Leaping Forward

The Need for Innovation in Wildlife Conservation

LEELA HAZZAH, SALISHA CHANDRA AND
STEPHANIE DOLRENRY

As stated in Chapter 1, human–wildlife conflict is one of the most critical threats to wildlife, in particular the large carnivores; when they injure or kill domestic animals and threaten people, more often than not, they are killed in retaliation. For example, African lions (*Panthera leo*) have declined by at least 43 per cent over the past 21 years (Bauer et al. 2016) and indiscriminate killing by people poses the greatest threat (IUCN 2006). Conservationists have worked for decades to reduce the killing of threatened large carnivore species with the aim to increase their populations. The end goal has been to achieve coexistence and sustainable wildlife populations (Woodroffe et al. 2005).

We suggest that a linear view of coexistence is limiting (i.e. there is no end destination) and can reduce conservationists' ability to successfully understand the conservation context and implement effective long-term successful initiatives. To overcome this limitation, it may be useful to borrow insights from the business world and pedagogy of innovation to elucidate our understanding of how to maintain long-term coexistence. Innovation is commonly regarded as a new way, or at least a perception of a new way, of doing something within a given context (Zaltman et al. 1973; Cantwell 1989). In this chapter, we explore two types of innovation, incremental and radical, through the case study of a field-based lion conservation programme, Lion Guardians (www.lionguardians.org). Incremental innovation, which involves a low degree of new knowledge, moderately improves performance (e.g. minor adjustments to current conditions); whereas the higher risk radical innovation, involving a high degree of new knowledge, can enhance outcomes and performance in a dramatic fashion. Radical innovation, therefore, represents a clear departure from existing practice (Duchesneau et al. 1979; Ettlie et al. 1984;

Dewar & Dutton 1986) such as when Amazon leveraged emerging technologies and introduced a completely new business model within the need for physical retail space, or when rhino conservations introduced GPS and Google Glass technologies for anti-poaching efforts (Ortolani 2016). Radical innovation involves the development of a novel idea, demands out-of-the box thinking, yet the chance of success can be difficult to estimate, often resulting in opposition to such ideas (McKeown 2008; Biggs et al. 2010; Un 2010).

Until now, there have been only small pockets of hope in the conservation arena, with failures and evidence indicating a global decline of wildlife populations (Brashares et al. 2014). Since time is of the essence, we suggest that conservationists should restrict their focus on incremental innovations, as the pace of change fostered by this approach is too slow to actually save many of the declining species. Instead, a focus on radical innovation to shake up the conservation agenda is necessary. Pursuing an interdisciplinary approach, borrowing from other advanced fields and ultimately taking bigger risks will provide the impetus for change that the current conservation landscape needs. Furthermore, without substantial long-term committed funds these 'radical' ideas cannot come to fruition. Unlike the business world, it is inordinately more difficult to raise funds for conservation efforts. Not only do businesses have access to various sources of funding, but also their ability to raise these funds is directly linked to results. The better the results, the more funds will flow towards that business. For the most part, this is not the case in conservation, making it difficult for these radical innovations to take hold and have impact on a larger scale.

17.1 THEORETICAL FRAMEWORK

In the simplest form, innovation refers to a change in the way something is done (Carrillo-Hermosilla et al. 2010). Most innovation takes place in the incremental mode (Hellstrom 2007; Van den Bergh et al. 2011). It is increasingly acknowledged in the literature that focusing on incremental innovation along traditional channels does not suffice for attaining challenging environmental goals, such as reducing human–wildlife conflict (Tukker & Butter 2007; Carrillo-Hermosilla et al. 2010). In addition, long-term incremental innovations cannot be sustained without radical innovation since an incremental effort will face decreasing marginal returns (Hellstrom 2007). Similarly, in the business world, CEOs want their organizations to innovate strategically. In particular,
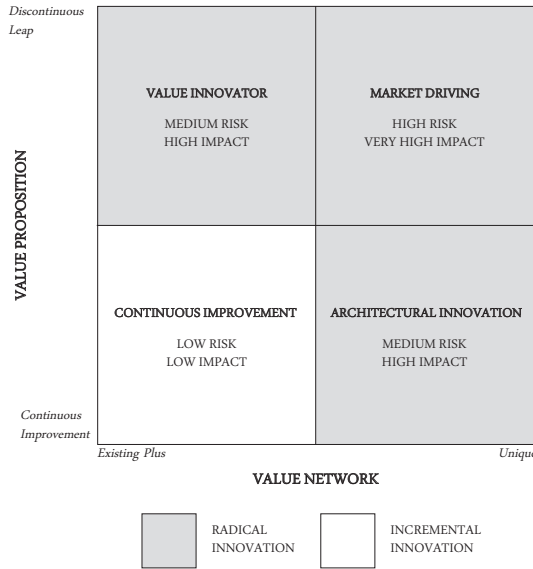
Figure 17.1 Types of strategic innovation.
Adapted from Kumar et al. 2000.

they stress the value of radical innovation because it allows a company to surge past its competitors and deliver sustained growth by creating new markets and/or by changing the rules of the game (Kumar et al. 2000). These strategic innovations are classified into four different quadrants based on how they modify the value proposition (combination of benefits and price offered to customers) or how they reconfigure the value network (alignment of activities required to create, produce and deliver the value proposition to the customer) and in special cases how they innovate along both these dimensions (Kumar et al. 2000) (Figure 17.1).

Most firms operate in the lower left-hand quadrant, using careful market research of customer needs to develop a slightly differentiated product or service. Companies such as Nestlé operate rather effectively in this space of *continuous improvement*. Take for example, Coffee Mate™ (creamer) that was introduced by Nestlé over 50 years ago. Since then it has essentially made minor improvements to suit customer changes such as providing non-dairy options (almond and coconut milk-based) and different flavours (caramel, macchiato, etc.). These are essentially minor modifications to the value proposition offered to the customer. Moving along the value proposition dimension, the upper left-hand quadrant is composed of *Value Innovators* or companies that focus on delivering

superior value on key factors to their customers, not just on staying marginally ahead of the competition. These companies do not expend their resources to offer certain product and service features just because that is what their rivals are doing. Through this they realize cost savings that are transferred to the customer and they are also able to free up their resources to identify and deliver completely new sources of value (benefits). An interesting example of this type of innovation is Kinepolis – the world's first megaplex that came into existence when the movie theatre industry in Belgium was declining steadily. Many cinema companies shut down and there was fierce competition among the remaining operators. While all other cinema operators turned their cinemas into multiplexes with small viewing rooms, Kinepolis built rooms with 700 seats, and so much legroom that viewers did not have to move when someone passed by. The seats themselves were oversized with individual armrests and configured on a steep slope in the floor to ensure everyone an unobstructed view. The screens measured up to 29 meters by 10 meters and rested on their own foundations so that sound vibrations were not transmitted among screens. Kinepolis was able to offer this radically superior cinema experience without increasing ticket prices because the concept of the megaplex resulted in one of the lowest cost structures in the industry. By going against the grain and providing customers with a discontinuous leap in benefits at the same cost of an inferior product, Kinepolis was able to take over 50 per cent of the market in its first year (Kim & Mauborgne 2004).

