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QUALITY COSTS FROM AN ENVIRONMENTAL ACCOUNTING PERSPECTIVE: THE CASE OF THE DEEPWATER HORIZON

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Abstract

When we look at the past of human history, it is known that numerous events that cause loss of life and property have occurred. The negativities experienced arise due to both the human hand and the reactions of nature. The accident doesn't say I'm coming, but it can give a signal! Because when looking at the cause of many events, it is possible to see that some messages are actually hidden. For example, the decrease in the diversity of living species comes from the fact that humans are killing nature. Considering the losses here, it is not possible not to mention the concept of cost. It is clear that every positive or negative event or situation experienced has a cost in one's life. At this point, what is needed to manage costs and maintain human life on a higher quality ground? Just as nature prefers to receive in return for what it offers, human beings will want to receive in return for their attitudes and behaviors. Then, two key tools emerge, on which man must concentrate in the nature he lives in; quality and cost. Because, in the face of the concept of quality, which consists of living to the standards that should be, the costs, which are the cost of the relevant life, show themselves. Therefore, the issue of quality costs is very important in the continuation of human life. This study, it is aimed to examine the Deepwater Horizon oil platform accident in terms of quality costs and to make suggestions in terms of quality costs to prevent its recurrence. The aforementioned disaster has been evaluated over its quality costs, and a predictable cost table has been presented to avoid the repetition of its consequences. As a result of the study, it was concluded that the disaster in question killed sustainability. To avoid similar cases in the future, suggestions have been made for the costs of failure.

1. Introduction

Our old world (perhaps it is young!) and the mortals that inhabit it have been living with disasters (humanity, nature, environment, etc.) for centuries. Our world and people are negatively affected by disasters. One cannot help but ask himself such a question. Is there a positive impact? To say the truth, it can be thought that the world and people have been positively affected by some disasters. Maybe you can find positive aspects too.

When do we bring to mind the disasters that have happened so far, and which one can take the top place? According to what order should we rank the firstly, that is, the largest? Variables such as the area of influence, the destruction it causes, the damage it causes, and the size of the affected population have a critical role. For example; Chernobyl, Hiroshima-Nagasaki, Nazi massacre, Krakatoa, Vesuvius-Pompeii, Plague epidemic, Covid 19, tsunamis, earthquakes, forest fires, etc.

We can group the mentioned disasters or disasters in a logical framework. If you want let's put natural disasters first row. Krakatoa, Vesuvius-Pompeii, Plague Epidemic, tsunamis, earthquakes. There is not precaution much that people can do or take about these. Events such as earthquakes, tsunamis, and volcanic eruptions have always happened and will continue to happen from now on. People can take precautions to avoid harm due to these disasters. They cannot completely prevent it. Staying away from points where disasters are likely to occur can be considered the first precautionary step.

We can put man-made disasters in second place. The reason for these disasters is always the human factor. It is useful to divide it into two. Disasters are caused by people on purpose and accidental disasters. Disasters that people cause knowingly and willingly; We can list Hiroshima-Nagasaki as the Nazi massacre, forest fires, wars, and epidemics. Regarding the accidental ones (perhaps human negligence, to say error might be more accurate). We can count Chernobyl, ship, and plane crashes, and flammable and explosive material accidents. We can systematize the disasters or accidents described up to this point as follows. Disasters; i) natural disasters, ii) disasters that occur due to the human factor. Disasters are based on human factors; i) disasters caused by people knowingly and willingly, and ii) disasters based on accident.

This study aims to examine the Deepwater Horizon oil platform accident in terms of quality costs and to make suggestions in terms of quality costs to prevent the recurrence of failure. The disaster, which we will consider and examine in this study, can be seen as an accident based on the human factor. It is a disaster created by the oil platform Deepwater Horizon. It is a disaster based on the human factor that has a very significant impact. It can be avoided with quality costs. Separately, it is a disaster whose consequences can be revealed with quality costs. The study is composed of two main parts. In the first part, to determine the position of the Deepwater Horizon oil platform on the world and human beings within the scope of the study; sustainability, environmental accounting, and quality costs are explained theoretically. In the second part, the Deepwater Horizon oil platform disaster was handled in terms of quality costs, and suggestions were made based on the results achieved.

2. Sustainability

Ecological evolution occurring throughout the world has uploaded new tasks to businesses, institutions, and organizations, and as a result, their responsibilities have increased by diversifying. The lifespan and thus the liabilities of the business are also expanding in the face of living things in nature (Dinçer, 2006: 411). Globally changes and developments have led businesses to seek new ways to maintain their existence. The person who has a dynamic structure; environmental, social, and economic responsibilities are reflected in the personality of the business.

In the recent past, the following responsibilities of businesses regarding the increasing use of technology have increased more.
i) Change in employee structure (quantitatively and qualitatively),
ii) Continually expanding into new markets,
iii) Environmental responsibilities in parallel with the needs of the age.

