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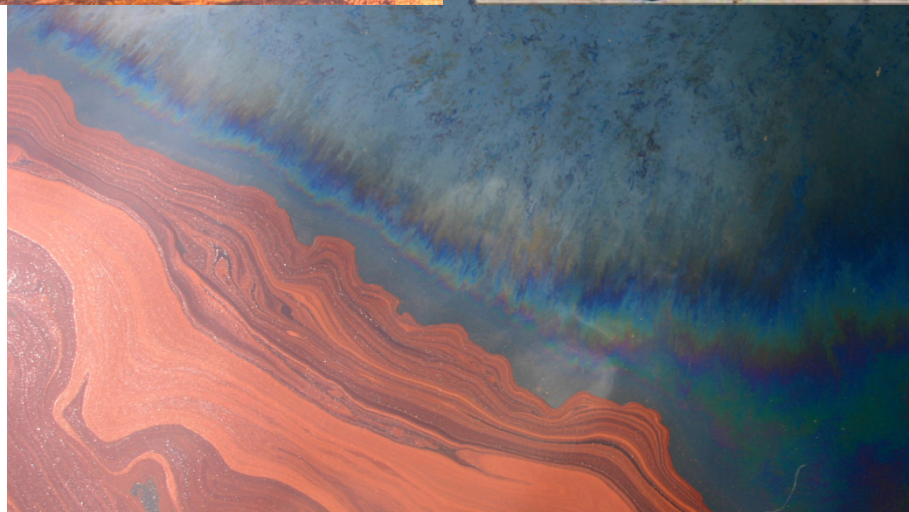
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## **Pouring oil over the Balearic tourism industry**

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# **Pouring oil over the Balearic tourism industry**

**Joan Carles Cirer Costa**

Anything that can go wrong, will go wrong. <sup>a</sup>

The 2010 accident showed that no operating company in the world had the capacity to rapidly contain a deep-water blowout. <sup>b</sup>

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<sup>a</sup> Murphy's law.

<sup>b</sup> Donald Boesch, 2012: "I am one of two scientists who served on the US president's commission that produced the report *Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling*."

## **POURING OIL OVER THE BALEARIC TOURISM INDUSTRY**

**Summary:** This study aims to predict the possible negative effects on the Balearic tourism economy of the exploitation of marine oil fields near its coastline. We describe the current business structure of the islands' tourism industry and then focus on the various kinds of spills that might affect it. Our conclusion is that the exploitation of the oil fields will significantly damage the tourism industry: a series of small-scale accidents followed by a large spill could destroy the complex structure of Balearic tourism, and would have severe repercussions for the economy of the archipelago.

**Keywords:** Oil spill; tourism; Balearics.

**JEL codes:** H41, H84, K32, Q34, Q52.

### **Highlights:**

- An oil spill affects both the natural environment and the social and economic structure.
- The extent of the damage will vary depending on the economic structure affected.
- Even small spills may be economically devastating.
- Tourism is particularly sensitive to the risk of oil spills.

# POURING OIL OVER THE BALEARIC TOURISM INDUSTRY

## 1. Introduction

Unfortunately, a regular succession of oil spills has been recorded in recent decades. This has led both governments and the academic world to carry out increasingly detailed economic evaluations of the costs that these ecological disasters generate. Many studies have quantified their impact using an *ex post* methodology: that is, estimating the damage caused by a particular spill. Studies of this kind have been conducted after all the large-scale spills of recent years: for example, the *Deepwater Horizon* (Hayworth et al. 2011. Oxford Economics, 2010), the *Prestige* (Loureiro et al. 2006, 2009), and the *Exxon Valdez* (McDowell Group, 1990). Researchers have also constructed general models to identify the main factors that should be included in these cost analyses (Kontovas et al. 2010. Allo & Loureiro, 2013).

A second type of study carries out *ex ante* analyses, trying to predict the amount of damage that a spill might cause in a specific environment. *Ex ante* studies of Belize (Cisneros et al. 2013) and the US coastline (Etkin, 2004; 2005) have been carried out, while other more general studies have assessed the natural and social capital that might be affected by a large-scale accident (Gaddis et al. 2007. Kinner & Merten, 2006). The present study offers an *ex ante* analysis, extending its field of study to the social and entrepreneurial impact of an oil spill.

Our starting point is the assumption that all large-scale accidents affect both a natural and a social environment (Palinkas et al. 1993). In this paper we describe the social and economic environment under threat, the tourism industry, and then outline the dangers facing it. Finally we assess the foreseeable effects of an accident, or of a specific sequence of accidents, on this environment.

## 2. The Balearic tourism industry

### 2.1. An absolute dependence on tourism

In 2012, the Balearics received 10.4 million tourists – almost as many as Croatia, and considerably more than Portugal (UNWTO, Tourism Highlights 2013). This

concentration of visitors in a relatively reduced area makes the archipelago the largest and most densely-populated tourism cluster in the Mediterranean. The Balearic tourism industry caters almost exclusively for holidaymakers from Europe, and in fact tourism is the only source of primary income that the islands receive. The figures published by the Spanish National Statistics Institute clearly reflect this extreme level of specialisation: between 2000 and 2008 the section “Hostelry” (Hospitality, bars & restaurants) accounted for 21.4% of the islands’ total GDP – more than three times the Spanish average, which stood at 6.7%. The total dependence of the islands’ economy on tourism is confirmed by the sluggishness of the agricultural and industrial sectors, whose production does not even reach the third of the Spanish average, and by the predominance of sectors such as Souvenirs and Hostelry machinery (Cirer, 2014b).

