although this study has made numerous theoretical, methodological and practical contributions, there is still much to be explored.

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APPENDIX A

Reference list of articles included in SQLR (Article 1)

References list of articles included in the SQLR (Article 1)

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APPENDIX B

Article 2: Invitation email to experts, informed consent form, interview schedule and questionnaire

Article 2: Example of invitation email to expert

Liandi Slabbert

From: Liandi Slabbert
Sent: 29 July 2019 08:59 PM
To: Recipient
Subject: Factors that influence the uptake of visitor research in protected areas

Dear Recipient,

As the manager of tourism research at South African National Parks, I have a keen interest to see that the visitor research collected in our national parks is integrated into management strategies, decisions and practices. As such, I have based my PhD (University of Pretoria) on better understanding the utilisation of visitor research in the context of protected area visitor management.

As an expert in Visitor Management and a highly experienced researcher, I would like to invite you to participate in my PhD study. As a key point of departure for this research, I need your expert opinion on the factors that influence the uptake of visitor research by practitioners for decision-making purposes.

Please can you help me by answering a few questions? This should not take more than 15 minutes of your time. Please click on the link below:

<https://www.surveymonkey.com/r/uptakeofVRexpertopinion>

Alternatively, we can also schedule a Skype or Zoom call if you prefer a more informal discussion?

I thank you in advance!

Kind regards,

Liandi Slabbert
Manager: Tourism Research
Visitor Services unit
South African National Parks
www.sanparks.org
www.wildcard.co.za

Article 2: Delphi round 1 informed consent form and interview guide



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Factors influencing the uptake of visitor research in protected area visitor management

Faculty of Economic and Management Sciences
Division of Tourism Management

Research conducted by: Mrs. L. Slabbert (97021980)

Dear Sir / Madam,

As a recognised expert and/or experienced researcher in the area of managing and monitoring of visitors in protected areas, we would like to invite you to participate in a research study by Liandi Slabbert, a PhD candidate under the guidance of Dr Elizabeth du Preez of the Division of Tourism Management at the University of Pretoria.

The purpose of the study is to investigate the utilisation of visitor research in the context of protected area visitor management. Even though researchers continually collect visitor data, academic understanding of the uptake of such data in visitor management strategies and practices remains fragmented.

As a key point of departure for this research, we need your expert opinion on the factors that influence the uptake of visitor research by practitioners for decision-making purposes.

Please note the following:

- Your identity will remain anonymous in all documents reporting on the results of this study. Access to your identity and responses to this questionnaire will be limited to myself and my supervisor. The answers you give will be treated as strictly confidential.
- Any summary of the content, or quotations from your answers, that are made available through academic publication or other academic outlets will be anonymised so that you cannot be identified, and care will be taken to ensure that other information which could identify yourself is not revealed.
- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than 15 minutes of your time.
- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.

Ethical clearance for this study has been granted by the Faculty of Economic and Management Sciences' Committee for Research Ethics (Protocol number: EMS026/19). Please contact my supervisor, Dr. E.A. du Preez if you have any questions or comments regarding the study.

By filling out your name below and clicking on the NEXT button, you hereby indicate that you have read and understood the information provided above and that you willingly agree to participate in the study.

* 1. Please state your details below. Your identity will remain anonymous in all documents reporting on the results of this study.

Title, Name and Surname:

Affiliation(s) / Organisation:

Position:

Areas of expertise / research focus:

Country of (permanent) residence:

* 2. Have you been directly or indirectly involved in, or provided advice on, the management of visitors in a protected area, in any of the following continents? (Check all that apply)

- ☐ Africa
- ☐ Asia
- ☐ Australia
- ☐ Europe
- ☐ North America
- ☐ South America
- ☐ None
- ☐ Other (please specify)

* 3. Have you been responsible, or shared responsibility towards collecting data about visitors in a protected area, in any of the following continents? (Check all that apply)

- ☐ Africa
- ☐ Asia
- ☐ Australia
- ☐ Europe
- ☐ North America
- ☐ South America
- ☐ None
- ☐ Other (please specify)



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Factors influencing the uptake of visitor research in protected area visitor management

For the purposes of this study, we will refer to Visitor Research as:

Data and information gathered to increase our knowledge of visitors, their characteristics, behaviours and visitor use statistics, along with the benefits and impacts resulting from their visitation.