Quality costs at the point of creating a corporate sustainable identity have gained critical importance. Today, it is of great importance to reveal the mystery and importance of the concepts mentioned at the point of sustaining the existence of businesses. The concept of sustainability, which has a key role in the survival of living things, people, and businesses (Chapin et al., 1996); "of the resources that humanity uses today; It can be defined as the evaluation of future generations in a way that will allow them to continue their vital activities at an optimum level by filtering economic, social, environmental, legal and moral values" (Kurnaz & Kestane, 2016). When considered in terms of businesses, sustainability requires consideration of social and environmental factors as well as economic expectations. With the formation of economic, environmental, and social responsibilities of enterprises, which are the basic building blocks of directing economies, sustainability has assumed a vital role due to the problems that occur in managerial processes. At the beginning of the problems that may arise in the relevant process, environmental disasters that occur in the context of climate change are of great importance (Aksoy, 2013). While the first obstacle to the healthy performance of sustainability activities is natural disasters, the second is the attitudes, behaviors, and approaches caused by human beings, which are indispensable in the management of businesses.

The transformation of business activities from a national to an international dimension has made the invisible aspects of people clear, and the works and transactions carried out have become more visible compared to previous periods. In this direction, new responsibilities have been imposed on businesses in different areas (Blowfield & Murray, 2008). While it is foreseen that the economic value creation processes of the business should be maximized, it has emerged as an inevitable requirement to minimize the problems they have caused directly or indirectly in the social and environmental context (Hahn & Scheermesser, 2006). Considering the studies carried out in the Brundtland Report (1987), the importance of the concept of sustainability, which is attributed to meeting the needs of today in a way that does not prevent meeting the needs of future generations, was emphasized (Russell et al., 2007). In the following process, the concept of corporate sustainability has come to the fore as the ability to sustain corporate existence in line with social and environmental stakeholder pressures (Hockerts, 2001). At the point of protecting the assets of businesses and performing their activities in an optimum way, corporate sustainability can be expressed as that "In order to ensure the continuity of the businesses, it should not only meet the needs of the present by

turning to social and environmental activities, as well as the aim of economic profit, but also enable the protection and development of resources that can be used in the future, and the effort to maintain the profitability of the enterprise as a living entity".

2.1. Corporate Sustainability Principles

Today, it has emerged as an important need to place the understanding of corporate sustainability in the management mechanism for businesses to reach their long-term goals healthily in terms of their fields of activity (Max, 2008). In terms of meeting the said need rationally, it would be appropriate to clarify the principles of corporate sustainability in terms of economic, social, and environmental aspects (Bansal, 2005).

Economic Sustainability: Economic sustainability emerges as increasing the financial performance of businesses in the context of increasing their profits primarily to generate income and protecting their current market position in the said increasing trend. Additionally, it can be expressed as an approach that aims to carry out activities that may benefit society. Its main purpose is to create long-term value for stakeholders by filtering emerging opportunities (economic, social, and environmental) from various perspectives (Nemli, 2004). It is critically important to consider financial performance, which is the most basic indicator of economic sustainability in terms of businesses (Tuna, 2014). The ability of businesses to manage their different economic capitals is the building block of economic sustainability (Besler, 2009).

Social Sustainability: The sustainability of human life can be expressed as reaching and obtaining the best living standards (Liverman et al., 1988). Recent global change and transformation movements have directed businesses around the world to social responsibility studies. It has gained an important quality that the activities of businesses are accepted by society. Social sustainability practices have come to the fore at the point of activating corporate sustainability studies. As a result, it has become an inevitable necessity to focus on stakeholder relations and to receive positive appreciation from stakeholders. In addition to obtaining economic success for businesses, their social success provides stakeholders with a key mission in terms of social value creation. Thus, a permanent position has been given to the stakeholders who have a critical value in the realization of the activities of the enterprises. Stakeholders have played a key role in ensuring social sustainability (Sarıkaya et al., 2010).

Environmental Sustainability: Environmental sustainability, which is called livinbyth the resources offered by nature and the limits of related resources, is also at the base of creating a healthy economy (Hitchcock & Williard, 2009). Environmental problems, which are one of the most important problems of the world as of our age by creating a common language and paved the way for studies on the related subject. Firstly, the developments that started with the establishment of the "Economic Development Cooperation Organization (OECD-1960)" were followed by the "Save the World Strategy Report" published by the "International Union for Conservation of Nature and Natural Resources (IUCN-1980)" (McKenzie, 2004). Sustainability studies have been evaluated in terms of the environment in the process to date by Brundtland Report (1987). Attention has been drawn to the sustainable use of natural resources by the increasing population in the world and to ensure the safety of food products (Shrivastava, 1995).

A new area of responsibility has been formed for businesses whose environmental performance has come to the fore in the context of creating an image of added value, minimizing costs, and fulfilling political and social responsibilities in line with the aforementioned developments (Nunes & Bennett, 2010). Environmental accounting practices have come to the fore at the point of measuring the relevant performance accurately and consistently and the content of environmental accounting has been explained in the following title.

