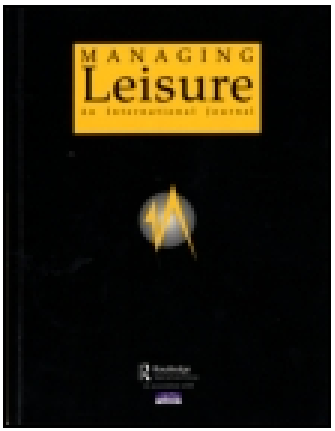

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Center Parcs UK: leisure development which achieves biodiversity gains

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There is a growing consensus that land management for nature conservation in the UK must move from being a negative, essentially protectionist, activity to being a positive, creative, managerial one. Maintaining and enhancing biodiversity is the driving force for both statutory and voluntary nature conservation organisations. Leisure development is often associated with a change of land use to a 'less natural' environment, which threatens nature conservation interests. However, this does not have to be the case. Environmental assessments for some leisure developments which involve large areas of land, including areas marginal to the main focus of recreational activity, have suggested, at the planning stage, that such developments can result in environmental improvements. This paper examines the three Center Parcs UK Holiday Villages established in coniferous woodland plantations and illustrates the biodiversity gains, which can be achieved. Careful site selection, environmentally sensitive design and construction, and management regimes that foster target species and habitats are important. Ecological monitoring is vital both to quantify and substantiate biodiversity gains and to raise awareness and confirm expectations.

INTRODUCTION

Traditionally land management for nature conservation in the UK has been both protectionist and reactive. Strategies to deal with perceived threats comprised site acquisition, designation and management agreements (Selman, 1992). However, the level of landscape and habitat degradation and fragmentation in the UK, experienced since World War II, has prompted the development of habitat restoration. Many resource managers wish to restore habitat because they are concerned that remaining natural and semi-natural habitats are being degraded both by their isolation and their vulnerability to external environmental factors. Rowell (1991), for example, estimated that 200 Sites of Special Scientific Interest (SSSIs) are damaged or destroyed every year.

Jarman (1995) identified and defined four types of habitat restoration:

(i) Habitat rehabilitation is defined as reversing degradation and damage, by restoring the surviving skeleton of a habitat with its assemblages of species to its former more natural condition.
(ii) Habitat re-creation is defined as restoring a site to a condition that it was known, or deduced to have been previously.
(iii) Habitat creation represents the creation of new assemblages of species and habitats for a site, either building on the habitats and physical structures already present, or creating something artificial, unrelated to the existing conditions.
(iv) Habitat and species translocation is the process of moving whole habitats or selected parts of a community from one site to another either to reinvigorate a declining population or to 'save'

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them where a site is going to be irrevocably destroyed.

In practice these terms are often confused and interchanged. The Society for Ecological Restoration (SER) is an international organization dedicated to raising standards and disseminating information about ecological restoration. The definition of ecological restoration currently used by SER is:

> the process of intentionally altering a site to establish a defined indigenous historic ecosystem. The goal is to restore the structure, function, diversity and dynamics of a particular ecosystem.

THE IMPORTANCE OF BIODIVERSITY

The need to maintain and enhance biodiversity is a powerful argument in favour of ecological restoration. The Biodiversity Convention (BDC), one of the key outcomes of the 1992 Earth Summit, promoted guidelines on protecting the diversity of the world's species and habitats. Biodiversity is defined in the BDC as:

> the variability among living organisms from all sources including *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (Biodiversity Convention, Article 2, UNCED, 1992).

Signatories are required to develop 'strategies, plans or programmes for the conservation of biodiversity' (Article 6a) and 'rehabilitate and restore degraded ecosystems and promote the recovery of threatened species' (Article 8f).

In response to the BDC the non-governmental conservation organizations in the UK issued 'Biodiversity Challenge' (Wynne *et al*., 1995) which recommended the setting of species and habitat priorities, nature conservation targets and action plans. In other words a target-led approach to ecological restoration whereby findings could be linked to key issues. The wider debate included discussions on character diversity, species richness, community diversity and genetic diversity within species in addition to scarcity, scale and criticality (i.e. what represents a viable ecosystem) issues.