Visitor management, in the context of this study is broadly defined as:

Frameworks, strategies, practices, tools and techniques used to align tourism and recreation to protected area objectives in providing opportunities for quality visitor experiences while also responding to the potential negative impacts from visitation.

* 4. In your opinion, to what extent has the visitor research collected to date in the protected areas you have worked in, **reached its potential** in terms of being utilised by practitioners?

- ☐ A great deal
- ☐ A lot
- ☐ A moderate amount
- ☐ A little
- ☐ None at all

* 5. Do you think, in general, protected area managers treat visitor research as a **key input** into strategic (long term) planning decisions (such as determining the PA's tourism and recreational objectives or crafting revenue generation strategies)? Please explain your answer.

* 6. Generally speaking, do PA managers **optimally** integrate the available visitor research into tactical and operational decisions (in areas such as visitor use management, resource planning, visitor interpretation, marketing, improving visitor experiences etc)? Please explain your answer.

* 7. Below is a list of factors that could potentially influence the uptake of (available) visitor research by practitioners in protected areas. Next to each factor, please indicate the type of influence you think it might have, defined as one of the following:

Positive = This factor promotes the uptake of research.

Negative = This factor inhibits the uptake of research.

Both = This factor can both promote and inhibit the uptake of research.

No influence = This factor has no influence on the uptake of research.

Unsure = I don't have enough information to answer.

	Type of influence
Adaptation of research outputs to suit the practitioner's needs.	
The availability of practitioners that are trained in the role of visitor research in PA visitor management.	
Efforts by practitioners to acquire research.	
The level of experience of a researcher in terms of publication outputs (articles, books, etc).	
A researcher's level of experience in PA visitor management.	
A researcher's level of experience in working with PAs that receive high numbers of visitors.	
The dissemination efforts by the researcher.	
Direct interactions between the researcher and practitioner(s).	
The relevance of the research to the practitioner's work.	
The extent that the research is directed towards practitioners.	
The organisational memory of the PA - defined by Baskerville & Dulipovici (2006) as "... the individual recollections and shared interpretations of historical information consequent to implementing earlier decisions and brought to bear on present decisions ..."	
The end user's experience with and understanding of visitor research.	
The type of research conducted (qualitative, quantitative, or mixed).	
Researchers taking the practitioner's context into consideration.	
Collaborative efforts between external researchers and researchers employed by the PA (internal/embedded researchers).	
Involvement of the practitioner in the research process.	
Involvement of the researcher in management decision-making.	



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Factors influencing the uptake of visitor research in protected area visitor management

8. Apart from those already mentioned, what are some of the steps researchers could take to improve the uptake of their research by practitioners in protected areas?

9. Are there any other factors you can think of that may influence the utilisation of (available) visitor research in protected areas? Please also mention whether it influences utilisation in a positive or negative way.

Thank you kindly for taking the time to provide inputs.

All expert responses will be collated, summarised and transformed into a short questionnaire, to be distributed to all respondents again. The aim of this is to work towards consensus agreement among experts regarding the main factors influencing utilisation of visitor research.

Please keep an eye out for an invitation to participate in the second round of inquiry. This should only take 10 minutes of your time.

Please contact the researcher, Mrs Liandi Slabbert should you have any queries or further comments.

Article 2: Delphi round 2 informed consent form and questionnaire



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Which factors are most important in influencing the uptake of visitor research in protected area visitor management?

Faculty of Economic and Management Sciences
Division of Tourism Management

Research conducted by: Mrs. L. Slabbert (97021980)

Dear Sir / Madam,

From the inputs received from 27 experts around the globe, we have compiled a list of factors that influence utilisation of visitor research in protected area visitor management.

The next step in the process is to obtain consensus among experts about the factors that are most influential. All we require you to do is to rate each factor on a Likert scale from 1 - 5 in order of importance. This should not take more than 7 minutes of your time.

