Independent Final Report

A Study of British Petroleum's Resilience

How the Oil Giant Adapted to Shocks from Deepwater Horizon to Covid-19

by

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March 2021

Independent Final Report Presented to

Ritsumeikan Asia Pacific University

In Partial Fulfillment of the Requirements for the Degree of

Master of Business Administration

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Certification Page

I, Adrian Pujianto (Student ID: 52119002) hereby declare that the contents of this Independent Final Report are original and true and have not been submitted at any other university or educational institution for the award of a degree or diploma.

All the information derived from other published or unpublished sources has been cited and acknowledged appropriately.

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2021/1/11

Acknowledgements

I would like to start by thanking my parents, who without their financial and emotional support I could not have dreamed of studying abroad. Not to mention that this is my second time abroad, directly after I had finished my undergraduate studies. Also, special thanks to my father who has helped me tremendously with raising my interest and understanding of the oil & gas industry.

Furthermore, I would like to give special recognition to my research supervisor Professor Phillip Dean Pardo who gave me invaluable guidance and aid in developing this report. His interesting views as well as his understanding of the industry was greatly appreciated to help me organize my thoughts. Not to mention I am also grateful for his patience during times of confusion, his calm demeanor helped to guide me back on track without fail. Though I do regret that we were not able to meet in person more often due to the COVID pandemic and subsequent need to distance ourselves from others.

Third, I want to extent my heartfelt gratitude to my friends, in Indonesia and here in Japan who have helped me to overcome trying times. Not just with their friendship but with support in academic concerns both for class and my independent report. Especially in my last two semesters here when self-isolation and online classes had just started.

Abstract

In this report, the Author hopes to break down and discuss the different organizational changes that have taken place in British Petroleum (BP) since its 2010 Deepwater Horizon oil spill to the unforeseen COVID-19 pandemic. From these shocks the author hopes that this Report will incrementally add to the existing literature. To summarize, crisis stimulates and hastens change, the Deepwater Horizon accident of 2010 has inadvertently helped BP to better organize itself, the selling off of its less productive assets, streamlining of processes and creation of better standard operating procedures set the stage for BP to move into the future as an energy company. Elements of Highly Reliable Organizations (HRO) have been reinforced at BP following the Deepwater incident, in the form of internal terms such as 'organizational excellence' and BP's OMS (Operating Management System). This increased commitment to HRO characteristics after the incident has helped BP weather the unpredictability of the industry ever since as well as provide a guide to the current covid crisis. Therefore, the author believes that the concept of HRO should become more widely adopted as a 'gold standard' of the industry and also for others that operate in risky/dangerous circumstances.

Key words: resilience, crisis, resilience management, HROs

Chapter 1: Introduction

Introduction

COVID 19 has become a tragic world changing event. Companies have been forced to adapt to extreme changes in the global business environment as we see entire economies and supply chains disrupted. In the case of BP (British Petroleum), this presents an interesting opportunity to compare how a company known as one of the "supermajors", which have massive amounts of resources at their disposal, is adapting to this change. What makes BP unique among the other supermajors is the environment in which it is operating, having suffered in 2010 from the largest marine oil spill in the history of the petroleum industry, the Deepwater Horizon oil spill. This event has cost BP upwards of 70 billion USD, as of February 2020 according to Nocera, (2020) no doubt this has stretched the assets, both financial and human resources of BP. The Deepwater horizon incident of 2010 affected BP in a number of ways. For example, its stock valuation dipped to its late 1990's values, about a 50% decrease in value, the reparations BP was obligated to pay forced the company to divest numerous investments, the accident also greatly tarnished its reputation in the eyes of the world and its consumers (Oudhuis & Tengblad, 2017). As shown by appendix 3 which visualizes BP's share value from 2000 until 2021, we can see large depreciation of its share value of more than 50% of its pre-accident values. That value has yet to recover even 10 years since the accident.

The Deepwater Horizon Accident

On May 2009, BP CEO Tony Hayward spoke at the Stanford Graduate School of Management. In his speech he covered the massive growth that BP had experienced in the last decade, acknowledged accidents & scandals, and pointed out organizational inefficiencies within the company. One of the things he revealed to his audience what his management team had been working on to remedy these problems, what he termed "the way forward". This among other things emphasized the importance of having "Safer, reliable operations" (refer to appendix 1 for transcript). Despite this, not a year later, on the 20th of April 2010, BP experienced the now infamous Deepwater Horizon oil spill in the Gulf of Mexico, what happened?

BP's 2010 Deepwater oil spill is recognized as the world's largest oil spill in history. The spill released 4.9 million barrels of crude oil into the Gulf of Mexico, creating an ecological disaster for nearby coastal communities. As a result, BP immediately set aside USD 20 billion to pay for expected cleanup costs, compensation for the affected communities, as well as the funding of research institutes, (Schleifstein, 2020). This initial number has, according to Oudhis & Tengblad (2017, p. 71) ballooned greatly from its initial value, to over USD 50 billion by 2017. As of April 2020, the figure owed by BP and its partners has risen to USD 71 billion, of which USD 69 billion will be borne by BP personally, (Schleifstein, 2020).

According to Lavis (2018), deepwater drilling is drilling which occurs at water depths of between 4000-7000 feet (1220-2134 meters). At the time of the accident offshore deepwater drilling had only just begun to become economically feasible. For reference, between 1992 and 2008, deepwater wells in the Gulf of Mexico had increased from only three to 36, (Oudhis & Tengblad, 2017, p. 74: Ingersoll, Locke & Reavis, 2012). Though there were already many wells which operated at maximum depths of up to only 400 feet (122 meters). To emphasize the depth

of the Deepwater Horizon platform, we must consider that it was operating at a depth of 4993 feet (1522 meters), with an addition of the depth of the well (bottom of sea floor to oil pocket) which was roughly 18000 feet (5486 meters), (Pallardy, 2020). Unfortunately, the enthusiasm to rapidly advance deepwater drilling technology had not been shared for the development of equivalent countermeasures for accidents at such depths. The technology with eventually capped the leaking well was developed while the well was leaking, because failsafe's and spill measures of the period were incapable of sealing the well, (Brady, 2020: Oudhuis & Tengblad, 2017).

Additionally, further investigation has shown that the incident itself was largely attributable to human error as well as organizational negligence. Particularly because managers responsible for the drilling willingly set aside safety procedures in preference of maintaining deadlines and cutting costs, according to Amado (2013), 2010 costs for deepwater offshore drilling varied between USD600,000-USD800,000 per day. The Deepwater Horizon well was at the time of the deadline, 43 days behind schedule and USD 58 million over budget, with a daily cost of USD 500,000 per day of operation, (Grayson, 2019; Ingersoll et al. 2012). An example to illustrate their desire for speed over safety was replacing heavy drilling mud with lighter sea water before the cement for capping the well had properly dried. Furthermore, Transocean, the operator of the rig, had only recently had a near miss incident at another of their wells yet still ignored certain safety procedures; it was also discovered that BP neglected to carry out a test which would check the integrity of the cement which was deposited to plug the well due to cost reasons (Goldenberg, 2011: Oudhuis & Tengblad, 2017: Barstow, Rohde, & Saul, 2010; Ingersoll et al., 2012). A safety audit of the Deepwater Horizon rig in September 2009 revealed a total of 390 repairs which were urgent, requiring a total of 3,500 labor hours to fix, more shockingly, it was discovered that the rig had never been sent to a dry-dock for maintenance for nine years. And the computers which

controlled the drilling were grossly outdated, using 1990's era operating systems and would frequently freeze, (Ingersoll et al., 2012).

Problem Identification

Crisis is a concept that is all too familiar in the oil and gas industry, there is a long list of events which have greatly affected the oil industry since its rapid development in the 20th century. The industry has constantly been under attack from events such as sudden shifts in supply and demand, this can happen for a number of reasons such as the development/adoption of new mining/drilling technologies which allowed the extraction of shale oil in 2014. However, this sudden increase in demand was not met with an increase of demand, further pushing the prices down, (Stocker, Baffes & Vorisek, 2018). Supply can also change due to sudden shifts in demand, the clearest example of this is easily visible if we observe the current COVID-19 pandemic. Lockdowns around the world have arrested economies and have subsequently caused the demand for crude oil to fall, for example, Chinese consumption of oil was responsible for 80% of global oil demand growth in 2019; The closing of this economy (at least at the time of research) had disastrous effects for the oil market, (Casey, 2020). Referring to appendix 2, we can observe a very steep decline in the price of crude oil from around the start of the year to March-April, a decline from USD 60 per barrel to USD 20; As of now the oil prices have only just managed to recover half-way, at USD 40 per barrel

Yet market forces are not the only factor oil companies must worry about, political factors are also a consideration. Threats of a conflict between Iran and Saudi Arabia, countries among the top 10 global producers of oil, can also influence oil prices as risk of political events rises. A recent

and tangible example of this is the trade war which occurred between Russia and Saudi Arabia, a flooding of oil onto an already saturated market created by the COVID pandemic pushed prices to historic lows, even for the first time ever creating negative prices in the US oil market, (Sheppard, 2020: Sullivan, 2020).

Because of this, although clear differences exist between the nature of the Deepwater Horizon accident and the present COVID 19 pandemic, the author believes that certain parallels or connections can still be drawn between the two. For instance, both crises have forced BP to change drastically. As a result of costs for paying compensation to victims and penalties, BP was forced to sell off USD 75 billion of its assets. However, this was taken as a positive change according to the newly appointed CEO of the time, Bob Dudley. As he was quoted saying, "The company has transformed itself. It's a tighter, more compact company than it was", (Mufson, 2018). Similarly, the COVID-19 pandemic has shook the belief of the consistency of oil prices, where demand was generally on the rise, usually driven by the emerging economies, and was therefore mostly at the mercy of the supply and other geopolitical circumstances. Now the industry is seeing that demand can plummet to extreme levels, on top of a resurgent trend for renewables meaning that the future energy mix will see the dominance of oil and other fossil fuels decreasing, (Carrington, 2020; BP, 2020b). Consequently, BP has decided to abandon its traditional model of reliance on sales of oil & gas, instead trying to rebrand itself as an energy company; going so far as to target itself as a 'net zero emission company by 2050 or sooner', under the leadership of its newest CEO Bernard Looney (Mufson, 2020; BP, 2020a). An example of this movement is the continued divestment of BP's assets in the petrochemical industry, such as its recent sale to INEOS worth USD 5 billion, (Hartzog & Grigorey, 2020)

Consequently, a study of crisis and resilience would be very relevant in the industry. As Linkov and Trump (2019, p. 10) mention in their book, “Resilience is also an important question to tackle threats of very low probability yet disastrous consequences, where no clear strategy exists to mitigate or prevent such threats from happening in the first place”.

