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EUROPEAN RIVER CRUISING AND SUSTAINABILITY

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Abstract

The aims of this paper are to offer an exploratory review of the extent to which the leading European river cruise companies are publicly addressing their environmental, social and economic impacts and reporting on their sustainability strategies and achievements and to offer some reflections on sustainability within the European river cruise industry. The paper begins with brief outline of river cruising and of the characteristics of sustainability. The information on which the paper is based is drawn from the river cruise associations' and the leading European river cruise companies' corporate web sites. The findings of the paper reveal that the leading European river cruise companies have done little to publicly address the sustainability of their operations. More critically the authors argued that the European river cruise companies' commitments to sustainability are driven by the search for efficiency gains and are couched within existing business models centred on continuing growth rather than on maintaining the viability of natural ecosystems and communities. As such the leading European river cruise companies are, at best, currently pursuing a 'weak' rather than a 'strong' model of sustainability. The paper provides an accessible exploratory review of sustainability reporting in the European river cruise industry and as such it will interest professional working in the river cruise industry and more generally in the hospitality industry as well as academics and students interested in tourism and sustainability.

Keywords – River cruising; sustainability; environment; economic growth; Europe

Introduction

River cruising has grown rapidly in popularity in recent years to become a high profile niche element within the leisure tourism market. Geographically river cruising is concentrated in the major river systems of Western Europe but river cruising itineraries are also now available in Russia, China, Cambodia, Vietnam, and Myanmar. Given its rapid growth and expanding geographical coverage the environmental and social impacts of cruising are growing in scale and complexity. While the environmental, social and economic impact of ocean cruising and the cruising companies' approaches to reporting their management of these impacts have received some attention in the academic literature (e.g. Johnson 2002; Brida and Zapata 2010; Klein 2011; De Grosbois 2015; Font et. al 2016) to date work on the impacts of river cruising have been conspicuous by its absence from the literature. With this in mind the aim of this paper is to offer an exploratory review of the extent to which the leading European river cruise companies are publicly addressing their environmental, social and economic impacts and reporting on their sustainability strategies and achievements.

River Cruising

While the world's oceans and major rivers have long provided vitally important methods of transport the modern origins of ocean cruising as a holiday and leisure activity

have been traced back to the late 1960's and early 1970's (World Tourism Organization 2010). Cruising grew moderately during the 1970's and 1980's but in the decades since then it has consistently grown rapidly and it has become an iconic and a dynamic niche within the leisure tourism market, continually extending and enhancing its product and service offer and developing new markets. River cruising within Europe has developed much more recently and in many ways its emergence as a new element in the tourism market can be traced to 1992 with the opening of the 170 kilometre Main-Danube Canal which effectively connected Europe's main river arteries. Across much of Europe the tributaries and smaller rivers that flow into the main rivers provide additional opportunities to travel to the heart of the continent and also to explore a number of its more remote regions. Within Europe river cruise routes include the Rhine, Danube, Seine, Rhone, Moselle, Elbe, Oder, Douro, Volga, Dnieper and Po rivers. More generally river cruising itineraries now include the Yangtze in China, the Irrawaddy in Myanmar, the Mekong in Cambodia and Vietnam, the Nile in Egypt, the Chobe in Namibia and Botswana and the Murray in Australia.

The number of passengers taking river cruises within Europe grew from 75,000 in 2010 to 120, 000 in 2014. While the number of passengers taking river cruises in the rest of world declined from 67,000 to 19,000 during the same time period this was more than accounted for by the political situation in Egypt which reduced the number of passengers by 85% (Cruise Line International Association 2015). In 2014 Europe accounted for 86% of all river cruise passengers and the cruises on the Rhine, Danube and Moselle rivers accounted for 57% of all European river cruise passengers (Cruise Line International Association 2015). The river cruise operators offer a variety of packages generally varying in length from 7 to 14 nights with integral flights to and from the points of departure. Some companies offer themed cruises focusing, for example on wine appreciation, beer tasting, jazz, opera, impressionist art, golf, First World War history, Jewish heritage and Christmas markets.