Diagonally opposite the *Value Innovator* lies *Architectural Innovation*. Companies in this segment offer a similar product or service to others in the same industry but they differentiate themselves by radically redefining components or the entire method in which the value proposition is delivered to the customer. For instance, easyJet (a low-cost airline launched 20 years ago in the UK) systematically redefined the purchasing, operations, marketing and distribution components within the value network to deliver low prices at a profit. easyJet managed to achieve distribution savings of about 20–25 per cent over other full-service carriers (e.g. British Airways) by encouraging internet sales, not using travel agents, not issuing paper tickets and not participating in industry reservation systems. Furthermore, it used a yield management tool to maximize revenues for each flight based on matching supply and demand. Most importantly, much of the saving in its value network was generated through radically streamlining the operations using fast turnaround times, a single type of airplane and elimination of kitchen and business classes.

Both *Value Innovators* and *Architectural Innovation* are radical innovations on a single dimension. However, on the upper right-hand quadrant lie *Market-Driving* firms such as Amazon, The Body Shop and IKEA which have created new markets and revolutionized existing industries. The success of such *Market-Driving* firms is rooted in radical innovation on two dimensions: a discontinuous leap in the value proposition and the rapid configuration of a unique value network (Kumar et al. 2000). We will delve into the details of this quadrant below by providing a conservation case study, Lion Guardians.

As evidenced by the success of companies such as Amazon, *Market-Driving* innovations bust the status quo leading to higher value for both the business and the customers than any other type of innovation. Nonetheless, the majority of innovation in the business world is incremental because organizations believe that creating a differentiated product or service based on detailed market research of customer leads to success (Kumar et al. 2000). In other words, most companies tend to operate in the bottom left-hand quadrant of Figure 17.1: inching along with *Continuous Improvement*. Similarly, most conservationists are naturally risk averse due to the apprehension of wasting philanthropic donations. In addition, the success or failure of a conservation organization is often directly linked to human life and livelihoods, making it much harder to recover from a financial or reputational loss than in the business world. To put this into the carnivore conservation context, field organizations primarily focus on developing new mitigation techniques to reduce human–wildlife conflict. These incremental innovations often only solve part of the problem or shift the problem. For example, many conservation organizations working on carnivore conflict issues invest resources into building better bomas/livestock corrals. From fortified steel mesh to *lion lights,* many options are being tried and tested across Africa (Okello et al. 2014; Manoa & Mwaura 2016). While there is evidence that this kind of incremental innovation may reduce predators entering homes by fortifying the livestock enclosure (Okemwa 2015; Manoa & Mwaura 2016), it does not solve the issue of human–wildlife conflict outside of the boma, where much of the conflict takes place. Furthermore, it could also shift predatory behaviour to a neighbour's home and/or cause people to become less risk averse to potential predator damage. Carnivores could also adapt to the changes/product improvements, making them obsolete. As a result, the impact of these incremental innovations may not be sustained in the long run.

Conversely, we need to consider how immense the impact of conservation could be if we chose a higher risk, market-driving approach to the

issues we are combatting, i.e. operated in the top right-hand quadrant of Figure 17.1. Take for example the Aravind Eye Hospital in India that was founded to *eradicate needless blindness*. It began as a modest eleven-bed hospital in the house of the founder and today is one of the largest eye-care systems in the world with over 4,000 beds, servicing close to 7 million patients, 60 per cent of whom receive the service free of charge. The secret behind this lasting and high impact non-profit organization is a radically innovative approach to funding, marketing and delivery of eye-care to both the wealthy and the impoverished (Rangan & Thulasiraj 2007). Specifically, Aravind developed a self-funding model where the 40 per cent who are able to pay for the service provide enough margin for the hospital to deliver the same level of treatment to the 60 per cent who cannot (Rangan & Thulasiraj 2007). In other words, the hospital provides identical service to all its patients regardless of their ability to pay. In this way, the founder managed to change the rules of the game by providing a high quality and competent service to all patients (a higher value proposition). They also standardized eye-care treatment allowing for mass delivery of services (a unique value network). This spurred a discontinuous leap in the eye-care industry where patients from both extremes of the economic spectrum come to the same hospital for eye-care. In the past, the poor and the rural village dwellers could only go to public hospitals where they may or may not have gotten what they needed. This example illustrates how a non-profit organization, even when the stakes are high, can make lasting and sustainable impact through radical innovation.

It is, however, important to note that both types of innovation are required for sustained impact and that one cannot exist without the other. The association between incremental and radical innovation in conservation can be understood in terms of the adaptive cycle from the social-ecological system (SES) theory, which focuses on interactions between people and ecosystem (Berkes & Folke 2000; Gunderson 2001; Holling 2001; Biggs et al. 2010). This is particularly important when managing complex social and ecological systems, where not enough information is available, since that means projects and organizations have to learn to adapt to uncertainties (Holling 1973; Holling & Meffe 1996). Feedback loops are used to help improve management decisions and adapt to uncertainty (Olsson et al. 2004). The front loop can be seen as incremental innovation that improves and strengthens the current effort and change can be slow and more deliberate; while the back loop provides an opportunity for more radical innovation and

unpredictable change is introduced (Plowman et al. 2007; Biggs et al. 2010; Westley & Antadze 2010).

