Scuba diving tourism system: a framework for collaborative management and sustainability

Kay Dimmock
Southern Cross University, kay.dimmock@scu.edu.au

Ghazali Musa
University of Malaya

Publication details
Published version available from: http://dx.doi.org/10.1016/j.marpol.2014.12.008
The Scuba Diving Tourism System: a framework for collaborative management and sustainability

Abstract

This paper proposes a conceptual model for the scuba diving tourism system (SDTS). A holistic view was adopted to highlight the central elements of scuba diving tourism (SDT). Specifically, the paper examines the key components in the SDTS along with issues which challenge the sustainability of SDT. Scuba divers, the marine environment, the host community and the scuba diving tourism industry (including all associated industries) are fundamental elements of the SDTS. Notably, the host community is often overlooked as a key stakeholder in the management and sustainability of SDT at the destination. A systems approach used to conceptualise the SDTS highlights the need for adaptive management and leadership to encourage future orientated thinking and the integration of stakeholder concerns and perspectives to ensure the sustainability of marine resources and experiences.

Keywords

Scuba diving tourism system, sustainability, stakeholders, host community, marine environment

1. Introduction

The popularity of recreational scuba diving has increased in recent decades to an extent that scuba diving and the business activity supporting it have become important tourism sectors stimulating a billion dollar global industry [1-2]. Ongoing demand for scuba diving has been driven by divers’ desire to witness and experience marine nature [3-4]. At the same time greater access to appealing underwater sights through advances in technology, training, education, and equipment have created a thriving Scuba Diving Tourism (SDT) industry that supports diving activity [5]. There is now a proliferation of destinations and tourism
enterprises working to accommodate and serve scuba diving tourists who seek access to marine environments and wildlife. Now, scuba diving tourists travel throughout the world visiting coral reefs in 91 countries [6].

A growing number of publications in recent years have alerted to the many issues and concerns relevant to scuba diving tourism. A review of research since 2005 reveals some 16,000 publications with scuba diving as their focus. This research comprises a broad inquiry extending from marine environment impacts through to human physiology, health and safety, and diver motivation and satisfaction. Many of these studies support an effort to understand the issues in scuba diving and related tourism, yet less than 30 percent integrate multiple stakeholders and perspectives in a holistic or systematic way.

Research has been linear with attention primarily given to scuba diving tourists and impacts. Little research has included the scuba diving industry, host communities or efforts towards sustainability. Research has, for example, examined the profile and motivations of divers [7], diver satisfaction [8-9] and diver experiences [4, 10-11]. Study of divers’ experiences has drawn on the detail of personal narratives of being immersed in the underwater world [11-12]. In doing so, researchers have grappled with the multi-dimensional and multi-disciplinary nuances of the human - environment phenomenon drawing from environmental, social and psychological factors [10, 13-14]. These endeavours have conceptualised scuba diving experiences as place attachment, in-water comfort and responsible underwater behaviour. Together they offer insight and detail of human experiences in a marine leisure context revealing fulfilment and happiness, comfort, constraint or negotiation and responsible underwater behaviour [10, 13-14].

Scuba diving tourism is an economically important industry evidenced by the number of locations promoting their marine resources in efforts to become scuba diving destinations and scuba diving hotspots. This is witnessed in the popularity of Koh Tao in Thailand, Layang Layang and Sipadan in Malaysia and the Great Barrier Reef, Australia as ‘must dive’ places widely promoted in social and other media [15-17]. This is supported by research assessing the economic value of scuba diving tourism for industries and destinations [18-20]. Tourist
demand for scuba diving has resulted in the global emergence of a niche sector which represents high-yield tourism [4].

A range of research has also examined the environmental impacts of diving on marine ecosystems [7, 15, 21-22]. Atkins et al. [23], for example, noted that frequency and diversity of use is changing marine habitats and landscapes. Research has also highlighted the fragility of ecosystems used for tourism and noted the importance of ongoing assessment of ecological, social and economic factors to inform discussions of sustainability [24-25]. Meanwhile, Liu [26] argues that change in environmental resources at a destination does not render sustainability a failure, as some impacts are unavoidable. Scuba diving in sensitive and fragile locations requires effective management to protect ecological and cultural values. In the search for sustainable approaches, there is a need to understand the intersections between social and environmental systems as the critical points from which to advance sustainability goals [27]. Thus to achieve sustainable outcomes, effective tourism management must integrate both social and ecological systems [28-30].

