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ORIGINAL ARTICLE

Forest Green Rovers Football Club: A model for tomorrow's golf clubs

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ABSTRACT

Apparently golf and the ecological transition are hardly compatible. However, golf's governing boards (national and international) are fully aware of the need to take this imperative into account. In the field, it is up to golf directors to rise to the challenge. In practical terms, the question is: how can we, at an operational level, combine the offer of golf with the ecological transition in the long term? This central question also constitutes our problem. Our hypothesis is that a pioneering football club in this area, Forest Green Rovers Football Club, could provide an operational model that could help them. Our research methodology is therefore based on the four-stage approach proposed by Berger Douce and Nguyen Tan. This leads us to propose two operational models that can help golf managers implement the ecological transition in their clubs.

Keywords: Environment, Sustainability, Golf, Ecological transition, Golf course managers, Operational models.

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INTRODUCTION

"*Faced with the consequences of global change, growing pressure on resources and increasing environmental regulations, all stakeholders in the industry must realise that to safeguard its activities and the attractiveness of the game of golf, it is imperative to initiate an ecological transition plan of unprecedented ambition*" (Golf Course 2030). Far from the image perceived by many distant observers, golf's governing bodies are now fully aware of the need to implement the ecological transition on all golf courses. Many initiatives are already underway at various levels (public authorities, federations, clubs, partners, etc.). The priority now is to get things up and running. The question is how do we go about it? The answer, however, is not simple. Although there are several possible approaches, we prefer to define the task at hand by using a model already in place within a different discipline. Our hypothesis is as follows. Forest Green Rovers Football Club's (FGRFC) eco-responsible sporting perspective could be used as an operational model for the ecological transition of the golf clubs of tomorrow. To examine this, we have chosen to proceed in four stages. After presenting the current thinking on the subject (1), we will indicate our question (2) then our methodology (3) and finally the results obtained: the Ambition+ and Adaptation models (4).

GOLF AND THE ECOLOGICAL TRANSITION

Awareness

The early 1960s

At that time, the notions of sustainable development, social and environmental responsibility and sustainability were not major concerns. Quite the contrary, in fact. In 1964, G. C. Nutter, editor-in-chief of one of the most prestigious journals for American golf superintendents (The Golf Course Reporter) condemned Rachel Carson's book (Silent Spring, 1962), in which she criticised entrepreneurs who used chemicals that were damaging to the environment, particularly in the golf industry. Carson even suggested limiting the use of some of them (biocides), which at the time seemed absolutely essential for maintaining golf courses (Millington and Wilson, 2016).

Early 2000s

Another article published in the same journal (Ostmeyer, 2001) defends a radically different position and encourages greenkeepers to become aware of the problem.

Over the last 40 years, our perception of this issue has changed profoundly. Social and environmental responsibility (SER) has become an important issue in the world of golf, particularly in terms of the social value that golf brings to the environment (Hammond and Hudson, 2007; Golf Business International, 2021). As with other companies operating in the sports and leisure sector (Ratten and Babiak, 2010; Ratten, 2010), people involved in the world of golf are now seeking to integrate SER principles into their operations.

Few contributions address this issue at club level, even though many philanthropic initiatives have long existed in this sector (International Golf Federation, 2021): charitable fundraising, aid to surrounding communities, financial support, etc. At environmental level, there is currently a focus on five key issues (White, 2021): water, decarbonisation, pesticides, biodiversity and multifunctionality. There is a good reason for this: maintaining a golf course requires a large quantity of resources, the use of which must now be part of an eco-responsible approach (Scott and al., 2018). Here is a brief overview of these key issues.

Water. The stakes are high, both economically and politically (Cohen and al., 1999; Balogh and Walker, 2020; Shaddox, and al., 2022). Today, the aim is to limit consumption, rationalise its use and recycle used

water as often as possible. The choice of grasses planted (which consume more or less water) can also be crucial in certain regions (McCarty, 2018).

Decarbonisation. Maintaining a golf course requires numerous mechanical operations that are sources of carbon emissions (Tidåker and al., 2017): repeated grass-cutting, fertilisation, aeration, sanding, energy consumption by buildings located on the site, etc. In this sector, limiting the carbon footprint, therefore, means: improving course maintenance conditions, limiting the use of nitrogen fertiliser, recycling grass cuttings, investing in electric equipment, etc.

Pesticides. For many years, greenkeepers have been using them to guarantee the *"playability*" and verdant aspect of their courses. In the United States, since the publication of the book The greening of golf: Sport, globalization and the environment (2016), more responsible practices have been introduced: less systematic use, choice of less toxic products, even voluntary total elimination in some cases.

Biodiversity. The golf course has many strengths in this area. The challenge is to preserve and develop them (Tanner and Gange, 2005; Colding and Folke, 2009; Petrosillo and al., 2019). One effective way of doing this is to preserve biodiversity and the naturalisation of areas where the game is not played by using native vegetation, particularly near water hazards.

Multifunctionality. Although it seems less essential, multifunctionality is one way that could enable golf courses to offer services not exclusively to its members (Dahl Jensen and al., 2017). As at St Andrews (Boden, 2015), providing access to non-golfers under certain conditions, opening clubhouses to other publics, implementing educational programmes, etc. could be interesting options to develop.