Similar to the continuum of coexistence, there is a continuum of innovation (Hage 1980). In the business world, the history of innovation consists of one-off radical innovations that disrupt industries followed by minor incremental changes. Following the initial burst of radical innovation, similar or slightly superior products enter the market until the next radical innovation redefines the industry and so on. For example, IKEA burst into the furniture retail market in the 1950s with a unique value network and high value proposition, disrupting the way furniture was purchased (Kling & Goteman 2003). It focused on young people and families and developed big stores outside of city centres where customers picked the products themselves in direct contrast with the way traditional furniture stores operated. Not only did IKEA change the way the product was delivered, it provided classic clean Scandinavian designs at affordable prices, thereby also upping the value proposition for the customer. By effectively turning the furniture retail market on its head, IKEA has grown from strength to strength; from a mail order company that used a milk van to deliver its furniture, today IKEA is a multi-channel home furnishing retailer with 183,000 employees, turnover of \$37.6 billion and 392 stores worldwide.

Similarly, in the conservation arena when Lion Guardians was initiated in early 2007, it was with a unique approach that also increased the benefits to the communities that live with wildlife. Wildlife conservation traditionally focused on the species in question, not the people. Lion Guardians took the opposite approach and focused on the people. Together, conservationists and communities developed a model that blended traditional knowledge and culture with science that resulted in enhanced and dramatic impact on lion conservation in southern Kenya. The radical innovation that is known as the Lion Guardians model has ultimately transformed people who once killed lions into their guardians and reduced lion killing by more than 90 per cent (Hazzah et al. 2014).

As we delve into the Lion Guardians case study, we will highlight the parallels with the business world, in particular using the IKEA example to further showcase the importance and relevance of precepts such as radical innovation in the conservation arena. Additionally, we will discuss how conservationists may learn and adapt successful innovative approaches from the business world.

17.2 CASE STUDY: LION GUARDIANS

In response to the high level of lion killing (over 160 lions in an eight-year period; Hazzah et al. 2014), we initiated a conservation programme, called Lion Guardians, in which traditional Maasai warriors (henceforth Guardians) were employed. Until this point most conventional conservation organizations were focused on studying lion behaviour, collaring lions and conserving them in protected areas. Just as IKEA set up shop outside of the central business area to reduce cost, Lion Guardians focused on community lands (non-protected areas) and hired individuals with no formal education and with past killing behaviour. In so doing, Lion Guardians essentially changed the rules of the game (the value network; see Table 17.1 for specific details of Lion Guardians' unique value network).

Prior to being appointed as Guardians, many of the warriors were renowned lion killers with vast influence and respect in their communities. Lion killing has traditional significance within the Maasai society. The Maasai have historically valued lions (except when they have attacked livestock) because they provide warriors with a cultural role that reasserts their power and strength as they protect their communities (Hazzah et al. 2017). Protection of community –whether marauding animals or encroaching tribes – is the primary job of a Maasai warrior.

The programme provided incentives through conservation-related employment, training in literacy (the majority of Guardians at time of employment are non-literate) and scientific monitoring, and community assistance, all directly linked to the presence of lions (see Table 17.2). For example, job opportunities as Guardians only become available if and when lion densities are shown to have increased; and if they decreased then jobs would be removed. During employment, the Guardians lived and worked from their home communities and wore traditional clothes as their uniform (see Table 17.2). They took pride in their strong traditional knowledge of their environment, abilities to track lions on foot and to protect their communities (e.g. alerting herders to lion presence to proactively prevent attacks on livestock and assisting in better husbandry practices) (Hazzah et al. 2014). Guardian jobs were in high demand because warriors could live at home and use their specialized tracking skills and their confidence working near large wild animals (Dolrenry et al. 2016). By focusing on the issues affecting the people and their values, Lion Guardians

Table 17.1 *Lion Guardians' unique value network: key differentiators that allowed Lion Guardians to change the way carnivore conservation was effected in the community lands of the Amboseli-Tsavo ecosystem*

	Solution design	Focus area	Delivery	Marketing/ fundraising
Traditional conservation organizations	Fit/customize existing solution External solution imposed (low risk)	Protected areas Species-centric	Trained scientists High cost	Emotional appeal
Lion Guardians	Participatory approach to solution Strong model of behaviour theory change Establishment of trust Problem solving – understanding the root cause of the problem Experimental and adaptive – learn by doing and continue to adapt by using feedback loops (high risk)	Community lands People-centric	Indigenous community members with no formal education Leverage traditional ecological knowledge Cost-effective Targeted employment and volunteer process Marriage of modern science and traditional knowledge	Result-based

was able to provide a discontinuous leap in benefits to the communities – making it attractive for them to conserve lions instead of killing them. The most effective part of this equation is that, like IKEA, Lion Guardians was able to deliver these benefits to the communities while reducing the sacrifices or compromises that community members would have to make. IKEA customers did not have to sacrifice on design or choice even though they were paying significantly less; communities in Lion Guardians areas could continue to live in their traditional and chosen manner while losing less livestock to depredations.

Table 17.2 *Key factors that triggered conservation innovation and the formation of the Lion Guardians conservation model, acted as sources of ideas for alternative approaches (bricolage) and facilitated diffusion of new approaches (contagion) (adapted from Briggs et al. (2010))*

Factors	Lion Guardians example	Illustrative qualitative narratives
Impetus for innovation	1. Eradication of lion population within the ecosystem (minimum of 160 lions killed between 2003 and 2011). 2. Disenfranchisement of the warrior age-set and erosion of Maasai cultural practices and traditions. 3. Strong cultural drive to kill lions to gain prestige and inadequate legal ramifications imposed by the government for killing. 4. Historical conflict between pastoralists and government over land and resources restrictions. 5. Strong institutional support via an umbrella organization (Living with Lions) that gave Lion Guardians the breadth to explore and innovate. 6. Funds secured for pilot of the model. However, radical innovation is often difficult to fund. Wildlife conservation society the Great Cats Program (now Panthera) provided the funds to start the pilot in 2006 (initially $25,000).	'Killing lions is what I grew up with; there used to be so many lions when I was younger. We almost wiped them out' (Maasai elder 2006) 'If we don't stop killing all the lions then we will end up with none very soon, and this is what our fathers did to us with the rhinos' (Lion Guardians 2007) 'We often don't like wildlife because our age-set is left out and we are harassed by the older age-sets who are employed as game scouts. We [warriors] would start to like wildlife if we were given [an] opportunity to work with them' (Maasai warrior 2005) '*Olamayio* [traditional lion hunt] was formed only for warriors to show off our strength for women. It brings immense prestige to the warrior who spears the lion first and is very important to Maasai culture' (Maasai warrior 2005) '… those foxes [government] just get money from wildlife and they forget about the problems people encounter from wildlife – have taken all our fertile land as protected areas, and those wildlife are killing people, eating our livestock' (Maasai elder 2006)
Bricolage: sources of alternative ideas and approaches	1. Engagement of key stakeholders: spent time living in Maasai communities and studied the drivers/motivations behind lion killing (Hazzah 2006). During this period trust was built with the communities, specifically the warriors. Trust cannot be overemphasized as a critical component for community-based innovation to occur.	'Let us warriors help conservationist[s] monitor lions. Our tradition and culture makes us the best and most experienced people to save lions. And most important is I am not removed from my culture and my people' (Maasai warrior 2006)

2. Building the model: over fifty brainstorming sessions (informal) with key warrior leaders and lion killers led to discussions about them feeling marginalized in conservation and how they had the traditional knowledge and skills to protect lions if given the opportunity due to their years as herders. Also, how conservation-related employment would allow them to fulfil their traditional role as warriors in the community (protection via mitigation) while also earning a living to provide for their families.