Evaluating a region’s total income from tourism is a difficult task. It is hard to arrive at an accurate estimate. Tourists pay a large proportion of their total expenditure to tour operators in their home countries, which send them on their way to their destinations through complicated financial arrangements that include transfers to subsidiaries and to third parties. The money spent by tourists directly in their destination is also distributed among a large number of firms some of which are 100% tourism-based such as hotels or car rentals, and others like shops and restaurants which also serve the local population and sell non-locally manufactured products.

The most reliable instruments for calculating the economic weight of the sector are the surveys on tourism spending carried out by the Spanish Tourism Studies Institute, and the detailed versions of these surveys focusing solely on the Balearics, published by the Balearic government. These sources calculate tourist spending in the Balearics at 10.2 bn, 10.9 bn and 11.4 bn Euros for the years 2010, 2011 and 2012 respectively. These values represent an annual income of between 7.5 bn and 8 bn Euros for the islands.

The total economic dependence of the Balearics on tourism is not new. It is the culmination of a long historical process which dates back to the early twentieth century, when the *Grand Hotel* opened in Palma de Mallorca. The tourist sector was consolidated as a key element of the island economy in the 1930s, (Cirer, 2014), and it was then that Majorca’s tourism industrial district developed and acquired many of the features that characterise it today. In the 1960s the industry experienced tremendous growth and established itself as the island’s main source of income; in the 1980s it expanded even further. Over the past twenty years the emphasis has switched from

quantity to quality, with the disappearance of small, obsolete establishments and the overhaul of the hotel network (Cirer, 2014b). So, for fifty years now, the Balearics have been entirely dependent on tourism, and today the tourism industry is a mature, stable economic sector.

## *2.2. The Balearic tourism model: sun, sand and sea*

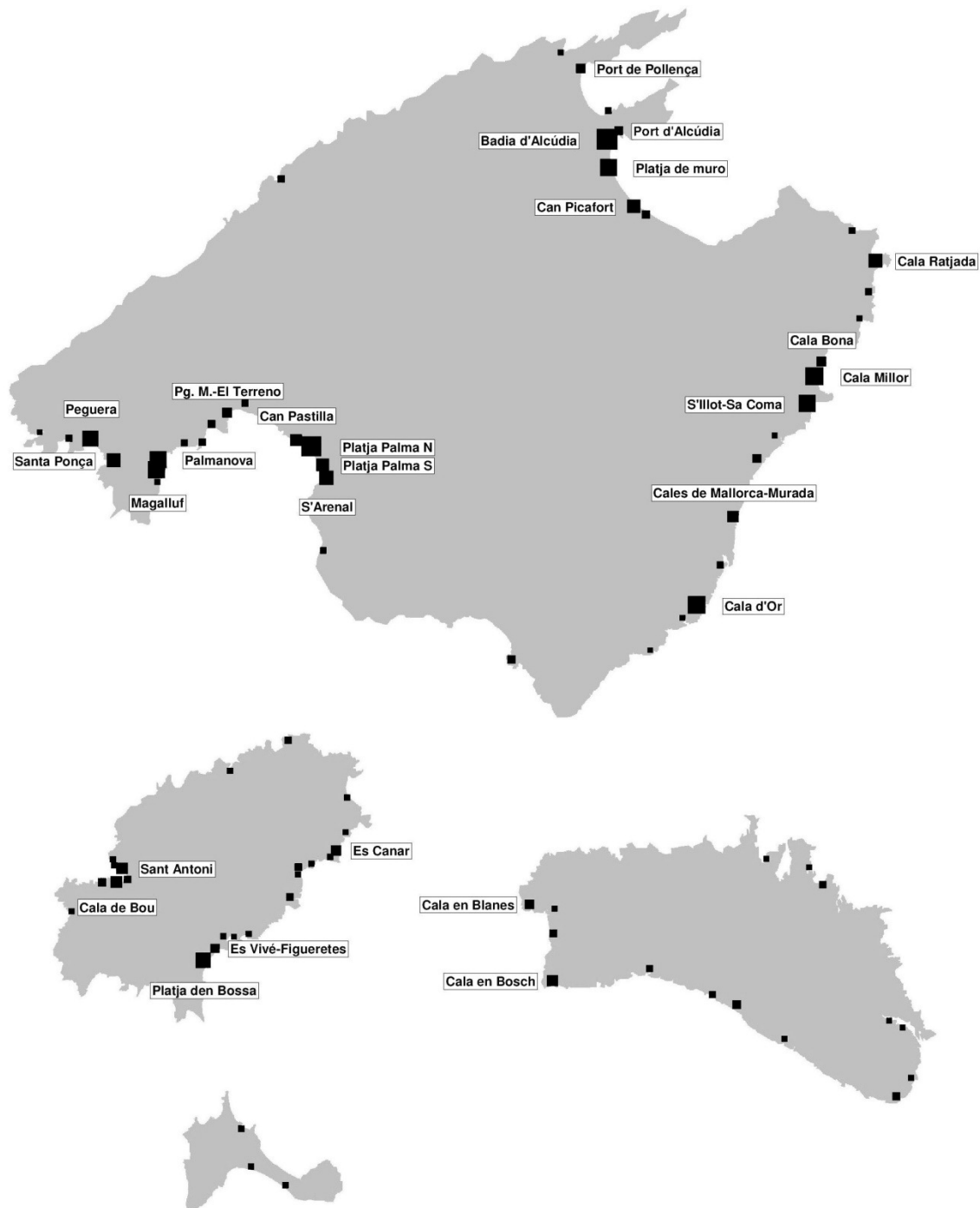
The tourists who visit the Balearics are almost exclusively European. Many of them return to the islands year after year. They are not the kind of travellers who are interested in new destinations and new experiences; their holidays on the islands are part of their annual calendar, and they regularly report high levels of satisfaction (Cladera, 2009; Jacobsen, 2002; Jacobsen & Dann, 2009). They come to the islands to relax, to take a break from their routine, and to consolidate their kinship relationships and cultivate new friendships.