The issue of the social and environmental responsibility of golf clubs is multifaceted and today concerns four main groups of actors: players (amateurs and professionals), managers (directors and greenkeepers), sporting authorities (federations and leagues) and public institutions (States, local government).

In France, the public authorities see the consideration of SER issues by sports organisations as part of a wider process (Bayle, 2012; François and Boucher, 2023) aimed at meeting national and international commitments. This is mainly reflected in changes to certain legislation concerning, for example, the use of chemicals. For federations, this is now a major issue, as it affects both the conditions in which sports are practised and the image of the activity. In France, it has led the French Golf Federation (FGF) to appoint a vice-president (Sylvianne Villaudière) to lead a strategic committee on ecological transition.

For managers of golf courses, the issue is more complex. They have to reconcile economic imperatives (profitability of the facilities), golfers' expectations (quality of the course), the general public's perception (often negative) and regulatory changes (concerning watering, for example).

At these different levels, a number of discussions are currently underway[1].

Current thinking

In many countries, sustainable development has been a major issue in public sports policy since the early 2000s (Zedet, 2006). Sport concerns all three pillars of sustainable development (social, economic and environmental). It is therefore at the crossroads of the majority of related issues. In France, these discussions

[1] In what follows, we will focus on the perceptions of sports users.

have led to a sustainable development strategy for sport since 2011 (SDSS). In the European model of sport, the sports federations are the logical relays for the priorities defined. To achieve this, three tools are currently favoured (Bayle and al., 2011): information, raising awareness of ecological practices and the development of new marketing tools.

The French Golf Federation (FGF) is emerging as a leading sports federation in terms of eco-responsibility. Its action plan also focuses on three areas (FGF, 2022):

- The updating of maintenance methods, with, in particular, following the Labbé law[2], the elimination of the use of synthetic physio-sanitary products by 2025,
- Rational management of water resources: renovation of irrigation systems, watering strictly limited to playing areas, rainwater harvesting, use of recycled water,
- Preserving biodiversity on the courses by protecting existing flora and fauna.

Although it is the federations that provide the initiative (Royal and Ancient, 2018), only the stakeholders and therefore the clubs, have the power to actually implement the proposed action plans. To date, most of the work (François and Bayle, 2014) on this issue has focused on professional clubs, and with this in mind, several results stand out (see p. 12). One of these is a certain difficulty in operationalising the announced ambitions, despite relatively significant resources.

This issue is even more acute for amateur clubs, whose resources are limited. As a direct result of the specificities surrounding these types of clubs a series of questions naturally arise for golf course managers around the running of the clubs.

What can be done? At what level and according to what priorities? How can we overcome the resistance of our members and customers? How do we deal with practical problems? These are some of the dilemmas facing the directors of amateur sports clubs. In golf, the managers are on the front line.

The question of implementation

There is a huge amount of work to be done on the ground (Bizzari, 2006; Mercatanti, 2017). Where would be the best place to start? Is it by limiting or even stopping the use of chemicals to maintain certain playing surfaces? Reducing water consumption or changing water provisioning conditions? Limiting mechanical operations? Encouraging the development of local biodiversity? Educating employees in these new practices? By doing everything possible to obtain environmental certification? Integrating the Corporate Social Responsibility (CSR) dimension into marketing initiatives? Or simply opt for (more) "*rustic*" golf courses?

Although some of these actions can undoubtedly be undertaken simultaneously, another difficulty faced by golf's managers is known as the "*Augusta Syndrome*" (Wheeler and Nauright, 2006; Millington and Wilson, 2017). This "*syndrome*" is the result of the increasing media coverage of golf on television, mainly "*Grand Slam*" events and, therefore, the Augusta Masters. With the broadcasting of this tournament and others that take place on particularly well-maintained courses with impeccable aesthetics, and therefore always verdant, many golfers, particularly wealthy ones, want to play in comparable conditions, which more often than not runs counter to the implementation of the CSR principles (Hammond and Hudson, 2007).

[2] Labbé Law. https://www.pan-europe.info/blog/labb%C3%A9-law-colloquium-%E2%80%93-assessment-and-prospects-towards-zero-pesticides-non-agricultural-areas

More generally, taking into account the opinions of customer-golfers on these issues cannot be neglected. The current literature (Minoli, 2018) underlines this. Many golfers pay little attention to these issues for two reasons: a lack of knowledge or even understanding of environmental issues and an unwillingness to bear the cost of the necessary investments via an increase in the price of green fees. More specifically, Fouillouze and al. (2023) distinguish four categories of golfer: the "*opposed*", who are not in favour of implementing eco-responsible management; the "*neutrals*", who are undecided; the "*supporters*", who are in favour of implementing pro-active management on CSR issues; and the "*committed*", who, by virtue of a close connection to nature, already incorporate eco-responsible principles into their behaviour on the course.

Another of their conclusions (Fouillouze and al.) relates to the need for subsidiarity. It will be difficult to make the ecological transition without the consent of the customer-golfers, at the risk of them moving away from the sport to the detriment of the clubs' economic health. It is also unthinkable that the transition will take place if the clubs are not the main vectors for its implementation.

The solution lies with the clubs

As Table 1 (Bouvet, 2009) shows, various categories of courses, and therefore clubs, can be distinguished on the basis of their preferred customers, their management methods or their environment.