Ratification of the BDC represented a clear UK government imperative, and a formal commitment for the first time, to plan objectively for the furtherance of nature conservation. The UK Biodiversity Steering Group, set up by the Government and consisting of representatives from a wide range of groups and interests, was tasked with developing a range of specific costed conservation targets for key species and habitats; suggesting improvements for biodiversity data accessibility; raising public awareness and involvement in biodiversity conservation; and initiating a review process. Biodiversity habitat priorities were identified on the basis of one or more of the following criteria:

(i) habitats at risk either due to the speed of their decline or because they are rare;
(ii) habitats which may be functionally critical;
(iii) habitats for which the UK has international protection obligations; and
(iv) habitats of importance to the 116 selected species.

The UK Biodiversity Steering Group Report (HM Government, 1995), whilst being largely descriptive, refined, prioritized and provided more detail on the broad targets set out in *Biodiversity: The UK Action Plan*. It listed 1250 species of conservation concern and gave a commitment to action plans, including the case for local biodiversity action plans (BAPs) to reflect and implement national priorities taking into account local variation. Action plans for priority species and habitats were completed in 1999. The local plans,

many of which have now also been produced, include wildlife audits, vision documents and challenge reports as well as action plans. There are currently wide ranges of approaches to biodiversity action planning but a 'partnership' is favoured (Pritchard, 2000).

THE CONTRIBUTION OF LEISURE DEVELOPMENTS TO BIODIVERSITY TARGETS

Examples of recreational activities in rural areas, which have been associated with conservation benefits, include traditional field sports. However, these benefits, which include the retention and management of small woods as cover for shooting and the management of watercourses for fishing interests, have mostly been brought about by default, rather than through active planning for biodiversity interests.

More formal leisure development is often associated with a change of land use to a 'less natural' environment, which threatens nature conservation interests. Mistakes have been made in the past, and the decision in 1999, by John Prescott, not to allow an 18–hole golf course development on Penn Wood, an ancient woodland site within the Chilterns Area of Outstanding Natural Beauty (AONB), suggests that some developers continue to misjudge the Government's commitment to safeguard biodiversity. However, this does not have to be the case. Environmental assessments for some leisure developments which involve large areas of land, including areas marginal to the main focus of recreational activity, can put forward convincing arguments at the planning stage, which support the view that such developments can result in environmental improvements. Johnson (1998), for example, showed that new golf courses located on former agricultural land of low nature conservation value, can provide the impetus for habitat restoration.

The principles on which Local Environment Agency Plans (LEAPs) aim to secure an overall enhancement of the quality of the environment through the land use planning system are pertinent. Carroll and Howes (1999) have described these as:

(a) new development which contributes to the quality of the environment;
(b) prevention of further erosion of natural and man-made heritage;
(c) restoration of damaged environments; and
(d) the sustainable management of natural resources.

CENTER PARCS UK

The success of Center Parcs activity-based short-break holidays throughout Europe (the Netherlands, Belgium, Germany, France and UK) has been measured by high levels of customer satisfaction and in terms of the significant and consistent proportion of repeat business (Lavery, 1990). More recently this has been reiterated by Gratton (1997) in an overview of the Center Parcs product in Britain during the 10–year period 1987–1997. Center Parcs UK comprises three Holiday Villages, each established in rural locations in the English countryside. The company has demonstrated that with the correct design, construction and operational philosophy, it is possible to create a facility that causes minimal disturbance and actually enhances the site in terms of wildlife conservation (Sheppard, 1992).

The principal element of the Center Parcs concept is to allow their guests to escape from the pressures of modern day living by enjoying close contact with nature with all its restful and restorative qualities. In order to realize this concept there are no boundaries between 'Nature Areas and People Areas'. To achieve this, and stemming from the original design principles, management for wildlife extends right up to guest villas with each villa patio being a vantage point for a wealth of

wildlife (Collins, 1999). This ethos of 'wrapping nature round leisure facilities' determines the requirement for an extensive landscape setting of forest, glades and water areas; and provides the incentive to manage and create 'natural' habitats for customer enjoyment.