3. Environmental Accounting

The understanding of corporate sustainability triggers the creation of an accounting information system that can facilitate the decision-making mechanism in the management processes of businesses (Hernadi, 2012). Therefore, the work and transactions that traditional accounting has fulfilled are the subjects of discussion. The ecological effects of businesses during the realization of their activities are not taken into account sufficiently by traditional accounting. On the other hand, giving higher importance to financial measurement leads to missed potential opportunities and failure to foresee the risks that may arise healthily. As a result, traditional accounting cannot meet today's needs (Maunders & Burritt, 1991). The importance of environmental information emerges in determining whether the activities of the enterprises harm the environment in which they in (Milne, 1996; Schaltegger & Burritt, 2010). Namely, there is a need to create approaches that envisage environmental and social factors to be taken into account, with the understanding of corporate sustainability bringing a new dimension to the structure of accounting. As a result, a three-dimensional structure has emerged that takes into account the economic, environmental, and social factors in terms of making the activities of businesses more sustainable (Signitzer & Prexl, 2008). The mentioned structure has been brought to the literature by Elkington (1997). It is envisaged to produce economic, social, and environmental

information on business activities by three-dimensional accounting and to establish a balance between related elements (Gray & Milne, 2002; Çalışkan, 2012).

Environmental accounting, which is a new branch of accounting, has emerged to make accurate and consistent evaluations by stakeholders in the production and reporting of environmental information, which comes after the economic dimension of three-dimensional accounting. Environmental accounting, which reveals the financial effects caused by environmental and ecological factors on the recording, reporting, and reporting of business activities (Schaltegger & Burritt, 2010), focuses on the qualitative performance of businesses. Although environmental accounting has different aspects in itself (Fülöp & Hernadi, 2013), it helps the decision-making mechanism in terms of analyzing the costs of the effects and taking the right decisions by taking into account the environmental effects of the enterprises (Hernadi, 2012). Environmental accounting, which is envisaged to be used in the development of environmental successes of businesses as well as their economic success; differs from traditional accounting practices in analyzing and reporting the effects of businesses on the environment (Akbaş, 2011).

The necessity of determining and analyzing the environmental impacts of the activities of the businesses or the effects of the business activities on the environment and taking into account the communal outputs has paved the way for the emergence of the concept of sustainability accounting. The related branch of accounting is based on the integrated recording, reporting, and analysis of the activities of the business in the economic, social, and environmental context and sharing them with the relevant parties (Schaltegger & Burritt, 2010). This approach, on the other hand, has led to a discussion of the structure and content of the concept of cost at the point of determining the effects of economic, social, and environmental factors on the activities of businesses. The costs that arise in the process of carrying out the activities also caused the quality to be questioned and it aroused curiosity about what values the quality costs consist of. The face of quality costs is explained in the context of the theme of this study in the following title.

4. Quality Costs

Cost can be expressed as the whole of the sacrifices made to achieve a goal or to have an object. On the other hand, in today's competitive environment, quality has a critical role in determining customer satisfaction levels and adapting to market conditions. One of the most important indicators of quality or the performance of a business is quality costs (Ömürgönülşen, 2009). There are various definitions of the related concept in the literature. In the context of the theme of this study, the cost of quality can be expressed as "the costs that arise as a result of the planned quality controls of the activities carried out to prevent errors that may occur and the errors observed during the production or after the delivery of the product to the customer" (Yükçü, 1999).

A guide named “British Standards Organization- BS6143” has been published on how to measure and use quality costs (British Standards Institute, 1981). The guide clarifies how they will be used, along with the costs related to quality. The concept of Total Quality Cost has been proposed as the cost of assuring or providing quality assurance, in addition to the losses that occur in case of not having the determined quality. In determining the quality costs, a classification in the form of “prevention-evaluation-failure”, which is specified as the PAF model with the BS6143 standard (Preventation-Appraisal-Failure), was used (Giakatis & Rooney, 2000). It is worth noting that the earliest quality cost models (PAF) were created by Feigenbaum (1956) and Masser (1957). The aforementioned model has been widely used in the service sector as well as in the manufacturing sector (Hwang & Aspinwall, 1996). Quality costs can be classified into two groups by Crosby (1979) i) "conformity cost" as the cost of making a product with both the desired conditions, ii) the errors encountered in providing the desired conditions, "cost of nonconformity" (Yıldırım & Saylık, 2009). On the other hand, in the work titled “Total Quality Control” prepared by Feigenbaum in 1956 seen that quality costs are classified into four main groups: i) Prevention, ii) Measurement-Evaluation, iii) Internal Failure, and iv) External Failure Costs (Atış & Şener, 2017).

4.1. Classification of Quality Costs

In the context of the theme of the study, Feigenbaum's classification is based. Here, it would be appropriate to state that prevention, measurement, and valuation costs occur on demand, while internal and external failure costs occur as a result (İçerli, 2020).

Prevention Costs: These constitute the entire cost of activities carried out to investigate, reduce or prevent the risk of conformity or defect. It can also be expressed as the costs arising from the activities of establishing the quality system and placing it within the organization (İçerli, 2020). It consists of the costs of the activities carried out to prevent errors before they occur. The costs incurred to ensure that departments and personnel perform their duties without errors the first time can be cited as an example (Yükçü, 1999).