Objective of the study

From this catastrophic event, this paper hopes to identify what corporations can do in the face of such disruptive events. In this case, the paper wants to know what lessons we can learn from BP’s handling of the Deepwater incident, how did the company change as a result of the accident? How did BP survive through such a disastrous event which cost the company billions of dollars in penalties in addition to its loss of reputation? And how does the changes made to BP influence their reactions to other crisis’s which have hit the company since. Ultimately, we hope to be able to identify how lessons from a crisis the magnitude of the Deepwater incident can be used to tackle the ongoing global crisis, the COVID-19 pandemic.

Research Question

This research will analyze the case from the perspective of crisis and resilience. How does resilience help companies to cope with emergency situations? What can be done to improve a company’s resilience? Lastly, we will attempt to link the study of BP to present crisis’s such as the corona virus pandemic.

Therefore, we have summed up these points into a research question of, “How has COVID 19 forced BP to restructure itself in the face of other crises that BP has encountered since the 2010 spill? How did these additional/subsequent crises affect BP?”.

Chapter 2: Literature Review

The 4 Quadrants Model of known/unknowns

To gain a better understanding of crises and resilience it is useful to first understand the concept of knowns/unknowns as a supportive base. Since crises are easily linked to areas of uncertainty, as described above, deepwater drilling had only recently begun to become commercially viable. Therefore, we can easily assume that there were many yet understood factors or dangers of drilling at such depths.

The 4 quadrants model consists of four combinations of known and unknown, Cleden (2009, p. 13-14) provides us a model depicting the combinations, '**known knowns**', '**known unknowns**', '**unknown knowns**', and the most relevant for this topic '**unknown unknowns**'. For a visualization, please refer to appendix 4.

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'**Known knowns**' (quadrant 1) allude to knowledge/facts which are already known by the organization, represented in the form of data and independently verifiable evidence, there is no risk or uncertainty in this area. In the context of the oil and gas industry this could be represented by onshore oil drilling which is safer and well understood by now. '**Known unknowns**' (quadrant 2) refer to risk, this realm means possible dangers that are identified, or a knowledge gap which is acknowledged by the organization; here variables are still quantifiable. This could allude to everyday operational risks associated with deepwater drilling such as the pressure from drilling deeper, the amount of cement/sealant needed to cap an exploratory well as well as the blowout

preventer as a final barrier against disaster. Here the risks and the dangers are known, and appropriate measures can be taken to minimize the dangers or chances of a crisis.

'**Unknown knowns**' (quadrant 3) refer to what Cleden calls untapped knowledge, knowledge which is readily accessible to the organization; it could also allude to dormant or unused resources. In the industry this could translate to relevant research institutes which are not utilized or potential cooperation within the industry. We see this through the creation of the Marine Well Containment Company (MWCC) which was spearheaded by four oil supermajors consisting of Chevron, ConocoPhillips, ExxonMobil, and Shell pooling in a total of USD 1 billion in response to BP's Deepwater Horizon disaster. Since its inception it has accepted membership of 6 other oil and gas companies including which operate in the Gulf of Mexico including BP. Currently it is constantly on standby, with pre-made capping stacks designed for different depths and pressures, in case of another similar accident, (Brady, 2020: MWCC, 2020).

Lastly are '**unknown unknowns**' (quadrant 4) which can be termed as uncertainty, as the word suggests this realm suggests a situation which is a complete mystery. He emphasizes the point that these uncertainties are unfathomable for up to two reasons; there is no knowledge of its existence, so there is no base to begin theorizing, another reason is the factor may be immeasurable or impossible to categorize despite awareness of a looming threat. Here the organization lacks understanding of their environments, creating a situation where it is impossible to even begin to theorize potential issues; this realm is characterized by unpredictable events, or what Cleden names 'bolts from the blue'. Adding to this, the nature of the unfathomable uncertainty can have the effect of making people purposely ignore the issue, as even though people may be able to anticipate a threat (natural disasters such as hurricanes or earthquakes) it may be difficult to estimate the potential impact due to secondary effects, (Kim, 2017). Comparing this to the industry, we can

liken the first attempts at offshore drilling or particularly deepwater drilling to this realm, as although there was preliminary research done for developing the first platforms, there would have been no way companies could completely comprehend the complexity or risks associated with it.

Cleden also describes a final and interesting phenomenon within the model, although it does not constitute a quadrant on its own, the transfer of knowledge from quadrant 1 to 4, from well known facts to uncertainty. The transfer is possible for a number of reasons such as incorrect assumptions, mistakes in data or misjudged competencies. This implies that organizations should still always be aware of their current situation as things that they think they know can actually be wrong.

Crisis

There are numerous different definitions for a crisis, according to Hermann (1963, P.64) a crisis would be based on three dimensions, they are that the event would "threatens high-priority values of the organization", present only a limited window of time to formulate a response, and is ultimately unanticipated by the organization. Pearson & Clair (1998, p. 60) point out five characteristics of a crisis, they are highly confusing situations with unknown causes and effects; pose a significant threat to the organization despite slim chances to occur; provide only little time to respond; surprise members of the organization; and creates a dilemma that will create either a positive or negative change. They further refine these points, into a definition for an organizational crisis which is "... a low-probability, high-impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly".

To further elaborate this concept, it is important to first recognize crisis as one of two states, as an event or either a process, (Williams, Gruber, Sutcliffe, Shepherd & Zhao, 2017, P. 735).

Crisis as an Event and/or Process

As an event, the focus of the crisis is only on the specific accident/incident which occurred, with an emphasis on the impacts and damages caused. Here the analysis of the crisis focuses on the triggering properties, what was the final event that caused the crisis. In the case of BP's Deepwater incident, this would be the moment the well exploded. A feature, of the event perspective is that is aids towards creating an understanding of the event during its 'acute phase', helping researchers understand how to react in times of a crisis, (Roux-Dufort, 2016). However, possible drawback of the compartmentalized view of the crisis, which emphasizes the actions taken by individuals in response to event. It also perpetuates a more reactive approach to crisis management, a culture of accepting crisis as an impossibility which can only be anticipated, and its effects reduced. Also, it critically ignores the possible avenues which could have created the crisis event in the first place, (Williams et al., 2017, p. 275; Pearson & Clair, 1998; Manyena 2006).

Crisis as a process provides observers with a much more inclusive view of an organization. Through this perspective, a more thorough analysis is done, by considering the periods before and after the crisis. Roux-Dufort (2016) argues that as a process, crises are a result of conditions that allowed it to incubate, such as an accumulation of organization inefficiencies or failures, eventually released as a crisis through a triggering event. This intersects slightly with Perrow's (1984) argument of "normal accidents" (explained in page 29) which mentions that crisis accidents

can be created from the interaction between multiple failures. Additionally, he identifies several stages consisting of warning signals, triggering event (acute phase), amplification, and resolution. Furthermore, analyzing crisis as a process instead of just the damages that it caused helps give organizations a chance to look at itself by revealing weaknesses or deficiencies that would not have been discovered if a crisis did not occur.

In the case of the Deepwater Horizon incident some examples of crisis incubating factors was the complexity of the safety system, such as an emergency system being controlled by 30 different buttons. Other factors relating to company culture was also present such as constantly drilling/practicing for common difficulties, such as hurricanes but never a blowout (as was what happened), as well as conflicting messages in the safety handbook which emphasized the importance of 'rapid action' yet also warning against overreaction, (Barstow et al., 2010)

Crisis as a Buildup

Continuing the previous discussion, Roux-Dufort (2009), identifies three dimensions of a crisis which are the gradual accumulation of organizational dysfunctions (what he also calls 'imperfections'), and managerial ignorance, which is then set off by the 'triggering event'.

Organizational imperfections are what he identifies as the "… recurring weaknesses that have gradually become permanent elements within the organization". These 'imperfections' consist of a myriad of components and terms such as, weaknesses, negligence's, anomalies and errors, stemming from the idea that there is no such thing as a perfect organization. These imperfections by themselves may not necessarily constitute a crisis but have the possibility of laying the foundation for a potential crisis, or what he terms '***crisis proneness***'.

To elaborate these imperfections, we can take the four stages for the development of a crisis that he points out. They are ***anomalies, vulnerabilities, disruption,*** and ***crisis***:

Anomalies are the most basic form of imperfections; these are inevitable deviances which arise from the culture within the organization. They are invisible to managers if they do not create issues, essentially it is what the organization allows to 'slip by'. When enough ***anomalies*** are accumulated, they become ***vulnerabilities***; These can exist in several forms depending on the organization, such as near accidents, customer complaints, quality issues or alarming audits. Still in a controllable threshold, managers in this level, though they can observe these issues tend to attribute it to external forces beyond their control as a coping mechanism. This is then followed by ***disruptions*** which unravel the ***vulnerabilities*** and ***anomalies*** accumulated until that point, by this time procedures set in place are no longer sufficient to defuse the issue. This stage is signified by emergency responses such as the setting up of a crisis team, similar to before denial also sets in as managers convince themselves that they are not in a crisis. In the ***crisis*** phase, the organizations reputation and management are questioned. The situation is characterized by the destabilization of the company's environment, managers react defensively to protect their position and interests, and draw on proven methods to solve the issue.

Resilience

The definitions of resilience vary greatly depending on context, some definitions can be applied to others. For example, the word resilience appears in and is used when referring to a wide plethora of topics, ranging from ecology, physics, psychiatry and psychology, public health, urban development and all the way to environmental science, (Manyena, 2006, p. 1: Ungar, 2018, p. 2).