Center Parcs employs stringent criteria during site selection in order to avoid areas known to be of significant wildlife value. Proposals to develop a holiday village are listed under Schedule 2 of the European Community (EC) Directive on Environmental Assessment (97/11/EC). Center Parcs elected to undertake voluntary environmental assessments for the UK holiday village developments. The Environmental Statement for the most recent UK development (Aucombe Wood on the Longleat Estate, May 1991) presented evidence of consideration of alternative sites and confirmed that the chosen site was of limited ecological value. A more detailed ecological assessment and bird survey (Bioscan, 1991) identified evidence of remnant deciduous woodland flora, the presence of the nationally uncommon woodland grasshopper (*Omocestus rufipes*), several locally uncommon bird species and typical woodland mammals. Importantly, the detailed ecological study also identified actions to improve and enhance the biodiversity of the site, as well as identifying and preserving any remnant habitat or species typical of the local natural area profile. Initial landscaping encompassed the preservation and enhancement of these features. However, the principal contributing factor to the ecological gains recorded on Center Parcs Villages has been the creation of new wildlife habitats across the area. Complementing any existing remnants of valuable habitat new habitats include woodland clearings and fringing extensive networks of streams, lakes and ponds.

In order to maintain species and habitat preservation and enhancement, Center Parcs recognized the need for continuous assessment beyond the initial site development. A holistic management system for biodiversity has therefore been developed which incorporates detailed and long-term forest management plans including monitoring specific biodiversity targets. This is actioned by annual implementation plans, targeted and prioritized via continuous annual ecological monitoring results.

The Ecological Monitoring Programme is designed to:

- quantify desired and undesired change within natural habitats;
- maintain the right proportions of natural habitats;
- identify and preserve species of local or national scarcity;
- quantify the status of biodiversity action species against specified targets (both local and national);
- keep a detailed record of the species and habitats found in the village; and
- specify management actions which will maintain both species and habitat diversity and record progress against planned targets.

Whilst such a comprehensive programme involves considerable time and effort to ensure its effectiveness, Center Parcs believes such attention to detail in environmental assessment and monitoring results confers a double benefit. Firstly, the company is applauded by the industry as a leading example of sustainable tourism; secondly, investment in the natural environment has led to an increased appreciation of the villages by guests, with a resultant increase in the quality of the Center Parcs product and its commercial success in the market (Gratton, 1997).

BIODIVERSITY GAINS

The implementation of this management philosophy has resulted in considerable

quantifiable gains for biodiversity. This can be demonstrated by the following examples:

Sherwood Forest breeding birds

The value of the Sherwood Forest Village for British breeding birds can be demonstrated by comparing the results of the Center Parcs breeding bird studies with specific British Trust for Ornithology (BTO) research (Gregory and Baillie, 1998).

This research, entitled 'Large-scale habitat use of some declining British Birds', was completed using data from the 1995 breeding bird survey (BBS), which is an extensive annual sample survey of birds across the UK. Density estimation analyses for different species, as birds per square km, were derived for specific habitat categories by this research. Two of these density estimations have been used as a comparison against Center Parcs breeding bird results (see Tables 1 and 2).

Firstly, mean breeding bird densities for Center Parcs Sherwood can be compared against the mean number of birds within coniferous woodland from the BTO Data. This habitat category is the most applicable as each Center Parcs Village in the UK was a commercial coniferous woodland prior to development. Secondly, Center Parcs Sherwood bird numbers are compared against the habitat category returning the

Table 1 BTO results for coniferous woodland versus Center Parcs Sherwood Forest

	Breeding birds per square km at Center Parcs Sherwood Forest					
	BTO 1995	**1995**	**1996**	**1997**	**1998**	**1999**
Dunnock	3.80	46.90	40.70	41.90	49.30	41.90
Blackbird	10.60	155.50	140.70	162.90	191.30	160.40
		0	0	0	0	0
Songthrush	6.10	67.90	34.56	29.60	43.20	50.60
Starling	0.80	0.00	0.00	1.23	1.23	0.00
Linnet	3.10	29.60	20.90	19.70	14.80	13.50
Bullfinch	2.50	9.80	6.10	7.40	7.40	7.40
Reed Bunting	0.00	1.23	1.23	1.23	1.23	1.23
Skylark	1.20	0.00	0.00	0.00	0.00	0.00

Table 2 BTO results for optimal species habitat versus Center Parcs Sherwood Forest