Table 1. Three categorisations of golf courses.

Distinctive criteria	Types of courses	Definition
Preferred type of customers	Short golf courses	Courses with a reduced number of holes of fairly short distances, allowing beginners to learn and others to practise.
	With members	Courses located close to a large conurbation, which provides most of its members.
	For tourists	Courses in tourist areas for visiting players.
Style of management	For members only	Courses reserved exclusively for members.
	Private	Courses managed by a private association.
	Public	Courses managed by a local authority.
Environment	Links	Seaside courses, usually located in dunes, considered to be the `birthplace` of golf.
	Parkland	Courses in the countryside, forest or mountains.
	Real estate	Courses surrounded by residential areas.

Depending on their characteristics, the question of ecological transition is posed differently for these clubs.

Because of their smaller size and their primary purpose, short courses are easier to maintain and less subject to customer demands. In theory, they are well placed to fulfil the requirements of the ecological transition. Local courses, also known as member courses, derive most of their resources from membership fees. The challenge for them is therefore to try to include them in the discussions and in the implementation of the proposed adaptations. Tourist courses depend mainly on green fees sold to visiting golfers. For them, the dilemma is as follows: how to satisfy the demands of local pressure groups anxious to preserve privileged sites and at the same time those of tourists likely to prefer other destinations if the quality of the offer does not match their expectations?

The distinction between clubs according to their management style reflects different budgetary constraints: very "*loose*" for the former, variable for the latter and strong for the latter. Members golf clubs are those for which the ecological transition seems to be the easiest to implement from an economic point of view, as the members of these clubs generally agree to bear the costs of improving their facilities. In private clubs, where

profitability is more uncertain, the ecological issue comes up against management imperatives head-on. The question of priorities is therefore crucial. In public courses, everything depends on the general orientations chosen by the public managers of the course.

Links courses, which are natural courses par excellence (some of them have no irrigation system, for example), have often incorporated these requirements for a long time. Parklands and real estate courses, on the other hand, are subject to numerous constraints that need to be examined on a case-by-case basis.

When asked about this issue, golf managers[3] say that they most often refer to environmental programmes (Minoli and Smith, 2011) and in France to the Golf for Biodiversity programme launched by the FGF (2022), which aims to improve knowledge of the ecological issues associated with golf courses and land (Roquinarc'h and al., 2019). This is not without its problems (Minoli, 2018) for several reasons:

- As we saw earlier, few golfers feel concerned by these issues and even fewer are involved,
- The conditions required to host national or international events are not always compatible with the requirements of the ecological transition,
- For some managers, the cost-benefit analysis of the measures to be put in place is not a strong argument in favour of their introduction,
- Others doubt their effectiveness,
- The interests of owners, managers, greenkeepers and members in this matter rarely converge,
- A lack of time and information is also often cited.

Many golf managers are looking for a solution that would enable them 1) to overcome the problems listed above, 2) to have a framework (model) that has proved its overall effectiveness, 3) to implement the main precepts of the ecological transition without this being to the detriment of the stakeholders. Finally, is there an existing solution already in place in another sport?

PROBLEMATIC, RESEARCH QUESTIONS AND HYPOTHESIS

Problematic

In most golf clubs, the manager is part of a complex local eco-system (see Figure 1).

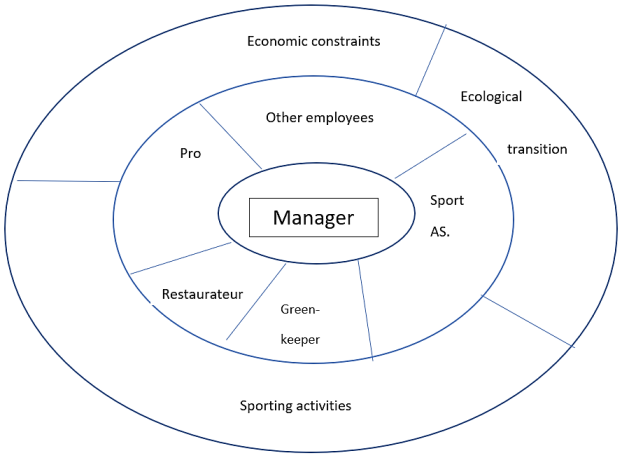

Figure 1. A golf manager's eco-system.

[3] We met the former managers of the Chalon sur Saône (public) and St Cloud ((private)) golf courses and the current managers of the Dijon Norges, Château d'Avoise (members), Gouverneur and Pont Royal (tourist) golf courses.

Today, the main role of the manager is to co-ordinate the activities of the staff in the first circle, taking into account the imperatives of the second. Depending on the status of the club, the sporting association is either the manager's employer or a major partner in defining the club's sporting policy. The greenkeeper can be seen as the manager's right-hand man, with whom he must work to offer members and visiting players the best possible golfing conditions based on the club's financial resources. As is the case for all company directors, the other employees (secretaries, gardeners, receptionists, starters, mechanics, etc.) are the human resources on which he must rely by adopting an appropriate management style. The restaurant manager may also be an employee of the club or run his own establishment. The majority of golfers are sensitive to the catering offer, and the caterer is often one of the club's key partners. Finally, the pro(s) are the teachers who are responsible for introducing beginners to the game and for giving lessons to more experienced players. They play a vital role in "*creating new golfers*" and maintaining the loyalty of senior players.