River cruise boats are much smaller than their ocean going counterparts and must necessarily conform to water level and bridge height restrictions. A typical river cruise boat, for example, would be 130 metres in length and 11 metres in breadth and would accommodate up to 200 passengers while the typical corresponding figures for ocean going cruise vessels are 200 metres, 26 metres and 1,300 passengers. Typically a river cruise vessel would have three decks, 100 suites encompassing a bedroom and a lounge with a veranda off the lounge and a balcony off the bedroom; a sun deck; a lounge and bar and restaurant both with floor to ceiling glass doors; television with information systems, satellite channels; and films on demand; free internet wireless service and some boats have heated swimming pools. While the river cruises operating companies emphasise style and attentive and personalized service in their brochures and marketing material river cruise vessels do not have the wide range of leisure and entertainment facilities available on ocean going cruise ships and generally more emphasis is placed on itineraries than on the ships themselves. Passengers are almost always in sight of land and sightseeing is an important element in the river cruising experience. River cruise boats stop at large cities and small towns and villages and river cruising packages normally offer, or can include, a range of land based excursions at many of their stopovers.

In extolling promoting the benefits of river cruising the operating companies draw attention to the relaxed pace of travel, views of a variety of landscapes and the opportunity to go ashore to visit a wide range of places and historic sites. A few illustrative examples posted on the Internet by the World of Cruising (2016) provide a little of the flavour of the way that the cruising experience is marketed. *‘Travelling through six countries and meandering for 766 miles, the legendary Rhine is considered one of the most romantic rivers in the world. Iconic Dutch windmills and enchanting German castles adorn the riverbanks alongside, as you wind your way past on route through Holland and Germany. Eventually you will reach the narrow Rhine Gorge, a UNESCO World Heritage Site set amidst the lush greenery of the Black Forest region. The Swiss city of Basel awaits, sitting at the point where the French, German and Swiss borders meet and marking the gateway to the Swiss Rhineland.’ ‘. Divided into upper, middle and lower basins, the Danube is breathtaking throughout its length, unveiling a world of architecture, heritage and culture along its banks. Indulge a love of classical arts in Vienna, pass castle ruins teetering on the banks of Durnstein and explore Passau.’ ‘A Mekong river cruise opens up a continent rich in culture and history, as the vast waterway winds through thriving cities, rural communities, floating villages and markets, and endless rice paddies, pagodas and temples. In Cambodia, the Mekong River provides the gateway for exploration of the Angkor Archaeological Park; a UNESCO World Heritage Site that is home to the magnificent Khmer temple ruins of Angkor. Built in the jungle of Siem Reap, Angkor Wat boasts an extensive array of ornate 12th century stone structures and is one of Asia’s most important archaeological sites.’*

A number of companies currently operate river cruises and the market is far less concentrated than in ocean cruising where the two largest operators, The Carnival Corporation and Royal Caribbean Cruises, accounted for some 70% of cruise passengers (Market Realist 2015, webpage). The larger operators include Tauck River Cruises, AMA Waterways, APT River Cruises, Arose, Avalon Waterways and Emerald Waterways. Viking River Cruises, the world’s largest river cruise company, was initially founded in 1997 by a Dutch and Scandinavian consortium and expanded its activities into the US market in 2000. By 2015 the company had a fleet of some 65 boats operating on many European rivers and on rivers in Egypt, China, Vietnam, Cambodia and Myanmar. Tauck, which entered the European river cruising market in 2006, is a US based family business founded in 1925 which offers guided tours, small ship ocean cruises, safaris and family travel experiences in over 70 countries. Avalon Waterways is a wholly owned subsidiary of Globus, a Swiss based company which consists of some 30 tourism and aviation businesses and carries some 500,000 passengers per annum across 65 countries. Avalon’s river cruise operations are relatively small, in 2015 its river cruising fleet consisted of some 22 vessels and its operations were concentrated in Europe, Cambodia, China and Egypt.

Sustainability

The ideas underpinning sustainability are not new (Gruber 2012) but the concept began to attract increasing attention from the 1980’s onwards following the publication of the *‘World Conservation Strategy’* (International Union for Conservation of Nature and Natural Resources 1980) and *‘Our Common Future’* (World Commission on Environment and

Development 1987). In the following decades the term sustainability has become increasingly seen as offering a potential solution for a wide range of challenges and problems from the global to the local scale across seemingly all walks of life. Diesendorf (2000) argued that sustainability can be seen as *'the goal or endpoint of a process called sustainable development.'* Arguably the most widely used definition of sustainable development is that provided in *'Our Common Future'* namely *'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'* (World Commission on Environment and Development 1987).