Measurement and Valuation Costs: Consists of the cost incurred due to the control systems established to determine whether the manufactured products or services comply with the determined

quality standards. As of today, the perception of quality differs according to the approaches and preferences of the customers, as well as the quality conditions related to the product. As a result, extra costs occur (İçerli, 2020). It is the sum of the costs incurred in carrying out activities with the desired criteria and procedures in the context of detecting and eliminating errors in the product and service production process. An example is the investigation of doing all the work right the first time, every time (Yükçü, 1999).

Internal Failure Costs: These can be expressed as the costs that arise as a result of products that fail to meet the desired quality standards. The costs incurred for reworking defective products identified in the context of assessment activities are considered within the scope of internal failure costs. It can be summarized as the costs that arise in the context of converting defective products into sound products (Demircioğlu & Küçüksavaş, 2009).

External Failure Costs: These are the costs that occur as a result of the belief that the expected or desired conditions are not met as a result of the delivery of the produced services or products to the related parties (customers). The costs arising from the transportation, shipment, and after-sales services for delivery to customers are costly to businesses. Therefore, the business suffers because of not meeting customer expectations (Top & Karabınar, 2013). Examples include delivering a product to the customer, then returning the product to the enterprise, returning the defective product to the customer by making it sound, or returning the price received in return for the product.

Environmental factors can cause significant destruction or bring very serious opportunities to the activities of businesses. It can be met as an important cost factor that has an impact in a wide area, from the quality of the activities they have carried out to the sustainability of their existence. In the following stages, the damages caused by the Deepwater Horizon oil spill, which significantly impacted the world, are explained. Clarifying the losses caused by Horizon's environmental damages from the perspective of quality costs reveals the difference and importance of this research.

5. Deepwater Horizon

The world's energy needs are constantly increasing, which causes energy companies to make extraordinary efforts and make huge investments to find new oil sources. Oil exploration and production is known for its enormous challenges, such as operating in harsh environments and using the latest and most sophisticated technologies. Successful operations can bring significant rewards. But these operations can be balanced with equally significant risks. In the spring and summer of 2010, the British Petroleum Deepwater Horizon oil spill made its mark on world news, and the event was hailed as an environmental and economic disaster.

5.1. Background

Deepwater Horizon, Transocean Ltd. Sti. It is an offshore drilling rig licensed by British Petroleum (BP). Deepwater Horizon is a fifth-generation dynamically positioned semi-submersible oil platform. Horizon cost $365 million to build and is designed to operate in waters up to 8,000 feet deep and drill 30,000 feet deep. While drilling an exploratory well about 41 miles off the coast of Louisiana, an explosion and fire on the Horizon on April 20, 2011, killed 11 workers and started the release of large quantities of oil into the Gulf of Mexico.

The oil spill was finally brought under control when the well was closed on 15 July 2011. Damage to BP, the environment, and the U.S. gulf coast economy is estimated at $36.9 billion, as will be explained in this study. Damages; i) human error and equipment failure at BP's Deepwater Horizon offshore drilling unit, ii) the U.S. government's failure to allocate, and in some cases not allow, resources to help contain the oil spill, and iii) misinformation spread by the news media about the amount and location of oil pollution in the water and on the Gulf of Mexico beaches (Smith et al., 2011).

Estimating the total economic cost of an oil spill is extremely difficult due to many unknown factors, particularly regarding the extent to which the oil is separated above and below the surface, and how and how quickly the oil biodegrades. Oil did not spread onto beaches anywhere near the size predicted in worst-case scenarios. In addition, the oil-eating microbes consumed the oil droplets faster than most experts thought. The biological decomposition process is complex. It is affected by the amount of oil, microbes, and nutrients in the region (Biello, 2010).

5.2. Effects / Costs of Deepwater Horizon

Estimating the effects of the BP oil spill is extremely important. Because crude oil is difficult and expensive to eradicate from an ecosystem. Also, BP is a publicly traded company. Stakeholders need to be informed of damages to BP itself and to third parties for whom it may be liable. In this context, the costs related to environmental damage caused by BP-licensed Horizon are clarified below.

According to the National Marine Fisheries Service, the United States Gulf of Mexico waters produce 73% of domestically harvested shrimp and 59% of oysters (Schmit, 2010). The service reports that the commercial fishing industry's sales revenues for 2008 are as follows, by state. $10.9 billion for all Gulf States,

including Alabama $445 million, Florida $5.7 billion, Louisiana $2.4 billion, Mississippi $391 million, and Texas $2.0 billion (National Marine Fisheries Service, 2010).