Beyond the differences that may exist between the members of the association and the director in relation to the Augusta Syndrome mentioned above. For example, the pros may wish to have the best possible working tool to attract a large clientele, the restaurant owners may be sensitive to the image and reputation of the club and the greenkeeper may have a personal point of view on the actions to be carried out on the course. Meeting all these expectations is not always easy, especially when the imperatives of the ecological transition need to be taken into account. So what should be done? A twofold necessity is emerging:

- Make choices, conditioned by local imperatives (type of site, irrigation system, existing flora and fauna, etc.) and time (weather, season, visitor numbers, etc.),
- Be based on a reference framework that enables it to justify its actions to all stakeholders and to implement an overall action plan.

In other words, the problem it faces, and which we will address in this contribution, is as follows.

At an operational level, how can we sustainably reconcile sporting activities and ecological transition?
The operational level is that of implementation in the clubs. The sustainable nature of the actions undertaken refers to the obligation to make choices that do not jeopardise the club's long-term future, and therefore to take into account the economic constraints associated with its management style. Services correspond to access to the course and associated facilities (driving range, putting green, training area) and any associated services. The ecological transition is generally defined as: "*All the changes made to the economic and social model with the aim of meeting the requirements of sustainable development and reducing society's ecological footprint*" (Makowiak, 2023).

According to the directors interviewed, there are three different ways of doing this:

- Try to apply directly the recommendations made by the governing bodies,
- Draw inspiration from practices implemented by other companies of comparable size operating in other sectors,
- Draw on "*models*" from the sporting world, in particular (professional) sports clubs,
- In order to proceed further, it is necessary to examine these three scenarios in more detail.

Three ways of initiating action
To implement the ecological transition, a golf manager's first instinct is to turn to his or her umbrella federation. In its action plan (FGF, 2022a), the FGF offers training courses to help managers commit their structure to preserving biodiversity and practising ecologically responsible golf. The "*Keys to making the ecological*

transition at my golf course" programme is the one most directly aimed at golf managers. It comprises four main parts:

- The constraints and opportunities associated with sustainable development issues for golf,
- The challenges of the ecological transition,
- The environmental action plan for a golf course,
- Promoting its commitments to players and staff (FGF, 2022c).

There is no doubt that this is a training programme that could prove extremely useful, but for reasons we will come-back to below, it has not yet been very successful[4], which suggests that other, more global and easily transferable solutions should be examined.

Most golf clubs are profit centres. Another possibility mentioned by the golf directors we met was to find inspiration in what is being done in small and medium-sized enterprises (SMEs). A large number of SMEs wishing to implement a green transition plan rely on the environmental programmes available to them (Darnall and Sides, 2010). The aim of these general programmes is to encourage smaller businesses to use their resources more efficiently, reduce waste and obtain certification (ISO 2015, for example). These programmes can be more or less formalised (McKeiver and Gadenne, 2005) and therefore not always easy to apply. In the golf sector, they are often difficult to implement for the following reasons (Minoli, 2018):

- Little external incentive, as owners, members and, even more so, visiting players have no short-term interest,
- A poor perception of the additional benefits that could result, as golf courses are seen by some, by their very nature, as structures that already do more for the environment than others,
- A lack of financial resources.

Another oft-repeated difficulty is the need to satisfy the requirements of multiple stakeholders with often divergent expectations and demands. However, as the business model of (professional) sports clubs is more similar to that of golf clubs, it is, in the eyes of golf managers, another possible source of benchmarking. Research on this issue focuses mainly on professional clubs (François and Bayle, 2014). These are similar to golf clubs in several respects:

- There are many different stakeholders (owners, managers, fans, sponsors, public authorities, media),
- With the exception of the wealthiest of them, economic constraints are strong,
- Environmental issues have only recently been taken into account,
- The supply is taking place within a framework that is already highly regulated,
- There are many uncertainties that can affect the way in which the activity is carried out.

What do these studies show? Three things in particular:

- The CSR practices of French professional football clubs are most often "*cosmetic*",
- The adoption of these practices is generally the result of external pressure, and
- Legitimacy appears to be the primary motivation.

On the basis of these results, it would appear that professional sports clubs can hardly be taken as a model, unless a club can be found whose environmental commitment is neither cosmetic, nor a response to institutional pressure, nor the result of a search for legitimacy. To our knowledge, only one club satisfies all

[4] In 2022, only 44 people, including managers and greenkeepers, had taken this programme.

three of these conditions, while at the same time having to deal with constraints specific to the sporting sector: Forest Green Rovers Football Club.