However defining sustainability is not straightforward and there are a number of contrasting and contested meanings and no obvious consensus in providing an operational definition. There is a family of definitions' essentially based in and around ecological principles and there are definitions which include social and economic development as well as environmental goals and which look to embrace equity in meeting human needs. At the same time a distinction is often made between 'weak' and 'strong' sustainability with the former being used to describe sustainability initiatives and programmes developed within the existing prevailing economic and social system while the latter is associated with much more radical changes for both economy and society. Roper (2012) for example, suggested that *'weak sustainability prioritizes economic development, while strong sustainability subordinates economies to the natural environment and society, acknowledging ecological limits to growth.'*

As the scale and geographical reach of river cruising has grown so has its environmental, social and economic impacts and there is growing interest amongst investors, environmental pressure groups, media and tourists about such impacts and about how the river cruise companies are managing these impacts. Such interest is part of much wider corporate concerns that *'the transition to more sustainable patterns of production and personal consumption is not optional'* and reflects the belief that *'leading business recognise this as an opportunity and want to be part of the solution rather than part of the problem, as more and more consumers look to be smart and will increasingly establish new norms for socially acceptable behaviour'* (Deloitte 2012, p1). In a similar vein Lubin and Esty (2010, p.3) have argued that *'customers in many countries are seeking out sustainable products and services or leaning on companies to improve the sustainability of traditional ones'* and that *'managements can no longer ignore sustainability as a central factor in their companies' long-term competitiveness.'*

Method of Enquiry

In an attempt to undertake an exploratory examination of the extent to which Europe's river cruise companies are publicly recognising the environmental, social and economic impacts of their operations and addressing and reporting on their sustainability strategies and achievements the authors adopted a bilateral approach focused on the cruise operators' associations and on the individual river cruise operating companies. Firstly the authors undertook a general Internet search using the terms 'river cruising' and 'sustainability' and a more specific search of each of the river cruising associations', namely the Cruise lines International Association (CLIA) and IG River Cruise, the European River

Cruise Association, using the key word 'sustainability' and employing Google as the search engine. The aim here was to locate some general information on the river cruising industry and to ascertain if there were any collective approaches to sustainability within the industry and to identify the leading river cruise operating companies within Europe. The authors then undertook a more specific Internet search using the key words 'sustainability' and the name of each of the leading European river cruise operators as identified by the cruising associations. This second search also employed Google as the search engine. The aim here was to discover if, and to what extent, the leading river cruise operating companies were publicly addressing and formally reporting on their environmental, social and economic impacts and on their individual approaches to sustainability. The first and second searches were undertaken in November 2015 and December 2015 respectively and the most recent information posted on the various websites formed the empirical material for this paper.

Both the major cruising associations and the leading river cruising operating companies might be seen to reflect contemporary approaches to sustainability within the sector and also to be keen to publicise their sustainability initiatives to a wide audience. A number of authors (e.g. Holcomb et. al.2007) have used content analysis to systematically identify features within reports and on corporate websites but in conducting the current preliminary examination the authors deliberately chose to identify and review the selected companies' published approaches to sustainability employing a close inspection of the available commentary. The authors believe this simple approach was justified given, as revealed in the findings below, the limited material available on sustainability posted on the websites. As this information is in the public domain the authors took the view that they did not need to contact the selected associations and companies to obtain formal permission prior to conducting their research. At the same time the authors recognise that the approach chosen has its limitations in that there are issues in the extent to which a company's public statements fulsomely, and in detail, reflect strategic corporate thinking and whether or not such pronouncements might be considered little more than carefully constructed public relation exercises. However the authors believe that their approach offers an accessible portal and an appropriate approach for the present exploratory study.

Findings

The findings revealed that specific information about, and guidance on, environmental sustainability for river cruising has been produced within the industry by IG RiverCruise, the European River Cruising Association, and the Travel Foundation, an independent charity that works with the travel and tourism industry in shaping a sustainable future. Under the banner '*Greening Measures and Ecological Aspects of River Cruises*' Grammerstorf (2013), a Director of IG RiverCruise, identified four elements of '*responsible river cruising*' namely air outputs, land outputs, water outputs and safety and offered some general guidance on the management of these elements. Much more extensively the Travel Foundation (2013) published '*Environmental Sustainability for River Cruising*' as a guide to best practice.