A common theme to understanding resilience is to view it under the context of the particular system, (Walker, 2019, p. 135)

Also, we must also be careful to address what resilience does not necessarily mean, especially if we consider the above, knowing that there may be different definitions of resilience each correlated to its own context. Walker (2019) touches on three common points, firstly is the misunderstanding that resilience means to 'bounce back'. He asserts that resilience refers to the ability of an entity to absorb a shock/disturbance which has been thrust upon it and (as much as possible) remain the same way it was prior to the shock. Also, he points out the importance of a learning process in 'resilience', where the entity learns from the shock and subsequently adjusts itself in anticipation of similar shocks, particularly by "... altering the amounts of its different parts and the relations between them". Second, he points out that resilience is amoral, it does not always refer to a good thing, taking examples such as inner-city slums and salinized landscapes. Lastly, it is important to note that resilience does not equate to a resistance to change. He argues that the overprotection of systems in fact achieves the opposite goal and rather reduces resilience. Systems have thresholds where surpassing it would mean surpassing their limits of adaptation, forcing it to change. However, resilience does not necessarily mean aversion of these thresholds either, he says "... it's (resilience) about developing the ability to change where a threshold occurs in order to become more resilient; to increase the 'safe operating space' of the system". Considering the above three points, he leaves an all-inclusive definition of resilience, "Resilience, then, is the capacity of an organism, an ecosystem, a business, a city, to absorb a disturbance by re-organizing so as to keep functioning in the same kind of way and not cross into a different state of the system with a different kind of identity, or even into a different kind of system. In essence, it's about learning how to change in order not to be changed".

Resilience also exists as a philosophy and as a methodological practice, where philosophically it is concerned with ensuring that the entity/system survives while at the same time acknowledging that before any disruptive events occur, it is unlikely to be able to remove all risks to the system, (Perrow, 1984). As a methodology, resilience means to prepare a system for shocks utilizing available resources, knowing that however an actor may plan for threats or disruptions, disruptions are bound to happen, (Linkov & Trump, 2019). Weick & Sutcliffe (2007, p.14) expertly condenses this (resilience as an ideology) into, "Resilience is a combination of keeping errors small and of improvising workarounds that allow the system to keep functioning".

Resilience as a Process

In Ungar's (2018, p. 7-9) study of resilience, he identifies seven principles of resilience from analyzing resilience related papers of different studies. He asserts, as a second principle, that resilience is a process and provides list of five processes/components that contribute to a(n) organizations/systems resilience, although he uses the wording sustainable instead of resilience. Also, it is important to note that none of these processes are dominant above the other, they all work in conjunction with each other to achieve resilience.

Persistence mainly talks of the system's ability to direct its efforts to maintain its current state/operations in the presence of internal and/or external stresses despite its potential to achieve change, since the pressures which are acting on the system have not yet reached a level where the system needs to change. This process influenced by two factors which is the resources available to maintain what system is doing and support from relevant systems that would buffer it from

stress. Finally, Ungar points out, explains why it is possible why parts of a system may experience change while others may stay the same.

Resistance differs from persistence through the existence of support structures, it mainly describes a process within organizations which allows it to maintain itself in the face of a crisis. As explained above persistence describes a system which has supporting elements which allow it to minimize or neutralize pressures; Here the system must actively expend its resources to push back against external influence to maintain its current order. Like in persistence, Ungar also explains the relationship between parts of a system, in this case resistance could also mean components of a system changing in order to allow the larger whole to resist or maintain itself.

Recovery this process is interesting because it incorporates elements of adaptation and is dependent on other inputs into the system. Since we have established that resilience is not just simply the act of returning to a pre-crisis/disturbance state. In this case, Ungar notes that recovery is a process of returning to a similar, but not same condition. Essentially, knowledge received in the course of the disturbance is used in consideration during recovery.

Adaptation, as the word implies means the adjustment to change, as previously touched on in 'recovery', a system that has received a shock will restructure itself so that it will not be vulnerable, or at least as vulnerable, as it was in the first experience. Again, we also need to emphasize the importance of the interactions within a system, since it is a group effort within the organization. Different subsystems may need to interact with another or several others during a period of adaptation.

Transformation refers to a process where the system becomes something else entirely, these changes however does not necessarily mean that it is desired but could also be an act of

necessity. This can mean that the system changes as a result of a change in the environment and also that the environment is changed by the system. Benefits of a transformation (if there are) however, are also not automatically distributed equally. Ungar mentions that resilient systems, "...therefore, show both equifinality (many means to a single end), which is characteristic of their capacity to adapt, and multifinality (many desirable ends from many different means), which contributes to unpredictable forms of transformation", (Ungar, 2017, p. 9).

Resilience as an Ability

Williams et al. (2017, p. 743-746) link organizational resilience with resource endowments actors have that influence how they interact with crises. There are 5 of these endowments which are ***financial***, ***cognitive***, ***behavioral***, ***emotion-regulation***, and ***relational*** endowments. ***Financial endowments*** refer not solely to money but can also refer to resources in general, organizations that are rich in finances and other resources are able to draw upon a larger pool of tools to tackle shocks. ***Cognitive endowments*** refer to expertise and their sense of vision/purpose, organizations with strong performance in this measure can detect minute disruptions before they become serious. ***Behavioral*** endowments refer to the organizational structure or processes that lead to effective sharing of information within the organization, smoother integration of individuals within the organization helps with effectiveness of responses to issues. ***Emotion-regulation endowments*** refer to the mental health of individuals within the organization, particularly those in charge of making decisions, this concerns some factors such as optimism and hope. Lastly are ***relational endowments***, referring to social connections within the organization that aids the exchanging of

resources. This factor serves as a form of lubricant that helps organizations react effectively to issues, interestingly they also mention the importance this factor plays as an enabler for cognitive, behavioral, and emotional endowments.

Barasa, Mbau & Gilson (2018, p. 497-500), further expand on these points, they identify 9 different points to enhance organizational resilience with some definitions overlapping entirely or partially with those given above. The first factor they discuss is **material resources** which, like Williams et al. (2017), refers to resources both financial and material. Barasa et al. (2018) however adds by also recognizing the role of financial resources to mobilize other resources during times of crisis. Another factor they identify is '**preparedness and planning**', this factor was largely untouched previously and refers to adequate pre-planning before a crisis occurs. This can be in the form of contingency plans or even scenario exercises/drills. The third is called '**information management**' which refers to how information is managed and used, particularly concerning the flow of information. This overlaps with the above mentioned 'behavioral endowments' which also emphasizes the organizational structure for the sake of efficient information sharing within the organization. Fourth are '**collateral pathways and redundancy**', which was not mentioned previously, this talks about the organization having multiple plans of action to achieve a goal. Essentially, this factor argues the importance of ensuring a diverse web of connections within organizations so that in the event one connection is severed there can be backup channels.

The next factor they discuss is '**governance process**' which is further split into 3 effective governance characteristics of resilient organizations, with some of these factors overlapping with some definitions given previously. First mentioned is **decentralization**. While in the last factor they talk of decentralized structure and planning, this component refers more to the delegation of authority. Secondly, is the importance of **non-linear planning** which emphasizes integrating

feedback from different steps of a plan. This contrasts with linear planning where a step-by-step process is rigorously followed, regardless of results collected in each step. Lastly is the **degree of coordination** between different sections of the organization which facilitates effective use of the organization's resources, especially in an emergency where only a few resources are immediately available. In relation to Williams et al's (2017) work, we can observe that the elements of 'behavioral endowments' overlap with **decentralization** and **degree of coordination** discussed here. Both highlight the importance of organizational structure and how it can influence the effectiveness of response to crisis. **Non-linear planning,** however, was not discussed in their work.

The sixth factor that Barasa et al. (2018, p. 499) discuss is '**leadership practices'** which, similarly to '**governance process'** is also comprised of smaller components. First of all was the creation of a clear and shared vision to focus the efforts of the group, second was the need for inclusive decision making which included relevant stakeholders. Therefore, we can clearly see that this factor resonates strongly with Williams et al's (2017) 'cognitive endowments' which stresses the importance of a shared vision/mission as well as expertise of their field which can be symbolized here through inclusive decision making, bringing knowledge into the organization from appropriate stakeholders. Next is '**organizational culture**' which means the attitude of the organization, its peoples. Whether or not they embrace challenges as an opportunity to grow or an annoyance, this is supported by the embracing of innovation and creative thinking. This is followed by '**human capital**' which recognizes the importance of the human resources, this includes the cumulative skill of the workforce and the fulfillment of their needs as human beings. This includes both their physical wellbeing and emotional wellbeing, with particular emphasis on the creation of a positive social environment that would facilitate the sharing of emotions and information. Both

of these factors, '**organizational culture**' and '**human capital**' tie in with Williams et al's (2017, p. 744) 'emotion-regulation endowments' which touch on the importance of the mental health/fortitude of actors within the organization.

In addition, Barasa et al (2018, p. 500) identifies the importance of '**social networks and collaboration**' which refer to social capital which the organization can draw upon such as linkages of similar businesses that widens its ability to learn from others, and additional resources to tackle crises. This factor not only ties in with Williams et al's (2017, p. 745-746) 'relational endowments', but also covers certain elements of 'financial endowments' since it references the expanding of available resources.

HRO's (Highly Reliable Organizations), an end Goal?

To summarize the concept of the resilient firm, we can implement Weick & Sutcliffe's (2007), reverence of the of an HRO as a 'gold standard' for companies operating in risky industries, such as the oil and gas industry. They mention that the environment of HRO's is one where high-risk technologies are involved, there are no 'first-time' experiences since the risks are high. Therefore, we believe that this concept can be safely brought into the context of the oil and gas industry. These organizations are guided by 5 principles, namely: ***Preoccupation with failure, Reluctance to simplify, Sensitivity to operations, Commitment to resilience, Deference to expertise***.

Preoccupation with failure signifies that the organization is constantly anticipating or takes potential dangers very seriously. The organization has systems in place that are designed to

report risks to relevant individuals who can then make decisions based on the reports. These organizations also constantly emphasize within itself, the types of events that it seeks to avoid, and emphasizes the lessons to be learnt from near misses.

Reluctance to simplify, indicates a respect for the complexities of the real world. Never oversimplifying decision making based on only a few factors, which themselves might have been simplified. This factor also recognizes the importance of a decentralized chain of command so that people within the organization that recognize the situation will not be locked out of the decision-making process. Although there is also a benefit, or even need, simplify processes within the organization, at its core HRO's make sure that they maintain as wide a view as possible. (example?)

Sensitivity to operations, means a respect for the needs of staff who carry out the execution of the company's main activity, such as the staff posted onto the oil rigs for BP. These organizations ensure that these staff are given the resources needed to operate optimally. HRO's appreciate a more situational instead of a strategic awareness of their activities, which has the benefit of being aware of situations as they develop. Preventing the 'wound' from developing into a crisis-level event. This entails that interpersonal relationships are important within the organization because members need to have the 'confidence' to speak out regarding possible issues. Some common examples of this could be a whistleblower system where employees are rewarded in exchange for reporting unsafe situations to upper management.