Once in the islands, the tourists' behaviour is relatively homogeneous and predictable. They dedicate little time to excursions or sports, with the odd exception of a game of golf or tennis or a course in underwater diving; in general, they devote themselves to social activities in three well delimited areas, which are always located very close to each other: the beach, the communal areas in the hotel (above all the swimming-pool), and the public spaces in the resort around the hotel (streets, cafés, the promenade, and so on, Cohen, 1984. Obrador, 2009; 2012). The three areas are always sited as close to the shoreline as possible, as the sea exerts a strong attraction. The proximity of the sea and the view of the coastline offer a sensation of closeness to a "natural entity" (Caletrio, 2011), and indeed the seafront location is a key selling-point for high quality tourist accommodation (Cirer, 2013a, 2013b). The Mediterranean beaches have one of the highest economic valuations in the entire world (Ghermandi & Nunes, 2013, Onofri & Nunes, 2013) and their protagonism has shaped the geographical distribution of the tourist establishments in the Balearics shown in Figure 1.

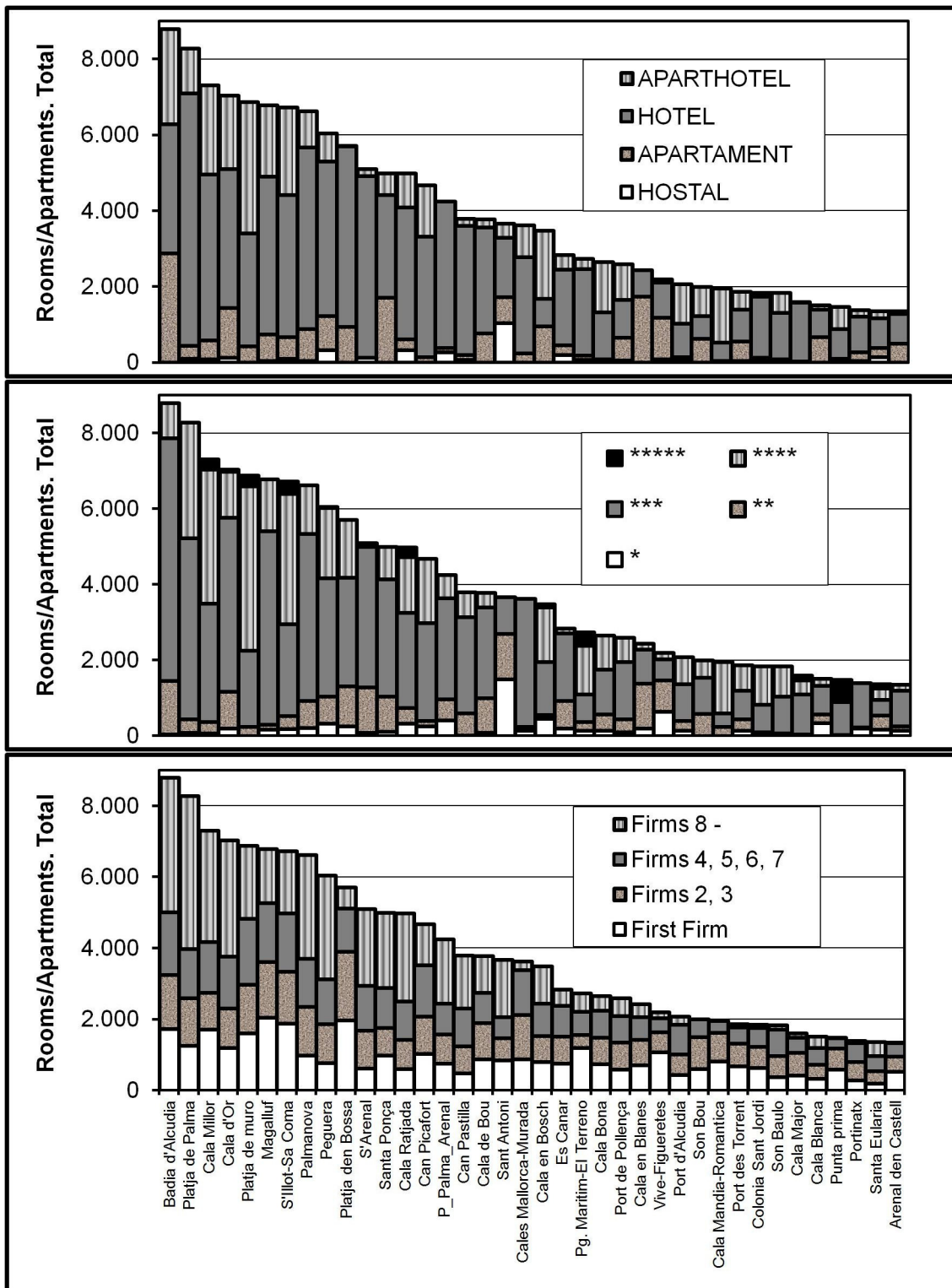
The prototypical Balearic tourist resort stretches along the coastline, parallel to the beach, and rarely extends more than 200/300 m back from the sea. The highest category establishments and almost all the complementary offer are located on the seafront, along with 1 and 2 star hotels and apartment blocks. (Cirer, 2013b).