Research hypothesis

On the basis of the above, our research hypothesis is as follows: Forest Green Rovers Football Club can provide an operational model for golf clubs (and therefore their managers). This hypothesis is based on the following seven observations:

- The findings set out above, namely:
  - The need to satisfy stakeholders with different and conflicting requirements,
  - For the majority of clubs, the existence of a strong economic constraint,
  - The limited time available for training courses on this subject,
- The risk of settling for cosmetic measures,
- The wish expressed by the directors to have a simple, global and effective reference framework to initiate and coordinate their actions,
- The hindsight that can now be gained from this model, which has been in place for several years,
- The communication advantages associated with this choice, and even the opportunities for diversification (in the strategic sense of the term) that go with it,
- FGRFC owner Dale Vince's desire to set an example: "*There are two kinds of changes you can make in the world, the one you can make yourself, which is necessarily limited, and the second is to be a catalyst. Showing people what can be done and generating change that way, and that's the one we prefer to do*[5]",
- The effectiveness of this business model, which has not only already proved its worth, but has also already set an example for clubs such as Bétis Séville in Spain, Lille Olympique Sporting Club in France and other football clubs in South America,
- Lastly, as Table 2 shows, the proximity of the priority actions identified in the two categories of club.

Table 2. Priority actions identified by the FGRFC and golf clubs.

Related actions to:	**FGRFC**	**Golf clubs**
Equipment management	Use of organic products	Limiting and then gradually banning physio-sanitary products
Reticence of the public	Club fans	Club members
Adapting infrastructures	Use of solar panels	Preserving existing biodiversity
Water management	Use of spectator urine and rainwater	Limit consumption and recycle as much as possible
The use of electric vehicles	For club members and spectators	For maintenance vehicles
Using recycled materials	Shirts, small equipment	Goodies, course accessories, small equipment
The type of catering	Bar	Club house
Sporting performances	Team one results	Club quality and image
Limiting the carbon footprint	Thanks to changes in maintenance conditions with a view to securing "*carbon neutral*" certification	Thanks to changes in maintenance conditions and the renewal of maintenance equipment
Choice of partners	Sponsors and suppliers	Sponsors and suppliers

However, comparison is not reason enough! This is why, after briefly presenting the FGRFC (2.4.), we will then have to choose an approach that will enable us to transfer the key concepts identified in the FGRFC model to golf clubs.

[5] https://www.fgr.co.uk/another-way

Forest Green Rover Football Club

Founded in 1889 as Nailsworth and Forest Green Rovers, FGRFC is based in Nailsworth (Great Britain). Until 2010, when the current chairman, Dale Vince, who is also chairman of Ecotricity, took over, the club played in the regional divisions. Vince's ambition was to make it the first "*environmentally responsible*" club. After several unsuccessful attempts, at the end of the 2016/2017 season, the club was promoted to the fourth regional division (League Two) and the town of Nailsworth became the smallest town in history to host an English professional club. In 2022, the club moved up to the third division (League One), where it failed to hold its own.

Aside from its sporting achievements, what sets the club apart is its "*green*" positioning, a title that FIFA recognised in 2017 when it named it the "*greenest club in the world*". This approach is based on five main pillars:

Energy. Solar panels provide 20% of total energy consumption, with the remainder supplied by the owner's company, Ecotricity, which specialises in 100% renewable electricity and carbon-neutral gas.

Carbon footprint. The club has made a commitment to the United Nations to reduce its emissions by 50% by 2030. Several levers are being used to achieve this:

- Reducing water consumption,
- The use of electric vehicles for maintenance and player transport,
- Installing recharging points in spectator car parks and encouraging spectators to use public transport,
- Extensive use of teleworking for club employees,
- Organising group travel for supporters.

Food. The club is vegan. It has also signed partnerships aimed at limiting plastic waste and using refillable or recyclable products.

The stadium. The field captures rainwater and recycles it for irrigation. No chemicals or pesticides are used. The Eco Park enclosure is made almost exclusively of wood. The site contains 500 trees and 1.8 kilometres of hedges to encourage biodiversity. It is located in an area that is easily accessible by public transport.

Communications. As the club's position is now known and recognised throughout the world[6], it is keen to spread its model and regularly presents its actions to outsiders. (Sources: club website and Papp-Vary and Farkas, 2022).

In its 2018 business report, it said, "*Forest Green Rovers (FGR) aims to become a truly sustainable football club, a world first. Our aim is to make it a place where an eco-responsible approach can be presented to a new audience, football fans. Indeed, we believe that we have the opportunity to introduce sustainability into the world of sport in the broadest sense, and not just football. Beyond its core business, FGRFC is an eco-system where production and consumption are thought through from an ecological and social sustainability perspective*" (Forest Green Rovers, 2018). The club strives to take these principles into account in all aspects of its business, but also to ensure that the beliefs and behaviours of consumers who come to watch matches change (FGR Environment Report, 2017).

The club aims to be a model, not only for other football clubs, but also for other sports clubs. By adopting an appropriate scientific approach, we think this is perfectly conceivable for golf clubs.

[6] The club obtained the ISO 1400 international environmental standard in 2018.

METHODOLOGY

How can operational principles be transferred from one domain to another?