The guide, described '*as the first of its kind in the public domain*', is '*designed to support the adoption of better environmental practices for river cruising*' (Travel Foundation

2013). By way of an introduction the guide, which is addressed to river cruise companies, suggested that *'the business benefits for improving the sustainability of your operations are clear'* and outlined six benefits. These benefits were seen to relate to reductions in costs and improvements in energy efficiency; risk management and legislative compliance; greater staff engagement; maintaining and enhancing competitive advantage; meeting emerging consumer expectations; and protecting the tourism environment. In addressing cost reductions and improvements in resource efficiency, for example, the guide stressed that improvements in environmental performance can also generate significant cost savings in operational budgets. In terms of competitive advantage the guide highlighted the importance of offering more sustainable forms of tourism in that they can be seen to offer customers a prized experience while enabling operating companies a competitive edge within the increasingly crowded river cruise marketplace.

The guide covers seven themes namely energy; water; wastewater; solid waste; monitoring; environmental management systems; and communications. In addressing energy, for example, the principal issues are identified as the contribution greenhouse gas emissions make globally to climate change and locally and regionally to air quality and the fuel consumption associated with propulsion. A number of energy saving procedures are suggested including investment in innovative technology and engines, staff training on energy saving procedures, promoting greater passenger awareness, regular maintenance of propulsion equipment and the employment, where itineraries permit, of an efficient cruising style and the use of shore-based power wherever possible. Clean water is identified as a precious resource, which should be used sparingly, while contaminated water has the potential to pollute the local environment. In looking to manage water resources the guide recommends a number of water-saving techniques including the installation of water sub-meters to allow a detailed picture of water consumption on board to be built up, the fitting of low flush toilets with low capacity cisterns and the installation of taps and showers with flow controllers. Similar types of operational measures are recommended for wastewater and solid waste with the accent being on reduction, recycling and reuse whenever possible.

The guide also emphasised the importance of communication, monitoring and a management system (EMS). The establishment of a comprehensive monitoring system was seen to be vitally important, for example, in establishing a performance baseline of water and energy use and waste production, in determining trends in resource consumption, in setting targets and assessing performance against such targets and in identifying problems at an early stage. A communications strategy is also seen to be important if staff are to be aware of the operational procedures to reduce and monitor energy and water consumption and waste disposal and to develop their appreciation and understanding of the benefits that the pursuit of a more sustainable approach will bring for the company and its customers. In recommending such a strategy the guide stressed that sustainability should not be seen to be confined to individual actions rather that it is a philosophy underpinning all a company's activities and decision making and that senior management have a vital role to play in consistently promoting and disseminating the sustainability message. Finally the guide recommends the introduction of an EMS to continuously record and minimise environmental impacts and measure performance against resource efficiency targets, on legal compliance and on policy awareness levels amongst staff.

While the guide's principal focus was on the environmental impacts of river cruising boats it also included some wider guidance on the relationships between the cruise operating companies and their suppliers, ports, local authorities, booking agents and competing cruise companies. River cruise companies are advised to include a thorough analysis of their supply chain as an integral part of a comprehensive sustainability strategy. This analysis should embrace the products purchased and any packaging as well as the logistics necessary to deliver these products onboard. The cruise operating companies are advised to source food locally, to reduce transport costs and emissions, all with sustainability in mind. The river cruise companies are also advised to work closely with port authorities to establish waste management facilities for food waste, glass, metal cans, plastics and paper as well as hazardous wastes. At the same time river cruise companies are also advised of the potentially positive economic and social impacts they may have in the destinations they visit. Such impacts can include employment, income generation, increased trade for shops, local restaurants, handicraft markets and cultural facilities.

The findings of the examination of the river cruise companies' web sites revealed that none of the leading European river cruise operators published a dedicated sustainability report. A small *number* of the selected operators namely Amadeus, Grand Circle, Delphin, Avalon Waterways, Uniworld and AMA Waterways posted some limited information on their approach to sustainability while the other selected companies published no information on sustainability. Uniworld River Cruises, for example, claimed *'we believe sustainability is the key to a better world'* and argued that *'In the course of travelling the great rivers of the world and meeting people from all over the globe, it's nearly impossible not to stand in awe of the beauty and power of the natural environment, and the cultures that call it home.'* More specifically Uniworld suggested that its approach to making *'a positive difference in the world'* is focused on its environmental, social and economic responsibility.