Apart from the matter of their size, most of the resorts are practically indistinguishable from each other. Their composition is also almost identical in terms of types of establishments, construction densities, and the presence of the large hotel chains (Cirer, 2013b, see Figure 2).

**Fig. 1.** Geographical distribution and relative size of the main tourist destinations in the Balearics.







**Fig. 2.** Distribution of rooms in hotels and apartments in the main destinations in the Balearics according to type of establishment, their category, and the firms owning the establishments.

### 2.3. *Tourism firms in the Balearics*

Tourism in the Mediterranean is made up of three key components: air transport, accommodation, and the complementary services. In the Balearics, as practically all the air transport is provided by charter or low cost flights from outside the islands, it need not concern us here. In contrast, the other two sectors are totally dominated by locally-based firms.

In the accommodation sector, the first feature that stands out is the diversity of the firms. The hotel businesses range from a group of five international chains at the top of the ladder to thousands of tiny family firms at the bottom. For our analysis we divide the sector into five groups:

1. Five globalised chains: *Melià, Iberostar, Barceló, Riu* and *Fiesta* manage more than 10,000 rooms and are among the hundred largest hotel operators in the world.
2. Extended chains: firms which have their headquarters in the Balearics and manage more than a thousand rooms, and also at least one hotel located outside the archipelago.
3. Local chains: firms with more than a thousand rooms but which have not expanded outside the Balearics; they remain strictly local.
4. Other Balearic firms: relatively small firms with only one establishment.
5. Non-Balearic firms: firms with headquarters outside the Balearics.

**Table 1.**

Classification of hotel firms operating in the Balearics. 2010.

Hotel firms operating in the Balearics	Hotels in Balearics			Hotels outside Balearics	
	Chains	Hotels	Rooms	Spain	Abroad
1 Globalised chains	5	75	21,849	230	377
2 Extended chains (> 1000 rooms)	17	185	37,622	45	26
3 Local chains (> 1000 rooms)	15	186	29,331		
4 Other Balearic firms		2,117	97,563		
5 Non-Balearic firms	36	82	11,609		
TOTAL (Official data 2010)		2,645	197,974		

SOURCES: Web pages of the firms themselves, business organisations, and the Balearic government.

**Table 2.**

The number of tourism firms in the Balearics classified according to the number of paid employees.

Economic Activity		Total	Number of paid employees				
			≤ 2	3 - 9	10 - 49	50 - 199	≥ 200
47	Retailers	11,454	9,388	1,872	170	22	2
551	Hotels and similar	964	424	298	150	76	16
552	Other tourist accommodation	726	579	121	22	4	
561	Restaurants	4,147	2,635	1,270	232	10	
663	Bars	3,723	3,042	616	65		
771	Car rentals	395	303	76	15	1	
79	Travel agencies	475	340	87	27	14	7
932	Recreational activities	387	284	72	24	7	
	TOTAL	22,271	16,995	4,412	705	134	25

SOURCE: Spanish National Statistics Institute. Directory of business firms, 2012.

These data (table 1), bear witness to the wide dispersion of firms in the hospitality sector. In fact this dispersion has characterised the industry ever since mass tourism became consolidated in the islands. Since 1975, the three largest firms have never had a market quota above 10% of the total; the exceptionally low Herfindahl Index score – never moving outside the range between 0.005 and 0.008 – shows that no firm has ever enjoyed a position of market dominance (Cirer, 2014b). Table 1 above also highlights the secondary role played by firms from outside the islands: the tourism industry is firmly in the hands of local entrepreneurs.