Just a reminder:

- Your identity will remain anonymous in all documents reporting on the results of this study. Access to your identity and responses to this questionnaire will be limited to myself and my supervisor. The answers you give will be treated as strictly confidential.
- Any summary of the content, or quotations from your answers, that are made available through academic publication or other academic outlets will be anonymised so that you cannot be identified, and care will be taken to ensure that other information which could identify yourself is not revealed.
- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than 7 minutes of your time.
- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.

Ethical clearance for this study has been granted by the Faculty of Economic and Management Sciences' Committee for Research Ethics (Protocol number: EMS026/19). Please contact my supervisor, Dr. E.A. du Preez if you have any questions or comments regarding the study.

By filling out your name below and clicking on the NEXT button, you hereby indicate that you have read and understood the information provided above and that you willingly agree to participate in the study.

* 1. Please provide your name, surname and email address below. Your identity will remain anonymous in all documents reporting on the results of this study.

Name

Surname

Email address



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Which factors are most important in influencing the uptake of visitor research in protected area visitor management?

* 2. Below is a list of factors that you helped identify as likely to influence the uptake of (available) visitor research by practitioners in protected areas. For each factor, please rate the level of influence you think it may have on the uptake of visitor research by using the scale provided. 1 = Not at all influential; 5 = Extremely influential. If you feel you don't have enough information to rate a particular item, please select "I don't know".

	Not at all influential 1	Slightly influential 2	Somewhat influential 3	Very influential 4	Extremely influential 5	I don't know
Capacity & ability of practitioners (in terms of expertise, skills, time, resources) to SOURCE, INTERPRET and APPLY visitor research effectively.	☐	☐	☐	☐	☐	☐
Practitioners' expertise in and knowledge of visitor management.	☐	☐	☐	☐	☐	☐
Practitioners' awareness of the importance of empirical research for better management decision-making.	☐	☐	☐	☐	☐	☐
Practitioners' willingness to try new methods of obtaining data.	☐	☐	☐	☐	☐	☐
Efforts by practitioners to acquire research.	☐	☐	☐	☐	☐	☐
Involvement of the practitioner in the problem formulation and research process.	☐	☐	☐	☐	☐	☐
Involvement of the researcher in management decision-making.	☐	☐	☐	☐	☐	☐
The extent of the interactions between researchers and practitioners (personal informal contacts, participation in committees, workshops and meetings etc.)	☐	☐	☐	☐	☐	☐
The researcher's focus on practitioners' needs.	☐	☐	☐	☐	☐	☐
Practitioners' willingness to collaborate with / listen to researchers.	☐	☐	☐	☐	☐	☐
Alignment between researcher's goals and PA management objectives.	☐	☐	☐	☐	☐	☐
The relevance of the research to local / regional policy decision makers.	☐	☐	☐	☐	☐	☐
Trust between researchers and practitioners.	☐	☐	☐	☐	☐	☐
Researchers taking the reality of the PA (in terms of budget, politics, resources, challenges) into consideration.	☐	☐	☐	☐	☐	☐
Having a champion higher up in the organisation or government that supports the research.	☐	☐	☐	☐	☐	☐
The availability of an internal (embedded) researcher in the PA for external researchers to collaborate with.	☐	☐	☐	☐	☐	☐