In addressing environmental responsibility, for example, Uniworld reported its contribution to the Travel Foundation's environmental guide to river cruising mentioned earlier and its partnership with Whole World Water, a Canadian charity, *'to help to provide drinking water where it is needed most.'* The company claimed its *'dedication to social responsibility'* took many forms including *'providing excursions that immerse travellers in local cultures'* and supporting local charities and helping *'to develop programs focused on preserving local communities and cultures.'* Economically the company emphasised that its work with organic wineries and small family businesses epitomised its commitment to environmentally conscious businesses in all its river cruise destinations. Further the company argued that *'by introducing our guests to these local, sustainable ventures, we are able to provide truly unique experiences to travellers while bringing economic opportunity to the region.'*

Under the banner *'Sustainable Travel'* Avalon Waterways stressed its commitment *'to minimising its impact on the environment and to reducing its dependence on non-renewable resources'* and claimed to *'have implemented policies to support this mission and are working carefully to enhance our products with this mission and our values combined.'* Further Avalon Waterways claimed it maintained *'a policy of "Leave Only Footprints and Take Only Photos"'* and *'our staff and major service providers strive to ensure no removal of*

any natural or cultural artefacts or materials to ensure our environment looks and functions the same before and after our visit.' The company also provided some information on its partnership with the charity Tourism Cares in supporting the ChildSafe Network in the Siem Reap region of Cambodia.

In outlining its *'Environmental Policy'* Grand Circle Cruise Line, for example, claimed to be *'committed to lessening our impact on the planet while encouraging our suppliers and customers to do the same.'* Grand Circle further claimed *'We strive to be stewards of the environment through the efficient and sustainable use of natural and economic resources, and practices such as energy conservation and the preservation of biodiversity'* and that *'By doing this we'll help preserve the world we travel not only for our customers but for generations to come.'* However although Grand Circle posted some information on the company's *'environmental policy'* this was focused singularly on recycling and on reducing pollution and waste in the company's headquarters rather than on its river cruising operations' approach to sustainability.

Discussion

Although more and more large companies are employing the Internet to report on their sustainability strategies and achievements, the findings of the current study reveal that there is only limited information on the environmental, social and economic impacts of river boat cruising or on how the operating companies are currently developing their approaches to sustainability. On the one hand at the sector level, the Travel Foundation, with support from one of the river cruise operators, published a best practice guide focused largely, but not exclusively, on the environmental dimensions of sustainability and IG River Cruise, the European River Cruising Association, posted some limited descriptive material on introducing green operational practices. On the other hand none of the leading river cruise operators produced a sustainability report though a small number of them published some limited information on environmental policy and on their approach to sustainability. This is not a problem per se in that companies have no statutory obligation to report on sustainability. As such this may reflect the reality that collectively the leading river cruise companies are at the beginning of what may well be a long and difficult journey towards sustainability and a number of issues merit discussion and reflection.

Firstly if *'developing a sustainable brand can help to manage reputational risks, enhance relationships with key stakeholders, and meet the requirements of a growing segment of consumers that place value on sustainability'* (European Union et. al. 2013) within the industry then the majority of the river cruise operating companies are currently falling well short of the mark. More specifically reporting on sustainability may be important in helping to counter increasingly critical media and pressure group commentary. At a time when the Secretary General of the Cruise Line International Association recognised *'an increase in the level of public scrutiny that the cruise industry faces'* (Cruise Line International Association 2015), how the river cruise companies publicly address sustainability issues seems likely to become increasingly important. Fostering and disseminating a positive commitment to, and engagement with, a range of sustainability issues and publicly providing evidence of this commitment through a

transparent sustainability reporting process may serve European river cruise companies increasingly well in the future.