Commitment to resilience, means that members of the organizations are conscious of potential issues and do their best to solve them. Essentially, they recognize that no system is impervious to issues, and therefore are constantly ready to make adjustments to cope with it. As quoted by the Weick & Sutcliffe (2007, p. 14), "The hallmark of an HRO is not that it is error-free

but that errors don't disable it". A strategy they use to cope is to ensure that errors are detected while they are small, as well as recognizing potential alternative routes in order to ensure continuous functionality. These strategies imply that an HRO should be knowledgeable of all relevant information, of technology, the system, and of itself.

Deference to expertise, means that HRO's are aware that decision making based solely on hierarchical positioning may be detrimental to the organization. This is especially true in organizations with a very rigid hierarchy where feedback loops between lower-level and upper-level management may be lacking, allowing an issue to snowball downwards as it is executed. Decision making should be delegated to the most relevant person at that point in time. However, they also recognize that experience and expertise are not the same since experiences can be repetitive and not necessarily have anything to contribute.

Are HRO's Feasible and Crisis Avoidable? "Normal" Accident Theory

Finally, to conclude the topic of HRO's, we should also discuss the feasibility of such a stringent concept (of zero accidents) by introducing the concept of "normal accidents". Perrow (1984) in his book "Normal Accidents", states that complex systems with numerous points of interaction between components will, despite the existence of fail-safes and backups eventually encounter a situation which bypass these safety measures. Conditions which would certainly exist with the high-tech equipment which oil companies use; we can recall one of the safety mechanisms on Deepwater Horizon, which was operated by a total of 30 buttons, (Barstow et al., 2010)

It is important to note that Perrow describes this process as "inevitable", which is why they are termed 'normal accidents'. These events would usually be trivial and disconnected but could connect with other systems in ways that designers could not have imagined at first, therefore

eventually leading to a crisis. Another issue he mentions is how a majority of the causes of accidents are reported as “operator error”, however this does not consider that often these cases also feature unexpected circumstances which the operator had to handle. In addition to this, we should also not that organizations are sometimes at fault for worsening the situations as they engage in actions according to Perrow as, “ignoring warnings, taking unnecessary risks, sub-par work, deception and lying”. Interestingly we can note that a few of these characteristics are present as characteristics of what made the Deepwater incident possible. Such as pressure from upper management to expedite the drilling process to cut drilling costs.

Chapter 3: Research Methodology

Recalling the objective of the study, we identified that this paper wishes to find out what BP did in response to a crisis the magnitude of the Deepwater Horizon incident. We wish to know how BP changed as a result of the accident, along with what lessons we can learn from their handling. From this we hope to be able to get an insight on how BP, and similar companies in the industry can cope or adapt to the current global crisis that is the COVID-19 pandemic.

In order to achieve these goals, this paper will utilize the qualitative method of research, particularly thematic content analysis. Through telephone interviews with 6 members of BP Indonesia senior staff (please refer to appendix 7 for details of interviewees), we hope to be able to analyze the internal changes that have occurred within BP since the accident as well as their thoughts and opinions regarding these changes where possible (interview sheet can be seen in appendix 6). Then we will compare these results to the existing literature regarding resilience to get an understanding of the organizations inner workings. Lastly, we will then compare these results to readily available secondary data regarding the accident itself, particularly analysis of BP's reactions by relevant journals, think tanks, commissions, etc. We will also consider recommendations suggested by Dr. Brown (2012) of the British Middle East Center for Studies and Research (BMCSR), (more details in appendix 5) to the current realities in BP as answered by respondents.

Chapter 4: Findings

Regarding the Deepwater Horizon Incident

From the successful interviews, we can observe several trends in answers. When asked about how BP changed as a result of the accident, there is a consensus that BP made several adjustments to deal with its situation. These adjustments include moving from a previously regional-based to a more top-down organization, with increased emphasis on streamlining and the reduction of inefficiencies wherever possible. Mr. Aryoseno points out (refer to appendix 7.1.5) that BP still utilizes local practices despite an increased emphasis on top-down management, as long as they remain compatible to BP's overall process. Additionally, BP created new operational protocols and standards which are embodied in examples such as OMS (Operating Management System) and 'operational excellence'. However, one employee, BP Indonesia employee in downstream segment/ oil trading #2 (appendix 7.3.10), gives an observation that BP is still follows the regional structure such as having 'regional heads' that make decisions for their relevant areas. Also giving examples such as Asia-Pacific operations being handled by the regional head office, Singapore, and European operations reporting to the head office in the UK.

Continuing the topic of how BP changed, insights learnt from BP Indonesia employee in downstream segment/ oil trading #2 gives strong examples of how seriously safety was taken by BP. Referring to appendix 7.3.4, the employee mentions how safety protocols affected business transactions. For example, when dealing with customers or partners, BP would send their inspectors ahead of a shipment to inspect port facilities of the recipient, if safety deficiencies are found then the activity will be put on hold. This was very stressful for local businesses including Pertamina, Indonesia's nationally owned oil company which ran on a budget and was therefore

sometimes forced to make concessions in safety standards, therefore BP would suffer numerous delays when doing business with them. A consistency can be observed between Mr. Aryoseno who as a member of BP Indonesia's finance department reported that BP increased priority on accumulating cash whenever possible, and answers from employees in the trading division which also noted that BP refused to receive payments through methods such as letters of credit, preferring instead to receive payments in cash.

Mr. Parhusip also contributes to this from the perspective of a front-line personnel (involved with drilling operations). Referring to appendix 7.6.4, he noted a drastic tightening of security levels to the extent that they became constrictive to daily operations. There were more layers of authorization that a decision had to go through; this was also mixed with the introduction of requiring signed documents before approving decisions. This measure inadvertently created concern for staff as the signatures could possibly be used in court to implicate them if an accident were to occur. Although he notes that eventually (around a year after the accident), staff were finally allowed to contest changes that they felt were too restrictive.

To add, we can also observe from the interviews with employees that were not employed at BP during the Deepwater incident (appendix 7.2 and 7.4) that although the accident had no direct impact on their respective companies (Schlumberger & Medco Energi), their companies still reacted to the incident by preemptively raising safety standards. This phenomenon was also reported to occur throughout the industry according to most interviewees.

Regarding the Covid Pandemic

For the topic of changes to BP as a result of the covid pandemic, there was a near unanimous agreement that no significant change can be felt on their day to day operations aside

from the necessity for remote working, as a BP employee in the trading division noted (refer to appendix 7.2.3) mentions that even before the covid pandemic BP has had numerous experiences in dealing with price fluctuations. For issues such as working remotely, numerous respondents acknowledge a relatively easy transition since BP has had strong remote working capabilities since even before the pandemic. In terms of the current changes undertook at BP, such as its commitment to net zero and a rebranding to an 'energy company', most employees interviewed mention that the current pandemic has only accelerated the urgency for change, as BP had expressed its commitment to these goals in its 2019 annual report. Although, Mr. Parhusip (refer to appendix 7.6.9) expressed concerns regarding profitability if BP were to complete this planned transition. The company might run into issues such as lower profit margins by relying more on renewables than oil & gas. Another interesting point learnt from Anonymous President Director of BP Subsidiary (appendix 7.5.6) is that the industry overall is seeing an increase in consolidation (mergers), particularly amongst the smaller producers, as a strategy to survive the current crisis.

High Reliability Organizations (HRO's)

Concerning the topic of HRO's, it is interesting to note that respondents unanimously agree that this concept should be adopted. However, they believe that the principles endorsed by the HRO may have already been implemented within BP but in different forms, such as the above-mentioned OMS and 'operational excellence'. Such characteristics may have existed even before the Deepwater incident, but was strongly reinforced following the accident.

Response to Recommendations from Brown (2012)

In terms of the recommendations (refer to appendix 5) from Dr. Brown of the think tank, British Middle East Center for Studies and Research, respondents point out that generally, BP has generally followed all recommendations with the exception of franchising. So far franchising within BP only exists in its downstream operations such as fuel pumps and its convenience store chain (am/pm). Although for recommendation number 4, respondents were limited in their ability to reply due to not being involved in operational roles but were still aware that generally an improvement of safety regulations were done.

As a concluding theme to the interviews, I observe that the experiences and lessons learnt following the Deepwater Horizon greatly helped the organization better adapt to the covid pandemic. Changes to organizational structure as well as to business practices helped BP to get used to crisis situations, such that when the covid crisis arose BP was not as badly shocked. This was even to the extent that employees reported feelings such as ‘familiar’ when asked about the present changes BP is undergoing.

Chapter 5: Discussion

Presently BP is moving to remake itself, from an oil & gas company into an energy company, as signified by some actions such as mentioning a stop on exploration for new oil & gas reserves early this year, (Mufson, 2020). As shown by appendix 2, the price of oil (USD per barrel) has generally been in a decline ever since the highs preceding the 2008 global financial crisis. Since then the price had fluctuated, but stabilized in the USD 80-100 /bbl. range, this stability did not last long, however. As mentioned above, the rapid introduction of US shale into the global oil market, which was not matched by an equivalent increase in demand caused the price per barrel of oil to tumble to as low as USD 40 per barrel. Again, the prices of oil stabilized following this shock, however this was then disrupted by the COVID pandemic and subsequent lockdowns of economies saw the demand for oil fall again. BP also re-evaluated its forecasted average price per/barrel down from USD 70 to just USD 55 until 2050, in addition to its asset value; writing off USD 17.5 billion due to the re-evaluation of future oil prices, (Bousso, 2020; Hartzog & Grigorey, 2020).

These recent losses have forced BP to further rethink and restructure itself, exemplified by its expressed intention to reduce 10,000 mostly office-based positions from its total employee workforce of 70,100, which surprisingly also includes a reduction of senior management from 250 to 120, not only as a cost-cutting measure to cope with the COVID-19 pandemic but also as a preparation for its anticipated transition into a net zero energy company with increased emphasis on renewable energy, (BP, 2020a; BP, 2020b; Hartzog & Grigorey, 2020; Hurst, 2020; Nasralla & Bousso, 2020). These changes are a quintessential example for Ungar's (2018) stance for resilience as a process, specifically we can see ***transformation*** in play. BP, as a result of environmental pressures can no longer maintain its current form (***persistence***), since the 2010 accident BP has

endeavored to redouble its efforts in its oil & gas business such as bringing online 7 oil & gas related projects in 2017, followed by another 6 in 2018, (Mufson, 2018; Shields, 2018). These projects are a clear indication of ***resistance*** where BP now was expending resources to push itself back into a desired course, against a currently hostile environment. In line with the interview with Mr. Aryoseno, (refer to appendix 6.1.8 & 6.1.10), we can observe that the COVID pandemic served as a propellant for change, as exemplified by BP's historic share value (refer to appendix 3). Which never reached pre-2010 levels since the accident and has fluctuated wildly ever since. Although pre-covid, the share value was beginning to stabilize, the pandemic has further strained BP's stability as its share value fell to even lower values than the post-Deepwater accident decline. Such steep decline has no doubt incentivized BP to radically shift its strategy in order to attempt to break out of its current situation, as following similar strategies since after the accident have not led to satisfactory recovery.