3. Discussions with other conservationists and scientists about how to integrate a high-risk model.

Contagion: adoption and diffusion of new ideas

1. During the pilot we worked with a local long-standing NGO (Maasailand Preservation Trust – now Big Life Foundation) to help the recruitment of warriors/ Guardians and get advice on management issues. After the initial five Guardians were hired we realized that political appointment of Guardians was not providing the highest quality candidates. By January 2007, we shifted to a new hiring model. We informed communities of a vacancy and provided them with a phone number to call in with any lion reports. Warriors would volunteer for months looking for lions and the best candidates – those with exceptional tracking skills, strong work ethic/ commitment and leadership skills – were offered employment.

'We can track lions in the dark, with our eyes closed, and we will never fail at it' (Lion Guardian 2008)

'We live with the community, wear shukas [traditional clothes] and nothing can be hidden from us. We are leaders in our own right and we will use our positions to improve the image of our project and save lions' (Lion Guardian 2013)

'Conservation of wildlife is the mandate of the Kenya Wildlife Service, but this work is too huge for us to achieve alone. We need other stakeholders to support us with this mandate' (Julius Cheptei, Kenya Wildlife Service 2015)

'I never thought as a herder I would ever be given such an opportunity. And what is even better is that this programme is only for traditional warriors who have never been to school – it is our programme' (Lion Guardian 2007)

'Lion Guardians has given us the opportunity to gain formal, gainful employment. It has helped us as individuals and known lion killers, saved us from a life behind bars' (Lion Guardian 2014)

'Before I become a Lion Guardian I killed eight lions, and was known and respected by many far and wide. Over the past eight years I have stopped over 100 lion hunts and risked my life many times to ensure my lions are safe' (Lion Guardians 2015)

(*continued*)

Table 17.2 (*continued*)

Factors	Lion Guardians example	Illustrative qualitative narratives
	2. For the first two years of the programme we held monthly meetings with all the Guardians to continue to improve and adapt the model, and to ensure it was culturally relevant and impactful. We also met with community leaders/elders each month to hear their suggestions. In addition, every year we conducted a systematic questionnaire throughout the communities to get broad-scale feedback.	'After I heard about Lion Guardians I encouraged people to stop killing lions. I did this because I am happy that my son no longer endangers himself going out to kill lions but is employed instead' (Maasai elder 2007) 'You may find a Lion Guardian who has no livestock is of equal social status to someone who has more than 400 livestock. A person who owns livestock might lose them one day, while the Lion Guardian continue to get benefits from lions' (Lion Guardians 2007)
	3. Ownership – high level of participation (mainly through monthly meetings, weekly field interactions during lion tracking, naming of individual lions) led the warriors to feel a strong sense of ownership over the programme and also their lions. For example, the name Lion Guardians was voted on by the entire team with each member getting one vote.	'The first lion I saw roaring was Sikiria. When we collared Sikiria, I touched him with my own hand and the day after I saw him walking around, which made me very happy. When Sikiria mated with three females they all had many cubs who are now sub-adults lions. I know all these sub-adults by name and I protect them like my own children' (Lion Guardians 2013)
	4. Support and attention – having dedicated people, both Guardians and biologists, on the ground responding daily to reports was critical in driving the programme forward. Particularly, Guardians needed to know they were supported by the main camp and that their reports were being responded to and there were opportunities for ongoing and consistent training.	"Lion Guardians are protectors of lions and livestock – we are part of a programme that develops coexistence' (Lion Guardians 2016) 'I have never been to school and thus never held a pen before. I first held it like a spear. But I am now proud that I can write my name, fill data forms and even use a GPS.

5. Allowing the model to transpire organically. We did not come into the communities with a preconceived solution on how to save lions and help communities. We listened to the communities, most importantly, the warriors, and from their ideas and suggestions the Lion Guardians model began to take form.

6. Scaling Lion Guardians – in 2008 we began getting interest in our model from surrounding Maasai communities; they began to demand Lion Guardians at their sites. In 2009 we expanded the programme to two new areas and in 2010 we did a final expansion covering all the core communities in the Amboseli-Tsavo ecosystem. By 2011, we began sharing the model with other sites in Africa.

This has brought me so much respect in my community' (Lion Guardians 2015)

'Once the community accepts you as a Guardian, they don't hide anything from you. A hunt can be stopped simply because they respect you and don't want to jeopardize your job' (Lion Guardians 2013)

'Lion Guardians is one of the most important answers to lion conservation that I've seen. There's no doubt it has turned the tide for the Amboseli lions, and it has terrific potential to do the same for lions in large parts of savanna Africa' (Luke Hunter 2013)

'The Lion Guardians philosophy is intriguing. In Ngorongoro Tanzania, local communities have not had the chance to participate in wildlife conservation. When I heard about this programme, I saw it as an opportunity for the pastoralists in my area in Tanzania to be fully involved in conservation in a meaningful way' (Maasai elder 2014)

Lion Guardians was piloted in September 2006, and began in earnest in January 2007, covering a 1,229 km² area in the Amboseli-Tsavo ecosystem (Table 17.2). The programme started with five Guardians and over the years has grown to cover over 4,000 km² in Kenya and has been adapted to other sites in Africa with approximately eighty warriors employed in Guardian-like positions. As we saw with the IKEA example, the radical innovation that Lion Guardians brought to carnivore conservation changed the landscape. Since then other organizations in Africa have adapted the Lion Guardians model (e.g. Ruaha Lion Defenders, KopeLion Ngorongoro, Long Shields Zimbabwe). Meanwhile, over the course of the last ten years, Lion Guardians has continued along the path of continuous improvement; through incremental innovation several elements have been added to the model (see lion naming example in Table 17.2). Similarly IKEA has branched out from being purely a furniture store to a one-stop shop for all home furnishings and has started to branch out of its traditional Scandinavian design to appeal to global markets.