	Not at all influential 1	Slightly influential 2	Somewhat influential 3	Very influential 4	Extremely influential 5	I don't know
PA agencies clearly articulating their research needs to researchers.	☐	☐	☐	☐	☐	☐
Adapting research outputs to practitioners' needs (readability, presentation, clearly defined implications, timely feedback etc).	☐	☐	☐	☐	☐	☐
The dissemination efforts by the researcher (such as sending reports, having meetings with practitioners, using media outlets etc.).	☐	☐	☐	☐	☐	☐
Researchers reporting results directly to managers through personal contact.	☐	☐	☐	☐	☐	☐
A policy environment in the PA agency that encourages innovation, change and improvement in visitor services.	☐	☐	☐	☐	☐	☐
Institutional support of the research at all levels.	☐	☐	☐	☐	☐	☐
Large or increasing numbers of visitors experienced by the PA or agency (the more visitors, the more focus on using visitor research).	☐	☐	☐	☐	☐	☐
Competing management priorities which affect practitioners' ability to implement research findings.	☐	☐	☐	☐	☐	☐
Social acceptance of visitor research within the PA.	☐	☐	☐	☐	☐	☐
Internal politics within the PA agency.	☐	☐	☐	☐	☐	☐
Availability of funding for implementing recommendations.	☐	☐	☐	☐	☐	☐
Precedence given to natural resource management with little focus on visitor management.	☐	☐	☐	☐	☐	☐
Practitioners' focus on sourcing or applying visitor research for a single use purposes - not approaching the acquisition of visitor research in a way that will result in multiple applications.	☐	☐	☐	☐	☐	☐
The organisational memory of the PA - recollection of historical information used for decisions in the past - which can influence present decisions.	☐	☐	☐	☐	☐	☐
A researcher's level of experience in PA visitor management.	☐	☐	☐	☐	☐	☐
A researcher's level of experience in working with PAs that receive high numbers of visitors.	☐	☐	☐	☐	☐	☐
If the research can be reapplied to contexts other than what it was originally designed for.	☐	☐	☐	☐	☐	☐
The type of visitor research collected (visitor use statistics, visitor satisfaction data, attributes about visitors etc).	☐	☐	☐	☐	☐	☐
The time associated with collecting, analysing and reporting research - constraining for decision-making purposes.	☐	☐	☐	☐	☐	☐
The timing of the research – relevance at a specific point in time.	☐	☐	☐	☐	☐	☐
Research commissioned for the wrong reasons (personal or political agendas, budget expenditure targets, etc.)	☐	☐	☐	☐	☐	☐



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Which factors are most important in influencing the uptake of visitor research in protected area visitor management?

Thank you kindly for taking the time to provide inputs.

Please contact the researcher, Mrs Liandi Slabbert should you have any queries or further comments.

APPENDIX C

Article 3: Invitation email to researchers, informed consent form and questionnaire

Article 3: Example of invitation email to researcher

Liandi Slabbert

From: Liandi Slabbert
Sent: 05 November 2019 09:49 AM
To: Recipient
Subject: The utilisation of visitor data in protected areas

Dear Sir / Madam,

Each year, a large amount of data is generated about visitors, their experiences and the impacts they have on protected areas around the world.

Data can be qualitative or quantitative in nature and is usually obtained through research activities or sourced from protected area agency records or databases.

But what happens to the data/research outputs, once delivered to protected area management? Is it utilised in management decision-making the way it could be?

To further the discussion on how the uptake of visitor data or research could be improved, we first need to understand what current levels of utilisation look like.

As such, I have dedicated my PhD (University of Pretoria) to this topic, specifically, measuring the level of utilisation and the influence of certain factors on the uptake of visitor data.

If you been involved in collecting, analysing or reporting visitor data for protected areas, I would like to invite you to participate in my study. All that is required from you is to answer a survey which **should not take more than 15 minutes of your time**. This study involves an anonymous survey. Your name will not appear on the questionnaire and the answers you give will be treated as strictly confidential. You cannot be identified in person based on the answers you give.

Click here to answer the survey now: [Visitor data in protected areas](https://www.surveymonkey.com/r/utilisationofvisitordata)

Or alternatively, copy and paste the following link into your web browser:

<https://www.surveymonkey.com/r/utilisationofvisitordata>

Please be so kind as to forward the link to the survey to your colleagues or acquaintances who have worked with visitor data in protected areas.

I thank you in advance!

Kind regards,

Liandi Slabbert
Manager: Tourism Research
Visitor Services unit
South African National Parks
www.sanparks.org
www.wildcard.co.za

Article 3: Informed consent form and questionnaire



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The utilisation of visitor data in protected areas

Faculty of Economic and Management Sciences,
Division of Tourism Management

Research conducted by:
Mrs. L.M. Slabbert (97021980)

Dear Researcher,

You are invited to participate in an academic research study conducted by Liandi Slabbert, a PhD candidate from the Division Tourism Management at the University of Pretoria. **The purpose of the study is to investigate the utilisation of data and information about visitors to protected areas. Anyone that has been involved in the collection, analysis or reporting of visitor data in a protected area is welcome to partake in the study. A definition of what we consider to be "visitor data" is provided on the next page.**

To accurately capture the current level of utilisation of data about visitors, it is important that you answer the set of questions as completely and honestly as possible. Reporting will be done on an aggregated level only.