As mentioned before, following the Deepwater accident, BP was forced to pay billions of dollars as compensation to affected parties as well as to the federal government in fines. Despite these sanctions, which as of 2020 had amounted to USD 69 billion, (Schleifstein, 2020). BP has managed to survive and stabilized itself, a clear indication of Williams et al.'s (2017) and Barasa et al's (2018) hypothesis of organizational endowments, specifically financial endowments and material resources respectively. This is also exemplified by Anonymous President Director of BP Subsidiary's (refer to appendix 7.5.8) assessment that the increased safety measures implemented definitely increased BP's running costs and consequently reduced profit margins. But were nevertheless sustained because BP had the financial capability to maintain it, what he termed as a "strong balance sheet". In short, BP due to its size and resources had the capacity to absorb the financial blows from the fines levied. Additionally, in line with Barasa et al.'s hypothesis of

material resources, we can see that during the accident BP was able to use its wealth to mobilize an emergency response to the accident. And use its numerous investments as a shield to buffer itself from the financial shock of the fines it was ordered to pay.

Cracks on the wall, BP's safety history pre-Deepwater Horizon

Surprisingly, you need not look far into the past to observe BP's commitment to safety. In a span of 2 years (2005-2006) BP had had three separate incidents, in Texas, Alaska and the Gulf of Mexico, the most serious one being the infamous Texas refinery explosion which claimed 15 lives which gave birth to the *Baker report*. It highlighted several issues within BP's safety culture such as misinterpreting personal safety (workplace accidents) with overall process safety; to make things worse, improvements and maintenance to aging systems and components within the refinery that Amoco were planning prior to its merger with BP were cancelled under its new management in favor of saving costs. In Alaska, 2006, exactly a year after the refinery disaster a pipeline owned by BP sprang a leak which released 200,000 gallons of oil into Prudhoe Bay; this occurred despite numerous warnings from inspectors since 2001, (Ingersoll et al., 2012). Lastly, in the Gulf was the 'Thunderhorse' platform, BP's flagship project which was set to go beyond their competitors. After Hurricane Dennis in July 2005, it was seen tilting heavily on one side as if it was about to capsize; the incident was caused by a valve installed backwards which caused flooding during the hurricane, further inspection also discovered poor welding on the underwater pipelines which had the potential to have caused a leak the magnitude of the Deepwater incident had the platform been in operation, (Lyall, 2010).

BP had, under the leadership of Mr. Browne taken on a tradition of cost cutting and outsourcing of operations to contractors, such as Transocean who was running Deepwater Horizon on behalf of BP. Ingersoll et al. (2012) also indicates another critical change which was the

delegation of authority to onsite asset managers, which extended to BP's contractors. Furthermore, measurement of employee compensation was based on the performance of assets, which would give incentive for contractors to engage in risky decisions for the sake of potentially earning bonuses.

Referring to Roux-Dufort's (2009) work on crisis, we can observe a very strong similarity to what he argues as the four phases of a crisis, ***anomalies, vulnerabilities, disruptions,*** followed by the crisis itself. The prevalent lack of awareness for safety is a clear evidence of what he terms ***anomalies,*** deviations which are permitted by the organizational culture, issues not seen as serious. The ***anomalies*** within BP eventually built up into ***vulnerabilities*** which manifested itself in the form of the numerous near misses that BP experienced, as well as the safety audit of the Deepwater Horizon platform which highlighted various urgent repairs which needed to be done, as pointed out by Ingersoll et al. (2012). Next are the ***disruptions***, in this case we should split the event on the Deepwater Horizon platform into two events, the incident itself, and BP's handling of the crisis which gives way the fourth phase.

We could argue that the ***disruption*** event was the moment the blowout preventor failed, leading to the explosion which eventually brought down the rig. As the literature states, at this stage BP had already lost control of the situation and proceeded to create emergency plans in addition to a crisis management team. We can also point out the denial of managers as pointed out by Roux-Dufort, through comments from BP's CEO Tony Hayward who was known to have initially downplay the extent of the spill with comments such as, "I think the environmental impact of this disaster is likely to have been very, very modest", "The Gulf of Mexico is a very big ocean. The amount of volume of oil and dispersant we are putting into it is tiny in relation to the total water volume.", as well as remarks such as "I want my life back" (implying that his intentions

were not earnest),(Reuters, 2020). At the ***crisis*** phase, BP's company environment had deteriorated rapidly, especially in terms of its public reputation, which was worsened by the comments made by Hayward, BP's shares had started to fall and would eventually decrease by 50%, (Oudhuis & Tengblad, 2017.

HRO Analysis

Comparing the incident to the metrics of an HRO (Highly Reliable Organization), provided by Weick & Sutcliffe (2007) and some analysis of BP's HRO metrics by Oudhuis & Tengblad (2017, p. 82), we can get a better understanding of BP's operations.

As we have discussed in earlier segments, we can easily conclude that BP was negligent in regard to safety practices onboard the Deepwater Horizons rig. Warning signals were ignored numerous times on the day of the accident in favor of cost cutting and keeping on schedule, which is understandable from a financial perspective but was hazardous from a safety perspective. The trade-off between short term gains (money saved from quickly finishing) versus the potential risks should an accident occur at such circumstances (the depth, newer technology). Additionally, Barstow et al. (2010) points out the staff onboard the platform itself were constantly drilling for 'easy' issues such as hurricanes while ignoring serious issues such as a potential blowout incident, a clear ignorance of HRO principles. Furthermore, BP's top-down hierarchical structure was clearly a weakness as Oudhuis & Tengblad point out that advice from BP's engineers and the Transocean chief drilling expert who pointed out the need for better quality cement and well casing centralizers were ignored. BP did not appreciate the risk they were facing by drilling at such depths and ignored people whose jobs were to provide the company with relevant information.

However, since the incident, information revealed from interviewees especially those concerning the HRO's revealed that these principles were reinforced in the aftermath of the Deepwater incident. BP's creation of the OMS and its adherence to new standards embodied in 'operational excellence' were agreed upon by the interviewees to embody the principles of HRO's. These changes contributed to a more robust level of safety at BP, as can be seen by the lack of major accidents the company has faced since 2010. This may also serve as evidence against the previously mentioned "normal" accidents which was suggested by Perrow (1984). Despite advances in technology since the 2010 spill, in addition to the risks from previous technology, BP has not yet encountered any serious issues. Though it is not to argue that there are no issues at all, interviews with employees have revealed that the increased safety standards ensure that even if incidents occur, they are quickly isolated. Preventing what Perrow mentioned as interaction between multiple failures, potentially leading to a crisis situation.

Chapter 6: Conclusion & Recommendations

Limitations

To further understand the changes at BP on an operational level, especially following the Deepwater incident, it could provide better insight if this report had expanded the number of interviewees. Particularly employees which are front-line personnel (involved with drilling or refinery operations). As it stands presently, only 1 employee is involved with drilling activities (refer to appendix 7.6), with another one having experience in the past but in a different company (refer to appendix 7.4). I believe it is important to include more of these front-line personnel because one of the characteristics of an HRO, as well as other literature on the topic of resilience was "sensitivity to operations", which centers around gaining insight from front-line employees, in this case employees which are involved in drilling (land or sea) and operators of assets such as refineries. As a result, the insights learnt presently may be limited or even biased to a certain degree. Lastly, it would be very useful to further assess BP in the coming years as its long-term strategy begins to solidify. When this does happen, further evaluation to determine the effectiveness of its changes from an oil & gas company to an energy company could provide useful insights on not only resilience (undergoing change through turbulent periods), but also to how companies can seek to change itself drastically. Especially, as Mr. Parhusip (refer to appendix 7.6.9) who has been in BP for a substantial amount of time notes that BP is moving into a potentially less profitable industry and may therefore have to further innovate or develop its strategy to compensate for these changes.

Conclusion and Recommendations

In conclusion, we can surmise that the Deepwater Horizon incident was merely a result of BP's past symptoms of organizational negligence, as symbolized by the Texas refinery disaster, Alaska pipeline leaks, Thunderhorse platform incident as well as the near-miss incidents experienced by BP's contractor Transocean just months before the incident itself. All things considered, there was a serious lack of a resilience culture within the company, which could have been attributable to several reasons such as BP's rapid expansion under the leadership of John Browne and the incorporation of two new organizations and its culture.

However, we can take the Deepwater Horizon incident as a triggering event for BP's current transition into a net zero energy company. Had BP never had such a damaging/transforming event such as the Deepwater spill, they would have had less experience handling crisis situations and not have improved safety standards which would have eventually led to another potentially worse accident, and less time to enact changes until the COVID crisis, though this is pure speculation. Essentially, the Deepwater Horizon incident was a wakeup call for the company, it laid bare and made it impossible for BP to ignore the deficiencies of its culture and organization and was the push or kick needed to move in the right direction (appendix 7.5.5); supported by testimonies gathered from interviews. The divesting and narrowing of BP's businesses since the accident helped to 'clear the clutter' of BP's structure since the massive expansion it undertook under Mr. Browne at the turn of the century.

As a takeaway, the Deepwater Horizon cannot be compared on a one to one basis with the current COVID pandemic; Since the Horizons incident was mostly caused by internal concerns such company culture while the A pandemic is an external threat acting on the company. However, we can identify some common themes for promoting resilience. We can utilize the concept of HRO's as a base for companies operating in the oil & gas industry. As the interviews conducted

has shown, a stronger commitment (than before the incident) to HRO characteristics as represented through BP internal terms and processes such as OMS and 'operational excellence' has no doubt contributed to the absence of major accidents since 2010. This is because the definition of HRO's refer to an organization utilizing high-tech and risky technology that has avoided disasters despite the risk and complexities associated with the industry. Finally, the oil & gas industry is associated with so many risks both physically such as operations in waters which constantly grow ever deeper, as well as equally perilous factors beyond its control such as global politics, technological disruptions, and oil cartels. Because of this, I strongly believe that the concept of HRO's superbly summarize and incorporate elements of resilience discussed in the literature and can provide companies with guidelines or values to adhere to.