To illustrate the key factors that allowed for radical conservation innovation to take place to conserve lions in Southern Kenya, we adapted Table 17.2 from Biggs et al. (2010) and provided qualitative examples. As Biggs et al. (2010) suggested, we grouped the key factors along three specific dimensions that have been highlighted in literature to be important dynamics in social innovation: (1) impetus for innovation – which factors triggered and supported innovation, (2) bricolage – which new ideas were necessary to form a novel approach and (3) contagion – diffusion of the new ideas and how they were adopted/implemented. In addition, the final column is based on interviews with Guardians and other key stakeholders including Maasai warriors (Hazzah 2006, 2011). We pooled quotes that qualitatively supported and facilitated the innovation of Lion Guardians.

Most importantly, radical community-based conservation innovation can only take place when there is trust between the communities and the conservationists (Hahn et al. 2006). Establishing this trust can be difficult, time consuming and nuanced. Every community is different, with varied values, needs and socio-cultural practices. These all need to be understood and respected before productive discussions can ensue. In some places this could take months; in others it could take years; thus, patience and endurance are key. This also includes being respectful about the dress code of a specific culture and engaging in appropriate customary greetings and exchange of news. In the Lion Guardians

example, we spent a year listening to stories, participating in community events such as traditional ceremonies and church revivals and helped transport sick community members. We did not talk about lions or conflict; we let those conversations happen organically once the trust was built.

Innovation cannot be directly planned but is stimulated by creating an environment conducive for new innovation (Westley 2002; Biggs et al. 2010). One of the key elements recognized in the business world in creating this conducive environment is *allowing space for serendipity* (Kumar et al. 2000). Successful market-driving firms create an environment where individual creativity can flourish. For example, 3M Company, the American multinational conglomerate corporation, provides a large variety of centres and forums where ideas can be generated, shared and nurtured; employees are enabled to pursue their own research projects. The confluence of one of these research projects and the forums was the birth of the now well-known Post-It Note (Govindarajan & Srinivas 2013).

Much of the formation of Lion Guardians happened organically, and once the warriors generated the idea and took ownership over the model it enabled radical innovation to transpire naturally. Since then we have bolstered it with incremental innovations. For example, once the Guardians started to spend time with the lions, they started to give them Maasai names. In Maasai culture everything important has a name and thus they took pride in naming the lions, as well as in videotaping and photographing them to show to their communities (Dolrenry et al. 2016). They told stories to the elders, women and children using the lions' Maasai names, personalizing the lions to the broader community. No longer were lions simply anonymous enemies; they became individuals even to the community members not directly involved in their monitoring and conservation. A survey conducted in the study communities in late 2012 showed that 55 per cent (n = 85) of randomly sampled respondents across the ecosystem knew the name of at least one lion (Dolrenry et al. 2016). At an important community meeting one Guardian stated: 'There is a very deep connection between the Guardians and the lions we name. This connection can only be compared to the bond between best friends, or the feelings you have for your best cows.' At the time of creating the Lion Guardians model we had no idea that naming lions would have been so important, but because the model was adaptable and the Guardians felt comfortable and were part of the creation process, the environment of serendipity fostered innovation to continue to transpire.

In the Lion Guardians example, we found it important to initially reframe the lion–people relationship with the warriors in particular, but also the broader community, as part of the radical innovation stage. Additionally, we believe we were able to better engage the relevant stakeholders – the warriors that were killing the lions – by fostering a group identity and building a place for them to be recognized for their traditional roles that encourage bravery and courage (Hazzah et al. 2014; Dolrenry et al. 2016). This cannot be understated; part of what made this a successful innovation is the time investment and attention that each Guardian was given from the beginning and the opportunity for them to fully engage both in monitoring/ecological data collection and conservation. We believe that giving consistent respect and attention (i.e. responding to their reports, listening to their suggestions to improve the programme, etc.) was absolutely critical to getting the appropriate buy-in of the programme. The Guardians' perspective was also influenced by exposure to the lions and the informal interactions they had with them (Dolrenry et al. 2016). We observed how the interest in and attachment to the lions grew exponentially through informal experiential activities of tracking and then observing the lions as individuals within their natural settings (Vredenburg & Westley 1997).

At the core of any resilience model are components that focus on facilitating feedback loops and allowing for high levels of participation and monitoring, which often is what allows an initiative to be adaptive (Colfer 2005; Mutimukuru et al. 2006). Despite full participation being customarily emphasized in theory, in practice communities are often marginalized (Cooke & Kothari 2001). If marginalized groups are involved in the decision-making process (about rules and practices) and in monitoring their own resources, then their needs and interests are more likely to be taken into account (Dangol 2005) and a sense of ownership over the resources will emerge.

An example of the strong buy-in was witnessed in 2014, when thousands of warriors armed with their spears intended to kill wildlife in protest over a disagreement of land and human rights issues with the government. They felt the government was not listening to them and the only way they could be heard was by killing the *government's wildlife* (see Table 17.2). At this time, the Guardians were asked to cease work by their leaders to avoid getting injured while carrying out their duties. Even so, the majority of the Guardians found innovative ways to continue to safeguard the lions by using their position and knowledge as a Lion Guardian as they did not want to stand by and see their lions killed

(Table 17.2). Some would send the hunting parties in the wrong direction telling them they saw lions in a specific area the day before, others told hunting parties to avoid a certain pride because the lion's collar would take pictures of the killers and send it immediately to the government, and others more directly protected lions and risked their lives by standing in the path between the lions and the hunters and worked to dissuade their peers through compelling reasons not to kill lions.

In addition, literature has suggested that personality traits affect a person's ability to be entrepreneurial and to execute radical ideas (McCauley & Van Velsor 2004). We targeted lion killers with specific field skills, personality traits and leadership capabilities to carry out the innovation. When hiring Guardians we asked for months of volunteering to fully understand if they held the right traits and skills necessary to track and protect lions. This was a focused selection of a targeted group rather than an opportunistic hiring process. In retrospect, this was a key factor of why the innovation was successful. We believe that the programme will only be as strong as the employees who are on the ground working diligently every day, and therefore, a selective/targeted process is likely the most straightforward way to achieve this.