Please note the following:

- This study involves an anonymous survey. Your name will not appear on the questionnaire and the answers you give will be treated as strictly confidential. You cannot be identified in person based on the answers you give.
- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the attached questionnaire **as completely and honestly as possible**. This should not take more than 15 minutes of your time.
- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.

Ethical clearance for this study has been granted by the Faculty of Economic and Management Sciences' Committee for Research Ethics (Protocol number: EMS026/19). Please contact my supervisor, Dr. E.A. du Preez if you have any questions or comments regarding the study.

By clicking on the NEXT button below, you hereby indicate that you have read and understood the information provided above and that you willingly agree to participate in the study.



The utilisation of visitor data in protected areas

For the purposes of this study, we will refer to **visitor data** as:

Any data and information about visitors; their characteristics, motivations, needs, preferences (etc); how they utilise protected area spaces; the outcomes from visitation; and the impacts they have on protected areas. Different categories of visitor data is provided in the table below.

Data can be **qualitative or quantitative** and could have been obtained using any method, including through **formal research activities or sourced from protected area agency records and databases.**

Type	Data and information on
Socio-demographic attributes of visitors	Gender, age, culture, place of residence, ethnic group, income level, employment, level of education, marital status, children and so forth.
Psychological attributes of visitors pre-visit	Attitudes, expectations, motivations, preferences, perspectives, pre-trip knowledge and awareness, beliefs, values and mindfulness.
Travel arrangements and pre-visit information	Sources of information, sources of influence (on purchasing decisions), booking channels used, travel companions, distance travelled to destination.
Visitor use patterns and visitor behaviour at the destination	Statistics on the demand for and actual use of experiences, facilities & services; visitor spend; temporal and spatial use patterns including frequency of visits, length of stay and occupancy rates; visitor behaviour on site.
Visitor experience outcomes as a result of visitation	Visitor experiences, emotions, satisfaction, loyalty and safety incidences as a result of visitation; changes in place attachment and sense of place; post-trip knowledge and awareness; future intentions (intention to return or volunteer, willingness to pay, willingness to recommend, support towards management interventions) and appreciation of natural resources.
Visitor impacts as a result of visitation	Social, environmental and economic impacts of visitation whether positive or negative.

* 1. Have you been involved in collecting, analysing and / or reporting of visitor data in the context of a protected area in the last five years, in any of the following continents (check all that apply)?

- ☐ Africa
- ☐ Asia
- ☐ Australasia
- ☐ Europe
- ☐ North America
- ☐ South America
- ☐ None
- ☐ Other (please specify)

* 2. Which categories of visitor data have you worked with, in the context of protected areas? Please check all that apply.

- ☐ Socio-demographic attributes of visitors
- ☐ Psychological attributes of visitors pre-visit
- ☐ Travel arrangements and pre-visit information
- ☐ Visitor use patterns and visitor behaviour at the destination
- ☐ Visitor experience outcomes as a result of visitation
- ☐ Visitor impacts
- ☐ Other (please specify)

* 3. Which of the following tasks, related to the protected areas you worked with, have you performed? Check all that apply.

- ☐ Designing and scoping of the research / project / programme
- ☐ Data collection
- ☐ Data analysis
- ☐ Reporting of the results
- ☐ Making recommendations to practitioners or professionals of protected areas
- ☐ Engaging with practitioners or professionals from protected areas
- ☐ Implementation of recommendations



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The utilisation of visitor data in protected areas

Please answer the next set of questions keeping in mind the visitor data you collected, analysed or reported on, in the context of protected areas.

* 4. Please rate to what extent you agree with each of the statements below.

	Never	Rarely	Sometimes	Usually	Always
The results of the work have been transmitted to the practitioners and professionals concerned.	☐	☐	☐	☐	☐
The results have been read and understood by the practitioners and professionals concerned.	☐	☐	☐	☐	☐
The results have been cited as a reference in the reports, studies and strategies of action elaborated by practitioners and professionals.	☐	☐	☐	☐	☐
Efforts were made by practitioners and professionals to adopt the results or recommendations of the work.	☐	☐	☐	☐	☐
The results influenced the decisions of practitioners and professionals.	☐	☐	☐	☐	☐
The results gave rise to applications and extension by the practitioners and professionals concerned.	☐	☐	☐	☐	☐

* 5. How important is it to adapt research or data outputs for end users?