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Appendix:

1. Tony Hayward Speaking at Stanford Graduate School of Management May 12th, 2009, (Grayson 2019). Taken from: https://link.springer.com/chapter/10.1007/978-94-024-1144-7_2

Speaking to an audience of graduate students, Hayward began by describing the huge change that BP went through from 1999 onwards. 'Until the later 1990s BP was a relatively small oil and gas company. In an extraordinary period between 1999 and 2003, under the leadership of John Browne, we put together a whole series of mergers and acquisitions – such that by 2003 we had created one of the largest integrated oil and gas, energy companies in the world – equal second with Shell – with operations everywhere.

Then catastrophe struck. In the space of several years we had a whole series of real disasters actually.

- We blew up a refinery in Texas City and killed 15 people.
- Our flagship project, called Thunderhorse, almost ended upon the sea bed in 6000 ft of water in the Gulf of Mexico
- We had a major, major oil spill in Alaska
- We were found guilty by the Department of Justice for a trading manipulation in the natural gas market of the US
- And our financial performance in that period was appalling. We under-performed our major competitors by 30–50%

And so it was with that that I was given the job of being the CEO of BP.

The only thing you can do is to confront it head on – we assembled a new team, mainly internal but with some external people. We went through a critical self-assessment with the following diagnosis:

1. BP was a company which was top down, too directive and not good at listening – good stories travelled fast, bad ones travelled nowhere.
2. We had failed to recognise that we were an operating company – too many generalists, not enough skilled specialists.

3. We had created an extraordinary amount of complexity when we put all those companies together – consultants mapped 10,000 organisational interfaces- for a company of 100,000 employees that's impressive! – too much analysis and not enough decision-making.
4. Then we sat down as a team to decide what to do about it.

Firstly, we created something called 'The Way Forward'

- Safer, reliable operations
- Having the right people in the right place
- Performance: restoring revenues and reducing complexity

Secondly, we reinstated competitor benchmarking – looking at the performance of our principal competitor, Shell – an $8billion gap in Q2 2007.

Thirdly, we addressed issues of leadership and culture change.

At that time it turned out we had 36 live and operating leadership models at various parts of BP – not surprising; we had assembled all these companies from all over the place and they all had their different bits of heritage.

So my team spent 3 or 4 months, without consultants, without any external help, talking about the company that we wanted, the culture that we wanted and the leadership framework which would begin to enable that sort of culture.

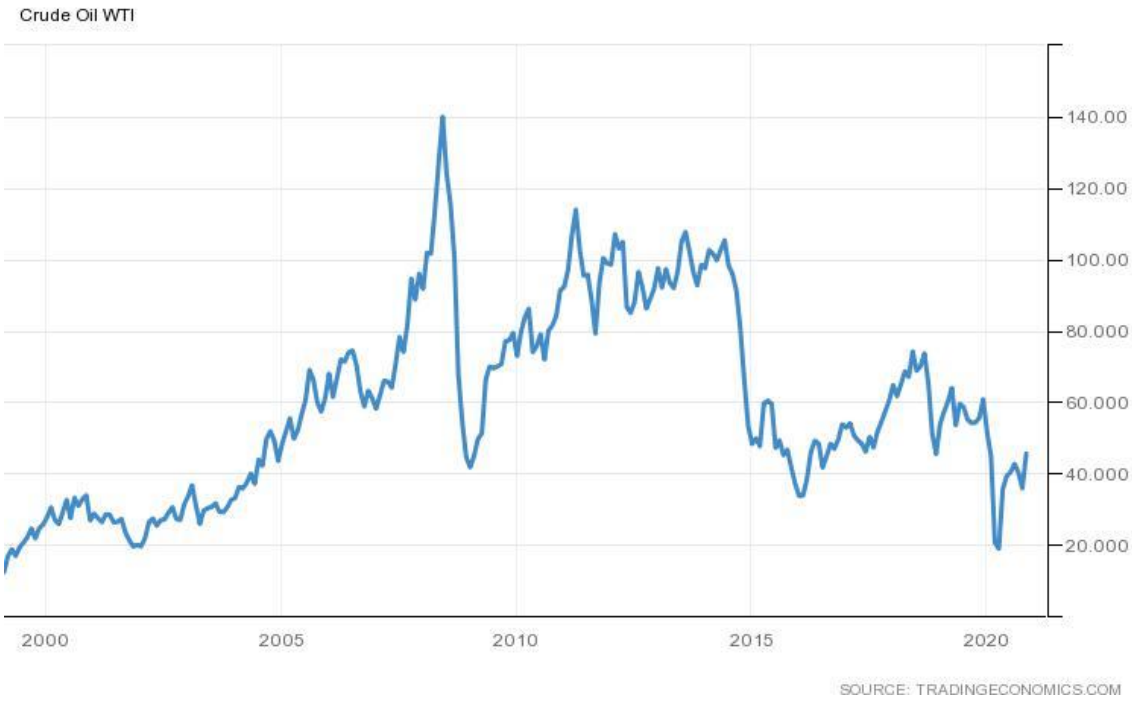
The new leadership framework would need to:

1. Recognise skills and professional capability and competence
2. Recognise how important it is to energise and motivate people
3. Focus on decision-making – there had been too much introspection and not enough taking of decisions and getting on with it
4. Deliver results.
5. The culture of an organisation is shaped by what the leaders do....

We are early in that journey. It's probably a 3–5 year journey for those who work in the offices and probably a 5 plus year journey for the people who work out in the facilities.....

Is it working (2 years into the process)? Well, I would say we are making progress, we are not there yet. We've closed the performance gap, so $8billion in Q2 2007 has become no gap at all in Q2 2009. We beat the market in three out of the last four quarters, and there is a lot of momentum in the company in terms of rising revenues and falling costs. So, there's a lot of momentum but it's clear that to create the sort of company that we want to create, which will be sustainable, we have more work still to do.

2. Historic price of West Texas Intermediate (WTI or NYMEX) crude oil prices per barrel, 2000-2020.

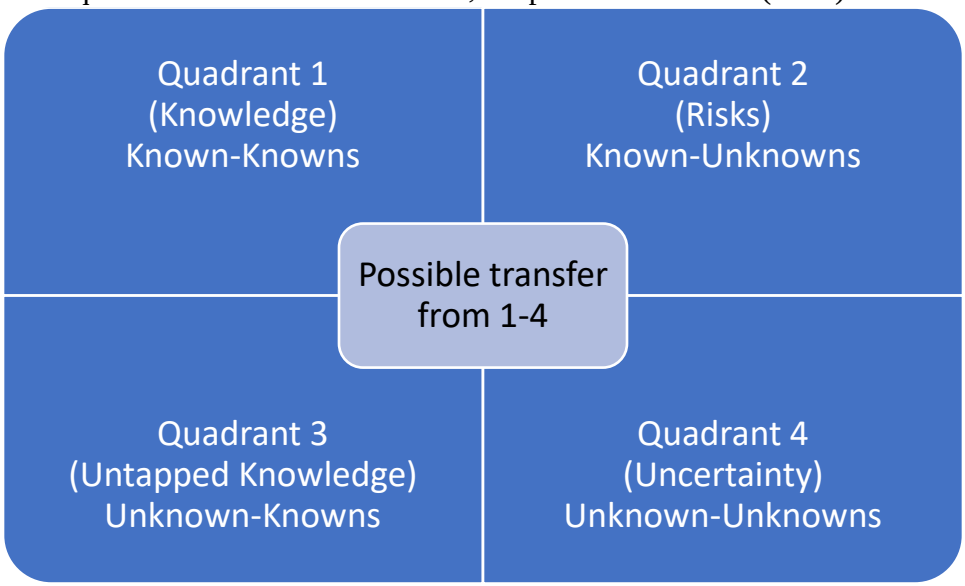


Source: https://tradingeconomics.com/commodity/crude-oil

3. Historic share value of BP January 1st, 2000 – January 1st, 2021

Source: https://www.bp.com/en/global/corporate/investors/investor-tools/share-price-history.html

4. The four quadrants of known/unknowns, adapted from Cleden (2009)



5. Recommendation list from Brown, (2012)

It is recommended that the organizational structure should become more centralized. This will improve cost efficiency and inject greater consistency into operations.
Focus on diversification, branch out into unrelated industries
Franchise
Developing better, clearer standards and processes for a range of activities in deep-sea drilling from cementing, to testing for leakages, to well control and general risk management.
Significantly improving education and training of BP personnel to enhance capability and competency.
Focus on company's competitive advantage such as loyalties and market strategy

6. Interview sheet/questions:
    - Note: Some questions were changed, and even new ones inserted impromptu due to circumstances of the interview. Ex: employee position, miscommunication, etc.

My name is Adrian Pujianto, I am a student from the MBA program of Ritsumeikan Asia Pacific University doing a report on organisational resilience, in the face of crisis. Specifically, I will be talking about how a major business organization adapts to major disruptions such as the Deepwater Horizon incident and the present COVID-19 pandemic. I chose BP because it has demonstrated success in dealing with the Deepwater Horizon incident and come out better.

Therefore, I want to know how BP changed because of the Deepwater Horizon incident, and the recently announced major changes to the organization to cope with the current COVID-19 pandemic and achieving net zero carbon emissions.

Hopefully, by understanding the changes that BP made in the face of such crises, we will be able to know how organizations can adapt to become more resilient. Not just for oil companies specifically, but for all companies.

I would like to ask you some questions along the following lines.

- First, I wish to know your role in BP, and how the Deepwater Horizon incident changed BP, at least for the departments you are/were in.
    - For those who were not in BP at that time, but still in the industry, I would like to know how/if at all your company was influenced by the event. Did they decide to take precautionary measures, or did they feel that BP's reaction was not their issue?
    - For those who were neither in BP nor the industry, I would like to know how the accident affected your respective organizations, if it had any influence at all.
- Second, I would like to know how the current COVID-19 pandemic has affected your role in BP, what are the changes that have happened as a result of BP taking steps to adapt to the new environment?
    - For those who are not in BP, the same question. How are your companies coping with the current situation? Are there any strategies that your company is implementing? At least in relation to your job.