Other research challenging the sustainability of scuba diving tourism highlights the importance of stakeholders within the destination [1, 31]. For example, Wongthong and Harvey [1] collected host community members perceptions of the diving industry in Thailand. Their research suggested that there were opportunities for improved relations between the scuba diving sector, marine-based tourism operations and those responsible for governance and management to achieve more sustainable outcomes. Meanwhile, Hillmer-Pegram [31] found that scuba diving operators in the US Virgin Islands experienced a lack of social and political support at the destination that challenged broader efforts to be sustainable. In other research, scuba diving tourism destination stakeholders in some Malaysian island locations had varying perceptions towards the sustainability of scuba diving tourism. Particularly evident were environmental concerns raised by industry stakeholders which were not a priority for non-diving stakeholders who, on the other hand, supported growth and development and a focus on economic outcomes generated by scuba diving and related industry activity [32]. This body of research concluded that achieving sustainable outcomes needs an approach which draws the views and concerns of multiple stakeholders together to integrate social and ecological issues in scuba diving tourism. To
this end, a systems approach is advantageous to understand elements, relationships and issues within a given tourism system and to explore how these can be managed to improve sustainable outcomes [26, 33-34].

A whole system approach is considered important to unravel the complexity of tourism activity and guide effective management and sustainability [28, 30, 35-37]. A systems approach can clarify the relationships between stakeholders and reveal the different perspectives, priorities and values of each. Systems approaches enable multiple stakeholders, and their needs and issues, to be acknowledged and included in decision-making processes [38]. In this way, systems approaches represent holistic alternatives to more linear approaches, which might exclude the concerns of particular people and contexts [37]. Further, processes of change and interactions between humans and their environment can be better understood from a systems standpoint [39]. For example, Atkins et al [23] used a systems perspective to study human induced influences on marine ecosystems and recommended policy-level decisions incorporating all stakeholders from the resource users’ community in addressing usage impacts and sustainability goals. As Plummer and Fennell [30] note, a systems approach provides new understandings while enabling more opportunities for sustainable management through collaboration and shared responsibility in the co-management of social and ecological resources.

In this paper, a whole systems approach is used to propose a conceptual model of the scuba diving tourism system (SDTS). Conceptual models help to explain complex phenomena and processes in tourism [28, 40]. They can, for example, highlight key elements and simplify important associations in otherwise complex stakeholder relationships that influence tourism development processes and outcomes [4, 40-41]. This paper takes a holistic view to clarify the key elements in the SDTS and explore patterns in the relationships between stakeholders involved in scuba diving tourism.

2. The Scuba Diving Tourism System
The central elements in the Scuba Diving Tourism System (SDTS) are considered to be: the marine environment, scuba divers, the scuba diving tourism industry and the host community (represented in Figure 1 and explained below).
As the proposed conceptual model shows, the core elements of the SDTS include divers, marine environments, the scuba diving tourism industry and the host community. The marine environment is located at the core of the SDTS since the marine environment is the key element on which all stakeholders in the system depend. Key stakeholders involved in the operation of the SDTS include scuba divers (demand), and suppliers of scuba diving tourism services (scuba diving operators, charter operations, scuba diving education and training, as well as associated service and tourism industries such as accommodation, transport, food services, retail and other services catering for scuba divers). Other key stakeholders include the host community who provide social and cultural resources and governments, policy makers and resource managers who manage and provide access to valued marine environments. In the context of SDT, the use of fragile ecological environments adds complexity to stakeholder relations [37, 44-45]. At the same time, stakeholders prioritise resources and functions according to their needs and make decisions based on those priorities [42].

To varying degrees, each stakeholder operating within this system has their own roles and responsibilities, yet they also interact with, and are dependent on, the other system stakeholders. Thus areas of overlapping function require collaboration and accommodation of roles, agendas and perspectives. Collaboration helps different stakeholders to recognise other stakeholders’ unique perspectives at the local level as well as provide a process for exchange and greater collective understanding [43]. As a social construct, system boundaries are flexible and when applied to the local context each stakeholder is identified highlighting their responsibility for influencing the system.

2.1. Divers

There are reportedly millions of certified scuba divers worldwide [2, 4]. However, many of them experience diving as part of a holiday or once-only activity [46]. Consequently, there is high demand for basic safety and skill development by new divers. Regulated by government and industry bodies [5], the development of diving competence continues
throughout an individual’s diving career as they seek more challenging underwater experiences and landscapes [6].