The exact amount of seafood harvested in 2010 could not be found from a reliable source. Given the length and extent of the spill, a reasonable estimate of the damage to the Gulf Coast commercial fishing industry from the BP oil spill would be a loss of $4.36 billion, roughly 40% of its 2008 sales of $10.9 billion. Tourism generates $65 billion in annual revenue for businesses in the Gulf Coast States (BP Gulf Oil Lawsuit, 2010). Oxford Economics estimated the damage to the Gulf Coast tourism industry from the BP oil spill by measuring the duration and scale of the negative impacts on tourism from similar previous disasters. The duration was measured as the time from the onset of each disaster to the point where visitor numbers and spending returned to pre-disaster levels. Specific previous events studied by Oxford Economics for tourism impacts include the 1979 Gulf of Mexico spill of 140 million gallons of oil, the Ixtoc oil spill, Hurricane Katrina and several other major hurricanes, the 1989 Exxon Valdez 11 million-gallon oil spill, the 2004 Asian Tsunami, and terrorist attacks. The duration and amount of tourism losses in the aforementioned case studies suggest that the BP oil spill will disrupt tourism on the Gulf Coast for at least 15 months, resulting in a loss of $7.6 billion in revenue, with a maximum of 36 months and $22.7 billion in lost revenue. (Oxford Economics, 2010).

St. Joe Company (NYSE: JOE), a major real estate developer, owned several hundred thousand acres in Florida's northwest Panhandle as of March 31, 2010. On April 20, 2010, when the Deepwater Horizon well exploded, St. Joe's closing share price was $35.70, it fell 42.4% to $20.56 as of October 15, 2010. Before the leak, land on the Florida coast was normally valued at $2 million to $8 million per acre. The average value of $3 million per acre resulted in an estimated 10% reduction in oil-exposed coastal real estate values. The property values of land along the coastal strip of land between Mobile, Alabama, and Clearwater, Florida are estimated to have been depreciated by $4.32 billion due to the BP oil spill (Drummer, 2010).

Animals at significant risk from the effects of the BP oil spill include: for example, marsh fish such as great sea turtles, bluefin tuna, sharks, marine mammals (porpoises, whales, and dolphins), oysters, brown pelicans, blue crab, shrimp, mullet, and menhaden, migratory shorebirds nesting on the beach, and migratory consist of songbirds (Drapkin, 2010). From Texas to Florida, the U.S. Department of the Interior has declared a total of eight National parks and four National Wildlife Refuges at immediate risk from the effects of the BP oil spill (U.S. Department of Interior, 2010). The U.S. Fish and Wildlife Service announced as been removed that 585,479 kg of oiled debris from the state of Mississippi, 172,185 kg from the state of Alabama, and 491,292 kg from the state of Florida (U.S. Fish and Wildlife Service, 2010).

Shows the number of visibly oiled animals (including sea turtles, birds, and mammals) tabulated by the U.S. Fish and Wildlife Service (USFWS) from the start of the BP oil spill to October 14, 2010. In the USFWS report, it was stated that the damage to injured or dead fish and wildlife was necessarily caused by the Deepwater Horizon/BP accident (U.S. Fish and Wildlife Service, 2010). Regarding the stated results, they are summarized in Table 1 and Table 2 below for a correct and consistent understanding of the losses.

Table 1. Environmental and economic damage estimates of the Deepwater Horizon oil spill

Descriptions	**Approximate Values**
Damages to the commercial fishing industry	4,36 million dollars
Damages to the tourism sector	3,80 million dollars
Damages in coastal real estate values	4,32 million dollars
Number of National parks and National Wildlife Refuges at immediate risk	12
Kilos of oiled debris from land in Mississippi, Alabama, and, Florida	1,248,956
October 14, 2010, visibly oiled dead animals;	
Birds	2,263
Sea Turtles	17
Mammals	4
October 14, 2010, visibly oiled live animals;	

Birds	2,080
Sea Turtles	456
Mammals	2

Resource: Smith, 2011.

Table 2. Cost estimates of the Deepwater Horizon oil spill to bp

Descriptions	**Approximate Values**
Actual costs for spill control, drain well, original well cover, grants made to Gulf countries, claims paid, and federal costs until Sep. 29, 2010	11,2 million dollars
"Deepwater Horizon Oil Spill Foundation" pledge to cover damages to businesses and individuals	20,0 million dollars
Costs estimated by BP other than the items mentioned above	1,0 million dollars
Potential fines within the scope of the Clean Water Act	4,7 million dollars
Total	***36,9*** million dollars

Resource: Smith, 2011.

6. Examining the Deepwater Horizon Case in Terms of Quality Costs

In the studies of oil extraction from the sea, drilling works are carried out on exploration platforms in torches and find the oil. After finding oil at sufficient depth, the task of the exploration platform is completed. At the bottom of the sea, the point where the drill pipe comes out of the earth's crust and meets the sea water is concreted and closed. Later, to extract oil from that well and produce it, production platforms are installed in the well with a concrete mouth, and these platforms bring oil to the surface for months and years and offer it to the service of humanity.

The reason for the accident case was that the concrete was not made of sufficient quality, the seabed was cold, a few degrees above freezing, and a significant amount of heating occurred due to friction during drilling. The leaked oil started to burn. Deepwater Horizon burned down, and the workers working on the platform were unfortunately burned to death. Due to the severity of the fire, even the bodies of some of the workers could not be found.