	Breeding birds per square km at Center Parcs Sherwood Forest					
	BTO 1995	**1995**	**1996**	**1997**	**1998**	**1999**
Dunnock	29.20	46.90	40.70	41.90	49.30	41.90
Blackbird	114.80	155.50	140.70	162.90	191.30	160.40
		0	0	0	0	0
Songthrush	15.70	67.90	34.56	29.60	43.20	50.60
Starling	255.60	0.00	0.00	1.23	1.23	0.00
Linnet	21.00	29.60	20.90	19.70	14.80	13.50
Bullfinch	7.30	9.80	6.10	7.40	7.40	7.40
Reed Bunting	9.80	1.23	1.23	1.23	1.23	1.23
Skylark	26.90	0.00	0.00	0.00	0.00	0.00

highest number of each specific bird per square km, the optimal habitat, from Gregory and Baillie's research.

The BBS involves three visits to a chosen monitoring location each year, each plot surveyed is a 1×1 km grid square. The first visit allows the surveyor to select a survey route through the area and further to record details of habitat characteristics. Further visits are carried out between April to mid-May for the first and mid-May to June for the second, both commencing between 6.00 am and 7.00 am.

The Center Parcs monitoring strategy employed in 1995 varied from the above as breeding birds were surveyed over one weekend in mid-May by two surveyors. The site represents 1.62 km squares and the division of the area into two plots plus the survey routes were established prior to the survey. The Center Parcs monitoring system was intensified from 1996 onwards with specific information on BAP species of bird or rare birds being gathered to supplement the fixed 2 day breeding bird study.

Thus the 1995 Center Parcs data and the BTO data within this paper are of similar intensity. Although small differences exist between the methodology of the two surveys, they are broadly comparable. The tables above present the results of the comparison between the published BTO data for 1995 and the Center Parcs results for 1995. In order to allow consideration of the long-term sustainability of the potential benefits from leisure developments, the results of Center Parcs breeding bird studies from 1996 to 1999 are also contained within the tables.

An analysis for each declining British bird species is presented below:

Dunnock (Prunella modularis). This species has declined by 35% in the UK (Siriwardena *et al.*, 1998) over the past 25 years and is included on the amber list of Birds of Conservation Concern (Gibbons *et al.*, 1996). The average result for coniferous woodland in 1995 recorded by the BTO was 3.8 breeding birds per square km. The introduction of both scrub and grassland habitats to the Center Parcs village has resulted in an average of 44.1 birds per square km. This result is also 14.9 birds above the average score for the best habitat category (rural) in the UK defined by Gregory and Baillie (1998) as 29.2 Birds per square km.

Blackbird (Turdus merula). This species has declined by 35% in the UK (Siriwardena *et al.*, 1998) in the past 25 years. The development of a diversity of natural habitats within the Center Parcs village has had a dramatic effect on the blackbird density. The 1995 BTO result returned an average of 10.6 birds per square km for coniferous woodland with the Center Parcs Village returning an average of 162.1 birds. This exceeds the best average result in the UK from the BTO study, suburban habitats, of 114.8 birds.

Songthrush (Turdus philomelos). This bird is of significant conservation concern being listed in the UK Biodiversity Action Plan (HM Government, 1995) as a short list (priority) species and a species on the red data list within Birds of Conservation Concern (Gibbons *et al.*, 1996). Songthrush has suffered a decline of 55% between 1976 and 1995 (Siriwardena *et al.*, 1998). Within coniferous woodland this bird averaged 6.1 per square km and within its best recorded habitat, rural, an average of 15.7 birds.

Center Parcs Sherwood Forest averaged 45.1 birds per square km, this represents over seven times higher Songthrush density than the average coniferous habitat studied by the BTO. Further still the result for the Center Parcs Village was 187% above that of the best habitat average for Songthrush reported in the BTO research. Songthrush represents a significant conservation success at Center Parcs, Sherwood and the

village is now a focus for a specific national BTO survey scheme, Ringing Adults for Survival (RAS), which was launched in 1999.

Starling (Sturnus vulgaris). Prior to 1997 no Starlings nested in the village. In 1997 one pair bred. These birds repeated this in 1998 but were again absent in 1999. The average result for coniferous woodland was 0.8 birds per square km and over the 5 years, 1995 to 1999, Center Parcs averaged 0.45 birds. The best habitat for this species was typically urban where 255.6 birds on average was recorded (Gregory and Baillie, 1998).