Table 2 shows the distribution of tourist firms in the Balearics according to the number of paid employees. Firms in the hotel and travel agency sector employ large numbers of staff, but all the other tourism-related activities are dominated by small firms.

We are now in a position to offer a general description of the tourist industry in the Balearics. All firms are located on the coastline; their geographical distribution depends directly on the dimensions of the beach available. All resorts offer a wide range of accommodation, in terms of the categories, types of hotel, and forms of ownership. The second central element of the islands' tourism industry, the complementary services, is always run by small firms, for the most part strictly local.

#### *2.4. The Balearic tourism cluster: an industrial district*

The concept of “industrial district” was coined by Marshall at the end of the nineteenth century to define one of the two models of business organisation in operation in the United Kingdom. The first of these models comprised large firms with vast, vertically integrated factories; the other was made up of regional groups containing dozens or hundreds of firms producing highly similar products using similar procedures, and working almost in cooperation. These “industrial districts” (Marshall & Marshall, 1879. Marshall, 1990) are characterised by the unhindered circulation of information and by the presence of highly efficient labour markets, supplies, and specialised services inside a particularly dynamic environment.

Marshall's ideas were practically forgotten until the end of the twentieth century, when they were revived by a new school of Italian economists. These authors defined the industrial district as a dense network of inter-entrepreneurial relations involving firms of similar characteristics inside a clearly delimited physical environment

(Becattini, 2004. Piore & Sabel, 1984). The proximity between the firms eliminates the advantages of vertical integration and favours the district's joint competitiveness (Cainelli, 2012, Taylor & Asheim, 2001). Firms enjoy cheaper inputs and specialised services, derive greater benefit from the economies of scale, and are able to offer a wider range of products; this variety enables them to gain access to all segments of the market (Johansson & Quigley, 2003).

In the context of Balearic tourism, the lack of vertical integration in the hotel firms bears witness to the influence of the industrial district. The hotels rely on external entrepreneurs for their supplies and the maintenance of their property, and consider the adjacent complementary services as an integral part of their offer. Their publicity material invariably contains advertisements for the complementary services on offer in the vicinity, such as daytrips, sports activities, and so on.

All these features of the industrial district underline its markedly economic character, but it should be stressed that the basis of its cohesiveness is the society around it and the development of a sense of identification deriving from the existence of tacit, flexible agreements that substitute formal contractual relations (Sammorra & Biggiero, 2001). The constant interaction between firms allows its continuous evolution and, at the same time, fosters the accumulation of a shared social capital accessible to all members (Johansson & Quigley, 2003), which eventually becomes a mark of identity of the group. Once the industrial district is consolidated, the rights and responsibilities extend to all members, creating a set of structures of social support and collectively accepted forms of behaviour (Staber, 2007). The key features of the network are trust, mutual understanding, and a readiness for collaborative action (Cohen & Prusak, 2001).

Perhaps the clearest proof of the intensity of the cooperation achieved within the Balearic tourism cluster is the process of internationalisation. The firms that expanded abroad did so almost simultaneously and chose the same country as their destination, the Dominican Republic, and the same means of entry, direct investment (Payeras et al. 2012. Such, 2003). The Balearic firms also commissioned their habitual suppliers in the islands to carry out much of the construction work in the new destinations in the Caribbean and Cancun, and engaged the same European tour operators with whom they had worked in the Balearic market for the commercialisation of the new product (Rivas, 2012).

### 3. The danger posed by oil

#### 3.1. Spills

In this section we analyse the various types of spill, dividing them according to their size. The largest of all, termed megaspills, are caused by the collapse of an oil rig which releases vast quantities of crude oil from an underwater oil well. The two megaspills recorded so far are *Ixtoc I*, in 1979, and *Deepwater Horizon*, in 2010. Both poured more than half a million cubic metres of crude oil into the Gulf of Mexico. The *Ixtoc I* spill stretched more than 1,000 km, from Yucatan to Texas, and the *Deepwater Horizon* spill reached the states of Louisiana, Mississippi, Alabama and Florida (Dokken, 2011). Here we focus on the *Deepwater Horizon* case, because of its similarities to a hypothetical accident in a platform in the Balearic Sea.

The *Deepwater Horizon* drilling rig collapsed just after perforating the *Macondo* well in the Gulf of Mexico, at a depth of 1,400 metres, claiming eleven lives and causing a spill which lasted 87 days. More than 4.5 million barrels of crude oil (Crone & Tolstoy, 2010) and half a million tonnes of methane gas leaked into the Gulf (Joye et al. 2011). However, the effects of this spill came as a real surprise to the specialists. The amount of crude oil that reached the beaches and mangrove forests was far smaller than predicted, and its behaviour was also totally unexpected: the gas and the soluble components of the oil did not rise to the surface but were dissolved in the water column and were consumed by microorganisms at great depths, causing an enormous extension of anoxic water (Du & Kessler, 2012). This process of chemical fractionation remains poorly understood; nevertheless it broke down part of the oil, thus reducing the amount that reached the coastline.