- Third, I want to compare BP's policies before and after the incident, and after the COVID pandemic to the concept of HRO's (Highly Resilient Organizations)
    - **Note: Please refer to part II**
- Lastly, which only applies to current BP personnel. To the best of your knowledge, how do you feel the following recommendations from Dr. Sarah Brown from the British Middle East Center for Studies & Research (BMCSR) were applied to BP's operations after the Deepwater Incident? Or are any of them applied only now? **Note: Please refer to part III**
    - Which, if any of these recommendations followed through by BP after the incident?
    - Did any of these applied recommendations influence how BP is reacting to the COVID pandemic?

PART I: Interview Questions

1. Name

2. Position, explain role in BP

3. To the best of your knowledge, has there been any other major incidents at BP between the Deepwater Horizon incident and the current COVID pandemic?

A. Deepwater Horizon specific

1. How did the Deepwater horizon accident affect BP? At least in relation to your specific role
2. Did you notice any changes that happened within the company? Particularly your relevant tasks
    a. Were you involved in these changes?

B. COVID-19 specific

1. How has BP changed because of the pandemic? At least in relation to your specific role in the company?
2. Were there any changes which were done as a result of the Deepwater Horizon spill which has been helpful to the current handling of the pandemic?

PART II: HRO characteristics
More from: https://blog.kainexus.com/improvement-disciplines/hro/5-principles

- "an organization that has succeeded in avoiding catastrophes despite a high level of risk and complexity"

- Environment of HRO's is full of high-risk technology, must be mastered without trial-and-error, stakes are too high (just like at deepwater horizon)
- Environments unfold rapidly, errors propagate quickly
- Understanding never perfect
- Pressure on people to make wise choices with insufficient information
    - Examples of HRO's:
        - Air traffic control
        - Nuclear aircraft carries
        - Nuclear power plants
        - Hospital emergency department
        - Aircraft operations

5 principles of HRO, with elaboration below:

1. Preoccupation with failure
    a. Process Failures are Addressed Immediately and Completely
    b. Not ignoring any failures, down to the smallest detail.
    c. Process breakdowns are identified
    d. Fixated on how things could fail
    e. Encouragement to report concerns for potential failures.
- BP always has an emergency plan, always emphasized planning.

2. Reluctance to simplify
    a. Complex Problems Get Complex Solutions
    b. Accept the complexity of their reality
    c. Seeking new information that challenges their beliefs

3. Sensitivity to Operations
    a. Every Voice Matters
    b. Best understanding comes from the front-line employees, closer to work than executives
    c. Create conditions that allow people to communicate with them
    d. Taking concerns of employees seriously

4. Commitment to resilience
    a. Anticipating trouble spots
    b. able to identify errors that require correction while at the same time innovating solutions
    c. Ready for emergencies and have clear means of communication and control
    d. Recognize importance of multidisciplinary teams

5. Deference to expertise
    a. Expertise > seniority
    b. High-risk and fast changing circumstances on the ground which require expert analysis
    c. Leaders know who in the organization is an expert

d. Organization creates experts and helps newer members keep up

- Do you think BP, and maybe oil companies (especially those that operate offshore) should adopt an HRO model?

PART III: Think-tank recommendations
Link to original report: http://bmcsr.com/wp-content/uploads/2012/11/Economics.pdf

list by Dr. Sarah Brown of the "British Middle-East Center for Studies & Research":

- Were any of these applied? At least to the best of your knowledge, and how?

1. It is recommended that the organisational structure should become more centralised. This will improve cost efficiency and inject greater consistency into operations.
2. Focus on diversification, branch out into unrelated industries
3. Franchise
4. Developing better, clearer standards and processes for a range of activities in deep-sea drilling from cementing, to testing for leakages, to well control and general risk management.
5. Significantly improving education and training of BP personnel to enhance capability and competency.
6. Focus on company's competitive advantage such as loyalties and market strategy

7. Interview results:
   7.1. Jody Aryoseno (referred to as Mr. Aryoseno in paper)

1 Name	Jody Aryoseno
2 Position, role in BP	Regional finance lead for BP
3 How was BP affected immediately after the incident?	Junior staff at time of accident (entry from 2007), big hit for staff morale, many rumors of potential take-over by competitors circulating among staff.
4 How did the Deepwater incident affect BP, in relation to your role	In finance, a greater emphasis on cost efficiency, cost reductions. Removing inefficiencies, streamlining, and centralizing processes. Involving workforce reductions, finding chances to accumulate cash
5 Follow-up: Wouldn't a top-down structure limit speed/efficiency?	Introduction of OMS (Operating Management System) post-accident. Creating a standardized framework, but still leaving room for local practices which are assessed annually against the OMS. Changes meant to be gradual.
6 Follow up: Were these changes effective?	Yes, shares were stable pre-covid, good balance sheet with good liquidity. Company exceeding expectations despite 2010 incident
7 Did you notice any changes that happened within the company?	Yes, there were some changes in certain levels

8 How has BP changed as a result of COVID?	At his level, no major changes besides working remotely. Similar processes still active. BP had strong remote working capabilities even before the pandemic. Covid accelerated the need to move in a new direction. More emphasis for on the job training.
9 Were the changes done since the Deepwater Horizon useful for the current handling of the pandemic	Yes, the OMS system helps by providing a guideline on what to do in uncertain times, ex: communication segment of OMS
10 Follow up: Do you agree with these changes? How do you feel about these changes?	It's a bold move (BP decision to become a net-zero carbon emission company by 2030). BP must continue to try to create value for customers, regardless of which direction it may take it. Current situation as a 'glimpse' to the possibility of a society which operates using much less carbon fuels. BP strongly incentivized to change since strategy has more or less stayed the same since 2010, but shares have never recovered to pre-2010 levels.
11 Should BP, or other oil companies adopt an HRO model?	Yes, but BP may have already applied such concepts but in different forms. Especially in the form of the OMS, these concepts were reinforced after the Deepwater incident
12 Recommendations from Brown (appendix 5)	**Yes** **Yes**, this is shown by our current changes **Yes**, but not for major operations **Yes** **Yes** **Yes**, as exemplified by sell-off of petrochemical business to INEOS

7.2. BP Indonesia employee in downstream segment/ oil trading #1

1 Name	*Request to remain anonymous
2 Position, role in BP	Member of BP trading and shipping team, handling sales and marketing of business
3 Has there been any other incidents at BP between Deepwater incident and current COVID pandemic?	Yes, constant crisis's such as price declines, as well as governmental issues such as not issuing permits on time. A need to maintain relations with government which is delicate
4 How did the Deepwater incident affect BP*, in relation to your role	Deepwater incident not taken as a direct issue to the company, although industry-wide, accident was a 'wake-up' call to double down on safety procedures. Lessons from Deepwater incident taken by entire industry.
5 Did you notice any changes that happened within the company?	No affect, at least on employees' duties, no influence on trading.
6 How has BP changed as a result of COVID?	Covid crisis has hit BP in a period of transition, prepared management (many past experiences of price decline). Operationally, BP must pay attention to government regulations.

7 Were the changes done since the Deepwater Horizon useful for the current handling of the pandemic	After incident, financial institutions lost confidence in BP's ability to pay. Therefore, BP has had to pursue different methods to cope, such as not issuing letters of credits and attempting to build back trust.
8 Follow-up: How has the current initiative pursued by BP affected your role within the company?	Not much affect to trading and shipping. Although oil & gas will remain a vital segment of BP's earnings as a 'fuel' for the planned changes. BP now more focused on specific tasks, efficiency and reducing redundancies through methods such as reducing segregation of roles and unifying roles. Major changes in the world anticipated such as the UK banning sales of petrol and diesel vehicles by 2030
9 Should BP, or other oil companies adopt an HRO model?	Concept of HRO may already exist in BP in different forms such as 'operational excellence'. Systems are in place to detect issues/errors before the exacerbate, as well as an emphasis on training before posting to positions. Includes previously mentioned OMS
10 Recommendations from Brown (appendix 5)	**Yes** **Yes**, a focus on the energy industry such as shares in numerous downstream industries, committee selects which areas BP will participate in, ensuring alignment with BP strategies **No**, aside from downstream functions such as fuel stations and convenience stores **Yes** **Yes**, emphasis on whistleblowing culture **Yes**, emphasis on identifying customer needs and awareness of external forces such as competitors

Notes:

*: employee not yet employed at BP during Deepwater incident, but was in the industry, at an Indonesian oil firm called Medco Energi.

7.3. BP Indonesia employee in downstream segment/ oil trading #2

1 Name	Request to remain anonymous
2 Position, role in BP	Marketer, 30 years in the company.
3 How was BP affected immediately after the incident?	Massive drop in stock value, more than 50%. Employees also felt this decrease as it was common for employees to own stock of the company. Many stakeholders such as NGOs like Greenpeace became involved which hurt the image, many affected parties encouraged to prosecute. BP sent staff (upstream), on rotation to clean up the spill. CEO changed, from British to a US citizen, perhaps to improve communication between parties. Rapid testing of experimental technology which eventually led to a solution capable to stop the flow of oil.