Secondly there are issues about the way that both the sector and the individual cruise operating companies look to define and operationalise sustainability. Such definitions can be seen as being dominantly, but not exclusively, built around efficiency gains and the search for competitive advantage and are driven as much, and arguably more, by business continuity goals as by concerns for the environmental, social and economic impacts of their operations. At the operational level while many of the environmental initiatives reported by the river cruise companies are designed to reduce energy and water use and waste generation they also reduce the river cruise companies' operating costs. The Travel Foundation (2013), for example, argued that *'by safeguarding destinations, companies have the opportunity to protect the natural assets they rely on to be able to offer an enjoyable holiday, enhance brand value, increase profits, save costs and improve competitive positioning, both for attracting and retaining cruise guests and recruiting the best staff talent.'* More generally and more critically this echoes Banerjee's (2008,) argument that *'despite their emancipatory rhetoric, discourses of corporate citizenship, social responsibility and sustainability are defined by narrow business interests and serve to curtail the interests of external stakeholders.'*

Thirdly there are issues around the underlying tensions between sustainability and economic growth. In recent years the river cruising industry within Europe has experienced significant growth. The river cruise operating companies do not offer a definition of growth per se but their approach is rooted in the general belief that continuing economic growth will be accompanied by the more efficient use of resources. This trend which is seen as either relative or absolute decoupling (relative decoupling refers to using fewer resources per unit of economic growth while absolute decoupling refers to a total reduction in the use of resources) underpins many conventional definitions of sustainability and the vast majority of current corporate sustainability strategies and programmes. However Wiedmann et. al. (2015) argued that *'achievements in decoupling in advanced economies are smaller than reported or even non-existent'* and this, in turn, may be seen to undermine the concept of responsible growth.

More specifically the concept of sustainable consumption which Cohen (2005, webpage) has described as *'the most obdurate challenge for the sustainable development agenda'* might be seen to be a thorny issue for the leading river cruise companies. In many ways both the concept and the practice of cruising, with its aim, for example, to *'enrich the guest experience through culinary, entertainment and technology enhancements'* can be seen as the very antithesis of sustainable consumption. That said the continuing popularity of cruising suggests little consumer appetite for sustainable consumption and here the European Environment Agency's (2012) recognition that *'sustainable consumption is seen by some as a reversal of progress towards greater quality of life'* in that *'it would involve a sacrifice of our current, tangible needs and desires in the name of an uncertain future'* resonates.

Finally there are criticisms of the sustainability of river cruising within Europe from a political economy perspective. Sprague (2014) argued that *'the major companies in the cruise industry have come to embody what it means to be transnational- circumventing borders and manipulating local economies in order to enrich the very few and sell exotic experiences to privileged sectors while at the same time generating very little benefit for those they exploit to achieve these ends.'* More generally Mansfield (2009), argued that conventional approaches to sustainability fail to recognise *'the political nature of the socio-economic processes that produce environmental degradation poverty and injustice.'* Jackson (2006) has argued that *'it is entirely fanciful to suppose that deep emission and resource cuts can be achieved without confronting the structure of market economies.'* In a similar vein Castro (2004) has questioned the very possibility of sustainable development under capitalism and argued that economic growth relies upon the continuing and inevitable exploitation of both natural and social capital.

Conclusions

This exploratory review suggests that, to date, the leading European river cruise companies have done little to publicly address the sustainability of their operations. As sustainability becomes increasingly important in managing risk and reputation then all the leading European river cruise companies may need to reconsider their current approach to sustainability reporting if they are to retain, and ideally enhance, their position within the competitive and dynamic market for the leisure pound. More generally the authors would argue that relatively limited current commitments to sustainability within the river cruise industry can be interpreted as being primarily driven by business imperatives. The accent being on making efficiency gains across a wide range of economic, social and environmental issues rather than on maintaining the viability and integrity of natural ecosystems and on reducing demands on finite natural resources. More critically the authors suggest that the leading European river cruise companies' commitments to sustainability are couched within existing business models centred on continuing growth and consumption and that, at best, these commitments represent a weak approach to sustainability.

A number of potential future research agendas can be identified across a range of disciplines within tourism sector. Marketing research would be valuable, for example to explore how cruise customers, travel agents and consultants decode the concept of sustainability and on the extent to which customers are prepared to change their river cruise purchasing behaviour and cruise company patronage in the light of companies' sustainability strategies and achievements. The management of sustainability issues between the river cruise companies and local suppliers also merits greater research attention. Research might also be profitably pursued to examine how river cruise companies look to manage the environmental, social and economic impacts in a range of European river locations. Research into information system developments to integrate the continuous automatic recording, transmission and aggregation of sustainability performance data would also help to facilitate the development and dissemination of the sustainability reporting process. On the finance side research designed to examine how commitments to sustainability are reflected in profit margins and stock market performance also seems likely to become increasingly important.

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