It is important to note, however, that in spite of being a radical innovation, Lion Guardians has not been able to scale and amplify its impact similar to Aravind Eye Hospital or IKEA. As aforementioned, the reason behind this is the fundamental problem that plagues conservation – a funding model that is not aligned with the types of results achieved in conservation. In the case of IKEA, for instance, the feedback loop between buyer and seller is much clearer and this market advantage is borne out in financial results that make the business sustainable in the long run. With Aravind, the unique approach of streamlined operation costs together with a for-profit arm allowed it to scale without having to rely on altruistic donor funding based on a good deed feeling rather than on a financial return on investment. In conservation, it can take decades to realize and verify benefits. Furthermore, often these benefits are hard to monetize or hard to specifically credit to a particular conservation intervention (Huwyler et al. 2009). Accordingly, Lion Guardians has adjusted its growth model to broaden impact using a knowledge-sharing service delivery concept rather than a franchising of expansions of Lion Guardians' core operations to several sites. This allows the organization to maintain streamlined operations and a smaller cost base as we try to achieve broader impacts. In addition, the knowledge-sharing delivery model could be a fund-generating source as

we are providing a tangible service in exchange for appropriate remuneration. However, it is unclear whether the fees generated from knowledge sharing will ever be sizeable enough to support the organization, as our customers themselves are other conservation organizations.

After a decade of operations, given the changing contexts (cultural shifts, human and lion population expansions, and climatic factors) we are now beginning the cycle of gathering new knowledge so as to evaluate whether radical innovation is needed once again to continue to enhance outcomes and performance profoundly as it did during the creation of Lion Guardians. It has been essential to manage human–carnivore conflict through applying incremental innovation since our radical innovation a decade ago. However, another radical innovation may once again be necessary to meet the growing demands and increasing strain that is put on the communities and lions as we move along the coexistence continuum.

17.3 DISCUSSION

Both in the business world and the conservation space, the theory and our examples clearly illustrate that organizations need to be ambidextrous and versatile. They need to be capable of managing both incremental and radical innovation. This is often difficult, given the contrasting needs of these two types of innovation. Maintaining an environment that is conducive to radical innovation is more difficult as organizations become larger and set in their ways. Accordingly, it is incumbent upon the leadership driving the organizations to maintain an environment that nurtures innovation with a focus on outcomes and impact – not on activities and tasks. In addition, the organizational structure and strategy have to be realigned over time to reflect the changing environment. IKEA is known as one of the world leaders in innovation and it continues to maintain its market advantage by innovating, keeping its core strength in mind – its unique value proposition of classy furniture design at affordable prices delivered through a unique value network (Tushman & O'Reilly 1996; Kumar et al. 2000).

Based on our experience at Lion Guardians and examples from the business world, we posit that using incremental innovation and feedback loops is necessary to maintain and sustain coexistence for periods of time. However, at certain times or in areas where species are declining rapidly or there is a dramatic shift in the system (e.g. cultural

erosion, subdivision, etc.) radical innovation needs to be prioritized, since time to save species is running out.

For both types of innovation, it is important to have an informal setting where trust has been established and mistakes are accepted and integrated, since an overformal structure may compromise organic innovation and exchange of ideas and trust (Vredenburg & Westley 1997; Gunderson 1999; Hahn et al. 2006; McKeown 2008). A key component of innovation is fitting the programme within existing needs and values of the community; however, many conservation groups focus more on understanding the needs of species or ecosystems (Sorice & Donlan 2015).

Furthermore, we have found it important to remember that innovation and coexistence are both non-linear processes. There are often periods of time when new ideas or approaches have limited adoption or when community tolerance is decreased. Studies show that it takes time to appreciate the value of the ecological attribute that is being lost and to establish the likely cause (Gunderson 1999; Berkes et al. 2008). Additionally, the initial responses to conservation problems are generally done through incremental changes to existing approaches. It is only once it has been established that these responses are insufficient given current contexts, that radical innovative responses are sought (Biggs et al. 2010). We need to promote integrated, collaborative, adaptive environmental management through democratic leadership where parties contribute and take ownership of key decisions (Greenleaf & Spears 2002). And through this collaborative process, we found parties contributed insights which were instrumental in framing and implementing innovation at both levels. At IKEA, for instance, all employees are involved in innovation strategy development from top management to business unit heads including internal innovation experts (ikea.com).

Innovation is also relative to a particular set of contexts and time. What was innovative a decade ago can, in time, generate its own problems or become obsolete. A challenge for all of conservation is to design and redesign models, approaches and institutions that remain innovative and adaptive over time (Gunderson 2001; Berkes et al. 2008), given where local communities and key stakeholders are on the coexistence scale. Therefore, always having a pulse on the local changing contexts and being ready and open for adaptations and new innovations is critical for long-term success of conservation goals. In the Lion Guardians example we presented, prior to implementation, lion killing was at an all-time high and was decimating the lion population (Hazzah et al.

2014). There was a demand from the community, specifically the warriors, to innovate and there was a real need for radical innovation to halt the killing. However, after a decade of innovation (both radical and incremental) we have seen a more than tripling of the lion population in the Amboseli-Tsavo ecosystem that has resulted in a different set of problems – more conflict leading to a lowering of community tolerance. In addition, in the past decade we have seen substantial changes in Maasai cultural values, particularly the warriors; this includes an erosion of traditional ecological knowledge and bush skills with more youth attending school and others finding work in nearby towns. We also faced a challenge of organizational growth with the number of Guardians increasing ten-fold. We struggled with how to manage the changing culture with many more employees – how do we provide the same level of training, attention and time in the field with a growing team across several expansive landscapes while maintaining motivation? Over the years we have engaged several incremental innovations to address these areas of concern, but the change is relentless and culture is dynamic so the need for another radical innovation may be necessary to maintain high levels of performance and desirable outcomes.

Westley et al. (2010) suggest that there has to be a demand for innovation for it to actually happen. This was clear in the Lion Guardians example because the warriors strongly demanded an innovation that was inclusive of their skills and knowledge. Demand for innovation alone is likely not enough given the current conservation space, and thus securing long-term financial invesments is also vital to ensure sustainability. There are think tanks that exist (e.g. Centre for Social Innovation, Skoll Forum, etc.) that have attempted to provide a platform for entrepreneurs to present their work to potential funders. Yet these arenas often necessitate radical innovative ideas rather than incremental ones, which is the norm for conservationists. Radical innovation is often costly and needs sustained financial backing for long periods of time to truly test the validity of an idea (e.g. Van den Bergh et al. 2011).