Divers seek opportunities to view and experience diverse underwater sites and landscapes [17]. They create demand for SDT through their motivations and expectations of marine environments. Personal factors influence motivation to engage, and a broad literature (as previously noted) helps to understand the inner state of divers’ intentions and drivers [47]. Factors motivating divers include the thrill of diving and seeing marine flora and fauna [13]. Divers are interested in viewing underwater landscapes and marine life particularly when size, variety and abundance of species are distinctive [18, 48-49].

Scuba diving markets are heterogeneous, with Garrod [2] noting that the market varies according to diving experience and demography, aspirations and needs. This can extend to the physical requirements of disabled divers [50]. Motivation to dive in a particular site is influenced by several factors such as location, diver demography, gender and level of diving specialisation [47]. Over time, and with increased diving frequency, divers’ motivations change as skills and competence improve [51]. More complex diving and specialisation is often sought including photography, wreck or cave diving [7, 52].

The ecological impact divers may have on underwater sites is an area of some concern. While research has been inconclusive to date, some studies suggest that more experienced divers show greater concern for the quality of marine flora compared with those less specialised [16, 51]. On this basis, ecological impacts at scuba diving sites have been linked to diver experience and technical competence [53-55]. However, negative impacts also occur at highly concentrated diving locations and sites used by experienced divers [4, 24].

Negative impacts can occur to ecosystems from contact with divers, diver equipment and fins, as well as from poor buoyancy control [17]. Buoyancy control is one of the most important factors producing divers’ impacts [56]. Reports show that most impacts occur at the start of the dive, as divers settle and become familiar with aquatic conditions [57]. Impacts may also be more common among novice divers [13]. Opportunities to build diver awareness and knowledge are important as many new divers are often unaware of the
consequences of their impacts [58]. The diving tourism industry plays a key role here as dive masters can influence underwater conduct and behaviour by sharing information that encourages low impact diving practices [49, 53].

The marine environment is the focus of diver attention, whether on arrival at a destination, at the outset of training and equipment familiarisation, or underwater in the pursuit of satisfying diving experiences. Yet, the SDT S works because of the industry organisations and business relations which support divers.

### 2.2. The scuba diving tourism industry

Scuba divers are generally highly dependent on a wide range of industry operators to deliver accessible and satisfying scuba diving experiences. The SDT industry, therefore, centres on the suppliers of scuba diving services (scuba diving operators, charter operations, scuba diving education and training, dive specific retail services, souvenirs, etc.). However, SDT is also reliant on a wide range of associated service and tourism industries that provide access and essential tourism related services (such as information providers, marketers, travel agents, accommodation, transport, food and beverage services, souvenir outlets, retail services, medical services, other services catering for scuba divers and tourist more generally) [19, 28]. These industry providers are located not only in destination regions but in transit routes and generating regions around the world, as well as increasingly online. Consequently, the vast range of industries and operators supplying SDT services and products can be overlooked in policy and planning processes where a systems approach is not used.

There is great diversity and specialisation amongst these industry stakeholders. Larger organisations are more likely to be involved in shaping broader policy and training, while small to medium sized operators tend to be involved in localised and specialised services [70]. The interactions between such large numbers of organisations can be challenging. The SDTS relies on successful relations and co-ordination between these industry sectors and destination stakeholders [19]. Within the scuba diving tourism industry, substantial cooperative inter-organisational activity is necessary in the supply and provision of SDT
experiences [4]. Achieving co-operation requires organisations from these diverse sectors to develop relations and partnerships that build opportunities for collective and sustainable outcomes and a systems approach can be advantageous in this regard.

The purchase of an experience of SDT involves a contract between the diver and scuba diving operators, with the industry supplier required to provide a level of care and responsibility for safety and risk management. Legislation reinforces these responsibilities [59]. The industry plays an important role in training of skills and competence development. However, the current standardised approach to training and certification may not be sufficient to ensure low impact diving given the diversity of diver skills and experiences across the international community [6, 60]. Cardwell [61] noted that the development of scuba diving competence requires competent instructors with a broad range of experiences. Nevertheless, large numbers of divers with different skill levels can make it challenging for operators to satisfy a broad market and competency base [15].