The reason for the disaster is that the concreting was not done in sufficient quality. Other oil explorations were stopped immediately after the disaster, and a similar disaster was tried to be prevented from recurring. Although the cause of the accident is expressed as "concrete quality", it seems to be a reason that needs to be investigated by digging into six. Until this case, concreting has been done similarly to the previous ones. It doesn't seem to be a problem. The following questions come to mind:

• Is there an application error in the concreting in the Deepwater Horizon case?
• Is the material (cement) of the concrete act of sufficient quality and not suitable for this job?
• Could appropriate concrete be developed at the temperature difference?
• Could more durable cement be developed?
• Was the application rushed?

The questions can be increased. After all, this disaster could have been avoided with "better concreting". As a prevention cost, "better concreting" could have prevented this disaster with a cost increase of maybe 10,000 dollars, 1,000,000 million dollars. This cost has not been incurred, and failure costs have arisen, resulting in millions of dollars in costs. Both British Petroleum and our world have had to endure these costs.

6.1. Cost Loss of British Petroleum (BP)

The search company incurred significant failure costs. These costs can be predicted in Table 3.

Table 3. Cost loss of British Petroleum

Cost of Quality	**Estimated Amount (Dollars)**
Cost of prevention	
- Better concreting	$10.000.000
- **Total Cost of Prevention**	

Cost of Failure	
- The cost of the sinking Deepwater Horizon	$560.000.000
- The value of the burning oil	$2.940.000.000
- The value of the oil spilled into the sea (49 million barrels)	$2.940.000.000
- The cost of collecting the spilled oil	$8.000.000.000
Compensation and litigation costs paid	
- Compensation paid to dead employees	
- Compensation paid to the tourism sector	
- Compensation paid to house and property owners	
- Costs of lawsuits filed	
Total claims paid and litigation costs	$18.007.000.000
- The resulting cost of the stopping calls	$9.006.000.000
Total Cost of Failure	$32.447.000.000
Net Cost of Quality (T.C.F. – T.C.P.)	($32.447.000.000-$10.000.000) $32.437.000.000

As summarized in Table 3, the Deepwater Horizon disaster, which turned into an environmental disaster, inflicted great losses and damages on BP. The cost of preventing these losses and damages is very small compared to the costs of failure.

Although the costs of preventing failure are very small in nature, it may be possible to prevent failure completely by keeping mentioned costs a little higher than expected (perhaps 10, 100, or 1000 times the planned) introducing the risk, and increasing the chance of success to close to 100%. Even seemingly minor risks can happen, as in the case of Deepwater Horizon, and cause failures that destroy businesses. In a similar incident, a passenger plane flying from the USA to Europe crashed into the Atlantic Ocean after taking off, this case was the end of the affiliated airline.

6.2. Loss of Cost for the Environment

It was explained what the cost of prevention was associated with the issue, in the region where the incident occurred, and thus our world has incurred significant failure costs that are difficult to quantify in monetary terms. These costs can be anticipated in Table 4.

Table 4. Loss of environmental costs

Cost of Quality	**Estimated Amount (Dollars)**
Cost of prevention	
- Better concreting	$10.000.000
- **Total Cost of Prevention**	
Cost of Failure	
- The effect of burning oil on global warming	Yes
- The effect of lost oil on the economy	Yes
- The environmental impact of dead fish	Yes
- The environmental impact of dead birds	Yes
- The environmental impact of dead microorganisms	Yes
- The impact on people's living conditions	Yes
- Distrust in the world oil sector	Yes
- Environmental concerns around the World	Yes
- The threat to sustainability	Yes
Total Cost of Failure	Excessively
Net Cost of Quality	Excessively

In Table 4, the damage caused by the Deepwater Horizon failure to the environment and the indignation in the world is examined. Table 4 is an important source of information in terms of exhibiting the damage such activities cause to our supply and our universe, and telling the damage inflicted on the citizens of the world. It is very important to be understood the negative impact of future activities on sustainability.

The interesting thing is that there is no problem when oil or similar economic values sleep in the place where they should be in nature for centuries. However, while the added value created as a result of relocation by human hands is offered to the service of humanity, the negativities or failures experienced or created can carry the world or the universe to a point where it is difficult to live.

The Deepwater Horizon incident invites humanity to stay within the triangle of reasonable benefit, prudent use, and respect for the environment.

7. Conclusions

When we look at the cost of failure after the Deepwater Horizon disaster, the prevention action and costs that must be taken to prevent them are very small. From an environmental point of view, disaster can mean "killing sustainability".

The Deepwater Horizon case is neither the first nor the last environmental accounting, failure costs, and sustainability case. There have been many failures so far. It will continue to happen from now on (unless importance is given to prevention activities). In the Gulf War, the burning of oil wells in abandoned lands, huge forest fires in the northern hemisphere every year in summer, and aircraft and ship accidents threaten sustainability. With small preventive activities, events that cause major failures and thus costs can be prevented.

When mankind realizes this and is committed to sustainability, there will be no oil, coal, or forest to burn; it will not be possible to find healthy resources to build transportation or production equipment. Every cost of failure is a blow to sustainability, every sustainability effort is a prevention activity and costs to protect the future of nature and the universe, thus humanity. For successful sustainability, we must place the reality of quality costs at the center of our lives.