The spill was concentrated in the north of the Gulf of Mexico but, contrary to the predictions of the oceanographers, it did not reach the coastlines of southern Florida and Cuba. This was because of the presence of strong south-westerly winds, which are relatively infrequent in this area, and the unexpected effect of the “Loop Current” (Mackenzie, 2013. Olascoaga & Haller, 2012).

The inaccuracy of the predictions stresses how little is known about these spills and highlights the risks of attempting to transfer this limited knowledge to the Mediterranean context. The wind and current regime of the Mediterranean is very different from that of the Gulf of Mexico, and it is by no means certain that the ocean

contains bacteria able to degrade large amounts of crude oil (Dokken, 2011). According to Amanda Mascarelli, “the oil could linger both in the deep ocean and in sediments for months or years, slowly bleeding more pollutants” (Mascarelli, 2010, p. 22).

Finally, we should stress that these megaspills are not isolated occurrences. Analysing more than 1,200 oil spills between 1974 and 2000, a Swiss group concluded that these disasters followed a well-established probability distribution. Spills are not extraordinary phenomena but form part of a trend, even if their return period may be relatively long (Eckle et al. 2012).

A single megaspill of these dimensions has the capacity to ruin the tourist industry in a huge proportion of the Mediterranean – not only the whole of the Balearic archipelago, but hundreds and thousands of kilometres of continental coastline as well (Norse & Amos, 2010). What is more, a leak lasting several weeks would effectively wipe out at least two tourist seasons, and recovery would depend on the capacity of the Mediterranean to rapidly degrade this enormous quantity of crude oil (Margottini, 2011).

One level down from the megaspills we find large spills, which are caused by the collapse of a well (Eckle et al. 2012) or by the sinking of an oil tanker. In the Mediterranean, a spill of a few tens of thousands of cubic metres would rapidly occupy thousands of square kilometres. Its behaviour would be unpredictable and would depend on the prevailing winds, although the most likely scenario is that it would rapidly reach the coastline and that local breezes would guide it towards the beaches and coves, precisely the area where all the hotels are located (Furberg et al. 2002. Romero & Ramis, 1996). A single spill of this kind in springtime, just at the start of the tourist season, would affect the whole of the Balearics, either directly or indirectly, and probably the coastlines on the mainland as well. The final effects of a spill of this kind are very hard to predict: they depend on the time of year, the type of spill, the meteorological conditions, the quantity of crude oil burnt in the case of fire, the means available for cleaning, and so on.

All the precedents confirm the extreme variability of the consequences of a large-scale oil spill. In some cases, all the variables have converged to limit the damage, as in the accidents of the *Haven* (Martinelli et al. 1995. Turbini et al. 1993) and the *Braer*, (Butler & Fennell, 1994); but there have been others in which the worst predictions have been borne out, as in the case of the *Prestige* (Daniel et al. 2004; Franco et al. 2006).

Finally, we should also mention medium-sized and small spills. These are much more common than the others but often pass relatively unnoticed as they generate less interest in the press and in the statistics (Vieites, et al, 2004. Wikelski et al. 2002). In the Gulf of Mexico alone, 39 spills from ocean platforms were recorded in a 14-year period (Kerr et al. 2010); the database compiled by the ENSAD group recorded a total of 1,213 accidents leaking more than 200 tonnes between 1974 and 2000 (Eckle et al. 2012) and the ITOPF database recorded more than 10,000 spills above seven tonnes between 1974 and 2008 (Kontovas et al. 2010). The origin of spills of this size varies widely: mechanical problems in tankers, rigs and pipelines, errors handling the extraction equipment, extreme meteorological conditions, and so on.

In adverse conditions, spills of this type may have far more serious consequences than the relatively small amount of oil involved might initially suggest. In 2009 only 270 tonnes sufficed to wreck 80 km. of coastline in Moreton Island, Australia (Stevens et al. 2012). On the island of Ibiza, on 11 July 2007 the merchant vessel *Don Pedro* spilled little more than ten tonnes of fuel oil, which immediately reached the nearby coastline, causing the closure of the beaches of Platja d'en Bossa, Figueretes and Talamanca for a week (Sureda et al. 2011. Ministerio de Fomento, 2009. Cirer, 2015).

### 3.2. *The effect on tourism*

Evidently, an oil spill has a direct, immediate effect on the natural environment, but it has a significant human impact as well. The image of crude oil in the public subconscious is almost wholly negative. The ideas it conjures up of contamination and danger are the exact opposite of what holidaymakers expect to find in their destination. Franco et al. make the point that ecotoxicity and social alarm are unrelated (Franco et al, 2006). Oceanography studies, for example, often conclude that solid tarballs which have lost their volatile compounds are relatively safe, but the presence of large quantities of these unsightly black balls on a beach will make it distinctly unattractive to tourists. The same can be said of the smell once a beach has been cleaned of oil, or of the smoke from the fires frequently caused by the leaks.