Beyond training, diving industry services can include a charter boat ride to the site and underwater management of divers which must be carried out with due care and skill [59]. In this way dive operators control the real risks while managing and tempering perceived risks, allowing divers to retain the thrill and adventure they seek [62]. Thirumoorthi et al. [63] noted that operators who focus on professionalism and attention to safety and security during the scuba diving excursion give divers a greater sense of trust and confidence. These features also contribute markedly to satisfaction with the operator as part of the service delivery. MacCarthy et al. [64] referred to these features as peripheral aspects of scuba diving experiences which include operator service and functionality along with camaraderie formed between divers within the diving group.

Thus, diver satisfaction can be related to both tangible and intangible aspects [19, 56]. Building all aspects of diver safety into the marine encounter includes using ‘the buddy system’ underwater, where individuals are trained to dive in pairs or groups and monitor each other for reasons of safety and comfort. Issues of trust and social comfort play a role in satisfaction and can contribute to ongoing diving participation [65].
Ultimately, a great deal of satisfaction associated with scuba diving is dependent on quality experiences within the marine environment [63, 66]. However, some aspects of the marine environment are beyond the service provider’s control [63]. For example, divers anticipate experiencing high quality marine flora, fauna, good weather and ocean conditions [67], and in adverse conditions satisfaction can decline. In fact, Dimmock [68] found the impact of externalities such as weather and ocean conditions were significant environmental issues which can hinder scuba diving excursions and challenge scuba diving operators in meeting their business goals and the divers’ satisfaction.

Interaction between divers and the industry is assisted by the increasing use of technology, including social media which has helped to meet demand and improve diver education and networking throughout the diving community. Social media extends word-of-mouth marketing and promotes awareness and perceptions towards diving destinations, sites and underwater experiences through dynamic platforms [19, 69].

**2.3. The host community**

Newly emerging economies and developing nations are increasingly sought after by divers in the search for new dive sites. The Coral Triangle of Southeast Asia is arguably the world’s leading recreational scuba diving destination, combining accessibility and recognition for outstanding dive quality [17]. In fact, regions along the equatorial zone are popular for their diving sites and newly emerging economies. Hence, there is a potential for ecotourism activities, such as scuba diving, to open new destinations and enable host communities to benefit [71].

Host communities play a critical, yet often overlooked, role in SDT. Regular demand and supply of scuba diving tourism services generates patterns of interaction between environmental and social systems involving host communities [72]. For communities with pristine natural resources these interactions have high potential to create positive livelihood benefits for residents [26]. For example, the scuba diving tourism industry can provide local opportunities for training and employment as boat skippers, underwater guides or dive masters. Related tourism service industries can also provide opportunities for employment
and enterprise development. Employment may transform a community by dispersing significant income within the locality and creating potential beneficial opportunities for residents [73-74]. In a similar way, divers’ willingness to pay to access areas such as protected marine reserves or pristine resources can provide finances and salaries for marine park managers and other marine guardianship roles [75].

How destination communities respond to changes in the social fabric created by tourism is an indicator of management and sustainable goals [72]. For example, the tourism model applied to scuba diving tourism in the US Virgin Islands raised concerns about the equity of the industry’s economic impact and broader connection with the destination [31]. As well, Daldenez and Hampton [76] found different environmental and economic priorities among dive industry stakeholders in Malaysia, highlighting opportunities for collaboration to support positive social outcomes across the destination [70].

It is important to understand and monitor the benefits to host communities [27] and a systems approach can facilitate this. Opportunities can be missed if the SDT sector is not working closely with the host community, as Hillmer-Pegram’s [31] research found. It has been suggested that positive responses from divers to a destination can lead to further investment in the destination, but that does imply broader management and community involvement and benefits [54]. For example, ownership of scuba diving tourism operations from outside the community can lead to economic leakage and external influence on business decisions, particularly in developing locations, constraining the development potential of the host community [70]. In fact, Daldenez and Hampton, [76] found substantially low levels of host community participation in scuba diving tourism and supporting businesses in some Malaysian islands. In that study local ownership was small scale with external business ownership predominating through external investment in destination infrastructures.