Linnet (Carduelis cannabina). This bird is of significant conservation concern being listed in the UK Biodiversity Action Plan (HM Government, 1995) as a short list (priority) species and on the red data list within Birds of Conservation Concern (Gibbons *et al.*, 1996). Linnet suffered a decline of 38% between 1976 and 1995 (Siriwardena *et al.*, 1998). The average return for coniferous woodland from the BTO study was 3.1 birds per square km. Center Parcs Sherwood Forest averaged 19.7, over six times higher. The village result of 19.7 also compared well against the best habitat average of 21.

However, in 1995 when this research was completed by the BTO the Center Parcs village recorded 29.6 birds per square km, higher than the best habitat average from the BTO study. Since 1995 this bird has continued to decline on the village and a specific management plan for nesting habitat has been developed and implemented. The effectiveness of this management will not come to fruition until 2001 when managed scrub achieves the optimum height and density identified by Center Parcs research. The management objective is to halt the decline of this species on the village despite the national trend. However, ultimate success will be dependant upon suitable foraging on neighbouring farmland being available.

Bullfinch (Pyrrhula pyrrhula). This bird is of significant conservation concern being listed in the UK Biodiversity Action Plan (HM Government, 1995) as a short list (priority) species and on the red data list within Birds of Conservation Concern (Gibbons *et al.,* 1996). Bullfinch suffered a decline in the British Population of 53% between 1976 and 1995 (Siriwardena *et al.*, 1998).

Bullfinch has achieved a sustainable population on the Center Parcs village with an average of 7.62 birds per square km. This compares against the average for a coniferous woodland of 2.5 birds and the average for its best UK habitat, scrub, of 7.3 birds per square km. In 1995 the village held 9.8 breeding birds per square km, 35% above the best average result for this bird in the UK.

Reed Bunting (Emberiza schoeniclus). This bird is of significant conservation concern being listed in the UK Biodiversity Action Plan (HM Government, 1995) as a short list (priority) species and on the red data list within Birds of Conservation Concern (Gibbons *et al.*, 1996). Reed bunting declined by 46% between the BTO survey years 1976 and 1995 (Siriwardena *et al.*, 1998). It is a bird associated with wetlands and in particular reed bed habitats where it forages for food. As a result it was not recorded in any coniferous woodland study areas completed by the BTO in 1995.

With the addition of the wetland habitats within the Center Parcs landscape, habitat for a small breeding population has been created, with the village recording 1.23 birds per square km. However, whilst this population has proved sustainable over the past 5 years, further works have been implemented in 1999 within the village to create further reed bed habitat similar to that currently utilized by the resident birds. The management objective is to provide for the fledging birds, which will then leave the village annually. The small number of birds, 1.23 per square km, on the village compares

within an average of 9.8 for its favoured water habitats.

Skylark (Alauda arvensis). This bird is of significant conservation concern being listed in the UK Biodiversity Action Plan (HM Government, 1995) as a short list (priority) species and on the red data list within Birds of Conservation Concern (Gibbons *et al.*, 1996). Skylark declined by 49% between the BTO common bird census years 1976 and 1995 (Siriwardena *et al.*, 1998).

This species is typical of open grassland and the average for coniferous woodland of 1.2 birds per square km compares with the best average for semi-natural grasslands of 26.9 birds per square km. This bird has never bred on the Center Parcs Village of Sherwood but has bred on the golf course area and adjacent grasslands of Center Parcs Elveden Forest Village in Suffolk where sufficient habitat exists and where 6.17 birds per square km were recorded in 1999.

The above analysis compares just one taxonomic group on one Center Parcs village. However, the bird population represents a tertiary consumer in the ecological food chain, a species group highly dependant upon the diversity and density of flora (both for habitat and food) and invertebrate fauna.