A spill not only has directly measurable physical consequences, but it can also profoundly modify consumer behaviour. After the *Deepwater Horizon* accident, for example, a survey in the US found that half those polled had cut down on their consumption of sea food, and that 18% refused to buy any products from the Gulf of



Mexico (Fitzgerald & Gohlke, 2014). Much the same occurs in the tourism market: the *Braer* accident in the Shetlands in 1993 decimated tourism in these islands (Butler & Fennell, 1994), the *Exxon Valdez* accident brought tourism down by 43% in the south of Alaska (McDowell Group, 1990) and the *Prestige* caused losses of more than 100 million euros in the tourism sector in the north of Spain (Loureiro et al. 2006).

The damage caused by the *Deepwater Horizon* turned out to be infinitely greater, as it affected a coastal area which was highly specialised in tourism (Crotts & Mazanec, 2013, Hayworth et al. 2011). The first estimations placed the losses at around 7.6 bn dollars (Oxford Economics, 2010), concentrated above all in non-hotel establishments such as apartments, restaurants, rental homes, leisure centres, and so on. (Ritchie et al. 2013).

No sooner had the spill made the headlines than the cancellations came flooding in, especially in the Gulf of Mexico. Leisure tourism has a very low tolerance of risk (Kozak et al. 2007. Williams & Balaz, 2013); holidaymakers change plans or cancel their bookings at the first sign of trouble. After the *Deepwater Horizon* there were strong deviations of demand, which severely affected not just areas near the spill but also others a considerable distance away, such as west Florida (Ritchie et al. 2013. Crotts & Mazanec, 2013).

These deviations of demand will follow any highly publicised, large-scale spill. Their effects are particularly insidious, because the individuals and firms hit by the cancellations will have enormous difficulty obtaining any economic compensation; neither their businesses nor the cities where they are based have been directly damaged by the oil spill and they will find it very difficult to demonstrate their losses. Not even the strict *Federal Oil Pollution Act* of 1990 recognises the risk to take legal action in the case of deviation of demand (Goldberg, 2010). And when the *Braer* sank in the Shetland Isles in 1993, there was a strong deviation of demand even though the spill eventually turned out to be minimal; a violent storm dispersed the discharge and drastically reduced the ecological damage. In spite of this, tourism in the islands was seriously disrupted because the tanker running aground had attracted international media attention, and in the following weeks the press said nothing about the fact that the coastline of the Shetlands remained virtually unscathed (Butler & Fennell, 1994).

Perhaps the worst blow to a tourist destination hit by a spill is the long-term effect on its image. For many Alaskan entrepreneurs, the greatest harm caused by the *Exxon Valdez* was the diffusion of news stories and photographs that undermined the image of

a pristine natural environment which until then had been the region's main selling-point (McDowell Group, 1990). Similarly, many potential tourists may now associate the Gulf of Mexico more with the *Deepwater Horizon* spill than with the beautiful white sand of its beaches (Crotts & Mazanec, 2013. Hayworth et al. 2011).

#### **4. Conclusions: Ecological aspects of the economic and social impact of the oil drilling industry in the Balearics**

##### *4.1. Impact of a large-scale spill*

It is now time to assess the impact of a potential oil spill on the Balearic tourism economy. To do so we must adopt an integrated, globalised approach, and this, to quote the Catalan ecologist Margalef, puts us in a position of relative weakness. The data we must include are complex and disparate and we cannot hope to condense the reality analysed into a few mathematical formulae (Margalef, 1986). Linear relationships fall away and irreversibilities appear (Pindyck, 2007); the points of no return lead the system towards a situation of unpredictable chaos, (Ives & Carpenter, 2007). So far in this article we have described the tourism sector in the Balearics and the risks posed by the potential oil spills if drilling commences in the vicinity of the Balearics. Now we will bring these two realities together. In so doing we will be obliged to make evaluations and predictions, but above all to speculate. The chains of events we propose here are plausible in the light of the evidence; things in the future may or may not develop as we suggest, but in any case these hypotheses must be taken into account in the debate and in the design of future policies.

In the above section we estimated the annual income from tourism in the Balearics at around 8 bn €, and so this is the maximum limit of damage that a large-scale spill could immediately cause in the islands. We think we have provided sufficient data to suggest that a megaspill of the type *Deepwater Horizon* or an accident involving a large oil-tanker, compounded by other factors (occurrence in springtime, proximity to the islands, adverse meteorological conditions and poor management by the authorities) could totally destroy an entire tourist season. This estimation does not consider that the effects of a truly large spill in the Mediterranean Sea might last several years, a possibility raised by several analyses of the large spills in the Gulf of Mexico; nor does

it include the disastrous long-term effects on the image of tourism in the islands. In both cases, the economic damage would be impossible to calculate.

Accountancy techniques from the world of insurance can only give a very limited idea of the damage caused. In the context of the Balearics, they would be unable to reflect the irreversible effects of the spill on the lives of many innocent people. Nor does the “replacement cost” technique help to assess the damage to the natural environment, because it may vastly underestimate the social cost (Boyd, 2010) in a business environment like the Balearic tourism industry.

The first point to consider in the aftermath of a hypothetical oil spill is the volume of compensation, which could be enormous. On its web page, British Petroleum claims to have spent more than 14 bn dollars on cleaning up work and in compensation after the *Deepwater Horizon* blowout. Evidently, very few firms in the world could make a payout of this magnitude. And if the accident is caused by a firm based in a tax haven or by a tanker flying a flag of convenience (Allo & Loureiro, 2013), it is highly likely that the perpetrator will simply disappear, leaving the victims with no-one to sue.