17.4 RECOMMENDATIONS AND FUTURE DIRECTIONS

- Be brave; since time is of the essence, we suggest that conservationists should restrict their focus on incremental innovations, as the pace of change of this approach is too slow to actually save many of the declining species. Instead, a focus on radical innovation to shake up the conservation agenda is necessary. Do not be afraid to change

the rules of the game; where there is risk there is also potential for high reward. Risk can be limited through pilot testing before spreading to wider areas.

- Be patient and build respect; innovation can only take place when there is trust between the communities and the conservationists. Establishing this trust can be difficult, time consuming and nuanced. Every community is different, with varied values, needs and socio-cultural practices. These all need to be understood and respected before productive discussions can ensue. In some places this could take months; in others it could be years, thus patience is key.
- Be supportive; one of the key elements recognized in the business world in creating this conducive environment is *allowing space for serendipity*. Successful market-driving firms create an environment where individual creativity can flourish. We believe that giving consistent respect and attention (i.e. responding to the Guardians' reports, listening to their suggestions to improve the programme, etc.) was absolutely critical to getting the appropriate buy-in of the programme.
- Be inclusive; when designing a community-based conservation model, think about the needs of both the people and species.
- Think big and take risks; it is necessary to inject innovation into long-term conservation funding mechanisms and strategically approach the question of how to secure long-term and substantial support for radical out-of-the-box ideas that conserve species and provide sustained benefits to the communities impacted by wildlife.
- Be adaptive, flexible and quantify your impacts; at the core of any resilience model are components that focus on facilitating feedback loops and allowing for high levels of participation and monitoring, which often is what allows an initiative to be adaptive. Being ambidextrous in your approach with high levels of flexibility will allow for the greatest conservation outcome to develop organically and likely be culturally appropriate. Lastly, it is important to frequently measure your performance on the ground; only then it is possible to understand what areas of the model can be adapted and improved to further broaden conservation impacts.
- One of the major gaps and hindrances to innovation in conservation is the current donor-driven funding model. Both conservation organizations and their donors want to steer clear of the *commoditization* that comes with translating conservation projects into cash flows and products (Huwlyer et al. 2009). However, the current funding

models rampant in the conservation world are generally risk averse and hesitant to fund innovations or provide the sustainable financing require to scale innovations from a pilot project/prototype to a fully fledged solution. Financial instruments could possibly bridge this gap between investor interests and conservation needs. However, more research is required in this arena to further establish access to mainstream finance markets for conservation organizations to take innovative risks and grow their impact.

17.5 References

Bauer, H., Becker, M., Begg, C., Bertola, L., Chapron, G., Croes, B., Dricuru, M., Funston, P. F., Groom, R., Henschel, P., Hunter, L., Loveridge, A., Macdonald, D., Packer, C., Petracca, L., Robinson, H., Tende, T., Tumenta, P. F., Venktraman, M., White, P. A. & Winterbach, C. (2016). *Panthera leo*. The IUCN Red List of Threatened Species 2016. e.T15951A79929984.

Berkes, F., Coldin, J. & Folke, C. (2008). *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change*. Cambridge: Cambridge University Press.

Berkes, F. & Folke, C. (2000). *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*. Cambridge: Cambridge University Press.

Biggs, R., Westley, F. R. & Carpenter, S. R. (2010). Navigating the back loop: Fostering social innovation and transformation in ecosystem management. *Ecology & Society*, 15(2), art. 9.

Brashares, J. S., Abrahms, B., Fiorella, K. J., Golden, C. D., Hojnowski, C. E., Marsh, R. A., McCauley, D. J., Nuñez, T. A., Seto, K. & Withey, L. (2014). Wildlife decline and social conflict. *Science*, 345(6195), 376–8.

Cantwell, J. (1989). *Technological Innovation and Multinational Corporations*. Cambridge, MA: B. Blackwell.

Carrillo-Hermosilla, J., del Río, P. & Könnöläc, T. (2010). Diversity of eco-innovations: Reflections from selected case studies. *Journal of Cleaner Production*, 18(10), 1073–83.

Colfer, C. J. P. (2005). *The Complex Forest: Communities, Uncertainty, and Adaptive Collaborative Management*. Washington, DC: Resources for the Future.

Cooke, B. & Kothari, U. (2001). *Participation: The New Tyranny?*. London: Zed Books.

Dangol, S. (2005). Participation and decision making in Nepal. In C. J. P. Colfer, ed., *The Equitable Forest: Diversity, Community, and Resource Management*. Washington, DC: Resources for the Future and CIFOR, pp. 54–71.

Dewar, R. D. & Dutton, J. E. (1986). The adoption of radical and incremental innovations: An empirical analysis. *Management Science*, 32(11), 1422–33.

Dolrenry, S., Hazzah, L. & Frank, L. G. (2016). Conservation and monitoring of a persecuted African lion population by Maasai warriors. *Conservation Biology*, 30(3), 467–75.

Duchesneau, T. D., Cohn, S. F. & Dutton, J. E. (1979). *A Study of Innovation in Manufacturing: Determinants, Processes, and Methodological Issues*. Orono: University of Maine, Social Science Research Institute.

Ettlie, J. E., Bridges, W. P. & O'Keefe, R. D. (1984). Organization strategy and structural differences for radical versus incremental innovation. *Management Science*, 30(6), 682–95.

Govindarajan, V. & Srinivas, S. (2013). The innovation mindset in action: 3M corporation. *Harvard Business Review*, H00B25-PDF-ENG.

Greenleaf, R. K. & Spears, L. C. (2002). *Servant Leadership: A Journey into the Nature of Legitimate Power and Greatness*. Mahwah, NJ: Paulist Press.

Gunderson, L. (1999). Resilience, flexibility and adaptive management – antidotes for spurious certitude? *Conservation Ecology*, 3(1), art. 7.

Gunderson, L. H. (2001). *Panarchy: Understanding Transformations in Human and Natural Systems*. Washington, DC: Island Press.

Hage, J. (1980). *Theories of Organizations: Form, Process, and Transformation*. New York: John Wiley & Sons.

Hahn, T., Olsson, P., Folke, C. & Johansson, K. (2006). Trust-building, knowledge generation and organizational innovations: The role of a bridging organization for adaptive comanagement of a wetland landscape around Kristianstad, Sweden. *Human Ecology*, 34(4), 573–92.