	Not important at all				Extremely important	N/A
Readability and ease of comprehension of reports or research articles	☐	☐	☐	☐	☐	☐
Specific, operational nature of conclusions or recommendations	☐	☐	☐	☐	☐	☐
Provision of data that can be analysed by end users	☐	☐	☐	☐	☐	☐
Sensitivity to end users' expectations	☐	☐	☐	☐	☐	☐
Presentation / packaging of reports (graphics, colour, packaging)	☐	☐	☐	☐	☐	☐
On-time delivery of results to end users	☐	☐	☐	☐	☐	☐
Attention to deliverables	☐	☐	☐	☐	☐	☐

* 6. How important is each of the following dissemination activities for the utilisation of visitor data?

	Not important at all				Extremely important	N/A
Preparing and conducting meetings in order to plan the subject and scope of projects with end users	☐	☐	☐	☐	☐	☐
Formal meetings to report on a study's progress or to discuss preliminary results with end users	☐	☐	☐	☐	☐	☐
Formal meetings to discuss findings with end users	☐	☐	☐	☐	☐	☐
Organising dissemination activities for end users	☐	☐	☐	☐	☐	☐



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The utilisation of visitor data in protected areas

* 7. Please rate your agreement with each of the following statements. Refer to your involvement in visitor data / visitor research in protected areas.

	Strongly disagree				Strongly agree	N/A
My work is considered pertinent by practitioners	☐	☐	☐	☐	☐	☐
My work coincides with the needs and expectations of practitioners and professionals	☐	☐	☐	☐	☐	☐
There is a target public of practitioners comprising a receptive audience for the dissemination and use of my work	☐	☐	☐	☐	☐	☐
Practitioners and professionals attribute credibility to my work	☐	☐	☐	☐	☐	☐
My work is closely aligned with the objectives of the end user organisation	☐	☐	☐	☐	☐	☐
My results have reached users at just the right moment to be used	☐	☐	☐	☐	☐	☐
Practitioners clearly articulate their research or data needs to me	☐	☐	☐	☐	☐	☐
Practitioners put my recommendations into action(s)	☐	☐	☐	☐	☐	☐



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The utilisation of visitor data in protected areas

* 8. How important is each of the following linkage mechanisms for the utilisation of visitor data or research?

	Not important at all				Extremely important	N/A
Informal contacts with staff and professionals of protected areas	☐	☐	☐	☐	☐	☐
Participation in committees, seminars and workshops with staff of protected areas	☐	☐	☐	☐	☐	☐
Sending reports to protected area practitioners and professionals	☐	☐	☐	☐	☐	☐
Publication of articles in popular media	☐	☐	☐	☐	☐	☐

* 9. Thinking of the protected areas (PA) you have worked with, please rate how often the following conditions are true for you.

	Never	Rarely	Sometimes	Usually	Always	N/A
My work is supported by a champion higher up in the PA agency or government department.	☐	☐	☐	☐	☐	☐
The PA agencies I work with exhibit a policy environment that encourages innovation, change & improvement in visitor services.	☐	☐	☐	☐	☐	☐
Funding is available to PAs for implementing the recommendations of my work.	☐	☐	☐	☐	☐	☐
Internal politics within PA agencies prevent the uptake of my visitor research or data.	☐	☐	☐	☐	☐	☐
My work is relevant to local or regional policy decision makers.	☐	☐	☐	☐	☐	☐
I receive institutional support of my work at all levels.	☐	☐	☐	☐	☐	☐
Practitioners have the necessary skills and resources required to interpret and apply my research / data effectively.	☐	☐	☐	☐	☐	☐
Practitioners are aware of the importance of collecting data about visitors to inform management decisions.	☐	☐	☐	☐	☐	☐



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The utilisation of visitor data in protected areas

* 10. For which types of protected areas have you collected, analysed or reported visitor data? Check all that apply.