Community based projects like the Shark Reef marine reserve in Fiji attest to the potential for change in lifestyle practices which favour conservation and protection of marine species [77]. The conservation of marine species and local ownership of shark diving tourism operations led to the host community becoming custodians of an internationally recognised
dive tourism destination which can empower and benefit the community. In South Africa, studies on socio-economic impacts of SDT have drawn the host community attention to the conservation value of natural resources, including marine flora and fauna which helped to develop a tourism niche for shark diving [78]. However, financial benefits for locals are often not achieved [79]. Consequently, there are calls for improved opportunities for local residents – ones that generate work opportunities, sustainable livelihoods and positive socio-cultural outcomes [26, 76, 80].

2.4. Marine environments

The SDTS depends on the accessibility, careful management and responsible use of the marine environment. The industry’s reliance on quality marine environments is evident in the regular use of Marine Protected Areas (MPAs) which are a significant attraction because of the quality of underwater sights they offer. However, MPAs are established primarily to conserve marine flora and fauna [18, 81], and therefore protection from human impacts is critical. Meanwhile, evidence of poorly managed marine protected areas has been noted, especially in tropical locations with developing economies [82]. In Curacao, poor state-based governance of marine parks led private sector marine conservation organisations, including scuba diving tourism operators, to assume greater responsibility for reef protection [83].

Scuba diving tourism may offer financial support to enable marine conservation in many locations. Local governments are also able to invest in monitoring marine environments, encouraging research and preventing overfishing and other negative impacts [84]. Negative impacts on marine resources from diving have received attention for some time with early recognition of the potential for mass diving tourism to damage ecosystems [85]. For divers and diving industry operators, marine environmental management strategies include improving underwater behaviour, particularly ensuring the absence of contact (fins, body, cameras) with benthic systems and removing boat anchors from substrate. Meanwhile, ongoing research remains alert to trends in diver behaviours and impacts with reports noting that divers cause less harm to marine ecosystems than poor land-use practices and other social activity in host localities [17, 86]. These broader environmental impacts create
vulnerable marine environments through excessive construction and infrastructure development with increasing pressure from population [87].

3. Discussion

Ensuring the sustainable future of scuba diving tourism requires an understanding of the issues which arise from divers’ desire to maximise their experiences, the industry efforts to enable these experiences while achieving commercial goals, the host community needs and priorities, and the imperatives to preserve pristine environments and conservation values in the long term. These complex and sometimes competing goals can challenge the multiple stakeholders who utilise, manage and value marine environments [30, 35, 37]. It is also evident that Scuba Diving Tourism (SDT) in marine environments can create issues which have consequences in local, regional, national and global contexts [29, 30]. Yet SDT requires sustainable principles and practices if fragile marine resources and quality scuba diver experiences are to be available in the future [19].

There are many advantages in using of a systems approach to encourage the use of sustainable principles and practices in the management of SDT. Firstly, a systems approach can ensure that important ecological and social elements (like marine ecology and the host community) are integrated into policy and management decisions. Additionally, a systems approach reveals the complexity of SDT activities and the multiple stakeholders involved in its delivery. This, in turn, encourages integration of the views and needs of multiple stakeholders into policy and decision making in a holistic and systematic way. Incorporating the different views and concerns of multiple stakeholders to address issues enhances creativity and innovative responses and enhances the potential for greater acceptance and commitment by different sectors of the SDTS.

More narrowly focused or sector specific approaches can exclude the concerns of particular people and contexts in ways that hamper sustainability goals [37]. Scuba diving operators, for example, can experience a lack of social and political support which challenges their efforts to operate sustainably [31]. However, a systems approach provides greater opportunities for stakeholder collaboration and shared responsibility, and an active role in
the co-management of social and ecological resources [30]. A systems approach is also advantageous because it encourages policy-level decisions that incorporate all stakeholder views, and encourages commitment from all stakeholders in addressing issues and sustainability goals [23]. In this way, a systems approach can also lead to improved relations between those with a stake in scuba diving tourism, especially marine-based tourism operators and those responsible for governance and management.

Nevertheless, incorporating the concerns of diverse stakeholders can add a layer of complexity in decision making. For example, environmental concerns prioritised by some stakeholders may not be a priority for other stakeholders who instead support growth and development and are focused on economic outcomes [32]. The diverse and interdisciplinary nature of stakeholder perspectives which underpin the proposed ecological and socio-ecological model of the Scuba Diving Tourism System (SDTS) can inevitably create tensions produced by differing values and priorities. Such tensions do not necessarily mean conflict, and can be a catalyst for greater awareness and innovation, providing foundations for improved management practices and sustainable futures. Each stakeholder in the proposed model has different agendas which can challenge sustainable goals. This highlights the need for co-operative relations [33, 44].