Hazzah, L. (2006). *Living among Lions (*Panthera Leo*): Coexistence or Killing? Community Attitudes towards Conservation Initiatives and the Motivations behind Lion Killing in Kenyan Maasailand*. MSc Thesis. Madison: University of Wisconsin-Madison.

Hazzah, L. (2011). *Exploring Attitudes, Behaviors, and Potential Solutions to Lion (*Panthera leo*) Killing in Maasailand, Kenya*. PhD Dissertation. Madison: University of Wisconsin-Madison, Nelson Institute of Environmental Studies.

Hazzah, L., Bath, A., Dolrenry, S., Dickman, A. & Frank, L. (2017). From attitudes to actions: Predictors of lion killing by Maasai warriors. *PLoS ONE*, 12(1), e0170796.

Hazzah, L., Dolrenry, S., Naughton-Treves, L., Edwards, C. T., Mwebi, O., Kearney, F. & Frank, L. (2014). Efficacy of two lion conservation programs in Maasailand, Kenya. *Conservation Biology*, 28(3), 851–60.

Hellstrom, T. (2007). Dimensions of environmentally sustainable innovation: The structure of eco-innovation concepts. *Sustainable Development-Bradford*, 15(3), 148.

Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Reviews in Ecology & Systematics*, 4(1), 1–23.

Holling, C. S. (2001). Understanding the complexity of economic, ecological, and social systems. *Ecosystems*, 4(5), 390–405.

Holling, C. S. & Meffe, G. K. (1996). Command and control and the pathology of natural resource management. *Conservation Biology*, 10(2), 328–37.

Huwyler, F., Käppeli, J. & Tobin, J. (2009). *Conservation Finance from Niche to Mainstream: The Building of an Institutional Asset Class*. Credit Suisse et al. Available from https://assets.rockefellerfoundation.org/app/uploads/20160121144045/con servation-finance-en.pdf (accessed November 2018).

IUCN. (2006). Regional conservation strategy for the lion *Panthera leo* in Eastern and Southern Africa. Gland, Switzerland, IUCN SSC Cat Specialist Group, p. 60.

Kim, W. C. & Mauborgne, R. (2004). Value innovation: The strategic logic of high growth. *Harvard Business Review*, July–August. Available from https://hbr.org/2004/07/value-innovation-the-strategic-logic-of-high-growth (accessed November 2018).

Kling, K. & Goteman, I. (2003). IKEA CEO Anders Dahlvig on international growth and IKEA's unique corporate culture and brand identity. *The Academy of Management Executive*, 17(1), 31–7.

Kumar, N., Scheerb, L. & Kotlerc, P. (2000). From market driven to market driving. *European Management Journal*, 18(2), 129–42.

Manoa, D. O. & Mwaura, F. (2016). Predator-proof bomas as a tool in mitigating human–predator conflict in Loitokitok Sub-County, Amboseli Region of Kenya. *Natural Resources*, 7(1), 28–39.

McCauley, C. D. & Van Velsor, E. (2004). *The Center for Creative Leadership Handbook of Leadership Development*. San Francisco: John Wiley & Sons.

McKeown, M. (2008). *The Truth about Innovation*. India: Pearson Education.

Mutimukuru, T., Kozanayi, W. & Nyirenda, R. (2006). Catalyzing collaborative monitoring processes in joint forest management situations: The Mafungautsi Forest case, Zimbabwe. *Society & Natural Resources*, 19, 209–24.

Okello, M. M., Kiringe, J. W. & Warinwa, F. (2014). Human–carnivore conflicts in private conservancy lands of Elerai and Oltiyiani in Amboseli Area, Kenya. *Natural Resources*, 5(08), 375.

Okemwa, B. O. (2015). *Evaluating Anti-Predator Deterrent against Lions in Group Ranches surrounding Amboseli National Park, Kenya*. MSc Thesis. Kenya: University of Nairobi.

Olsson, P., Folke, C. & Berkes, F. (2004). Adaptive comanagement for building resilience in social–ecological systems. *Environmental Management*, 34(1), 75–90.

Ortolani, G. (2016). Nepal goes high-tech in its fight against rhino poachers. *Mongabay*, 14 November. Available from https://news.mongabay.com/wildtech/2016/11/nepal-goes-high-tech-in-its-fight-against-rhino-poachers/ (accessed November 2018).

Plowman, D. A., Baker, L. T., Beck, T. E., Kulkarni, M., Solansky, S. T. & Villarreal Travis, D. (2007). Radical change accidentally: The emergence and amplification of small change. *Academy of Management Journal*, 50(3), 515–43.

Rangan, V. K. & Thulasiraj, R. (2007). Making sight affordable (innovations case narrative: The Aravind eye care system). *Innovations*, 2(4), 35–49.

Sorice, M. & Donlan, J. (2015). A human-centered framework for innovation in conservation incentive programs. *Ambio*, 44, 788–92.

Tukker, A. & Butter, M. (2007). Governance of sustainable transitions: About the 4(0) ways to change the world. *Journal of Cleaner Production*, 15(1), 94–103.

Tushman, M. L. & O'Reilly, C. A. (1996). The ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review*, 38(4), 8–30.

Un, C. A. (2010). An empirical multi-level analysis for achieving balance between incremental and radical innovations. *Journal of Engineering & Technology Management*, 27(1), 1–19.

Van den Bergh, J. C., Truffer, B. & Kallis, G. (2011). Environmental innovation and societal transitions: Introduction and overview. *Environmental Innovation & Societal Transitions*, 1(1), 1–23.

Vredenburg, H. & Westley, F. (1997). Innovation and sustainability in natural resource industries. *Optimum: The Journal of Public Sector Management*, 27 (2), 32–49.

Westley, F. (2002). The devil in the dynamics: Adaptive management on the front lines. In L. H. Gunderson & C. S. Holling, eds., *Panarchy: Understanding Transformations in Human and Natural Systems*. Washington, DC: Island, pp. 333–60.

Westley, F. & Antadze, N. (2010). Making a difference: Strategies for scaling social innovation for greater impact. *Innovation Journal*, 15(2), art. 2.

Woodroffe, R., Thirgood, S. & Rabinowitz, A. (2005). The future of coexistence: Resolving human–wildlife conflicts in a changing world. In R. Woodroffe, S. Thirgood & A. Rabinowitz, eds., *People and Wildlife, Conflict or Coexistence?* Cambridge: Cambridge University Press, pp. 388–405.

Zaltman, G., Duncan, R. & Holbeck, J. (1973). *Innovativeness and Organizations*. New York: John Wiley & Sons.