- ☐ Nature reserve
- ☐ Wilderness area
- ☐ National park
- ☐ National monument or national feature
- ☐ Habitat management area or Species management area
- ☐ Protected Landscape or Seascape Area
- ☐ Protected Area with sustainable use of natural resource
- ☐ I'm not sure

Other (please specify)

* 11. Which of the following size categories of protected areas have you worked with? Check all that apply.

- ☐ Less than 50 000 visitors a year
- ☐ 50 000 to 199 999 visitors a year
- ☐ 200 000 to 999 999 visitors a year
- ☐ 1 million visitors a year or more
- ☐ I'm not sure

* 12. How many years have you been engaging with protected area practitioners or professionals?

- ☐ No direct engagement with protected area practitioners or professionals
- ☐ Less than a year
- ☐ 1 - 5 years
- ☐ 6 - 10 years
- ☐ More than 10 years

* 13. Which of the following options best describes your role?

- ☐ I am currently employed by a protected area or protected area agency
- ☐ I am a researcher / consultant working for or affiliated with an external research organisation - including universities and consultancies
- ☐ Both
- ☐ Other (please specify)

* 14. In what year were you born? (enter 4-digit birth year; for example, 1976)

* 15. In which country do you reside in permanently?



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The utilisation of visitor data in protected areas

From one researcher to another, a heartfelt thank you for taking the time to complete this questionnaire. Your inputs are much appreciated.

PLEASE be so kind as to forward the link to this survey to your colleagues or acquaintances who have been involved in collecting, analysing or reporting visitor data or who have conducted visitor research in protected areas. This will assist in furthering the conversation of how to improve utilisation in management decision-making.

Please feel free to send me an email if you would like to receive a copy of the results of this study.

APPENDIX D

Declaration regarding plagiarism



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**FACULTY OF ECONOMIC AND
MANAGEMENT SCIENCES**

Declaration Regarding Plagiarism

The Faculty of Economic and Management Sciences emphasises integrity and ethical behaviour with regard to the preparation of all written assignments.

Although the lecturer will provide you with information regarding reference techniques, as well as ways to avoid plagiarism, you also have a responsibility to fulfil in this regard. Should you at any time feel unsure about the requirements, you must consult the lecturer concerned before submitting an assignment.

You are guilty of plagiarism whenever you extract information from a book, article, web page or any other information source without acknowledging the source and pretend that it is your own work. This does not only apply to cases where you quote the source directly, but also when you present someone else's work in a somewhat amended (paraphrased) format or when you use someone else's arguments or ideas without the necessary acknowledgement. You are also guilty of plagiarism if you copy and paste information directly from an electronic source (e.g., a web site, e-mail message, electronic journal article, or CD-ROM) without paraphrasing it or placing it in quotation marks, even if you acknowledge the source.

You are not allowed to submit another student's previous work as your own. You are furthermore not allowed to let anyone copy or use your work with the intention of presenting it as his/her own.

Students who are guilty of plagiarism will forfeit all credits for the work concerned. In addition, the matter will be referred to the Committee for Discipline (Students) for a ruling. Plagiarism is considered a serious violation of the University's regulations and may lead to your suspension from the University. The University's policy regarding plagiarism is available on the Internet at <http://www.library.up.ac.za/plagiarism/index.htm>.

For the period that you are a student in the Faculty, the following declaration must accompany all written work that is submitted for evaluation. No written work will be accepted unless the declaration has been completed and is included in the particular assignment.

I/we declare the following:

1. I understand what plagiarism entails and am aware of the University's policy in this regard.
2. I declare that this assignment is my own, original work. Where someone else's work was used (whether from a printed source, the Internet or any other source) due acknowledgement was given and reference was made according to departmental requirements.
3. I did not copy and paste any information directly from an electronic source (e.g., a web page, electronic journal article or CD-ROM) into this document.
4. I did not make use of another student's previous work and submitted it as my own.
5. I did not allow and will not allow anyone to copy my work with the intention of presenting it as his/her own work.

Surname and initials	Student number	Signature	Date
Slabbert, L.M.	97021980		15 August 2020