Floristic diversity

Table 3 details the increase in floristic diversity recorded in all three Center Parcs UK villages. The table sets out the number of species recorded in ecological compartments in 1994 compared to the 1998 survey results. Numbers of species per ecological compartment are recorded and expressed as mean species total per compartment. The results can obviously be dramatically affected by the planting of species and a proportion of those recorded in the ecological compartments were planted. However, planted species average just 9% of total flora and the vast majority of planting was carried out prior to the 1994 survey. Furthermore, this planting was typically woody species, predominately those species already present within the mature woodland. The number of and area of ecological compartments varies between each village and therefore total flora for each village in 1998 is also included.

As can be seen by these results the deliberate creation and management of habitats has resulted in natural colonisation leading to a net gain for biodiversity. At Elveden Forest, a village that has developed as a valuable Breckland nature reserve, species gain over the 4 years equated to a 152% increase in floristic diversity per ecological compartment. Sherwood Forest, a coniferous plantation on a former ancient forest and a typical lowland heathland area, has seen an increase in species diversity of 116% per ecological compartment. Finally Longleat Forest, a commercial plantation on a site of ancient woodland and lowland heath, has recorded an increase in species diversity of 45% per ecological compartment.

Invertebrate species

In order to further demonstrate the potential for biodiversity gain from these leisure developments the total invertebrate species records for each Center Parcs Village can be seen in Table 4 below. According to Peterken

Table 3 Mean species diversity of ecological compartments – flora

	Elveden	Sherwood	Longleat
1994	37.5	46.8	50.6
1998	94.8	101	73.6
Total Flora, 1998	416	387	335

Table 4 Invertebrate records from Center Parcs villages

	Elveden Forest	Sherwood Forest	Longleat Forest
Total Invertebrate Fauna	1,763	1,709	1,217
Locally Scarce Species[a]	51	26	22
Nationally Scarce Species[b]	82	35	27
Red Data Book Species[c]	21	3	4

[a] Recorded as locally scarce in the country – various sources.
[b] Notable, notable B and notable A species as detailed by Ball (1986).
[c] Nationally rare (RDB 3), nationally vulnerable (RDB 2), nationally endangered (RDB 1), as per Shirt (1987).

(1993) 'almost every wood will contain a few rare invertebrates but the best sites are usually found to have as many as 3–5% scarce and rare species in several groups' (p. 232). On this basis Elveden Forest already qualifies as a 'best site' but not Sherwood or Longleat.

CONCLUSIONS

Center Parcs UK has won a number of industry sponsored environmental awards (Gratton, 1997). The company has been cited as an example of sustainable tourism good practice (IDA, 1999) and the introduction of an environmental management system approach and successful ISO 14001 accreditation attest to proactive corporate environmental stewardship (Collins, in press). However, the environmental 'added value' which Center Parcs Villages have contributed can be seen best in terms of biodiversity gains. The following elements are key factors:

Careful site selection

The choice of sites with an initial low biodiversity value is important. Many commercial coniferous forests are effectively monocultures of spruce or pine. Economic forestry techniques produce large stands of even-aged trees, which are then harvested as soon as growth rates decline. From this relatively poor biodiversity base, even small management adjustments can create significant nature conservation benefits (Fuller and Peterken, 1995).

Environmentally sensitive design and construction

The Center Parcs approach is to plan and build to accommodate nature. Villas are designed to blend into the landscape and less than 10% of the villages are covered with roads and buildings. Within each 400 acre site this ensures refuge locations for wildlife and provides scope for creative management practices.

Management regimes which foster target species and habitats

The target-led approach advocated by biodiversity action planning has been adopted by Center Parcs UK. The Holiday Village sites have recorded 587 species of wild plants and more than 2000 animal species including over 500 species of moths and butterflies. Many endangered species have specific habitat requirements. Introducing appropriate management regimes can incorporate these requirements. An example of Center Parcs commitment in this area is the specific management for wildflowers at their Elveden Village where in partnership with Plantlife, the wild-plant conservation charity, the Suffolk Wildlife Trust and English Nature, a

conservation project for 20 wildflowers has been established. Amongst these are two priority plants from English Nature's species recovery project.

Ongoing ecological monitoring

A key objective of monitoring ecological change is to provide data as a scientific basis for conservation (Spellerberg, 1991). Quantifying biodiversity gains also raises awareness and expectations. This is important for both employees and clients. Monitoring also allows for site-specific management plans targeted at the effective deployment of available resources and thus sustains biodiversity gains and for Center Parcs helps to guarantee commercial success.

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