According to Kourilsky (1990), the origin of knowledge shared between several disciplines is to be found in "*unifying concepts*", i.e. general principles (emergence, organisation, etc.), "*common frameworks*" adopted as objects of study by certain disciplines. For example, the law of exponential growth, which has been verified for both bacterial populations and telephone communications, is a good example of a "*law*" shared by several disciplines. From this point of view, a model born in one discipline and later used in another must be preceded by an analysis of a double compatibility: a horizontal compatibility and a vertical compatibility. Horizontal compatibility refers to the need to define processes, functions, factors and a common language between disciplines. The second is more fundamental. It consists of verifying the validity of the orders or the underlying logic levels. For example, a technical process that works at a given level is not necessarily operational in a wider context. Similarly, in economics, certain results that are perfectly valid in microeconomics can lead to macroeconomic heresies. In the field of science, the choice of scale of analysis is a crucial factor. Following the recommendations made by Descartes in his Discourse on Method, another approach may be to "*divide*" a complex problem into a series of simpler problems. In some cases, this division into "*prime elements*" makes it possible to identify an "*elementary particle*", common to several fields, which can then be used to understand certain objects of study more easily. Darwin developed his theory of natural selection using concepts specific to horticulture and animal husbandry. The use of nomadic concepts does, however, need to be surrounded by important methodological precautions. When such analogies are used with care they can prove highly fruitful (Bouvet, 2009).

Berger-Douce and Durieux Nguyen Tan (2002) propose a method based on analogy and metaphor. We have chosen to use it because of its operational nature. This method comprises four stages.

The four stages of the approach proposed by Berger-Douce and Durieux Nguyen Tan

Stage 1. The purpose of the first stage is to "*clear the ground*", i.e. to present the problem by identifying the key concepts or components that will be used during the transfer. In this case, we need to determine the main axes around which the Forest Green Rovers model is based.

Stage 2. The second stage consists of using the general concepts identified in the previous stage to design a simplified "*source framework*" on which the analogy will be based. To do this, we need to present the choices made by the FGRFC in each of the directions identified.

Stage 3. The third stage consists of identifying the elements which play similar roles in similar areas. This phase is often referred to as the equivalence preparation phase'. In a way, it involves "*translating*" observations in the first domain into possible actions in the second.

Stage 4. The fourth stage is, strictly speaking, the transfer of knowledge from the original domain, football, to the target domain, golf. The aim is to infer from the elements identified in the previous stages applicable rules that will provide solutions to the problem encountered, in this case the operational implementation of the ecological transition in golf clubs.

Application

Stage 1. In view of the above, we believe that the FGRFC model has three main components:

- The economic axis, which determines production and supply choices,

- The environmental aspect, which determines the choices made in terms of construction, development and management of facilities,
- The social dimension, which aims to influence the behaviour of stakeholders.

Stage 2. On the basis of these three axes, the source framework is made up of the commitments made by the FGRFC at these three levels. These are as follows:
At economic level:

- Have a responsible purchasing policy,
- Involve sponsors in the chosen activities,
- Limiting the digital footprint,
- Give priority to sustainable food.

On an environmental level:

- Encourage sustainable mobility,
- Limit waste,
- Preserving the environment,
- Limiting water consumption.

On a societal level:

- Managing volunteers responsibly,
- Raising awareness internally,
- Educate the population about sustainable development,
- Seek to obtain "*labels*".

Stage 3. Applied to golf, these commitments lead to the following recommendations:
At the economic level:

- Have a responsible purchasing policy = for all infrastructures (clubhouse, restaurant, course, etc.) choose equipment (and therefore suppliers) compatible with the implementation of the ecological transition.
- Involving sponsors in environmentally-friendly practices = choosing as partners, particularly for club competitions, companies that care about the environment.
- Limit the digital footprint = keep computer equipment for a long time and limit the use of very high definition videos.
- Give priority to sustainable food = offer organic, animal welfare-friendly, seasonal products in the clubhouse restaurant, limiting the supply of meat and fish.

In environmental terms:

- Encourage sustainable mobility = install charging points for electric vehicles in the car park and encourage members to carpool.
- Limiting waste = favouring the use of recyclable products and limiting the use of plastic products as much as possible.
- Preserving the environment = preserving and developing the site's existing biodiversity, limiting the use of physio-sanitary products, reducing the carbon footprint.
- Limiting water consumption = harvesting rainwater, encouraging the recycling of wastewater, choosing suitable grasses.

On a societal level:

- Responsible management of volunteers = rewarding the work of volunteers within the club and encouraging them to take part in federal training courses.

- Raise awareness internally = organise theme days.
- Educate for sustainable development = promote the "*eco-golfer*" communication campaign.
- Seek to obtain "*labels*" = in France, the biodiversity label (bronze, silver, gold) and ISO 14024.

Stage 4. This final stage involves proposing a "*model*" to golf club managers based on that of the FGRFC. Not all clubs can have the same ambitions, depending on the constraints they face. This is why we have chosen to present not one but two models, depending on the level of commitment possible.

The different possible levels of commitment

Depending on their primary vocation, their management style and their location, not all golf clubs can approach the ecological transition in the same way. The motivation of managers can also differ greatly. According to the Agence de la Transition Ecologique[7], four graduated scenarios can be envisaged:

- The first is founded on a (re)evolution in behaviour. New practices, new consumption habits and major transformations in the way we travel, heat and eat are the cornerstones.
- The second is based on a shared determination on the part of all (economic) actors, leading to global cooperation and massive investment in solutions for the future.
- The third assumes that technological progress will make it possible to find solutions to all environmental challenges,
- Finally, the last option envisages a "*status quo*" that will allow current lifestyles to be safeguarded. It assumes massive investment in (non-existent) technologies capable of "*repairing*" the damage caused to the environment by the annoying habits of the past[8].