References

1. Akbaş, H.E. (2011). Çevresel Yönetim Muhasebesi: Özellikleri, Unsurları ve Kullanım Alanları. MÖDAV Dergisi, (3), 29-59.
2. Aksoy, Ç. (2013). Sürdürülebilirlik Performansının Değerlendirilmesine Yönelik Ölçek Önerisi ve Türkiye'deki İşletmelerde Uygulaması. Doktora Tezi, Sosyal Bilimler Enstitüsü, Marmara Üniversitesi, İstanbul.
3. Atış, C. and Şener, Z. (2017). Üretim İşletmelerinde Kalite Maliyetlerinin PAF Modeline Göre Sınıflandırılmasının Önemi, International Journal of Academic Value Studies (Javstudies),3(14), 171-185.
4. Bansal, P. (2005). Evolving Sustainably: A Longitudinal Study of Corporate Sustainable Development. Strategic Management Journal. 2, 197-218.
5. Besler, S. (2009). Yönetim Yaklaşımlarıyla Kurumsal Sürdürülebilirlik. Beta Basım Yayım. İstanbul.
6. Biello, D. (2010). Meet the Microbes Eating the Gulf Oil Spill [Slide Show]. Scientific American, Website: http://www.scientificamerican.com/article.cfm?id=gulfoil-eating-microbes-slide-show
7. Blowfield, M.and Murray, A. (2008). Corporate Responsibility: A Critical Introduction. Oxford University Press. Oxford.
8. BP Gulf Oil Lawsuit. (2010). BP Gulf Oil Spill Lawsuit, Website: http://www.bpgulfoilspilllawsuit.net/
9. British Standards Institute, (1981), British Standards Organization- BS6143. https://global.ihs.com/doc_detail.cfm?document_name=BS%206143&item_s_key=00022724
10. Chapin III, F. Stuart, T., Margaret S. and Masaki T. (1996). Principles of Ecosystem Sustainability. American Naturalist, 148(6), 1016-1037.
11. Çalışkan, Ö. A. (2012). Sürdürülebilirlik Raporlaması. Muhasebe ve Vergi Uygulamaları Dergisi, 2012 (1),41-68.
12. Demircioğlu, E.N. and Küçüksavaş, N. (2009). Kalite Maliyetleri, Çukurova Üniversitesi İİBF Dergisi, Haziran, 13(1), 32-67.
13. Dinçer, Ö. (2006), Stratejik Yönetim ve İşletme Politikası, Beta Basım Yayım Dağıtım, İstanbul.
14. Drapkin, J. K. (2010). 10 Animals Most at Risk from Gulf Oil Spill. CBS News, Website: online at http://www.cbsnews.com/8301-503543_162-20003738-503543.html
15. Drummer, R. (2010). Commercial Property Owners Brace for Economic Impact of Gulf Oil Spill. CoStar Group, Website: http://www.costar.com/News/Article.aspx?id=A29633B3A61D835AB027939541FEBE8B
16. Giakatis, G., and Rooney, E.M. (2000). The Use of Quality Costing to Trigger Process Improvement in an Automotive Company, Total Quality Management, 11(2), 155-170.
17. Gray, R. and Milne, M. (2002). Sustainability Reporting: Who's kidding whom?. Chartered Accountants Journal of New Zealand, 81(6),66–70
18. Hahn, T. and Scheermesser, M. (2006). Approaches to Corporate Sustainability Among German Companies.

Corporate Social Responsibility and Environmental Management (İn Press), 13, 150–165.