4 How did the Deepwater incident affect BP, at least in relation to your role	Most significant changes were the increased emphasis on safety. From a trading perspective, these tightened safety regulations even hurt BP's business performance in Indonesia because BP ships were of a higher quality and costed more to purchase, maintain, and operate. The increased safety regulations also hurt business because partner organizations were expected to adhere to our (BP's) standards. Inspectors would be sent to investigate the facilities of our business partners, if they were found lacking then the business deal would be put on hold until safety could be assured. Payment through Letter of Credit (LC) was also strongly avoided since BP was concerned about compatibility of financial institutions unless partner company was strongly reliable. Emphasis on cash-only payments. However, local (and smaller) businesses in Indonesia had trouble with this since they could not afford to pay cash in advance. This situation even led to the closing of BP refineries because they could not make enough earnings. Business partners such as Pertamina (Indonesian state-owned oil company) had trouble following these standards since they were operating on a budget. Cooperation with Pertamina on Joint Venture's involving refineries was also avoided due to fears of safety differences. Increased emphasis on safety goes down to individual level also. Such as periodic safety tests which, if failed, could affect employee performance ratings. Employees were also expected to take driving tests, and BP endorsed the usage of company vehicles which had apparatus such as speed trackers involved, as well as a certified driver.
5 Follow up: how did the mergers in the 2000's affect BP?	Not in many significant ways, since we were the acquiring companies that meant that those companies (Amoco & ARCO) had to comply and adjust to our standards.
6 Did you notice any changes that happened within the company? Were you involved in them?	Standards were mostly set by consultants, with the head office in the UK. We merely executed them, so I was not really involved with these changes.
7 How has BP changed as a result of COVID?	Work from home. BP even ensures that employees have adequate furniture to facilitate working from home, such as comfortable chairs and other office necessities like printers and scanners. These would be delivered to employee homes. Webinars are also held frequently to keep employees connected, these also gave updates on the situation of the pandemic and provide contact with health professionals. Employees feeling unwell will even be helped by BP to find a hospital.
8 Were the changes done since the Deepwater Horizon useful for	Yes. The increased emphasis on safety is similar to the events following the Deepwater incident, so it feels familiar. Only now, there is an increased emphasis on the health factor.

the current handling of the pandemic	
9 Should BP, or other oil companies adopt a HRO model?	Yes. But the HRO principles feel familiar, I believe these are already embodied within BP's commitment to safety. The same can be said for all, if not most of the big oil firms. They are probably executed in different forms.
10 Recommendations from Brown (appendix 4)	**No**, as far as I'm aware BP is still regional, for example the business head for the Asia-Pacific region is in Singapore, so any relevant decisions are decided there. So, decisions are made very quickly, I don't believe this would be possible if BP became more top-down. However, I do see it becoming possible as BP transitions into an energy company and becomes leaner, such as its sale of the petrochemical segment of the company. **Yes**, currently BP is moving strongly in the direction of renewable energies which was mostly untouched before **Yes**, but not in the upstream level, although even for examples such as fuel stations it is a partnership. In Indonesia we are partnering with AKR with a 50-50 share split. **Yes**, although I cannot comment much because this is more on the upstream segment. **Yes**, even since before the accident I believe. BP was known in the industry as a 'school' for traders, if you look at other large oil firms, you'll notice that many of their traders are ex-BP employees. We even offer trading classes for our local partners in Indonesia. **Yes**, since the current strategy is changing, as shown by our transition into an energy company. We are focusing our attention to renewables through actions such as selling our refineries and our stakes at various oil fields.
11 Closing remarks	The period following the Deepwater incident was very well handled by our finance department, which still managed to get bank loans despite the crisis. They ensured banks trust in BP. Overall, BP has done a good job surviving such odds since 2010 and now in the covid pandemic. Despite all, business has gone on smoothly.

7.4. Ferry Mahendra Putra (referred to as Mr. Ferry in paper)

1 Name	Ferry Mahendra Putra
2 Position, role in BP	Marketing, trading & shipping team, from 2016. Dealing with Pertamina as his main customer
3 Has there been any other incidents at BP between Deepwater incident and current COVID pandemic?	Not to my knowledge, the only recent crisis we're having is the covid pandemic
4 How did the Deepwater incident affect BP*, in relation to your role	Deepwater Horizon incident had no direct impact on the company. Although Schlumberger was actually one of the contractors working on the Deepwater rig itself, the company

	was not faulted for anything. In general, the accident provided many lessons learnt for the industry, particularly technical issues around drilling and safety. This prompted the company to update its standards.
5 Did you notice any changes that happened within the company*?	We implemented a new Standard Operating Procedure (SOP) and doubled down on security. We focused on how to improve drilling performance based on lessons from the accident. Before the incident, when conducting business with our clients we merely followed any of their requests. But after the accident, we actually made attempts to request or at least suggest to our customers to follow better safety standards.
6 How has BP changed as a result of COVID?	Driven by the decrease in demand for oil, we have been forced to reducing production costs as much as possible. This involved creating new systems to reduce logistical costs, divesting of less profitable assets and the regrettable but necessary laying off of employees.
7 Were the changes done since the Deepwater Horizon useful for the current handling of the pandemic	Yes, but my ability to comment further is limited since I did not experience firsthand the changes that happened. But I imagine that it helped BP to get ready for crisis situations such as now.
8 Should BP, or other oil companies adopt a HRO model?	Yes, I believe these principles are already existing but in different forms. For example, BP's continued commitment to avoid accidents through strict rules, zero tolerance for mistakes or non-procedural activities. As well as basing course of action from team decisions.
9 Recommendations from Brown (appendix 4)	**Yes**, depends on decision types, risky decisions must be approved by the top, but less important regions can be approved by local managers **Yes**, although BP isn't moving into completely unrelated industries such as automotive or tourism, the current shift into an energy company **Yes**, only in the downstream, upstream franchising is too risky, we have to control the risk **Yes**, safety as a number one concern. Although as a business cost-cutting may be necessary to increase efficiency, no cost-cutting is allowed on safety measures **Yes** **Unknown****

Note:

*: Interviewee was working at Schlumberger at time of incident as a field engineer

**: Miscommunication and inability to follow up led to a gap

7.5. Anonymous President Director of BP Subsidiary

1 Name	Request to remain anonymous
2 Position, role in BP	President Director of a BP subsidiary, VP of sales and Marketing at time of Deepwater incident
3 Has there been any other incidents at BP between Deepwater incident and current COVID pandemic?	None, excluding minor operational incidents. Potential gaps for major crisis have been sorted out.
4 How did the Deepwater incident affect BP*, in relation to your role	Tremendous effects on structuring. BP established a more centralized approach through the establishment of "global organization". These would handle their respective responsibilities such as "Global Project Organization (GPO)", "Global Drilling Organization (GDO)", and "Global Operation Organization (GOO)". Because of this the chain of command was changed, I had to report to the GOO, before the incident I would report to the CFO. Similarly, the shipping manager used to report to me, but following the incident he/she had to report directly to the GOO. All decisions must be signed off by headquarters, engineering authorities and other relevant experts.
5 Did you notice any changes that happened within the company?	Yes, the incident caused a major disruption. Forced BP to look at itself internally, analyzing all procedures, identifying gaps. If assets or holdings are deemed dangerous to operate then they are sold off. If we cannot fix it we'll get rid of it. Overall, tolerance to unsafe operations has become zero.
6 How has BP changed as a result of COVID?	In terms of the industry as a whole, there has been a greater push for consolidation due to the difficult environment. Increasing standards which exists. Company's goal is to increase value for shareholders, so unnecessary risk must be avoided. Actually, pushed up BP's operational costs. No more discussions such as "if we do this, we can get a bit more profit".
Follow up: In what ways does a commitment to safety increase prices?	Upgrading to the newest equipment, creating a 'gold standard' for everything. Ex: swapping out equipment that may even have a longer useful life. Training costs
8 Were the changes done since the Deepwater Horizon useful for the current handling of the pandemic	Yes, helps to have no more major incidents. Means that there are no more interruptions to our operations. Smooth operations lead to operational efficiency. BP's constant paranoia to prevent accidents have readied the company for when something bad happened. Companies with balance sheets not as strong as BP may not be able to afford such costs
9 Should BP, or other oil companies adopt a HRO model?	Yes, exists under different names. It's a necessity
10 Recommendations from Brown (appendix 4)	**Yes**, centralization in terms of standards. **Yes**, currently happening **Yes**, but only in the downstream **Yes**, **Yes**,

	Yes,

7.6. Josmar Parhusip (referred to as Mr. Parhusip)

1 Name	Josmar Parhusip
2 Position, role in BP	Operation drilling manager
3 Has there been any other incidents at BP between Deepwater incident and current COVID pandemic?	No, nothing of that scale
4 How did the Deepwater incident affect BP*, in relation to your role	I was senior staff drilling engineer at Baku, Azerbaijan at time of accident. It created a massive decline in stocks. After the accident, BP formed a special team to go through the accident and update our policies. They formed a new organization called SNOR (Safety and Operational Risk). On a day-to-day level, BP became very conservative following the incident, the updates to safety slowed down our decision making. I had to request my superior for permission, and he had to check his superior. Another example was the new rules to have personnel physically sign a document to approve activities, in order to ensure accountability. This created a lot of fear and hesitation because employees could be taken to court with that as evidence if an accident occurred.
5 Follow up: How did you feel about the changes which were implemented?	Essentially, a company must be able to control risks. As a result of the accident, tasks felt constrictive because we had to get approval from HQ's in Houston and London. This chain of command overruled regional knowledge, so we felt that our knowledge was useless. But after a year (once publicity had died down a bit), we could contest some of the changes that we felt were excessive. But personally, I felt that it was necessary because BP had to reassure its investors and spectators that we have things under control.
6 Did you notice any changes that happened within the company*? Were you involved in these changes?	Guidelines existed in BP, which were then revised by select people. I was one member of a team. Essentially, they selected representatives from around the world which was deemed knowledgeable in that process/operation. We also invited members from around the world to share knowledge of practices, 'general practice'.
7 How has BP changed as a result of COVID?	Covid and Deepwater not entirely comparable. The result of the Deepwater incident was that BP significantly tightened the top-down control, creating a uniform standard. However, for covid the response is more region centered, these are based on local assessments, such as making sure we are in compliance with government rules/directives. BP has also become smaller because of the covid crisis since we divested underperforming assets in our transition to

	renewables. This on top of using our oil & gas operations as a source of funding for the transition.
8 Were the changes done since the Deepwater Horizon useful for the current handling of the pandemic	May not be a fair comparison because in some ways, the covid crisis has affected BP in ways which were even more damaging than the Deepwater incident, such as causing a decline in oil prices. However, BP's experience of going through several tough incidents such as the Deepwater incident has definitely helped the company ready itself for periods of trouble.
9 Follow up: How do you feel about the current changes? Are they feasible?	BP is very good in mergers and acquisitions; we have many experiences in this regard such as the mergers with Amoco and Atlantic Richfield Corporation (ARCO). If BP wants to undertake such a daring project to become an energy company heavily based on renewables, I think BP will use mergers to gain entry into the industry, we will not start from scratch. The strategy is there and is supported by many people. But there are issues in profitability since renewables have much smaller profit margins compared to oil & gas. So, what is the next step for BP? Will they decide to branch out into becoming a distributor/utilities company? BP needs to prepare a long-term strategy.
10 Should BP, or other oil companies adopt a HRO model?	Yes. I believe that BP has striven for these goals, the terms discussed by the HRO concept is very familiar to me.
11 Recommendations from Brown (appendix 4)	**Yes**, in some ways we definitely became more centralized. But the current covid situation depends on a regional response **Yes**, the current transition into an energy company is a perfect example of this **Yes**, nothing beyond the downstream section of our company (fuel stations and convenience stores) **Yes**, this was definitely done after the accident, especially because I experienced these changes first-hand as a member of the drilling team **Yes**, **Yes**, we are currently changing our market strategy and transitioning into an energy company.