We do not believe it is necessary to design four different models for golf clubs based on the FGRFC example. On the other hand, this approach highlights the value of proposing graduated models depending on the level of commitment possible and desired by the parties involved. Two models are proposed below. The first is ambitious and constitutes something of a theoretical model. The second is less ambitious. It is based on extending actions that already exist in part. The example of FGRFC helps to bring them together within a coherent framework.

RESULTS

The Ambition+ (AB+) model

The "*Ambition +*" model describes what may be the situation for the majority of tomorrow's golf courses. We are still a long way off from achieving this goal. For the time being, based on the FGRFC model, it presents choices that would make golf courses pioneering sports facilities in this area. It involves abandoning long-standing habits (players) and methods (managers). What is more, some of the investments envisaged are expensive and therefore most certainly out of the reach of golf courses, whose economic equilibrium is fragile. It is therefore a theoretical framework towards which we must try to move.

Adaptation Model (AD)

The adaptation model is simpler to implement and already partially exists in some clubs[9]. It is based on management choices and is, therefore, mainly dependent on the will of the managers.

[7] The Agency for Ecological Transition https://www.ademe.fr/les-futurs-en-transition/les-scenarios/#technologies-vertes
[8] In a not-too-distant perspective, Golf Course 2030, for its part, proposes three possible scenarios for changing weather conditions.
[9] Examples include La Rochelle Sud, Les Alouettes, Vittel Hermitage, La Jonchère, Quiberon, Dinard and Loches

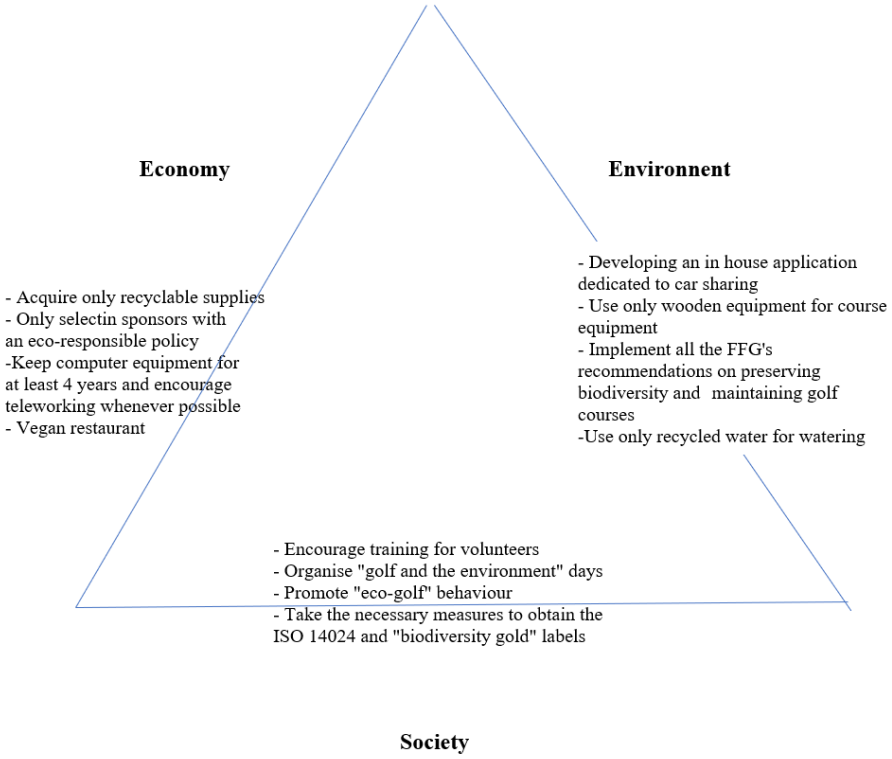

Figure 2. Ambition + model.

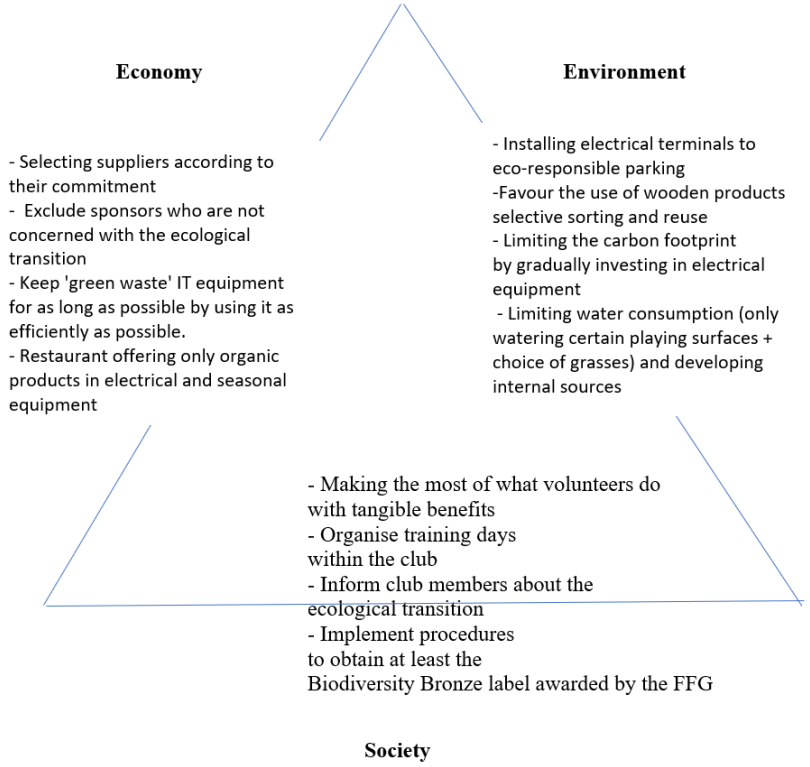

Figure 3. Adaptation model.