The second point is the deviation of demand. A large-scale spill is unlikely to physically affect all the island coastline; there will probably be destinations that the oil does not reach. Even so, these resorts will be badly hit by the generalised fall in bookings. Similarly, many suppliers of complementary services will face enormous difficulty in demonstrating their loss in income due to the spill. Faced with the fall in demand, only the large international firms with concerns elsewhere will be able to offset part of the loss by redirecting the cancelled bookings towards their other resorts in the Canaries or the Caribbean.

The third point is the firms’ financial capacity, or more precisely their ability to respond to the fall in income caused by a spill. The largest firms are the best placed to secure loans to tide them over (Such, 2003). Quite a few mature medium-sized firms have a low level of debt and can also survive one or two very lean years, but small and medium-sized family firms and newcomers to the business have a much weaker financial structure and in most cases the risk of bankruptcy is very high.

Finally, another area of uncertainty is the capacity of firms to obtain compensation through the courts. In the best case scenario, there will be a clearly identifiable, solvent perpetrator, which firms can sue. Otherwise – and this is the more likely case – they must take legal action against the Spanish government. In both cases

the legal proceedings are likely to be drawn out and costly; once again, it is the large firms that are in the best position to respond.

A large, isolated spill would act like a wild fire in a Mediterranean forest; it would sweep everything before it, destroying the lives of thousands of people whose survival is linked to a small business either as owners or as employees. There is a strong risk of psychiatric problems (Grattan et al. 2011. Palinkas et al. 1993) and of social exclusion (Farber, 2012). A large-scale spill in the Balearics would leave many more casualties in the social and business environments than corpses among the marine life along the shore.

But, as happens in the forests, the fire will probably be followed by a recovery. The large firms will survive, and will be the basis for the reconstruction of the new tourism cluster, a new industrial district. The individuals will not be the same in many cases, and the image of the islands will take years to recover, but the European demand for leisure holidays will hold up and a large part of the business could recover. To an extent, and on a less dramatic scale of things, this is the mechanism that has allowed the Balearic tourism industrial district to survive profound crises in previous eras (Cirer, 2014).

#### *4.2. The worst possible sequence of events*

In the section above we analysed the impact of a large-scale, isolated spill. Now we consider what might happen if this spill were to occur as the culmination of a sequence of particularly damaging events.

Our worst imaginable sequence begins with the systematic exploitation of oil fields in the vicinity. The drilling will not generate any great economic benefit for the islands, because the rigs are supplied for the most part from the mainland. In fact, even without any spills, the drilling will damage the islands' economy: the view of the rigs on the horizon does nothing to promote tourism, restrictions will be placed on sailing, and so on.

The next stage in the sequence is a succession of small spills, of tens or hundreds of tonnes of crude oil. None of them are reported in the European press but, if they occur in summer, they will be enough to close down several beaches for two or three weeks; we already have the precedent of the wreck of the *Don Pedro*, in Ibiza, in 2007, (Cirer, 2015). Very few resorts will be directly affected, but the consequences will

extend rapidly to the entire archipelago; in each case the holidays of several thousands of tourists will be ruined, and their stories will spread rapidly via the social networks.

As a result, there will be a growing perception among firms that tourism in the Balearics has become a high risk activity, likely to generate catastrophic losses in a totally random fashion. Facing this risk, entrepreneurs will reduce their investments, and standards in the industry will fall. The tourists who come to the islands will have less and less purchasing power and the complementary services will be progressively reduced and impoverished, setting off a dangerous downward spiral. To use an ecological metaphor, the reduction in diversity will weaken the system's capacity to deal with a strong outside threat (Loreau et al. 2001, Yachi & Loreau, 1999) as its redundancies and freedom to respond to sudden changes in the environment steadily diminish.

In the final stage, a large-scale spill overwhelms the business sector which is already struggling to remain profitable and has few financial reserves. What is worse, the accident is caused by an unidentifiable agent – maybe based far outside Spanish jurisdiction – and no legal action can be taken against them. The large firms, which for many years have invested only sparingly in the islands, will have little interest in maintaining their position in the Balearic market and will be reluctant to play the role of leaders in the industry's reconstruction; any compensation they receive will probably be reinvested in other sites. Without the economic and entrepreneurial capacity of these large firms the district will not recover, the complementary services will disappear, and entire segments of the tourist market, as well as many individual destinations, will be lost.

Continuing with the metaphor of the forest fire, this large-scale disaster would be the last in a series of events which leave the system's reserves exhausted (Llovet, 2006. Pausas, 2004. Rodrigo, Retana & Pico, 2005). The revival will be much slower and more limited, the forest will be much poorer with little biodiversity, and large areas will be abandoned due to erosion and the loss of fertile soil. A situation of continued stress will have broken down the system's resilience and resistance, and so after a period of desperate struggle it will finally collapse (Downing et al. 2012).

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