19. Hernadi, H.B, (2012). Green Accounting for Corporate Sustainability. Club of Economics in Miskolc TMP 8 (2), 23-30
20. Hitchcock D. and M. Williard. (2009). The Business Guide to Sustainability: Practical Strategies and Tools for Organizations. Second Edition. Axis Performance Advisors.
21. Hockerts, K. (2001). Corporate Sustainability Management – Towards Controlling Corporate Ecological and Social Sustainability. Sustainability at The Millenium: Globalization. Competitiveness and The Public Trust January 21-25. Ninth International Conference of Greening of Industry Network, Bangkok.
22. Hwang, G.H. and Aspinwall, E.M. (1996) Quality Cost Models and Their Application: A Review, Total Quality Management, 7(3), 267-281.
23. İçerli, M.Y. (2020). Hurda İmha Maliyetlerinin Kalite Maliyetleri Açısından İrdelenmesi, 1. Basım, Nobel Yayınevi, Ankara.
24. Kurnaz, N. and Kestane, A. (2016). Kurumsal Sürdürülebilirliğin Ekonomik Açıdan İncelenmesi ve Yatırımcı Davranışları İlişkisi: BIST Sürdürülebilirlik Endeksinde Bir Uygulama. Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, Temmuz, 49, 278-302.
25. Liverman, D. M., Hanson, M. E., Brown, B. J. and R. W. Merideth. (1988). Global Sustainability: Toward Measurement. Environmental Management. 12/2. pp: 133-143, Https://Books.Google.Com.Tr/Books?Hl=Tr&İd=Hottaaaamaaj&Dq=Global+Sustainability%3A+Toward+Measurement&Focus=Searchwithinvolume&Q=Global+Sustainability%3A+Toward+Measurement
26. Maunders, K., and Burritt, R. L. (1991). Accounting and Ecological Crisis, Accounting, Auditing & Accountability Journal, 4(3),9-26.
27. Max, L. H. M. (2008). Organizational Culture and Corporate Sustainability İn Hong Kong's Development Companies. The University of Hong Kong A Dissertation Submitted to Faculty of Architecture İn Candidacy For The Degree of Bachelor Of Science İn Surveying Department of Real Estate And Construction, April
28. McKenzie, S. (2004). Social Sustainability: Towards Some Definitions. Hawke Research Institute, Working Paper Series. No 27.
29. Milne, M. J. (1996). On Sustainability; The Environment and Management Accounting, Management Accounting Research, 7(1), 135–161
30. National Marine Fisheries Service. (2010). Fisheries Economics of the United States, 2008. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-F/SPO-109, 177. available online at http://www.st.nmfs.noaa.gov/st5/publication/index.html
31. Nemli, E. (2004). Sürdürülebilir Kalkınma: Şirketlerin Çevresel ve Sosyal Yaklaşımları. Birinci Baskı. Filiz Kitabevi. Ankara.
32. Nunes, B. and D. Bennett. (2010). Green Operations Initiatives İn The Automotive Industry: An Environmental Reports Analysis and Benchmarking Study. Benchmarking: An International Journal. 17(3), 396-420.
33. Oxford Economics (2010). Potential Impact of the Gulf Oil Spill on Tourism, U.S. Travel, http://www.ustravel.org/sites/default/files/page/2009/11/Gulf_Oil_Spill_Analysis_Oxford_Economics_710.pdf
34. Ömürgönülşen, M. (2009). A Research on The Measurement of Quality Costs in The Turkish Food Manufacturing Industry, Total Quality Management & Business Excellence, 20(5), 547-562.
35. Russell, S., Haigh, N. and A. Griffiths. (2007). Understanding Corporate Sustainability. Corporate Governance and Sustainability. Chapter 2.
36. Sarıkaya, M., Erdoğan, M. and F. Z. Kara. (2010). İnternet Ekonomisi ve Kurumsal Sürdürülebilirlik. Eskişehir Osmangazi Üniversitesi İİBF Dergisi. Ekim. 5(2), 31-50.
37. Schaltegger, S. and Burrit R. L. (2010). Sustainability Accounting for Companies: Catchphrase or Decision Support for Business Leaders?. Journal of World Business, (45), 375-384.
38. Schmit, J. (2010). Shrimpers, fishermen, and hotels feel oil spill's trickledown effect. USA Today, Website: http://www.usatoday.com/money/economy/2010-05-13-gulfecon13_CV_N.htm?csp=obinsite
39. Shrivastava, P. (1995). The Role of Corporatıons in Achıevıng Ecologıcal Sustaınabılıty. Academy of Management Review. Vol: 20, No: 4 pp: 936-960.
40. Signitzer, B. ve Prexl, A. (2007). "Corporate Sustainability Communications: Aspects of Theory and Professionalization", Journal of Public Relations Research,20 (1),1-19.

41. Smith, L. C., and Smith, M., and Ashcroft P. (2011). Analysis of Environmental and Economic Damages from British Petroleum's Deepwater Horizon Oil Spill. Albany Law Review, Vol. 74, No. 1, 563-585. http://dx.doi.org/10.2139/ssrn.1653078
42. Top, Y. and Karabinar, S. (2013). Dış Başarısızlık Kalite Maliyetleri ve Toyota Araçlarının Geri Çağrılması Örneği, Global Journal of Economics and Business Studies, Küresel İktisat ve İşletme Çalışmaları Dergisi, 2(4), 58-67.
43. Tuna, Ö. (2014). Kurumsal Sürdürülebilirlik Yaklaşım ve Uygulamaları: KOBİ'lere Yönelik Bir Araştırma. Doktora Tezi. Afyon: Afyon Kocatepe Üniversitesi Sosyal Bilimler Enstitüsü.
44. U.S. Department of the Interior. (2010). Interior Fact Sheet – BP Deepwater Horizon Response. U.S. Department of the Interior, Website: http://www.doi.gov/deepwaterhorizon/Interior-Fact-Sheet-BP-Deepwater-Horizon-Response.cfm
45. U.S. Fish and Wildlife Service. (2010). FWS Deepwater Horizon Oil Spill Response. U.S. Fish and Wildlife Service, Website: http://www.fws.gov/home/dhoilspill/index.html
46. Yükçü, S. (1999). Kalite Maliyetlerinin Muhasebeleştirilmesi, Anadolu Matbaacılık, İzmir.
47. Yıldırım, H. and Saylık, B. (2009). Kalitesizlik Maliyetleri Üzerine Bir İnceleme, Marmara Üniversitesi İ.İ.B.F. Dergisi, 26(1), 239-267.