DISCUSSION

Although these two models have different ambitions, they are nevertheless built on the same foundations. They share an identical philosophy, but the means envisaged to move towards an eco-responsible model are less drastic in the adaptation model. The latter can therefore be seen as a step towards the former. While some of the actions listed require considerable investment, others are virtually free and could therefore be quickly implemented. In both cases, the main aim is to provide golf managers with an overall framework to ensure that a number of eco-responsible initiatives are not cancelled out by other choices. Sustainability is the guiding principle underlying these proposals. In the short term, to limit the impact of golf on the environment and adapt playing conditions to climate change; in the longer term, to ensure the ongoing future of golf.

Even if they appear to be blueprints for certain proposals, the models proposed do not emphasise the human dimension of this reflection: inclusion, gender equality, accessibility for people with disabilities, etc. should also be taken into account.

In terms of communication, however, the adoption of the adaptation model could enable certain golf managers to choose an original marketing strategy. In the golf sector, the strategic positioning of clubs is most often the result of their location and history. For example, courses that host major international competitions (e.g. the British Open) or that have been around for a long time (e.g. British links) are perceived as prestigious and attractive. Similarly, golf courses close to major conurbations can select their members and adopt an elitist policy. But what about the others? This question is often not considered by managers who do not benefit from a "*natural positioning*". But there are ways of thinking about it. In the wake of numerous studies highlighting the benefits for the physical and mental health of golfers (Driver, 1996; Hume, Keogh and Reid, 2005; Farahmand and al., 2009; Berlin and Klenosky, 2014; Murray and al., 2018), some authors (Breitbarth and Huth, 2019) propose a "*health*" positioning for golf courses that do not benefit from "*natural*" comparative advantages. In the same vein (a combination of the two being perfectly possible), a clearly asserted eco-responsible positioning, along the lines of what exists for the FGRFC, could appeal to "*committed*" golfers who are particularly attached to these issues.

More generally, this type of strategy could certainly help to improve the image of golf, which is often criticised on these issues due to a lack of knowledge of the subject. It is important to highlight that this is just a rough outline in order to give a general overview of the situation. Ideally, it should be extended to overcome some of its limitations.

Limitations of the analysis

Two types of limitations can be mentioned: methodological and general.

Methodological

Our study could have benefited from:

- A larger number of interviews with golf managers. However, one clear trend has already emerged: the need for a global framework for reflection and the limited time available to devote to these issues on a daily basis.
- A real immersion in FGRFC. We considered this, but unfortunately it was not possible for financial reasons.
- The creation of indicators to measure the benefits generated by the proposed actions, but this proved to be too complex for us. However, the study being carried out by the Centre de Droit et d'Economie

du Sport in Limoges[10] in collaboration with the FGF should lead to an overall cost-benefit analysis in this area.

General

- Our work does not provide an estimate of the cost of the measures to be implemented, which is an essential factor in the choice of managers. For France, some of the documents available on the FGF website are a partial substitute.
- Since it is based on the FGRFC model, our proposal does not take up exactly the directions mentioned by Golf Course 2030, the reference document proposed in 2018 by the Royal and Ancient. On closer examination, it is similar in almost every respect, with the exception of multifunctionality.
- The proposed guidelines do not take into account the specific problems associated with the organisation of competitions, particularly international competitions, which are very demanding in terms of playing conditions and course maintenance.

CONCLUSION

A lot has changed since the early 1960s. Today, the ecological transition is a priority for all stakeholders in the golf industry. Several crucial issues have emerged: water, decarbonisation, pesticide use, biodiversity and multifunctionality. The people involved on the ground, i.e. golf course managers, are the most directly concerned, as they have the onerous task of reconciling the need to maintain golfing activities, the ecological transition and economic constraints. Depending on the nature of the facility, not everyone has the same resources to solve this complex equation. Many of them are therefore looking for a formal framework that will enable them to go beyond the implementation of one-off actions to meet all the constraints resulting from climate change and its consequences. Among the various possibilities available to them, the FGRFC model is a particularly interesting one.

Following the approach proposed by Berger-Douce and Durieux Nguyen Tan (2002), it is indeed possible to propose two models that are directly operational for golf course managers and which, in addition to their practical usefulness, can provide them with a focus for innovative positioning. Like other industries, the golf industry is at a crossroads. Like White (2021), we believe that its role could even prove to be a driving force: "*Although sustainability is a lofty goal, it's a huge opportunity for golf, and there are a number of steps that golf courses can take immediately to begin changing for the better. Golf has the potential to set a leading example for how sports can play their part in tackling climate change and will be forced to adapt no matter what. Again, by prioritizing the triple bottom line—people, planet, and profit—golf courses can truly become a force for good*".

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[10] CDES Limoges, The Centre for Law and Economy of Sport.

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