Thus, a systems approach requires greater commitment to the inclusion of differing viewpoints and the development of more holistic and sustainable solutions. This is sometimes considered a disadvantage of using a systems approach since greater time and resources are often required [28]. However, it is becoming clear that a more inclusive framework to ensure all views are heard and valued is an important step in ensuring the effective management and sustainability of SDT [28, 30, 35-36].

Practices which encourage multi-stakeholder participation and adaptive management approaches can benefit the SDTS, given diverse perspectives and priorities across the range of stakeholders [26, 30, 35]. Adaptive management can provide iterative processes which recognise that environmental resource systems are only partially understood and the whole range of stakeholders have to contribute to sustainable management in some degree. Collaboration can ensure that the whole SDTS is focused towards common and agreed upon
goals. Through communication and knowledge sharing, as part of future focused outcomes, adaptive management involves tracking resource conditions by sharing information decision-making processes [88]. This information exchange between stakeholders benefits the system. Adaptive management aims at integrating the complexity of stakeholder knowledge and expertise through an evolving process which incorporates social, economic and environmental specialisations [89]. Such an approach relies on connecting the three key dimensions of policy, problem-solving and practice [89]. Meanwhile the process of achieving consensus among system stakeholders can use a value-focused process to increase informed and broadly accepted decisions [93, 94].

Though there can initially be differences among stakeholder perspectives, ongoing commitment to achieve agreement is important. Sustainability leadership can contribute to this goal as it involves a collective shift in consciousness and efforts to re-engineer processes [95]. Differing views are common within systems; however effective leadership can help integrate stakeholder views in ways that benefit the whole system [96]. In this way, there can be a sense of collective responsibility shared by all stakeholders in the system [97]. Redekop [98] points out that part of the challenge lies in overcoming personal and immediate needs at the expense of future goals, for the greater good. The idea is to encourage future-oriented behaviour at all levels.

For the diving industry, leadership can help to engage the host community in a range of adaptive management opportunities, and to encourage participation and build inclusion. For the destination, the natural resource is a source of livelihood which involves both constraints and opportunities. Through collaboration and community involvement there is potential for improvements towards sustainability. Specific examples include industry-driven initiatives for whale shark diving in the Seychelles, which effectively created opportunities for stakeholders, including economic outcomes linked to conservation values [99]. In Mexico community-based whale shark tourism also led to collaborative management and codes of practice which were then adopted in multiple destinations across the country [100]. Identifying issues and changes that can be collaboratively managed is essential to sustaining the SDTS [25]. Many problems which confront society involve the complex interactions between ecological and social systems from the global to a local level.
4. Conclusion

The model presented in this conceptual paper proposes the key elements of the Scuba Diving Tourism System (SDTS). Important to the system is a focus in the marine environment on which all stakeholders, including the host community, are dependent. A sustainable future for SDT requires inclusion, collaboration and collective responsibility between all key stakeholders. It also requires effective policy, problem solving and practice to which all stakeholders are committed. A systems approach to the SDTS may be a powerful collective platform for improved policy and management practices. It represents an innovation that has the potential to build sustainable futures for marine ecologies, scuba divers, scuba diving operators, tourism interests and host communities.

Scuba diving in sensitive and fragile scuba diving locations requires effective management to protect ecological and cultural values and ensure the sustainable use of resources. Marine environmental sustainability is a critical global issue which, nonetheless, has the potential to be a strategic business opportunity for host communities and the scuba diving tourism industry that seeks to attract tourists to a destination. In the search for sustainable approaches, understanding and integrating social and environmental systems, and the needs and issues of all stakeholders involved in the SDTS, will be important in both policy and practice. This conceptualisation of the SDTS represents a critical point from which to advance these sustainability goals.

Future research might apply this model to specific locations and contexts. It could be used, for example, to understand stakeholder concerns and interactions, improve management and planning processes, review current issues and devise solutions, or analyse the barriers and benefits of using a systems approach. Further research is also needed to refine the model and analyse its efficacy in ensuring SDT has a sustainable future.
References


[78] Dickens ML. Socioeconomic aspects of the Sodwana Bay SCUBA diving industry, with specific focus on sharks. African Journal of Marine Science 2014; 36(1); 39-47.


